National Asthma Council Australia

AUSTRALIAN ASTHMA HANDBOOK

VERSION 2.0

MANAGEMENT

Adolescents

This PDF is a print-friendly reproduction of the content included in the *Management – Adolescents* section of the *Australian Asthma Handbook* at **asthmahandbook.org.au/management/adolescents**

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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 adolescents and young adults

Overview

This section deals with special considerations for asthma in adolescents and young adults. It should be used in conjunction with the general Diagnosis and Management sections of this handbook.

For younger adolescents, the general guidance for diagnosing and managing asthma in children will apply in most situations. By mid-adolescence (around 14–16 years), the general guidance for diagnosing and managing asthma in adults will apply in most situations.

▶ See: *Diagnosing asthma in children*
See: *Diagnosing asthma in adults*
See: *Managing asthma in children*
See: *Managing asthma in adults*

Note: Various age ranges are used to define adolescence.[1] In this handbook 'adolescents' refers to people aged approximately 12–18 years and 'young adults' refers to people aged 19–24 years, acknowledging that hormonal changes that accompany puberty may begin before age 12 and maturation may continue beyond age 24.

In this section

References

1. Sawyer SM, Afifi RA, Bearinger LH, *et al*. Adolescence: a foundation for future health. *Lancet*. 2012; 379: 1630-1640. Available from: http://www.ncbi.nlm.nih.gov/pubmed/22538178

Investigating asthma-like symptoms in adolescents and young adults

Recommendations

Use spirometry to assess lung function objectively and to confirm the diagnosis, even if the person had asthma during childhood.

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):

- Towns and Asperen, 2009[1]
- Weinberger and Abu-Hasan, 2007[2]
- Yeatts *et al.* 2003[3]

For adolescents with exercise-related symptoms, consider objective tests (e.g. exercise testing, bronchial provocation (challenge) tests) or referral to investigate the possibility of non-asthma causes such as dyspnoea due to poor cardiopulmonary fitness, hyperventilation or upper airway dysfunction.

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):

- British Thoracic Society and Scottish Intercollegiate Guidelines Network, 2008[4]
- Tilles, 2010[5]

Ask about smoking and exposure to other people's tobacco smoke.

How this recommendation was developed

Consensus

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

In adolescent girls, consider whether asthma symptoms are affected by the menstrual cycle.

How this recommendation was developed

Consensus

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

More information

Impact of puberty on asthma

In the past, it was thought that children typically 'outgrew' asthma due to maturation of the autonomic and central nervous systems under the effect of sex steroids during puberty.[6] However, there is little evidence to support this assumption.[6] Puberty does not predict

remission of asthma. Almost two-thirds of children with chronic asthma have persistent symptoms throughout puberty.[6]

Early puberty has been reported to be an independent risk factor for the persistence of asthma into adolescence, and for the severity of asthma in adulthood.[6] The mechanism for this association is unclear, and might involve the effects of hormonal changes on reactivity of airways or risk factors that are common to both asthma and early puberty.[6]

Increased BMI in girls has been associated with both early puberty and increased asthma risk.

Australian data show that more boys than girls experience remission of asthma during adolescence (based on 2007–2008 data):[7]

- the prevalence of current asthma is higher for boys than girls among children aged 0–14 years, and higher for women among people aged 15 years and over
- the prevalence of current asthma in children aged 10–14 years is approximately 12% for boys and 7% for girls
- the prevalence of current asthma in adolescents and young adults aged 15–24 years is approximately 11% in both sexes.

Asthma can worsen or improve during adolescence; close monitoring is necessary so that medicines can be adjusted to maintain good asthma control at the lowest effective doses. If attempted back-titration of an adolescent's preventer dose or step-down in the treatment regimen results in worsening of asthma symptoms, this experience can help the person understand why it is necessary to take these medicines regularly. Health professionals can make unsuccessful back-titration an opportunity to reinforce self-management education.

Asthma can occur for the first time during adolescence, more commonly in girls than boys.[1] The true prevalence of asthma in adolescents is difficult to estimate because of under- and over-diagnosis.

Assessment of asthma in adolescents

The majority of adolescents with asthma have normal lung function despite experiencing significant asthma symptoms.[8]

Lung function may not be a strong predictor of future flare-ups or correlate with current symptoms in adolescents.[9]

Assessment of asthma in adolescents is usually similar to assessment in adults, taking into account confidentiality and psychosocial factors that are especially important in this age group.

At each visit, it is useful to ask about days absent from school due to asthma.

Table. Definition of levels of recent asthma symptom control in adults and adolescents (regardless of current treatment regimen)

Good control	Partial control	Poor control
All of: • Daytime symptoms ≤2 days per week • Need for SABA reliever ≤2 days per week† • No limitation of activities • No symptoms during night or on waking	One or two of: • Daytime symptoms >2 days per week • Need for SABA reliever >2 days per week† • Any limitation of activities • Any symptoms during night or on waking	Three or more of: • Daytime symptoms >2 days per week • Need for SABA reliever >2 days per week† • Any limitation of activities • Any symptoms during night or on waking

SABA: short-acting beta$_2$-agonist

† SABA, not including doses taken prophylactically before exercise. (Record this separately and take into account when assessing management.)

Note: Recent asthma symptom control is based on symptoms over the previous 4 weeks.

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▶ See: *Assessing symptom control and risk in adults*
See: *Assessing symptoms and control in children 6 years and over*

Diagnostic difficulties when investigating asthma-like symptoms in adolescents

Asthma is commonly misdiagnosed in young people presenting with exercise-related symptoms or cough.[1] Conditions associated with dyspnoea include hyperventilation, anxiety, and poor cardiopulmonary fitness.[2]

Both denial and overplay of symptoms has been observed among adolescents.[1] Adolescents with new or re-emerging asthma symptoms may deny their symptoms.[1] US data suggest that risk factors for undiagnosed asthma among adolescents include female sex, smoking (current smoking and exposure to others' smoke), low socioeconomic status, family problems, low physical activity and high body mass.[3]

Exercise-related symptoms in adolescents

In adolescents, exercise-related wheezing and breathlessness are poor predictors of exercise-induced bronchoconstriction. Only a minority of adolescents referred for assessment of exercise-induced respiratory symptoms show objective evidence of exercise-induced bronchoconstriction.[10]

For adolescents with exercise-related symptoms, common conditions that should be considered in the differential diagnosis include poor cardiopulmonary fitness, exercise-induced upper airway dysfunction and exercise-induced hyperventilation.[1, 5]

In addition to spirometry, other objective tests (e.g. cardiopulmonary fitness testing, bronchial provocation tests) may be helpful to clarify the diagnosis and inform management.

▶ See: *Investigation and management of exercise-induced bronchoconstriction*

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Psychosocial factors affecting adolescent health

Adolescence is a time of rapid growth and physical, cognitive, emotional and social development. An adolescent's age is not a reliable indicator of maturity in each of these areas.[11]

Mental health disorders (e.g. depression, anxiety, eating disorders) are common and clinically important among young people.[11] A significant proportion of adult mental health problems emerge during adolescence.[11]

Adolescence is also a time when people can begin risky behaviours (e.g. smoking, poor eating habits, physical inactivity, and drug and alcohol use), which can continue into adulthood.[11, 12] Although smoking rates among adolescents and young people are declining,[13] approximately 6% of adolescents aged 15–17 years smoke, and 4% smoke at least daily.[14] Smoking rates are higher among Aboriginal and Torres Strait Islander young people, young people living in rural and remote communities, and young people of lower socioeconomic status.[15, 13]

Adolescents with chronic disease show higher rates of health risk behaviours than healthy adolescents.[11, 16] Some risk behaviours are based on incorrect health beliefs (e.g. the myth that smoking cannabis is good for asthma).

Risk-taking behaviour – as well as poor understanding of their health condition – may contribute to the higher rate of food-induced fatal anaphylaxis among adolescents and young adults, compared with other age groups.[17]

Depression, risk behaviours and poor adherence to medicines are interrelated.[18] Adolescents with asthma who adhere poorly to asthma treatment and hide their asthma are more likely to start smoking than other adolescents with asthma.[19] Among adolescent boys, those with lower quality of life are most likely to start smoking.[19]

Adolescents often wish to discuss their health concerns with health professionals but are reluctant to discuss sensitive issues unless asked directly and confidentially.[11]

Physiological and psychological changes

Stress, anxiety and extreme emotions

Some patients report asthma flare-ups and asthma symptoms in response to stress and extreme emotions.[20, 21]

Adolescents with asthma may experience breathlessness in response to stress (without changes in lung function or other asthma symptoms).[22]

▶ See: *Investigating asthma-like symptoms in adolescents and young adults*

Laughter

Laughing is a common trigger for wheeze in infants. In children, the presence of respiratory symptoms that are triggered by laughter increases the probability of symptoms being due to asthma.

▶ See: *Diagnosing asthma in children*

Hormonal changes

Asthma may worsen during the premenstrual phase in up to 40% of women, possibly due to a reduced response to corticosteroids and bronchodilators.[23] However, this rarely causes severe flare-ups.[23]

Perimenstrual worsening asthma may be relatively common among women with severe or poorly controlled asthma, and may share risk factors with aspirin-exacerbated respiratory disease.[24]

Asthma control worsens during pregnancy in about one third of women with asthma.[25] During pregnancy, approximately 6% of women with asthma are hospitalised with a severe asthma flare-up.[26, 27]

▶ See: *Managing asthma during pregnancy*

Sexual activity

Sexual activity may trigger asthma symptoms possibly due to physical exertion (exercise-induced bronchoconstriction), heightened emotion, or a combination of these factors. Exposure to dust mite allergens in bedding may also be a trigger for people who are sensitised.

People with asthma may experience limitation to sexual activity due to asthma or be concerned about the effect of their asthma on their sex life.[28, 29] However, patients are unlikely to mention concerns about sexual activity to their doctor.[29]

Practical information for patients about sex and asthma is available from Asthma Australia.

▶ Go to: Asthma Australia's *Triggers* webpage
See: *Investigation and management of exercise-induced bronchoconstriction*

Resources for health professionals working with adolescents

▶ Go to: The Royal Australasian College of Physicians' *Working with young people* online resource
Go to: *Headspace*: Australia's National Youth Mental Health Foundation
Go to: *Inspire Foundation*
Go to: *Reachout*
Go to: The Royal Children's Hospital Melbourne's *Transition – for health professionals*
Go to: NSW Agency for Clinical Innovation's Transition planning checklist
Go to: NSW Centre for Advancement of Adolescent Health, The Children's Hospital at Westmead's Adolescent health GP resources
Go to: *ChIPS (Chronic Illness Peer Support)*
Go to: *Relationships Australia*
Go to: *Smarter than Smoking*
Go to: The Children's Hospital at Westmead's *Kids Quit smoking cessation brief interventions*

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Assessing and managing asthma in adolescents and young adults

Recommendations

By mid-adolescence (around 14–16 years), consider applying asthma management guidance for adults in most situations.

Note: Whether the individual is considered to be a child or adult for the purposes of prescribing will depend on the individual's size and clinical factors, TGA-approved product information for medicines, and PBS subsidisation criteria.

How this recommendation was developed

Consensus

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

For patients who report the diagnosis of asthma made in the past or elsewhere, confirm the diagnosis if possible.

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

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

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):

- Aaron *et al.* 2008[1]
- Lucas *et al.* 2008[2]
- Luks *et al.* 2010[3]
- Marklund *et al.* 1999[4]

Consider whether exercise-related symptoms may be due to a non-asthma cause such as poor cardiopulmonary fitness (particularly in obese patients), upper airway dysfunction, hyperventilation or anxiety.

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):

- British Thoracic Society and Scottish Intercollegiate Guidelines Network, 2008[5]
- Tilles, 2010[6]
- Rietveld *et al.* 1999[7]

Plan regular asthma review as for adults. Explain that asthma often changes during these years so it is important to keep adjusting the treatment to maintain good control at the lowest effective dose.

Table. Risk factors for adverse asthma outcomes in adults and adolescents

Please view and print this figure separately: http://www.asthmahandbook.org.au/table/show/40

How this recommendation was developed

Consensus

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

Monitor growth in adolescents taking high doses of inhaled corticosteroids or frequent courses of oral corticosteroids.

How this recommendation was developed

Consensus

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

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For adolescents taking regular inhaled corticosteroid whose asthma has been well controlled for at least 3 months, try reducing the dose or stepping down by one step while monitoring. If well controlled for at least 3 months on the lowest dose, consider a trial cessation of inhaled corticosteroid.

Note: For those in mid-to-late adolescence, follow the guidance for adults

Figure. Stepped approach to adjusting asthma medication in children aged 6-11 years

Please view and print this figure separately: http://www.asthmahandbook.org.au/figure/show/120

Figure. Stepped approach to adjusting asthma medication in adults and adolescents

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

How this recommendation was developed

Consensus

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

When assessing the causes of poor asthma control, consider psychosocial and behavioural factors such as non-adherence to preventer medicines, smoking or exposure to other people's tobacco smoke.

How this recommendation was developed

Consensus

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

If adherence to preventer medicines is inadequate, explore barriers and motivating factors.

How this recommendation was developed

Consensus

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

Explain to young people that asthma medicines do not have any effects on sexual activity or fertility in the short-term or long-term.

How this recommendation was developed

Consensus

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

Assess and manage comorbid conditions, lifestyle and psychosocial factors that could affect asthma:

- **encourage adequate physical activity and healthy eating**
- **repeatedly assess smoking status and offer help to quit**

- **manage obesity according to national guidelines**
- **identify and manage allergic rhinitis, mental health conditions (e.g. depression and anxiety), gastro-oesophageal reflux disease and sleep disorders**
- **identify and manage psychosocial risk factors.**

Table. Interrelated psychosocial risk factors for poor asthma control in adolescents

Poor adherence to treatment
Denying or disregarding asthma symptoms
Avoiding regular review appointments
Life events (new school, moving house, family disruption, absent parent)
Family problems (e.g. family conflict, family dysfunction)
Psychological distress (e.g. feelings of hopelessness, bereavement or recent loss)
Mental health problems (e.g. depression, emerging mood disorders)
Risky use of alcohol/other substances
Communication problems

Risk behaviours or disregard of symptoms may indicate emerging mental health problems. Poor adherence can be an indicator of family problems, life events and psychological distress.

Source: **Bender BG. Risk taking, depression, adherence, and symptom control in adolescents and young adults with asthma. Am J Respir Crit Care Med 2006; 173: 953-957. Available from: http://www.ncbi.nlm.nih.gov/pubmed/16424441**

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How this recommendation was developed

Consensus

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

For girls and women, assess whether flare-ups are affected by the menstrual cycle. For girls and woman with predictable perimenstrual worsening of asthma symptoms, consider hormonal management or refer for investigation.

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):

- Boulet, 2009[8]
- Rao *et al.* 2013[9]

In pharmacies, ask adolescents and young adults buying non-prescription relievers when they last saw their doctor, and encourage asthma check-ups.

How this recommendation was developed

Consensus

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

If the person has been seeing a paediatric respiratory physician, arrange a new referral to a respiratory physician who treats adults, when appropriate. Discuss the transition to adult health care and check that the young person is satisfied with the adult services.

How this recommendation was developed

Consensus

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

More information

Diagnostic difficulties when investigating asthma-like symptoms in adolescents

Asthma is commonly misdiagnosed in young people presenting with exercise-related symptoms or cough.[10] Conditions associated with dyspnoea include hyperventilation, anxiety, and poor cardiopulmonary fitness.[11]

Both denial and overplay of symptoms has been observed among adolescents.[10] Adolescents with new or re-emerging asthma symptoms may deny their symptoms.[10] US data suggest that risk factors for undiagnosed asthma among adolescents include female sex, smoking (current smoking and exposure to others' smoke), low socioeconomic status, family problems, low physical activity and high body mass.[12]

Exercise-related symptoms in adolescents

In adolescents, exercise-related wheezing and breathlessness are poor predictors of exercise-induced bronchoconstriction. Only a minority of adolescents referred for assessment of exercise-induced respiratory symptoms show objective evidence of exercise-induced bronchoconstriction.[13]

For adolescents with exercise-related symptoms, common conditions that should be considered in the differential diagnosis include poor cardiopulmonary fitness, exercise-induced upper airway dysfunction and exercise-induced hyperventilation.[10, 6]

In addition to spirometry, other objective tests (e.g. cardiopulmonary fitness testing, bronchial provocation tests) may be helpful to clarify the diagnosis and inform management.

▶ See: *Investigation and management of exercise-induced bronchoconstriction*

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Physiological and psychological changes

Stress, anxiety and extreme emotions

Some patients report asthma flare-ups and asthma symptoms in response to stress and extreme emotions.[14, 15]

Adolescents with asthma may experience breathlessness in response to stress (without changes in lung function or other asthma symptoms).[7]

▶ See: *Investigating asthma-like symptoms in adolescents and young adults*

Laughter

Laughing is a common trigger for wheeze in infants. In children, the presence of respiratory symptoms that are triggered by laughter increases the probability of symptoms being due to asthma.

▶ See: *Diagnosing asthma in children*

Hormonal changes

Asthma may worsen during the premenstrual phase in up to 40% of women, possibly due to a reduced response to corticosteroids and bronchodilators.[8] However, this rarely causes severe flare-ups.[8]

Perimenstrual worsening asthma may be relatively common among women with severe or poorly controlled asthma, and may share risk factors with aspirin-exacerbated respiratory disease.[9]

Asthma control worsens during pregnancy in about one third of women with asthma.[16] During pregnancy, approximately 6% of women with asthma are hospitalised with a severe asthma flare-up.[17, 18]

▶ See: *Managing asthma during pregnancy*

Sexual activity

Sexual activity may trigger asthma symptoms possibly due to physical exertion (exercise-induced bronchoconstriction), heightened

emotion, or a combination of these factors. Exposure to dust mite allergens in bedding may also be a trigger for people who are sensitised.

People with asthma may experience limitation to sexual activity due to asthma or be concerned about the effect of their asthma on their sex life.[19, 20] However, patients are unlikely to mention concerns about sexual activity to their doctor.[20]

Practical information for patients about sex and asthma is available from Asthma Australia.

▶ Go to: Asthma Australia's *Triggers* webpage
See: *Investigation and management of exercise-induced bronchoconstriction*

Impact of puberty on asthma

In the past, it was thought that children typically 'outgrew' asthma due to maturation of the autonomic and central nervous systems under the effect of sex steroids during puberty.[21] However, there is little evidence to support this assumption.[21] Puberty does not predict remission of asthma. Almost two-thirds of children with chronic asthma have persistent symptoms throughout puberty.[21]

Early puberty has been reported to be an independent risk factor for the persistence of asthma into adolescence, and for the severity of asthma in adulthood.[21] The mechanism for this association is unclear, and might involve the effects of hormonal changes on reactivity of airways or risk factors that are common to both asthma and early puberty.[21]

Increased BMI in girls has been associated with both early puberty and increased asthma risk.

Australian data show that more boys than girls experience remission of asthma during adolescence (based on 2007–2008 data):[22]

- the prevalence of current asthma is higher for boys than girls among children aged 0–14 years, and higher for women among people aged 15 years and over
- the prevalence of current asthma in children aged 10–14 years is approximately 12% for boys and 7% for girls
- the prevalence of current asthma in adolescents and young adults aged 15–24 years is approximately 11% in both sexes.

Asthma can worsen or improve during adolescence; close monitoring is necessary so that medicines can be adjusted to maintain good asthma control at the lowest effective doses. If attempted back-titration of an adolescent's preventer dose or step-down in the treatment regimen results in worsening of asthma symptoms, this experience can help the person understand why it is necessary to take these medicines regularly. Health professionals can make unsuccessful back-titration an opportunity to reinforce self-management education.

Asthma can occur for the first time during adolescence, more commonly in girls than boys.[10] The true prevalence of asthma in adolescents is difficult to estimate because of under- and over-diagnosis.

Transition to adult asthma care

The late teens and early twenties can be a dangerous period for young people with asthma because GPs and parents often assume that the parent's good management of their child's asthma will automatically continue as the child grows up. Good self-management cannot be assumed, and health professionals need to carefully check the patient's understanding of their asthma and its treatment.

Equipping and supporting an adolescent with a chronic disease to take over self-management of their condition as they grow up and make a smooth transition to adult health services requires planning. Some experts consider this in three phases:

- early stage (12–14 years) – the adolescent begins to participate in his or her own care
- middle stage (15–16 years) – the adolescent gains skills and information to take over self-care
- late stage (17–18 years) – the young person moves into the adult system.

▶ Go to: The Royal Children's Hospital Melbourne's *Transition – for health professionals*
Go to: NSW Agency for Clinical Innovation's Transition planning checklist

Resources for health professionals working with adolescents

▶ Go to: The Royal Australasian College of Physicians' *Working with young people* online resource
Go to: *Headspace*: Australia's National Youth Mental Health Foundation
Go to: *Inspire Foundation*
Go to: *Reachout*
Go to: The Royal Children's Hospital Melbourne's *Transition – for health professionals*
Go to: NSW Agency for Clinical Innovation's Transition planning checklist
Go to: NSW Centre for Advancement of Adolescent Health, The Children's Hospital at Westmead's Adolescent health GP resources
Go to: *ChIPS (Chronic Illness Peer Support)*
Go to: *Relationships Australia*
Go to: *Smarter than Smoking*

Go to: The Children's Hospital at Westmead's *Kids Quit smoking cessation brief interventions*

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 and adolescents

Please view and print this figure separately: http://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 beta$_2$ 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.[23, 24]

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 microg and 200/25 microg 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.[25]

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: http://www.asthmahandbook.org.au/table/show/9

Table. Definitions of ICS dose levels in adults

Inhaled corticosteroid	Daily dose (microg)		
	Low	Medium	High
Beclometasone dipropionate †	100–200	250–400	>400
Budesonide	200–400	500–800	>800

Inhaled corticosteroid	Daily dose (microg)		
	Low	Medium	High
Ciclesonide	80–160	240–320	>320
*Fluticasone furoate**	—	100	200
Fluticasone propionate	100–200	250–500	>500

† 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

Respiratory Expert Group, Therapeutic Guidelines Limited. *Therapeutic Guidelines: Respiratory, Version 4*. Therapeutic Guidelines Limited, Melbourne, 2009.

GlaxoSmithKline Australia Pty Ltd. Product Information: *Breo (fluticasone furoate; vilanterol) Ellipta*. Therapeutic Goods Administration, Canberra, 2014. Available from: https://www.ebs.tga.gov.au/

GlaxoSmithKline Australia Pty Ltd. Product Information: *Arnuity (fluticasone furoate) Ellipta*. Therapeutic Goods Administration, Canberra, 2016. Available from: https://www.ebs.tga.gov.au/

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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),[26] or stepping down to a different inhaled corticosteroid/long-acting beta$_2$ agonist combination that will achieve a lower inhaled corticosteroid dose. (e.g. Stepping down from treatment with once-daily medium dose fluticasone furoate/vilanterol [100/25 microg] can be achieved by switching to twice-daily low-dose fluticasone propionate/salmeterol [100/50 microg or 50/25 microg]). With either option, patients need careful explanation, including clear written instructions, to avoid potential confusion when changing between inhaler devices and dosing frequencies.

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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.[27] Normal FEV_1/FVC values derived from population studies vary,[28, 29] but are usually greater than:[28]

- 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.[29]

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.[30, 27] 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.[31,32]

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

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Supporting adolescents and young adults to self-manage their asthma

Recommendations

Make sure young people understand that they need to carry a reliever inhaler with them at all times, so they can use it immediately if they experience asthma symptoms.

How this recommendation was developed

Consensus

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

Ensure every patient has a written asthma action plan appropriate to their age and self-management capability.

How this recommendation was developed

Consensus

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

Encourage self-management and provide support and education appropriate to the individual's stage of psychosocial development. Repeat the key information at each visit.

How this recommendation was developed

Consensus

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

Offer self-management support that is appropriate to the person's preferences (e.g. text message reminders about appointments, online information, electronic written asthma action plan) and direct them to appropriate resources and programs (e.g. peer-led asthma education, if available).

How this recommendation was developed

Consensus

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

More information

Asthma self-management for adolescents

Children's knowledge of asthma improves during adolescence.[1] However, the latest available data show that less than one in five (18%) Australian adolescents has a written asthma action plan, and only 28% have discussed their asthma management plan with their GP within the previous 12 months.[2]

During adolescence, young people get their asthma knowledge mainly from parents.[1] Adolescents whose parents were born overseas in countries with a lower asthma prevalence may have less knowledge of asthma. Chronic disease carries stigma in some communities, particularly Asian cultures. Children and adolescents from culturally and linguistically diverse communities may be expected to self-manage at a younger age and with less monitoring by parents, and so may need more support and education.

Specialised asthma nurses and asthma and respiratory educators are an invaluable resource for instruction, training and providing

support for adolescents with asthma and their families.

Self-management programs

Asthma self-management education programs designed for adolescents can improve asthma-related quality of life,[3, 4, 5, 6] improve asthma knowledge,[3, 4, 7] improve ability to use a spacer correctly,[3] improve adolescents' confidence or belief in their ability (self-efficacy) to manage their asthma,[3, 6] increase behaviour to prevent asthma symptoms,[6] increase use of preventer medicines,[6] increase use of written asthma action plans,[6] reduce symptoms[3, 6] reduce limitation of activity due to asthma,[6] reduce school absences due to asthma,[3, 6] and reduce rates of acute care visits, emergency department visits, and hospitalisations.[6]

However, there is not enough evidence to determine which types of self-management programs for adolescents are most effective or the most important components of programs. (Few RCTs directly compared different programs.)

Most of the asthma programs designed for adolescents have been run in schools.

Peer-led asthma programs

Several studies have shown that adolescents can be trained to teach their peers about asthma self-management and motivate them to avoid smoking.[4, 5, 8] Asthma self-management programs for adolescents that use peer leaders can:

- significantly influence self-management behaviour, compared with adult-led programs[8]
- achieve clinically important improvements in health-related quality of life,[4, 5] increase adolescents' belief in their ability (self-efficacy) to resist smoking,[4] and increase asthma self-management knowledge[4] (compared with adolescents at schools not involved in this type of program[4] or with baseline[5])
- may be particularly beneficial for boys from low socioeconomic status background.[5]

The Triple A (Adolescent Asthma Action) program is a school-based peer-led adolescent asthma self-management education program developed in Australia.[9]

▶ Go to: *The Triple A (Adolescent Asthma Action) program*

Use of technology to support self-care

Providing asthma education messages through technologies that adolescents use every day (e.g. internet, phones, interactive video)[10, 11, 12] may be an effective way to deliver asthma health messages, compared with traditional media or with strategies that are not tailored for adolescents.

Resources for health professionals working with adolescents

▶ Go to: The Royal Australasian College of Physicians' *Working with young people* online resource
Go to: *Headspace*: Australia's National Youth Mental Health Foundation
Go to: *Inspire Foundation*
Go to: *Reachout*
Go to: The Royal Children's Hospital Melbourne's *Transition – for health professionals*
Go to: NSW Agency for Clinical Innovation's Transition planning checklist
Go to: NSW Centre for Advancement of Adolescent Health, The Children's Hospital at Westmead's Adolescent health GP resources
Go to: *ChIPS (Chronic Illness Peer Support)*
Go to: *Relationships Australia*
Go to: *Smarter than Smoking*
Go to: The Children's Hospital at Westmead's *Kids Quit smoking cessation brief interventions*

Transition to adult asthma care

The late teens and early twenties can be a dangerous period for young people with asthma because GPs and parents often assume that the parent's good management of their child's asthma will automatically continue as the child grows up. Good self-management cannot be assumed, and health professionals need to carefully check the patient's understanding of their asthma and its treatment.

Equipping and supporting an adolescent with a chronic disease to take over self-management of their condition as they grow up and make a smooth transition to adult health services requires planning. Some experts consider this in three phases:

- early stage (12–14 years) – the adolescent begins to participate in his or her own care
- middle stage (15–16 years) – the adolescent gains skills and information to take over self-care
- late stage (17–18 years) – the young person moves into the adult system.

▶ Go to: The Royal Children's Hospital Melbourne's *Transition – for health professionals*
Go to: NSW Agency for Clinical Innovation's Transition planning checklist

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