Taking smoking into consideration when assessing and managing a person’s asthma, encouraging a smoke-free environment for children, and helping people who smoke to quit

ABOUT

This PDF is a print-friendly reproduction of the content included in the Clinical issues – Smoking section of the Australian Asthma Handbook at asthmahandbook.org.au/clinical-issues/smoking

Please note the content of this PDF reflects the Australian Asthma Handbook at publication of Version 1.2 (October 2016). For the most up-to-date content, please visit asthmahandbook.org.au

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**ABBREVIATIONS**

| AC | COPD | COX | ED | EIB | FEV₁ | FVC | FSANZ | GORD | HFA | ICS | ICU | IgE | IV | LABA | LAMA | LTRA | MBS | NIPPV | NSAIDs | OCS | OSA | PaCO | PaO | PBS | PEF | pMDI | SABA | LAMA | TGA |
|----|------|-----|----|-----|-----|-----|-------|------|-----|-----|-----|-----|-----|-----|------|------|------|-----|-------|--------|-----|-----|------|-----|-----|-----|------|------|------|-----|-----|
| CFC | chronic obstructive pulmonary disease | cyclo-oxygenase | emergency department | exercise-induced bronchoconstriction | forced expiratory volume over one second | forced vital capacity | Food Standards Australia and New Zealand | gastro-oesophageal reflux disease | formulated with hydrofluoralkane propellant | inhaled corticosteroid | intensive care unit | Immunoglobulin E | intravenous | long-acting beta₂-adrenergic receptor agonist | leukotriene receptor antagonist | Medical Benefits Scheme | non-invasive positive pressure ventilation | nonsteroidal anti-inflammatory drugs | oral corticosteroids | obstructive sleep apnoea | carbon dioxide partial pressure on blood gas analysis | oxygen partial pressure on blood gas analysis | Pharmaceutical Benefits Scheme | peak expiratory flow | pressurised metered-dose inhaler or ‘puffer’ | short-acting beta₂-adrenergic receptor agonist | long-acting muscarinic antagonist | Therapeutic Goods Administration |

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- The Australian Primary Health Care Nurses Association (APNA)
- The Thoracic Society of Australia and New Zealand (TSANZ)

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Smoking and asthma

Overview

If a person smokes, or is exposed to other people’s tobacco smoke, this factor must be taken into account when investigating respiratory symptoms, assessing asthma control, and managing asthma.

Smoking:

- increases the risk of asthma flare-ups in people with asthma
- increases the risk of COPD
- reduces the probability of achieving good asthma control
- reduces therapeutic response to inhaled corticosteroid
- accelerates long-term decline in lung function.

Exposure to environmental tobacco smoke during gestation or early childhood increases the risk of early childhood wheezing and adversely affects lung function, as well increasing the risk of other congenital and childhood conditions.

The use of electronic cigarettes by people with asthma should not be encouraged until more evidence is available about short-term and long-term safety of all ingredients, including flavouring chemicals.

In this section

Assessment considerations
Smoking and asthma assessment

Management considerations
Smoking and asthma management

Asthma prevention
Asthma prevention and smoking
https://www.asthmahandbook.org.au/clinical-issues/smoking/asthma-prevention
Smoking and asthma assessment

Recommendations

Take a smoking history for all patients. Ask patients about exposure to environmental tobacco smoke as well as smoking.

How this recommendation was developed

Consensus

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

Consider scheduling planned asthma check-ups every 6 months for people who smoke to assess recent asthma symptom control and frequency of flare-ups. Explain that this is necessary because smoking increases a person’s risk of asthma flare-ups even if they have few symptoms, and because their lungs may be deteriorating faster than for a person who does not smoke.

Figure. Lung function decline in smokers and non-smokers with or without asthma

Please view and print this figure separately: https://www.asthmahandbook.org.au/figure/show/7

How this recommendation was developed

Consensus

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

- Dijkstra et al. 2006
- James et al. 2005
- O’Byrne et al. 2009
- Osborne et al. 2007
- Pedersen et al. 2007

Check the patient’s smoking status at regular intervals.

How this recommendation was developed

Consensus

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

Consider the possibility of coexisting COPD and asthma in people who smoke.

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:
Effects of smoking on lung health

Smokers with asthma show changes in airway epithelium, which are associated with increased asthma symptoms, such as shortness of breath and mucus production. Exposure to cigarette smoke in people with asthma alters the inflammatory disease mechanism to become more like that seen in people with chronic obstructive pulmonary disease (COPD). Smoking reduces lung function in people with or without asthma. In those with asthma, smoking accelerates decline in lung function over a lifetime.

Figure. Lung function decline in smokers and non-smokers with or without asthma

Please view and print this figure separately: https://www.asthmahandbook.org.au/figure/show/7

However, treatment with inhaled corticosteroids helps prevent lung function decline in smokers with asthma.

Smoking home-grown or illegally produced loose tobacco ('chop-chop') is likely to be at least as harmful as smoking branded cigarettes. Smoking any substance is likely to damage lungs.

Effects of exposure to environmental tobacco smoke on asthma

Among adults with asthma, exposure to cigarette smoke (smoking or regular exposure to environmental tobacco smoke within the previous 12 months) has been associated with a significantly increased risk of needing acute asthma care within the next 2–3 years.

Effects of smoking on asthma control and medicines

Smoking reduces the probability of achieving good asthma control. Among adults with asthma, exposure to cigarette smoke (smoking or regular exposure to environmental tobacco smoke within the previous 12 months) has been associated with a significantly increased risk of needing acute asthma care within the next 2–3 years.

Smoking reduces response to inhaled corticosteroids and oral corticosteroids in people with asthma. People who smoke may need higher doses of inhaled corticosteroids to receive the same benefits (improvement in lung function and reduction in flare-ups) as non-smokers.

Therapeutic response to montelukast appears to be unchanged by smoking. Therefore, montelukast may be useful in smokers with mild asthma.

Note: PBS status as at October 2016: Montelukast treatment is not subsidised by the PBS for people aged 15 years or over. Special Authority is available for DVA gold card holders, or white card holders with approval for asthma treatments.

Electronic cigarettes (e-cigarettes)

Electronic cigarettes (e-cigarettes) are battery powered devices that create a mist, allowing people to simulate cigarette smoking. Most deliver nicotine in a vapour. Many also contain flavouring chemicals.

Safety concerns

E-cigarettes produce fewer toxins than conventional cigarettes, but there is very little evidence about their long-term safety, and effects on lung function are unclear.

Concerns have been raised about the potential adverse effects on airway health:

- In a small controlled study conducted among healthy smokers, short-term use of e-cigarettes was associated with increase in respiratory flow resistance, increase in impedance, and decrease in exhaled nitric oxide, compared with use of the device after removal of the cartridge containing the vapourisable liquid.
- Some e-cigarettes may contain potentially harmful chemicals such as propylene glycol (a respiratory irritant), formaldehyde, formaldehyde-forming hemiacetals, and potentially toxic particulate matter.
It is recommended that health authorities act to minimise harm until evidence of safety, quality and efficacy can be produced. There is currently insufficient evidence to conclude whether e-cigarettes can benefit smokers in quitting, or about the extent of their potential harms. It is recommended that health authorities act to minimise harm until evidence of safety, quality and efficacy can be produced.

The National Health and Medical Research Council (NHMRC) statement on e-cigarettes concludes:

Positions and guidance by Australian organisations

The National Health and Medical Research Council (NHMRC) statement on e-cigarettes concludes: There is currently insufficient evidence to conclude whether e-cigarettes can benefit smokers in quitting, or about the extent of their potential harms. It is recommended that health authorities act to minimise harm until evidence of safety, quality and efficacy can be produced.

NHMRC advises that studies show that e-cigarettes expose both users and bystanders to particulate matter (very small particles) that may worsen existing illnesses, or increase the risk of developing diseases such as cardiovascular or respiratory disease.

Lung Foundation Australia recommends people quit smoking rather than try e-cigarettes. Quit Victoria warns that the short- and long-term health impacts of using e-cigarettes remain unknown, noting that e-cigarettes currently on the market have not passed through the extensive safety and efficacy evaluation required for products involving delivery of chemicals to the lung. Quit Victoria recommends that people use quitting aids approved by the Therapeutic Goods Administration, which have good safety profiles and have been shown to increase long-term quitting rates.

Very few studies have assessed potential benefits and harms in people with asthma. A small cohort study reported improvements in respiratory symptoms, lung function, airway hyperresponsiveness, and asthma control (measured by ACQ score) in people with asthma who switched from smoking conventional cigarettes to e-cigarettes.

Positions and guidance by Australian organisations

The National Health and Medical Research Council (NHMRC) statement on e-cigarettes concludes: There is currently insufficient evidence to conclude whether e-cigarettes can benefit smokers in quitting, or about the extent of their potential harms. It is recommended that health authorities act to minimise harm until evidence of safety, quality and efficacy can be produced.

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References


Figure. Lung function decline in smokers and non-smokers with or without asthma

Mean FEV₁ corrected for baseline height, weight and age in (a) men and (b) women

<table>
<thead>
<tr>
<th>Graph</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>People who do not have asthma and do not smoke</td>
</tr>
<tr>
<td>b</td>
<td>People with asthma who do not smoke</td>
</tr>
<tr>
<td></td>
<td>People who do not have asthma who smoke</td>
</tr>
<tr>
<td></td>
<td>People with asthma who smoke</td>
</tr>
</tbody>
</table>

Source
Asset ID: 7
Smoking and asthma management

Recommendations

Advise all patients with asthma to avoid tobacco smoke.

How this recommendation was developed
Consensus
Based on clinical experience and expert opinion (informed by evidence, where available).

For those who smoke, advise quitting and support them to quit.

How this recommendation was developed
Adapted from existing guidance
Based on reliable clinical practice guideline(s) or position statement(s):

- Zwar et al. 2011

Repeatedly offer help to quit smoking, whether or not the person shows interest in quitting.

How this recommendation was developed
Adapted from existing guidance
Based on reliable clinical practice guideline(s) or position statement(s):

- Zwar et al. 2011

Follow the national smoking cessation guidelines for health professionals, including prescribing nicotine-replacement therapy and other pharmacotherapy as indicated.

Go to: The Royal Australian College of General Practitioners' Supporting smoking cessation: a guide for health professionals

How this recommendation was developed
Adapted from existing guidance
Based on reliable clinical practice guideline(s) or position statement(s):

- Zwar et al. 2011

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):
If prescribing smoking cessation therapies, check for potential drug–drug interactions with asthma medicines and other medicines.

*How this recommendation was developed*
Adapted from existing guidance
Based on reliable clinical practice guideline(s) or position statement(s):
- Zwar et al. 2011

Consider using the person's spirometry readings to motivate them to quit.

*How this recommendation was developed*
Consensus
Based on clinical experience and expert opinion (informed by evidence, where available).

Do not encourage the use of electronic cigarettes, even for the purpose of smoking cessation.

*How this recommendation was developed*
Consensus
Based on clinical experience and expert opinion (informed by evidence, where available).

For people with asthma who continue to smoke or are exposed to tobacco smoke, consider:
- prescribing an inhaled corticosteroid, even if the person experiences few or 'mild' symptoms
- whether the person is experiencing a reduced response to their prescribed inhaled corticosteroids
- whether the person may benefit from regular treatment with montelukast.

**Table. Steps for conducting a treatment trial**

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

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

Asset ID: 36

Note: PBS status as at October 2016: Montelukast treatment is not subsidised by the PBS for people aged 15 years or over. Special Authority is available for DVA gold card holders, or white card holders with approval for asthma treatments.

*How this recommendation was developed*
Consensus
After a person with asthma quits smoking, review preventer dose requirements and step down, if possible.

*How this recommendation was developed*

**Consensus**

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

Arrange follow-up to maximise the person’s chance of staying smoke-free, based on the individual’s needs and according to the national smoking cessation guidelines.

More information

**Benefits of quitting smoking for people with asthma**

Evidence from cohort studies suggests that smoking cessation can reverse the effects of smoking on airways of people with asthma. Epithelial characteristics in ex-smokers with asthma are similar to those in people with asthma who have never smoked.  

Within 6 weeks of quitting smoking, people with asthma show improvement in lung function and a reduction in airway inflammation, compared with people with asthma who continue to smoke, based on evidence from a nonrandomised comparative cohort study.  

**Supporting patients to quit smoking**

In the past, health professionals were sometimes advised to attempt to identify patients who are ready to quit smoking and focus interventions on these people. However, recent evidence suggests that offering all smokers help to quit is more effective than offering help only to those who express interest quitting.

People with asthma may find it very difficult to quit, even compared with other smokers, so they may need extra support and encouragement from health professionals.

Some health professionals use graphs showing the rate of smoking-associated lung function decline to motivate people with asthma to quit.

*Figure. Lung function decline in smokers and non-smokers with or without asthma*
When prescribing smoking cessation medicines for patients taking any other medicines, consider potential drug–drug interactions (e.g. bupropion toxicity may be increased when taken concomitantly with aminophylline or corticosteroids).

Electronic cigarettes (e-cigarettes)

Electronic cigarettes (e-cigarettes) are battery powered devices that create a mist, allowing people to simulate cigarette smoking. Most deliver nicotine in a vapour. Many also contain flavouring chemicals.

Safety concerns

E-cigarettes produce fewer toxins than conventional cigarettes, but there is very little evidence about their long-term safety, and effects on lung function are unclear.

Concerns have been raised about the potential adverse effects on airway health:

- In a small controlled study conducted among healthy smokers, short-term use of e-cigarettes was associated with increase in respiratory flow resistance, increase in impedance, and decrease in exhaled nitric oxide, compared with use of the device after removal of the cartridge containing the vapourisable liquid.
- Some e-cigarettes may contain potentially harmful chemicals such as propylene glycol (a respiratory irritant), formaldehyde, formaldehyde-forming hemiacetals, and potentially toxic particulate matter.
- A study reported that inhalation of e-cigarette solutions was associated with airway inflammation and airway hyperresponsiveness in a mouse model.
- An in vitro study reported that some constituents of liquid flavourings in e-cigarettes evoked a cellular physiological response in mouse tracheal epithelial cells, which suggests that flavourings in e-cigarettes could harm airways.
- A study using a mouse model reported that neonatal exposure to e-cigarette emissions impaired lung growth.

Very few studies have assessed potential benefits and harms in people with asthma. A small cohort study reported improvements in respiratory symptoms, lung function, airway hyperresponsiveness, and asthma control (measured by ACQ score) in people with asthma who switched from smoking conventional cigarettes to e-cigarettes.

Positions and guidance by Australian organisations

The National Health and Medical Research Council (NHMRC) statement on e-cigarettes concludes: There is currently insufficient evidence to conclude whether e-cigarettes can benefit smokers in quitting, or about the extent of their potential harms. It is recommended that health authorities act to minimise harm until evidence of safety, quality and efficacy can be produced.

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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.

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

Effects of smoking on asthma control and medicines

Smoking reduces the probability of achieving good asthma control. Among adults with asthma, exposure to cigarette smoke (smoking or regular exposure to environmental tobacco smoke within the previous 12 months) has been associated with a significantly increased risk of needing acute asthma care within the next 2–3 years.
Smoking reduces response to inhaled corticosteroids and oral corticosteroids in people with asthma.2,3,4,5,8 People who smoke may need higher doses of inhaled corticosteroids to receive the same benefits (improvement in lung function and reduction in flare-ups) as non-smokers.8

Therapeutic response to montelukast appears to be unchanged by smoking.4 Therefore, montelukast may be useful in smokers with mild asthma.6,7

Note: PBS status as at October 2016: Montelukast treatment is not subsidised by the PBS for people aged 15 years or over. Special Authority is available for DVA gold card holders, or white card holders with approval for asthma treatments.

**Stepping down regular asthma medicines in adults**

The main aim of medical treatment for asthma is to achieve good asthma control and minimise the risks of asthma with the lowest effective dose of preventer medicines for each individual.

Stepping down is considered when the patient has experienced good asthma control for 2–3 months and is at low risk of flare-ups.

**Figure. Stepped approach to adjusting asthma medication in adults**

Please view and print this figure separately: https://www.asthmahandbook.org.au/figure/show/31

**General tips**

It is important to ascertain the person’s actual treatment regimen before stepping down, because many patients may already be taking their preventer only intermittently.

Those who deliberately avoid taking their preventer due to concerns about inhaled corticosteroids may accept regular daily treatment at a lower dose, with an action plan to deal with flare-ups.

Steps down should be planned before the patient has finished their current inhaler, so that the previous dose can be resumed immediately if asthma control deteriorates.

Patients should be advised to step back up if they or their clinician judge that their asthma is worse overall (not just after the first time they experience asthma symptoms after stepping down). Patients and clinicians should agree beforehand on criteria for worsening asthma control.

Some patients are very concerned about reducing their dose (despite the risk of treatment-related adverse effects) and may prefer to stay on high doses for long periods. To enable early detection of deterioration in control during step-down, patients can be asked to monitor their peak flow for 2 weeks before, and 3–4 weeks after, the dose reduction.

**Stepping down inhaled corticosteroid dose**

For many patients with well-controlled asthma taking inhaled corticosteroid/long-acting beta2 agonist combinations or inhaled corticosteroids alone, the inhaled corticosteroid dose can be reduced without loss of asthma control if downward dose adjustments are made gradually.25,26

The dose can be reduced by stepping down through the available formulations.

Note: TGA-registered fluticasone furoate/vilanterol combinations contain moderate-to-high doses of inhaled corticosteroid (100/25 mcg and 200/25 mcg respectively).

**Ceasing inhaled corticosteroid**

Patients with well-controlled asthma who stop taking regular low-dose inhaled corticosteroid treatment have an increased risk of flare-ups, compared with those who continue inhaled corticosteroids.27

It may sometimes be necessary to stop treatment temporarily in order to confirm the diagnosis of asthma in a person taking inhaled corticosteroids. In this situation, close monitoring of symptom control is needed.

**Table. Confirming the diagnosis of asthma in a person using preventer treatment**

Please view and print this figure separately: https://www.asthmahandbook.org.au/table/show/9

**Table. Definitions of ICS dose levels in adults**

<table>
<thead>
<tr>
<th>Inhaled corticosteroid</th>
<th>Daily dose (mcg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>Medium</td>
</tr>
<tr>
<td></td>
<td></td>
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</tbody>
</table>
### Inhaled corticosteroid Daily dose (mcg)

<table>
<thead>
<tr>
<th>Inhaled corticosteroid</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beclometasone dipropionate †</td>
<td>100–200</td>
<td>250–400</td>
<td>&gt;400</td>
</tr>
<tr>
<td>Budesonide</td>
<td>200–400</td>
<td>500–800</td>
<td>&gt;800</td>
</tr>
<tr>
<td>Ciclesonide</td>
<td>80–160</td>
<td>240–320</td>
<td>&gt;320</td>
</tr>
<tr>
<td>Fluticasone furoate*</td>
<td>—</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>Fluticasone propionate</td>
<td>100–200</td>
<td>250–500</td>
<td>&gt;500</td>
</tr>
</tbody>
</table>

† Dose equivalents for Qvar (TGA-registered CFC-free formulation of beclometasone dipropionate).

*Fluticasone furoate is not available as a low dose. TGA-registered formulations of fluticasone furoate contain a medium or high dose of fluticasone furoate and should only be prescribed as one inhalation once daily.

**Note:** The potency of generic formulations may differ from that of original formulations. Check TGA-approved product information for details.

**Sources**


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### Ceasing long-acting beta\(_2\) agonist

Patients whose asthma is well controlled with an inhaled corticosteroid/long-acting beta\(_2\) agonist combination (either as conventional maintenance treatment plus short-acting beta\(_2\) agonist reliever, or as budesonide/formoterol maintenance-and-reliever therapy) can continue taking this regimen long-term. The dose can be reduced by stepping down through the available formulations.

Alternatively, for patients taking an inhaled corticosteroid/long-acting beta\(_2\) agonist combination as maintenance treatment, the combination can be replaced with an inhaled corticosteroid inhaler at the same dose. However, a meta-analysis of several studies reported deterioration in asthma control after ceasing long-acting beta\(_2\) agonist treatment in patients with asthma previously stabilised on inhaled corticosteroid/long-acting beta\(_2\) agonist combination. Therefore, if inhaled corticosteroid/long-acting beta\(_2\) agonist is replaced by inhaled corticosteroid only, patients should be advised to start taking their old combination inhaler again if asthma worsens within the first few days after switching.

**Note:** For patients taking fluticasone furoate/vilanterol, no studies are available to guide stepping down. Options include stepping down to inhaled corticosteroid alone (recommended in the TGA-approved Product Information), standing down to inhaled corticosteroid/long-acting beta\(_2\) agonist combination that will achieve a lower inhaled corticosteroid dose, or switching to twice-daily low-dose fluticasone propionate/salmeterol (100/25 mcg or 50/25 mcg). With either option, patients need careful explanation, including clear written instructions, to avoid potential confusion when changing between inhaler devices and dosing frequencies.

### References


Before considering stepping up, check symptoms are due to asthma, inhaler technique is correct, and adherence is adequate.

Consider stepping up if good control is not achieved.

When asthma is stable and well controlled for 2–3 months, consider stepping down (e.g. reducing inhaled corticosteroid dose, or stopping long-acting beta\(_2\) agonist if inhaled corticosteroid dose is already low).

ICS: inhaled corticosteroid; SABA: short-acting beta\(_2\) agonist; LABA: long-acting beta\(_2\) agonist

* Reliever means rapid-onset beta\(_2\) agonist and includes:
  - short-acting beta\(_2\) agonists
  - low-dose budesonide/formoterol combination – only applies to patients using this combination in a maintenance-and-reliever regimen. (This combination is not classed as a reliever when used in a maintenance-only regimen).

§ In addition, manage flare-ups with extra treatment when they occur, and manage exercise-related asthma symptoms as indicated.

Asset ID: 31
Table. Confirming the diagnosis of asthma in a person using preventer treatment

<table>
<thead>
<tr>
<th>Clinical profile</th>
<th>Lung function</th>
<th>Interpretation or action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Typical variable respiratory symptoms</strong></td>
<td>Variable airflow limitation demonstrated</td>
<td>Consistent with asthma diagnosis.</td>
</tr>
<tr>
<td></td>
<td>Variable airflow limitation not demonstrated</td>
<td>Note: In a patient with a confirmed diagnosis of asthma, these features are consistent with sub-optimal (poor or partial) asthma control and suggest treatment should be reviewed.</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td><strong>Current respiratory symptoms</strong></td>
<td>Fixed (irreversible or incompletely reversible) airflow limitation (post-bronchodilator FEV₁/FVC &lt; lower limit of normal for age and FEV₁ &lt; 80% predicted)</td>
<td>Obtain historical documentation of variable airflow limitation if possible.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If not available, test again (either of):</td>
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<tr>
<td></td>
<td></td>
<td>• Repeat lung function test during and after symptoms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Withhold bronchodilator treatment for required time then repeat spirometry before and 10–15 minutes after salbutamol.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If diagnosis still not confirmed, consider bronchial provocation (challenge) test.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note: a negative challenge test would not rule out asthma in a person taking inhaled corticosteroids.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consider referral to a specialist respiratory physician to confirm the diagnosis.</td>
</tr>
<tr>
<td><strong>Few respiratory symptoms</strong></td>
<td>Variable airflow limitation not demonstrated</td>
<td>Obtain historical documentation of variable airflow limitation if possible.</td>
</tr>
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</tr>
</tbody>
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Note: In a patient with a confirmed diagnosis of asthma, these features are consistent with sub-optimal (poor or partial) asthma control and suggest treatment should be reviewed.
<table>
<thead>
<tr>
<th>Clinical profile</th>
<th>Lung function</th>
<th>Interpretation or action</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>If not available, consider back-titrating preventer by one step:†</td>
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<td></td>
<td></td>
<td>† Reduce inhaled corticosteroid dose by 50%.</td>
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<td>† 2–3 weeks later reassess lung function by spirometry before and 10–15 minutes after salbutamol.</td>
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<td>† If still no evidence of variable airflow limitation, consider stopping preventer treatment (with close monitoring) and repeating spirometry another 2–3 weeks later.</td>
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<td>If preventer is ceased and symptoms do not return at 2–3 weeks, review within 6 months.</td>
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</table>

Table applies to patients taking maintenance inhaled corticosteroid or combination inhaled corticosteroid/long-acting beta$_2$ agonist

§ When spirometry is performed as a diagnostic test, inhaled bronchodilators should be withheld before the test. Withholding times vary between medicines:

- at least 4 hours for short-acting beta$_2$ agonists (e.g. salbutamol, terbutaline) and short-acting muscarinic antagonists (e.g. ipratropium)
- at least 12 hours for preventers containing long-acting beta$_2$ agonists for which twice-daily dosing is recommended (e.g. formoterol, salmeterol)
- at least 24 hours for long-acting muscarinic antagonists (e.g. aclidinium, glycopyrronium, tiotropium) and preventers containing long-acting beta$_2$ agonists with once-daily dosing (e.g. fluticasone furoate plus vilanterol).

Note: Requested withholding times may vary between centres that conduct formal lung function testing.

† For patients using inhaled corticosteroid/long-acting beta$_2$ agonist combinations, reduce the dose of inhaled corticosteroid component by 50%. For those already using the lowest possible dose of inhaled corticosteroid/long-acting beta$_2$ agonist combination, consider switching to low-dose inhaled corticosteroid or stopping preventer.

Before stepping down, document the patient’s current asthma status and risk factors, and ensure that the person has a written asthma action plan and an appointment for asthma review.

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Asset ID: 9
Asthma prevention and smoking

Recommendations

Advise women not to smoke while pregnant.

How this recommendation was developed

Consensus

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

Advise parents to ensure babies and children are not exposed to cigarette smoke (or to toxins from tobacco smoke that remain in clothing and hair).

More information

Prenatal and childhood exposure to tobacco smoke
Tobacco smoking by pregnant women damages children’s respiratory health. It also increases the risk of stillbirth, spontaneous abortion, reduced foetal growth, preterm birth, low birth weight, placental abruption, sudden infant death, cleft palate, cleft lip and childhood cancers.¹

Risk of developing asthma
Prenatal exposure to tobacco smoke and exposure during infancy increase the risk of wheezing during early childhood.²

See: Primary prevention of asthma

Effects on children’s asthma
Evidence from an Australian cohort study suggests that children with asthma whose mothers smoked during pregnancy benefit less from treatment with inhaled corticosteroids, and show less improvement in airway hyperresponsiveness over time, than those with asthma but no intrauterine exposure to smoke.³

Electronic cigarettes (e-cigarettes)
Electronic cigarettes (e-cigarettes) are battery powered devices that create a mist, allowing people to simulate cigarette smoking. Most deliver nicotine in a vapour. Many also contain flavouring chemicals.

Safety concerns
E-cigarettes produce fewer toxins than conventional cigarettes, but there is very little evidence about their long-term safety,⁴ and effects on lung function are unclear.⁵

Concerns have been raised about the potential adverse effects on airway health:

- In a small controlled study conducted among healthy smokers, short-term use of e-cigarettes was associated with increase in respiratory flow resistance, increase in impedance, and decrease in exhaled nitric oxide, compared with use of the device after removal of the cartridge containing the vapourisable liquid.⁶
Some e-cigarettes may contain potentially harmful chemicals such as propylene glycol (a respiratory irritant), formaldehyde, formaldehyde-forming hemiacetals, and potentially toxic particulate matter. A study reported that inhalation of e-cigarette solutions was associated with airway inflammation and airway hyperresponsiveness in a mouse model. An in vitro study reported that some constituents of liquid flavourings in e-cigarettes evoked a cellular physiological response in mouse tracheal epithelial cells, which suggests that flavourings in e-cigarettes could harm airways. A study using a mouse model reported that neonatal exposure to e-cigarette emissions impaired lung growth.

Very few studies have assessed potential benefits and harms in people with asthma. A small cohort study reported improvements in respiratory symptoms, lung function, airway hyperresponsiveness, and asthma control (measured by ACQ score) in people with asthma who switched from smoking conventional cigarettes to e-cigarettes.

Positions and guidance by Australian organisations

The National Health and Medical Research Council (NHMRC) statement on e-cigarettes concludes: There is currently insufficient evidence to conclude whether e-cigarettes can benefit smokers in quitting, or about the extent of their potential harms. It is recommended that health authorities act to minimise harm until evidence of safety, quality and efficacy can be produced.

NHMRC advises that studies show that e-cigarettes expose both users and bystanders to particulate matter (very small particles) that may worsen existing illnesses, or increase the risk of developing diseases such as cardiovascular or respiratory disease.

Lung Foundation Australia recommends people quit smoking rather than try e-cigarettes.

Quit Victoria warns that the short- and long-term health impacts of using e-cigarettes remain unknown, noting that e-cigarettes currently on the market have not passed through the extensive safety and efficacy evaluation required for products involving delivery of chemicals to the lung. Quit Victoria recommends that people use quitting aids approved by the Therapeutic Goods Administration, which have good safety profiles and have been shown to increase long-term quitting rates.

References
