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Chronic obstructive pulmonary disease (COPD), associated comorbidities and risk factors

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People with chronic obstructive pulmonary disease (COPD) often have other chronic diseases and long-term conditions. These are referred to as 'comorbidities'—two or more health problems that are present at the same time. Comorbidities are typically more common in older age groups.

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Findings from this report:

- 55% of people aged 45 and over with COPD also had arthritis.
- Adults aged 45 and over with COPD were 2.1 times as likely to be a current daily smoker as adults without COPD
- 90% of Australians aged 45 and over with COPD had at least one other chronic condition in 2017–18
- At least 40% aged 45 and over with COPD had at least one of asthma, mental and behavioural conditions or back problems

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About COPD and associated comorbidities

Comorbidity

People with chronic obstructive pulmonary disease (COPD) often have other chronic diseases and long-term conditions. These are referred to as **comorbidities**—two or more health problems present at the same time. Comorbidities often share common risk factors, and are increasingly seen as acting together to determine the health outcome.

Australians diagnosed with one or more chronic conditions often have complex health needs, die prematurely and have poorer overall quality of life [1]. In terms of comorbidities, in 2017–18 one in five Australians (20%) had two or more chronic conditions [2]. As people age, they are more likely to have more than one chronic condition. Because COPD is more likely to occur in older people, people with COPD also commonly experience a range of other chronic conditions [3, 4, 5]. These comorbidities contribute to ill health and risk of death in all stages of COPD, and the incidence of hospitalisation for non-respiratory causes is increased in patients with COPD [5, 6]. As well, when people are admitted for non-respiratory causes, they have a longer length of hospital stay and are more likely to die if they also have COPD [7].

The chronic conditions that have been selected for this COPD comorbidity analysis are: arthritis, asthma, back problems, cancer, diabetes, heart, stroke and vascular disease, kidney disease, mental and behavioural conditions and osteoporosis. They have been selected because they are common in the general community and cause significant burden. Other chronic conditions that are found commonly in people with COPD, and that can impact on COPD, include bronchiectasis and obstructive sleep apnoea [8]. COPD is also associated with an increased risk of lung cancer and gastro-oesophageal reflux disease (GORD) [8].

Having a history of asthma is a major risk factor for being given a diagnosis of COPD, particularly for smokers [9, 10]. 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 [11] (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 [12]. The National Asthma Council Australia and Lung Foundation recently released an information paper on Asthma-COPD overlap, which includes recommendations for the treatment and management of the condition [12].

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 [13]. 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 [13]. The Action Plan acknowledges as with most chronic conditions, lung disease may co-exist with other common chronic conditions. The Action Plan addresses these comorbidities when clinically relevant to a patient living with lung condition(s) [13]. For more information, see National Strategic Action Plan for Lung Conditions.

Treatment and management

Comorbidities can complicate management options and multiply the effects of chronic conditions [9, 14]. Physicians may need to prescribe medications for one condition that may exacerbate another existing comorbid condition. For example, some bronchodilator medications prescribed for COPD may worsen glaucoma (increased pressure in the eyes), or can cause urinary problems in men with an enlarged prostate. Use of steroid tablets for COPD exacerbations (or flare-ups) may contribute to weakening of the bones (osteoporosis).

COPD has a high rate of comorbidity with cardiovascular disease (CVD) [15]. Beta-blocker medications are recommended for management of acute coronary syndromes, cardiac failure and sometimes for irregular heartbeat and hypertension. However, these medications can cause severe flare-ups in people with asthma and so have frequently been withheld from people with COPD. Despite this, recent evidence suggests that beta-blockers may be safe and helpful for managing COPD [16], though the COPD-X Plan states that despite a paucity of evidence to suggest harm, beta-blockers are still under-utilised in COPD for guideline-based indications such as systolic heart failure [8].

Establishing a better understanding of the common comorbidities of COPD may help with the diagnosis of comorbid conditions. For example, coronary artery disease is common in patients with COPD and is underdiagnosed [17]. Optimal management of any individual patient with COPD should include identification and management of comorbidities and anticipation of increased risks associated with those comorbidities in the presence of COPD [8].

Prevention and diagnosis can be improved by a better understanding of risk factors for the development of COPD. Tobacco smoking, air pollution, poor nutrition and serious childhood lung infections are all known risk factors for developing COPD [8] (more information on risk factors can be found in the section Risk factors associated with COPD):

Treatment strategies that target modifiable behaviours can be used to manage various chronic diseases, for example, diet, exercise, weight control, and smoking cessation or reduction [18]. Smoking cessation is the most important intervention to prevent the worsening of COPD [8].

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COPD and associated comorbidities

Number of comorbid chronic conditions in people with COPD

Based on self-reported data from the 2017–18 National Health Survey (NHS), an estimated 599,000 Australians (2.5% of the population) have COPD, many of who are aged 45 and over [1]. Eighty six per cent of people who had COPD also had one or more of the following selected chronic conditions [1]:

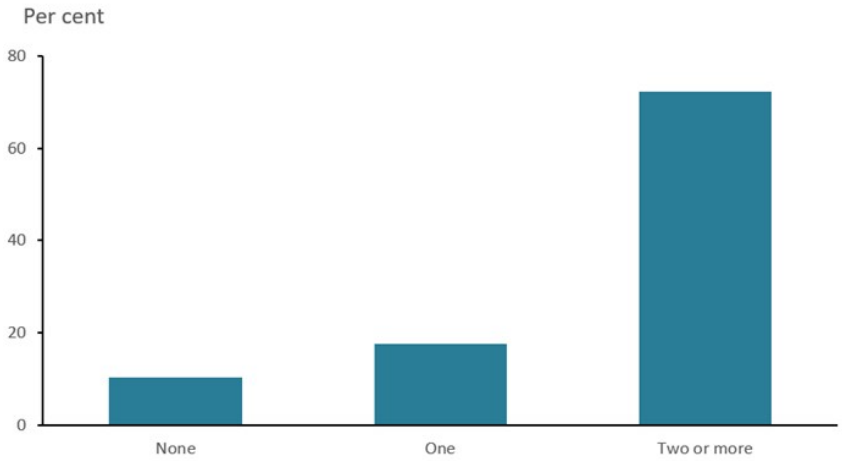
- arthritis
- asthma
- back problems
- cancer
- diabetes
- heart, stroke and vascular disease
- kidney disease
- mental and behavioural conditions
- osteoporosis.

These 9 chronic conditions have been selected because they are common in the general community, pose significant health problems, have been the focus of ongoing national surveillance efforts, and action can be taken to prevent their occurrence [2, 3].

Additional chronic conditions that are commonly found in people with COPD, and that can impact on COPD, include bronchiectasis (a condition in which the airway walls are damaged and the person has excessive mucus production and frequent chest infections) and obstructive sleep apnoea [4].

Of those aged 45 and over who had COPD, 90% had at least one other chronic condition while just 10% had COPD and no other selected chronic conditions (Figure 1). Nearly 1 in 5 (18%) had one other selected chronic condition and over 2 in 3 (72%) had two or more other selected chronic conditions.

Figure 1: Comorbidity of selected chronic conditions in people aged 45 and over with COPD, 2017–18



Note: The 9 other selected chronic conditions include arthritis, asthma, back problems, cancer, diabetes, heart, stroke and vascular disease, kidney disease, mental and behavioural conditions and osteoporosis.

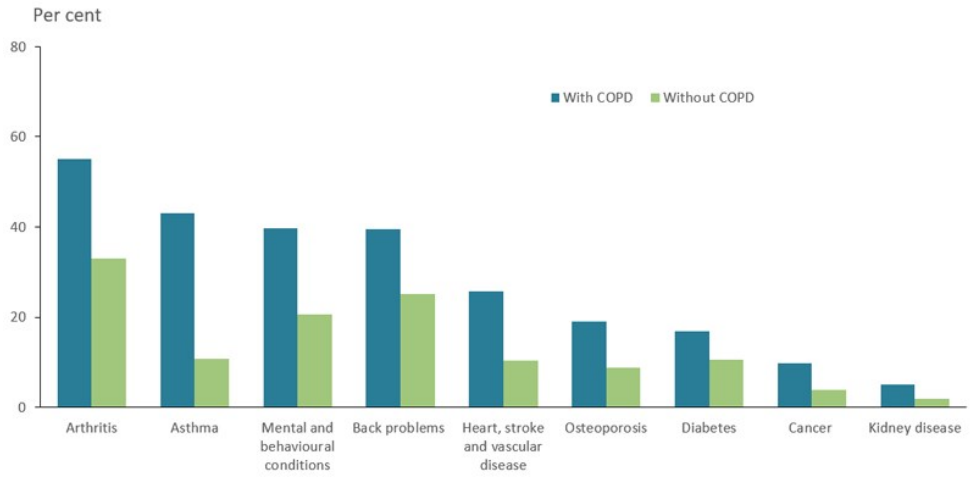
Source: AIHW analysis of ABS 2019 [5] (Data table).

Types of comorbid chronic conditions in people with COPD

Among people aged 45 and over with COPD:

- 55% had arthritis (compared with 33% for people without COPD)
- 43% had asthma (compared with 11% for people without COPD)
- 40% had mental and behavioural conditions (compared with 21% of people without COPD)
- 40% had back problems (compared with 25% for people without COPD)
- 26% had heart, stroke and vascular disease (compared with 10% of people without COPD) (Figure 2).

Figure 2: Prevalence of other chronic conditions in people aged 45 and over with and without COPD, 2017–18



Notes

1. Proportions do not total 100% as one person may have more than one additional diagnosis.
2. COPD here refers to self-reported current and long-term bronchitis and/or emphysema.

Source: AIHW analysis of ABS 2019 [5] (Data table).

Data notes

The comorbidity data presented here are based on self-reported data from the Australian Bureau of Statistics National Health Survey (NHS). When interpreting self-reported data, it is important to recognise that because we rely on respondents providing accurate information, the outputs may not always be a true reflection of the situation.
Please note that for some analyses there are wide confidence intervals. These should be taken into account when interpreting these data.

In the 2017–18 NHS, the number and proportion of persons with long-term health conditions is presented as those who have 'a current medical condition which has lasted, or is expected to last, for 6 months or more, unless otherwise stated' [1]. For the conditions arthritis, asthma, cancer, heart, stroke and vascular disease (HSVD), diabetes, kidney disease and mental and behavioural conditions, the estimates are based on: persons who reported having been told by a doctor or nurse that they had the condition/s whether they reported that their condition was current and long-term; that is, their condition was current at the time of interview and had lasted, or was expected to last, 6 months or more.

For HSVD and diabetes, estimates also included persons who reported they had the conditions, but that these conditions were not current and long-term at the time of interview.

The conditions data collected for back problems and COPD are 'as reported' by respondents and do not necessarily represent conditions as medically diagnosed. However, as the data relate to conditions which had lasted, or were expected to last, for six months or more, there is considered to be a reasonable likelihood that medical diagnoses would have been made in most cases. The degree to which conditions have been medically diagnosed is likely to differ across condition types. See the National Health Survey: Users' Guide, 2017–18 [3] for more information.

In order to focus on comorbidity by COPD status, this report did not adjust for age-structure when comparing people with self-reported COPD and those without. It is possible that within the same age-group, those with COPD are older on average than those without, which would make the former more likely to have comorbidity due to older age. For more information on age-standardised prevalence of comorbidity with and without COPD, please see the Data table. Note that when age-standardised prevalence was examined, the difference between those aged 45 and over with COPD who had kidney disease compared to those without COPD who had kidney disease became non-significant.

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Risk factors associated with COPD

COPD shares a number of risk factors with other chronic diseases, such as:

Non-modifiable risk factors

- age (COPD is more common as people age)
- genetic predisposition.

Modifiable risk factors

- smoking or exposure to environmental tobacco smoke (including in childhood)
- exposure to fumes and smoke from carbon-based cooking and heating fuels, such as charcoal and gas
- occupational hazards (for example, exposure to pollutants and chemicals)
- poor nutrition
- pneumonia or childhood respiratory infection.

In people with COPD, risk factors for poor health outcomes such as worsening symptoms, exacerbations (flare-ups) and increased risk of death include [1]:

- smoking and exposure to environmental tobacco smoke
- influenza and pneumococcal infection
- malnutrition/obesity
- insufficient physical activity
- presence of comorbidities
- cold weather.

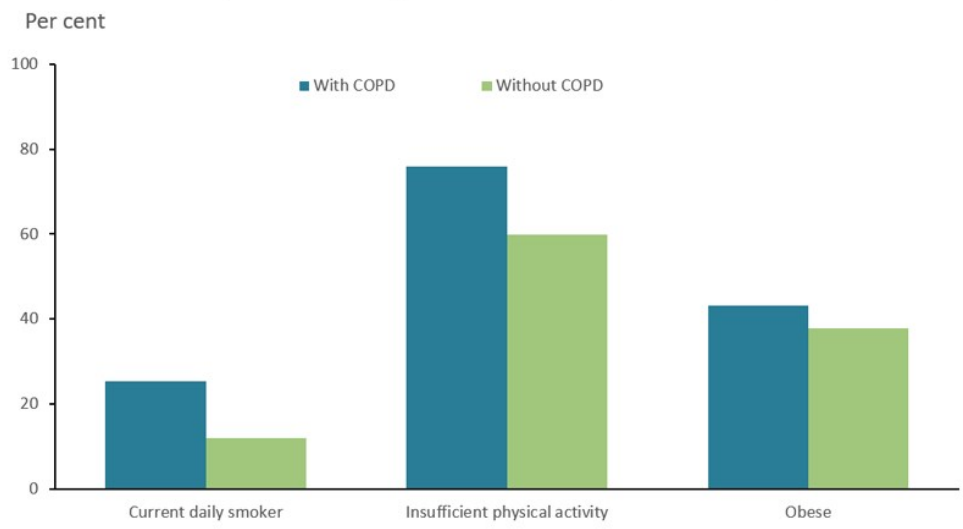
For COPD, as for many other chronic conditions, there are two types of risk factors: those that increase the chance of developing COPD in the first place, and those that increase the chance that a person who already has COPD will develop additional health problems. Risk factors also vary according to the person's age.

Finding a factor that is associated with an increased risk of developing COPD, or an increased risk of poor health outcomes in COPD, does not necessarily mean that the risk factor caused these problems, or that they can be prevented. However, there is overwhelming evidence that smoking and exposure to biomass fuels are major causes of COPD.

Common risk factors

Based on the 2017–18 National Health Survey (NHS), people with self-reported COPD aged 45 and over were more likely to be current daily smokers and insufficiently physically active, compared with those without COPD aged 45 and over (see Figure 1). Risk factor definitions are included in Box 1. These risk factors are also common among other chronic conditions [2].

Figure 1: Prevalence of risk factors in people aged 45 and over with and without COPD, 2017–18



Note: Overweight and obese are based on Body Mass Index (BMI) for persons whose height and weight was measured and imputed. In 2017–18, 33.8% of respondents aged 18 years and over did not have a measured BMI. For these respondents, imputation was used to obtain BMI. For more information see Appendix 2: Physical measurements in the 2017–18 National Health Survey [2].

Source: AIHW analysis of ABS 2019 [3] (Data table).

Selected risk factors

Smoker status

People with COPD aged 45 and over were more likely to be current daily or ex-smokers, with:

- 25% being a current daily smoker (compared with 12% without COPD aged 45 and over)
- 47% being an ex-smoker (compared with 38% without COPD aged 45 and over) (Figure 2).

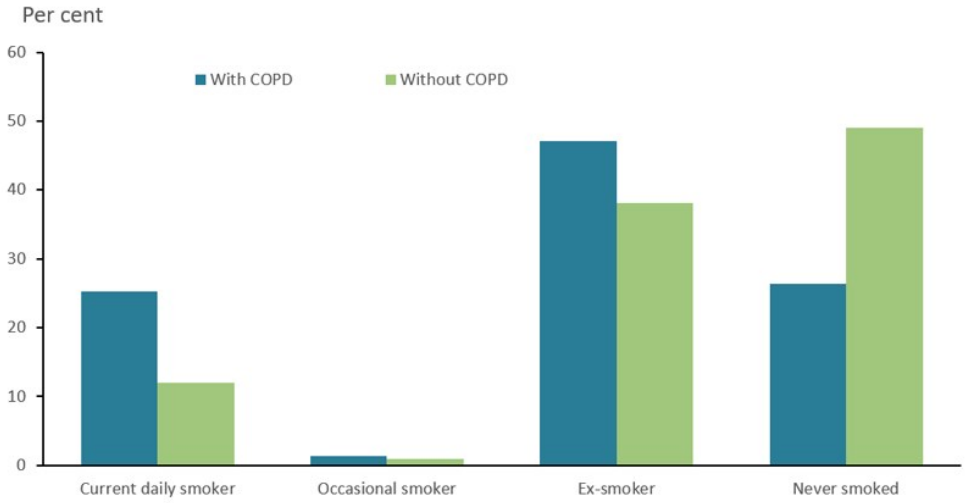
It is worth noting that one quarter (26%) of people aged 45 and over with COPD had never smoked cigarettes.

Tobacco smoking is one of the leading behavioural risk factors for death from all causes and contributes significantly to deaths from a range of chronic conditions (including CVD, COPD and lung cancer). Tobacco smoking is the predominant cause of COPD and is associated with a majority of COPD cases [4]. Lifelong smokers have a 50% probability of developing COPD during their lifetime [5].

Once COPD has developed, continued smoking increases the risk of exacerbations (flare-ups) and the risk of death, not only from COPD but also from other causes, such as cancer and CVD. While the damage from past smoking is not fully reversible, the rate of progression of COPD can be reduced through smoking cessation [5]. Quitting smoking also reduces the risk of exacerbations and mortality in patients with COPD [6, 7].

General Practitioners play an important role in encouraging and supporting people to quit smoking, especially when they have health problems caused or exacerbated by smoking, which are more common with age [8]. In Australia, smoking rates have been falling amongst males since the 1950s (1970s in women) [9], and recent studies have shown that smoke free laws, tobacco price increases and mass media campaigns have all contributed to a continuing decline in smoking rates, including among young people [10].

Figure 2: Smoker status of people aged 45 and over with and without COPD, 2017–18



Source: AIHW analysis of ABS 2019 [3] (Data table).

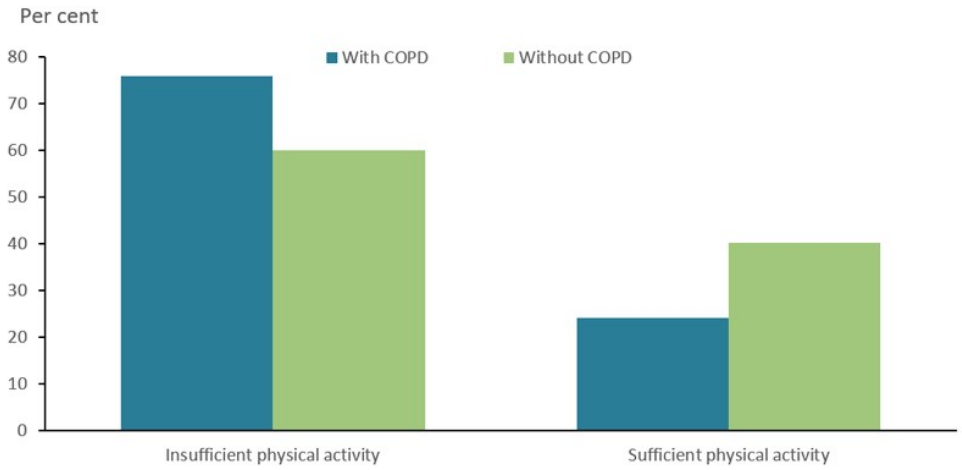
Physical activity

People with self-reported COPD aged 45 and over were more likely than people without COPD aged 45 and over to be insufficiently physically active (76% compared with 60% for people without COPD) (Figure 3).

One of the main features of COPD is shortness of breath on exertion. As the condition progresses, shortness of breath can worsen and even minor physical activities, such as dressing or showering can become very difficult. People with COPD therefore are often unable to exercise as much as those without COPD, or they may limit their physical activity to avoid becoming short of breath. However, low physical activity in turn leads to lack of cardiovascular fitness, increased risk of cardiovascular disease, and obesity, each of which may further worsen shortness of breath.

Exercise-based pulmonary rehabilitation is an important part of management of COPD, as it improves quality of life and exercise capacity and reduces hospitalisations. It is recommended for all patients with COPD, especially those with exercise limitations. 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 [11]. For more information regarding pulmonary rehabilitation, refer to Monitoring pulmonary rehabilitation and long-term oxygen therapy for people with chronic obstructive pulmonary disease (COPD).

Figure 3: Physical activity in people aged 45 and over with and without COPD, 2017–18



Source: AIHW analysis of ABS 2019 [3] (Data table).

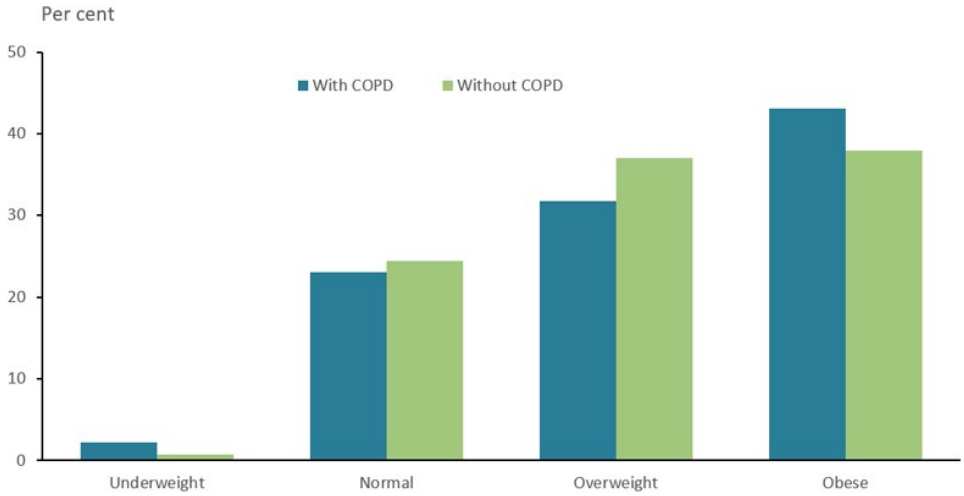
Body mass

People with self-reported COPD aged 45 and over were not significantly more likely to be obese compared with people without COPD (43% with COPD compared with 38% without COPD) (Figure 4).

Several studies have shown strong associations between overweight and obesity, as measured by BMI, and increased prevalence of COPD [12]. This is not surprising, as the prevalence of both COPD and obesity increase with increasing age. There is little evidence that high BMI increases the risk of developing COPD. However, obesity is a risk factor for dyspnoea (or shortness of breath), which may contribute to symptoms of COPD and may also reduce lung function.

For patients who already have COPD, many studies have shown that mild obesity appears to be protective from risk of death, unlike many other chronic diseases in which increased body weight is associated with worse outcomes. Being underweight or average weight is associated with increased risk of dying for people with COPD [13]. The relationship between low BMI and increased mortality is particularly seen in patients with more severe COPD, of whom around 14% experience substantial weight loss and reduced fat-free mass [13]. This may be due to systemic inflammation associated with COPD, leading to muscle wasting [12]. Reduced micronutrient intake may also contribute to increased risk [13].

Figure 4: Proportion of people aged 45 and over with and without COPD by BMI, 2017–18



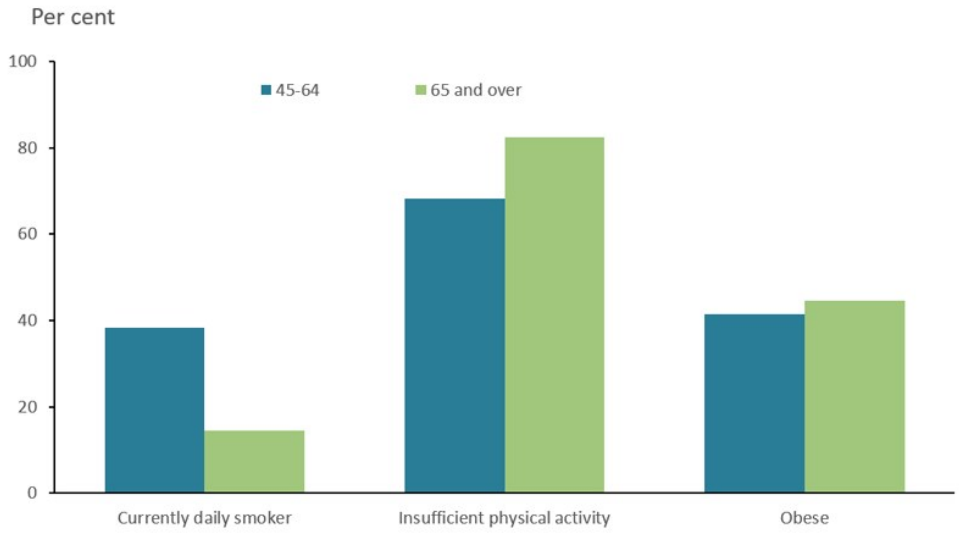
Note: Based on BMI for persons whose height and weight was measured and imputed. In 2017–18, 33.8% of respondents aged 18 years and over did not have a measured BMI. For these respondents, imputation was used to obtain BMI. For more information see Appendix 2: Physical measurements in the 2017–18 National Health Survey [2].

Source: AIHW analysis of ABS 2019 [3] (Data table).

Age differences in risk factors in people with COPD

People with COPD aged 45–64 were more likely to be a current daily smoker (38%) compared with those aged 65 and over (14%) and were less likely to be insufficiently physically active (68%) compared with people with COPD aged 65 years and over (82%). The difference in obesity between the two age groups was not statistically significant (Figure 5).

Figure 5: Prevalence of risk factors in people aged 45 and over with COPD, by age group, 2017–18



Note: Overweight and obese are based on BMI for persons whose height and weight was measured and imputed. In 2017–18, 33.8% of respondents aged 18 years and over did not have a measured BMI. For these respondents, imputation was used to obtain BMI. For more information see Appendix 2: Physical measurements in the 2017–18 National Health Survey [2].

Source: AIHW analysis of ABS 2019 [3] (Data table).

Data notes

This analysis is based on data only for people aged 45 and over. This age group was selected because the development of COPD occurs over many years and therefore mainly affects older people, and positive responses to the questions about 'bronchitis and/or emphysema' in the National Health Survey (NHS) from younger people are more likely to include more cases of acute bronchitis or asthma than COPD itself.

Please note that for some analyses there are wide confidence intervals. These should be taken into account when interpreting these data.

The risk factor data presented here were obtained at one point in time, based on self-reported data from the NHS (with the exception of BMI, which was measured). When interpreting self-reported data, it is important to recognise that it relies on respondents providing accurate information.

It is not possible to attribute cause and effect to self-reported risk factors (and measured) and COPD. Risk factors present at the time of the survey may or may not have contributed to the presence of COPD. Similarly, the presence of COPD may not be directly related to the number of risk factors a person has.

The risk factor definitions used in the ABS 2017–18 National Health Survey are described below in Box 1.

Box 1: Definitions for risk factors in the National Health Survey

Smoker status

Refers to the frequency of smoking of tobacco, including manufactured (packet) cigarettes, roll-your-own cigarettes, cigars and pipes, but excluding chewing tobacco, electronic cigarettes (and similar) and smoking of non-tobacco products. Categorised as:

Current daily smoker	A respondent who reported at the time of interview that they regularly smoked one or more cigarettes, cigars or pipes per day.
Current smoker – Other (occasional)	A respondent who reported at the time of interview that they smoked cigarettes, cigars or pipes, less frequently than daily.
Ex-smoker	A respondent who reported that they did not currently smoke, but had regularly smoked daily, or had smoked at least 100 cigarettes, or smoked pipes, cigars, etc at least 20 times in their lifetime; and
Never smoked	A respondent who reported they had never regularly smoked daily, and had smoked less than 100 cigarettes in their lifetime and had smoked pipes, cigars, etc less than 20 times.

Source: ABS 2018. National Health Survey: Glossary, 2017–18 [14].

Physical activity

Australia's Physical Activity and Sedentary Behaviour Guidelines (the Guidelines) are a set of recommendations outlining the minimum levels of physical activity required for health benefits, as well as the maximum amount of time one should spend on sedentary behaviours to achieve optimal health outcomes [15]. Please see the Physical activity web topic page for more information.

In 2017–18, the ABS National Health Survey collected information for the first time on physical activity at work. Therefore all results for adults include physical activity at work.

Based on the guidelines, insufficient physical activity is defined as:

- Adults aged 18–64 who did not complete 150 minutes of moderate to vigorous physical activity across 5 or more days in the last week
- Adults aged 65 and over who did not complete at least 30 minutes of physical activity per day on 5 or more days in the last week.

For the purpose of calculating activity time, vigorous activity time is multiplied by a factor of two.

Muscle strengthening activities are not included in this analysis.

Source: AIHW 2019. Insufficient physical activity web report [16].

Body mass index

Body Mass Index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, normal weight, overweight and obesity. It is calculated from height and weight information, using the formula weight (kg) divided by the square of height (m). To produce a measure of the prevalence of underweight, normal weight, overweight or obesity in adults, BMI values are grouped according to the table below.

Category	Range
Underweight	Less than 18.50
Normal range	18.50 — 24.99
Overweight	25.00 — 29.99
Obese I	30.00 — 34.99
Obesity class II	35.00 — 39.99
Obesity class III	40.00 or more

In 2017–18, 33.8% of respondents aged 18 years and over did not have a measured BMI. For these respondents, imputation was used to obtain BMI [16].

Sources: ABS 2018. National Health Survey: Glossary, 2017–18 [14]; ABS 2019. National Health Survey: Users' Guide, 2017–18 [17].

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Data

- Data tables: COPD, associated comorbidities and risk factors
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