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

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## Citation

**AIHW**

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People with chronic obstructive pulmonary disease (COPD) often have other chronic and long-term conditions. This is called 'comorbidity', which describes any additional disease that is experienced by a person with a disease of interest (the index disease). Comorbidities are typically more common in older age groups.

**Cat. no:** ACM 40

**Findings from this report:**

- 55% of people aged 45 and over with COPD also had arthritis

- 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

- Adults aged 45 and over with COPD were 2.1 times as likely to be a current daily smoker as adults without COPD

# About COPD and associated comorbidities

## Comorbidity

People with chronic obstructive pulmonary disease (COPD) often have other chronic and long-term conditions. This is called '**comorbidity**', which describes any additional disease that is experienced by a person with a disease of interest (the index disease). 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 (AIHW 2018). In terms of comorbidities, in 2017–18 one in five Australians (20%) had two or more chronic conditions (ABS 2018). 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 (Chatlia et al. 2008; Divo et al. 2012). 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 (Franssen & Rochester 2014). 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 (Holguin et al. 2005).

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 COPD, include bronchiectasis and obstructive sleep apnoea (Lung Foundation Australia & the Thoracic Society of Australia and New Zealand 2019). COPD is also associated with an increased risk of lung cancer and gastro-oesophageal reflux disease (GORD) (Lung Foundation Australia & the Thoracic Society of Australia and New Zealand 2019).

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' (Department of Health 2019). 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' (Department of Health 2019). 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) (Department of Health 2019). 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 (Van der Molen 2010). 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) (AIHW 2019).

COPD has a high rate of comorbidity with cardiovascular disease (CVD) (Bhatt et al. 2014). 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 (AIHW 2019). Despite this, recent evidence suggests that beta-blockers may be safe and helpful for managing COPD (Bhatt et al. 2016), 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 (Lung Foundation Australia & the Thoracic Society of Australia and New Zealand 2019).

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 (Reed et al. 2012). 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 (Lung Foundation Australia & the Thoracic Society of Australia and New Zealand 2019).

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 (Lung Foundation Australia & the Thoracic Society of Australia and New Zealand 2019). 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 (Bauer et al. 2014). Smoking cessation is the most important intervention to prevent the worsening of COPD (Lung Foundation Australia & the Thoracic Society of Australia and New Zealand 2019).

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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 (ABS 2018a). While COPD 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. The 2017–18 NHS estimates that 464,000 (4.8%) Australians aged 45 and over had COPD (ABS 2019). Eighty six per cent of people who had COPD also had one or more of the following selected chronic conditions (ABS 2018a):
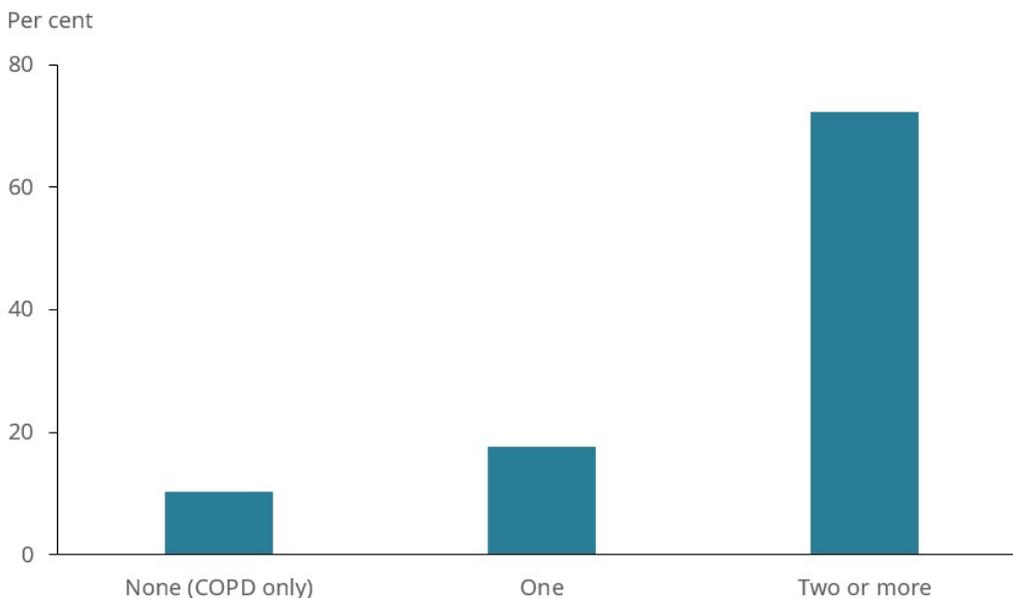
- arthritis
- asthma
- back problems
- cancer
- diabetes
- heart, stroke and vascular disease
- kidney disease
- mental and behavioural conditions
- osteoporosis.

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 (AIHW 2013; AIHW 2015).

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 (Lung Foundation Australia & the Thoracic Society of Australia and New Zealand 2019).

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.
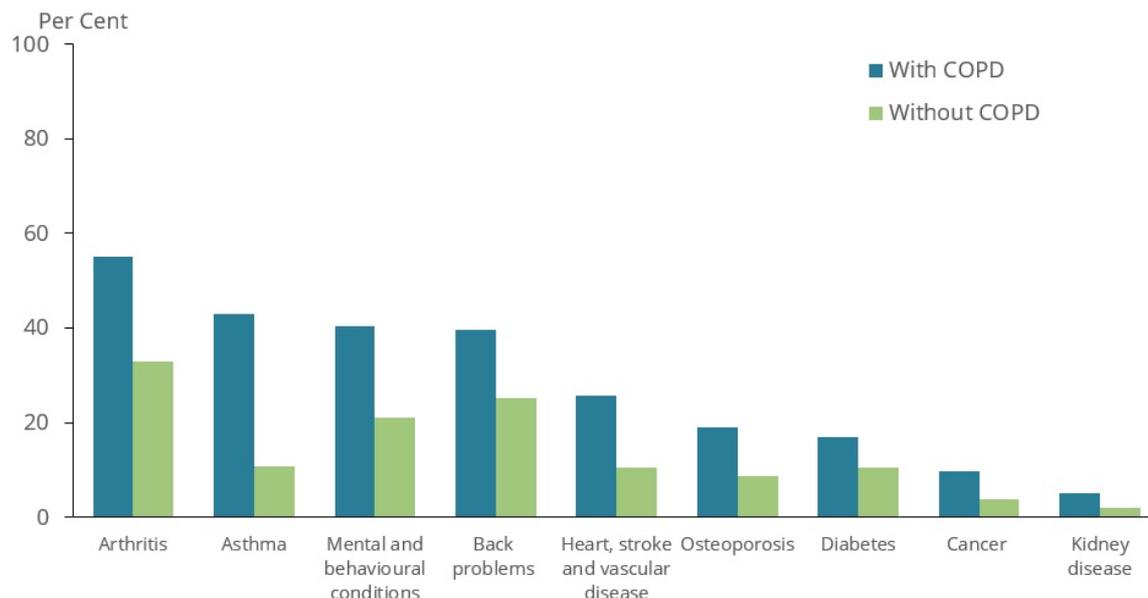
*Source:* ABS 2019 (Data table).

## 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)
- 41% 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. COPD here refers to self-reported current and long-term bronchitis and/or emphysema.
2. Proportions may not add to 100% as a person may have more than one additional diagnosis.

*Source:* ABS 2019 (Data table).

## Data notes

The National Health Survey (NHS) uses three factors to determine whether or not a person is counted as having a particular condition: whether the condition is current, whether it is long term and whether it was medically diagnosed. The combination of these factors required for a person to count as having the condition varies according to the nature of the condition. For example, some conditions, such as diabetes and HSVD, once diagnosed, are seen to be lifelong. Even if a person no longer reports symptoms, they still count as having the condition. While other conditions, such as depression, asthma, cancer or back problems, can be lifelong, episodic or in complete remission.

Most conditions do not need the respondent to have been diagnosed by a doctor or nurse. The respondent is counted if they said they have the condition. However, in cases where the respondent said they had diabetes or HSVD and that the condition was not current, they need to have received a diagnosis to be counted.

Table 1: Definitions used for chronic conditions

| Condition | Current | Long term | Has the condition been diagnosed by a doctor or nurse? |
|---|---|---|---|
| Arthritis | current | long term | no diagnosis required |
| Asthma | current | long term | no diagnosis required |
| Back problems | current | long term | no diagnosis required |
| Cancer | current | long term | no diagnosis required |
| COPD | current | long term | no diagnosis required |
| Diabetes | current | long term | no diagnosis required |
| (2 combinations) | ever had | not long term | diagnosis required |
| Heart, stroke and vascular disease (HSVD) | current | long term | no diagnosis required |
| (2 combinations) | ever had | not long term | diagnosis required |
| Kidney disease | current | long term | no diagnosis required |
| Mental and behavioural conditions | current | long term | no diagnosis required |

| Osteoporosis | current | long term | no diagnosis required |
|---|---|---|---|

*Note:* Please see the 2017-18 NHS User Guide for more information on the definitions of the conditions.

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# Risk factors associated with COPD

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

- Non-modifiable risk factors
  - age (COPD is more common as people age)
  - genetic predisposition (AIHW 2019)
- 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 (f example, exposure to pollutants and chemicals)
  - poor nutrition
  - pneumonia or childhood respiratory infection (AIHW 2019).

In people with COPD, risk factors for poor health outcomes such as worsening symptoms, exacerbations (flare-ups) and increased risk of death include (Lung Foundation Australia & the Thoracic Society of Australia and New Zealand 2019):

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

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 (AIHW 2019).

## 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 (under Data notes). These risk factors are also common among other chronic conditions (ABS 2018a).

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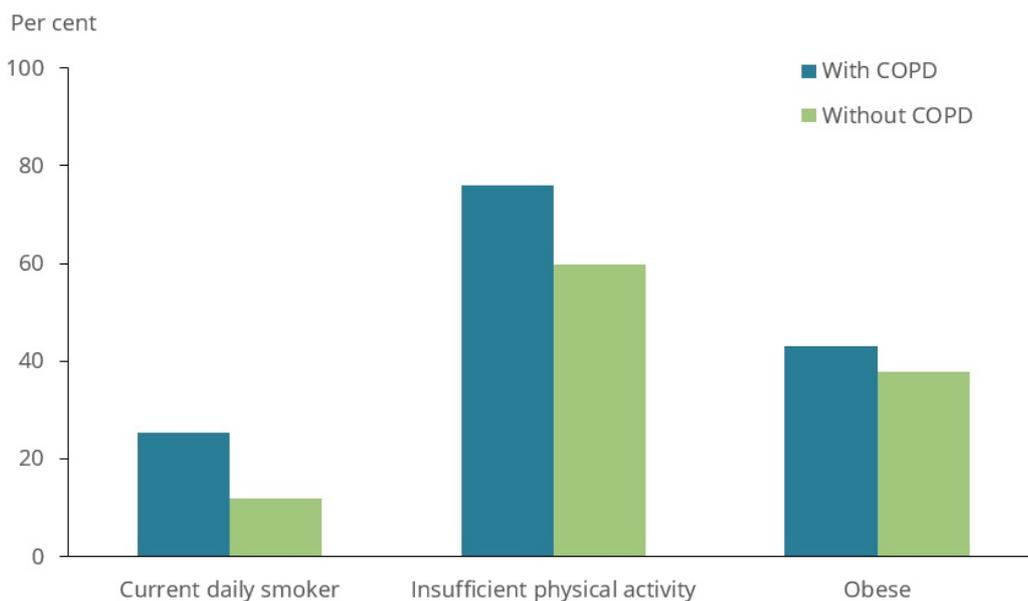


*Note:* Obese is based on body mass index (BMI) for persons whose height and weight was measured and imputed. In 2017–18, 33.8% of respondents aged 18 years and over did not have a measured BMI. For these respondents, imputation was used to obtain BMI. For more information, see Appendix 2: Physical measurements in the 2017–18 National Health Survey (ABS 2018).

## 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) (AIHW 2019). Tobacco smoking is the predominant cause of COPD and is associated with a majority of COPD cases (Yawn & Kaplan 2008). Lifelong smokers have a 50% probability of developing COPD during their lifetime (Laniado-Laborin 2009).

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 cardiovascular disease (AIHW 2019). While the damage from past smoking is not fully reversible, the rate of progression of COPD can be reduced through smoking cessation (Laniado-Laborin 2009). Quitting smoking also reduces the risk of exacerbations and mortality in patients with COPD (Anthonisen et al. 2005; Au et al. 2009).

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 (Royal Australian College of General Practice 2014). In Australia, smoking rates have been falling amongst males since the 1950s (1970s in women) (Greenhalgh et al. 2019), 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 (Wakefield et al. 2014).

**Figure 2: Smoker status of people aged 45 and over, with and without COPD, 2017-18**
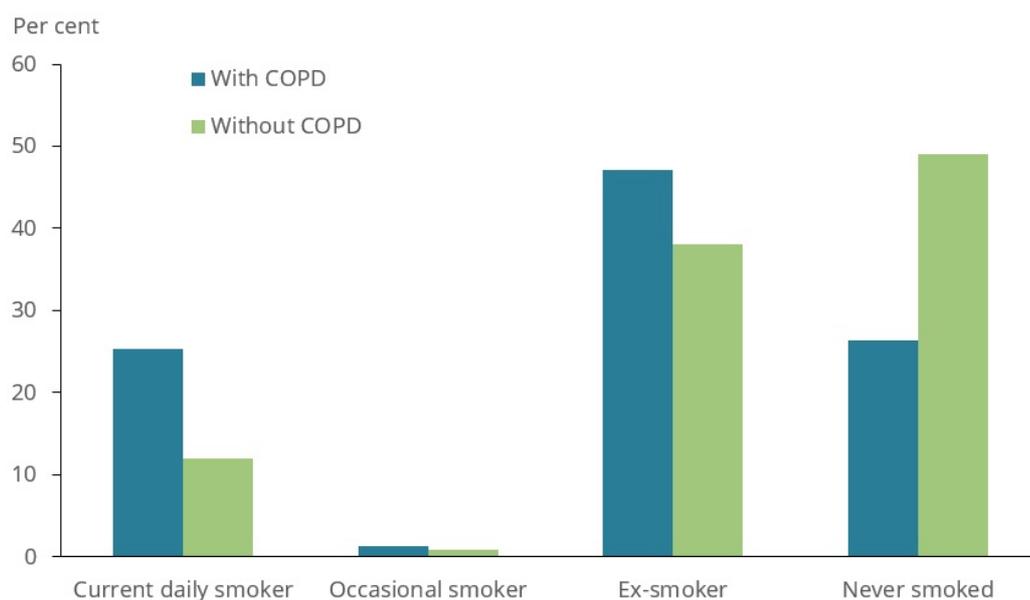
### Physical activity

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 (AIHW 2019).

Exercise-based pulmonary rehabilitation is an important part of management of COPD, as it improves quality of life and exercise capacity and reduces hospitalisations (Alison et al. 2017). It is a system of care that includes education, exercise training and psychosocial support delivered by an interdisciplinary team of therapists (Alison et al. 2017). 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 (Alison et al. 2017). 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**

Per cent
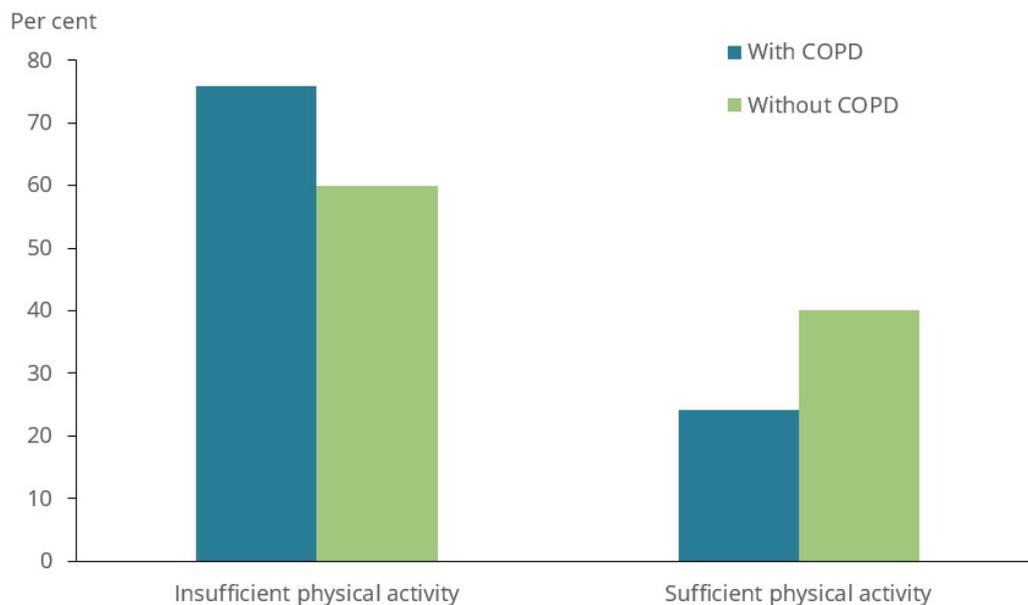


*Source:* ABS 2019a (Data table).

## 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 body mass index (BMI), and increased prevalence of COPD (Fuller-Thoson et al. 2018). 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 (AIHW 2019).

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 (Hanson et al. 2014; Spelta et al. 2018). Being underweight or average weight is associated with increased risk of dying for people with COPD (Hanson et al. 2014). 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 (van der Molen 2010). This may be due to systemic inflammation associated with COPD, leading to muscle wasting (van der Molen 2010). Reduced micronutrient intake may also contribute to increased risk (Hanson et al. 2014).

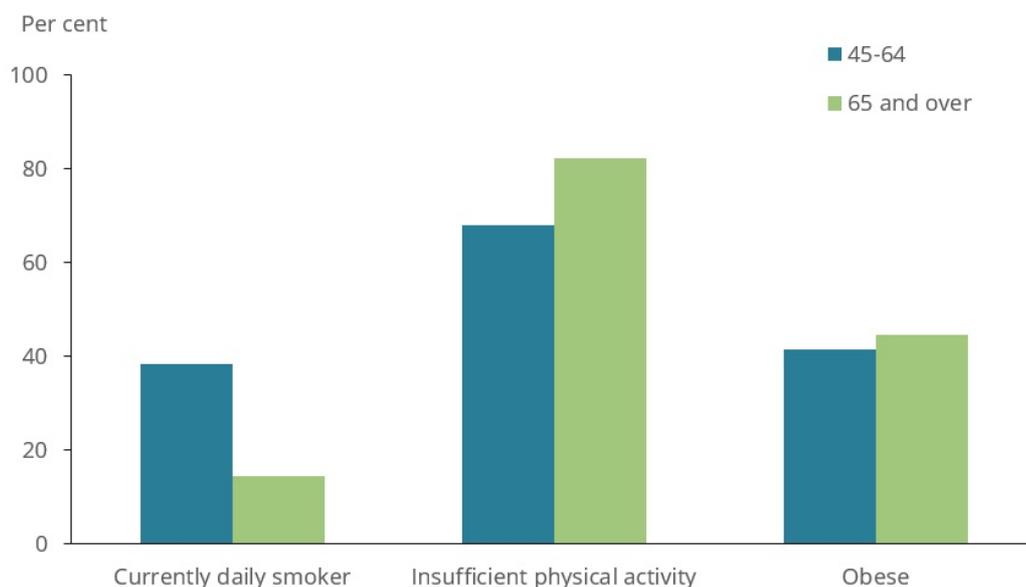**Figure 4: Proportion of people aged 45 and over, with and without COPD, by BMI, 2017-18**

Per cent
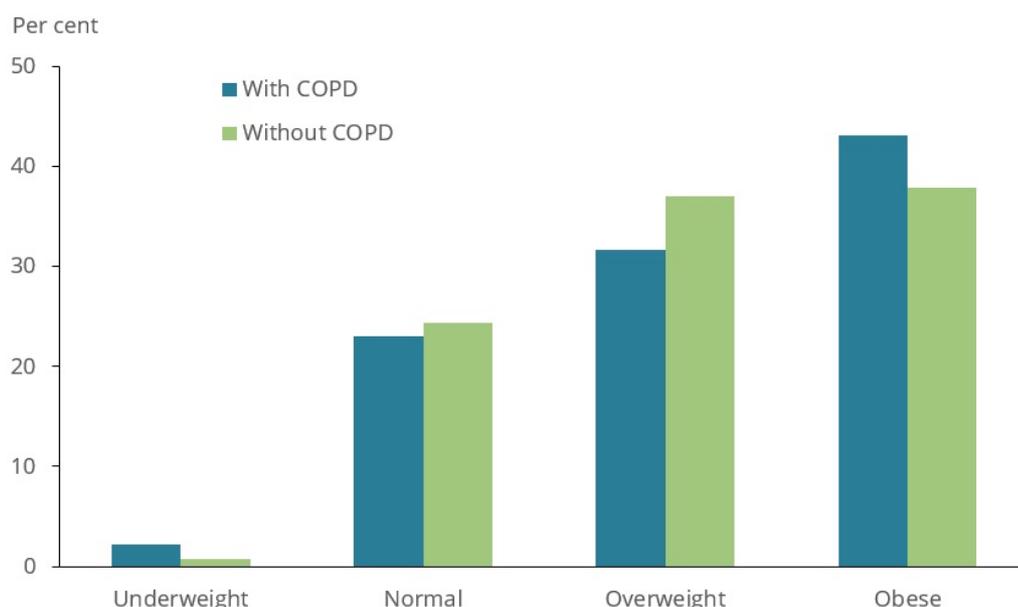


*Note:* Based on body mass index (BMI) for persons whose height and weight was measured and imputed. In 2017–18, 33.8% of respondents aged 18 years and over did not have a measured BMI. For these respondents, imputation was used to obtain BMI. For more information, see Appendix 2: Physical measurements in the 2017–18 National Health Survey (ABS 2018).

*Source:* ABS 2019a (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 ages 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 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 (ABS 2018).

*Source:* ABS 2019a (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.

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 2018b.

### 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 (Department of Health 2019). Please see the Physical activity 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 2019b.

### 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 (ABS 2019b).

*Sources*: ABS 2018b; ABS 2019b.

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# Data

Data tables: COPD, associated comorbidities and risk factors

Download Data tables: COPD, associated comorbidities and risk factors. Format: XLS 215Kb XLS 215Kb

Last updated 7/08/2019 v1.0

# Related material

## Resources

Asthma in Australia 2011: with a focus chapter on chronic obstructive pulmonary disease
View

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

Chronic obstructive pulmonary disease (COPD)
View

## Related topics

- Chronic disease
- Risk factors

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