

# Asthma in Adults

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The incidence of asthma is increasing worldwide. In Australia a number of studies have revealed increasing prevalence in adults and children.<sup>1,2</sup> There is considerable regional variation in asthma rates.

The available information on the prevalence of asthma in adults of the Aboriginal population suggest regional variation, however, there are some conflicting results. Some studies report a lower prevalence of asthma in rural Aboriginal adults than in non-Aboriginal adults.<sup>3</sup> They suggest that atopy and airway hyper-responsiveness are dependent on response to environmental factors, possibly accounting for the difference. Bremner et al. report a greater impairment of lung function in Aboriginal people in rural Western Australia than the compared population of rural non-Aboriginal people; this could be related to inherited characteristics or the presence of disease, asthma, respiratory infections and other illness.<sup>4</sup> In a paper on hospitalisation rates of people with respiratory disease in WAs, Aboriginal people were admitted to hospital with asthma more frequently than non-Aboriginal people.

Interestingly, people in non-metropolitan areas also had higher admission rates for respiratory illness. This may account for some of this increase, given a high proportion of Aboriginal people live in non-metropolitan areas.

A diagnosis of asthma may be difficult to distinguish from respiratory illness caused by infection as they cause similar symptoms. Aboriginal people have a higher prevalence of other causes of respiratory illness, especially those linked to cigarette smoking. (See Smoking section of this manual.) At times the diagnosis of asthma is made incorrectly. Asthma therapies will be less effective in this instance.<sup>6</sup>

Asthma affects children and adults. There is much similarity in diagnosis and management, however, there are some important differences to consider. In adults the diagnosis is often confused or combined with that of chronic obstructive airways disease. Asthma is reversible airflow obstruction, characterised by cough, wheeze, chest tightness and breathlessness. It is episodic and caused by hyperresponsive airways, muscle constriction and mucus production.

The diagnosis is best made with spirometry demonstrating reversibility of the obstruction with salbutamol, a beta agonist, which relaxes smooth muscle in the bronchioles. Often the diagnosis is attempted by using a peak expiratory flow metre to estimate response to salbutamol. While this is a compromise often made in remote areas, spirometry is the ideal diagnostic aid and becoming less expensive and more available and portable.

Asthma management guidelines are available and recently updated in Australia outlining a six-step approach to optimise management.<sup>7</sup> This document refers to important areas for management of asthma in our context and should be used with reference to the national guidelines.

### **Other important diagnoses to consider**

- Exclude other causes of respiratory illness (Note that there will often be co-morbidities in Aboriginal populations)
- Infections: more likely to have a temperature, unwell contacts, a short history of illness
- Aspiration: acute history of cough and wheeze associated with aspiration
- Heart failure: a history of heart problems, medications like frusemide or angiotensin converting enzyme inhibitor (ACEi)
- ACEi medications can cause a dry irritating cough as a side effect
- Foreign body inhalation: symptoms associated with inhaling a foreign body e.g. peanut
- Pneumothorax, spontaneous: a history of acute onset breathlessness, with some pleuritic chest pain, commonest in young tall thin men
- Pneumothorax, traumatic: acute onset breathlessness and pleuritic chest pain in association with trauma to the chest
- TB and malignancy may present with a long-standing cough and shortness of breath

### **Taking a history**

The important features of history identifying asthma are:

- Recent symptoms, particularly nocturnal cough and interference of the symptoms with daily activities
- Previous asthma exacerbations, especially admissions to hospital and intensive care units
- Medication use, frequency and doses
- Triggers i.e. dust, pollen, smoke, allergies
- Personal or family history of atopy in terms of hayfever, eczema and allergy

Treatment is outlined well in the National Asthma Campaign guidelines.

### **Acute asthma**

Presentations vary in severity from mild to severe.

#### **Symptoms and signs**

Mild: Some increase in cough and wheeze, particularly at night or after exercise. This may occur in response to an upper respiratory tract infection and responds to salbutamol.

Observation reveals slightly raised respiratory rate and expiratory wheezes on listening to the chest. The person talks in sentences. Forced expiratory volume (FEV1) and peak expiratory flow rate (PEFR) are >75% predicted.

Moderate: The cough and wheeze occur throughout the day and night and the symptoms restrict activities. There is some response to salbutamol, however, this is temporary. Observation reveals increased respiratory rate,

use of accessory muscles to breathe and wheezes throughout the chest. The person will speak in phrases and is obviously breathless at rest. FEV1 and PEFr are between 50-75% predicted.

Severe: Anxious, increase in breathlessness and chest tightness, with a feeling of being unable to inhale adequately, limited speaking and obvious increased effort to breathe. May have central cyanosis, using all accessory muscles of the chest to breathe and may have a silent chest on auscultation. FEV1 and PEFr <50% predicted and oximetry <92% saturation.

**Non-acute asthma**

When reviewing asthma in someone who is not acutely unwell, it is important to consider the following steps modified from the six-step asthma management plan.<sup>9</sup>

Assess asthma severity

Assess overall severity when the patient is stable, not during an attack.

Achieve best lung function

Treat until best lung function attained, use lowest dose required to maintain good control and function.

Maintain best lung function: avoid triggers

Identify and avoid triggers.

Maintain best lung function: use optimal medication

Ensure understanding of the use of medication and use the minimum number of medications and doses necessary to prevent acute exacerbations.

**Treatment of acute asthma<sup>8</sup>**

(Note: slight context-specific variations from the National Asthma Management guidelines)

| Treatment  | Mild attack   | Moderate attack   | Severe and life threatening attack   |
|--|---|---|--|
| Oxygen   | No  | 6-15 l/m via mask to keep oxygen saturation >90%  |  |
| Bronchodilator e.g. Salbutamol via nebuliser or spacer | 4 puffs concurrently via spacer or 5 mg salbutamol/2.5 ml saline repeat 4-hourly as necessary | 4 puffs concurrently via spacer or 2 x 5 mg salbutamol/2.5 ml saline repeat 1-4-hourly as necessary<br>Ring DMO/GP<br>Consider transfer | 5 mg salbutamol/2.5 ml saline every 15-30 mins<br>Ring DMO/GP<br>re transfer |
| Oral corticosteroids e.g. prednisolone                 | Consider  | Yes   | First give IV hydrocortisone, oral later                                     |
| Intravenous steroids e.g. hydrocortisone               | Not necessary   | 200mg stat  | 200 mg 6-hourly and needs DMO/GP review                                      |
| Observations   | Regular   | Continuous  | Continuous   |

How to assess severity in non-acute asthma<sup>10</sup>

| Symptoms   | Mild   | Moderate              | Severe             |
|--|--|-----------------------|--------------------|
| Wheeze, tightness, cough, shortness of breath        | Occasional e.g. with viral infection or exercise | Most days             | Every day          |
| Symptoms at night                                    | None   | <once/week            | >once/week         |
| Symptoms on waking                                   | None   | <once/week            | >once/week         |
| Required admission to hospital in last year          | No   | Usually not           | Usually            |
| Previous life threatening attack (ICU or ventilator) | No   | Usually not           | May have a history |
| Bronchodilator use eg salbutamol                     | <twice/week                                      | Most days             | >3-4 a day         |
| FEV1 (%predicted)<br>Morning peak flow               | >80%<br>>90% recent best                         | 60-80%<br>80-90% best | <60%<br><80%       |

In remote areas it is important to consider evacuation plans for people with moderate/severe asthma.

Develop a plan for times the asthma is worse

Plan how to manage acute attacks and access medical care.

Education and regular review

Ensure understanding of the illness and its treatment.

Emphasise the need for regular review.

Review use of medication and inhaler technique at each visit.

Important: All people with asthma should have a 'reliever' medication e.g. salbutamol, and know how to use it.

### Diagnosis

Diagnosis is made on spirometry showing airway obstruction reversible with salbutamol. The FEV1 increases by 15% or more in adults and children after reliever (bronchodilator), provided that the baseline in adults is more than 1.3 litres. Spirometry accurately assesses impairment in lung function and demonstrates presence and reversibility of airway obstruction to the patient. A diagnosis of asthma is supported if morning and night time spirometry demonstrate >15% change. Peak expiratory flow rates (PEFR) are not as reliable as spirometry as a diagnostic tool, however, in situations where there is limited facility for spirometry, we use both, peak flows (the peak expiratory flow increases by 15% after reliever, provided the adult baseline is more than 300 litres/minute) and therapeutic trials, to assist diagnosis and management in adult asthma. In this situation, using

the PEFr rather than the spirometer, it is most valuable when attention is paid to achieving maximum effort for three results, before and after bronchodilator. However, given the increasing portability of spirometry, it may be possible to arrange spirometry in the remote setting in the future.

PEFR are helpful for early recognition of deterioration, when symptoms are intermittent, asthma is unstable or treatment is being altered. They are also useful for people who have symptoms but who have normal spirometry with no significant reversibility.

For children or others unable to reliably use a spirometer or peak flow metre, therapeutic trials may support the diagnosis.<sup>11</sup>

It is important to differentiate asthma from chronic obstructive pulmonary disease; the treatment options overlap, however the response to treatment may differ. It is common for someone with COPD to report they have 'asthma', however there is less reversibility of their airway obstruction and therefore less response to relievers. In practice the prescription of reliever medication is often for airway responsiveness and relief of symptoms regardless of the diagnosis.

### **Triggers**

There is evidence that smoke inhalation exacerbates asthma.<sup>12</sup> Moving camp fires away from houses and reducing the cigarette smokers within range of the person with asthma can reduce the number of asthma exacerbations, i.e. smokers smoke outside dwellings. Recent research in the Top End showed higher rates of hospital presentations with asthma during peak fire season.<sup>13</sup>

Knowledge of the effect of triggers, i.e. awareness of pollen and dust causing hayfever, on the pattern of asthma, will assist the person to preempt and treat asthma early.

### **Education**

'Self-management education (training in management of asthma individualised to the patient) involving a written action plan, self-monitoring (peak expiratory flow measurement or symptom diaries) and regular medical review leads to improvements in health outcomes and should be offered to adults with asthma.'<sup>14</sup> It is clear that adequate management of asthma in the primary care setting makes a difference. Primary care is the ideal place to establish the person's concerns and clarify their knowledge, the importance of monitoring their asthma at home, becoming familiar with the use of peak flow metres and equipment used for treatment, and appropriate management of asthma symptoms. All patients require an individualised regime to assist them to control their asthma symptoms and tailor their use of medication. There is a guide to assist health professionals to achieve this.<sup>15</sup>

Simply imparting information only, (limited asthma education) has limited benefit in reducing the frequency of hospital admissions, doctor visits or medication use but may play a role in improving patient's perceptions of their symptoms. For adults at high risk there is reduction in emergency department visits.<sup>16</sup> The pertinence of this must be emphasised and health professionals in remote Northern Territory must consider the most appropriate way to communicate culturally, assisting the population to understand the relationship between symptoms and signs, triggers, underlying pathology and management.

## **Treatment**

The goals of treatment are: to minimise daily experience of symptoms; to reduce the frequency of exacerbations by maintaining medication and by pre-empting exacerbations and managing them promptly; and using the minimum medication to achieve this.

There are three groups of medication and multiple options for delivery:

### 1. Relievers

beta2 agonist salbutamol (Asmol, Ventolin, Respolin), metered dose inhaler (MDI) or nebulas

Terbutaline (Bricanyl), turbuhaler or nebulas

Ipratropium (Atrovent), MDI or nebulas

### 2. Preventers

Steroids, beclomethasone (Qvar), MDI, autohaler

Budesonide (Pulmicort), turbuhaler, MDI

Fluticasone (Flixotide), autohaler

Prednisolone tablets and intravenous hydro-cortisone, short courses for exacerbations

Sodium chromoglycate (Intal), MDI

Nedocromil sodium (Tilade), MDI

Leukotiene antagonists as oral medication

### 3. Symptom controllers

Long-acting beta2 agonist, Salmeterol (Serevent), MDI, accuhaler

eformoterol (Foradile), aeroliser and turbuhaler

Symptom controllers, such as long-acting beta2 agonists, salmeterol and eformoterol, are commenced in patients with frequent nocturnal asthma already receiving treatment with maximal doses of inhaled corticosteroids. When added to inhaled steroids there is an associated improvement of lung function and symptoms.<sup>17</sup> These should be used after review by a medical practitioner.

There are a number of issues pertinent to the remote setting in Australia – availability of medication, simplicity of instruction to assist management in emergencies, ease of delivery of medication to avoid complications of malfunctioning equipment and access to medical advice and management. For simplicity it is important to consider the first-line medications in detail and recognise the potential for treatment with alternatives, seeking medical advice as appropriate.

## **First-line medications**

### **Relievers**

Salbutamol and terbutaline, acute relief of symptoms via inhaler or nebuliser.

Notes:

1. Spacer versus nebuliser: for acute asthma attacks, spacer devices used with inhalers are as effective as nebulisers in delivering medication.<sup>18</sup> This is critical as nebulisers may malfunction or function poorly and therefore deliver less medication. The advantage of a nebuliser is the opportunity to use oxygen in the delivery of the medication for severe asthma, however, oxygen can be delivered nasally or intermittently via mask together with salbutamol via spacer.
2. There is some evidence to suggest, in mild intermittent asthma, using salbutamol regularly rather than in response to symptoms is associated

with deterioration in FEV1.<sup>19</sup> Therefore it is important to instruct appropriately.

3. There is some evidence in acute asthma management in hospitals that treatment with continuous beta2 agonist seems to be associated with greater improvement in FEV1, when compared with intermittent treatment.<sup>20</sup> (Note that there were no systematic reviews and the studies are small)
4. Adding ipratropium (Atrovent) to salbutamol in treatment of severe exacerbations can improve response<sup>21,22</sup> however there is little evidence for its use in less severe episodes.

**Treatment of non-acute asthma (adapted from ref 23)**

| Severity  | Common features   | Maintenance therapy  |
|-----------|---|--|
| Very mild | Episodic  | Short-acting beta agonist e.g. Salbutamol for use as necessary<br>Sodium cromoglycate for exercise induced asthma  |
| Mild      | Occasional symptoms (up to 2/wk)<br>Exacerbations >6-8 weeks apart<br>Normal FEV1 when asymptomatic                 | Low dose inhaled corticosteroid <b>regularly</b> (e.g. 400 mcg/day beclomethasone or budesonide; 200 mcg/day fluticasone)<br>Or use nedocromil sodium or sodium cromoglycate, but if control of symptoms not achieved use low dose corticosteroid<br>Short-acting beta agonist prn   |
| Moderate  | Symptoms most days<br>Exacerbations <6-8 weeks apart affecting daytime activity and sleep; and lasting several days | Inhaled corticosteroid (e.g. 750-1600 mcg/day beclomethasone or budesonide; 400-750 mcg/day fluticasone)<br>Short-acting beta agonist prn (a long acting beta agonist could be added here after review with DMO/GP)<br>Oral corticosteroid may be required in acute exacerbation to reduce the chance of deterioration                   |
| Severe    | Persistent<br>Limited activity level<br>Nocturnal symptoms >1/wk<br>Frequent need for emergency treatment           | High-dose corticosteroid (up to 2000 mcg/day beclomethasone; 2400 mcg/day budesonide; 1000 mcg/day fluticasone)<br>Plus long-acting beta agonist<br>Short-acting beta agonist prn<br>Consider addition of leukotriene receptor antagonist e.g. montelukast (Singulair) in discussion with DMO/GP<br>Oral corticosteroid when appropriate |

## **Preventers**

Corticosteroids – beclamethasone inhaler, budesonide, oral prednisolone and intravenous hydrocortisone.

Sodium cromoglycate – effective in mild asthma as a regular dose, and before exercise in exercise induced asthma.

Notes:

- 1.The choice of preventer depends on the severity of asthma and the patient's regular medications. (see table below re maintenance treatment).
- 2.In maintenance therapy commence inhaled steroids if the symptoms of asthma are occurring more frequently than twice/week.
- 3.Commence with inhalers using oral and intravenous steroids in acute exacerbations and for short periods only.
- 4.In acute asthma, there is some evidence that systemic corticosteroids taken early in the exacerbation reduce rates of hospital admission and relapse.<sup>24</sup> The initiation and duration of use of systemic steroids will depend on the individual and the nature of the exacerbation. This may mean a lower threshold for treatment in remote areas treating proactively to prevent deterioration and the need for transfer.
- 5.Leukotriene antagonists added to use of beta2 agonists for mild-to-moderate persistent asthma, reduce asthma symptoms and beta2 agonist use. There is a systematic review showing no significant difference in rate of exacerbations between leukotriene antagonists and inhaled corticosteroids however corticosteroids significantly increased quality of life, lung function and symptom control.<sup>25</sup> At this stage use of inhaled steroids is preferable for simplicity of asthma management in remote settings and should be continued even if control is improved with the addition of a leukotriene receptor antagonist.

The other medications listed are used in patients who have asthma less optimally treated by first-line measures. These are likely to be less familiar to staff and communities and require careful monitoring and education in their use. The recent update on asthma management by the National Asthma Campaign is a helpful resource to add to this document.

## **Issues for remote settings**

### **1. Which device do I recommend?**

A metered dose inhaler is more effective when used with a spacer. This should be encouraged as much as possible, and particularly for severe attacks. Medication is delivered effectively via a spacer and all clinics should have one available for management of acute asthma.

Turbuhaler or accuhaler delivery of medication is more easily managed than the coordination of a metered dose inhaler, unless the metered dose inhaler is used with a spacer. Turbuhalers and accuhalers are much less bulky to carry around and also give good medication delivery to the lungs when used correctly. In the wet tropics, Turbuhalers tend to absorb too much moisture and may not function well.

Regularly check the device is used correctly.

### **2. Do people become psychologically dependent on their puffers, over-use the nebuliser or beta agonists?**

This is a risk for any one with breathing difficulty, as the experience can be very frightening. The more a person understands their symptoms and the

mechanism producing them the more they understand the treatment, therefore using medication appropriately.

**3. How many people are using the correct technique?**

This is an issue managed optimally with good communication assisting people to connect their symptoms with an understanding of how the lungs work and the use of the medication and delivery devices.

**4. Continuation of smoking despite the diagnosis of asthma?**

This is a universal issue. Asthma can be a motivator to cease smoking. See the smoking section for the importance of brief interventions etc.

**5. In acute presentations of asthma,** health professionals in remote locations must consider the patient's prognosis over the following 24 hours, acting to evacuate before deterioration. The assessment should be made on the severity of the presentation, response to medication on immediate treatment and the patient's past history.

**6. Primary health care is an ideal environment for optimal management of asthma.**

The contact with health professionals at community level can initiate and support the education, prevention and treatment to maintain optimal health.

**7. Maintenance of vaccination for pneumococcal and influenza** vaccines is important in prevention of infectious exacerbations/ complications of asthma.

Specialist review and support is important for people with frequent exacerbations and severe disease.

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