Asthma in adolescents

When to worry, how to navigate the challenges

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The management of adolescents with asthma is challenging and recognition of their developmental context and psychosocial factors plays an important role in appropriate diagnosis and treatment.

Adolescents with asthma are a high-risk group due to their unique developmental context, the changing epidemiology of asthma in this age group and the emergence of psychosocial factors that can impact on management. Adolescents may under recognise their symptoms or deny they exist, leading to poor adherence to medication and risk-taking behaviours such as smoking, which can adversely affect asthma control. Also, misdiagnosis can result in over or undertreatment of this group of patients.

Asthma remains one of the most common chronic conditions affecting young Australians, third after allergic rhinitis and short sightedness according to the Australian Institute of Health and Welfare (AIHW) report, Young Australians: Their Health and Wellbeing 2011. The report also revealed that only 28% of adolescents with asthma had discussed their Asthma Management Plan with a GP or specialist in the preceding 12 months and only 18% of adolescents with asthma had a written Asthma Management Plan.

A preformatted Asthma Action Plan from the National Asthma Council Australia only takes a few minutes to complete and discuss with patients (Figure). The use of asthma action plans is time effective in the long term and has been shown to:
- improve adherence
- reduce school absences

Key points
- Clarity of diagnosis is important to inform appropriate management of adolescents with asthma.
- Exercise-related symptoms are common in the adolescent age group and may be caused by a variety of underlying factors not related to asthma.
- See the young person alone for at least part of the consultation, and provide reassurance regarding privacy and confidentiality.
- Provide and discuss an asthma action plan with every change of treatment.
- Red flags for high-risk asthma include poor asthma control, adherence issues, under recognition of illness, psychosocial stressors, risk-taking behaviour and communication barriers.

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Among the most important roles for GPs is co-ordinating the care of adolescents with severe or labile asthma, particularly at times of change and with transition from paediatric to adult specialty care.

**Epidemiology**

Although the prevalence of asthma is higher in prepubertal boys than girls, a gender shift develops during adolescence with increased incidence and decreased remission rates of asthma among adolescent girls.

The exact age and cause of this gender shift is unclear; however, hormonal changes throughout this period have been implicated. Further research is providing evidence on the role of fluctuating levels of oestrogen, with some women experiencing increased asthma symptoms in the premenstrual luteal phase as hormone levels drop.

**Diagnosis**

It is important to be clear about what is asthma and what is not; an accurate diagnosis is required to inform ongoing management and avoid under or overtreatment.

The *Australian Asthma Handbook* provides a very useful and interactive online resource for asthma management with a section specifically related to adolescents with asthma.

Asthma is classified according to frequency and persistence of symptoms and is characterised by episodes of wheeze with shortness of breath, often precipitated by triggers such as viral infections or environmental factors (Table 1).

Recurrent cough as the predominant or only symptom can be misleading.

A detailed patient history and physical examination, use of objective measures of airway function and assessment of atopic status are needed to confirm a diagnosis of asthma. Investigations to consider include:

- spirometry, including post-bronchodilator response
- allergen skin testing to common environmental and food allergens
- challenge testing or exercise testing to establish evidence of airway hyper-responsiveness or reveal the cause of exercise-related symptoms
- peak expiratory flow (PEF) monitoring, although not routinely recommended or used in adolescents with asthma, can be helpful in some circumstances to establish evidence of PEF variability and motivate adherence to treatment.

**Differential Diagnosis**

Exercise-related symptoms are common in the adolescent age group and may be caused by a variety of underlying factors not related to asthma. However, it is

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**Table 1. Definitions of Asthma Patterns**

<table>
<thead>
<tr>
<th>Category</th>
<th>Pattern and intensity of symptoms (when not taking regular treatment)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intermittent asthma</strong></td>
<td></td>
</tr>
<tr>
<td>Infrequent</td>
<td>Symptom-free for at least six weeks at a time (symptoms up to once every six weeks on average but no symptoms between flare-ups)</td>
</tr>
<tr>
<td>Frequent</td>
<td>Symptoms more than once every six weeks on average but no symptoms between flare-ups</td>
</tr>
<tr>
<td><strong>Persistent asthma</strong></td>
<td></td>
</tr>
<tr>
<td>Mild</td>
<td>FEV₁ ≥80% predicted and at least one of:</td>
</tr>
<tr>
<td></td>
<td>• daytime symptoms more than once per week but not every day</td>
</tr>
<tr>
<td></td>
<td>• night-time symptoms more than twice per month but not every week</td>
</tr>
<tr>
<td>Moderate</td>
<td>Any of:</td>
</tr>
<tr>
<td></td>
<td>• FEV₁ &lt;80% predicted</td>
</tr>
<tr>
<td></td>
<td>• daytime symptoms daily</td>
</tr>
<tr>
<td></td>
<td>• night-time symptoms more than once per week</td>
</tr>
<tr>
<td></td>
<td>• symptoms sometimes restrict activity or sleep</td>
</tr>
<tr>
<td>Severe</td>
<td>Any of:</td>
</tr>
<tr>
<td></td>
<td>• FEV₁ ≤60% predicted</td>
</tr>
<tr>
<td></td>
<td>• daytime symptoms continual</td>
</tr>
<tr>
<td></td>
<td>• night-time symptoms frequent</td>
</tr>
<tr>
<td></td>
<td>• flare-ups frequent</td>
</tr>
<tr>
<td></td>
<td>• symptoms frequently restrict activity or sleep</td>
</tr>
</tbody>
</table>

*ABBREVIATION: FEV₁ = forced expiratory volume in one second.*

† These definitions can be applied to children over the age of 6 years when not taking a regular preventer medication.

ASTHMA ACTION PLAN
Take this ASTHMA ACTION PLAN with you when you visit your doctor

NAME ___________________________________________

DATE ___________________________________________

NEXT ASTHMA CHECK-UP DUE ___________________________________________

DOCTOR’S CONTACT DETAILS
Name ____________________________
Phone ___________________________
Relationship _______________________

EMERGENCY CONTACT DETAILS
Name ____________________________
Phone ___________________________
Relationship _______________________

WHEN WELL  Asthma under control (almost no symptoms)

Your preventer is: ____________________________ (NAME & STRENGTH)
Take ____________ puffs/tablets ____________ times every day
☐ Use a spacer with your inhaler

Your reliever is: ____________________________ (NAME)
Take ____________ puffs
When: You have symptoms like wheezing, coughing or shortness of breath
☐ Use a spacer with your inhaler

ALWAYS CARRY YOUR RELIEVER WITH YOU

OTHER INSTRUCTIONS
(e.g. other medicines, trigger avoidance, what to do before exercise)

WHEN NOT WELL  Asthma getting worse (needing more reliever e.g. more than 3 times per week, waking up with asthma, more symptoms than usual, asthma is interfering with usual activities)

Keep taking preventer: ____________________________ (NAME & STRENGTH)
Take ____________ puffs/tablets ____________ times every day
☐ Use a spacer with your inhaler

Your reliever is: ____________________________ (NAME)
Take ____________ puffs
☐ Use a spacer with your inhaler

OTHER INSTRUCTIONS
(e.g. other medicines, when to stop taking extra medicines)

IF SYMPTOMS GET WORSE  Asthma is severe (needing reliever again within 3 hours, increasing difficulty breathing, waking often at night with asthma symptoms)

Keep taking preventer: ____________________________ (NAME & STRENGTH)
Take ____________ puffs/tablets ____________ times every day
☐ Use a spacer with your inhaler

Your reliever is: ____________________________ (NAME)
Take ____________ puffs
☐ Use a spacer with your inhaler

OTHER INSTRUCTIONS
(e.g. other medicines, when to stop taking extra medicines)

Prednisolone/prednisone: ____________ each morning for ____________ days
☐ Contact your doctor today

DANGER SIGNS  Asthma emergency (severe breathing problems, symptoms get worse very quickly, reliever has little or no effect)

Asthma emergency  (severe breathing problems, symptoms get worse very quickly, reliever has little or no effect)
Call an ambulance immediately
Say that this is an asthma emergency
Keep taking reliever as often as needed

Peak flow* (if used) below:

National Asthma Council Australia
Leading the attack against asthma

DIAL 000 FOR AMBULANCE
www.nationalasthma.org.au

* Peak flow not recommended for children under 12 years.

Figure. The National Asthma Council Australia Asthma Action Plan (continued on next page). This is appropriate for use in adolescent patients and is available to download from the National Asthma Council Australia website (www.nationalasthma.org.au/asthma-tools/asthma-action-plans). Reproduced with permission from the National Asthma Council Australia. © National Asthma Council Australia.
ASTHMA ACTION PLAN
what to look out for

WHEN WELL

THIS MEANS:
• you have no night-time wheezing, coughing or chest tightness
• you only occasionally have wheezing, coughing or chest tightness during the day
• you need reliever medication only occasionally or before exercise
• you can do your usual activities without getting asthma symptoms

WHEN NOT WELL

THIS MEANS ANY ONE OF THESE:
• you have night-time wheezing, coughing or chest tightness
• you have morning asthma symptoms when you wake up
• you need to take your reliever more than usual eg. more than 3 times per week
• your asthma is interfering with your usual activities

IF SYMPTOMS GET WORSE

THIS MEANS:
• you have increasing wheezing, cough, chest tightness or shortness of breath
• you are waking often at night with asthma symptoms
• you need to use your reliever again within 3 hours

DANGER SIGNS

THIS MEANS:
• your symptoms get worse very quickly
• you have severe shortness of breath, can’t speak comfortably or lips look blue
• you get little or no relief from your reliever inhaler

CALL AN AMBULANCE IMMEDIATELY: DIAL 000
SAY THIS IS AN ASTHMA EMERGENCY.

DIAL 000 FOR AMBULANCE

ASHTMA MEDICINES

PREVENTERS
Your preventer medicine reduces inflammation, swelling and mucus in the airways of your lungs. Preventers need to be taken every day, even when you are well.
Some preventer inhalers contain 2 medicines to help control your asthma (combination inhalers).

RELIEVERS
Your reliever medicine works quickly to make breathing easier by making the airways wider.
Always carry your reliever with you – it is essential for first aid. Do not use your preventer inhaler for quick relief of asthma symptoms unless your doctor has told you to do this.

To order more Asthma Action Plans visit the National Asthma Council website. A range of action plans are available on the website – please use the one that best suits your patient.
www.nationalasthma.org.au

Developed by the National Asthma Council Australia and supported by GlaxoSmithKline Australia.
National Asthma Council Australia retained editorial control.
important to note that adolescents may avoid exercise because of unrecognised asthma symptoms and therefore underestimate the extent of their exercise limitations.

Patients with exercise-related symptoms require accurate assessment to differentiate exercise-induced asthma from reduced physical fitness, hyperventilation and vocal cord dysfunction (Box 1). Referral of patients for further specialist multidisciplinary assessment and investigations including lung function testing can be helpful to clarify and manage continued symptoms.

The obesity rate has escalated dramatically in the adolescent age group over the past few decades. Risk factors for obesity include increasingly sedentary behaviour (especially for females) and increased screen time, with the combination leading to reduced physical fitness, with breathlessness being perceived as an asthma symptom. Obesity itself can be associated with asthma, with a body mass index (BMI) of more than 30 kg/m² increasing this risk; however, precise mechanisms connecting the two are not yet clear.

Being overweight can affect lung mechanics with reduced functional residual capacity, expiratory reserve volume and, to a lesser extent, total lung capacity. The effects of bronchoconstriction can be magnified by changes in lung mechanics in obese patients (greater hyperinflation and greater airway closure), which results in an increased sensation of dyspnoea when compared with patients who are not obese. The possibility that the mechanism connecting obesity and asthma may be related to inflammatory cytokines is being studied further. In addition, genetic studies are proceeding to further explore the relation between high BMI and asthma.

Habit cough, sometimes also termed psychogenic cough, is often misdiagnosed as asthma and patients are treated inappropriately with asthma medication. Anxiety and psychosocial factors may mimic or trigger acute ’asthma’; however, these symptoms are usually associated with normal spirometry and oximetry results and rapid improvement.

**ASSESSMENT**

Additional patient assessments are of use in both clarifying an asthma diagnosis and informing asthma management in the adolescent population. This includes assessing a patient’s sleep and obesity issues, taking a menstrual history and performing a psychosocial review.

**Sleep assessment**

Obesity, atopy and allergic rhinitis may be associated with snoring and obstructive sleep symptoms. Improving the underlying control of these conditions can then impact on asthma control.

**Obesity assessment**

BMI, onset of obesity and associated management issues that can impact on asthma (such as early menarche and disordered sleep) should be assessed.

**Menstrual history**

Exacerbations of asthma symptoms occurring in the luteal phase should be assessed and hormonal management considered. Also, early menarche is associated with obesity and increased asthma prevalence.

**Psychosocial review**

HEADSSS 3.0 (Home environment, Education and employment, Eating, peer-related Activities, Drugs, Sexuality, Suicide/ depression and Safety) assessment is
3. APPROACH TO DEVELOPING A TREATMENT PLAN FOR AN ADOLESCENT WITH ASTHMA

- See the young person alone for at least part of the consultation, and provide reassurance regarding privacy and confidentiality with standard exclusions (refer to the Adolescent Health GP Resource Kit listed in Box 2).
- Consider cultural perspectives and health beliefs that may potentially impact on a young person and their family.
- Explore and encourage the adolescent’s self-management capacity and provide re-education about medications, side effects and concerns as needed.
- Negotiate the treatment plan with the adolescent patient to engage them in their own health and provide an opportunity for decision making about what will work for them. Specialised asthma nurses are an invaluable resource for providing instruction, training and support for adolescents with asthma and their families.
- Recognise and address medication nonadherence, and explore barriers and motivating factors. A home visit, particularly if the asthma is severe, can be most informative to overcome any barriers or difficulties, e.g. environmental triggers such as animal allergens, house dust mites, cockroaches and moulds as well as the impact of environmental tobacco smoke. In one paediatric asthma study, treatment-related problems (such as incorrect use of devices, nonadherence and out-of-date medications) contributed to poor asthma control in approximately half the cohort. Routinely check and reinforce correct inhaler technique; a visit to the GP or specialist or any change in treatment is an opportunity to check technique. Instructional videos on inhaler technique are available online at: www.nationalasthma.org.au/how-to-videos.
- Assess smoking behaviour for the adolescent and their family/household members and peers. Provide a brief intervention or referral for smoking cessation support.
- Assess and address risky behaviours such as the use of recreational drugs.
- Assess and address family dysfunction and affective disorders.
- When selecting initial preventer medications consider the patient’s pattern of asthma and their age and stage as outlined in Table 2 (see also www.asthmahandbook.org.au/populations/adolescents). Combination therapy medications (inhaled corticosteroids plus long-acting beta agonists [LABA]) are not first-line initial preventer medications and should be reserved for use as a step up in patients who do not improve on low-dose inhaled corticosteroids. The regular use of a LABA can lead to tolerance to short-acting beta agonists as well as loss of protection against exercise-induced bronchospasm. Other options for step up therapy include optimising the dose of inhaled corticosteroids or a combination of inhaled corticosteroids and leukotriene receptor antagonists.
- Simplify treatment plans by choosing medications that need to be given less frequently (e.g. using ciclesonide, a once-daily inhaled corticosteroid).
- Perform ongoing reviews with adjustment of the treatment plan, including back titration of medication doses where possible. Changes should only be considered after reviewing inhaler technique and adherence, and should ideally be based on both reported symptom control and spirometry results.

MANAGEMENT PLANS

Consideration of the strategies outlined in Box 3 can be helpful when developing a treatment plan for an adolescent with asthma. An initial preventer treatment plan is provided in Table 2.

Adolescent high-risk indicators

Many factors place adolescents with asthma at high risk for poor health outcomes (Box 4).

Severe or poorly controlled asthma

Frequent hospitalisation or emergency department attendance, taking numerous courses of corticosteroids, missing school and exercise avoidance are all indicators of poor asthma control.

Nonadherence to treatment

The degree to which the adolescent is participating with the agreed treatment plan should be assessed. This is often best achieved by asking open-ended questions that enable the young person to weigh up what is working well and what is more challenging in achieving improved treatment adherence (Box 5). Routines around treatment plans have been demonstrated to be helpful. Therefore, encouraging ease of access to treatment and linking taking medications to existing activities or set times of the day can be helpful (e.g. before brushing teeth, using electronic reminders or ‘asthma apps’ on mobile phones).

Attitude to their asthma

A disregard of symptoms and an avoidance of regular review appointments is recommended in adolescents with asthma as a useful psychosocial screening assessment to highlight areas of concern. Anxiety, depression and other mental health problems often emerge during the adolescent years and affected patients require appropriate psychosocial assessment and support because recognising and addressing mental health problems is important to achieve optimal asthma management. Resources are listed in Box 2.
Asthma self-management and to motivate them to avoid smoking.18-20 Peer-led asthma self-management education program developed in Australia.21 The program is also targeting schools in high-risk areas of need and including peer-led smoking cessation intervention and smoking cessation training for school teachers, counsellors and Indigenous health workers.

Family support
A supportive, cohesive family environment with open communication is one of the most important factors enabling an adolescent to cope with chronic illness.22 This is important not only to reinforce treatment routines but also to facilitate school, social and peer interactions. Exploring the family history, including asthma, atopy, occupations, mental health, smoking status and environmental factors, helps inform management and the providing of optimal support.

Media and technology
Asthma resources for patients are now available in the form of mobile phone apps.
One of these is the Asthma Buddy (www.nationalasthma.org.au/asthma-tools/asthma-action-plans/asthmabuddy). This app reminds patients when medications are due, stores an electronic asthma action plan and allows patients to record symptoms.

In addition, text messaging of reminders about adolescent patients’ appointment times improves follow-up rates.

Exploring ways with the young person to use technology to improve adherence and management will become increasingly useful with the emergence and evaluation of these tools.

**TRANSITION TO ADULT CARE**

Transition refers to the ‘purposeful planned movement of adolescents and young adults with chronic physical and medical conditions from a child-centred to adult-orientated healthcare system’. Transition planning involves the following steps:

- a preparation phase in the early adolescent years incorporating re-education, self-management promotion and self-advocacy
- an active phase (at age 16 to 18 years) discussing and establishing an individualised transition plan

One of these is the Asthma Buddy (www.nationalasthma.org.au/asthma-tools/asthma-action-plans/asthmabuddy). This app reminds patients when medications are due, stores an electronic asthma action plan and allows patients to record symptoms.

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Exploring ways with the young person to use technology to improve adherence and management will become increasingly useful with the emergence and evaluation of these tools.

**CONCLUSION**

The role of the GP is crucial in supporting and establishing an effective asthma management strategy during adolescence, to improve current asthma control and decrease comorbidity in adulthood.

Although this article focuses on asthma, many of these principles can be helpful in managing young people living with other chronic conditions. Adolescence, despite its physical and psychosocial complexity, is a time of opportunity and adolescents with asthma can benefit from a comprehensive and developmentally focused approach to management.
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REFERENCES


