

Pre-school wheeze – Emergency management in children

Purpose

This document provides clinical guidance for all staff involved in the care and management of children aged one to five years presenting to an Emergency Department (ED) in Queensland with a wheezing illness.

This guideline has been developed by senior ED clinicians and Paediatricians across Queensland, with specialist input from Paediatric Respiratory staff, Queensland Children's Hospital, Brisbane. It has been endorsed for use across Queensland by the Queensland Emergency Care of Children Working Group in partnership with the Queensland Emergency Department Strategic Advisory Panel and the Healthcare Improvement Unit, Clinical Excellence Queensland.

Guidance for wheezing children aged less than one year can be found in the [Bronchiolitis – Emergency management in children Guideline](#). For wheezing children over five years refer to the [Asthma- Emergency management in children Guideline](#).

Key points

- Wheezing in pre-school-aged-children is due to a heterogeneous group of diseases.
- A thorough assessment and continuous review is necessary for each child during their presentation.
- Steroids are not indicated in pre-school children who present for the first time or infrequently with a mild to moderate wheeze.
- Wheezing illnesses can be life-threatening. Seek senior emergency/paediatric advice promptly for a child with severe respiratory distress or who is not responding to therapy.

Introduction

Wheeze is a continuous high-pitched sound with musical quality emitting from the chest during expiration,¹ with increased work of breathing.² Pre-school wheeze is also referred to as reactive airways disease. Wheeze is a very common ED presentation in children that is usually caused by intercurrent viral infection or other environmental triggers. Evidence suggests that up to 30% of children will have at least one episode of wheezing prior to their third birthday,^{3,4} over half will have more than one episode⁵ and 60% will stop wheezing by six years of age.

Pre-school wheeze vs asthma

The pathology and natural progression of wheezing illnesses in pre-school children is variable and not fully understood. The term asthma is not used to describe a wheezing illness in pre-schoolers as there is insufficient evidence that the pathophysiology is similar to that of asthma in older children and adults.¹



The type of wheeze a child experiences can change over time. Pre-schoolers commonly experience wheeze during discrete time periods, often in association with clinical evidence of a viral infection (such as rhinovirus, RSV, coronavirus, human metapneumovirus, parainfluenza virus and adenovirus) with symptoms absent between episodes. Repeated episodes tend to occur seasonally, and it usually declines over time disappearing by six years of age. This is known as an episodic viral wheeze.

Less commonly, a pre-school child can experience a multi-trigger wheeze. In such cases symptoms also occur between acute exacerbations. Viral infection is a common trigger but other triggers include tobacco smoke, allergen exposure, mist, crying, laughter and exercise.

Risk factors for a future diagnosis of asthma include:

- onset of wheeze over the age of 18 months
- personal history of atopy e.g. eczema
- maternal asthma

Several clinical predictive indices for future risk of asthma have been developed based on combinations of the presence of atopic manifestations, indirect evidence of airway inflammation such as peripheral blood eosinophil count, and severity of pre-school wheeze.² The ability of these tools to identify those who will develop asthma is poor (positive predictive value (PPV) ranging from 44 to 54%). However, the absence of known risk factors can be useful to reassure parents of a lower risk of future asthma.

Assessment

The purpose of assessment (history taking and physical examination) is to:

- confirm a wheezing disorder
- identify symptom pattern, severity and possible trigger factors
- look for features suggestive of an alternative diagnosis or associated condition¹

Studies have shown while physicians can accurately identify wheeze, parents may not be able to do so.² Ideally, the presence of a wheeze should be confirmed by a clinician.

History

History should include specific information on:

- the wheeze, other noises and features of respiratory distress
- family history (including mother and sibling/s) of asthma and atopy
- smoking status of household members

All health professionals have a role in advocating for their patients by advising parents about the increased risk of wheezing associated with parental smoking.

Examination

The child should be assessed within the time frame recommended by the triage category. General appearance, mental state and level of respiratory distress are the most important markers of illness severity.⁷

Signs of respiratory distress in pre-school children include accessory muscle use, abdominal breathing, intercostal recession, subcostal recession and tracheal tug.



ALERT – Wheeze may be absent due to severe airway obstruction or extreme fatigue. A “silent chest” (chest with little or no breath sounds) is a warning sign of life-threatening respiratory failure and/or respiratory arrest.



Initial severity assessment: to be completed immediately		
Mild-moderate	Severe	Life-threatening
<ul style="list-style-type: none"> • Can walk or move around • Speak in phrases • SpO2 greater than 90% in room air • Mild respiratory distress 	<ul style="list-style-type: none"> • Unable to complete sentences in one breath due to dyspnoea • SpO2 less than 90% in room air • Significant respiratory distress +/- grunting 	<ul style="list-style-type: none"> • Altered conscious level/exhaustion • Poor respiratory effort/agonal breathing • SpO2 < 90% in room air +/- cyanosis • Soft or absent breath sounds

Secondary severity assessment: to be completed concurrently with initial bronchodilator dose		
Mild-moderate ALL the following:	Severe ANY of the following:	Life-threatening ANY of the following:
Alert	Agitated, restless, distressed	Drowsy or unconscious
Can talk or vocalise	Speech may be limited	Unable to vocalise due to dyspnoea
Can walk or crawl	Lethargic	Collapsed or exhausted
Mild-moderate respiratory distress	Severe respiratory distress	Severe respiratory distress or poor respiratory effort
Normal skin colour	Not applicable [NB2]	Cyanosis
Normal respiratory rate [NB3]	Tachypnoea	Bradypnoea [NB3]
Normal heart rate [NB4]	Tachycardia [NB4]	Cardiac arrhythmia or bradycardia (preterminal sign, may occur just before respiratory arrest)
Wheeze or normal lung sounds	Not applicable [NB2]	'Silent chest' or reduced air entry
SpO2 > 90%	SpO2 > 90%	SpO2 < 90% or clinical cyanosis

NB2: May be the same as mild-moderate and does not determine severity level.

NB3: Normal respiratory rate (breaths/min): younger than one year, 30 to 40; one to two years, 25 to 35; two to five years, 25 to 30.

NB4: Normal heart rate (beats/min): younger than one year, 110 to 160; one to two years, 100 to 150; two to five years, 95 to 140.

Source: Adapted from Therapeutic Guidelines and Asthma Handbook

Oxygenation

Oxygen saturation (SpO2) is effectively measured in using pulse oximetry. Poor gas exchange and decreased saturations may be a result of severe airway obstruction due to bronchoconstriction, airway oedema and/or mucous plugging.⁸

Differential diagnosis

Wheeze is due to narrowing of intrathoracic airways and expiratory flow, irrespective of the underlying mechanism. Less commonly, there are alternative reasons for a child to wheeze. Consider further investigation if assessment (history and examination) identifies as any unusual features which may allude to the differential diagnoses outlined in the following table.



Less common causes of wheeze in children

Respiratory	<ul style="list-style-type: none"> Anatomical abnormalities of the airway. e.g. tracheomalacia, bronchomalacia Chronic suppurative lung disease/bronchiectasis including cystic fibrosis Bronchiolitis obliterans
Other	<ul style="list-style-type: none"> Inhaled foreign body Cardiac failure Gastro-oesophageal reflux

Investigations

Investigations are not routinely recommended for a pre-school wheeze diagnosis.² While viral PCR testing may be useful to reassure the family it is not recommended as will not alter the management.

Investigations for the management of wheeze in pre-school children

Investigation type	Utility
Chest X-Ray	Consider for a child: <ul style="list-style-type: none"> with an atypical history including symptoms present from birth who does not respond to therapy to assess for alternative or additional diagnoses e.g. pneumonia or inhaled foreign body.
Blood tests	Consider for a child: <ul style="list-style-type: none"> with a severe/life-threatening wheeze not responding to therapy unable to stretch bronchodilator doses receiving treatment for contributing causes such as pneumonia. venous blood gas will allow monitoring if venous carbon dioxide, and serum potassium, lactate and glucose as markers of potential Salbutamol toxicity. FBC and CRP may guide management if a concurrent bacterial infection is considered.

Acute management

Refer to Appendix 1 for a summary of the recommended emergency management and medications for a pre-school child with a wheezing illness.

Management comprises of medications targeted at relieving acute bronchospasm, alleviating lower airway inflammation, and providing respiratory support in the form of oxygen and non-invasive ventilation. Steroids are not indicated in pre-school children who present for the first time or infrequently with a mild to moderate wheeze.

Repeated clinical assessment following each treatment is essential to determine the change in clinical symptoms (improvement/no change/deterioration). This should be well documented in the patient clinical notes.



Bronchodilators

Salbutamol (short acting inhaled beta2 agonist) is recommended for all pre-schoolers with wheeze.⁹

Monitor oxygen saturations continuously if administering Salbutamol more often than every two hours. Bronchodilators may produce a paradoxical effect in children with underlying structural abnormalities such as bronchomalacia or tracheomalacia.¹⁰

Inhaled Salbutamol dosing for the treatment of wheeze in pre-school children

Metered dose inhaler (MDI) 100 micrograms (via spacer +/- mask*)	Age 1 to 5 years: 6 puffs
Nebulised	Age 1 to 5 years: 2.5 mg
Salbutamol burst	Administer three doses as above at twenty-minute intervals
Continuous nebulised Salbutamol	Neat Salbutamol nebuliser solution (5 mg/mL), replenish where reservoir empty. Use 5 mg/1 mL nebulisers or 30 mL multi-use bottle.

* Use mask also if unable to form a reliable seal on spacer



ALERT – Cumulative Salbutamol doses can cause agitation, tremor, tachycardia, tachypnoea and rarely, hypertension. Raised lactate, hypokalaemia and raised glucose on VBG are markers of Salbutamol toxicity.

MDI and spacer vs nebuliser

- MDI usually preferred as:
 - faster (nebuliser requires a child to sit still for at least 10 minutes).
 - less facial and oropharyngeal deposition of medication (nebuliser delivers at best 10% of the prescribed drug to the lungs and child may experience side effects of systemic absorption such as tachycardia and tremor)
- Nebuliser is recommended for children who are struggling with their breathing and/or not able to co-ordinate taking a deep breath through the spacer.

How to use a spacer

- Prime spacer before use to negate electrostatic charge (and optimise drug delivery) with 10 Salbutamol puffs.
- Shake MDI before each puff. Administer one puff at a time into the spacer (+/- face mask).
- The child clears the medication from the spacer by taking four breaths following each puff.



Weaning Salbutamol

Stretching the time between Salbutamol doses should be based on an assessment on the child. This should be done in collaboration with the child and caregiver³⁰ and include:

- **respiratory distress:** decreased work of breathing (subcostal & intercostal recession/tracheal tug /nasal flaring)
- **activity level:** decreasing lethargy, increasing alertness
- **respiratory rate:** decreasing to within normal limits for age
- **heart rate:** decreasing to within normal limits for age
- **speech:** able to talk in sentences
- **auscultation:** air entry improved, wheeze reduced or appearance of wheeze in previously quiet chest (note wheeze alone is not an indication for Salbutamol)
- **cough:** reduction or change in cough i.e. becomes looser
- **oxygen saturations:** increasing oxygen saturations and decreasing oxygen requirement

Ipratropium bromide

Not routinely recommended as there is insufficient evidence to support use.¹¹

Consider for children with severe symptoms following Salbutamol MDI or in combination with Salbutamol in nebuliser reservoir.¹²

Ipratropium dosing for the treatment of wheeze in pre-school children

Metered dose inhaler (MDI) 20 micrograms	4 puffs (84 micrograms) via spacer every twenty minutes for three doses
Nebulised	250 micrograms nebulised every twenty minutes for three doses

Steroids

Steroids are recommended for pre-school children with wheeze with:

- frequent episodes
- ongoing bronchodilator use more frequently than every two hours
- severe or life-threatening symptoms
- a requirement for intensive care unit admission

Consider steroids for pre-school children with a history suggestive of an asthma phenotype e.g. atopy and maternal family history of asthma.

While the evidence is still evolving, steroids are not currently recommended for pre-school children who present for the first time or infrequently with mild to moderate wheeze.

Some studies suggest that steroids do **not** reduce symptom severity or the need for hospital treatment in pre-school children with mild to moderate wheeze.⁸ A large randomised, double-blind, placebo-controlled trial found no significant difference in the duration of hospitalisation in children with mild to moderate wheezing associated with viral infection in those given oral steroids compared to placebo.¹³ However, a recent Australian study concluded that Prednisone had a clear benefit at reduced length of stay in children with mild-moderate viral associated wheeze.¹⁴

The systemic steroid of choice is oral Prednisone/Prednisolone.



Studies have shown that Dexamethasone may be a suitable alternative steroid. In a recent paediatric study, a single 0.3 mg/kg dose of Dexamethasone was found to be as effective as a three-day course of Prednisone to Prednisone 0.1 mg/kg for three days.¹⁵ However, Dexamethasone suspension is not readily available in the community or non-tertiary hospitals.

Prednisolone (Oral) dosing for treatment of wheeze in pre-school children	
Day	Dose
Day 1	2 mg/kg (maximum 50 mg)
Day 2 and 3	1 mg/kg Can extend course to five days if still symptomatic after three-day course

Oxygen

Target oxygen saturations (SpO₂) and the use of low and high flow oxygen therapy is highly variable depending upon local practice and resource availability. Follow local policies where available.

There is no evidence to clearly define an optimal oxygen saturation (SpO₂) target and therefore the threshold for administration of supplemental oxygen for young children with respiratory illnesses. Consensus opinion supports a target of SpO₂ of 94% or above. Lower saturations may be tolerated depending upon institutional practice. A study in infants (age less than 12 months) with bronchiolitis showed that a target SpO₂ of more than 90% was as safe and clinically effective as 94%.¹⁶ This study may influence future practice in other respiratory illnesses. A current randomised controlled trial studying high flow oxygen therapy for children with acute hypoxemic respiratory failure uses a cut off of less than or equal to 92% for the commencement of oxygen supplementation.¹⁷

Low flow oxygen should **not** be given to children for work of breathing in isolation, and the practice of “fly-by” oxygen (i.e. leaving a mask adjacent the patient’s face) is discouraged. Desaturations below the local limit for less than five minutes during sleep with rapid self-correction does not mandate increasing or commencing supplemental oxygen. Nursing staff may initiate supplemental oxygen however, a medical review should be requested at the time to ascertain the cause of deterioration. Oxygen should be prescribed on an oxygen order form as per local practice.⁸

Continuous oximetry should be performed in children requiring oxygen.

Low flow oxygen for infants with bronchiolitis by method of delivery	
Nasal prongs	Hudson mask
Maximum flow rate of 2 L/min	Commence at a minimum flow rate of 4 L/min to ensure adequate delivery if oxygen requirement is greater than 2 L/min

Intravenous medications

Magnesium sulphate



Seek senior emergency/paediatric input as per local practice for child requiring magnesium sulphate. Consider contacting paediatric critical care.

Consider in child with severe/life-threatening respiratory distress who is not responding to inhaled bronchodilators.

Magnesium sulphate is thought to act by decreasing the uptake of calcium by bronchial smooth muscle cells, which leads to bronchodilation. In addition, it may have a role in inhibiting mast cell degranulation, which reduces inflammatory mediators.^{18,19} There is no clear evidence to support use for the treatment of pre-school wheeze.¹¹



**ALERT – Prescribe Magnesium in mmols and administer using safety software syringe drivers.**

Administer Magnesium sulphate using safety software syringe drivers with a standard concentration of 0.5 mmol/ml. e.g. a 10 kg child, the Magnesium sulphate dose is 0.2mmol/kg = 2 mmol. This translates to 4ml of 0.5 mmol/ml solution and must be administered through a safety software syringe driver over 10 - 20 minutes to minimise the risk of too rapid administration and dosing errors.

Magnesium sulphate (IV) dosing for the treatment of wheeze in pre-school children

Bolus dose	0.2 mmol/kg (equivalent to 50 mg/kg) infused intravenously over twenty minutes (maximum 10 mmol = equivalent to 2,500 mg) Doses up to 0.4 mmol/kg (maximum of 8 mmol) have been used. Must be administered in syringe driver using safety software.
Side effects	Usually minor, including epigastric or facial warmth and flushing, pain and/or numbness at infusion site and dry mouth. Severe reactions include allergy, hypotension, respiratory depression and circulatory collapse
Monitoring	Full cardiac monitoring with blood pressure every five minutes. Cease infusion if hypotension persists. Monitor knee reflexes if repeating dose to assess for magnesium toxicity which can result in respiratory failure. Cease magnesium if reflexes absent.

Intravenous salbutamol

Contact paediatric critical care specialists (onsite or via RSQ) for children requiring Salbutamol IV

Salbutamol IV is only recommended for children with a very severe acute wheeze.²⁰

Administer an initial bolus dose and monitor closely for signs of Salbutamol toxicity. Slow or cease infusion if significant concerns. Evaluate the clinical response to this initial dose and consider progression to a Salbutamol IV infusion.

Salbutamol (IV) dosing for the treatment of wheeze in pre-school children

Bolus dose	100 microgram/kg infused over twenty minutes (maximum 5 milligrams)
Infusion	1-2 microgram/kg/min (to maximum weight 50 kg)
Side effects	Cumulative doses of Salbutamol can cause agitation, tremor, tachycardia, tachypnoea and rarely, hypertension. Raised lactate, hypokalaemia and raised glucose on VBG are markers of Salbutamol toxicity.
Monitoring	Full cardiac monitoring Monitor venous potassium levels.



Intravenous steroids



Seek senior emergency/paediatric input as per local practice for children requiring steroids IV. Consider seeking paediatric critical care input (onsite or via RSQ).

Consider in a child with severe wheeze who cannot tolerate oral medication or has a decreased conscious level.

Steroid dosing for the treatment of wheeze in pre-school children

Hydrocortisone (IV)	4 mg/kg (maximum 200 mg) then every six hours on day one
OR Methylprednisolone (IV)	1 mg/kg (maximum 60 mg) then every six hours on day one

High flow nasal cannula oxygen (HFNC) therapy and non-invasive ventilation (NIV)



Seek urgent paediatric critical care advice (onsite or via RSQ) for a child requiring HFNC therapy

HFNC therapy may help avoid intubation but can also provide pre-oxygenation whilst preparation for inevitable intubation is underway.

A randomised controlled study assessing the efficacy of HFNC therapy for children with acute hypoxemic respiratory failure including patients with pre-school wheeze is currently being conducted. The findings will improve our understanding of the role of HFNC therapy for pre-school wheeze.¹⁷

HFNC therapy and ongoing bronchodilator therapy

Providing bronchodilator therapy at the same time as HFNC therapy is challenging. A specific circuit (preferred) or a transient decrease to low flow oxygen is required. Where a circuit is not available and the child is too unwell to remove HFNC therapy, a bolus or infusion of salbutamol IV is

Potential concerns (access via QH intranet) have been raised regarding the use of HFNC therapy.

Follow local policies and procedures for nursing ratios and ward location. View [CHQ Nasal High Flow Therapy Guideline](#).

NIV including continuous positive airways pressure (CPAP) or bi-level positive airways pressure (Bi-PAP) can also be considered to help avoid intubation or pre-oxygenate for inevitable intubation e.g. child with a normal level of consciousness who is unable to maintain SpO₂ greater than or equal to 94% despite oxygen via a Hudson mask with reservoir, or has deteriorating work of breathing with increasing fatigue, tachycardia, and tachypnoea.

Medications not routinely recommended

The following medications are not routinely recommended in the acute management of pre-school wheeze:

- hypertonic saline
- oral beta2 agonists (e.g. Salbutamol syrup) due to systemic side effects¹⁸
- inhaled corticosteroids¹
- intermittent montelukast¹⁸



Chronic management

Preventer medication may be considered for children with recurrent episodes of multi-trigger wheeze (MTW). Medication should be prescribed by the child's general practitioner or Paediatrician.

Preventative medications for children with recurrent wheeze episodes (multi-trigger wheeze)

Medication	Management
Inhaled corticosteroids	3-month trial may be considered A RCT of long-term inhaled corticosteroid demonstrated improvement (smaller effect than school-aged-children and adults) in symptoms, exacerbation rates, lung function, and airway hyper-responsiveness. ^{21,22}
Leukotriene antagonists	Daily montelukast may be considered as an alternative to inhaled corticosteroids for toddlers with MTW who are at high risk for asthma. ²³ Parents should be counselled on potential side effects including headaches and mood disturbance/depression.

Escalation and advice outside of ED

Clinicians can contact the services below if escalation of care outside of senior clinicians within the ED is needed, as per local practices. Transfer is recommended if the child requires a higher level of care.



Child is critically unwell or rapidly deteriorating child

Includes the following children (as a guide)

- severe and not responding to treatment
- requiring respiratory support e.g. HFNC or NIV
- requiring Salbutamol IV
- if considering intubation

Less than 1 year	1-4 years	5-11 years
<ul style="list-style-type: none"> • RR >50 • HR <90 or >170 • sBP <65 • SpO2 <93% in oxygen or <85% in air • GCS ≤12 	<ul style="list-style-type: none"> • RR >40 • HR <80 or >160 • sBP <70 • SpO2 <93% in oxygen or <85% in air • GCS ≤12 	<ul style="list-style-type: none"> • RR >40 • HR <70 or >150 • sBP <75 • SpO2 <93% in oxygen or <85% in air • GCS ≤12



Reason for contact	Who to contact
For immediate onsite assistance including airway management	The most senior resources available onsite at the time as per local practices. Options may include: <ul style="list-style-type: none"> • paediatric critical care • critical care • anaesthetics • paediatrics • Senior Medical Officer (or similar)
Paediatric critical care advice and assistance	Onsite or via Retrieval Services Queensland (RSQ). If no onsite paediatric critical care service contact RSQ on 1300 799 127 : <ul style="list-style-type: none"> • for access to paediatric critical care telephone advice • to coordinate the retrieval of a critically unwell child RSQ (access via QH intranet) Notify early of child potentially requiring transfer. Consider early involvement of local paediatric/critical care service. In the event of retrieval, inform your local paediatric service.



Non-critical child

May include children with:

- previous admission requiring critical care
- history of sudden deterioration
- any other significant clinical concern

Reason for contact	Who to contact
Advice (including management, disposition or follow-up)	Follow local practice. Options: <ul style="list-style-type: none"> • onsite/local paediatric service • Queensland Children's Hospital experts via Children's Advice and Transport Coordination Hub (CATCH) on 13 CATCH (13 22 82) (24-hour service) • local and regional paediatric videoconference support via Telehealth Emergency Management Support Unit TEMSU (access via QH intranet) on 1800 11 44 14 (24-hour service)
Referral	First point of call is the onsite/local paediatric service



Inter-hospital transfers

Do I need a critical transfer?	<ul style="list-style-type: none"> • discuss with onsite/local paediatric service • view Queensland Paediatric Transport Triage Tool
Request a non-critical inter-hospital transfer	<ul style="list-style-type: none"> • contact onsite/local paediatric service • contact RSQ on 1300 799 127 for aeromedical transfers • contact Children's Advice and Transport Coordination Hub (CATCH) on 13 CATCH (13 22 82) for transfers to Queensland Children's Hospital
Non-critical transfer forms	<ul style="list-style-type: none"> • QH Inter-hospital transfer request form (access via QH intranet) • aeromedical stepdown (access via QH intranet) • commercial aeromedical transfers: <ul style="list-style-type: none"> ○ Qantas ○ Virgin ○ Jetstar

When to consider discharge from ED

Consider discharge for children who meet ALL of the following:

- well, active child requiring Salbutamol no more frequently than every three hours
- SpO2 greater than or equal to 94%
- normal hydration and toleration of diet and fluids
- parent/caregiver can safely manage the child at home, return in event of deterioration and access further medication.

Consider a longer period observation in SSU or inpatient service for the despite looking well for a child with a history of sudden deterioration or admission to critical care.

An assessment of the family's ability to safely manage the child at home should be done as per the [Pre-school Wheeze Disease Education Checklist \(PDF\)](#) (QH staff only) prior to discharge.

On discharge a child should be provided with:

- Discharge letter
- [Wheeze Action Plan](#) – copies for family, general practitioner, and medical record
- [Pre-school Wheeze factsheet](#) and [Puffers and Spacers factsheet](#)

Follow-up

- with GP or Paediatrician within a week, or earlier depending upon the course of illness

When to consider admission

Facilities without a Short Stay Unit (SSU)

Consider admission for child with:

- severe illness i.e. ongoing respiratory distress and failure to respond to initial burst of bronchodilator or requiring oxygen
- unable to stretch bronchodilators within four hours of ED presentation



Despite meeting the clinical discharge criteria admission may be considered for the following patients:

- previous critical care admission or previous sudden deterioration
- unable to get to a hospital within 30 minutes
- social factors impacting upon ability to monitor and supervise child at home

Facilities with a Short Stay Unit (SSU)

Considering admission to a SSU if:

- symptoms occur within one to two hours of initial treatment with bronchodilator **AND**
- no further investigations are required

Children who require bronchodilator therapy more frequently than one hourly require vigilant monitoring and regular review by medical staff.³⁰ Unless specifically discussed with SSU medical and nursing staff, the child should remain in the acute assessment area of the ED.

During admission to SSU:

- record vital signs and respiratory assessment in line with bronchodilator frequency or hourly if requiring oxygen supplementation³⁰
- Salbutamol frequency can be weaned ("stretched") by appropriately trained nursing or medical staff, depending on local practices

When to consider admission to inpatient ward from SSU

There is little evidence to support specific requirements however, consider admission for the following:

- severe illness i.e. respiratory distress or continued need for frequent bronchodilators (every one to two hours)⁸ at 24 hours post-presentation
- failure to improve after 12 hours of care patient (at which point consider poor bronchodilator responder, suboptimal frequency of administration, or alternate diagnoses)
- requirement for supplemental oxygen

When to consider admission to inpatient ward from SSU

Local practices will dictate criteria for admission from SSU to an inpatient ward. Some general criteria to consider include:

- clinical deterioration with a need to escalate treatment
- failure to progress and wean bronchodilators to every three hours in 12 – 24 hours (consider poor bronchodilator response, suboptimal administration or alternative diagnosis)
- persisting supplemental oxygen requirement

Related documents

Guideline

- [Asthma](#)

Forms and factsheets

- [Pre-school Wheeze Disease Education Checklist \(PDF\)](#) (QH staff only)
- [Wheeze Action Plan](#)
- [Pre-school Wheeze factsheet](#)
- [Puffers and Spacers factsheet](#)



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Guideline approval

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Disclaimer

This guideline is intended as a guide and provided for information purposes only. The information has been prepared using a multidisciplinary approach with reference to the best information and evidence available at the time of preparation. No assurance is given that the information is entirely complete, current, or accurate in every respect. We recommend hospitals follow their usual practice for endorsement locally including presenting it to their local Medicines Advisory Committee (or equivalent) prior to use.

The guideline is not a substitute for clinical judgement, knowledge and expertise, or medical advice. Variation from the guideline, taking into account individual circumstances may be appropriate.

This guideline does not address all elements of standard practice and accepts that individual clinicians are responsible for:

- Providing care within the context of locally available resources, expertise, and scope of practice
- Supporting consumer rights and informed decision making in partnership with healthcare practitioners including the right to decline intervention or ongoing management
- Advising consumers of their choices in an environment that is culturally appropriate and which enables comfortable and confidential discussion. This includes the use of interpreter services where necessary
- Ensuring informed consent is obtained prior to delivering care
- Meeting all legislative requirements and professional standards
- Applying standard precautions, and additional precautions as necessary, when delivering care
- Documenting all care in accordance with mandatory and local requirements

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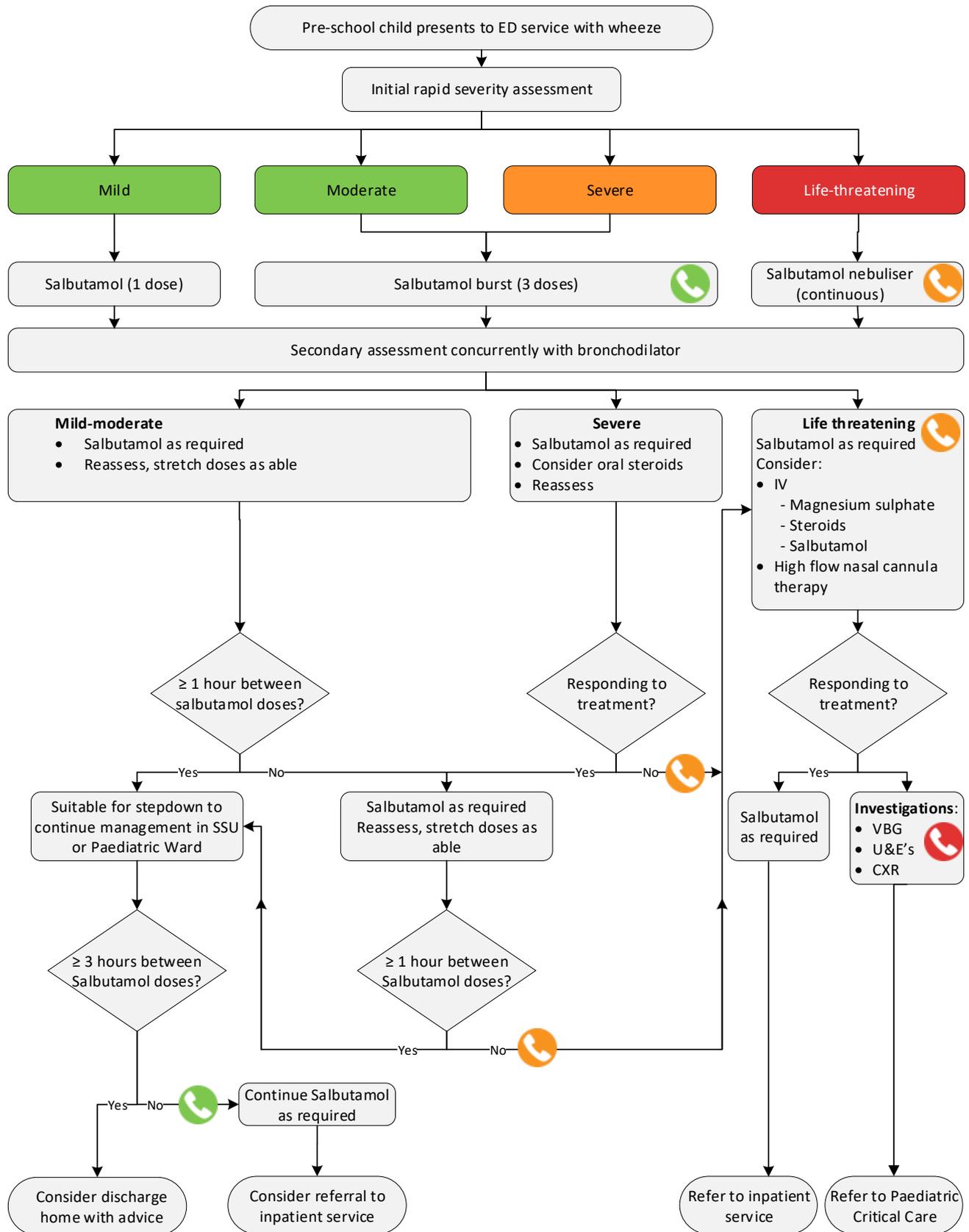


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Consider seeking senior emergency/paediatric advice as per local practices

Seek senior emergency/paediatric advice as per local practices. Consider contacting paediatric critical care

Call Retrieval Services Queensland (RSQ) on 1300 799 127 if no paediatric critical care facility onsite

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Pre-school wheeze – Emergency management in children – Medications

Inhaled Salbutamol dosing for the treatment of wheeze in pre-school children

Metered dose inhaler (MDI) 100 micrograms	Age 1 to 5 years: 6 puffs
Nebulised	Age 1 to 5 years: 2.5 mg
Salbutamol burst	Administer three doses as above at twenty-minute intervals
Continuous nebulised Salbutamol	Neat Salbutamol nebuliser solution (5 mg/mL), replenish where reservoir empty. Use 5 mg/1 mL nebulisers or 30 mL multi-use bottle.

*Always use with a spacer. Also use a mask if unable to form a reliable seal around the spacer.



ALERT – Cumulative Salbutamol doses can cause agitation, tremor, tachycardia, tachypnoea and rarely, hypertension. Raised lactate, hypokalaemia and raised glucose on VBG are markers of Salbutamol toxicity.

Magnesium sulphate (IV) dosing for the treatment of wheeze in pre-school children

Bolus dose	0.2 mmol/kg (equivalent to 50 mg/kg) infused intravenously over twenty minutes (maximum 10 mmol = equivalent to 2,500 mg) Doses up to 0.4 mmol/kg (maximum of 8 mmol) have been used. Must be administered in syringe driver using safety software.
Side effects	Usually minor, including epigastric or facial warmth and flushing, pain and/or numbness at infusion site and dry mouth. Severe reactions include allergy, hypotension, respiratory depression and circulatory collapse.
Monitoring	Full cardiac monitoring with blood pressure every five minutes. Cease infusion if hypotension persists. Monitor knee reflexes if repeating dose to assess for magnesium toxicity which can result in respiratory failure. Cease magnesium if reflexes absent.

Steroid dosing for the treatment of wheeze in pre-school children

Prednisolone (Oral)	Day 1: 2 mg/kg (maximum 50 mg) Day 2 and 3: 1 mg/kg Can extend course to five days if still symptomatic after three-day course
Hydrocortisone (IV)	4 mg/kg (maximum 200 mg) then every six hours on day one
OR Methylprednisolone (IV)	1 mg/kg (maximum 60 mg) then every six hours on day one

Salbutamol (IV) dosing for the treatment of wheeze in pre-school children

Bolus dose	100 microgram/kg infused over twenty minutes (maximum 5 milligrams)
Infusion	1-2 microgram/kg/min (to maximum weight 50 kg)
Monitoring	Full cardiac monitoring Monitor venous potassium levels.

