



# AUSTRALIAN ASTHMA HANDBOOK

QUICK REFERENCE GUIDE

## ENDORSEMENT

The *Australian Asthma Handbook* has been officially endorsed by:

**The Royal Australian College of General Practitioners (RACGP)**



**RACGP**

**The Australian Primary Health Care Nurses Association (APNA)**



**The Thoracic Society of Australia and New Zealand (TSANZ)**



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# AUSTRALIAN ASTHMA HANDBOOK

## QUICK REFERENCE GUIDE

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Complete online version of the *Australian Asthma Handbook* available at: [astmahandbook.org.au](http://astmahandbook.org.au)

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# ABOUT THE HANDBOOK

## QUICK REFERENCE GUIDE

This Quick Reference Guide is a companion to the full *Australian Asthma Handbook* Version 1.0, developed by the National Asthma Council Australia. The *Australian Asthma Handbook* is the national clinical practice guidelines for asthma management in primary care.

This Guide features key figures and tables from the Handbook, alongside selected section overviews to provide context. It is not a standalone summary of the guidelines.

We strongly encourage readers to refer to the full Handbook if possible.

Visit [astmahandbook.org.au](http://astmahandbook.org.au)

## OBJECTIVE

Australia has one of the highest prevalence rates of asthma in the world; around 1 in 10 adults and children has asthma. Since publication of the first national asthma guidelines in 1989, asthma management has improved. Deaths have declined, along with hospitalisations and urgent general practice visits. Most asthma is now managed in primary care.

The *Australian Asthma Handbook* aims to improve health outcomes and quality of life for people with asthma by providing clear guidance for the primary care health professionals involved in their care. It establishes a benchmark for the standard of care for people with asthma.

## SCOPE

The Handbook provides evidence-based, practical guidance to primary care health professionals on the most effective strategies in the diagnosis and management of asthma in adults and children.

Using a patient-centred approach, the Handbook includes all aspects of the diagnosis and management of asthma within a primary care chronic disease management framework, with a particular emphasis on practicality and accessibility.

In addition, recognising the limited access to high-level acute care services in rural and remote areas, we also included detailed guidance on management of acute asthma applicable to a range of clinical settings.

## USERS

Effective asthma management involves the whole primary care team, working with the person and also their family or carer where appropriate.

We developed the Handbook for use by general practitioners, community pharmacists, asthma and respiratory educators, primary healthcare/practice nurses, and Aboriginal and Torres Strait Islander health workers and practitioners.

The Handbook is also intended as a practical reference for other related health professionals, healthcare administrators and healthcare students, whom we encourage to use the Handbook as their guide to current best-practice asthma care in Australia.

## DEVELOPMENT

The *Australian Asthma Handbook* is the seventh edition of Australia's asthma guidelines, previously published as the *Asthma Management Handbook*.

As with previous editions, we adopted a multidisciplinary approach in developing the *Australian Asthma Handbook* to ensure the advice remained relevant and implementable by the target users. More than 80 primary care and specialist contributors formed the working groups and overarching Guidelines Committee, chaired by a general practitioner.

We used a structured and transparent methodology to formulate the recommendations, focusing on practical and evidenced-based advice. We wrote the recommendations and supporting commentary in plain language so that the guidance would be comprehensive yet clear.

## WEBSITE

We have published the full *Australian Asthma Handbook* as a purpose-built website rather than a printed document. The unique, interactive site has a clear content hierarchy, putting key recommendations to the fore as well as allowing readers to explore deeper layers for supporting commentary with hyperlinks to cited references and external resources.

This change in emphasis will enable more frequent updates to the Handbook to ensure it remains at the forefront of asthma management, not only in Australia, but also globally.

## WEBSITE FEATURES

### **Clear-cut recommendations**

The *Australian Asthma Handbook's* webpages put recommendations centre stage, clearly distinguishing actions from supporting evidence and other information so health professionals can focus on the vital tasks of accurate diagnosis and effective management of asthma.

### **Methodology and evidence: 'How this recommendation was developed'**

Setting a new standard in transparency, the Handbook uses a unique and innovative icon system that provides an immediate visual cue on the methodology behind each recommendation. Clicking on these icons reveals more detail on the type and scope of evidence and links through to the referenced studies if available.

These icons do not necessarily imply the clinical importance of the recommendation; some of our consensus recommendations are just as important as those arising from systematic review results.

The recommendations were developed using standardised methods, including systematic review (for five key clinical questions), consideration of selected evidence, adaptation of existing guidance, and consensus based on best-available evidence and clinical experience.

For more information on the Handbook's methodology, recommendation types and the unique icon system, see the Handbook's Methodology section: [astmahandbook.org.au/about/methodology](http://astmahandbook.org.au/about/methodology)

### **References**

The more than 1500 references informing the Handbook are listed by page. The reference details can be accessed directly by hovering over the citation number or from the list at the bottom of each page. Both provide links direct to the source document – often full text versions of journal articles – if publicly available.

Consider the possibility of upper airway dysfunction when FEV<sub>1</sub>/FVC ratio on spirometry is normal or when symptoms of breathlessness or wheeze do not improve after taking short acting beta<sub>2</sub> agonist.

**How this recommendation was developed**

**Consensus**

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

Morris MJ, Christopher KL. Diagnostic criteria for the classification of vocal cord dysfunction. *Chest*. 2010; 138: 1213-23. Available from: <http://journal.publications.chestnet.org/article.aspx?articleid=1045155>

- Morris and Christopher, 2010 <sup>4</sup>
- Kenn and Balkissoon, 2011 <sup>5</sup>

Recommendation showing methodology and evidence information plus hover-over reference information including a link through to the source.

## More information

Want to find out more?

The Handbook's *More information* topics provide a summary of the best evidence, any other supplementary material and links to references and related resources.

These summaries automatically appear on any page with recommendations about that topic, meaning consistent and comprehensive supporting information is always on hand.

## Figures and tables

Much of the Handbook's key advice is laid out in easy-to-read tables and figures that are used regularly around the site. These figures and tables have been designed so they can be copied and/or printed as re-useable and standalone content.

## Glossary

Throughout the Handbook, a red underline indicates commonly used terms and acronyms that are explained in hover-over tool tips. A full list of definitions and special terms can also be accessed through the Handbook's Resources section: [astmahandbook.org.au/resources](http://astmahandbook.org.au/resources)

### Making the clinical diagnosis of asthma

The clinical diagnosis of asthma is based on the probability that the symptoms are due to asthma rather than another cause and on the magnitude of deviation from the level and variation in lung function that is seen in a healthy population.

**Table 1. Findings that increase or decrease the probability of asthma in adults**

Although untreated asthma is usually characterised by airway hyperresponsiveness and airway inflammation (eosinophilic and/or neutrophilic), these features are not essential for making the diagnosis of asthma in clinical practice.

The evidence for asthma must be documented at the time of diagnosis, because characteristic clinical, physiological and pathological features may improve sometimes called controller because fixed airflow limitation may develop over time. diagnosis of asthma after a patient has been started on preventer treatment.

*More information* topic including an embedded table that can be clicked to access content and hover-over glossary tool tip.

### References

1. Aaron SD, Vandemheen KL, Boulet LP, et al. Overdiagnosis of asthma in obese and nonobese adults. *CMAJ*. 2008; 179: 1121-1131. Available from: <http://www.cmaj.ca/content/179/11/1121.full>
2. Morris MJ, Christopher KL. Diagnostic criteria for the classification of vocal cord dysfunction. *Chest*. 2010; 138: 1213-23. Available from: <http://journal.publications.chestnet.org/article.aspx?articleid=1045155>

Close

Included references are listed at the bottom of each webpage and include a link through to the source.

# DEFINITIONS

## A WORKING DEFINITION OF ASTHMA

Asthma is a chronic lung disease, which can be controlled but not cured.

In clinical practice, asthma is defined by the presence of both the following:

- excessive variation in lung function ('variable airflow limitation', i.e. variation in expiratory airflow that is greater than that seen in healthy people)
- respiratory symptoms (e.g. wheeze, shortness of breath, cough, chest tightness) that vary over time and may be present or absent at any point in time.

In young children in whom lung function testing is not feasible, including most preschool children, asthma is defined by the presence of variable respiratory symptoms.

Untreated asthma is usually characterised by chronic inflammation involving many cells and cellular elements,<sup>1</sup> airway hyperresponsiveness,<sup>1</sup> and intermittent airway narrowing (due to bronchoconstriction, congestion or oedema of bronchial mucosa, mucus, or a combination of these).

Asthma probably represents a spectrum of conditions with different pathophysiological mechanisms.<sup>2</sup> In older patients, there may be substantial overlap with the features of chronic obstructive pulmonary disease (COPD).

The diagnosis of allergic asthma is more likely when the person also has allergy and a family history of asthma.

### Notes

To confirm the diagnosis asthma, it is necessary to demonstrate excessive variation in lung function, i.e. variation in expiratory airflow that is greater than that seen in healthy people (variable airflow limitation) – e.g. by spirometry in adults and in children old enough to perform the test – but it is not necessary to demonstrate airway hyperresponsiveness in a laboratory test or to demonstrate the presence of inflammatory cells in the airway. Respiratory symptoms may be due to many conditions other than asthma, so:

- the diagnosis of asthma is based on the probability that symptoms and clinical findings are due to asthma
- to confirm the diagnosis, lung function testing must be done at a time when the person does not have a respiratory tract infection<sup>3</sup>
- the evidence for variable airflow limitation must be documented at the time of diagnosis
- in young children, especially pre-schoolers (who cannot perform spirometry), it can be difficult to diagnose asthma with certainty.

### Sources

1. Global Initiative for Asthma. *Global strategy for asthma management and prevention*. Global Initiative for Asthma, 2012.
2. Anderson GP. Endotyping asthma: new insights into key pathogenic mechanisms in a complex, heterogeneous disease. *Lancet*. 2008; 372: 1107-19.
3. Melbye H, Kongerud J, Vorland L. Reversible airflow limitation in adults with respiratory infection. *Eur Respir J*. 1994; 7: 1239-1245.

## ABBREVIATIONS

<b>CFC</b>	chlorofluorocarbon	<b>IV</b>	intravenous
<b>COPD</b>	chronic obstructive pulmonary disease	<b>LABA</b>	long-acting beta <sub>2</sub> -adrenergic receptor agonist
<b>ED</b>	emergency department	<b>NSAIDs</b>	nonsteroidal anti-inflammatory drugs
<b>EIB</b>	exercise-induced bronchoconstriction	<b>OCS</b>	oral corticosteroids
<b>FEV<sub>1</sub></b>	forced expiratory volume over one second	<b>PBS</b>	Pharmaceutical Benefits Scheme
<b>FVC</b>	forced vital capacity	<b>PEF</b>	peak expiratory flow
<b>ICS</b>	inhaled corticosteroid	<b>pMDI</b>	pressurised metered-dose inhaler or 'puffer'
<b>ICU</b>	intensive care unit	<b>SABA</b>	short-acting beta <sub>2</sub> -adrenergic receptor agonist
<b>IgE</b>	Immunoglobulin E	<b>TGA</b>	Therapeutic Goods Administration

## DEFINITION OF VARIABLE AIRFLOW LIMITATION

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

- a clinically important increase in FEV<sub>1</sub> (change in FEV<sub>1</sub> 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<sub>1</sub>) when measured repeatedly over time (e.g. spirometry on separate visits)
- a clinically important reduction in lung function (decrease in FEV<sub>1</sub> 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 to skip certain medicines before a spirometry visit.

A clinically important increase or decrease in lung function is defined as a change in FEV<sub>1</sub> of at least 200 mL and 12% from baseline for adults, or at least 12% from baseline for children, or a relative change in peak expiratory flow rate of at least 20%.<sup>1,2</sup> 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 false positives can occur 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<sub>2</sub> 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 COPD or in healthy people without either asthma or COPD.<sup>3,4</sup>

### Sources

1. Levy ML, Quanjer PH, Booker R, et al. Diagnostic Spirometry in Primary Care: Proposed standards for general practice compliant with American Thoracic Society and European Respiratory Society recommendations. *Prim Care Respir J.* 2009; 18: 130-147.
2. Pellegrino R, Viegi G, Brusasco V, et al. Interpretative strategies for lung function tests. *Eur Respir J.* 2005; 26: 948-968.
3. Collier AM, Pimmel RL, Hasselblad V, et al. Spirometric changes in normal children with upper respiratory infections. *Am Rev Respir Dis.* 1978; 117: 47-53.
4. Melbye H, Kongerud J, Vorland L. Reversible airflow limitation in adults with respiratory infection. *Eur Respir J.* 1994; 7: 1239-1245.

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

Inhaled corticosteroids	Daily dose (mcg)		
	Low	Medium	High
Beclomethasone dipropionate †	100–200	250–400	>400
Budesonide	200–400	500–800	>800
Ciclesonide	80–160	240–320	>320
Fluticasone propionate	100–200	250–500	>500

† Dose equivalents for Qvar (CFC-free formulation of beclomethasone dipropionate currently available in Australia).

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

#### Source

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

Australian Asthma Handbook asset ID: 22

**Table B. Definitions of ICS dose levels in children**

Inhaled corticosteroids	Daily dose (mcg)	
	Low	High
Beclomethasone dipropionate †	100–200	>200 (up to 400)
Budesonide	200–400	>400 (up to 800)
Ciclesonide ‡	80–160	>160 (up to 320)
Fluticasone propionate	100–200	>200 (up to 500)

† Dose equivalents for Qvar (CFC-free formulation of beclomethasone dipropionate currently available in Australia).

‡ Ciclesonide is registered for use in children aged 6 and over

#### Source

van Asperen PP, Mellis CM, Sly PD, Robertson C. *The role of corticosteroids in the management of childhood asthma.* The Thoracic Society of Australia and New Zealand, 2010.

Australian Asthma Handbook asset ID: 21

# DIAGNOSIS

## DIAGNOSING ASTHMA IN ADULTS

For detailed guidance and information, see [astmahandbook.org.au/diagnosis/adults](http://astmahandbook.org.au/diagnosis/adults)

There is no single reliable test ('gold standard') and there are no standardised diagnostic criteria for asthma.

In some patients, observing a response to treatment may help confirm the diagnosis, but lack of response to bronchodilators or to inhaled corticosteroids does not rule out asthma.

The diagnosis of asthma in adults is based on:

- history
- physical examination
- considering other diagnoses
- documenting variable airflow limitation.

**Table C. Findings that increase or decrease the probability of asthma in adults**

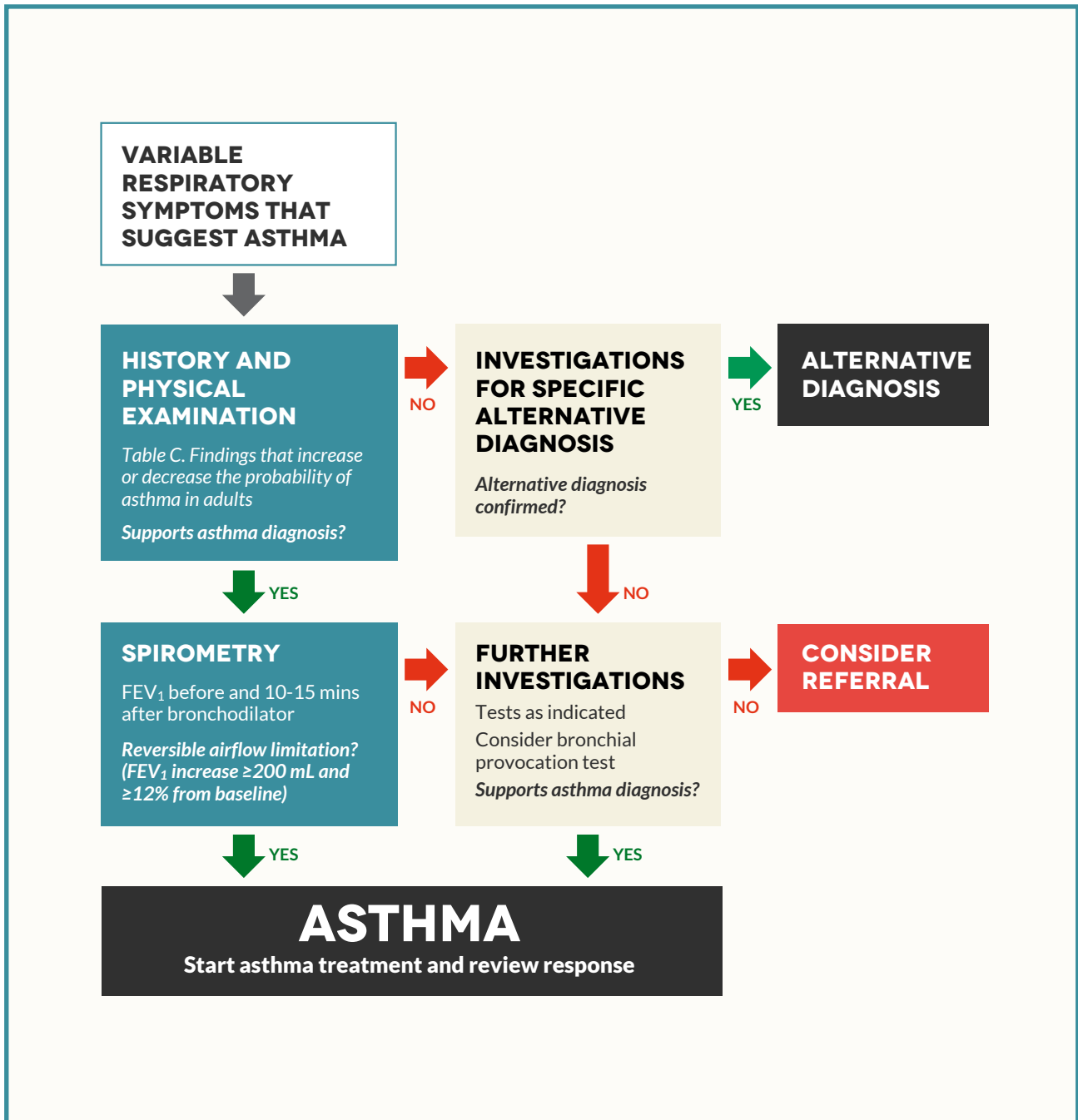
Asthma is more likely to explain the symptoms if any of these apply	Asthma is less likely to explain the symptoms if any of these apply
More than one of these symptoms: <ul style="list-style-type: none"><li>• wheeze</li><li>• breathlessness</li><li>• chest tightness</li><li>• cough</li></ul>	Dizziness, light-headedness, peripheral tingling
Symptoms recurrent or seasonal	Isolated cough with no other respiratory symptoms
Symptoms worse at night or in the early morning	Chronic sputum production
History of allergies (e.g. allergic rhinitis, atopic dermatitis)	No abnormalities on physical examination of chest when symptomatic (over several visits)
Symptoms obviously triggered by exercise, cold air, irritants, medicines (e.g. aspirin or beta blockers), allergies, viral infections, laughter	Change in voice
Family history of asthma or allergies	Symptoms only present during upper respiratory tract infections
Symptoms began in childhood	Heavy smoker (now or in past)
Widespread wheeze audible on chest auscultation	Cardiovascular disease
FEV <sub>1</sub> or PEF lower than predicted, without other explanation	Normal spirometry or PEF when symptomatic (despite repeated tests)
Eosinophilia or raised blood IgE level, without other explanation	
Symptoms rapidly relieved by a SABA bronchodilator	

**Adapted from:**

Respiratory Expert Group, Therapeutic Guidelines Limited. *Therapeutic Guidelines: Respiratory, Version 4*. Therapeutic Guidelines Limited, Melbourne, 2009. British Thoracic Society (BTS) Scottish Intercollegiate Guidelines Network (SIGN). *British Guideline on the Management of Asthma. A national clinical guideline*. BTS, SIGN, Edinburgh; 2012.

Australian Asthma Handbook asset ID: 2

Figure A. Steps in the diagnosis of asthma in adults



Australian Asthma Handbook asset ID: 4

## DIAGNOSING ASTHMA IN CHILDREN

For detailed guidance and information, see [astmahandbook.org.au/diagnosis/children](http://astmahandbook.org.au/diagnosis/children)

There is no single reliable test ('gold standard') and there are no standardised diagnostic criteria for asthma.

The clinical diagnosis of asthma in children involves the consideration of:

- history of recurrent or persistent wheeze
- presence of allergies or family history of asthma and allergies
- absence of physical findings that suggest an alternative diagnosis
- tests that support the diagnosis (e.g. spirometry in children able to perform the test)
- a consistent clinical response to an inhaled bronchodilator or preventer.

It can be difficult to diagnose asthma with certainty in children aged 0–5 years, because:

- episodic respiratory symptoms such as wheezing and cough are very common in children, particularly in children under 3 years
- objective lung function testing by spirometry is usually not feasible in this age group
- a high proportion of children who respond to bronchodilator treatment do not go on to have asthma in later childhood (e.g. by primary school age).

**⚠ A diagnosis of asthma should not be made if cough is the only or predominant respiratory symptom and there are no signs of airflow limitation (e.g. wheeze or breathlessness).**

**Table D. Findings that increase or decrease the probability of asthma in children**

Asthma more likely	Asthma less likely
<p>More than one of:</p> <ul style="list-style-type: none"> <li>• wheeze</li> <li>• difficulty breathing</li> <li>• feeling of tightness in the chest</li> <li>• cough</li> </ul>	<p>Any of:</p> <ul style="list-style-type: none"> <li>• symptoms only occur when child has a cold, but not between colds</li> <li>• isolated cough in the absence of wheeze or difficulty breathing</li> <li>• history of moist cough</li> <li>• dizziness, light-headedness or peripheral tingling</li> <li>• repeatedly normal physical examination of chest when symptomatic</li> <li>• normal spirometry when symptomatic (children old enough to perform spirometry)</li> <li>• no response to a trial of asthma treatment</li> <li>• clinical features that suggest an alternative diagnosis</li> </ul>
<p>AND</p> <p>Any of:</p> <ul style="list-style-type: none"> <li>• symptoms recur frequently</li> <li>• symptoms worse at night and in the early morning</li> <li>• symptoms triggered by exercise, exposure to pets, cold air, damp air, emotions, laughing</li> <li>• symptoms occur when child doesn't have a cold</li> <li>• history of allergies (e.g. allergic rhinitis, atopic dermatitis)</li> <li>• family history of allergies</li> <li>• family history of asthma</li> <li>• widespread wheeze heard on auscultation</li> <li>• symptoms respond to treatment trial of reliever, with or without a preventer</li> <li>• lung function measured by spirometry increases in response to rapid-acting bronchodilator</li> <li>• lung function measured by spirometry increases in response to a treatment trial with inhaled corticosteroid (where indicated)</li> </ul>	

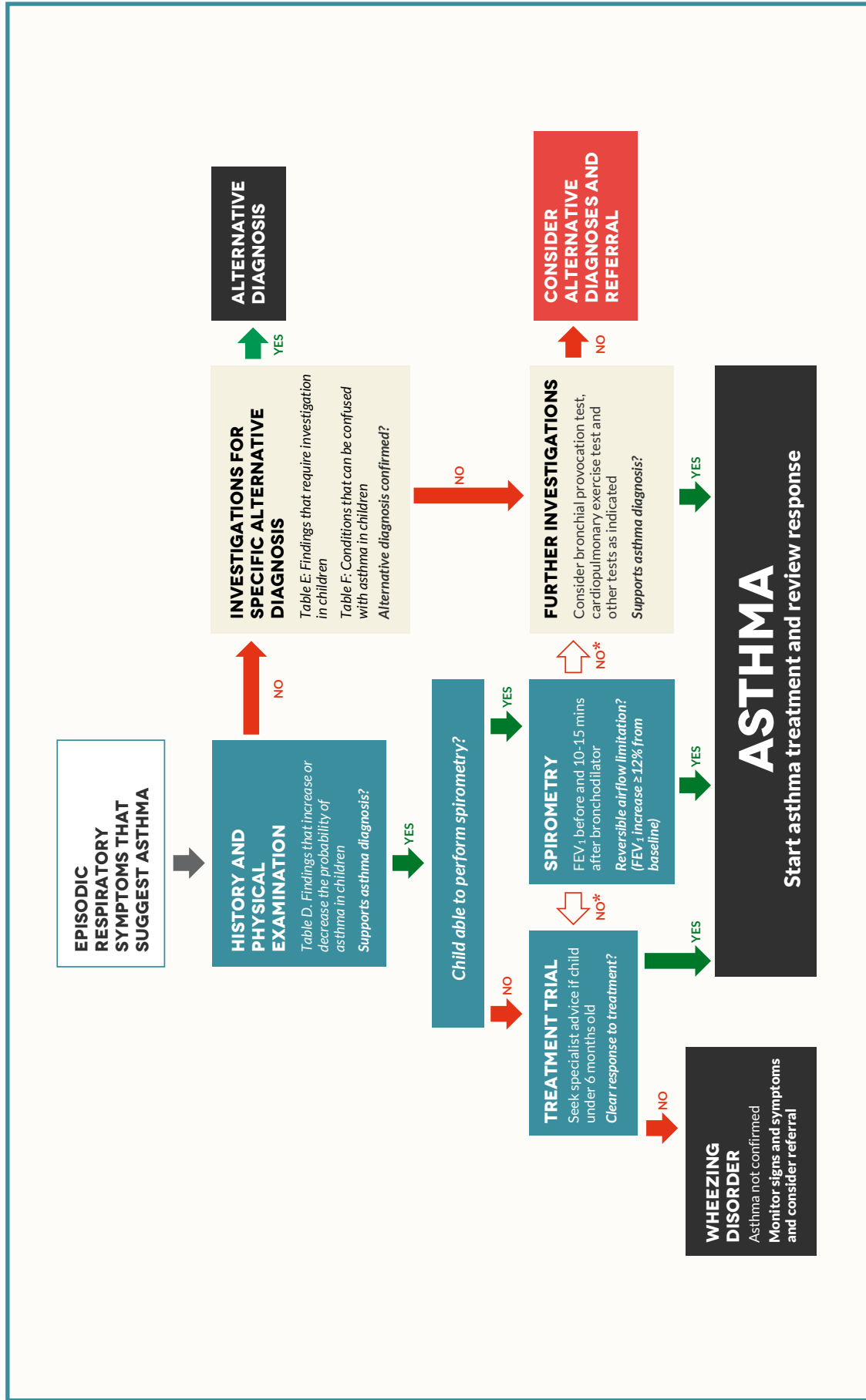
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British Thoracic Society (BTS), Scottish Intercollegiate Guidelines Network (SIGN). *British Guideline on the management of Asthma. A national clinical guideline.* BTS, SIGN, Edinburgh, 2012.

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

**Australian Asthma Handbook asset ID: 12**

Figure B. Steps in the diagnosis of asthma in children



\* Consider options (treatment trial or further investigations) according to individual circumstances, including child's ability to do bronchial provocation test or cardiopulmonary exercise test.

**Table E. Findings that require investigation in children**

<b>Finding</b>	<b>Notes</b>
<b>Persistent cough that is not associated with wheeze/ breathlessness or systemic disease</b>	Unlikely to be due to asthma
<b>Onset of signs from birth or very early in life</b>	Suggests cystic fibrosis, chronic lung disease of prematurity, primary ciliary dyskinesia, bronchopulmonary dysplasia, congenital abnormality
<b>Family history of unusual chest disease</b>	Should be enquired about before attributing all the signs and symptoms to asthma
<b>Severe upper respiratory tract disease (e.g. severe rhinitis, enlarged tonsils and adenoids or nasal polyps)</b>	Specialist assessment should be considered
<b>Crepitations on chest auscultation that do not clear on coughing</b>	Suggest a serious lower respiratory tract condition such as pneumonia, atelectasis, bronchiectasis
<b>Unilateral wheeze</b>	Suggests inhaled foreign body
<b>Systemic symptoms (e.g. fever, weight loss, failure to thrive)</b>	Suggest an alternative systemic disorder
<b>Feeding difficulties, including choking or vomiting</b>	Suggests aspiration – specialist assessment should be considered
<b>Inspiratory upper airway noises (e.g. stridor, snoring)</b>	Acute stridor suggests tracheobronchitis (croup)
<b>Persistent voice abnormality</b>	Suggests upper airway disorder
<b>Finger clubbing</b>	Suggests cystic fibrosis, bronchiectasis
<b>Chronic (&gt;4 weeks) wet or productive cough</b>	Suggests cystic fibrosis, bronchiectasis, chronic bronchitis, recurrent aspiration, immune abnormality, ciliary dyskinesia
<b>Focal (localised) lung signs</b>	Suggests pneumonia
<b>Nasal polyps in child under 5 years old</b>	Suggests cystic fibrosis
<b>Severe chest deformity</b>	Harrison's Sulcus and Pectus Carinatum can be due to uncontrolled asthma, but severe deformity suggests an alternative diagnosis
<b>Obvious breathing difficulty, especially at rest or at night</b>	Specialist assessment should be considered
<b>Recurrent pneumonia</b>	Specialist assessment should be considered

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**Table F. Conditions that can be confused with asthma in children**

<b>Conditions characterised by cough</b>
Pertussis (whooping cough)
Cystic fibrosis
Airway abnormalities (e.g. tracheomalacia, bronchomalacia)
Protracted bacterial bronchitis in young children
Habit-cough syndrome
<b>Conditions characterised by wheezing</b>
Upper airway dysfunction
Inhaled foreign body causing partial airway obstruction
Tracheomalacia
<b>Conditions characterised by difficulty breathing</b>
Hyperventilation
Anxiety
Breathlessness on exertion due to poor cardiopulmonary fitness

Source

Weinberger M, Abu-Hasan M. Pseudo-asthma: when cough, wheezing, and dyspnea are not asthma. *Pediatrics* 2007; 120: 855-64.

Australian Asthma Handbook asset ID: 11

# MANAGEMENT

## MANAGING ASTHMA IN ADULTS

For detailed guidance and information, see [astmahandbook.org.au/management/adults](http://astmahandbook.org.au/management/adults)

Asthma management in adults is based on:

- confirming the diagnosis
- assessing recent asthma symptom control and risk factors
- identifying management goals in collaboration with the patient
- choosing initial treatment appropriate to recent asthma symptom control, risk factors and patient preference
- reviewing and adjusting drug treatment periodically (see *Figure C: Stepped approach to adjusting asthma medication in adults*)
- providing information, skills and tools for self-management, including:
  - training in correct inhaler technique
  - information and support to maximise adherence
  - a written asthma action plan
  - information about avoiding triggers, where appropriate
- managing flare-ups when they occur
- managing comorbid conditions that affect asthma or contribute to respiratory symptoms
- providing advice about smoking, healthy eating, physical activity, healthy weight and immunisation.

### Classification of asthma severity and recent asthma symptom control in adults

Recent asthma symptom control in adults is defined by frequency of symptoms, the degree to which symptoms affect sleep and activity, and the need for reliever medication over the previous 4 weeks.

Any experience of flare-ups or night-time waking due to asthma symptoms, even if infrequent, usually indicates that the person needs regular preventer treatment.

Severity of asthma in adults is defined by treatment needed to maintain good control, not by the severity of acute flare-ups.

For patients prescribed a preventer, asthma severity can only be determined after using a preventer for at least 8 weeks.

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

Good control	Partial control	Poor control
All of: <ul style="list-style-type: none"> <li>• Daytime symptoms <math>\leq 2</math> days per week</li> <li>• Need for reliever <math>\leq 2</math> days per week†</li> <li>• No limitation of activities</li> <li>• No symptoms during night or on waking</li> </ul>	One or two of: <ul style="list-style-type: none"> <li>• Daytime symptoms <math>&gt; 2</math> days per week</li> <li>• Need for reliever <math>&gt; 2</math> days per week†</li> <li>• Any limitation of activities</li> <li>• Any symptoms during night or on waking</li> </ul>	Three or more of: <ul style="list-style-type: none"> <li>• Daytime symptoms <math>&gt; 2</math> days per week</li> <li>• Need for reliever <math>&gt; 2</math> days per week†</li> <li>• Any limitation of activities</li> <li>• Any symptoms during night or on waking</li> </ul>

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

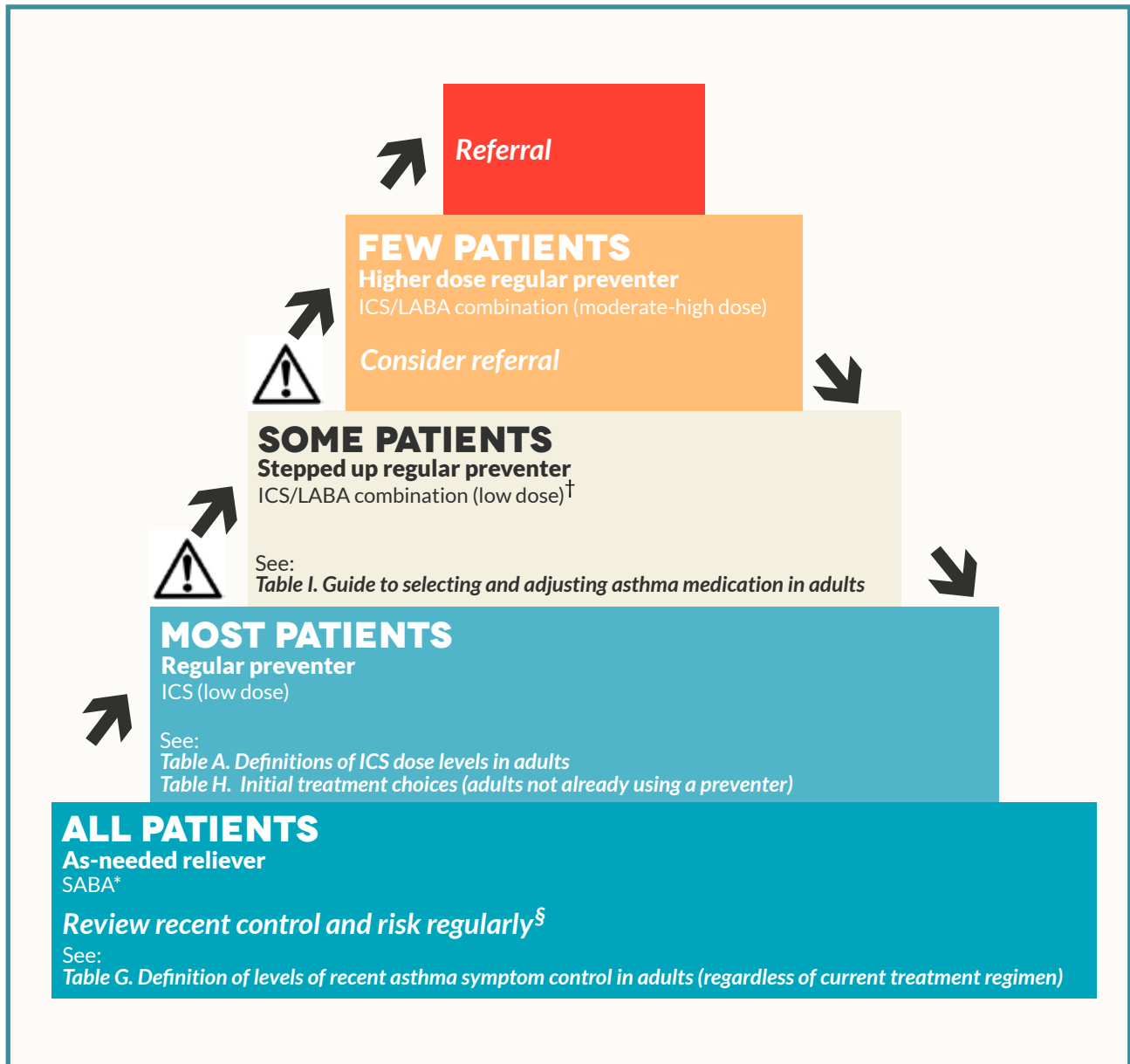
Note: Recent asthma symptom control is based on symptoms over the previous 4 weeks.

#### Source

Adapted from Global Initiative for Asthma (GINA). *Global strategy for asthma management and prevention*. GINA; 2012.

Australian Asthma Handbook asset ID: 33

Figure C. Stepped approach to adjusting asthma medication in adults



	Before considering stepping up, check symptoms are due to asthma, inhaler technique is correct, and adherence is adequate
	Consider stepping up if good control is not achieved.
	When asthma is stable and well controlled for 2–3 months, consider stepping down (e.g. reducing inhaled corticosteroid dose, or stopping long-acting beta <sub>2</sub> agonist if inhaled corticosteroid dose is already low).

\* Or low-dose budesonide/eformoterol combination for patients using this combination as both maintenance and reliever.

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

† Montelukast can be added to inhaled corticosteroid as an alternative to switching to ICS/LABA, but is less effective.

**Note:** Check the Pharmaceutical Benefits Scheme for subsidisation status; criteria for some asthma medicines differ between age groups and indications.

*Australian Asthma Handbook* asset ID: 31

**Table H. Initial treatment choices (adults not already using a preventer)**

Clinical situation	Suggested starting regimen †	Alternative options and notes
Symptoms less than twice per month and no flare-up within previous 12 months	SABA as needed	
Patient with newly diagnosed asthma whose symptoms are mild and occur twice per month or more often	Regular ICS starting at a low dose (plus SABA as needed)	Montelukast‡ Cromones§
Patient who has woken due to asthma symptoms at least once during the past month	Regular ICS starting at a low dose (plus SABA as needed)	If patient also has frequent daytime symptoms consider either of: <ul style="list-style-type: none"> <li>• medium- to high-dose ICS (plus SABA as needed)</li> <li>• (private prescription) combination ICS/LABA‡</li> </ul>
Patient with infrequent symptoms (on average, less than twice per month) who has required oral corticosteroids for a flare-up of asthma (exacerbation) within the last 2 years	Regular ICS starting at a low dose (plus SABA as needed)	
Patient who has ever received artificial ventilation or been admitted to an intensive care unit due to acute asthma	Regular ICS starting at a low dose (plus SABA as needed) ⚠ Monitor frequently	
Patient with newly diagnosed asthma whose symptoms are severely uncontrolled or very troublesome	Regular ICS (plus SABA as needed) For very uncontrolled asthma at presentation (e.g. frequent night waking, low lung function), consider (either of): <ul style="list-style-type: none"> <li>• high-dose ICS (then down-titrate when symptoms improve)</li> <li>• a short course of oral corticosteroids in addition to ICS</li> </ul>	Consider (private prescription) combination ICS/LABA‡

† When prescribing inhaled asthma medicines, take into account the person's preferences, ability to use the device, and cost issues; § Requires multiple daily doses and daily maintenance of inhaler; ‡ Check the Pharmaceutical Benefits Scheme for subsidisation status; criteria for some asthma medicines differ between age groups and indications.

Australian Asthma Handbook asset ID: 32

**Table I. Guide to selecting and adjusting asthma medication for adults**

Clinical situation	Action
Newly diagnosed asthma	Consider low-dose ICS (plus SABA as needed) If symptoms severe at initial presentation, consider one of: <ul style="list-style-type: none"> <li>• ICS plus a short course of oral corticosteroids</li> <li>• a short initial period of high-dose ICS then step down</li> <li>• (private prescription) combination ICS/LABA†</li> </ul>
Good recent asthma symptom control	If maintained 2–3 months, no flare-up in previous 12 months and low risk for flare-ups, step down where possible.
Partial recent asthma symptom control	Review inhaler technique and adherence – correct if suboptimal If no improvement, consider increasing treatment by one step and reviewing (if still no improvement, return to previous step, review diagnosis and consider referral)
Poor recent asthma symptom control	Review inhaler technique and adherence – correct if suboptimal Confirm that symptoms are likely to be due to asthma Consider increasing treatment until good asthma control is achieved, then step down again when possible
Difficult-to-treat asthma ‡	Consider referral for assessment or add-on options
Patient with risk factors §	Tailor treatment to reduce individual risk factors

† Check the Pharmaceutical Benefits Scheme for subsidisation status; criteria for some asthma medicines differ between age groups and indications; ‡ Poor recent asthma symptom control despite ICS/LABA combination at high–medium dose with good adherence and inhaler technique; § Risk factors for asthma events or adverse treatment effects, irrespective of level of recent asthma symptom control.

Australian Asthma Handbook asset ID: 5

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

	<b>Medical history</b>	<b>Investigation findings</b>	<b>Other factors</b>
<b>Factors associated with increased risk of flare-ups</b>	<p>Poor asthma control</p> <p>Any asthma flare-up during the previous 12 months</p> <p>Other concurrent chronic lung disease</p>	<p>Poor lung function (even if few symptoms)</p> <p>Peripheral blood eosinophilia (suggests eosinophilic airway inflammation)</p> <p>Difficulty perceiving airflow limitation or the severity of exacerbations</p>	<p>Exposure to cigarette smoke (smoking or environmental exposure)</p> <p>Socioeconomic disadvantage</p> <p>Use of illegal substances</p> <p>Major psychosocial problems</p> <p>Mental illness</p>
<b>Factors associated with increased risk of life-threatening asthma</b>	<p>Intubation or admission to intensive care unit due to asthma (ever)</p> <p>2 or more hospitalisations for asthma in past year</p> <p>3 or more ED visits for asthma in the past year</p> <p>Hospitalisation or ED visit for asthma in the past month</p> <p>High short-acting beta<sub>2</sub> agonist use (&gt;2 canisters per month)</p> <p>History of delayed presentation to hospital during flare-ups</p> <p>History of sudden-onset acute asthma</p> <p>Cardiovascular disease</p>	<p>Sensitivity to unavoidable allergens (e.g. <i>Alternaria</i> species of common moulds)</p>	<p>Inadequate treatment</p> <p>Experience of side-effects of OCS use (may contribute to under-treatment or delayed presentation to hospital during flare-ups)</p> <p>Lack of written asthma action plan</p> <p>Socioeconomic disadvantage</p> <p>Living alone</p> <p>Mental illness</p> <p>Use of alcohol or illegal substances</p> <p>Poor access to health care (e.g. rural/remote region)</p>
<b>Factors associated with accelerated decline in lung function</b>	<p>Chronic mucus hypersecretion</p> <p>Severe asthma flare-up in a patient not taking ICS</p>	<p>Poor lung function</p> <p>Peripheral blood eosinophilia (suggests eosinophilic airway inflammation)</p>	<p>Exposure to cigarette smoke (smoking or environmental exposure)</p> <p>Occupational asthma</p>
<b>Factors associated with treatment-related adverse events</b>	<p>Long-term high-dose ICS</p> <p>Frequent use of OCS</p>		<p>Anxiety disorder (due to increased sensitivity to asthma symptoms and reluctance to reduce ICS dose when asthma well controlled)</p> <p>Euphoria with OCS use</p>

**Sources**

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**Australian Asthma Handbook asset ID: 40**

**Table K. Management of risk factors for adverse asthma outcomes in adults**

<b>Risk factor</b>	<b>Clinical action †</b>
<b>Any risk factor for flare-ups</b>	<p>Check patient has an appropriate action plan</p> <p>Carefully check inhaler technique and adherence, and identify any barriers to good adherence</p> <p>Review frequently (e.g. every 3 months)</p>
<b>Hospitalisation or ED visit for asthma or any asthma flare-up during the previous 12 months</b>	<p>Ask about triggers for flare-ups, and lead time</p>
<b>History of intubation or intensive care unit admission for asthma</b>	<p>Ensure action plan recommends early medical review when asthma worsens</p>
<b>Hospitalisation or ED visit for asthma in the past month</b>	<p>Emphasise importance of maintaining regular ICS use after symptoms improve</p> <p>Confirm that patient has resumed using SABA only when needed for symptoms</p>
<b>High SABA use (&gt;2 canisters per month)</b>	<p>Check lung function</p> <p>If SABA use appears to be habitual, investigate causes and consider alternative strategies, e.g. short-term substitution of ipratropium for SABA</p>
<b>Long-term high-dose ICS</b>	<p>Consider gradual reduction of ICS dose if symptoms stable</p> <p>Monitor regularly (e.g. assessment of bone density, regular eye examinations)</p> <p>For local side-effects, ensure inhaler technique is appropriate</p>
<b>Poor lung function (even if few symptoms)</b>	<p>Consider 3-month trial of higher ICS dose, then recheck lung function</p> <p>Consider referral for detailed specialist investigation</p>
<b>Sensitivity to unavoidable allergens (e.g. Alternaria species of common moulds)</b>	<p>Refer for further investigation and management</p>
<b>Exposure to cigarette smoke (smoking or environmental exposure)</b>	<p>Emphasise the importance of avoiding smoke</p> <p>Provide quitting strategies</p> <p>Consider increasing ICS dose (higher dose of ICS likely to be necessary to control asthma)</p> <p>Refer for assessment of asthma-COPD overlap</p>
<b>Difficulty perceiving airflow limitation or the severity of exacerbations</b>	<p>Regular PEF monitoring</p> <p>Action plan should recommend early review and measurement of lung function</p>
<b>No current written asthma action plan</b>	<p>Provide and explain written asthma action plan</p>

† In addition to actions applicable to all risk factors

Australian Asthma Handbook asset ID: 41

# MANAGING ASTHMA IN CHILDREN

For detailed guidance and information, see [astmahandbook.org.au/management/children](http://astmahandbook.org.au/management/children)

The management of asthma and wheezing disorders in children is based on:

- confirming the diagnosis
- assessing the pattern of symptoms (including frequency of episodes and pattern of symptoms between episodes)
- assessing triggers
- discussing the goals of management with the child's parents and the child (depending on age)
- choosing initial treatment based on the child's age and pattern of symptoms
- reviewing and adjusting treatment periodically based on recent asthma symptom control and risk factors (see *Figure D: Stepped approach to adjusting asthma medication in children*)
- managing comorbid conditions that affect asthma (e.g. allergic rhinitis)
- providing parents and children with information and skills to manage their asthma, including:
  - a written asthma action plan
  - information about avoiding triggers, where appropriate
  - training in correct use of medicines, including inhaler technique
  - information and support to maximise adherence
- managing flare-ups when they occur
- providing advice about avoidance of tobacco smoke, healthy eating, physical activity, healthy weight and immunisation.

In children, initial treatment after making the diagnosis of asthma is guided by the pattern and severity of asthma symptoms. The aims of asthma management are to ensure that the child's asthma has been correctly diagnosed, and to enable the child to maintain a normal quality of life without interference from asthma or the side effects of asthma treatment.

For children already taking regular preventer treatment, adjustments to the treatment regimen are based on finding the lowest dose of medicines that will maintain good control of symptoms and prevent flare-ups.

## Classification of recent asthma symptom control in children

Ongoing review of asthma involves both assessing recent asthma symptom control and assessing risks for poor asthma outcomes (e.g. flare-ups, adverse effects of medicines).

Recent asthma symptom control is assessed according to the frequency of asthma symptoms over the previous 4 weeks.

**Table L. Definition of levels of recent asthma symptom control in children (regardless of current treatment regimen)**

Good control	Partial control	Poor control
All of: <ul style="list-style-type: none"> <li>• Daytime symptoms† ≤2 days per week (lasting only a few minutes and rapidly relieved by rapid-acting bronchodilator)</li> <li>• No limitation of activities‡</li> <li>• No symptoms§ during night or when wakes up</li> <li>• Need for reliever# ≤2 days per week</li> </ul>	Any of: <ul style="list-style-type: none"> <li>• Daytime symptoms† &gt;2 days per week (lasting only a few minutes and rapidly relieved by rapid-acting bronchodilator)</li> <li>• Any limitation of activities*</li> <li>• Any symptoms during night or when wakes up††</li> <li>• Need for reliever# &gt;2 days per week</li> </ul>	Either of: <ul style="list-style-type: none"> <li>• Daytime symptoms† &gt;2 days per week (lasting from minutes to hours or recurring, and partially or fully relieved by rapid-acting bronchodilator)</li> <li>• ≥3 features of partial control within the same week</li> </ul>

† E.g. wheezing or breathing problems; ‡ Child is fully active; runs and plays without symptoms; § Including no coughing during sleep; # Not including short-acting beta<sup>2</sup> agonist taken prophylactically before exercise. (Record this separately and take into account when assessing management.); \* E.g. wheeze or breathlessness during exercise, vigorous play or laughing; †† E.g. waking with symptoms of wheezing or breathing problems

Note: Recent asthma control is based on symptoms over the previous 4 weeks. Each child's risk factors for future asthma outcomes should also be assessed and taken into account in management.

Adapted from: Global Initiative for Asthma (GINA), *Global strategy for the diagnosis and management of asthma in children 5 years and younger*. GINA; 2009

Australian Asthma Handbook asset ID: 23

Figure D. Stepped approach to adjusting asthma medication in children



	Before considering stepping up, check symptoms are due to asthma, inhaler technique is correct, and adherence is adequate.
	Consider stepping up if good control is not achieved.
	When asthma is stable and well controlled for more than 3 months, consider stepping down (e.g. reducing inhaled corticosteroid dose to low).

\*Or low-dose budesonide/eformoterol combination, only for children aged 12 years or over who are using this combination as both maintenance and reliever.

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

Note: Check the Pharmaceutical Benefits Scheme for subsidisation status; criteria for some asthma medicines differ between age groups and indications.

Australian Asthma Handbook asset ID: 18

**Table M. Definitions of asthma patterns in children aged 0–5 years not taking regular preventer**

Category		Pattern and intensity of symptoms (when not taking regular treatment)
Infrequent intermittent asthma		Symptom-free for at least 6 weeks at a time (symptoms up to once every 6 weeks on average but no symptoms between flare-ups)
Frequent intermittent asthma		Symptoms more than once every 6 weeks on average but no symptoms between flare-ups
Persistent asthma	Mild	At least one of: <ul style="list-style-type: none"> <li>• Daytime symptoms† more than once per week but not every day</li> <li>• Night-time symptoms† more than twice per month but not every week</li> </ul>
	Moderate	Any of: <ul style="list-style-type: none"> <li>• Daytime symptoms† daily</li> <li>• Night-time symptoms† more than once per week</li> <li>• Symptoms sometimes restrict activity or sleep</li> </ul>
	Severe	Any of: <ul style="list-style-type: none"> <li>• Daytime symptoms† continual</li> <li>• Night-time symptoms† frequent</li> <li>• Flare-ups frequent</li> <li>• Symptoms frequently restrict activity or sleep</li> </ul>

† Symptoms between flare-ups. A flare-up is defined as a period of worsening asthma symptoms, from mild (e.g. symptoms that are just outside the normal range of variation for the child, documented when well) to severe (e.g. events that require urgent action by parents and health professionals to prevent a serious outcome such as hospitalisation or death from asthma).

Note: Use this table when the diagnosis of asthma can be made with reasonable confidence (e.g. a child with wheezing accompanied by persistent cough or breathing difficulty, no signs or symptoms that suggest a potentially serious alternative diagnosis, and the presence of other factors that increase the probability of asthma such as family history of allergies or asthma).

Australian Asthma Handbook asset ID: 14

**Table N. Definitions of asthma patterns in children aged 6 years and over not taking regular preventer**

Category		Pattern and intensity of symptoms (when not taking regular treatment)
Infrequent intermittent asthma †		Symptom-free for at least 6 weeks at a time (symptoms up to once every 6 weeks on average but no symptoms between flare-ups)
Frequent intermittent asthma		Symptoms more than once every 6 weeks on average but no symptoms between flare-ups
Persistent asthma	Mild	FEV <sub>1</sub> ≥80% predicted and at least one of: <ul style="list-style-type: none"> <li>• Daytime symptoms‡ more than once per week but not every day</li> <li>• Night-time symptoms‡ more than twice per month but not every week</li> </ul>
	Moderate	Any of: <ul style="list-style-type: none"> <li>• FEV<sub>1</sub> &lt;80% predicted‡</li> <li>• Daytime symptoms‡ daily</li> <li>• Night-time symptoms‡ more than once per week</li> <li>• Symptoms sometimes restrict activity or sleep</li> </ul>
	Severe	Any of: <ul style="list-style-type: none"> <li>• FEV<sub>1</sub> ≤60% predicted‡</li> <li>• Daytime symptoms‡ continual</li> <li>• Night-time symptoms‡ frequent</li> <li>• Flare-ups frequent</li> <li>• Symptoms frequently restrict activity or sleep</li> </ul>

† It may not be appropriate to make the diagnosis of asthma in children aged 6 or older who wheeze only during upper respiratory tract infections. These children can be considered to have episodic (viral) wheeze.

‡ Symptoms between flare-ups. A flare-up is defined as a period of worsening asthma symptoms, from mild (e.g. symptoms that are just outside the normal range of variation for the child, documented when well) to severe (e.g. events that require urgent action by parents and health professionals to prevent a serious outcome such as hospitalisation or death from asthma).

Australian Asthma Handbook asset ID: 15

**Table O. Initial preventer treatment for children aged 0–5 years**

Age	Pattern of symptoms	Management options and notes*
0–12 months	Intermittent asthma OR Viral-induced wheeze	Regular preventer treatment is not recommended
	Multiple-trigger wheeze	Refer for specialist assessment or obtain specialist advice before prescribing
1–2 years	Intermittent asthma OR Viral-induced wheeze	Regular preventer treatment is not recommended
	Persistent asthma OR Multiple-trigger wheeze	Consider a treatment trial with a cromone (sodium cromoglycate or nedocromil) and review response in 2–4 weeks† Consider a treatment trial of low-dose inhaled corticosteroids only if wheezing symptoms are disrupting child's sleeping or play. Review response in 4 weeks
2–5 years	Infrequent intermittent asthma OR Viral-induced wheeze	Regular preventer treatment is not recommended
	Frequent intermittent asthma OR Mild persistent asthma OR Episodic (viral) wheeze with frequent symptoms OR Multiple-trigger wheeze	Consider regular treatment with montelukast 4 mg once daily and review response in 2–4 weeks If symptoms do not respond, consider regular treatment with a low dose of an inhaled corticosteroid and review response in 4 weeks
	Moderate–severe persistent asthma OR Moderate–severe multiple-trigger wheeze	Consider regular treatment with a low dose of an inhaled corticosteroid and review response in 4 weeks

\* In addition to use of rapid-onset inhaled beta<sub>2</sub> agonist when child experiences difficulty breathing; † Cromone inhaler device mouthpieces require daily washing to avoid blocking. Episodic (viral) wheeze: episodes of wheezing (e.g. for a few days when child has a viral cold) and no wheezing at other times; Multiple-trigger wheeze: episodes of wheezing from time to time and child also coughs and wheezes at other times when does not have a viral cold.

Australian Asthma Handbook asset ID: 20

**Table P. Initial preventer treatment for children aged 6 years and over**

Pattern of symptoms †	Management options and notes
Infrequent intermittent asthma ‡	Regular preventer treatment is not recommended
Frequent intermittent asthma	Consider a treatment trial with montelukast 5 mg once daily; assess response after 2–4 weeks <b>Note:</b> a cromone (sodium cromoglycate or nedocromil) can be trialed as an alternative §
Mild persistent asthma	Consider a treatment trial with montelukast 5 mg once daily; assess response after 2–4 weeks If inadequate response after checking adherence, consider treatment trial with inhaled corticosteroid (low dose) <b>Note:</b> a cromone (sodium cromoglycate or nedocromil) can be trialed as an alternative§
Moderate-to-severe persistent asthma	Consider a treatment trial with regular inhaled corticosteroid (low dose); assess response after 4 weeks

\* Pattern of symptoms when not taking regular preventer treatment; † In addition to use of rapid-onset inhaled beta<sub>2</sub> agonist when child experiences difficulty breathing; ‡ Also applies to children who wheeze only during upper respiratory tract infections and do not have a diagnosis of asthma; § Cromone inhaler device mouthpieces require daily washing to avoid blocking

Australian Asthma Handbook asset ID: 16

**Table Q. Reviewing and adjusting preventer treatment for children aged 0–5 years**

Initial treatment	When to schedule review	Management options and notes	
		Treatment response	No treatment response †
Montelukast (children 2 years and over)	2–4 weeks	Continue montelukast treatment	Stop montelukast and start treatment with an inhaled corticosteroid, starting with a low dose
Inhaled corticosteroid (low dose)	4 weeks	Continue regular treatment at low dose After ≥ 3 months, consider stopping treatment and reviewing in 4 weeks	Review the diagnosis, adherence and inhaler technique Consider referral to a specialist (e.g. paediatric respiratory physician or paediatrician, if available) for assessment Consider adding montelukast (in combination with inhaled corticosteroid)‡

† Symptom control not achieved with initial treatment after verifying treatment was taken as intended

‡ Check the Pharmaceutical Benefits Scheme for subsidisation status; criteria for some asthma medicines differ between age groups and indications.

Australian Asthma Handbook asset ID: 25

**Table R. Reviewing and adjusting preventer treatment for children aged 6 years and over**

Initial treatment	When to schedule review	Management options and notes	
		Treatment response (symptoms well controlled)	No treatment response †
Montelukast or cromones	2–4 weeks	Continue treatment Set review date (e.g. 3 months)	Stop treatment and start treatment with an inhaled corticosteroid, starting with a low dose
Inhaled corticosteroid (low dose)	4 weeks	Continue regular treatment at low dose Set review date (e.g. 3 months)	Consider one of the following options:‡ <ul style="list-style-type: none"> <li>• Add montelukast in addition to inhaled corticosteroid (children 6–14 years)§</li> <li>• Increase the dose of inhaled corticosteroid; reassess in 2–4 weeks</li> <li>• Switch to combination long-acting beta<sub>2</sub> agonist/ inhaled corticosteroid</li> </ul>

† Symptom control not achieved with initial treatment after verifying treatment was taken as intended

‡ Before considering a change in the treatment regimen: review the diagnosis, adherence and inhaler technique consider referral to a specialist (e.g. paediatric respiratory physician or paediatrician, if available) for assessment.

§ Check the Pharmaceutical Benefits Scheme for subsidisation status; criteria for some asthma medicines differ between age groups and indications.

Australian Asthma Handbook asset ID: 26

## INHALER DEVICES AND TECHNIQUE

For detailed guidance and information, see [astmahandbook.org.au/management/devices](http://astmahandbook.org.au/management/devices)

There are three main types of inhalers for asthma and COPD medicines:

- standard pressurised metered-dose inhalers
- breath-activated pressurised metered-dose inhalers
- dry powder inhalers.

The correct inhaler technique depends on the device.

### Adherence

Check the *Australian Asthma Handbook* website for more information on assessing and maximising patients' adherence to asthma treatment.

[astmahandbook.org.au/management/adherence](http://astmahandbook.org.au/management/adherence)

**Table S. Considerations for choice of inhaler device type when prescribing inhaled medicines**

Clinical situation	Consideration
All patients	Recommend use of spacer when using reliever for acute asthma
Any patient using a pMDI for an inhaled corticosteroid	Recommend use of a spacer every time
Infants and small children	Use a facemask with a spacer
Poor manual dexterity (e.g. weak hands or osteoarthritis)	Consider a <i>Haleraid</i> device with pMDI, or a breath-activated inhaler
Difficulty connecting spacer to pMDI (e.g. elderly patient with weakness or poor coordination)	Consider a breath-activated inhaler
Inability to form a good seal around the mouthpiece of the inhaler or spacer (e.g. person with cognitive impairment)	Consider a spacer plus age-appropriate facemask
Difficulty speaking or reading English	Use an interpreter or provide written instructions in the person's first language
Using multiple inhalers	Choose the same type for each medicine, if possible, to avoid confusion If not possible, train person in the correct inhaler technique for each of their devices

#### Source

National Asthma Council Australia. *Inhaler technique in adults with asthma or COPD. An information paper for health professionals*. Melbourne: NAC; 2008.  
Australian Asthma Handbook asset ID: 76

**Table T. Types of inhaler devices for delivering asthma medicines**

<b>Design type</b>	<b>Brand name</b>	<b>Common medicines used with this type of inhaler</b>
<b>Standard pMDI</b>	Generic inhaler used alone or with a spacer	<b>Relievers</b> <i>Airomir</i> (salbutamol) <i>Asmol</i> (salbutamol) <i>Ventolin</i> (salbutamol) <i>Symbicort</i> (budesonide plus eformoterol) via <i>Rapihaler</i> when used in a maintenance-and-reliever regimen
		<b>Preventers</b> <i>Alvesco</i> (ciclesonide) <i>Flixotide</i> (fluticasone propionate) <i>Flutiform</i> (fluticasone propionate plus eformoterol) <i>Intal</i> (sodium cromoglycate) <i>Intal Forte</i> (sodium cromoglycate) <i>Qvar</i> (beclomethasone) <i>Seretide</i> (salmeterol plus fluticasone propionate) <i>Symbicort</i> (budesonide plus eformoterol) via <i>Rapihaler</i> <i>Tilade</i> (nedocromil sodium)
<b>Breath-activated pMDI</b>	<i>Autohaler</i>	<b>Relievers</b> <i>Airomir</i> (salbutamol)
		<b>Preventers</b> <i>Qvar</i> (beclomethasone)
<b>Dry-powder inhaler</b>	<i>Accuhaler</i> (breath-actuated dry-powder inhaler)	<b>Preventers</b> <i>Flixotide</i> (fluticasone) <i>Seretide</i> (salmeterol plus fluticasone)
		<b>Other</b> <i>Serevent</i> (salmeterol)
	<i>Aerolizer</i>	<i>Foradile</i> (eformoterol)
	<i>Turbuhaler</i>	<b>Relievers</b> <i>Bricanyl</i> (terbutaline sulfate) <i>Symbicort</i> (budesonide plus eformoterol) when used in a maintenance-and-reliever regimen
<b>Preventers</b> <i>Pulmicort</i> (budesonide) <i>Symbicort</i> (budesonide plus eformoterol)		
<b>Other</b> <i>Oxis</i> (eformoterol)		

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# ACUTE ASTHMA

## MANAGING ACUTE ASTHMA IN CLINICAL SETTINGS

For detailed guidance and information, see [astmahandbook.org.au/acute-asthma/clinical](http://astmahandbook.org.au/acute-asthma/clinical)

Acute asthma management is based on:

- assessing severity (mild/moderate, severe or life-threatening) while starting bronchodilator treatment immediately
- administering oxygen therapy, if required, and titrating oxygen saturation to target of 92–95% (adults) or at least 95% (children)
- completing observations and assessments (when appropriate, based on clinical priorities determined by baseline severity)
- administering systemic corticosteroids within the first hour of treatment
- repeatedly reassessing response to treatment and either continuing treatment or adding on treatments, until acute asthma has resolved, or patient is transferred to an intensive care unit or admitted to hospital
- observing the patient for at least 1 hour after dyspnoea/respiratory distress has resolved, providing post-acute care and arranging follow-up.

### Notes

Definitions of severity classes for acute asthma used in this Handbook may differ from those used in published clinical trials and other guidelines that focus on, are or restricted to, the management of acute asthma within emergency departments or acute care facilities. In this Handbook, the severity of flare-ups and acute asthma is defined consistently across all Australian clinical settings (including community-based clinics and emergency departments). Accordingly, the classification of flare-ups and the classification of acute asthma overlap (e.g. a flare-up is considered to be at least 'moderate' if it is troublesome enough to cause the patient or carers to visit an emergency department or seek urgent treatment from primary care, yet it might be assessed as 'mild' acute asthma within acute services).

In this Handbook, the categories of 'mild' and 'moderate' acute asthma have been merged to avoid confusion between terminologies traditionally used at different levels of the health system. Mild acute asthma can usually be managed at home by following the person's written asthma action plan.

**Table U. Rapid primary assessment of acute asthma in adults and children**

Mild/Moderate	Severe	Life-threatening
Can walk, speak whole sentences in one breath (For young children: can move around, speak in phrases) Oxygen saturation > 94%	Any of these findings: <ul style="list-style-type: none"><li>• Use of accessory muscles of neck or intercostal muscles or 'tracheal tug' during inspiration or subcostal recession ('abdominal breathing')</li><li>• Unable to complete sentences in one breath due to dyspnoea</li><li>• Obvious respiratory distress</li><li>• Oxygen saturation 90–94%</li></ul>	Any of these findings: <ul style="list-style-type: none"><li>• Reduced consciousness or collapse</li><li>• Exhaustion</li><li>• Cyanosis</li><li>• Oxygen saturation &lt; 90%</li><li>• Poor respiratory effort, soft/absent breath sounds</li></ul>

### Notes

The severity category may change when more information is available (e.g. pulse oximetry, spirometry) or over time

The presence of pulsus paradoxus (systolic paradox) is not a reliable indicator of the severity of acute asthma.

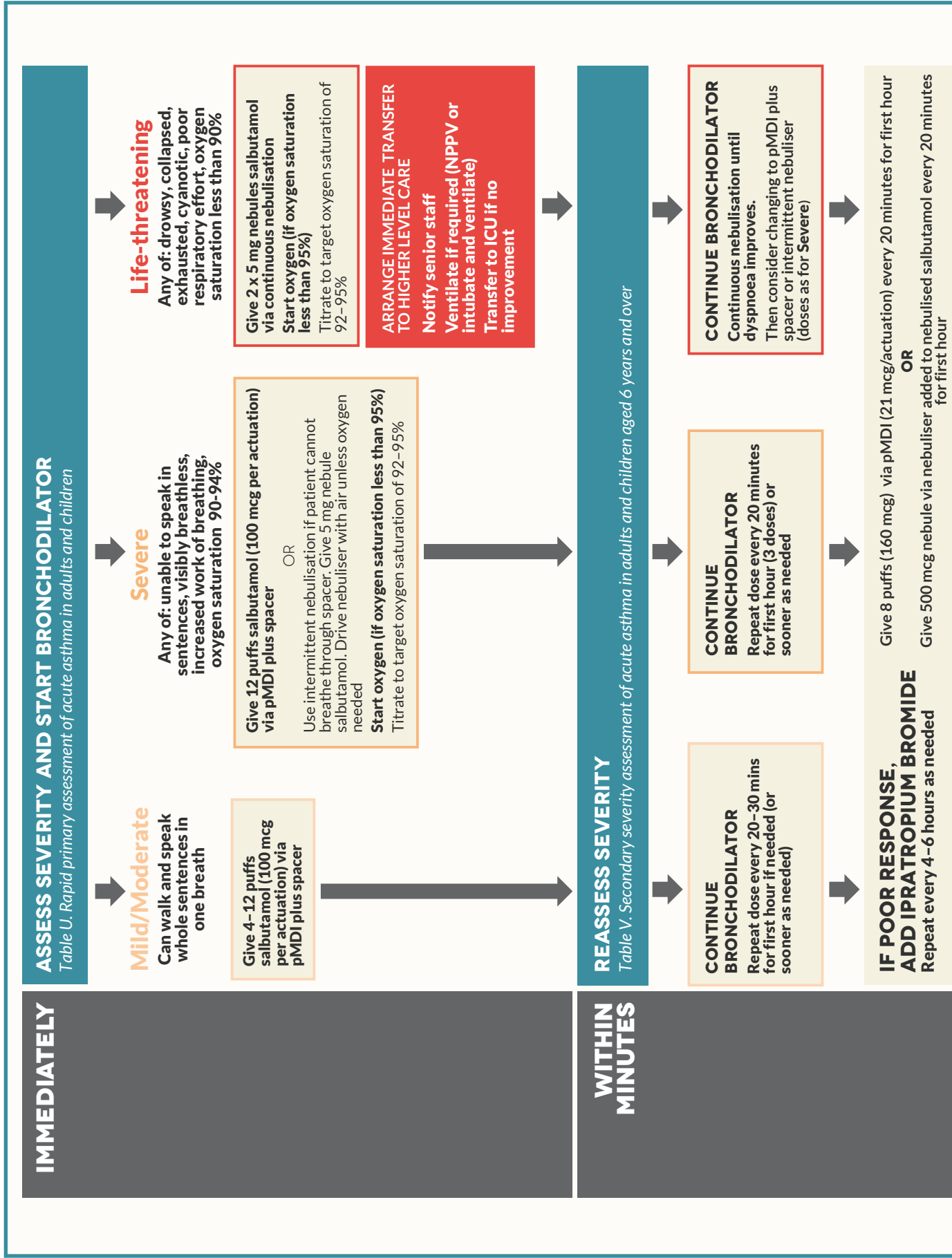
If oxygen therapy has already been started, it is not necessary to cease oxygen to measure pulse oximetry.

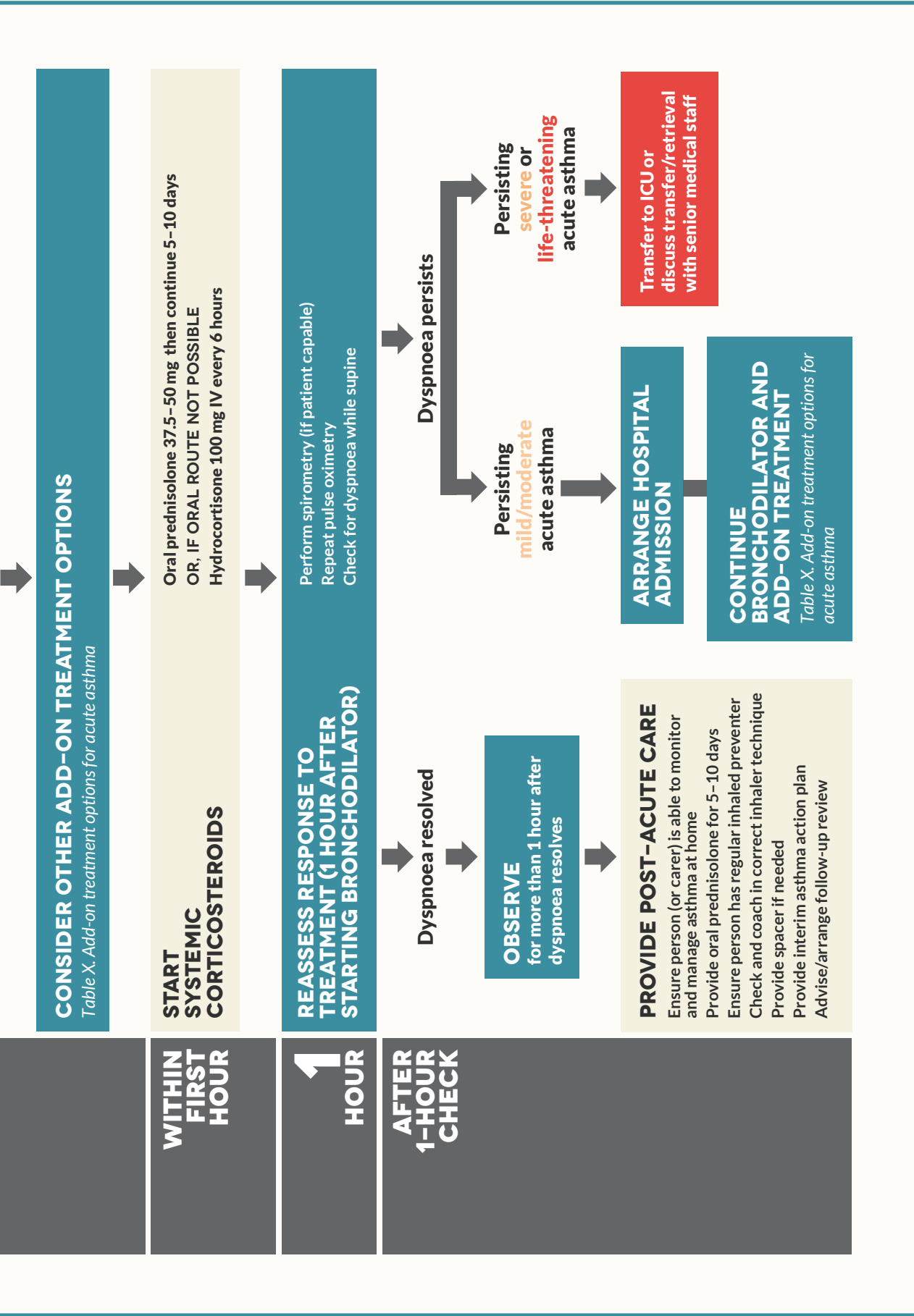
Oxygen saturation levels are a guide only and are not definitive; clinical judgment should be applied.

Definitions of severity classes for acute asthma used in this handbook may differ from those used in published clinical trials and other guidelines that focus on, are or restricted to, the management of acute asthma within emergency departments or acute care facilities.

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Figure E. Managing acute asthma in adults





**CONSIDER OTHER ADD-ON TREATMENT OPTIONS**

Table X. Add-on treatment options for acute asthma

**WITHIN FIRST HOUR**

Oral prednisolone 37.5–50 mg then continue 5–10 days  
OR, IF ORAL ROUTE NOT POSSIBLE  
Hydrocortisone 100 mg IV every 6 hours

**1 HOUR**

**REASSESS RESPONSE TO TREATMENT (1 HOUR AFTER STARTING BRONCHODILATOR)**

Perform spirometry (if patient capable)  
Repeat pulse oximetry  
Check for dyspnoea while supine

**AFTER 1-HOUR CHECK**

Dyspnoea resolved

**OBSERVE**  
for more than 1 hour after  
dyspnoea resolves

**PROVIDE POST-ACUTE CARE**

- Ensure person (or carer) is able to monitor and manage asthma at home
- Provide oral prednisolone for 5–10 days
- Ensure person has regular inhaled preventer
- Check and coach in correct inhaler technique
- Provide spacer if needed
- Provide interim asthma action plan
- Advise/arrange follow-up review

Dyspnoea persists

Persisting  
**mild/moderate**  
acute asthma

**ARRANGE HOSPITAL ADMISSION**

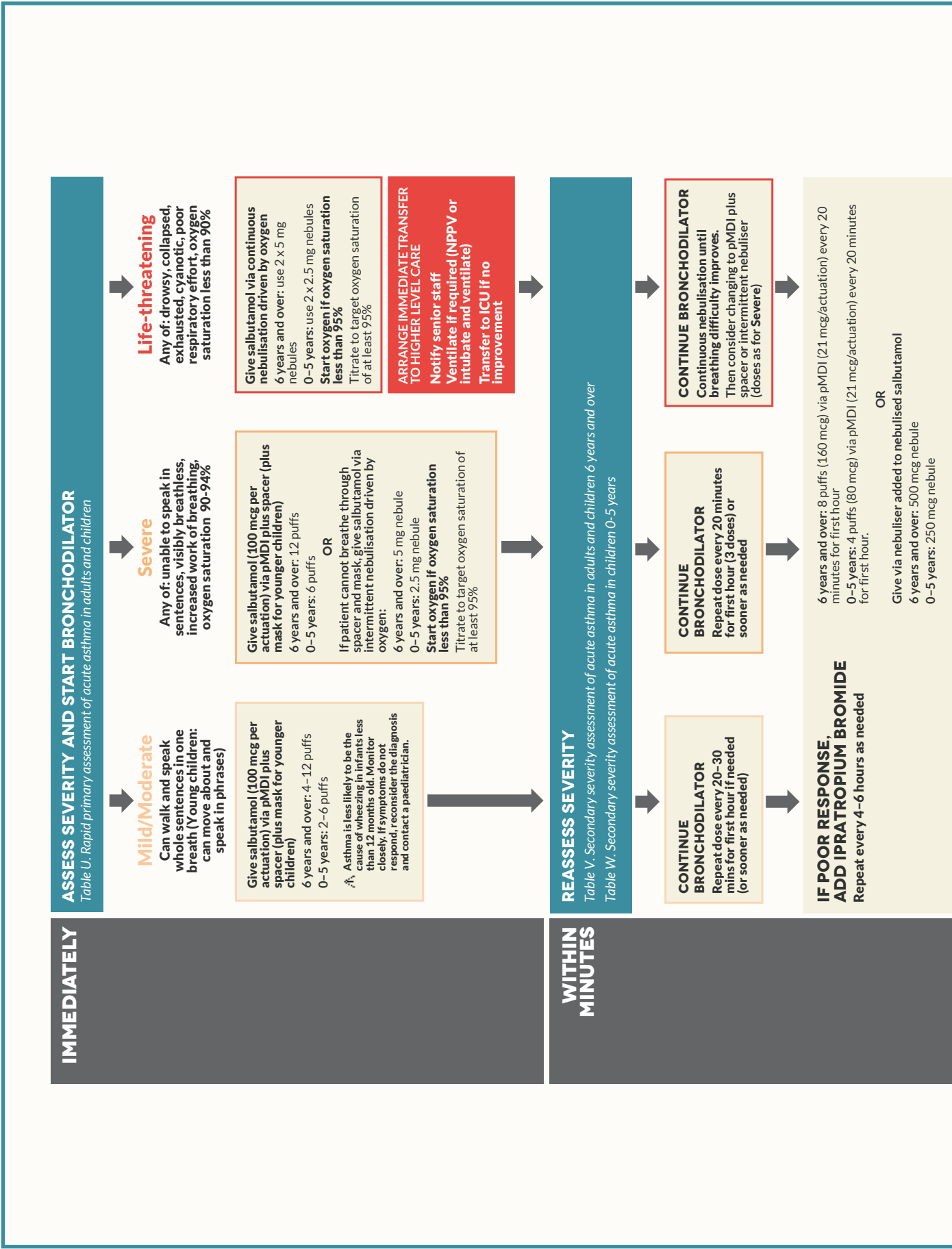
**CONTINUE BRONCHODILATOR AND ADD-ON TREATMENT**

Table X. Add-on treatment options for acute asthma

Persisting  
**severe or life-threatening**  
acute asthma

**Transfer to ICU or discuss transfer/retrieval with senior medical staff**

Figure F. Managing acute asthma in children



## CONSIDER OTHER ADD-ON TREATMENT OPTIONS

Table X. Add-on treatment options for acute asthma

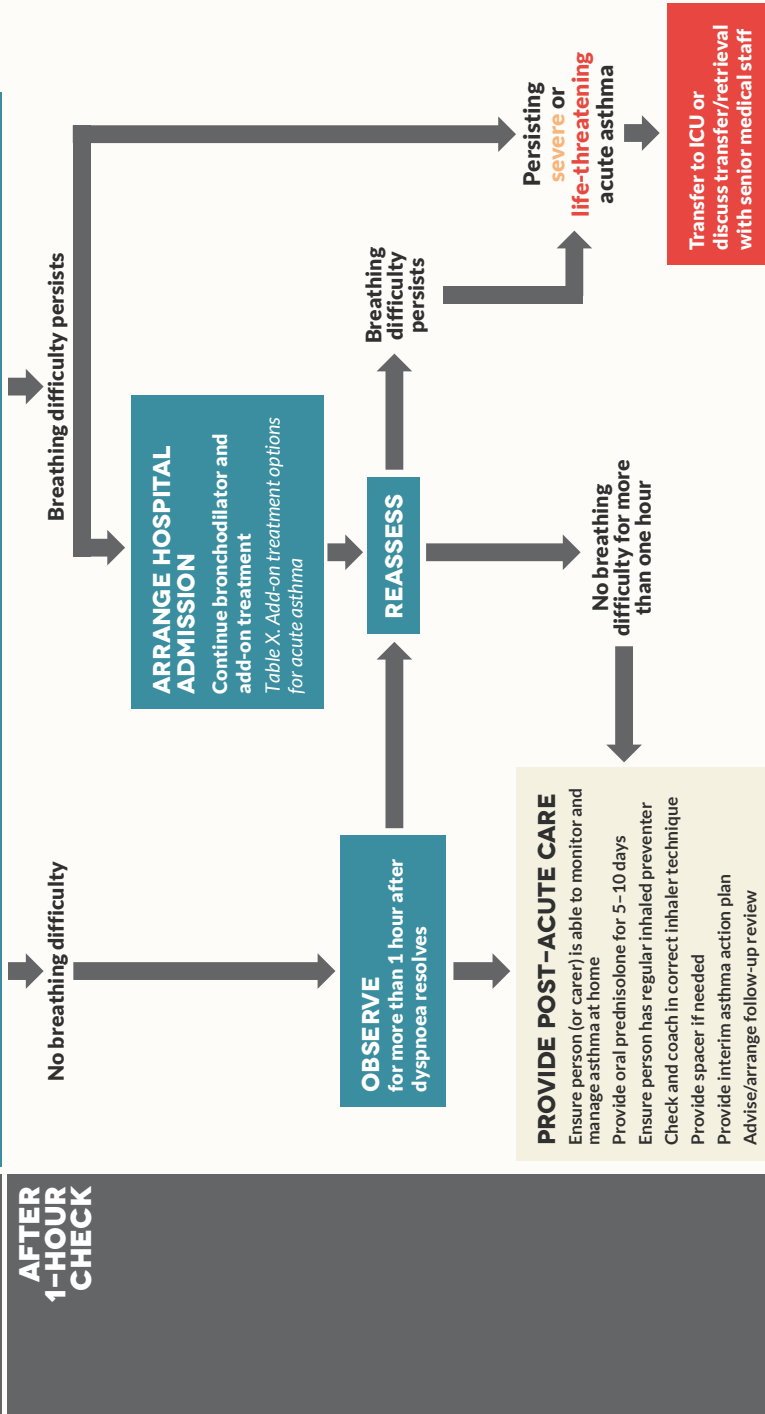
### START SYSTEMIC CORTICOSTEROIDS

Oral prednisolone 2 mg/kg oral (maximum 50 mg), then 1 mg/kg on days 2 and 3  
**OR, IF ORAL ROUTE NOT POSSIBLE**  
 Hydrocortisone IV initial dose 8–10 mg/kg (max 300 mg), then 4–5 mg/kg/dose every 6 hours on day 1, then every 12 hours on day 2, then once on day 3  
**OR**  
 Methylprednisolone IV initial dose 2 mg/kg (max 60 mg), then 1 mg/kg every 6 hours on day 1, then every 12 hours on day 2, then once on day 3  
 ⚠ For children 0–5 years, avoid systemic corticosteroids if mild/moderate wheezing responds to initial bronchodilator treatment

### REASSESS RESPONSE TO TREATMENT (1 HOUR AFTER STARTING BRONCHODILATOR)

Perform spirometry (if child capable)

### 1 HOUR AFTER 1-HOUR CHECK



**Table V. Secondary severity assessment of acute asthma in adults and children 6 years and over**

**Note: If features of more than one severity category are present, record the higher category as overall severity level**

	<b>Mild/Moderate (all of):</b>	<b>Severe (any of):</b>	<b>Life-threatening (any of):</b>
<b>Speech</b>	Can finish a sentence in one breath	Can only speak a few words in one breath	Can't speak
<b>Posture</b>	Can walk	Unable to lie flat due to dyspnoea Sitting hunched forward	Collapsed or exhausted
<b>Breathing</b>	Respiratory distress is not severe	Paradoxical chest wall movement: inward movement on inspiration and outward movement on expiration (chest sucks in when person breathes in) or Use of accessory muscles of neck or intercostal muscles or 'tracheal tug' during inspiration or Subcostal recession ('abdominal breathing')	Severe respiratory distress or Poor respiratory effort
<b>Consciousness</b>	Alert	†	Drowsy or unconscious
<b>Skin colour</b>	Normal	†	Cyanosis
<b>Respiratory rate</b>	<25 breaths/min	≥25 breaths/min	Bradypnoea (indicates respiratory exhaustion)
<b>Heart rate</b>	Adults: <110 beats/min Children: normal range	Adults: ≥110 beats/min Children: tachycardia	Cardiac arrhythmia or Bradycardia (may occur just before respiratory arrest)
<b>Chest auscultation</b>	Wheeze or Normal lung sounds	†	Silent chest or Reduced air entry
<b>Oxygen saturation (pulse oximetry)</b>	>94%	90-94%	<90% or Clinical cyanosis
<b>Blood gas analysis (adults, if performed) ‡</b>	Not indicated	Not indicated	PaO <sub>2</sub> <60 mmHg PaCO <sub>2</sub> >50 mmHg§ PaCO <sub>2</sub> within normal range despite low PaO <sub>2</sub> pH <7.35#

† Not applicable – may be the same as moderate and does not determine severity category

‡ Perform blood gas analysis only if clinically indicated

§ The presence of hypercapnoea indicates that the patient is tiring and may need ventilatory support.

# Metabolic acidosis (often associated with hypokalaemia) may occur with increased work of breathing and with high-dose salbutamol.

PaCO<sub>2</sub>, carbon dioxide partial pressure on blood gas analysis; PaO<sub>2</sub>, oxygen partial pressure on blood gas analysis

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**Table W. Secondary severity assessment of acute asthma in children 0–5 years**

Note: If features of more than one severity category are present, record the higher category as overall severity level

	Mild/Moderate (all of):	Severe (any of):	Life-threatening (any of):
<b>Speech</b>	Can talk or vocalise	†	Unable to vocalise due to dyspnoea
<b>Posture</b>	Can walk or crawl	Lethargic	Collapsed or exhausted
<b>Breathing</b>	Respiratory distress is not severe	Paradoxical chest wall movement: inward movement on inspiration and outward movement on expiration (chest sucks in when person breathes in) or Use of accessory muscles of neck or intercostal muscles or 'tracheal tug' during inspiration or Subcostal recession ('abdominal breathing')	Severe respiratory distress or Poor respiratory effort
<b>Consciousness</b>	Alert	†	Drowsy or unconscious
<b>Skin colour</b>	Normal	†	Cyanosis
<b>Respiratory rate</b>	Normal	Tachypnoea	Bradypnoea (indicates respiratory exhaustion)
<b>Heart rate</b>	Normal	Tachycardia	Cardiac arrhythmia or Bradycardia (may occur just before respiratory arrest)
<b>Chest auscultation</b>	Wheeze or Normal lung sounds	†	Silent chest or Reduced air entry
<b>Oxygen saturation (pulse oximetry)</b>	>94%	90-94%	<90% or Clinical cyanosis

† Not applicable – may be the same as moderate and does not determine severity category

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## Appendix

### Normal respiratory and heart rates in children

	Heart rate (beats/minute)	Respiratory rate (breaths/minute)
<1 year	110–160	30–40
1–2 years	100–150	25–35
2–5 years	95–140	25–30
5–12 years	80–120	20–25
12–18 years	60–100	15–20

Source

Samuels M, Wieteska S. (Eds) *Advanced paediatric life support: the practical approach*. 5th edn. Wiley-Blackwell, Oxford, 2011.

**Table X. Add-on treatment options for acute asthma**

Agent	Recommended use in acute asthma	Administration and dosage		Notes
<b>Inhaled ipratropium bromide</b>	Second-line bronchodilator if inadequate response to salbutamol	Via pMDI 21 mcg/actuation every 20 minutes for first hour  Repeat every 4–6 hours for 24 hours	<b>Adults:</b> 8 puffs  <b>Children 6 years and over:</b> 8 puffs  <b>Children 0–5 years:</b> 4 puffs	Use spacer (plus mask, if patient cannot use mouthpiece)
<b>IV magnesium sulphate</b>	Second-line bronchodilator in severe or life-threatening acute asthma, or when poor response to repeated maximal doses of other bronchodilators	IV infusion over 20 minutes	<b>Adults:</b> 2 g (20 mmol)  <b>Children 2 years and over:</b> 0.1–0.2 mmol/kg	Avoid magnesium sulphate in children younger than 2 years
<b>IV salbutamol (only in ICU)</b>	Third-line bronchodilator in life-threatening acute asthma that has not responded to continuous nebulised salbutamol after considering other add-on treatment options	Loading dose (infusion) then slow infusion	<b>Adults and children:</b>  Loading dose 5 mcg/kg/min over 1 hour  Then 1–2 mcg/kg/min  Wean off when breathing stabilises	Use only in critical care units (e.g. emergency department, intensive care unit/high-dependency unit)  Monitor blood electrolytes, heart rate and acid/base balance (blood lactate)
<b>Non-invasive positive pressure ventilation</b>	Consider if starting to tire or signs of respiratory failure			Do not sedate patient  If no improvement, intubate and start mechanical ventilation

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# CLINICAL ISSUES

## TROUBLESHOOTING

For detailed guidance and information, see [astmahandbook.org.au/clinical-issues/troubleshooting](http://astmahandbook.org.au/clinical-issues/troubleshooting)

When a person's asthma is not well controlled despite treatment, unnecessary or risky dose escalation can be avoided by systematically working through the possible reasons before adjusting the treatment:

- Check whether current treatment is appropriate.
- Check whether the patient is taking the medicine correctly and as prescribed.
- Check whether the symptoms are due to asthma.
- Consider the individual's triggers and any comorbid conditions that may affect asthma symptoms, risk or management.

You can use the checklist as a guide to help you and the patient or carer consider common problems that may be contributing to suboptimal asthma control.

### Other clinical issues

Check the *Australian Asthma Handbook* website for more clinical issues, including:

- Allergies and asthma
- Comorbid conditions and asthma
- Complementary therapies and asthma
- Chronic obstructive pulmonary disease (COPD) and asthma
- Food and asthma
- Work-related asthma

[astmahandbook.org.au/clinical-issues](http://astmahandbook.org.au/clinical-issues)

**Table Y. Troubleshooting checklist**

<p><b>Is the patient taking the medicine correctly?</b></p> <p><input type="checkbox"/> Is the person taking the medicine/s?</p> <p><input type="checkbox"/> Are there any reasons the person may be missing some or all doses? (e.g. cost, psychosocial reasons)</p> <p><input type="checkbox"/> Is the person's inhaler technique correct?</p> <p><input type="checkbox"/> Is the type of inhaler device right for the person?</p> <p><b>Is the current treatment appropriate?</b></p> <p><input type="checkbox"/> Is the type of preventer right for the individual?</p> <p><input type="checkbox"/> Is the prescribed dose of preventer likely to be effective?</p> <p><b>Is the person able to self-manage effectively?</b></p> <p><input type="checkbox"/> Is the written asthma action plan up to date and does the person know how to follow it?</p> <p><input type="checkbox"/> Is the person receiving conflicting advice from other health professionals?</p> <p><input type="checkbox"/> Is the person unable to manage their asthma due to life events, low health literacy, personal circumstances or other psychosocial factors?</p> <p><b>Are the symptoms due to asthma?</b></p> <p><input type="checkbox"/> Is the diagnosis correct?</p> <p><input type="checkbox"/> Are other conditions present?</p>	<p><b>Is the person exposed to unidentified triggers?</b></p> <p><input type="checkbox"/> Does the person smoke?</p> <p><input type="checkbox"/> Is the person exposed to other people's tobacco smoke or other smoke?</p> <p><input type="checkbox"/> Does the person know what triggers their asthma symptoms?</p> <p><input type="checkbox"/> Consider:</p> <p><input type="checkbox"/> cigarette smoke</p> <p><input type="checkbox"/> allergens (e.g. animals, pollens, workplace materials)</p> <p><input type="checkbox"/> cold/dry air</p> <p><input type="checkbox"/> indoor and outdoor pollution</p> <p><input type="checkbox"/> medicines (including complementary medicines)</p> <p><input type="checkbox"/> food chemicals/additives (if person is intolerant)</p> <p><input type="checkbox"/> viral respiratory tract infections</p> <p><input type="checkbox"/> comorbid medical conditions</p> <p><input type="checkbox"/> extreme emotions</p> <p><input type="checkbox"/> hormonal changes</p> <p><input type="checkbox"/> exercise.</p>
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## ASTHMA TRIGGERS

For detailed guidance and information, see [astmahandbook.org.au/clinical-issues/triggers](http://astmahandbook.org.au/clinical-issues/triggers)

A wide range of factors can trigger asthma, and triggers differ between individuals.

Most of the evidence that certain exposures and physiological factors can trigger asthma comes from cross-sectional population studies and cohort

studies. Because there is insufficient evidence to confirm without doubt whether some factors can or cannot act as triggers for an individual, triggers and avoidance strategies must be discussed with each patient.

**Table Z. Summary of asthma triggers**

<b>Avoidable triggers</b>	<b>Unavoidable triggers</b>
<b>Always avoid</b>	<b>Do not avoid</b>
<b>Cigarette smoke</b>	<b>Exercise</b> <b>Laughter</b>
<b>Avoid or reduce where possible*</b>	<b>Manage</b>
<p><b>Allergens (if person is sensitised)</b></p> <ul style="list-style-type: none"> <li>• Animal allergens (e.g. pets, animals in workplace)</li> <li>• Cockroaches</li> <li>• House dust mite</li> <li>• Moulds</li> <li>• Occupational allergens</li> <li>• Pollens</li> <li>• Thunderstorms (airborne pollens, moulds)</li> </ul> <p><b>Airborne/environmental irritants</b></p> <ul style="list-style-type: none"> <li>• Cold/dry air</li> <li>• Fuel combustion (nitrogen dioxide-emitting gas heaters)</li> <li>• Home renovation materials</li> <li>• Household aerosols</li> <li>• Moulds (airborne endotoxins)</li> <li>• Occupational irritants</li> <li>• Outdoor industrial and traffic pollution</li> <li>• Perfumes/scents/incense</li> <li>• Smoke (any, including bushfires, vegetation reduction fires, indoor wood fires)</li> <li>• Thunderstorms (multiple mechanisms)</li> </ul> <p><b>Certain medicines</b></p> <ul style="list-style-type: none"> <li>• Aspirin and NSAIDs (in patients with aspirin-exacerbated respiratory disease)</li> <li>• Bee products (pollen, propolis, royal jelly)</li> <li>• Echinacea</li> </ul> <p><b>Dietary triggers</b></p> <ul style="list-style-type: none"> <li>• Food chemicals/additives (if person is intolerant)</li> <li>• Thermal effects (e.g. cold drinks)</li> </ul>	<p><b>Respiratory tract infections</b></p> <p><b>Certain medicines</b></p> <ul style="list-style-type: none"> <li>• Aspirin (when given for purpose of desensitisation)†</li> <li>• Anticholinesterases and cholinergic agents</li> <li>• Beta blockers‡</li> </ul> <p><b>Comorbid medical conditions</b></p> <ul style="list-style-type: none"> <li>• Allergic rhinitis/rhinosinusitis</li> <li>• Gastro-oesophageal reflux disease</li> <li>• Nasal polyposis</li> <li>• Obesity</li> <li>• Upper airway dysfunction‡</li> </ul> <p><b>Physiological and psychological changes</b></p> <ul style="list-style-type: none"> <li>• Extreme emotions</li> <li>• Hormonal changes (e.g. menstrual cycle)</li> <li>• Pregnancy</li> <li>• Sexual activity</li> </ul>

\* If relevant avoidance strategies are practical and shown to be effective.

† Requires close specialist supervision.

‡ Also known as vocal cord dysfunction

## EXERCISE AND ASTHMA

For detailed guidance and information, see [astmahandbook.org.au/clinical-issues/exercise](http://astmahandbook.org.au/clinical-issues/exercise)

People with asthma can and should participate in physical activity. For adults or children involved in competitive sport, prescribers need to check which asthma medicines are permitted in the sport.

Exercise-induced bronchoconstriction can be managed effectively with relievers and preventers (or both) and should not stop people with asthma participating in physical activity.

**Table AA. Managing persistent exercise-induced respiratory symptoms in adults and adolescents**

Clinical scenario		Action	Notes
<b>Prior confirmed asthma diagnosis and recent asthma symptom control is assessed as partial or poor*</b>		Start low-dose ICS (if not already using a preventer) or step up preventer regimen# Salbutamol 15 minutes before exercise§ Review in 4–12 weeks†	
<b>Prior confirmed asthma diagnosis, recent asthma symptom control is assessed as partial or good,* and symptoms only occur with exercise</b>	Exercise symptoms on most or all days	Start low-dose ICS (if not already using a preventer) or step up preventer regimen# and review in 4–12 weeks†	Consider alternative causes (e.g. poor cardiopulmonary fitness, upper airway dysfunction‡) EIB can occur despite otherwise well-controlled asthma
	Exercise symptoms some days	Salbutamol 15 minutes before exercise§ Continue preventer if used	EIB can occur despite otherwise well-controlled asthma
<b>No previous diagnosis of asthma</b>		Investigate as for asthma (history, physical examination and spirometry before and after bronchodilator)** If asthma confirmed, follow management recommendations If asthma not confirmed by spirometry, consider: <ul style="list-style-type: none"> <li>• a trial of salbutamol 15 minutes before exercise§</li> <li>• whether regular preventer treatment is indicated</li> <li>• indirect challenge testing</li> <li>• Review in 4–12 weeks†</li> </ul>	For adolescents, consider early referral to an accredited respiratory function laboratory for indirect challenge testing or respiratory physician for investigation to rule out other common causes of exercise-related respiratory symptoms
<b>Competing athletes</b>		Consider indirect challenge testing. (Check which tests are required to demonstrate airway hyperresponsiveness) Check which medicines are permitted in the particular sport by consulting the Australian Sports Anti-Doping Authority (ASADA) before prescribing any medicine	Advise warm-up before planned exercise

\* See Table G: Definition of levels of recent asthma symptom control in adults (regardless of current treatment regimen)

# Before stepping up, check that inhaler technique is correct and adherence is adequate. See Figure C: Stepped approach to adjusting asthma medication in adults

† If exercise-induced symptoms do not resolve after adjusting medicines, and checking adherence and inhaler technique, consider alternative diagnoses, referral to an accredited respiratory function laboratory for indirect challenge testing, or referral to a respiratory physician for assessment.

‡ Also known as vocal cord dysfunction

§ Reliever should also be taken at other times as needed to manage symptoms

\*\* See Figure A. Steps in the diagnosis of asthma in adults

**Table AB. Managing persistent exercise-induced respiratory symptoms in children**

Clinical scenario		Action	Notes
Prior confirmed asthma diagnosis and recent asthma symptom control is assessed as partial or poor*		Consider preventer treatment based on age and pattern of symptoms§	
Prior confirmed asthma diagnosis, recent asthma symptom control is assessed as partial or good,* and symptoms only occur with exercise	Exercise symptoms most or all days	If child 2–14, consider regular montelukast (as sole preventer or added to ICS)# Review in 4–12 weeks†	Consider alternative causes (e.g. poor cardiopulmonary fitness, upper airway dysfunction) If symptoms do not respond to montelukast alone, consider low-dose ICS# If child currently taking ICS/LABA combination, consider a treatment trial of ICS alone (and salbutamol taken before exercise) or ICS plus montelukast
	Exercise symptoms some days but not every day	If child 6 years and over, salbutamol 15 minutes before exercise## If child 2–5 years, consider regular montelukast Review in 4–12 weeks†	
No previous history of asthma		Investigate as for asthma (history, physical examination and spirometry before and after bronchodilator if child can do test)** If asthma confirmed, manage as for asthma If asthma not confirmed by spirometry (in children able to perform the test), consider: <ul style="list-style-type: none"> <li>• a trial of salbutamol 15 minutes before exercise</li> <li>• whether regular preventer treatment is indicated</li> <li>• exercise testing for cardiopulmonary function to rule out exercise-related dyspnoea due to poor cardiopulmonary fitness</li> <li>• indirect challenge testing</li> </ul> Review in 4–12 weeks†	poor cardiopulmonary fitness is a common reason for exercise-related respiratory symptoms. Some children with asthma avoid exercise
Competing athletes		Consider indirect challenge testing. (Check which tests are required to demonstrate airway hyperresponsiveness) Check which medicines are permitted in the particular sport by consulting ASADA ( <a href="http://www.asada.gov.au">www.asada.gov.au</a> ) before prescribing any medicine	Advise warm-up before planned exercise

\* See Table L. Definition of levels of recent asthma symptom control in children (regardless of current treatment regimen)

§ See Table O. Initial preventer treatment for children aged 0–5 years and Table P. Initial preventer treatment for children aged 6 years and over

# Before stepping up, check that inhaler technique is correct and adherence is adequate. See Figure D. Stepped approach to adjusting asthma medication in children

† If exercise-induced symptoms do not resolve after adjusting medicines, and checking adherence and inhaler technique, consider alternative diagnoses, referral to an accredited respiratory function laboratory for indirect challenge testing, or referral to a respiratory physician for assessment.

\*\* See Figure B. Steps in the diagnosis of asthma in children

## Reliever should also be taken at other times as needed to manage symptoms

#### Notes

For some children with asthma, exercise-related symptoms are their only asthma symptoms.

Check the Pharmaceutical Benefits Scheme for subsidisation status; criteria for some asthma medicines differ between age groups and indications.

Australian Asthma Handbook asset ID: 84

## SMOKING AND ASTHMA

For detailed guidance and information, see [astmahandbook.org.au/clinical-issues/smoking](http://astmahandbook.org.au/clinical-issues/smoking)

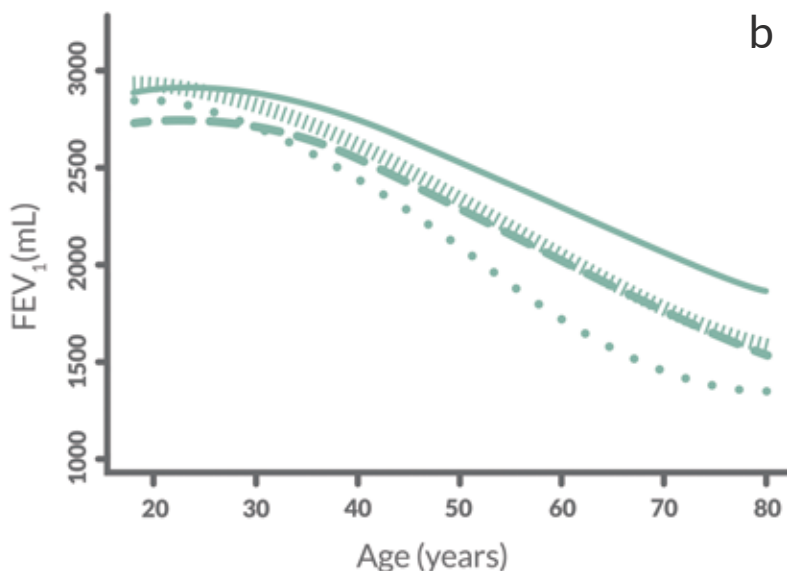
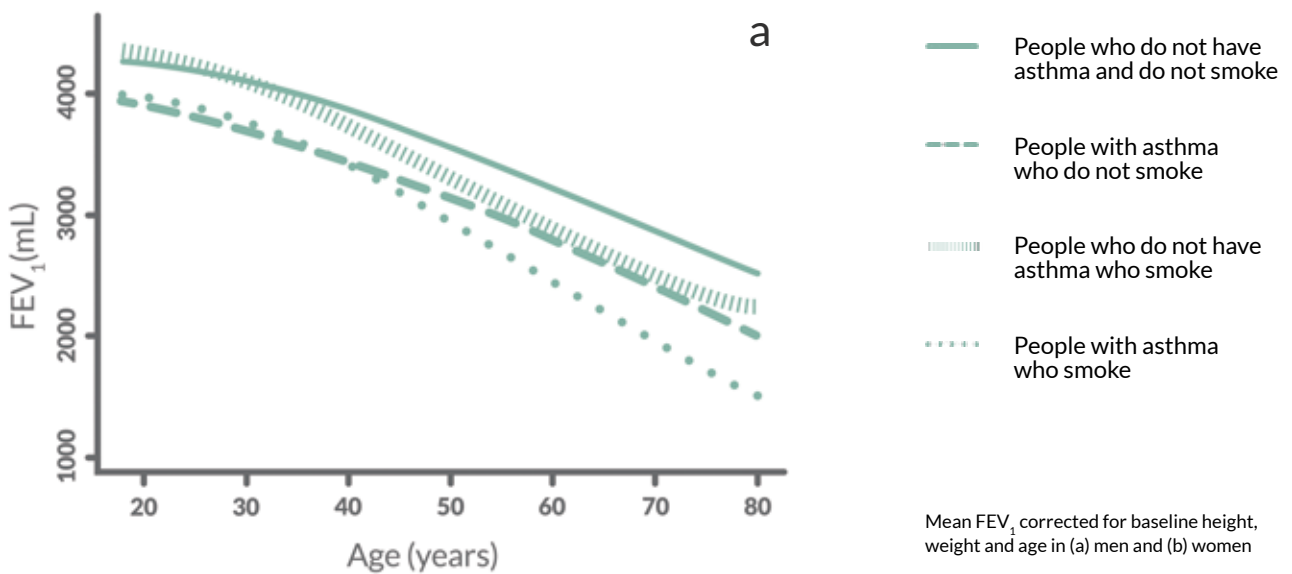
If a person smokes, or is exposed to other people's tobacco smoke, this factor must be taken into account when investigating respiratory symptoms, assessing asthma control, and managing asthma.

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

Smoking:

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

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



### Source

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James AL, Palmer LJ, Kicic E et al. Decline in lung function in the Busselton Health Study: the effects of asthma and cigarette smoking. *Am J Respir Crit Care Med* 2005; 171: 109-14.

Official journal of the American Thoracic Society.

Australian Asthma Handbook asset ID: 7

# POPULATIONS

## ASTHMA IN PREGNANT WOMEN

For detailed guidance and information, see [astmahandbook.org.au/populations/pregnant-women](http://astmahandbook.org.au/populations/pregnant-women)

Good asthma control during pregnancy is a high priority, to protect the foetus as well as the mother. Untreated asthma, poorly controlled asthma or flare-ups during pregnancy put mothers and babies at risk.

Reducing asthma-related risk for women with asthma and their babies involves:

- giving preconception advice to women with asthma
- advising pregnant women about good asthma control
- managing asthma actively during pregnancy
- managing flare-ups during pregnancy.

Asthma medicines are used in pregnancy when the risks of poor asthma control outweigh the risks associated with medicines.

Most asthma medicines can be used by breastfeeding women, because the risks of poor asthma control outweigh the risks associated with medicines.

### Other populations

Check the *Australian Asthma Handbook* website for more information on special considerations for these populations:

- Adolescents and young adults
- Older adults
- Aboriginal and Torres Strait Islander peoples
- Culturally and linguistically diverse communities

[astmahandbook.org.au/populations](http://astmahandbook.org.au/populations)

### Primary prevention of asthma

Check the *Australian Asthma Handbook* website for more information on preventing asthma from developing in people who do not already have a diagnosis of asthma (primary prevention).

[astmahandbook.org.au/prevention/primary](http://astmahandbook.org.au/prevention/primary)

**Table AC. Local breastfeeding safety information services**

State or territory	Service	Contact
ACT	ACT Drug Information Service (based at The Canberra Hospital)	02 6244 3333
New South Wales	MotherSafe (based at the Royal Hospital for Women, Randwick, Sydney)	02 9382 6539 (Sydney metropolitan area) 1800 647 848 (non-metropolitan NSW) <a href="http://www.mothersafe.org.au">www.mothersafe.org.au</a>
Queensland	Queensland Medicines Advice and Information Service	07 3646 3167
South Australia	Drugs in Pregnancy and Lactation information service (based at Women's and Children's Hospital)	08 8161 7222
Western Australia	Obstetric Drug Information Service (based at Women and Newborn Health Service)	08 9340 2723
Victoria	Ask a pharmacist (The Pharmacy Department Medicines Information Centre, based at the Royal Women's Hospital)	03 8345 3190 <a href="http://www.thewomens.org.au/askapharmacist">www.thewomens.org.au/askapharmacist</a>

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# PREVENTING ASTHMA

For detailed guidance and information, see [astmahandbook.org.au/prevention/preventive-care](http://astmahandbook.org.au/prevention/preventive-care)

In addition to the use of asthma medicines, asthma management involves managing relevant lifestyle factors, which are already the focus of broader chronic disease preventive health strategies in primary care.

Preventive care also includes appropriate immunisation, and managing other health conditions that may affect asthma control or self-management.

**Table AD. Preventive healthcare in people with asthma**

Type of preventive care	Issues	Clinical notes
<b>Lifestyle risk factors for chronic disease</b>	<i>Smoking</i>	Advise quitting and repeatedly offer help to quit smoking, whether or not the person shows interest in quitting Consider scheduling planned asthma check-ups to assess recent asthma symptom control every 6 months for people who smoke, due to increased risk of flare-ups and increased rate of decline in lung function over time Follow national guidelines for smoking cessation
	<i>Nutrition</i>	Encourage healthy eating for all patients with asthma: <ul style="list-style-type: none"> <li>• eating plenty of fruit and vegetables every day</li> <li>• eating fish often</li> <li>• minimising intake of saturated fats</li> <li>• Follow national dietary guidelines</li> </ul>
	<i>Physical activity</i>	Recommend physical training for quality-of-life benefits Advise patients that having asthma does not prevent them doing physical activity, including exercise training
	<i>Obesity</i>	Advise that weight loss might help control asthma Support obese or overweight people with asthma to lose weight Follow current national guidelines for the management of obesity and overweight
<b>Immunisation</b>	<i>Influenza vaccination</i>	Advise routinely for patients with frequent hospitalisations due to asthma and requiring multiple asthma medicines Influenza vaccines are free of charge for people with severe asthma Vaccination may not reduce the risk or severity of asthma flare-ups during the influenza season Follow national immunisation guidelines
	<i>Pneumococcal vaccination</i>	Follow national immunisation guidelines
<b>General health</b>	<i>Comorbidities</i>	Manage other conditions that may affect asthma or self-management, e.g: <ul style="list-style-type: none"> <li>• allergies, including allergic rhinitis</li> <li>• chronic obstructive pulmonary disease</li> <li>• gastro-oesophageal reflux disease</li> <li>• obstructive sleep apnoea syndrome</li> </ul>
	<i>Mental health</i>	Consider how mental health and psychosocial issues could affect asthma and self-management Screen for depression, panic disorder and anxiety disorder in patients with asthma that is moderate-severe or difficult to control
	<i>Complementary medicines</i>	Ask patients whether they use complementary medicines If patient interested in using complementary and alternative medicines and therapies, discuss expectations and provide information about safety and efficacy  If patient interested in using complementary and alternative medicines and therapies, discuss expectations and provide information about safety and efficacy

# MEDICINES GUIDE

For detailed guidance and information, see [astmahandbook.org.au/resources/medicines-guide](http://astmahandbook.org.au/resources/medicines-guide)

Asthma medicines are classified by their role in asthma management (preventers and relievers) as well as by their pharmacological and chemical classes.

Preventers include combination preventers (inhaled corticosteroid and long-acting beta<sub>2</sub> agonist combinations).

Other medicines used in asthma management are neither relievers nor preventers, but have specific roles in the management of flare-ups, severe acute asthma, or difficult-to-treat asthma.

The main pharmacological classes of asthma medicines are beta<sub>2</sub> receptor agonists, corticosteroids and leukotriene receptor antagonists.

**Table AE. Classification of asthma medicines\***

Duration	Role	Pharmacological class	Agent
Short term	Relievers	Short-acting beta <sub>2</sub> agonist relievers	Salbutamol Terbutaline sulfate
		Inhaled corticosteroid/rapid-onset long-acting beta <sub>2</sub> agonist combinations†	Budesonide/ eformoterol fumarate dihydrate
	Other short-term medicines (symptomatic and acute asthma treatment)	Systemic corticosteroids	Prednisolone or prednisone Methylprednisolone sodium succinate Hydrocortisone
		Anticholinergic bronchodilators (in acute asthma)	Ipratropium bromide
		Magnesium sulfate (in acute asthma)	Magnesium sulfate
Long term	Preventers	Inhaled corticosteroids (glucocorticosteroids)	Beclomethasone dipropionate Budesonide Ciclesonide Fluticasone propionate
		Inhaled corticosteroid/long-acting beta <sub>2</sub> agonist combinations	Budesonide/ eformoterol fumarate dihydrate Fluticasone propionate/ eformoterol fumarate dihydrate Fluticasone propionate/ salmeterol xinafoate
		Leukotriene receptor antagonists	Montelukast
		Cromones (mast cell stabilisers)	Sodium cromoglycate Nedocromil sodium
	Other long-term medicines	See: <a href="http://astmahandbook.org.au/resources/medicines-guide">astmahandbook.org.au/resources/medicines-guide</a>	

\* Please note this is an abridged version of the complete table provided in the full online *Australian Asthma Handbook*.

† The budesonide/eformoterol fumarate dihydrate combination is only used as reliever for adolescents and adults on maintenance-and-reliever regimen

**Notes:** Before prescribing any medicine, check the Therapeutic Goods Administration-approved product information.

Pharmaceutical Benefits Scheme criteria for some asthma medicines differ between age groups and indications.

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# AUSTRALIA'S NATIONAL GUIDELINES FOR ASTHMA MANAGEMENT

The *Australian Asthma Handbook* provides best-practice, evidence-based guidance translated into real-world advice for primary care health professionals.

This fully revised and updated edition brings a new name but the same primary care focus as the previous *Asthma Management Handbook*.

- All aspects of the diagnosis and management of asthma in primary care
- Practical and implementable recommendations
- Structured and transparent evidence analysis
- Multidisciplinary, patient-centred approach

The Handbook is proudly published by Australia's leading authority on asthma, the National Asthma Council Australia.