National Asthma Council Australia

AUSTRALIAN ASTHMA HANDBOOK

VERSION 2.0

POPULATIONS

Older adults

This PDF is a print-friendly reproduction of the content included in the *Populations – Older Adults* section of the *Australian Asthma Handbook* at **asthmahandbook.org.au/populations/older-adults**

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ABBREVIATIONS

CFC	chlorofluorocarbon
COPD	chronic obstructive pulmonary disease
COX	cyclo-oxygenase
DXA	dual-energy X-ray absorptiometry
ED	emergency department
EIB	exercise-induced bronchoconstriction
FEV_1	forced expiratory volume over one second
FEV_6	forced expiratory volume over six seconds
FSANZ	Food Standards Australia and New Zealand
FVC	forced vital capacity
GORD	gastro-oesophageal reflux disease
HFA	formulated with hydrofluroalkane propellant
ICS	inhaled corticosteroid
ICU	intensive care unit
IgE	Immunoglobulin E
IL	interleukin
IU	international units
IV	intravenous
LABA	long-acting beta$_2$-adrenergic receptor agonist
LAMA	long-acting muscarinic antagonist
LTRA	leukotriene receptor antagonist
MBS	Medical Benefits Scheme
NHMRC	National Health and Medical Research Council
NIPPV	non-invasive positive pressure ventilation
NSAIDs	nonsteroidal anti-inflammatory drugs
OCS	oral corticosteroids
OSA	obstructive sleep apnoea
PaCO	carbon dioxide partial pressure on blood gas analysis
PaO	oxygen partial pressure on blood gas analysis
PBS	Pharmaceutical Benefits Scheme
PEF	peak expiratory flow
pMDI	pressurised metered-dose inhaler or 'puffer'
PPE	personal protective equipment
SABA	short-acting beta$_2$ -adrenergic receptor agonist
SAMA	short-acting muscarinic antagonist
SaO_2	oxygen saturation
SpO_2	peripheral capillary oxygen saturation measured by pulse oximetry
TGA	Therapeutic Goods Administration

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Asthma in older adults

Overview

This section deals with adults over 55 years, but many of these considerations may also apply to younger adults.

In this section

Investigation

Investigating new asthma-like symptoms in older adults

http://www.asthmahandbook.org.au/populations/older-adults/investigation

Management

Managing asthma in older adults

http://www.asthmahandbook.org.au/populations/older-adults/management

Monitoring control

Assessing and monitoring asthma control in older adults

http://www.asthmahandbook.org.au/populations/older-adults/monitoring-control

Investigating new asthma-like symptoms in older adults

Recommendations

Consider the possibility of adult-onset asthma in adults of any age with dyspnoea, wheeze or cough, even older people without a history of asthma.

How this recommendation was developed

Consensus
Based on clinical experience and expert opinion (informed by evidence, where available).

When taking a history, ask about:

- **lifetime smoking history (including exposure to environmental tobacco smoke)**
- **comorbid conditions**
- **new medicines or a change in the regimen**
- **occupational exposure to allergens or irritants**
- **new hobbies that may expose the person to new allergens or irritants.**

How this recommendation was developed

Consensus
Based on clinical experience and expert opinion (informed by evidence, where available).

When investigating new respiratory symptoms that suggest asthma, perform or arrange spirometry before and 15 minutes after bronchodilator, as for younger adults.

Note: If reliable equipment and appropriately trained staff are available, spirometry can be performed in primary care. If not, refer to an appropriate provider such as an accredited respiratory function laboratory.

How this recommendation was developed

Consensus

Based on clinical experience and expert opinion (informed by evidence, where available), with particular reference to the following source(s):

- Reed, 2010[1]

Before doing spirometry, assess comorbidities and check if the person has any contraindications to spirometry. Advise patients to empty their bladder before spirometry.

How this recommendation was developed

Consensus

Based on clinical experience and expert opinion (informed by evidence, where available).

If FEV_1 improves after administering short-acting $beta_2$ agonist but the response does not meet criteria for acute response to bronchodilator, repeat spirometry 6–8 weeks after a treatment trial of an inhaled corticosteroid. Compare pre-bronchodilator FEV_1 with the pre-bronchodilator FEV_1 reading from the previous visit.

How this recommendation was developed

Consensus

Based on clinical experience and expert opinion (informed by evidence, where available).

If spirometry before and after bronchodilator demonstrates expiratory airflow limitation that is not completely reversible, consider the possibility of COPD as an alternative diagnosis or of asthma–COPD overlap, even if the person has never smoked.

Note: people with longstanding asthma can develop fixed airflow limitation that resembles COPD.

How this recommendation was developed

Consensus

Based on clinical experience and expert opinion (informed by evidence, where available), with particular reference to the following source(s):

- Gibson *et al.* 2010[2]
- Gibson and Simpson, 2009[3]
- McDonald *et al.* 2012[4]
- Abramson *et al.* 2012[5]
- Reed, 2010[1]

More information

Asthma prevalence in older adults

An estimated 7–15% of Australians aged 65 years or over have asthma, similar to asthma prevalence in the general adult population.[6] According to the latest available Australian population survey data (2011–2012),[7] self-reported current asthma rates among those aged 65–74 years are 9% for men and 13% for women, and among those aged 75 years and over are 8% for men and 13% for women.

New cases of adult-onset asthma can occur at any age.[2] Asthma is under-diagnosed and commonly misdiagnosed in older people.[2, 6, 8, 9, 10] The diagnosis is unrecognised in an estimated 50% of people with asthma aged over 75 years.[2]

Effects of ageing on the lungs

Lung function peaks at age 20–25 years, then progressively falls throughout life.[2] Age-related decrease in lung function is greater in men than in women.[1]

Ageing is associated with increased work of breathing, weakening of respiratory muscles, and inflammation of the airways.[2]

Asthma presentation in older adults

Asthma presents with the same clinical features in older adults as in younger adults.[6] However, older patients may under-report symptoms and attribute breathlessness to age or other comorbidities.[2, 6]

Wheeze and whistling in the chest are common (particularly in those aged over 75 years) and can be due to asthma, COPD, cardiac failure, acute bronchitis, bronchiectasis, cancer, or pulmonary embolism.[2] Wheezing can also occur in obese people who do not have asthma. Approximately one-third of people over 75 years old experience breathlessness.[2]

As with any patient, a careful history is necessary to identify symptoms and triggers. Physical examination should include examination of upper airway and chest auscultation, and alternative causes of respiratory symptoms should be considered and investigated as indicated.

Ask about new hobbies that may expose the person to new airborne allergens or irritants (e.g. woodworking, bird-keeping or home renovation projects). Asthma that begins in late adult life is rarely immunoglobulin E (IgE)-mediated.[1] However, allergic sensitisation is still common enough among older patients with respiratory symptoms to warrant allergy tests in the investigation of asthma-like symptoms[11] when allergic triggers are suspected (e.g. if history suggests that symptoms worsen seasonally or in certain places, or if control not achieved despite adherence to appropriate treatment and correct inhaler technique).

Lung function testing in older adults

More than 90% of patients with obstructive airway disease aged 65 years and over can perform an acceptable spirometry test (when staff are appropriately trained and rigorous quality control protocols are followed).[2, 12, 13]

Contraindications to spirometry include conditions in which increased blood pressure, intraocular pressure, intra-abdominal or intrathoracic pressure may be dangerous, such as unstable cardiovascular disease, recent myocardial infarction, recent pulmonary embolus, aneurysm, and recent cataract surgery.[14] Advise patients to empty their bladder before spirometry, because the effort required may cause leaking for those with urinary incontinence.

FEV_1/FVC ratio decreases with normal ageing. Reference values for forced expiratory volume in one second (FEV_1) and ratio of FEV_1 to forced vital capacity (FEV_1/FVC) applicable to people aged up to 95 years have been developed.[15] Reference values for older people are incorporated into newer spirometers. Airflow limitation should not be diagnosed based solely on the shape of the flow–volume loop.

Some degree of concavity in the expiration flow–volume curve (typical of airflow limitation) occurs as people age, even without asthma.

▶ Go to: National Asthma Council Australia's *Spirometry Resources*

Definition of variable expiratory airflow limitation

Most of the tests for variable expiratory airflow limitation are based on showing variability in FEV_1. While reduced FEV_1 may be seen with many other lung diseases (or due to poor spirometric technique), a reduced ratio of FEV_1 to FVC indicates airflow limitation.[16] Normal FEV_1/FVC values derived from population studies vary,[17, 15] but are usually greater than:[17]

- 0.85 in people aged up to 19 years
- 0.80 in people aged 20–39 years
- 0.75 in people aged 40–59 years
- 0.70 in people aged 60–80 years.

In children, it is less useful to define expiratory airflow limitation according to a specific cut-off for FEV_1/FVC ratio, because normal values in children change considerably with age.[15]

Some spirometers provide predicted normal values specific to age group. If these are available, a FEV_1/FVC ratio less than the lower limit of normal (i.e. less than the 5th percentile of normal population) indicates airflow limitation.

Variable expiratory airflow limitation (beyond the range seen in healthy populations) can be documented if any of the following are recorded:

- a clinically important increase in FEV_1 (change in FEV_1 of at least 200 mL and 12% from baseline for adults, or at least 12% from baseline for children) 10–15 minutes after administration of bronchodilator
- clinically important variation in lung function (at least 20% change in FEV_1) when measured repeatedly over time (e.g. spirometry on separate visits)
- a clinically important reduction in lung function (decrease in FEV_1 of at least 200 mL and 12% from baseline on spirometry, or decrease in peak expiratory flow rate by at least 20%) after exercise (formal laboratory-based exercise challenge testing uses different criteria for exercise-induced bronchoconstriction)
- a clinically important increase in lung function (at least 200 mL and 12% from baseline) after a trial of 4 or more weeks of treatment with an inhaled corticosteroid
- clinically important variation in peak expiratory flow (diurnal variability of more than 10%)
- a clinically important reduction in lung function (15–20%, depending on the test) during a test for airway hyperresponsiveness (exercise challenge test or bronchial provocation test) measured by a respiratory function laboratory.

Notes

Patients referred to a respiratory function laboratory may be asked not to take certain medicines within a few hours to days before a spirometry visit.

A clinically important increase or decrease in lung function is defined as a change in FEV_1 of at least 200 mL and 12% from baseline for adults, or at least 12% from baseline for children, or a change in peak expiratory flow rate of at least 20% on the same meter.[18, 16] A clinically important increase in FVC after administering bronchodilator may also indicate reversible airflow limitation, but FVC is a less reliable measure in primary care because FVC may vary due to factors such as variation in inspiratory volume or expiratory time.

The finding of 'normal' lung function during symptoms reduces the probability that a patient has asthma, but a clinically important improvement in response to bronchodilator or inhaled corticosteroid can occur in patients whose baseline value is within the predicted normal range.

The greater the variation in lung function, the more certain is the diagnosis of asthma. However, people with longstanding asthma may develop fixed airflow limitation.

Reversibility in airflow limitation may not be detected if the person is already taking a long-acting $beta_2$ agonist or inhaled corticosteroid.

Airflow limitation can be transient and does not necessarily mean that the person has asthma (e.g. when recorded during a severe acute infection of the respiratory tract). Ideally, airflow limitation should be confirmed when the patient does not have a respiratory tract infection. Reduction in lung function during a respiratory tract infection with improvement in lung function after its resolution, commonly occurs in people with asthma, but can

also be seen in patients with COPD or in healthy people without either asthma or COPD.[19,20]

▶ Go to: National Asthma Council Australia's *Spirometry Resources*
Go to: National Asthma Council Australia and Woolcock Institute *Peak Flow Chart*

Asthma–COPD overlap

Distinguishing between typical allergic asthma (childhood-onset allergic asthma) and typical COPD (emphysema in a heavy smoker) is straightforward.[21] However, it can be difficult to distinguish COPD from asthma in adults who have features of both conditions.[22, 23]These people are described as having asthma–COPD overlap.[22, 21, 3]

Asthma–COPD overlap is not a single, well-defined disease entity, but includes a range of airway disease phenotypes with different causal mechanisms.[22, 24] Features of both asthma and COPD have been described in:[3, 4, 1, 25]

- people with current asthma (allergic or non-allergic) who have had significant exposure to tobacco smoke
- people with longstanding asthma or late-onset asthma who have become persistently short of breath over time
- people significant smoking history and symptoms consistent with COPD who also have a history of childhood asthma
- people who present in middle age or later with shortness of breath, with a history of childhood asthma but no or few symptoms in between, and little smoking history.

Figure. Development of asthma, COPD and asthma–COPD overlap

Please view and print this figure separately: http://www.asthmahandbook.org.au/figure/show/108

People with asthma–COPD overlap often have poor disease outcomes, including:[22, 2627, 28, 29]

- high need for healthcare services
- worse quality of life, more wheezing, dyspnoea, cough and sputum production, and more frequent and severe respiratory exacerbations and hospitalisations, than people with COPD or asthma alone
- worse lung function demonstrated by spirometry than those with COPD alone, despite lower average exposure to tobacco smoke.

Features of asthma, COPD and asthma–COPD overlap

If several features of both asthma and COPD are present and neither condition is strongly favoured, respiratory disease should be managed according to recommendations for asthma–COPD overlap.

Table. Features that, when present, favour asthma or COPD

Clinical feature **(if measured/relevant)**	*Asthma more likely*	*COPD more likely*
Age of onset	Before 20	After 40
Pattern of symptoms	Variation in respiratory symptoms: • changes over minutes, hours or days • worse at night or early morning • triggered by exercise, emotions, airborne pollutants or allergens	Persistence of respiratory symptoms despite treatment Symptoms every day, including exertional dyspnoea History of chronic cough and sputum unrelated to specific triggers, before onset of dyspnoea
Lung function	Expiratory airflow limitation* is variable# Lung function normal between symptoms	Expiratory airflow limitation* is persistent† Lung function abnormal between symptoms
History	Previous diagnosis of asthma	Previous diagnosis of COPD, chronic

Clinical feature **(if measured/relevant)**	*Asthma more likely*	*COPD more likely*
	Family history of asthma and allergies[§] (allergic rhinitis or eczema)	bronchitis or emphysema Heavy exposure to tobacco smoke or biomass fuels
Long-term disease trajectory	Seasonal or yearly variation in symptoms Improvements (spontaneously or in response to medication) last for weeks	Slowly worsens over years Relief in response to medication is limited and short term
Chest X-ray	Normal	Severe hyperinflation[‡]

Features that, when present, increase the probability of either typical asthma or typical COPD. None of these features is essential to make the diagnosis of asthma or COPD, with the exception of persistent airflow limitation for making the diagnosis of COPD.

* Expiratory airflow limitation: indicated by a reduced ratio of forced expiratory volume in one second (FEV_1) to forced vital capacity (FVC) on spirometry (FEV_1/FVC less than the lower limit of normal (i.e. less than the 5th percentile of normal population). Typical FEV_1/FVC values derived from population studies are > 0.75 in people aged 40–59 years and > 0.70 in people aged 60–80 years.

Variable expiratory airflow limitation: variation beyond the range seen in healthy populations. It is indicated in adults by any of the following:

- a clinically important increase in FEV_1 (change in FEV_1 of at least 200 mL and 12% from baseline) 10–15 minutes after administration of bronchodilator
- clinically important variation in lung function (at least 20% change in FEV_1) when measured repeatedly over time (e.g. spirometry on separate visits)
- a clinically important increase in lung function (at least 200 mL and 12% from baseline) after ≥ 4 weeks' treatment trial with an ICS
- clinically important variation in peak expiratory flow (diurnal variability of more than 10%, calculated over 1–2 weeks as the average of daily amplitude per cent mean)
- a clinically important reduction in lung function (decrease in FEV_1 of at least 200 mL and 12% from baseline on spirometry, or decrease in peak expiratory flow rate by at least 20%) after exercise (formal laboratory-based exercise challenge testing uses different criteria for exercise-induced bronchoconstriction)
- a clinically important reduction in lung function (15–20%, depending on the test) during a test for airway hyperresponsiveness (exercise challenge test or bronchial provocation test) measured by a respiratory function laboratory.

The greater the variations, or the more occasions excess variation is seen, the more confidently the diagnosis of variable expiratory airflow limitation consistent with asthma can be made.

† Persistent expiratory airflow limitation is indicated by reduced post-bronchodilator FEV_1/FVC*

§ Lack of history of atopy does not exclude non-allergic asthma.

‡ Chest X-ray may be normal in a patient with COPD

Adapted from

Global Initiative for Asthma, Global Initiative for Obstructive Lung Disease. *Diagnosis and initial treatment of asthma, COPD and asthma-COPD overlap. Updated April 2017*. Global Initiative for Asthma and Global Initiative for Obstructive Lung Disease; 2017. Available from: http://ginasthma.org/gina-reports

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Table. Spirometry findings in asthma, COPD and asthma–COPD overlap

Finding	*Consistent with*

	Asthma	COPD	Asthma–COPD overlap
Normal FEV_1 /FVC before of after bronchodilator	Yes	No	No *
Abnormal lung function (post-bronchodilator reduced FEV_1/FVC and FEV_1 < lower limit of normal)	Yes #	Yes	Yes
Airflow limitation with greater bronchodilator reversibility than in healthy population (post-bronchodilator FEV_1 increase ≥ 12% and 200mL from baseline)	Yes ‡	Yes	Yes
Marked bronchodilator reversibility (FEV_1 increase ≥ 12% and 400mL from baseline)	Yes	Possible but unusual †	Possible §

FEV_1/FVC: ratio of forced expiratory volume in one second (FEV_1) to forced vital capacity (FVC), either before or after bronchodilator

* Normal FEV_1/FVC is not consistent with COPD unless there is other evidence of chronic non-reversible expiratory airflow limitation.

This finding is consistent with asthma that is poorly controlled or measured during a flare-up, or can be seen in some patients with longstanding asthma.

‡ The greater the variation, and the more times variation is seen, the more likely the diagnosis of asthma. However, some patients with longstanding asthma may develop persistent airflow limitation.

† Marked reversibility strongly favours asthma and is generally inconsistent with COPD, but does not rule out asthma–COPD overlap.

§ This finding may be seen in patients with asthma–COPD overlap, or occasionally in COPD, especially when FEV_1 is low.

Sources

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Asset ID: 103

Treatment for patients with asthma–COPD overlap

Inhaled corticosteroid treatment at low–moderate doses is essential to reduce the risk of potentially life-threatening flare-ups, even if asthma symptoms appear mild or infrequent.[22, 30]

Most patients also need treatment with a long-acting bronchodilator (either long-acting $beta_2$ agonist or long-acting muscarinic antagonist) in addition to an inhaled corticosteroid. Long-acting $beta_2$ agonists and long-acting muscarinic antagonists should not be used by people with asthma or asthma–COPD overlap unless they are also taking an inhaled corticosteroid (either in combination or separately).

Table. Long-acting bronchodilators for asthma–COPD overlap

Class	*Dosing*	*Agent*	**Brand name**
ICS–LABA combinations	Once daily	Fluticasone furoate + vilanterol	*Breo Ellipta 100/25 microg*† • Do not prescribe 200/25 microg formulation#
	Twice daily	Budesonide + formoterol	*Symbicort Rapihaler* *Symbicort Turbuhaler*
	Twice daily	Fluticasone propionate + formoterol	*Flutiform*
	Twice daily	Fluticasone propionate + salmeterol	*Fluticasone and Salmeterol Cipla* *Seretide Accuhaler* *Seretide MDI*
*LABAs**	Once daily	Indacaterol	*Onbrez Breezhaler*
	Twice daily	Formoterol	*Oxis* *Foradile*
	Twice daily	Salmeterol	*Serevent Accuhaler*
*LAMAs**	Once daily	Glycopyrronium	*Seebri Breezhaler*
	Once daily	Tiotropium	*Spiriva* *Spiriva Respimat*
	Once daily	Umeclidinium	*Incruse Ellipta*‡
	Twice daily	Aclidinium	*Bretaris Genuair*
*LABA–LAMA combinations**	Once daily	Indacaterol + glycopyrronium	*Ultibro Breezhaler*
	Once daily	Olodaterol + tiotropium	*Spiolto Respimat*
	Once daily	Vilanterol + umeclidinium	*Anoro Ellipta*‡
	Twice daily	Formoterol + aclidinium	*Brimica Genuair*

- * Ensure that patient is also using regular long-term ICS. LABAs and LAMAs should not be used by people with asthma or asthma–COPD overlap unless they are also taking an ICS, in combination or separately)
- Advise patients/carers that inhalers should be stored below 30°C and should not be left in cars.

† The inhaler must be discarded 1 month after opening the package and removing device from tray. When first opened, patients

should write the discard date on the label in the space provided. If stored in the refrigerator, inhaler should be taken out and allowed to return to room temperature for at least an hour before use.

‡ The inhaler must be discarded 6 weeks after opening after opening the package and removing device from tray. When first opened, patients should write the discard date on the label in the space provided. If stored in the refrigerator, inhaler should be taken out and allowed to return to room temperature for at least an hour before use.

Only the 100/25 microg dose of fluticasone furoate/vilanterol is TGA-approved for treatment of COPD. The higher dose (200/25 microg) is not TGA-approved for the treatment of COPD, so it should not be used in people with asthma–COPD overlap.

High doses of ICS (alone or in combination) are not recommended in patients with COPD and should therefore be used with caution in patients with asthma-COPD overlap, because of the risk of pneumonia.

Refer to PBS status before prescribing.

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Management should also include smoking cessation, treatment of comorbid conditions, physical activity, pulmonary rehabilitation, vaccinations, self-management (including a regularly updated action plan) and regular follow-up.[22]

▶ Go to: *Asthma action plans*
Go to: *COPD action plans*

Respiratory tract infections should be monitored carefully because people with asthma–COPD overlap have high morbidity rates and because ICS treatment is associated with increased risk of non-fatal pneumonia in people with COPD.[31] Most of the available evidence is from patients treated with fluticasone propionate, particularly at higher doses. Increased pneumonia rates have also been observed in studies of patients with COPD using fluticasone furoate/vilanterol. The higher dose of fluticasone furoate/vilanterol (Breo Ellipta 200/25 microg) is not approved for patients with COPD, so it should also not be used in patients with asthma–COPD overlap.

Specialist referral should be considered for patients with atypical symptoms or symptoms that suggest an alternative diagnosis, persistent symptoms or flare-ups despite treatment, or complex comorbidities.

▶ Go to: National Asthma Council Australia's *Asthma–COPD overlap* information paper

For information on diagnosis and management of COPD, refer to the COPD-X Concise Guide for Primary Care.[32]

▶ Go to: Lung Foundation Australia's *COPD-X Concise Guide for Primary Care*

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Managing asthma in older adults

Recommendations

When considering management options, take into account the individual's risk factors, comorbidity and self-management skills as well as assessing asthma control and lung function.

How this recommendation was developed

Consensus

Based on clinical experience and expert opinion (informed by evidence, where available).

Before prescribing any asthma treatment, consider potential drug-to-drug interactions with the person's other medicines or potential effects on other conditions.

How this recommendation was developed

Consensus

Based on clinical experience and expert opinion (informed by evidence, where available).

When starting a medicine or changing the regimen, conduct a treatment trial (e.g. 6–8 weeks) before prescribing long term.

When trialling any change, follow the steps for conducting a treatment trial.

Table. Steps for conducting a treatment trial

1. **Document baseline lung function.**
2. **Document baseline asthma control using a validated standardised tool such as the Asthma Score.**
3. **Discuss treatment goals and potential adverse effects with the person.**
4. **Run treatment trial for agreed period (e.g. 4–8 weeks, depending on the treatment and clinical circumstances, including urgency).**
5. **At an agreed interval, measure asthma control and lung function again and document any adverse effects.**
6. **If asthma control has not improved despite correct inhaler technique and good adherence, resume previous treatment and consider referral for specialist consultation.**

▶ **See:** *Asthma Score (Asthma Control Test)*

Asset ID: 36

How this recommendation was developed

Consensus

Based on clinical experience and expert opinion (informed by evidence, where available).

Advise and support older patients to quit smoking; explain that quitting has health benefits at any age and discuss all quitting options, considering any potential drug-to-drug interactions.

How this recommendation was developed

Adapted from existing guidance

Based on reliable clinical practice guideline(s) or position statement(s):

- Zwar *et al.* 2011[1]

Where possible, prescribe inhalers in preference to nebulisers and ensure the type of inhaler is appropriate for the individual.

How this recommendation was developed

Consensus

Based on clinical experience and expert opinion (informed by evidence, where available).

Avoid prescribing different types of inhaler devices, if possible. Minimise the number of inhaler devices and simplify the treatment regimen as much as possible.

How this recommendation was developed

Consensus

Based on clinical experience and expert opinion (informed by evidence, where available).

Carefully train patients to use their inhaler correctly. Check inhaler technique at each visit by asking patients to show you how they use their inhaler. Repeat instructions regularly. Make sure your own knowledge of correct inhaler technique is up to date so you can give a physical demonstration and coach patients.

How this recommendation was developed

Consensus

Based on clinical experience and expert opinion (informed by evidence, where available).

Provide self-management education, including a written asthma action plan. Consider whether the person needs:

- **a large-print written asthma action plan**
- **a pictorial action plan with minimal writing**
- **an integrated written self-management plan that includes instructions for managing comorbid conditions.**

How this recommendation was developed

Consensus

Based on clinical experience and expert opinion (informed by evidence, where available).

More information

Prescribing for older adults

Treatment-related adverse effects

Particular care may be needed when prescribing some medicines for older people.

Adverse effects of corticosteroids and beta$_2$-agonists are more common in patients aged 65 years and over than in younger adults, based on epidemiological evidence.[2, 3] Older people experience more adverse drug effects because of pharmacodynamic and pharmacokinetic changes and particularly drug–drug and drug–disease interactions.[4]

Theophylline is metabolised mainly by the liver and commonly interacts with other medicines. Its concentration in plasma should be monitored closely in older people.[4]

Oral corticosteroids are effective in regaining asthma control after a flare-up. However, long-term or frequent use increases the risk of

cataracts and osteoporosis in older patients[5] and may affect control of blood pressure, body weight and diabetes. Impaired glucose tolerance is common among older people, so consider monitoring blood glucose (e.g. morning and evening samples).

To minimise the risk of cataracts and osteoporosis, the use of oral corticosteroids should be minimised, and inhaled corticosteroids should be prescribed at the lowest dose needed to maintain good asthma control.[5]

Table. Treatment-related adverse effects reported in older people with asthma

Class of medicine	Potential adverse effects	Clinical action
Beta$_2$ agonists	Inotropic and chronotropic effects may worsen heart disease (e.g. arrhythmias, cardiomyopathy, myocardial ischaemia) or cause electrolyte disturbances.	Minimise need for short-acting beta$_2$ agonists by maintaining good asthma control with preventer treatment as indicated.
Inhaled corticosteroids	Long-term high doses may slightly increase risk of bone fractures. Overall, treatment does not appear to increase bone fracture risk in patients with COPD or asthma aged 40 years or over (meta-analysis of randomised controlled clinical trials).	Prescribe minimal dose needed to maintain good asthma control. Back-titrate dose in patients who have maintained good control for several months.
Combination inhaled corticosteroid/long-acting beta$_2$ agonist	Overall, treatment does not appear to increase risk (composite measure including asthma-related hospitalisations, deaths, and intubations) among patients aged ≥ 65 years (meta-analysis of controlled clinical trials comparing long-acting beta$_2$ agonists with no long-acting beta$_2$ agonist treatment).	Prescribe if indicated, as for younger adults.
Theophylline	Metabolised mainly by the liver. May interact with other medicines.	Monitor plasma concentration if theophylline needed to manage acute asthma. Avoid regular theophylline treatment.

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Asset ID: 48

Efficacy of asthma treatments

Older patients may have reduced response to bronchodilators and inhaled corticosteroids due to age-related changes such as stiffening of the chest wall, reduced respiratory muscle function, and an increase in residual volume from loss of elastic recoil in the lung.[2]

Effects of other medicines on asthma

Medicines that are commonly prescribed for older adults may worsen asthma control or interact with asthma medicines. Interactions

and adverse effects differ between individuals. Predictable bronchoconstriction can occur with:

- beta-adrenergic blocking agents (beta blockers) used in the management of hypertension, cardiac disorders, migraine and glaucoma
- cholinergic agents (e.g. carbachol, pilocarpine)
- cholinesterase inhibitors (e.g. pyridostygmine).

Comorbidity in older adults

Many older people with asthma also have multiple comorbidities and complex healthcare needs.[5, 6] Common conditions in older people that may affect asthma control include:[5]

- obesity
- gastro-oesophageal reflux disease
- obstructive sleep apnoea syndrome and other sleep disorders
- osteoporosis (vertebral fractures can impair respiratory capacity)
- cardiovascular disease (some medicines may worsen asthma).

The presence of diabetes can affect decisions about the use of systemic corticosteroids, while heart disease or anaemia can mimic symptoms.

There is limited clinical trial evidence to guide asthma management in older people with common comorbid conditions, because most asthma treatment trials have excluded people with these conditions.[3, 5] Guidelines for one disease condition may have to be modified for older people with multiple chronic diseases to avoid potential adverse effects including drug–drug interactions.[5]

Common age-related problems such as cognitive impairment, poor eyesight, hearing loss, poor coordination or osteoarthritis can affect a person's ability to use inhaler devices correctly.

Medicare items for chronic disease management (e.g. GP Management Plans, Team Care Arrangements, Multidisciplinary Care Plans) apply to patients with asthma.

▶ Go to: *Australian Government Department of Health*

Smoking and older adults

Older people who smoke may believe that the damage has already been done and therefore there is no benefit in attempting to quit, or believe that smoking is less risky in older people.[5]

However, older people can successfully quit smoking, and may even be less likely to relapse than younger adults.[5]

Choosing inhaler devices for older adults

Incorrect inhaler technique is common among older people with asthma or COPD, whether using a pressurised metered-dose inhaler or a dry-powder inhaler, particularly with those with more severe airflow limitation.[7, 5, 8, 9, 10, 11,12]

Table. Types of inhaler devices for delivering asthma and COPD medicines

Please view and print this figure separately: http://www.asthmahandbook.org.au/table/show/75

Inhaler devices should be used in favour of nebulisers wherever possible, just as for younger adults.[5] The use of nebulisers is more costly, carries a greater risk of side-effects and increases the risk of transmitting infections to other patients or to health workers. The use of ipratropium bromide via nebulisers with loose-fitting masks has been associated with pupil dilatation, blurred vision and acute glaucoma.[4] The use of inhaled corticosteroids by nebuliser can be associated with increased risk of skin atrophy or cataract if the seal around the mask is not good. In addition, in practice, many patients do not maintain their nebuliser adequately (e.g. they do not clean or change the bowl as often as recommended, increasing the chance of ineffective treatment or contamination).

Problems for older patients using inhalers

Common problems for older people include:[8, 11, 13, 14, 15, 16, 17]

- inadequate inspiratory flow (particularly among those with COPD), which limits ability to use dry-powder inhalers or pressurised metered-dose inhalers properly
- difficulty connecting a pressurised metered-dose inhaler to a spacer
- inability to coordinate breathing in with actuating a pressurised metered-dose inhaler
- inability to actuate a pressurised metered-dose inhaler due to arthritis or weakness of the hands
- inability to achieve a firm seal around the mouthpiece when using inhalers alone or with a spacer (particularly for patients with cognitive impairment, facial weakness, or who are missing teeth).

About half of all older people with asthma or COPD are prescribed more than one inhaler device.[18] As the number of prescribed devices increase, the frequency of error also increases.[19]

Inhaler options for older adults

Patients with arthritis may find it easier to use an aid (e.g. *Haleraid* hand-grip device) to help them actuate their inhaler, or use a breath-actuated inhaler. Mechanical difficulties can usually be overcome by checking each individual's technique and helping the person identify which inhaler they can use best among those available for the required medicine.

For some patients, a breath-actuated pressurised metered-dose inhaler (e.g. *Autohaler*) or breath-actuated dry-powder inhaler (e.g. *Turbuhaler* or *Accuhaler*) may be easier to use than pressurised metered-dose inhalers.[14, 15] However, some patients (e.g. those with severe COPD) may be unable to achieve a high enough inspiratory rate to actuate dry-powder inhalers (e.g. *Accuhaler* or *Turbuhaler*).[15, 17] With a breath-actuated inhaler, adequate lung doses of inhaled corticosteroids may be achieved despite poor technique.[20]

Older people with asthma can acquire and retain appropriate technique after specific instruction, but this instruction needs to be repeated regularly to reinforce correct inhaler technique,[5] just as for young people. People with cognitive impairment are likely to have problems retaining skills after instruction in the use of an inhaler.[21]

Table. Considerations when choosing inhaler devices for older patients

Problem	Solution
Reduced maximal inspiratory flow	Consider pMDI alone or with spacer Avoid dry-powder inhalers
Reduced manual dexterity (e.g. due to osteoarthritis)	Consider a *Haleraid* with a pMDI, where relevant (salbutamol, fluticasone, fluticasone/salmeterol) Consider pMDI with small-volume spacer or breath-actuated dry-powder inhaler
Inability to coordinate actuation and inhalation	Consider pMDI with spacer, breath-actuated pMDI or breath-actuated dry-powder inhaler Avoid pMDI without spacer
Inability to form effective seal with lips around mouthpiece	Use spacer plus face mask

Asset ID: 49

▶ Go to: National Asthma Council Australia's *Using your inhaler* webpage for information, patient resources and videos on inhaler technique
Go to: National Asthma Council Australia information paper for health professionals on *Inhaler technique for people with asthma and COPD*

Last reviewed version 2.0

Correct use of inhaler devices

Checking and correcting inhaler technique is essential to effective asthma management.

Most patients with asthma or COPD do not use their inhalers properly,[1, 4-7] and most have not had their technique checked or corrected by a health professional.

Incorrect inhaler technique when using maintenance treatments increases the risk of severe flare-ups and hospitalisation for people with asthma or COPD.[1, 4, 5, 14, 22, 23]

Poor asthma symptom control is often due to incorrect inhaler technique.[24, 25]

Incorrect inhaler technique when using inhaled corticosteroids increases the risk of local side effects like dysphonia and oral thrush.

The steps for using an inhaler device correctly differ between brands. Checklists of correct steps for each inhaler type and how-to videos are available from the National Asthma Council website.

▶ Go to: National Asthma Council Australia's *Using your inhaler* webpage for information, patient resources and videos on inhaler technique
Go to: National Asthma Council Australia's information paper for health professionals on *Inhaler technique for people with asthma or COPD*
Go to: NPS MedicineWise information on *Inhaler devices for respiratory medicines*

Last reviewed version 2.0

Self-management education for older adults

Inability to perceive airflow limitation or the severity of asthma symptoms, poor medication adherence, physical disability, cognitive dysfunction, and a passive self-management approach contribute to poorer asthma outcomes among elderly people with asthma.[22] Older people commonly attribute asthma symptoms to normal ageing and do not recognise the risk of asthma.[23]

Written asthma action plans for older people should be clear and easy to read. Some asthma educators use pictorial plans that feature images of the person's inhalers. Monitoring of peak expiratory flow at home (using a peak-flow meter) probably has no advantage over symptom monitoring in adults aged 50 years and over with moderate-to-severe asthma.[24]

Older people with multiple comorbid conditions are likely to be receiving advice from various health professionals. It may be necessary to integrate a person's written asthma action plan with their written advice for self-management of other conditions.

The best type of self-management education for older people with asthma has not been clearly identified, because the majority of studies have included younger adults. However, individualised education can improve older patients' ability to manage their asthma:

- Provision of information in writing (large, easy-to-read lettering with few words) and pictures can improve older people's lung function, asthma knowledge and skills, and ability and confidence to manage their asthma, compared with individualised education alone.[25]
- A combination of regular monitoring of asthma control, small-group education, personalised written asthma action plans, and coaching in correct use of inhalers can improve asthma-related quality of life, lung function and inhaler technique in adults aged 50 years and over with moderate-to-severe asthma.[24]

Telephone follow-up may help ensure older people have an asthma action plan.[26] Few studies have assessed strategies for improving adherence to asthma medicines in older patients.[6]

When caring for older Aboriginal and Torres Strait Islander people or people from culturally and linguistically diverse communities, health professionals should provide culturally appropriate health care and should work with interpreters as necessary to ensure effective communication.

▶ Go to: National Asthma Council Australia's *Asthma action plan resources*
See: *Providing self-management support for adults*

Psychosocial factors affecting asthma self-management

Psychosocial factors can affect asthma symptoms and outcomes in children and adults. These can include biological, individual, family and community-level factors, which can have synergistic effects in an individual with asthma.[27] Mechanisms may include effects of stress on the immune system[27] and effects of life circumstances on patients' and families' ability to manage asthma.

Relationships between psychosocial and cultural factors

Important influences on asthma outcomes include the person's asthma knowledge and beliefs, confidence in ability to self-manage, perceived barriers to healthcare, socioeconomic status, and healthcare system navigation skills, and by the quality of interaction and communication between patient and healthcare provider.[28] There is a complex interrelationship between:[28]

- patient factors (e.g. health literacy, health beliefs, ethnicity, educational level, social support, cultural beliefs, comorbidities, mental health)
- healthcare provider factors (e.g. communication skills, teaching abilities, available time, educational resources and skills in working with people from different backgrounds)
- healthcare system factors (e.g. the complexity of the system, the healthcare delivery model, the degree to which the system is oriented towards chronic disease management or acute care, and the degree to which the system is sensitive to sociocultural needs).

Health literacy

'Health literacy' refers to the individual's capacity to obtain, process, and understand basic health information and services they need to

make appropriate health decisions.[29] A person's level of health literacy is influenced by various factors including skills in reading, writing, numeracy, speaking, listening, cultural and conceptual knowledge.[28]

Inadequate health literacy is recognised as a risk factor for poorer health outcomes and less effective use of health care services.[28] Poor health literacy has been associated with poor asthma control,[30] poor knowledge of medications,[31] and incorrect inhaler technique.[31] Aspects of health literacy that have been associated with poorer asthma outcomes in adults include reading skills, listening skills, numeracy skills, and combinations of these.[28] Studies assessing the association between parents' health literacy and children's asthma have reported inconsistent findings.[28] Overall, there is not enough evidence to prove that low health literacy causes poor asthma control or inadequate self-management.[28]

Australian research suggests that there are probably many Australians with limited health literacy.[32] It may be possible to identify some groups of patients more likely to have inadequate health literacy, such as people living in regions with low socioeconomic status, and those with low English literacy (e.g. people with limited education, members of some ethnic minorities, immigrants, and the elderly).[28] However, even well-educated patients might have trouble with basic health literacy skills.[28]

Attempting to assess every patient's health literacy is impractical and may be embarrassing for the person and time-consuming for the health professional.[28] Instead, it may be more effective for health professionals simply to assume that all patients have limited health literacy.[28] Accordingly, all self-management skills need to be explained carefully, simply and repeatedly, and all written material should be clear and easy to read. Special consideration is needed for patients from culturally and linguistically diverse communities, including Aboriginal and Torres Strait Islander people.

Psychosocial support and improving health literacy

Psychosocial interventions that include asthma education may improve health-related quality of life for children and adolescents with asthma and their families.[33] However, simply providing education might not improve a person's health literacy, since it also depends on other factors like socioeconomic status, social support, and is influence by the provider and the healthcare system.[28]

Asthma Australia provides personal support and information for people with asthma and parents of children with asthma through the Asthma Australia Information line by telephone on 1800 Asthma (1800 278 462) or online.

▶ Go to: *Asthma Australia*

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Assessing and monitoring asthma control in older adults

Recommendations

As well as assessing asthma control and lung function, assess comorbidity, risk factors and psychosocial factors that may affect asthma control and self-management (e.g. poor eyesight, hearing loss, poor coordination, osteoarthritis, cognitive impairment and other mental health conditions).

How this recommendation was developed

Consensus

Based on clinical experience and expert opinion (informed by evidence, where available).

Review asthma regularly, as for younger adults. Consider:

- **recent asthma symptom control**
- **risk factors for flare-ups, deterioration in lung function or treatment-related adverse effects**
- **lung function**
- **inhaler technique**
- **adherence to medicines.**

How this recommendation was developed

Consensus

Based on clinical experience and expert opinion (informed by evidence, where available).

More information

Special considerations for review of asthma in older adults

Patient-reported symptoms can underestimate the severity of asthma in older adults.[1] Therefore, spirometry is necessary to measure lung function objectively.

Factors that can affect asthma control and self-management in older adults include comorbidity, chest infections, cognitive decline, social isolation, anxiety and depression, long-term smoking, obesity, dysfunctional breathing and exercise limitation.[2] The cost of medicines may also prevent people taking preventers as directed. All these factors should be checked when reviewing asthma.

The risk of dying from asthma increases with age in Australian men and women.[3] Approximately 60% of Australians who die from asthma are over 65 years old.[4] Most people 65 years and older who experience acute asthma are not taking regular inhaled corticosteroid treatment.[2]

Comorbidity in older adults

Many older people with asthma also have multiple comorbidities and complex healthcare needs.[2, 5] Common conditions in older people that may affect asthma control include:[2]

- obesity
- gastro-oesophageal reflux disease
- obstructive sleep apnoea syndrome and other sleep disorders
- osteoporosis (vertebral fractures can impair respiratory capacity)
- cardiovascular disease (some medicines may worsen asthma).

The presence of diabetes can affect decisions about the use of systemic corticosteroids, while heart disease or anaemia can mimic symptoms.

There is limited clinical trial evidence to guide asthma management in older people with common comorbid conditions, because most asthma treatment trials have excluded people with these conditions.[1, 2] Guidelines for one disease condition may have to be modified for older people with multiple chronic diseases to avoid potential adverse effects including drug–drug interactions.[2]

Common age-related problems such as cognitive impairment, poor eyesight, hearing loss, poor coordination or osteoarthritis can affect a person's ability to use inhaler devices correctly.

Medicare items for chronic disease management (e.g. GP Management Plans, Team Care Arrangements, Multidisciplinary Care Plans) apply to patients with asthma.

▶ Go to: *Australian Government Department of Health*

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