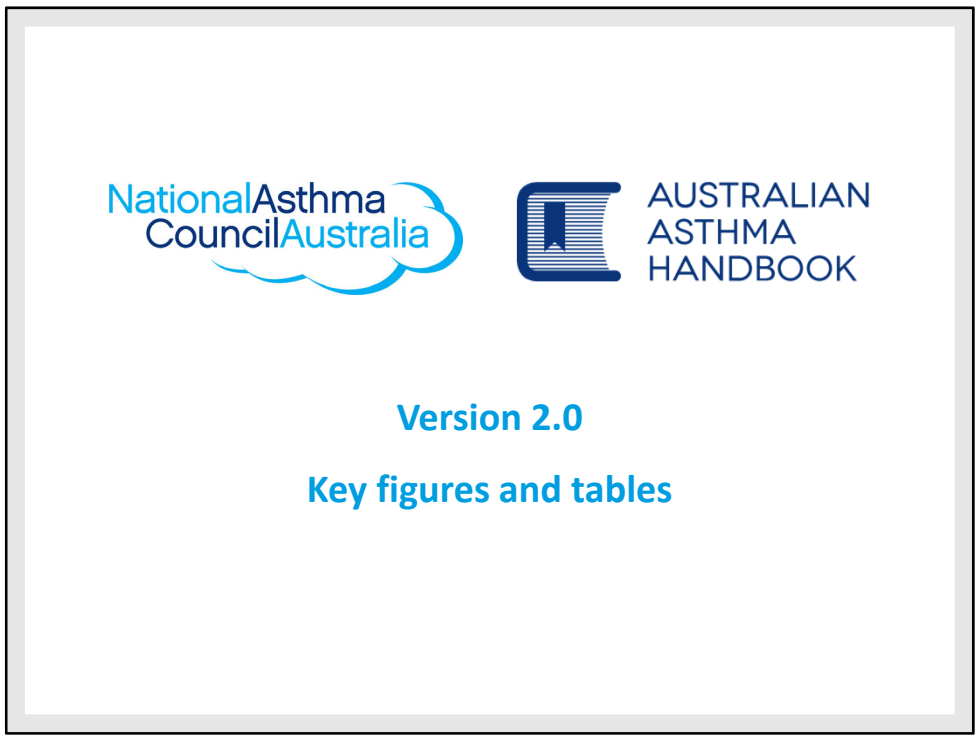

DIAGNOSIS OF ASTHMA IN ADULTS AND ADOLESCENTS

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Figure. Steps in the diagnosis of asthma in adults

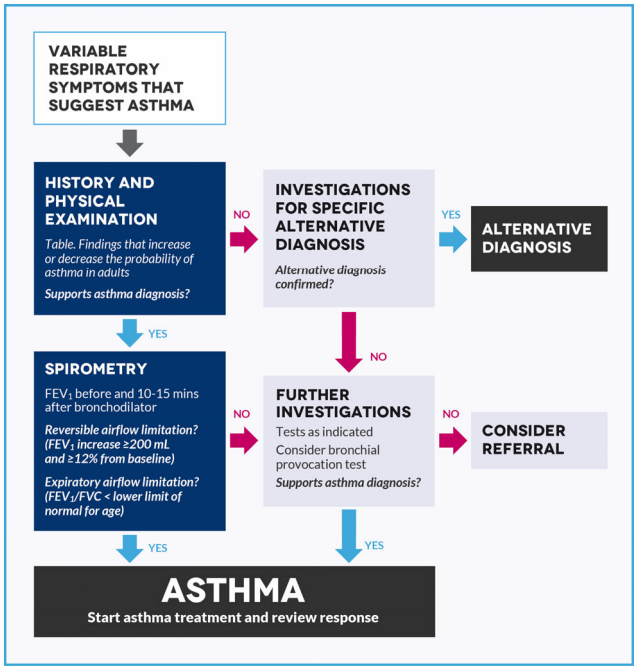

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Table. Findings that increase or decrease the probability of asthma in adults

*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: • wheeze • breathlessness • chest tightness • cough	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_1 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	

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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. Available from: https://www.brit-thoracic.org.uk/guidelines-and-quality-standards/asthma-guideline/.

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Table. Conditions that can be confused with asthma in adults and adolescents

Conditions characterised by cough	*Conditions characterised by wheezing*
Pertussis (whooping cough)	Respiratory infections
Gastro-oesophageal reflux	COPD
Rhinosinusitis/upper airway cough syndrome	Upper airway dysfunction
Adverse effect of medicines (e.g. ACE inhibitors)	*Conditions characterised by difficulty breathing*
Bronchiectasis	Breathlessness on exertion due poor cardiopulmonary fitness
Chronic obstructive pulmonary disease	Hyperventilation
Pulmonary fibrosis	Anxiety
Large airway stenosis	Chronic heart failure
Habit-cough syndrome	Pulmonary hypertension
Inhaled foreign body	Lung cancer

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DIAGNOSIS OF ASTHMA IN CHILDREN

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Figure. Steps in the diagnosis of asthma in children aged 1-5 years

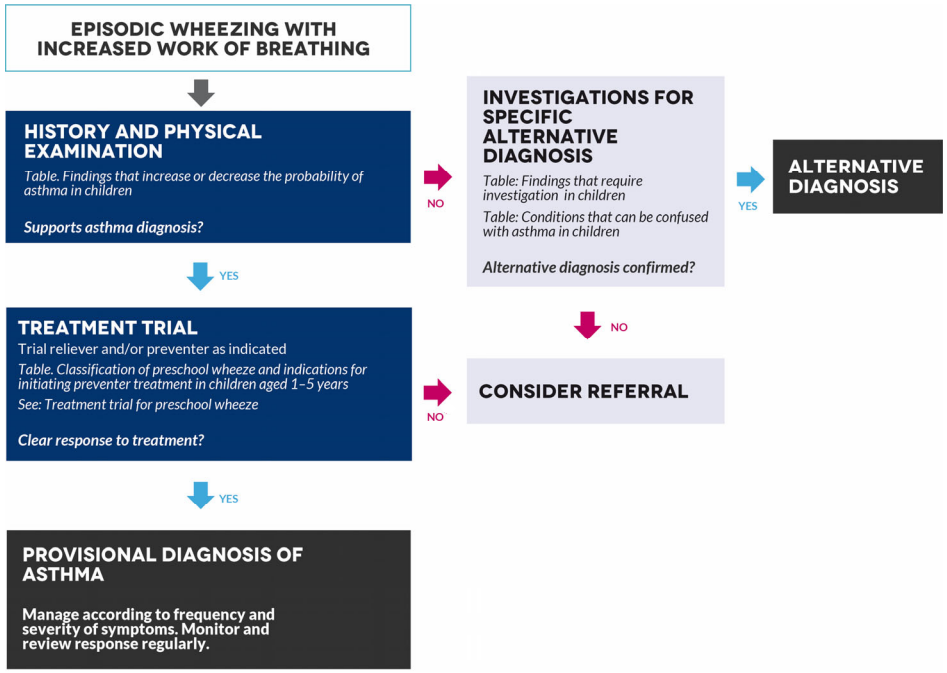

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Figure. Steps in the diagnosis of asthma in children aged 6 years and over

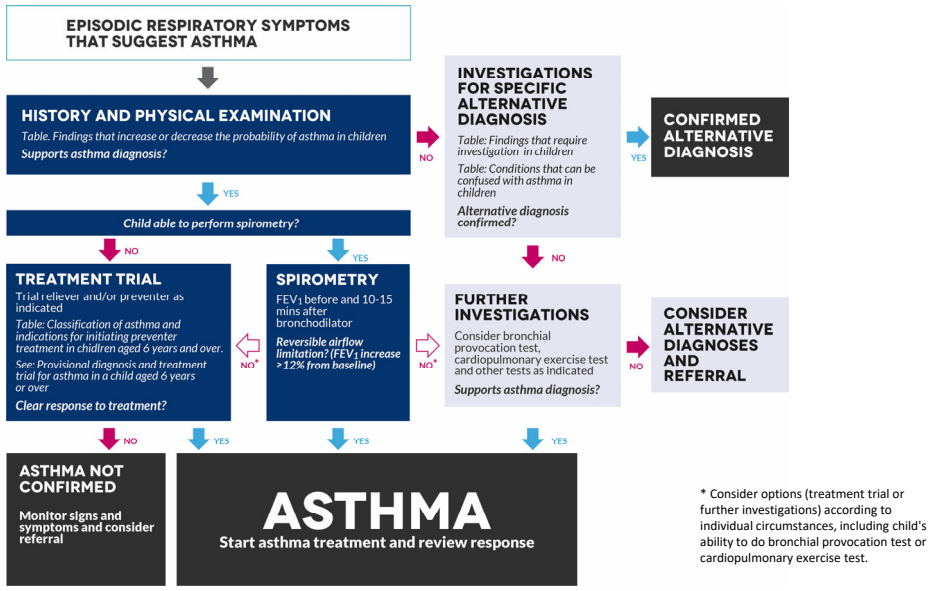

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Table. Findings that increase or decrease the probability of asthma in children

Asthma more likely	*Asthma less likely*
More than one of: • wheeze • difficulty breathing • feeling of tightness in the chest • cough *AND* Any of: • symptoms recur frequently • symptoms worse at night and in the early morning • symptoms triggered by exercise, exposure to pets, cold air, damp air, emotions, laughing • symptoms occur when child doesn't have a cold • history of allergies (e.g. allergic rhinitis, atopic dermatitis) • family history of allergies • family history of asthma • widespread wheeze heard on auscultation • symptoms respond to treatment trial of reliever, with or without a preventer • lung function measured by spirometry increases in response to rapid-acting bronchodilator • lung function measured by spirometry increases in response to a treatment trial with inhaled corticosteroid (where indicated)	Any of: • symptoms only occur when child has a cold, but not between colds • isolated cough in the absence of wheeze or difficulty breathing • history of moist cough • dizziness, light-headedness or peripheral tingling • repeatedly normal physical examination of chest when symptomatic • normal spirometry when symptomatic (children old enough to perform spirometry) • no response to a trial of asthma treatment • clinical features that suggest an alternative diagnosis

Sources

British Thoracic Society (BTS), Scottish Intercollegiate Guidelines Network (SIGN). *British Guideline on the management of Asthma. A national clinical guideline*. BTS/SIGN, Edinburgh, 2012. Available from: https://www.brit-thoracic.org.uk/guidelines-and-quality-standards/asthma-guideline

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

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Table. Conditions that can be confused with asthma in children

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

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Source

Weinberger M, Abu-Hasan M. Pseudo-asthma: when cough, wheezing, and dyspnea are not asthma. *Pediatrics* 2007; 120: 855-64. Available from: http://pediatrics.aappublications.org/content/120/4/855.full

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Table. Findings that require investigations in children (part 1)

Finding	*Notes*
Persistent cough that is not associated with wheeze/breathlessness or systemic disease	Unlikely to be due to asthma
Onset of signs from birth or very early in life	Suggests cystic fibrosis, chronic lung disease of prematurity, primary ciliary dyskinesia, bronchopulmonary dysplasia, congenital abnormality
Family history of unusual chest disease	Should be enquired about before attributing all the signs and symptoms to asthma
Severe upper respiratory tract disease (e.g. severe rhinitis, enlarged tonsils and adenoids or nasal polyps)	Specialist assessment should be considered
Crepitations on chest auscultation that do not clear on coughing	Suggest a serious lower respiratory tract condition such as pneumonia, atelectasis, bronchiectasis
Unilateral wheeze	Suggests inhaled foreign body
Systemic symptoms (e.g. fever, weight loss, failure to thrive)	Suggest an alternative systemic disorder

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Table. Findings that require investigations in children (part 2)

Feeding difficulties, including choking or vomiting	Suggests aspiration – specialist assessment should be considered
Inspiratory upper airway noises (e.g. stridor, snoring)	Acute stridor suggests tracheobronchitis (croup)
Persistent voice abnormality	Suggests upper airway disorder
Finger clubbing	Suggests cystic fibrosis, bronchiectasis
Chronic (>4 weeks) wet or productive cough	Suggests cystic fibrosis, bronchiectasis, chronic bronchitis, recurrent aspiration, immune abnormality, ciliary dyskinesia
Focal (localised) lung signs	Suggests pneumonia
Nasal polyps in child under 5 years old	Suggests cystic fibrosis
Severe chest deformity	Harrison's Sulcus and Pectus Carinatum can be due to uncontrolled asthma, but severe deformity suggests an alternative diagnosis
Obvious breathing difficulty, especially at rest or at night	Specialist assessment should be considered
Recurrent pneumonia	Specialist assessment should be considered

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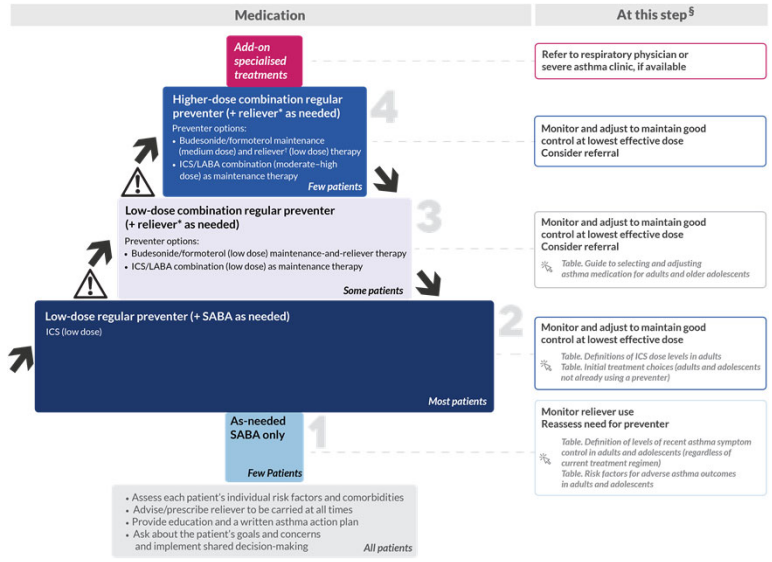
Figure. Stepped approach to adjusting asthma medication in adults



Notes
! : 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 despite good adherence and correct inhaler technique.
↘ : When asthma is stable and well controlled for 2–3 months, consider stepping down (e.g. reducing inhaled corticosteroid dose, or stopping long-acting beta$_2$ agonist if inhaled corticosteroid dose is already low).
ICS: inhaled corticosteroid; SABA: short-acting beta$_2$ agonist; LABA: long-acting beta$_2$ agonist
* Reliever means rapid-onset beta$_2$ agonist and includes: short-acting beta$_2$ agonists; low-dose budesonide/formoterol combination – only applies to patients using this combination in a maintenance-and-reliever regimen (steps 3 and above). This combination is not classed as a reliever when used in a maintenance-only regimen.
§ At all steps: review recent symptom control and risk regularly. Manage comorbidities and individual risk factors. Manage flare-ups with extra treatment when they occur. Manage exercise-related asthma symptoms as indicated.
† Medium dose as maintenance, low dose as reliever.

Notes

! : 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 despite good adherence and correct inhaler technique.

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

ICS: inhaled corticosteroid; SABA: short-acting beta$_2$ agonist; LABA: long-acting beta$_2$ agonist

* Reliever means rapid-onset beta$_2$ agonist and includes:
short-acting beta$_2$ agonists
low-dose budesonide/formoterol combination – only applies to patients using this combination in a maintenance-and-reliever regimen (steps 3 and above). This combination is not classed as a reliever when used in a maintenance-only regimen.

§ At all steps: review recent symptom control and risk regularly. Manage comorbidities and individual risk factors. Manage flare-ups with extra treatment when they occur. Manage exercise-related asthma symptoms as indicated.

† Medium dose as maintenance, low dose as reliever.

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

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

SABA: short-acting beta$_2$ agonist

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

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

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SABA: short-acting beta$_2$ agonist

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

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

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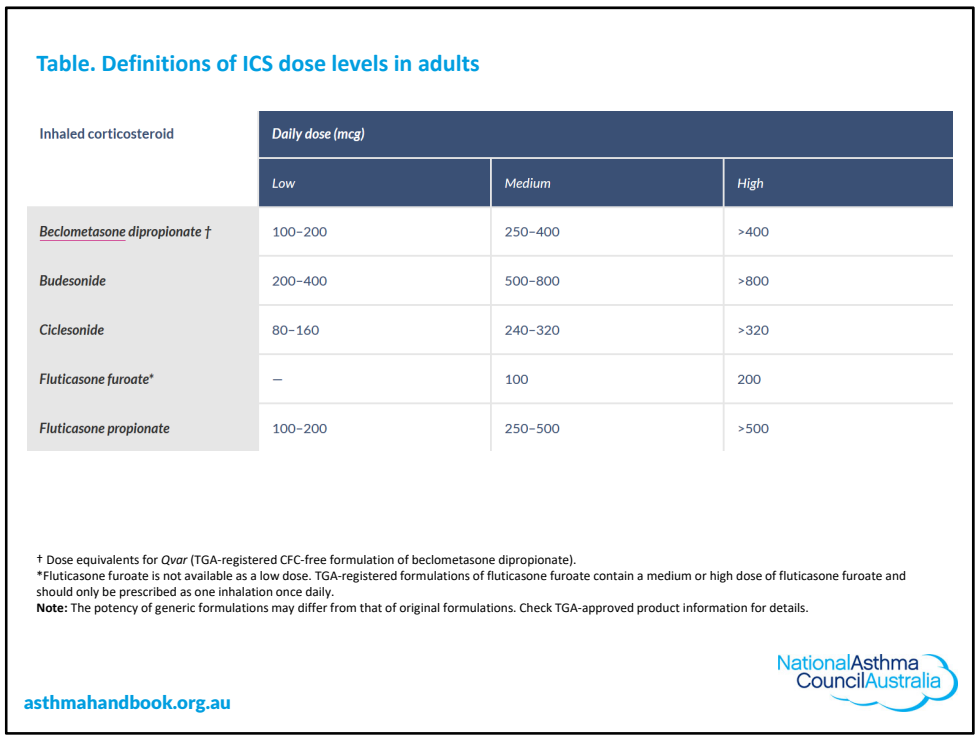

Table. Definitions of ICS dose levels in adults

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

† Dose equivalents for *Qvar* (TGA-registered CFC-free formulation of beclometasone dipropionate).
*Fluticasone furoate is not available as a low dose. TGA-registered formulations of fluticasone furoate contain a medium or high dose of fluticasone furoate and should only be prescribed as one inhalation once daily.
Note: The potency of generic formulations may differ from that of original formulations. Check TGA-approved product information for details.

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† Dose equivalents for *Qvar* (TGA-registered CFC-free formulation of beclometasone dipropionate).
*Fluticasone furoate is not available as a low dose. TGA-registered formulations of fluticasone furoate contain a medium or high dose of fluticasone furoate and should only be prescribed as one inhalation once daily.
Note: The potency of generic formulations may differ from that of original formulations. Check TGA-approved product information for details.

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Table. Guide to selecting and adjusting asthma medication for adults and older adolescents

Clinical situation	*Action*
Newly diagnosed asthma	Consider low-dose ICS (plus SABA as needed) If symptoms severe at initial presentation, consider one of: • ICS plus a short course of oral corticosteroids • a short initial period of high-dose ICS then step down • (private prescription) combination ICS/LABA† See: *Table. Initial treatment choices (adults and adolescents not already using a preventer)*
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 (unless already on low-dose ICS)
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.
§ Risk factors for asthma events or adverse treatment effects, irrespective of level of recent asthma symptom control.
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† 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.
§ Risk factors for asthma events or adverse treatment effects, irrespective of level of recent asthma symptom control.

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Table. Initial treatment choices (adults and adolescents not already using a preventer) (part 1)

Clinical situation	*Suggested starting regimen †*	*Alternative options and notes*
Symptoms less than twice per month and no flare-up that required oral corticosteroids within previous 12 months	SABA as needed	
Symptoms twice per month or more	Regular ICS starting at a low dose (plus SABA as needed)	Montelukast‡ Cromones§
Waking 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: • medium- to high-dose ICS (plus SABA as needed) • (private prescription) combination low-dose 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

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

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Table. Initial treatment choices (adults and adolescents not already using a preventer) (part 2)

Oral corticosteroids required for an asthma flare-up within the last 12 months (even if symptoms infrequent, e.g. less than twice per month on average)	Regular ICS starting at a low dose (plus SABA as needed)	
History of artificial ventilation or admission to an intensive care unit due to acute asthma (even if symptoms infrequent, e.g. less than twice per month on average)	Regular ICS starting at a low dose (plus SABA as needed) ⚠ Monitor frequently	
Patient not currently taking a preventer 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): • high-dose ICS (then down-titrate when symptoms improve) • a short course of oral corticosteroids in addition to ICS	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

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

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Table. Risk factors for adverse asthma outcomes in adults and adolescents (part 1)

	Medical history	*Investigation findings*	*Other factors*
Factors associated with increased risk of flare-ups	Poor asthma control Any asthma flare-up during the previous 12 months Other concurrent chronic lung disease	Poor lung function (even if few symptoms) Difficulty perceiving airflow limitation or the severity of flare-ups Eosinophilic airway inflammation§	Exposure to cigarette smoke (smoking or environmental exposure) Socioeconomic disadvantage Use of illegal substances Major psychosocial problems Mental illness
Factors associated with increased risk of life-threatening asthma	Intubation or admission to intensive care unit due to asthma (ever) 2 or more hospitalisations for asthma in past year 3 or more ED visits for asthma in the past year Hospitalisation or ED visit for asthma in the past month High short-acting beta$_2$ agonist use • Dispensing of 3 or more canisters in a year (average 1.6 puffs per day) is associated with increased risk of flare-ups in adults and children. • Dispensing 12 or more canisters in a year (average 6.6 puffs per day) is associated with increased risk of asthma death.	Sensitivity to an unavoidable allergen (e.g. *Alternaria* species of common moulds)	Inadequate treatment Experience of side-effects of OCS use (may contribute to under-treatment or delayed presentation to hospital during flare-ups) Lack of written asthma action plan Socioeconomic disadvantage Living alone Mental illness Use of alcohol or illegal substances Poor access to health care (e.g. rural/remote region)

§ White cell differential count on a peripheral blood sample is not routinely recommended in the investigation and management of asthma, except for patients with severe refractory asthma. In research studies, peripheral blood eosinophilia suggests the presence of eosinophilic airway inflammation.

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Sources

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Table. Risk factors for adverse asthma outcomes in adults and adolescents (part 2)

	History of delayed presentation to hospital during flare-ups History of sudden-onset acute asthma Cardiovascular disease		
Factors associated with accelerated decline in lung function	Chronic mucus hypersecretion Severe asthma flare-up in a patient not taking ICS	Poor lung function Eosinophilic airway inflammation§	Exposure to cigarette smoke (smoking or environmental exposure) Occupational asthma
Factors associated with treatment-related adverse events	Long-term high-dose ICS Frequent use of OCS		Anxiety disorder (due to increased sensitivity to asthma symptoms and reluctance to reduce ICS dose when asthma well controlled) Euphoria with OCS use

§ White cell differential count on a peripheral blood sample is not routinely recommended in the investigation and management of asthma, except for patients with severe refractory asthma. In research studies, peripheral blood eosinophilia suggests the presence of eosinophilic airway inflammation.

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Camargo CA, Rachelefsky G, Schatz M. Managing asthma exacerbations in the emergency department: summary of the National Asthma Education And Prevention Program Expert Panel Report 3 guidelines for the management of asthma exacerbations. *Proc Am Thorac Soc* 2009; 6: 357-66. Available from: http://www.atsjournals.org/doi/full/10.1513/pats.P09ST2

Global Initiative for Asthma (GINA). *Global strategy for asthma management and prevention*. GINA; 2016. Available from: http://www.ginasthma.org/

Goeman DP, Abramson MJ, McCarthy EA *et al.* Asthma mortality in Australia in the 21st century: a case series analysis. *BMJ Open* 2013; 3: e002539. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3657652

Osborne ML, Pedula KL, O'Hollaren M *et al.* Assessing future need for acute care in adult asthmatics: the profile of asthma risk study: a prospective health maintenance organization-based study. *Chest* 2007; 132: 1151-61. Available from: http://journal.publications.chestnet.org/article.aspx?articleid=1085456

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guideline-defined asthma control: analysis of a multinational cross-sectional survey. *Prim Care Respir J* 2009; 18: 41-9. Available from: http://www.nature.com/articles/pcrj200910

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Table. Management of risk factors for adverse asthma outcomes in adults (part 1)

Risk factor	*Clinical action †*
Any risk factor for flare-ups	Check patient has an appropriate action plan Carefully check inhaler technique and adherence, and identify any barriers to good adherence Review frequently (e.g. every 3 months)
Hospitalisation or ED visit for asthma or any asthma flare-up during the previous 12 months	Ask about triggers for flare-ups, and lead time
History of intubation or intensive care unit admission for asthma	Ensure action plan recommends early medical review when asthma worsens
Hospitalisation or ED visit for asthma in the past month	Emphasise importance of maintaining regular ICS use after symptoms improve Confirm that patient has resumed using SABA only when needed for symptoms
High SABA use (>3 canisters per year)	Check lung function If SABA use appears to be habitual, investigate causes and consider alternative strategies, e.g. short-term substitution of ipratropium for SABA

† In addition to actions applicable to all risk factors

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† In addition to actions applicable to all risk factors

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Table. Management of risk factors for adverse asthma outcomes in adults (part 2)

Long-term high-dose ICS	Consider gradual reduction of ICS dose if symptoms stable Monitor regularly (e.g. assessment of bone density, regular eye examinations) For local side-effects, ensure inhaler technique is appropriate
Poor lung function (even if few symptoms)	Consider 3-month trial of higher ICS dose, then recheck lung function Consider referral for detailed specialist investigation
Sensitivity to unavoidable allergens (e.g. Alternaria species of common moulds)	Refer for further investigation and management
Exposure to cigarette smoke (smoking or environmental exposure)	Emphasise the importance of avoiding smoke Provide quitting strategies Consider increasing ICS dose (higher dose of ICS likely to be necessary to control asthma) Refer for assessment of asthma–COPD overlap
Difficulty perceiving airflow limitation or the severity of exacerbations	Regular PEF monitoring Action plan should recommend early review and measurement of lung function
No current written asthma action plan	Provide and explain written asthma action plan

† In addition to actions applicable to all risk factors

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† In addition to actions applicable to all risk factors

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MANAGEMENT OF ASTHMA IN CHILDREN

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

Good control	*Partial control*	*Poor control*
All of: • Daytime symptoms† ≤2 days per week (lasting only a few minutes and rapidly relieved by rapid-acting bronchodilator) • No limitation of activities‡ • No symptoms§ during night or when wakes up • Need for SABA reliever# ≤2 days per week	Any of: • Daytime symptoms† >2 days per week (lasting only a few minutes and rapidly relieved by rapid-acting bronchodilator) • Any limitation of activities* • Any symptoms during night or when wakes up†† • Need for SABA reliever# >2 days per week	Either of: • Daytime symptoms† >2 days per week (lasting from minutes to hours or recurring, and partially or fully relieved by SABA reliever) • ≥3 features of partial control within the same week

SABA: short-acting beta$_2$ agonist

† e.g. wheezing or breathing problems
‡ child is fully active; runs and plays without symptoms
§ including no coughing during sleep
# not including doses 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

Notes:
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.

Validated questionnaires can be used for assessing recent symptom control:
Test for Respiratory and Asthma Control in Kids (TRACK) for children < 5 years
Childhood Asthma Control Test (C-ACT) for children aged 4–11 years

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SABA: short-acting beta$_2$ agonist
† e.g. wheezing or breathing problems
‡ child is fully active; runs and plays without symptoms
§ including no coughing during sleep
# not including doses 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
Notes:
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.
Validated questionnaires can be used for assessing recent symptom control:
Test for Respiratory and Asthma Control in Kids (TRACK) for children < 5 years
Childhood Asthma Control Test (C-ACT) for children aged 4–11 years

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Table. Definitions of ICS dose levels in children

Inhaled corticosteroid	*Daily dose (microg)*	
	Low	*High*
Beclometasone dipropionate †	100–200	>200 (maximum 400)
Budesonide	200–400	>400 (maximum 800)
Ciclesonide ‡	80–160	>160 (maximum 320)
Fluticasone propionate	100–200	>200 (maximum 500)

† Dose equivalents for *Qvar* (TGA-registered CFC-free formulation of beclometasone dipropionate)
‡ Ciclesonide is registered by the TGA for use in children aged 6 and over

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† Dose equivalents for *Qvar* (TGA-registered CFC-free formulation of beclometasone dipropionate)
‡ Ciclesonide is registered by the TGA 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. Available from: http://www.thoracic.org.au/clinical-documents/area?command=record&id=14

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Table. Classification of preschool wheeze and indications for preventer treatment in children aged 1–5

Severity of flare-ups	*Frequency of symptoms*			
	Symptoms every 6 months or less	*Symptoms every 3–4 months*	*Symptoms every 4–6 weeks*	*Symptoms at least once per week*
Mild flare-ups *(managed with salbutamol in community)*	Not indicated	Not indicated	Consider	Indicated
Moderate–severe flare-ups *(require ED care/oral corticosteroids)*	Indicated	Indicated	Indicated	Indicated
Life-threatening flare-ups *(require hospitalisation or PICU)*	Indicated	Indicated	Indicated	Indicated

PICU: paediatric intensive care unit; ED: emergency department
Indicated: Prescribe preventer and monitor as a treatment trial. Discontinue if ineffective.
Not indicated: Preventer is unlikely to be beneficial
Consider prescribing preventer according to overall risk for severe flare-ups
Symptoms: wheeze, cough or breathlessness. May be triggered by viral infection, exercise or inhaled allergens
Flare-up: increase in symptoms from usual day-to-day symptoms (ranging from worsening asthma over a few days to an acute asthma episode)
Preventer options: an inhaled corticosteroid (low dose) or montelukast
[!] Advise parents/carers about potential adverse behavioural and/or neuropsychiatric effects of montelukast
Notes:
Preventer medication is unlikely to be beneficial in a child whose symptoms do not generally respond to salbutamol
In children taking preventer, symptoms should be managed with a short-acting inhaled beta$_2$ agonist reliever (e.g. when child shows difficulty breathing).

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PICU: paediatric intensive care unit; ED: emergency department
Indicated: Prescribe preventer and monitor as a treatment trial. Discontinue if ineffective.
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Symptoms: wheeze, cough or breathlessness. May be triggered by viral infection, exercise or inhaled allergens
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Preventer options: an inhaled corticosteroid (low dose) or montelukast
[!] Advise parents/carers about potential adverse behavioural and/or neuropsychiatric effects of montelukast
Notes:
Preventer medication is unlikely to be beneficial in a child whose symptoms do not generally respond to salbutamol
In children taking preventer, symptoms should be managed with a short-acting inhaled beta$_2$ agonist reliever (e.g. when child shows difficulty breathing).

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Table. Classification of asthma and indications for initiating preventer treatment in children aged 6–11

Severity of flare-ups	Average frequency of flare-ups and symptoms between flare-ups		
	Infrequent intermittent Flare-ups every 6 weeks or less and no symptoms between flare-ups	**Frequent intermittent** Flare-ups more than once every 6 weeks and no symptoms between flare-ups	**Persistent** Between flare-ups (any of): • Daytime symptoms‡ more than once per week • Night-time symptoms‡ more than twice per month • Symptoms restrict activity or sleep
Mild flare-ups (almost always managed with salbutamol in community)	Not indicated	Consider	Indicated
Moderate–severe flare-ups (>2 in past year requiring ED or oral corticosteroids)	Consider	Indicated	Indicated
Life-threatening flare-ups (require hospitalisation or PICU)	Indicated	Indicated	Indicated

Preventer should be started as a treatment trial. Assess response after 4–6 weeks and review before prescribing long term.

ED: emergency department

Indicated: Prescribe preventer and monitor as a treatment trial. At follow-up, discontinue if ineffective

Not indicated: Preventer is unlikely to be beneficial

Consider prescribing preventer according to overall risk for severe flare-ups

‡ 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/carers and health professionals to prevent a serious outcome such as hospitalisation or death from asthma).

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Preventer should be started as a treatment trial. Assess response after 4–6 weeks and review before prescribing long term.
ED: emergency department
Indicated: Prescribe preventer and monitor as a treatment trial. At follow-up, discontinue if ineffective
Not indicated: Preventer is unlikely to be beneficial
Consider prescribing preventer according to overall risk for severe flare-ups
‡ 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/carers and health professionals to prevent a serious outcome such as hospitalisation or death from asthma).

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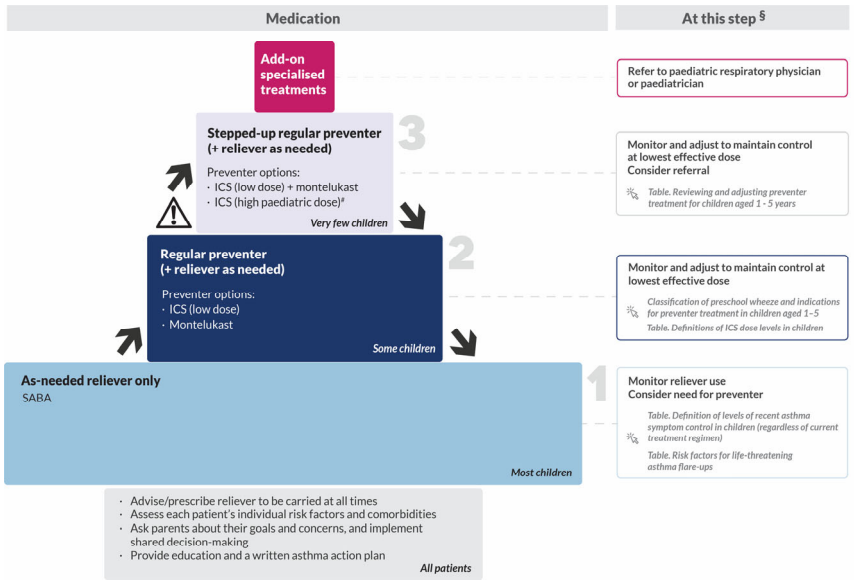
Figure. Stepped approach to adjusting asthma medication in children aged 1-5 years



Notes

! : 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 despite good adherence and correct inhaler technique.

↘ : Consider stepping down when asthma is stable and well controlled for more than 6 months.

ICS: inhaled corticosteroid; SABA: short-acting beta$_2$ agonist

§ At all steps: Review recent symptom control and risk regularly. Manage flare-ups with extra treatment when they occur. Manage exercise-related asthma symptoms as indicated.

Consultation with a specialist is recommended before prescribing high-dose inhaled corticosteroids in children aged 5 and under.

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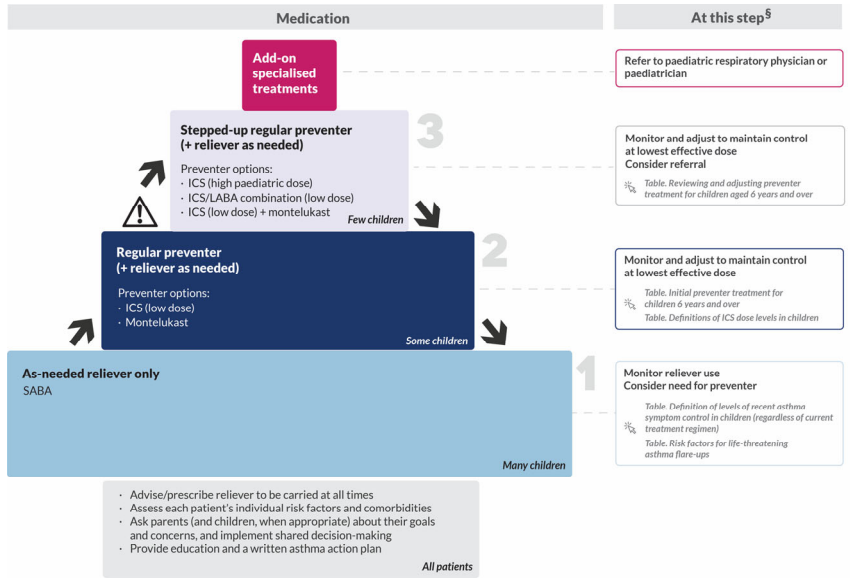
Figure. Stepped approach to adjusting asthma medication in children aged 6-11 years



Notes
! : Before considering stepping up, check symptoms are due to asthma, inhaler technique is correct, and adherence is adequate. Consider modifiable factors contributing to asthma symptoms (e.g. exposure to tobacco smoke or allergens, obesity or overweight).
↗ : Consider stepping up if good control is not achieved despite good adherence and correct inhaler technique.
↘ : Consider stepping down when asthma is stable and well controlled for more than 6 months.
ICS: inhaled corticosteroid; SABA: short-acting beta$_2$ agonist; LABA: long-acting beta$_2$ agonist
§ At all steps: Review recent symptom control and risk regularly. Manage flare-ups with extra treatment when they occur. Manage exercise-related asthma symptoms as indicated.

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Table. Risk factors for life-threatening asthma flare-ups in children

Asthma-related factors

Poor asthma control

Admission to hospital in preceding 12 months

History of intubation for acute asthma

Over-use of short-acting beta$_2$ agonist reliever

Abnormal spirometry findings

Reversible expiratory airflow limitation on spirometry despite treatment

Poor adherence to preventer

Incorrect inhaler technique for preventer

Poor adherence to asthma action plan

Exposure to clinically relevant allergens

Exposure to tobacco smoke

Other clinical factors

Allergies to foods, insects, medicines

Obesity

Family-related factors

Frequent failure to attend consultations/lack of follow-up after an acute flare-up

Significant parental psychological or socioeconomic problems

Parent/carer unequipped to manage asthma emergency

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MANAGEMENT OF ACUTE ASTHMA IN ADULTS AND CHILDREN

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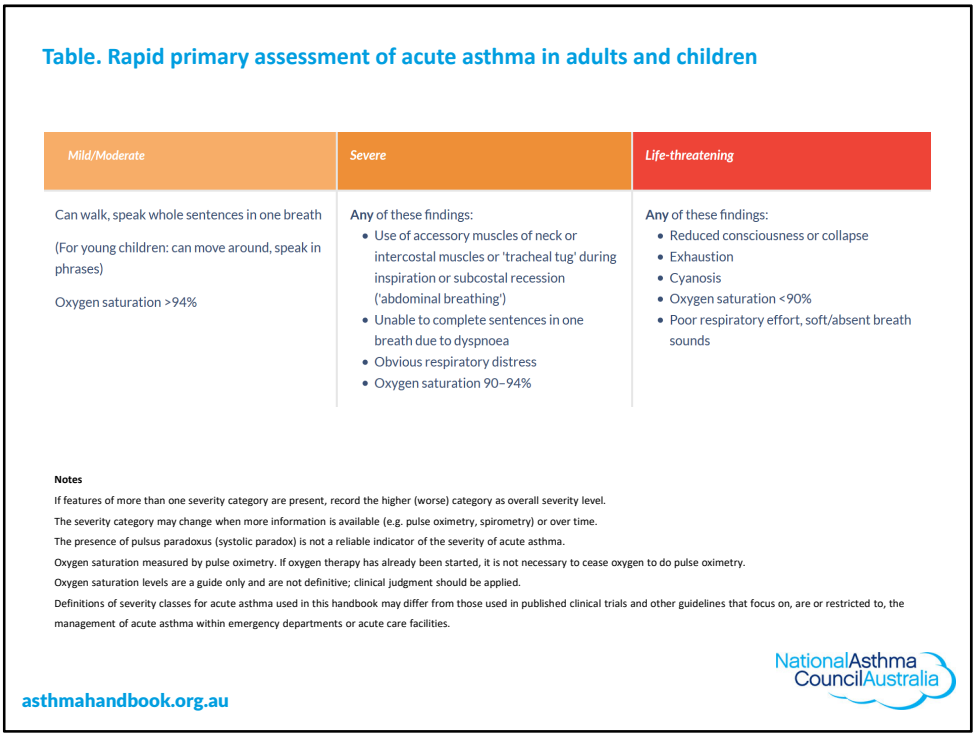

Table. Rapid primary assessment of acute asthma in adults and children

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: • Use of accessory muscles of neck or intercostal muscles or 'tracheal tug' during inspiration or subcostal recession ('abdominal breathing') • Unable to complete sentences in one breath due to dyspnoea • Obvious respiratory distress • Oxygen saturation 90–94%	**Any** of these findings: • Reduced consciousness or collapse • Exhaustion • Cyanosis • Oxygen saturation <90% • Poor respiratory effort, soft/absent breath sounds

Notes

If features of more than one severity category are present, record the higher (worse) category as overall severity level.

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.

Oxygen saturation measured by pulse oximetry. If oxygen therapy has already been started, it is not necessary to cease oxygen to do 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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Notes

If features of more than one severity category are present, record the higher (worse) category as overall severity level.

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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. Managing acute asthma in adults (part 1)

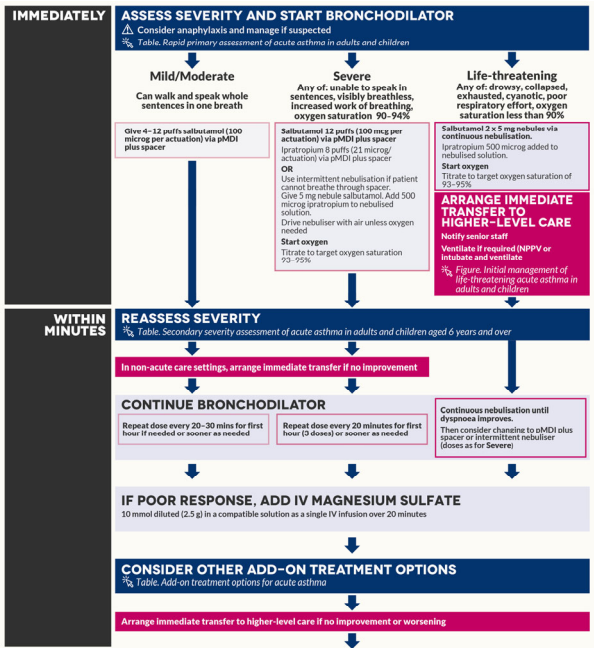

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Figure. Managing acute asthma in adults (part 2)

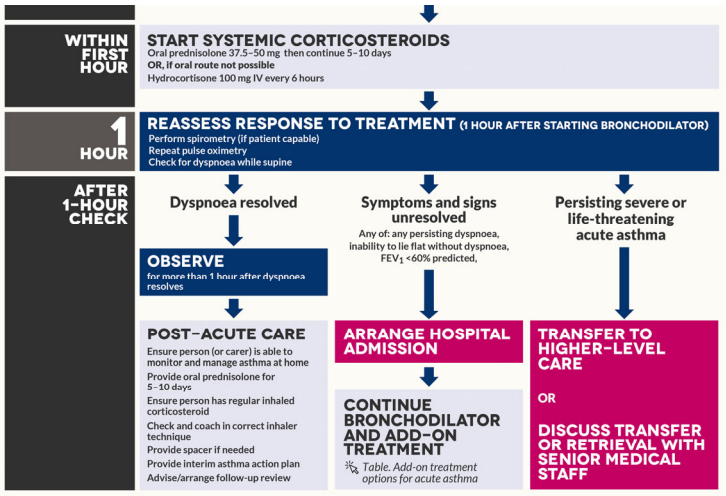

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Figure. Managing acute asthma in children (part 1)

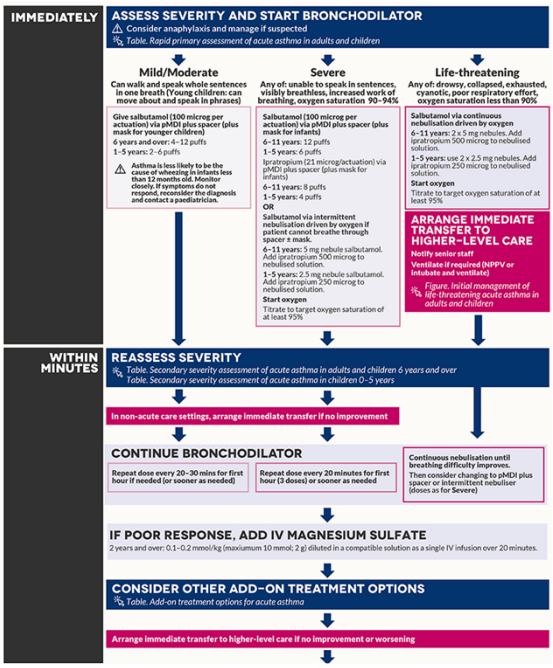

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Figure. Managing acute asthma in children (part 2)

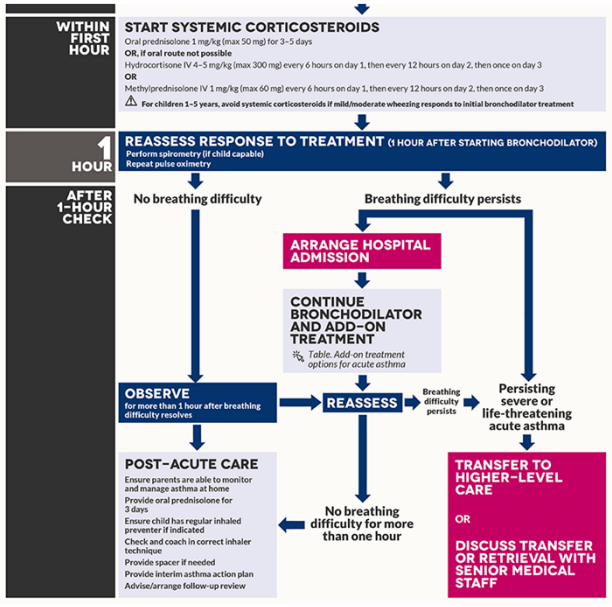

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Figure. Initial management of life-threatening acute asthma in adults and children (part 1)

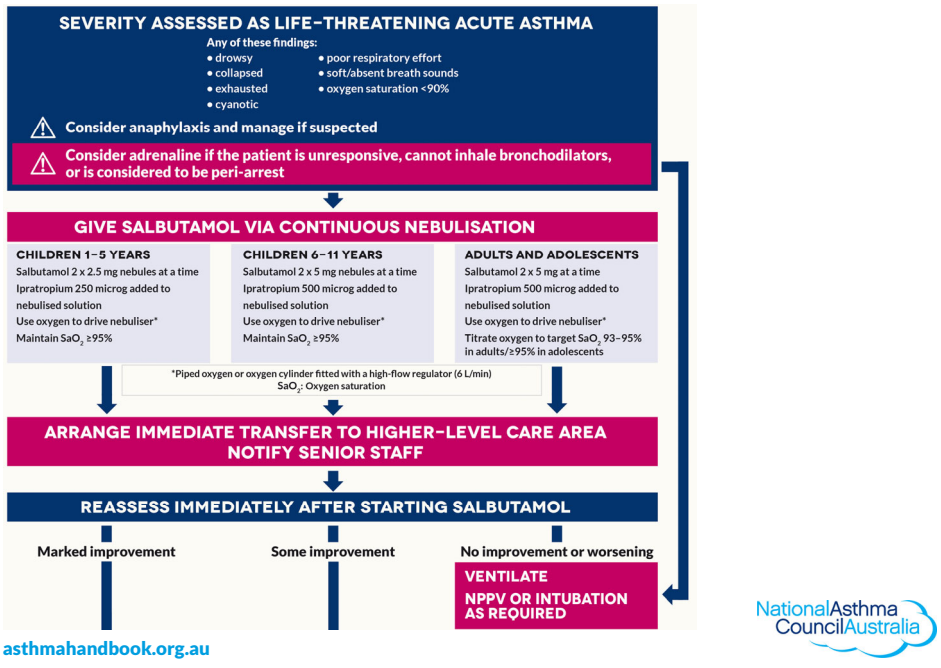

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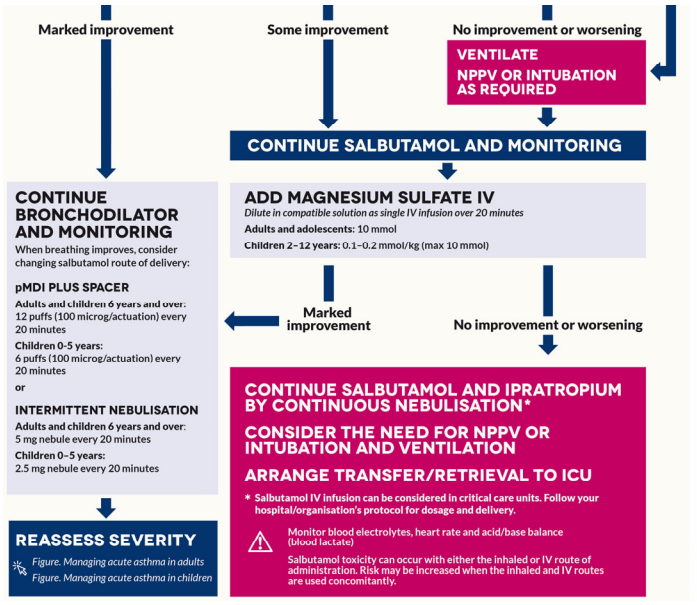
Figure. Initial management of life-threatening acute asthma in adults and children (part 2)



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MANAGEMENT CHALLENGES

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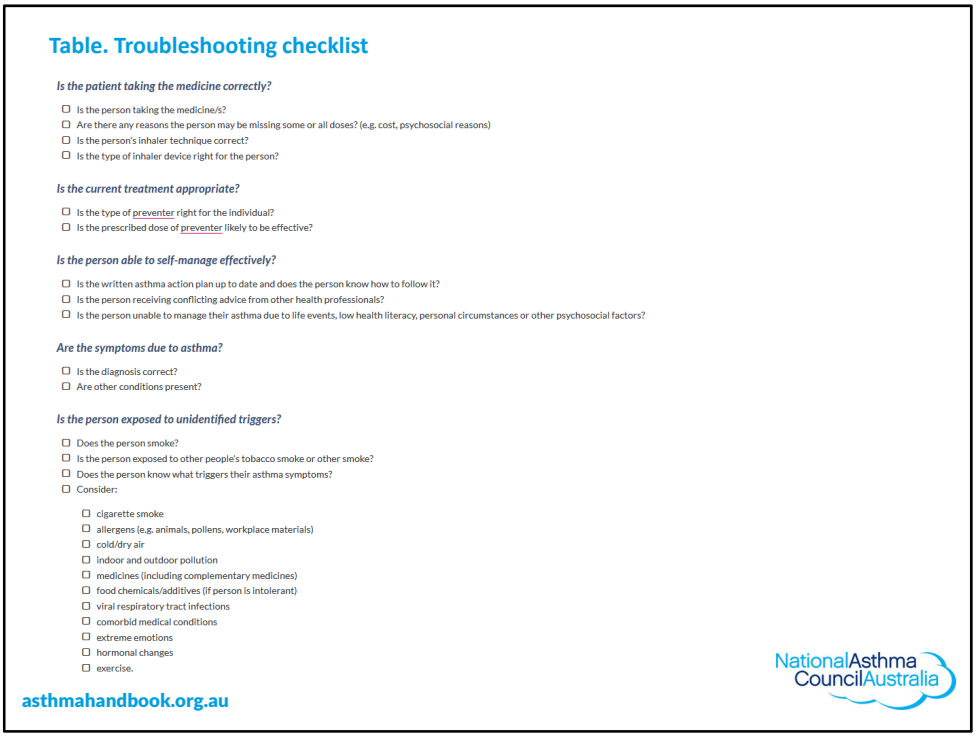

Table. Troubleshooting checklist

Is the patient taking the medicine correctly?

- ☐ Is the person taking the medicine/s?
- ☐ Are there any reasons the person may be missing some or all doses? (e.g. cost, psychosocial reasons)
- ☐ Is the person's inhaler technique correct?
- ☐ Is the type of inhaler device right for the person?

Is the current treatment appropriate?

- ☐ Is the type of preventer right for the individual?
- ☐ Is the prescribed dose of preventer likely to be effective?

Is the person able to self-manage effectively?

- ☐ Is the written asthma action plan up to date and does the person know how to follow it?
- ☐ Is the person receiving conflicting advice from other health professionals?
- ☐ Is the person unable to manage their asthma due to life events, low health literacy, personal circumstances or other psychosocial factors?

Are the symptoms due to asthma?

- ☐ Is the diagnosis correct?
- ☐ Are other conditions present?

Is the person exposed to unidentified triggers?

- ☐ Does the person smoke?
- ☐ Is the person exposed to other people's tobacco smoke or other smoke?
- ☐ Does the person know what triggers their asthma symptoms?
- ☐ Consider:
  - ☐ cigarette smoke
  - ☐ allergens (e.g. animals, pollens, workplace materials)
  - ☐ cold/dry air
  - ☐ indoor and outdoor pollution
  - ☐ medicines (including complementary medicines)
  - ☐ food chemicals/additives (if person is intolerant)
  - ☐ viral respiratory tract infections
  - ☐ comorbid medical conditions
  - ☐ extreme emotions
  - ☐ hormonal changes
  - ☐ exercise.

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Table. Summary of asthma triggers

Avoidable triggers	*Unavoidable triggers*
Always avoid	***Do not avoid***
Cigarette smoke	**Exercise** **Laughter**
Avoid or reduce where possible	***Manage***
Allergens (if person is sensitised and relevant avoidance strategies are practical and shown to be effective) • Animal allergens (e.g. pets, animals in workplace) • Cockroaches • House dust mite • Moulds • Occupational allergens • Pollens **Airborne/environmental irritants** • Cold/dry air • Fuel combustion (nitrogen dioxide-emitting gas heaters) • Home renovation materials • Household aerosols • Moulds (airborne endotoxins) • Occupational irritants • Outdoor industrial and traffic pollution • Perfumes/scents/incense • Smoke (any, including bushfires, vegetation reduction fires, indoor wood fires) • Thunderstorms in spring and early summer (grass pollen) **Certain medicines** • Aspirin and NSAIDs (in patients with aspirin-exacerbated respiratory disease) • Beta blockers† • Bee products (pollen, propolis, royal jelly) • Echinacea **Dietary triggers** • Food chemicals/additives (if person is intolerant) • Thermal effects (e.g. cold drinks)	**Respiratory tract infections** **Certain medicines** • Aspirin (when given for purpose of desensitisation)† • Anticholinesterases and cholinergic agents **Comorbid medical conditions** • Allergic rhinitis/rhinosinusitis • Gastro-oesophageal reflux disease • Nasal polyposis • Obesity • Upper airway dysfunction **Physiological and psychological changes** • Extreme emotions • Hormonal changes (e.g. menstrual cycle) • Pregnancy • Sexual activity

† Requires close specialist supervision. If indicated for acute cardiac events, must be given under specialist supervision and started at low dose.

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