Managing acute asthma in children 1–5 years in the ED

Read first

- Definition and classification of asthma exacerbations

Recommendation

Rapidly assess the severity of the acute asthma episode by observation and pulse oximetry.

Perform the assessment while preparing to administer salbutamol (and oxygen, if needed).

Table

Immediate treatment of acute asthma in children 1–5 years in the ED

	Mild–moderate	Severe	Life-threatening
Description	All of: Can walk (for younger children, can move about) Can speak in phrases (for younger children, can vocalise) Moderate use of accessory muscles of neck or intercostal muscles/tracheal tug/subcostal recession SpO_2 (room air) >94%	Any of: Unable to complete sentences in one breath due to breathlessness Significant use of accessory muscles of neck or intercostal muscles/tracheal tug/subcostal recession during inspiration Obvious respiratory distress SpO_2 (room air) ≤94%	Any of: Reduced consciousness/collapse, exhaustion Cyanosis Poor respiratory effort SpO_2 (room air) <90% Poor respiratory effort, soft/absent breath sounds
Immediate treatment	Give salbutamol 2–6 actuations (100 microg per actuation) via pMDI and spacer (tidal breathing), plus mask if needed	Arrange transfer to acute care Give salbutamol 6 actuations (100 microg per actuation) via pMDI and spacer (tidal breathing), plus mask if needed If patient cannot breathe through spacer with mask, give 2.5 mg nebule via nebuliser Start oxygen supplementation if SpO_2<92% on room air Titrate to target 92–96%	Arrange transfer to ICU Give salbutamol 2 x 2.5 mg nebules via continuous nebulisation driven by oxygen Maintain SpO_2 to target 92–96%
Continued treatment	Repeat salbutamol 4–6 actuations every 20–30 minutes for the first hour, if needed (sooner if needed)	Repeat salbutamol 6 actuations at least every 20 minutes for first hour (3 doses) and as needed	

Additional information

pMDI: pressurised metered-dose inhaler; SpO_2: oxygen saturation

Sources & rationale

Recommendation type: Consensus recommendation

References

Shi C, Goodall M, Dumville J, et al. The accuracy of pulse oximetry in measuring oxygen saturation by levels of skin pigmentation: a systematic review and meta-analysis. BMC Med 2022; 20: 267.

Notes

Pulse oximetry may overestimate oxygen saturation in people with higher levels of skin pigmentation.[Shi 2022]

Recommendation

Start bronchodilator therapy according to severity of the exacerbation.

Table

Immediate treatment of acute asthma in children 1–5 years in the ED

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Description	All of: Can walk (for younger children, can move about) Can speak in phrases (for younger children, can vocalise) Moderate use of accessory muscles of neck or intercostal muscles/tracheal tug/subcostal recession SpO_2 (room air) >94%	Any of: Unable to complete sentences in one breath due to breathlessness Significant use of accessory muscles of neck or intercostal muscles/tracheal tug/subcostal recession during inspiration Obvious respiratory distress SpO_2 (room air) ≤94%	Any of: Reduced consciousness/collapse, exhaustion Cyanosis Poor respiratory effort SpO_2 (room air) <90% Poor respiratory effort, soft/absent breath sounds
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Additional information

pMDI: pressurised metered-dose inhaler; SpO_2: oxygen saturation

Alert If using a nebuliser, follow your organisation's infection control protocols

Sources & rationale

Recommendation type: Consensus recommendation

Alert Monitor for salbutamol toxicity (e.g. tachycardia, tachypnoea, metabolic acidosis, hypokalaemia)

Alert Closely monitor level of consciousness, fatigue, oxygen saturation, respiratory rate and heart rate. If symptoms do not respond, call for an ambulance

In children aged 5 and younger with acute asthma symptoms or acute wheeze, salbutamol improves symptoms, reduces work of breathing, and increases oxygen saturation.[Storgaard 2025]

In older children and adults, repeated administration of inhaled SABA every 20 minutes for the first hour is effective for rapidly achieving bronchodilation in mild-to-moderate asthma exacerbations.[GINA 2025]

Salbutamol delivered via a pMDI with spacer is at least as effective as salbutamol delivered via nebuliser in preschool children with viral-induced wheezing or acute asthma who do not require mechanical ventilation.[Mitselou 2016]

The use of nebulisers may increase the risk of viral transmission.[Hui 2009, Biney 2024, Goldstein 2021]

Oral salbutamol or intravenous salbutamol are not recommended.

References

Biney IN, Ari A, Barjaktarevic IZ, et al. Guidance on mitigating the risk of transmitting respiratory infections during nebulization by the COPD Foundation Nebulizer Consortium. Chest 2024; 165: 653-668.

Global Initiative for Asthma (GINA). Global Strategy for Asthma Management and Prevention, 2025. Available from: **www.ginasthma.org**

Goldstein KM, Ghadimi K, Mystakelis H, et al. Risk of transmitting coronavirus disease 2019 during nebulizer treatment: a systematic review. J Aerosol Med Pulm Drug Deliv 2021; 34: 155-170.

Hui DS, Chow BK, Chu LC, et al. Exhaled air and aerosolized droplet dispersion during application of a jet nebulizer. Chest 2009; 135: 648-654.

Mitselou N, Hedlin G, Hederos CA. Spacers versus nebulizers in treatment of acute asthma – a prospective randomized study in preschool children. J Asthma 2016; 53: 1059-62.

Storgaard Petersen R, Hallas H, Brustad N, Chawes B. Short-term efficacy of inhaled short-acting beta-2-agonists for acute wheeze/asthma symptoms in preschool-aged children: a systematic review and meta-analysis. Thorax 2025; 80: 349-357.

Resources

National Asthma Council's video on how to use a metered dose inhaler (puffer) with a spacer for children

National Asthma Council Australia's fact sheet on spacers for pressurised metered-dose inhalers

Notes

Tidal breathing method:

1. Connect spacer to pMDI plus tightly fitting mask connected to the spacer mouthpiece.

2. Release 1 actuation of salbutamol into the spacer.

3. Watch the child breathe in and out for 4 breaths.

4. Release 1 more actuation of salbutamol into the spacer and repeat until all required actuations delivered.

If the child cannot breathe through a spacer using either the mouthpiece or a mask, use a nebuliser with mask.

Recommendation

If oxygen saturation <92% while breathing room air, start oxygen supplementation and titrate saturation to target 92–96%.

Sources & rationale

Recommendation type: Consensus recommendation

There is very little evidence available to inform recommendations for oxygen saturation targets in children with asthma. Recommended targets differ between major Australian paediatric teaching hospitals.

Delivery methods include simple mask (flow rate 5 L/min) or nasal prongs (flow rate 3 L/min).[GWACAHS 2023]

The normal range oxygen saturation levels measured by pulse oximetry in children is generally stated as 95–100%, one study reported a normal range of 97–100% in healthy children without asthma aged approximately 5–13 years.[Elder 2015]

Some guidelines recommend pulse oximetry alarms to be set at 92% low and 99% high when a child is receiving oxygen therapy.[SCHN 2024] Others recommend targets of 94–98% [RCHM 2020] or >95% for children. Saturations of 100% should be avoided in patients receiving supplemental O_2 (acceptable in a child breathing room air).[SCHN 2024]

Some guidelines suggest that, in a child recovering after acute asthma, SpO_2 in the low nineties due to ventilation/perfusion mismatch is acceptable if the child is clinically improving.[RCHM 2020, RCHM 2023]

There is no physiological basis for the application of low flow oxygen therapy to a child with normal SpO_2 while breathing room air and increased work of breathing.[SCHN 2024]

References

Elder JW, Baraff SB, Gaschler WN, et al. Pulse oxygen saturation values in a healthy school-aged population. Pediatr Emerg Care 2015; 31: 645-647.

Government of Western Australia Child and Adolescent Health Service. Community Health clinical nursing manual. Oxygen administration. [Reviewed 26 October 2023].

The Royal Children's Hospital Melbourne. Nursing guidelines. Oxygen delivery [webpage] [Approved December 2020].

The Royal Children's Hospital Melbourne. Acute asthma. [webpage] [last updated July 2023]

The Sydney Children's Hospitals Network. Oxygen therapy and delivery devices. Practice guideline. Guideline No: 2015-9085 v5. 15 November 2024.

Shi C, Goodall M, Dumville J, et al. The accuracy of pulse oximetry in measuring oxygen saturation by levels of skin pigmentation: a systematic review and meta-analysis. BMC Med 2022; 20: 267.

Resources

The Royal Children's Hospital Melbourne's guidance on **oxygen delivery**

The Sydney Children's Hospitals Network's **practice guideline on oxygen therapy and delivery devices**

Notes

Mask and spacer can be applied over nasal prong oxygen to deliver inhaled bronchodilator [RCHM 2023]

Pulse oximetry may overestimate oxygen saturation in people with higher levels of skin pigmentation.[Shi 2022]

Local policy for oxygen supplementation thresholds and targets may differ.

Recommendation

Complete the assessment when feasible after starting salbutamol and oxygen (if required).

Table

Secondary severity assessment of acute asthma in children 1–5 years in the ED

	Mild–moderate (all of):	Severe (any of):	Life-threatening (any of):
Consciousness	Alert	N/A	Drowsy or unconscious
Speech	Can talk or vocalise	Can only speak a few words in one breath	Cannot vocalise due to dyspnoea
Posture	Can walk or crawl	Lethargic	Collapsed or exhausted
Breathing	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
Skin colour	Normal	N/A	Cyanosis
Respiratory rate	Normal	Tachypnoea	Bradypnoea (indicates respiratory exhaustion)
Heart rate	Normal	Tachycardia	Cardiac arrhythmia or Bradycardia (may occur just before respiratory arrest)
Chest auscultation	Wheeze or Normal lung sounds	N/A	Silent chest or Reduced air entry
Oxygen saturation	>94%	90–94%	<90% or Clinical cyanosis

Additional information

N/A: Not applicable – may be the same as moderate and does not determine severity category

Perform a physical examination including auscultation, vital signs, and repeated pulse oximetry.

Complete a brief history, including:

- reliever taken for this episode before presentation (dose, number of doses, time of last dose)
- current asthma medicines (regular and as-needed, including type of devices used)
- assessment of adherence to ICS (if prescribed)
- what triggered this episode, if known (e.g. allergies, immediate hypersensitivity, medicines, respiratory infections)
- presence of coexisting conditions
- exposure to environmental smoke/vaping.

Alert Acute asthma is rarely triggered by food allergies, but confirmed food allergy is a risk factor for fatal or life-threatening asthma

Sources & rationale

Recommendation type: Consensus recommendation

The association of asthma and food allergy is a risk factor for fatal and near-fatal allergic reactions to food allergens.[Burks 2012]

References

Burks AW, Tang M, Sicherer S, et al. ICON: food allergy. J Allergy Clin Immunol 2012; 129: 906-920.

Recommendation

Start systemic corticosteroids if lack of good response to salbutamol within 30 minutes of presentation or if child requires hospital admission.

Children 1–5: prednisone/prednisolone 1 mg/kg orally each morning for 3 days

Sources & rationale

Recommendation type: Consensus recommendation

For children aged 1–5 years, systemic corticosteroids should generally be limited to those with severe acute wheezing. The Thoracic Society of Australia and New Zealand 2010 position statement on the use of corticosteroids in children [van Asperen 2010] recommended that the use of systemic corticosteroids in preschool children, particularly those with intermittent viral induced wheezing, should be limited to those with wheeze severe enough to need admission to hospital.

Evidence

In preschool children with acute viral-induced wheezing, there is inconsistent evidence for the benefits of systemic corticosteroids.[Foster 2018, Panickar 2009] Oral corticosteroids may be beneficial in children younger than 6 years with frequent acute wheezing or asthma, but evidence does not strongly support their use in this age group.[Castro-Rodriguez 2016]

After an acute asthma episode, treatment with systemic corticosteroids (intramuscular corticosteroids, oral prednisone/prednisolone, or oral dexamethasone) at discharge from the emergency department reduces the risk of relapse in children.[Castro-Rodriguez 2015, Kirkland 2018] However, systemic corticosteroid is not recommended for children 1–5 years unless the acute episode does not respond well to initial bronchodilator treatment or is severe enough to require hospital admission.

Doses

In children the majority of studies in children have used 1–2 mg/kg of oral prednisolone (maximum 60 mg) given initially then 1 mg/kg per day. Current evidence does not support the use of higher doses.[Normansell 2016]

In children, a 3-day course of prednisone/prednisolone is generally as effective as a 5-day course.[Chang 2008]

Most studies evaluating oral dexamethasone in children have used 0.6 mg/kg per dose on one or two consecutive days. [Paniagua 2017] Dexamethasone has a longer half-life than prednisone/prednisolone. Longer courses may more pronounced mineralocorticoid adverse effects. Oral dexamethasone treatment should not exceed 2 days. In children it may be associated with less vomiting than prednisone/prednisolone.[Paniagua 2017, Bravo-Soto 2017, Meyer 2014, Keeney 2014, Cronin 2016]

Safety

Short-term use of oral corticosteroids to treat acute asthma is often well tolerated in children,[Rowe 2001, Smith 2003, Rowe 2007] but may be associated with mood changes, nocturia, and difficulty sleeping.

In the long term, short courses of oral corticosteroids to manage asthma exacerbations are associated with increased lifetime risk of osteoporosis, pneumonia, cardiovascular or cerebrovascular diseases, cataract, sleep apnoea, renal impairment, depression/anxiety, type 2 diabetes, and weight gain.[Price 2018]

References

Bravo-Soto GA, Harismendy C, Rojas P et al. Is dexamethasone as effective as other corticosteroids for acute asthma exacerbation in children? Medwave 2017; 17: e6931.

Castro-Rodriguez, J. A., Rodrigo, G. J., Rodriguez-Martinez, C. E.. Principal findings of systematic reviews for chronic treatment in childhood asthma. J Asthma 2015; 52: 1038-45.

Castro-Rodriguez JA, Beckhaus AA, Forno E. Efficacy of oral corticosteroids in the treatment of acute wheezing episodes in asthmatic preschoolers: Systematic review with meta-analysis. Pediatric pulmonology 2016; 51: 868-76.

Chang, A B, Clark, R, Sloots, T P, et al. A 5- versus 3-day course of oral corticosteroids for children with asthma exacerbations who are not hospitalised: a randomised controlled trial. Med J Aust 2008; 189: 306-310.

Cronin JJ, McCoy S, Kennedy U et al. A randomized trial of single-dose oral dexamethasone versus multidose prednisolone for acute exacerbations of asthma in children who attend the emergency department. Ann Emerg Med 2016; 67: 593-601.e3.

Foster SJ, Cooper MN, Oosterhof S, Borland ML. Oral prednisolone in preschool children with virus-associated wheeze: a prospective, randomised, double-blind, placebo-controlled trial. Lancet Respir Med 2018; 6: 97-106.

Keeney GE, Gray MP, Morrison AK et al. Dexamethasone for acute asthma exacerbations in children: a meta-analysis. Pediatrics 2014; 133: 493-9.

Kirkland SW, Vandermeer B, Campbell S et al. Evaluating the effectiveness of systemic corticosteroids to mitigate relapse in children assessed and treated for acute asthma: A network meta-analysis. J Asthma 2018: 1-12.

Meyer JS, Riese J, Biondi E. Is dexamethasone an effective alternative to oral prednisone in the treatment of pediatric asthma exacerbations? Hosp Pediatr 2014; 4: 172-80.

Normansell R, Kew KM, Mansour G. Different oral corticosteroid regimens for acute asthma. Cochrane Database Syst Rev 2016; Issue 5: CD011801.

Paniagua N, Lopez R, Muñoz N, et al. Randomized trial of dexamethasone versus prednisone for children with acute asthma exacerbations. J Pediatr 2017;191:190-196.e1.

Panickar J, Lakhanpaul M, Lambert PC, et al. Oral prednisolone for preschool children with acute virus-induced wheezing. N Engl J Med 2009; 360: 329-328.

Price DB, Trudo F, Voorham J, et al. Adverse outcomes from initiation of systemic corticosteroids for asthma: long-term observational study. J Asthma Allergy 2018; 11: 193-204.

Rowe BH, Spooner C, Ducharme F, et al. Early emergency department treatment of acute asthma with systemic corticosteroids. Cochrane Database Syst Rev 2001; Issue 1: CD002178.

Rowe BH, Spooner C, Ducharme F, et al. Corticosteroids for preventing relapse following acute exacerbations of asthma. Cochrane Database Syst Rev 2007; Issue 3: CD000195.

Smith M, Iqbal S, Elliot TM et al. Corticosteroids for hospitalised children with acute asthma. Cochrane Database Syst Rev 2003; Issue 2: CD002886.

van Asperen PP, Mellis CM, Sly PD, et al. The role of corticosteroids in the management of childhood asthma. The Thoracic Society of Australia and New Zealand, 2010. Available from: https://thoracic.org.au/clinical-documents/asthma

Notes

Dispense only one course, to avoid overuse or inappropriate use of systemic corticosteroids.

Recommendation

Assess clinical response after each dose of bronchodilator and consider repeating the dose or escalating treatment.

If dyspnoea/increased work of breathing is partially relieved within first 5 minutes, reassess the need for repeated bronchodilator at 15 minutes.

If dyspnoea/increased work of breathing is not relieved, or condition deteriorates, repeat bronchodilator dose and consider adding inhaled ipratropium bromide (if not part of initial treatment) or IV magnesium sulfate:

- Inhaled ipratropium bromide in children 1–5 years: 4 actuations via pMDI (21 microg/actuation) every 20 minutes for first hour, then every 4–6 hours for 24 hours, if needed
- Intravenous magnesium sulfate in children 2–5 years: 0.1–0.2 mmol/kg (maximum 8 mmol) diluted in a compatible solution as a single IV infusion over 20 minutes.

Alert Reduced wheezing alone is an unreliable indicator of improvement, as it may indicate deterioration

Alert Intravenous magnesium sulfate may be associated with hypotension

Sources & rationale

Recommendation type: Consensus recommendation

Inhaled ipratropium bromide

Ipratropium is recommended as a first-line bronchodilator for patients with severe or life-threatening acute asthma, and as a second-line bronchodilator if inadequate response to salbutamol. The combination of ipratropium and short-acting beta2 agonist appears to be well tolerated in children.[Griffiths 2013]

Intravenous $MgSO_4$

Intravenous magnesium sulfate can be considered as a second-line bronchodilator in severe or life-threatening acute asthma, or when poor response to repeated maximal doses of other bronchodilators. It should not be used as a substitute for inhaled $beta_2$ agonists.[Knightly 2017]

Intravenous magnesium sulfate may reduce hospitalisation rates and improve lung function among children with acute asthma in presenting to the emergency department,[Goodacre 2013, Griffiths 2016] but clinical trial evidence is limited. [Griffiths 2016]

A small randomised controlled trial reported that IV magnesium sulfate was ineffective in reducing respiratory distress in very young children (6 months to 4 years) with acute virus-induced wheezing.[Pruikkonen 2018]

The optimal dose and infusion regimen has not been identified.[Green 2016]

IV magnesium sulfate is generally well tolerated.[Griffiths 2016, Irazuzta 2017]

Nebulised $MgSO_4$

A 2024 systematic review reported that nebulised $MgSO_4$ as an add-on second-line therapy for children with acute asthma may slightly improve lung function but does not reduce hospitalisation rates, based on low-certainty evidence.[Kumar 2024]

Nebulised magnesium sulfate is well tolerated in children.[Powell 2013a, Powell 2013b]

References

Goodacre S, Cohen J, Bradburn M et al. Intravenous or nebulised magnesium sulphate versus standard therapy for severe acute asthma (3Mg trial): a double-blind, randomised controlled trial. Lancet Respir Med 2013; 1: 293-300.

Griffiths B, Kew KM. Intravenous magnesium sulfate for treating children with acute asthma in the emergency department. Cochrane Database Syst Rev 2016; 4: CD011050.

Irazuzta JE, Chiriboga N. Magnesium sulfate infusion for acute asthma in the emergency department. J Pediatr (Rio J) 2017; 93 Suppl 1: 19-25.

Kumar J, Kumar P, Goyal JP, et al. Role of nebulised magnesium sulfate in treating acute asthma in children: a systematic review and meta-analysis. BMJ Paediatr Open 2024; 8: e002638.

Knightly R, Milan SJ, Hughes R et al. Inhaled magnesium sulfate in the treatment of acute asthma. Cochrane Database Syst Rev 2017; 11: CD003898.

Powell C, Kolamunnage-Dona R, Lowe J, et al. MAGNEsium Trial In Children (MAGNETIC): a randomised, placebo-controlled trial and economic evaluation of nebulised magnesium sulphate in acute severe asthma in children. Health Technol Assess 2013; 17: 1-216.

Powell C, Kolamunnage-Dona R, Lowe J et al. Magnesium sulphate in acute severe asthma in children (MAGNETIC): a randomised, placebo-controlled trial. Lancet Respir Med 2013; 1: 301-308.

Pruikkonen H, Tapiainen T, Kallio M et al. Intravenous magnesium sulfate for acute wheezing in young children: a randomised double-blind trial. Eur Respir J 2018; 51.

Su Z, Li R, Gai Z. Intravenous and nebulized magnesium sulfate for treating acute asthma in children: a systematic review and meta-analysis. Pediatr Emerg Care 2018; 34: 390-395.

Recommendation

After respiratory distress or increased work of breathing has resolved and symptoms have stabilised, observe the patient for at least 4 hours.

Sources & rationale

Recommendation type: Consensus recommendation

Recommendation

At discharge, ensure that the child has appropriate asthma treatment that includes an adequate maintenance dose of ICS.

If the child's asthma has been managed with a reliever alone (e.g. as-needed salbutamol), prescribe maintenance ICS treatment or arrange urgent review for reassessment of treatment.

Table

Low and medium/high ICS doses in children 1–5 years

Active ingredient	Total daily dose (microg)	
	Low	Medium/high
Fluticasone propionate	100 (50 twice daily)	200 (100 twice daily)

Additional information

ICS: inhaled corticosteroid

Medium/high doses should be avoided except under specialist supervision

Sources & rationale

Recommendation type: Consensus recommendation

Notes

A child with asthma who has an exacerbation severe enough to necessitate an ED visit needs maintenance ICS treatment, even if the child has been prescribed a short course of systemic corticosteroid. ICS should be started before the end of the systemic corticosteroid course, and the dose reviewed by the GP at follow-up.

Recommendation

Write an interim asthma action plan at discharge, including instructions on maintenance ICS dosing, salbutamol taken only as needed, and what to do is symptoms recur or worsen

Sources & rationale

Recommendation type: Consensus recommendation

References

Warraich S, Bush A, Levy ML, Fleming L. Regular (up to 10 puffs 4-hourly) inhaled salbutamol should be prescribed at discharge after an asthma attack: myth or maxim? Breathe (Sheff) 2023; 19: 230054.

Notes

‘Weaning plans’ for salbutamol are not recommended.[Warraich 2023]

Recommendation

Arrange follow-up

Recheck within 3 days with the child’s usual GP.

Comprehensive assessment in 2–4 weeks to reassess risk factors and review the treatment regimen (GP, paediatric respiratory physician, allergist, or paediatrician)

Sources & rationale

Recommendation type: Consensus recommendation

Consideration

If anaphylaxis is identified or suspected, manage with adrenaline.

ASCIA 2024 doses:

Auto-injector

ASCIA 2024 recommended dose for child 7.5–20 kg: adrenaline 150 microg IM via auto-injector

IM via needle and syringe using adrenaline 1:1,000 ampoules (1 mg per 1 mL)

Children: 0.01 mg per kg up to 0.5 mg (0.5 mL) per dose

Sources & rationale

Recommendation type: Adapted from ASCIA 2024

Anaphylaxis should be suspected when asthma-like respiratory symptoms are accompanied by either of the following features:[ASCIA 2024]

- Acute onset (minutes to hours) with simultaneous involvement of the skin, mucosal tissue, or both (e.g. generalized hives, pruritus or flushing, swollen lips-tongue-uvula)
- Acute onset of hypotension or bronchospasm or laryngeal involvement after exposure to a known or highly probable allergen for that patient (minutes to several hours), even in the absence of typical skin involvement.

References

ASCIA. **Acute management of anaphylaxis**. 2024, Australasian Society of Clinical Immunology and Allergy.

Resources

ASCIA Guidelines: Acute management of anaphylaxis

Notes

Adrenaline should be given before considering salbutamol when anaphylaxis is suspected.[ASCIA 2024]

Consideration

For patients with life-threatening asthma, deliver salbutamol via continuous nebulisation driven by oxygen.

When breathing improves, consider changing to a pressurised metered-dose inhaler plus spacer or intermittent nebuliser.

Alert When using a nebuliser, follow your organisation's infection control protocols

Sources & rationale

Recommendation type: Consensus recommendation

The use of nebulisers may carry a higher risk of viral transmission.[GINA 2025]

References

Biney IN, Ari A, Barjaktarevic IZ, et al. Guidance on mitigating the risk of transmitting respiratory infections during nebulization by the COPD Foundation Nebulizer Consortium. Chest 2024; 165: 653-668.

Global Initiative for Asthma (GINA). Global Strategy for Asthma Management and Prevention, 2025. Available from: **www.ginasthma.org**

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Hui DS, Chow BK, Chu LC, et al. Exhaled air and aerosolized droplet dispersion during application of a jet nebulizer. Chest 2009; 135: 648-654.

Notes

To deliver intermittent nebulised bronchodilators in a patient receiving oxygen therapy, use an air-driven compressor nebuliser and administer oxygen by nasal cannulae.

Titrate oxygen to target SpO_2 92–96% in children (or according to local policy).

If nebulised salbutamol is needed for a patient receiving supplemental oxygen, the nebuliser can be driven by piped (wall) oxygen or an oxygen cylinder fitted with a high-flow regulator capable of delivering >6 L/min. The patient should be changed back to their original oxygen mask when nebulisation is completed.

The use of nebulisers may increase the risk of viral transmission.[Hui 2009, Biney 2024, Goldstein 2021]

Consideration

If the child is unresponsive, cannot inhale bronchodilators, or is considered to be in peri-arrest, consider adrenaline.

Sources & rationale

Recommendation type: Consensus recommendation

Adrenaline is not used routinely in the management of severe acute asthma.

Its use should be reserved for situations where inhaled salbutamol cannot be given in a patient with respiratory arrest or pre-arrest status, or when anaphylaxis is suspected.

Practice point

Intravenous salbutamol is not recommended.

Practice point

Do not give oral salbutamol.

Practice point

Perform blood gas analysis in patients with life-threatening acute asthma.

Practice point

Monitor for signs of salbutamol toxicity (e.g. worsening tachycardia, metabolic acidosis, hypokalaemia).

Practice point

Consider admitting child to hospital if risk factors for poor response or relapse.

Consider admission if any of the following:

- hypoxia at presentation
- respiratory distress/increased work of breathing unresolved or unable to lie flat without dyspnoea 1–2 hours after presentation
- a history of ICU admission for asthma
- presentation for acute asthma within the past 4 weeks
- frequent presentations for acute asthma (e.g. several over previous year)
- high recent use of $beta_2$ agonists
- child cannot be monitored adequately at home or cannot easily return to hospital if needed
- other risk factors for adverse outcomes.

Practice point

The appropriate maintenance ICS dose at discharge depends on the history and the severity of the acute episode.

For most children with an acute episode requiring an ED visit, ICS should be started at (or increased to) medium doses, with review scheduled for 2–3 months later.

Table

Low and medium/high ICS doses in children 1–5 years

Active ingredient	Total daily dose (microg)	
	Low	Medium/high
Fluticasone propionate	100 (50 twice daily)	200 (100 twice daily)

Additional information

ICS: inhaled corticosteroid

Medium/high doses should be avoided except under specialist supervision

Practice point

Do not give instructions for pre-emptive or regular salbutamol dosing on discharge, but instruct parents to administer salbutamol only as needed. ‘Weaning plans’ are not recommended.

Practice point

Wheezing infants younger than 12 months old should not be treated for acute asthma.

Acute wheezing in this age group is most commonly due to acute viral bronchiolitis.

Follow bronchiolitis guidelines.

Resources

PREDICT's Australasian bronchiolitis guideline (2025)

https://www.predict.org.au/bronchiolitis-guideline/