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Strengthening national COPD monitoring using linked health services data

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Chronic obstructive pulmonary disease (COPD) is a leading cause of death and disease burden in Australia. Monitoring the prevalence of COPD each year is important for:

- assessing the health and economic burden of the condition in the Australian population
- health service planning
- evaluating progress in prevention and management.

There is currently no way to monitor COPD prevalence annually. Instead, current monitoring efforts rely on survey data that is time consuming and expensive to collect, preventing annual updates. Linked health administrative data provides a cost-efficient alternative that can be updated regularly.

For the first time, linked data from the National Integrated Health Services Information Analysis Asset (NIHSI AA) have been used to estimate the prevalence of COPD among health service users in Australia. Individuals with COPD are identified based on their health service use in the year prior to the 30 June reference date.

This report describes the prevalence of COPD by age and sex as well as socioeconomic and remoteness areas at 30 June 2019. It looks at the prevalence of COPD from 30 June 2017 to 30 June 2019 to examine trends over time. Estimates are for people aged 35 and over, consistent with guidelines for COPD screening, as this is the age group most at risk of COPD (Yang et al. 2022).

While undiagnosed COPD and mild COPD not managed with COPD-specific treatment cannot be captured, NIHSI AA estimates provide a valuable source of information to monitor the prevalence of diagnosed COPD that is managed with specific prescriptions or requires emergency or hospital care. People with diagnosed COPD accessing these health services are an important group for population monitoring to inform health service planning.

Comparisons with estimates based on survey data show how this work adds a vital perspective on the prevalence of COPD that is being treated with specific health services, and will add to the Australian Institute of Health and Welfare's (AIHW) routine monitoring of COPD.



Age 35+

2.7% of people aged 35 and over were identified as having COPD at 30 June 2019 based on their health service use in the year before



The prevalence of COPD was **2.8%** for men and **2.6%** for women at 30 June 2019



COPD prevalence was highest in areas of highest disadvantage (**3.8%**)



COPD prevalence was lowest in *Major cities* (**2.3%**)

AIHW

Using data linkage to improve national monitoring

There have been substantial challenges in estimating and monitoring the prevalence of COPD in Australia. COPD prevalence is currently monitored by the AIHW using Australian Bureau of Statistics (ABS) National Health Survey (NHS) data based on self-reported current and long-term bronchitis or emphysema. Estimates of COPD based on self-reported data are limited by potential under-reporting of the condition and changes in the way the condition is understood over time.

The Burden of Obstructive Lung Disease (BOLD) Australia study used spirometry testing and self-reported symptoms of breathlessness to identify people with COPD between 2006 and 2010 (Toelle 2021). Measured data provide the most accurate estimates of COPD prevalence. However, survey-based estimates can be quickly out-dated as surveys are time consuming and expensive to conduct which prevents them being updated annually.

Data linkage brings together data from 2 or more sources about a single entity, such as an individual. Linked data provides an opportunity to identify people with COPD across multiple sources of data. This report aims to improve the monitoring of COPD by using the linked data in the NIHSI AA to develop a cost-effective and updatable approach to produce ongoing population level estimates of COPD prevalence based on health service use. See Box 1 for further information on the NIHSI AA data.

Data linkage can also be used to fill information gaps in single sources of data and strengthen COPD monitoring across multiple areas. It can provide insights into the health experiences of people living with COPD, such as health service use over the life course and medication dispensing patterns. It can also provide a better understanding of health outcomes, such as hospitalisations and deaths for people with COPD.

Box 1. What is the National Integrated Health Services Information Analysis Asset (NIHSI AA)?

The NISHI AA version 1.0 is a linked data source developed by the AIHW. It brings together multiple national health data sources, as well as hospitalisations data supplied by states and territories.

Data collected include:

- admitted patient care services (hospitalisations) in public and private hospitals
- emergency department (ED) and outpatient services in public hospitals
- the Medicare Benefits Schedule (MBS)
- the Pharmaceutical Benefits Scheme (PBS) and Repatriation Pharmaceutical Benefits Scheme, collectively referred to as PBS data in this report
- residential aged care services
- the National Death Index.

Hospitalisations and ED data for the Northern Territory and Western Australia and most private hospitalisations data are not available as part of the NIHSI AA version 1.0, though this has limited effect on national level estimates. More information can be found in [Estimating the prevalence of COPD using the NIHSI AA: Technical report](#).

Additional information about NISHI AA is available through the AIHW's metadata online registry at <https://meteor.aihw.gov.au/content/766334>.

What is COPD?

COPD is a chronic lung condition which generally worsens over time. The key characteristic of the disease is chronic airflow limitation, resulting in shortness of breath. This airflow limitation is not fully reversible with the use of medication.

Multiple risk factors contribute to the development of COPD, including:

- genetic factors and early life events that affect lung growth, including asthma
- infections that cause damage to the lungs
- tobacco smoking, including both active smoking and passive exposure to smoke.
- environmental factors, such as living or working in areas with exposure to dust, gas, smoke or other air pollutants.

COPD can result in respiratory symptoms such as a chronic cough (which may be associated with sputum production), and shortness of breath. While COPD shares similar symptoms and can co-occur or overlap with other respiratory conditions including asthma and bronchiectasis, it remains a distinct condition for diagnosis and treatment.

For support to quit smoking speak to your GP or call the Quitline (13 78 48).

How are people with COPD identified using linked data?




In this report, people with COPD were identified in the population aged 35 and over at 30 June 2017 to 2019.

Although people may be diagnosed with COPD prior to age 35, people aged 35 and over are the focus of analysis in this report. This is consistent with recommendations for COPD screening, due to the higher risk of a respiratory condition being COPD from this age.

Three sources of data were used to identify people with COPD: PBS dispensing, hospitalisations, and ED data.

A 1-year look-back period was used to identify people with COPD and monitor COPD prevalence based on their health service use over time. People with diagnosed COPD who were alive at the 30 June reference date and who received COPD-specific treatment in the year before are counted in estimates of COPD prevalence. This measure provides a useful starting point for health service planning into the next year.

People with COPD were identified when they met at least one of the following case definitions:

PBS	Hospitalisations	ED
A person was dispensed 2 or more prescriptions for medications to treat COPD	One or more hospital admissions or separations with a principal or additional diagnosis of COPD	One or more emergency department presentations with a principal or additional diagnosis of COPD
		

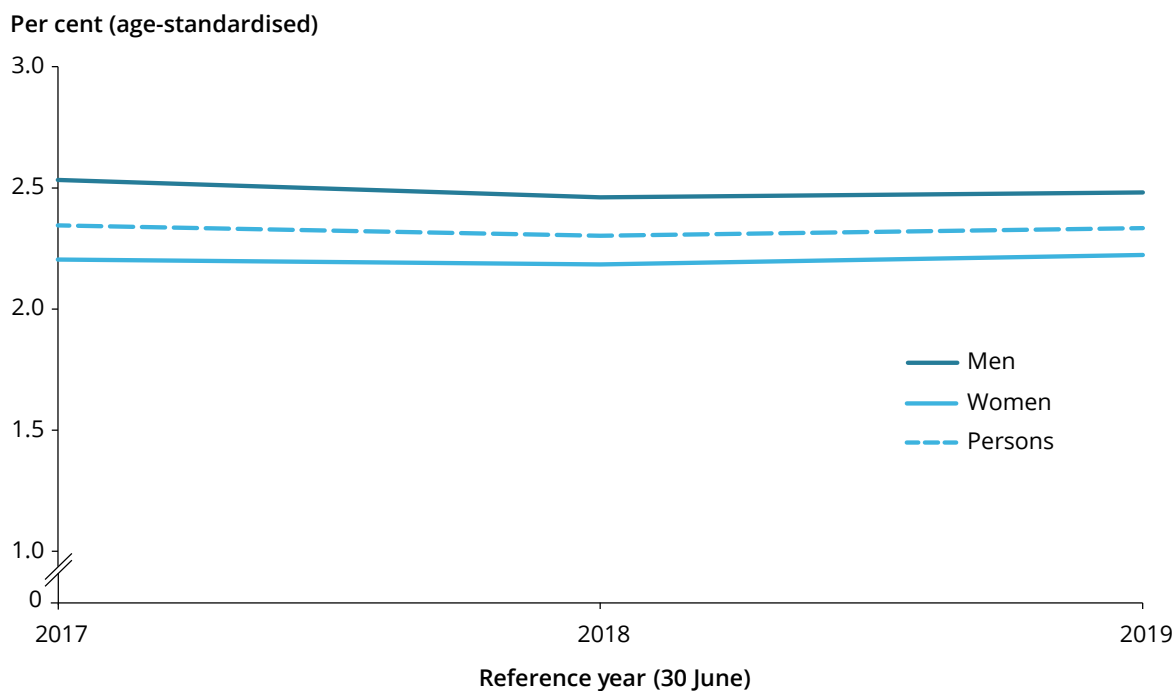
A limitation of this case definition is that it cannot capture undiagnosed COPD, and people with mild COPD are less likely to be identified as they are less likely to be dispensed COPD-specific prescriptions or require emergency treatment or hospitalisation. Similarly, the scope and capture of PBS and hospitalisations data within the NIHSI AA version 1.0 may limit the identification of prisoners and Indigenous Australians with COPD.

COPD prevalence in Australia

More than 365,000 people aged 35 and over were identified with COPD in the NIHSI AA data at 30 June 2019 based on their health service use in the year before, a prevalence of 2.7%. This means that 270 people in every 10,000 aged 35 and over at 30 June 2019 were taking medication or using emergency or hospital services for COPD between 1 July 2018 and 30 June 2019.

Almost 184,000 women and more than 181,000 men were identified as having COPD at 30 June 2019. After age-standardisation (adjusting for differences in the age structure of different populations and over time), COPD prevalence remained fairly stable between 2017 and 2019 and was consistently higher among men than women (Figure 1).

Figure 1: Prevalence (age-standardised) of COPD by sex, people aged 35 and over at 30 June, 2017 to 2019



Note: Age-standardised to the 2001 Australian population.
Source: AIHW NIHSI AA version 1.0.

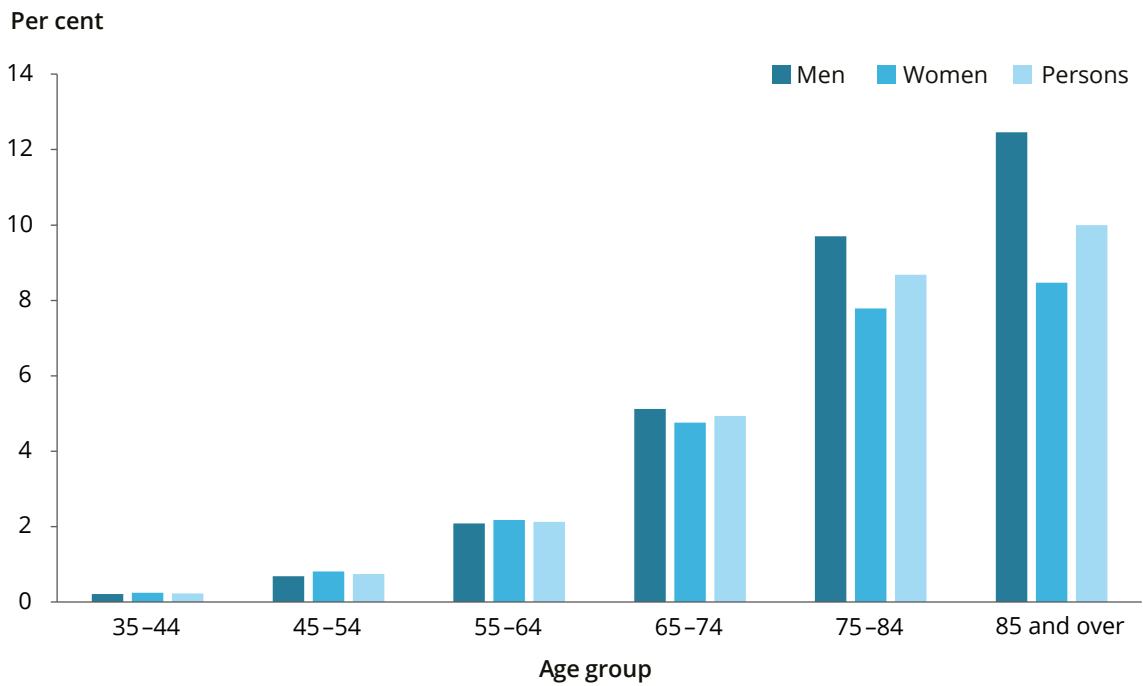
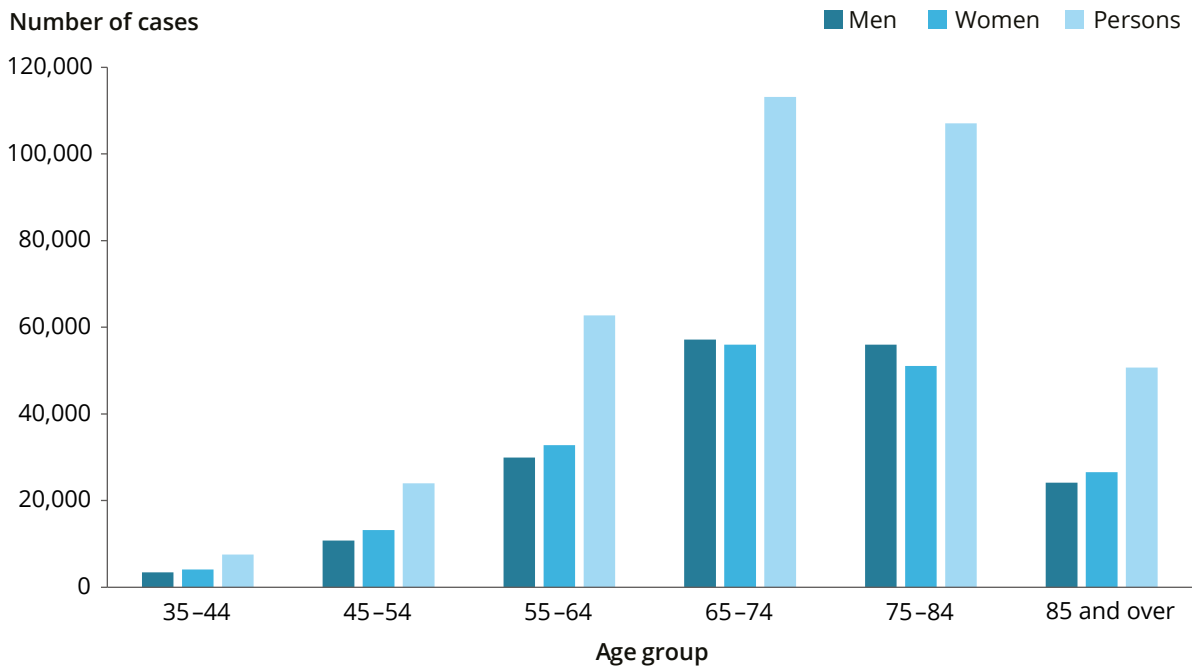
Variation by age group and sex

The number of people identified with COPD varied by age group, ranging from fewer than 7,600 people aged 35–44 to more than 113,000 people aged 65–74 at 30 June 2019. Over 60% of cases were identified among people aged 65–74 and 75–84. This pattern was largely consistent for both men and women (Figure 2).

The prevalence of COPD increased with age, ranging from 0.2% among those aged 35–44 to 10% among those aged 85 and over. These proportions were largely stable between 2017 and 2019. COPD prevalence was:

- similar among men and women aged 35–64 (age groups 35–44, 45–54 and 55–64)
- higher among men than women from the age of 65 (age groups 65–74, 75–84 and 85 and over).

Figure 2: Number and prevalence of people with COPD by age group and sex, 30 June 2019



Source: AIHW NIHSI AA version 1.0.

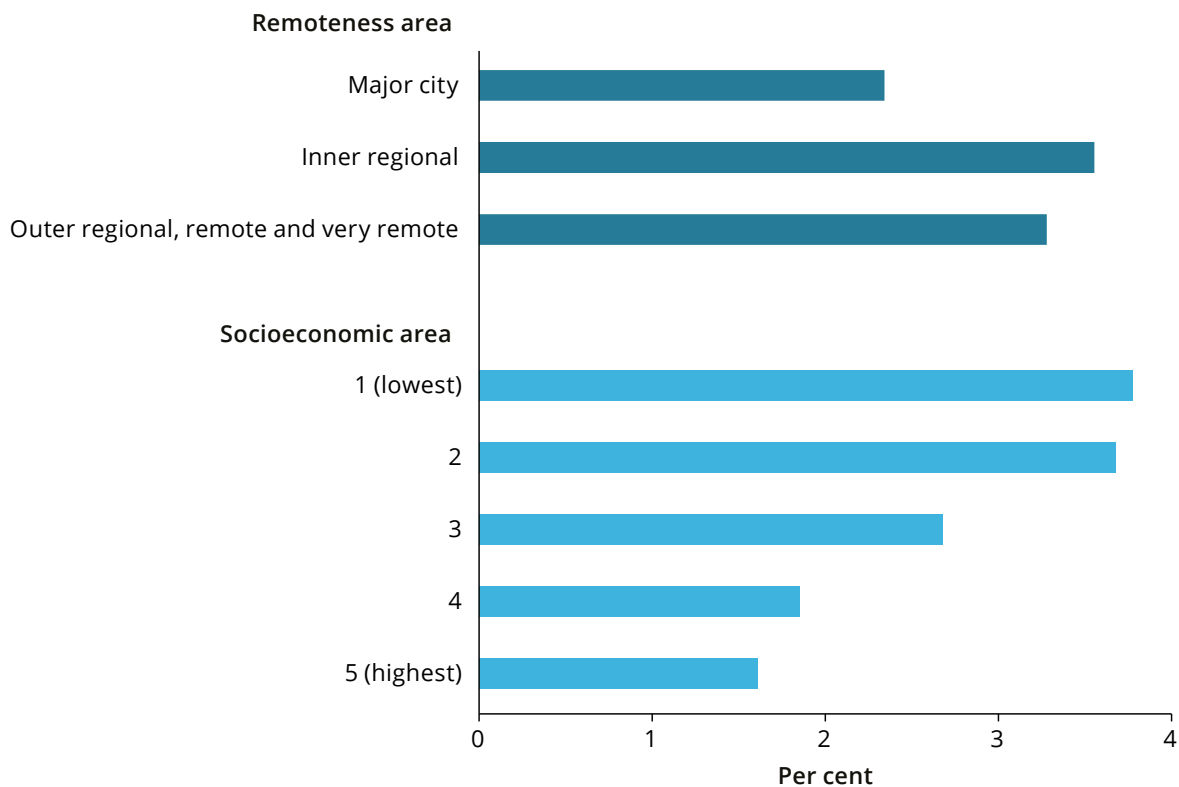
Variation between population groups

The prevalence of health service users identified as having COPD varied by socioeconomic and remoteness area (Figure 3).

At 30 June 2019 the prevalence was 3.6% in *Inner regional areas*, 3.3% in *Outer regional, remote and very remote areas* and 2.3% in *Major cities*. The prevalence of COPD in *Inner regional areas* and *Outer regional, remote and very remote areas* was 1.3 times as high as in *Major cities* after adjusting for age.

COPD prevalence was 3.8% in the lowest socioeconomic areas and 1.6% in the highest socioeconomic areas. After adjusting for age, the prevalence of COPD was 2.1 times as high in the lowest socioeconomic areas as in the highest.

Figure 3: Prevalence of COPD by socioeconomic and remoteness area, 30 June 2019



Notes

1. Socioeconomic areas are classified according to population-based quintiles using the Index of Relative Socio-Economic Disadvantage (IRSD) based on Statistical Area Level 2 (SA2) of usual residence.
2. Remoteness areas are classified according to the Australian Statistical Geography Standard 2016 Remoteness Areas structure based on Statistical Area Level 2 (SA2) of usual residence.

Source: AIHW NIHSI version 1.0.

Prevalence estimates by area may be affected by the type and availability of services, and data on services, for people with COPD in different areas. It is important to note that hospitalisations and ED data for Western Australia and the Northern Territory are not available in NIHSI AA version 1.0 and that medicines dispensed through remote Aboriginal health services cannot be associated with an individual and so cannot be attributed to a person to identify someone with COPD in this report.

Newly identified COPD service users

New cases of COPD identified at the 30 June 2019 reference date include people who:

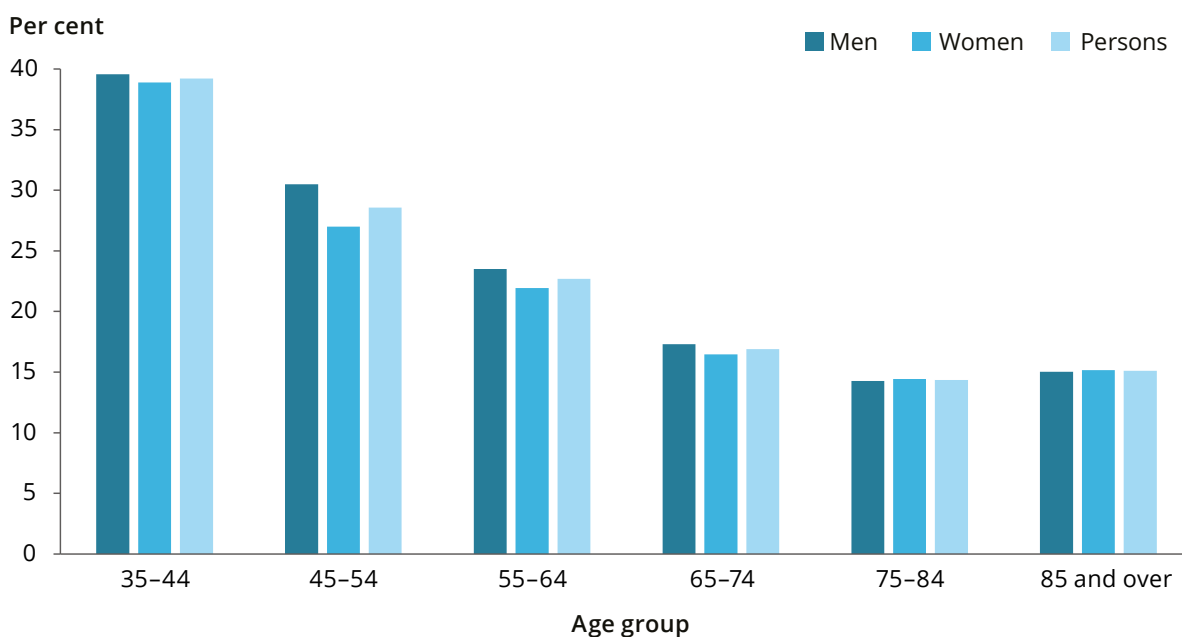
- met the age and health service use conditions to be identified as having COPD between 1 July 2018 and 30 June 2019
- did not meet the conditions to be identified as having COPD between 1 July 2010 and 30 June 2018
- were alive at the reference date.

Counts and proportions of new cases do not include people who otherwise met these conditions but who died before 30 June 2019.

Of the 365,000 people aged 35 and over identified as having COPD at 30 June 2019, almost 66,200 (18%) met the age and health service use criteria to be identified as having COPD for the first time between 1 July 2018 and 30 June 2019. This equates to 181 new COPD service users every day.

The proportion of people newly identified with COPD was similar for men and women across most age groups. It was higher among men than women in the 45–54 year age group (Figure 4).

Figure 4: Newly identified COPD cases as a proportion of total cases, people aged 35 and over at 30 June 2019, by age group and sex



Source: AIHW NIHSI AA version 1.0.

Impact

Of people aged 35 and over identified with COPD at 30 June 2018 almost 7% (24,000 people) died in the following year. In contrast, 1.0% (135,000) of people not identified with COPD at 30 June 2018 died in the following year.

Of people identified with COPD who died in the following year, COPD was listed as a cause of death for almost half (46%) of them (as their underlying or associated cause of death).

How do linked data COPD estimates compare with other sources?

NIHSI AA estimates of people with COPD aged 40 and over at 30 June 2018 are used for comparisons in this section to align the age group and reference date as much as possible with the data available in the comparison studies.

The ABS NHS is currently used to monitor COPD prevalence in Australia. NHS estimates of COPD are based on self-reported current and long-term bronchitis or emphysema. Self-reported COPD and airflow limitation are captured in the emphysema group. In 2017–18 an estimated 4.4% of Australians aged 40 and over had COPD according to this definition (AIHW analysis of ABS 2019).

The BOLD Australia study provides COPD prevalence estimates based on clinical assessment and results of spirometry testing using data collected between 2006 and 2010 (Toelle 2021). Using these data, weighted to the 2016 Australian Census, the study estimated that 4.4% of Australians aged 40 and over had COPD in 2016 based on self-reported symptoms of any level of breathlessness and the presence of persisting airflow limitation.

The prevalence of COPD among people aged 40 and over at 30 June 2018 who used health services is estimated to be 3.0% using the NIHSI AA data. This is about 30% lower than estimates from the BOLD Australia study and the NHS. However, several factors contribute to these differences including:

- BOLD Australia estimates are based on results of spirometry testing conducted as part of the study and include people who meet the criteria for chronic airflow limitation with breathlessness, regardless of whether COPD was previously diagnosed. People with undiagnosed COPD cannot be captured in NIHSI AA or NHS estimates.
- NHS estimates are based on self-reported long-term bronchitis or emphysema, but not everyone with these conditions will have COPD and be dispensed COPD-specific prescriptions. These people would not be captured in NIHSI AA estimates.
- Mild cases of COPD that are not being treated with the COPD medications used to identify cases and who do not require emergency or hospital care are not captured in NIHSI AA estimates.

What does this work add?

The NIHSI AA is a valuable source of information to estimate the prevalence of diagnosed COPD in Australia where the individual is receiving treatment in the form of an ED presentation, hospitalisation or by being dispensed COPD-specific prescriptions. This adds to our understanding of the prevalence of COPD, and provides vital information on the use of health services by people with COPD to inform health service planning and assess the health and economic burden of the disease.

More information

For more information on the data and methods used to estimate the prevalence of COPD, and for the underlying data used in this report see *Estimating the prevalence of COPD using the NIHSI AA: Technical report*, available on the AIHW website: <http://www.aihw.gov.au/reports/chronic-respiratory-conditions/copd-monitoring-using-linked-health-services-data/technical-report>

A detailed data extract of COPD prevalence by 5-year age groups and sex at 30 June, 2017 to 2019 is also available on the AIHW website: <http://www.aihw.gov.au/reports/chronic-respiratory-conditions/copd-monitoring-using-linked-health-services-data/data>

Glossary

age-standardisation: A method to remove the influence of age when comparing rates between population groups with different age structures, such as men and women. This is used as the rates of many diseases vary strongly (usually increasing) with age, and so too can service use, for example, hospitalisations – a population group with an older age structure will likely have more hospitalisations. The age structures of different populations are converted to the same ‘standard’ structure, and then the relevant rates, such as hospitalisations, that would have occurred within that structure are calculated and compared.

chronic bronchitis: The presence of cough and sputum (mucus) production for at least 3 months in each of 2 consecutive years; however symptoms can be ongoing and persist throughout the year.

emphysema: A structural abnormality of the lungs due to over-expansion or destruction of the lung tissue. This blocks oxygen intake and leads to shortness of breath and other problems.

look-back period: A defined pre-observation period without the illness or event to identify new cases of the disease.

prevalence: The number or proportion of cases or instances of a disease or illness present in a population at a given time. The prevalence of disease is related to both the incidence of the disease and how long people live after developing it.

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