NHS
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Clinical Commissioning Group

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Referral Support Service

Paediatrics

PA0 Pre-school Wheeze in Children Aged 1-5 years

Paediatric Normal Values (adapted from APLS)			
Age	Resp Rate	Heart Rate	Systolic BP
Neonate <4w	40-60	120-160	>60
Infant <1 y	30-40	110-160	70-90
Toddler 1-2 yrs	25-35	100-150	75-95
2-5 yrs	25-30	95-140	85-100

Definition

Presence of wheezing in pre-school children aged 1-5 years.
Acute wheeze in pre-school children is predominantly cause by viral respiratory infections, including rhinovirus and respiratory syncytial virus (RSV).

Exclude Red Flag Symptoms

- SpO_2 <92%, cyanosis
- Bradycardia <100 bpm
- Apnoea
- Marked sternal recession
- Persistent or worsening shortness of breath
- Too breathless to feed or speak
- Poor air entry
- Agitation, confusion

Low Threshold for Acute Referral

- Extreme low birth weight
- Prolonged NICU/SCBU
- Congenital heart disease
- Significant co-morbidity
- Reduced feeding <50%
- Previous severe episode
- Attack in late afternoon, at night or early in the morning
- Psychosocial stressors
- Recent hospital admission
- Already taking steroids
- Food allergy

General Points

- Lower respiratory tract illnesses with wheeze occur in around a third of all pre-school children aged 1-5 years
- Acute wheeze is one of the most common reasons for emergency department attendance and hospital admission in children
- Management strategies are extrapolated from school-aged children with asthma

- In contrast with school-aged children presenting with wheeze, most pre-school children are non-atopic (75%)
- A small subgroup with pre-school wheeze with sensitization to aero-allergens may response to maintenance inhaled steroids to prevent attacks.

Assessment

Symptoms

- Wheeze
- Cough
- Breathlessness
- Chest Tightness

Useful Questions

- Does your child have noisy breathing?
- Does the noise sound like a high-pitched whistle? (likely wheeze)
- Do they have noisy breathing or breathlessness only with colds (likely viral induced wheeze)
- Does the noise sound like a snore or rattle in the chest? (likely upper airways noise and not wheeze)
- Is there associated difficulty in breathing and/or cough? (likely wheeze)
- Do they cough, choke or gag when eating or drinking (consider aspiration)
- If they cough, does it sound chesty? (consider undiagnosed cystic fibrosis)

Most children with viral induced wheeze will stop wheezing as they get older, and not go on to develop asthma

Use code ‘suspected asthma’, asthma diagnosis should be confirmed when the child can undergo objective testing

Risk Factors for Persistent Asthma

- Earlier the onset of wheeze, the better the prognosis
- Frequent or severe episodes
- Atopy, e.g. eczema or rhinitis
- Family history of atopy, the strongest association is with maternal atopy
- Exposure to smoking
- Interval symptoms, or non-infective triggers for wheeze

Clinical Decision Aid

Yes	Does child have interval symptoms when they do not have viral infections?	No
Yes	Are the exacerbations severe and /or frequency	No
Yes	Are any of the following present	No

	• Atopy (personal or first-degree relative) • Eosinophilic inflammation (serum, FeNO) • Sensitisation (IgE, RAST, skin prick test)	
More like preschool asthma		More like preschool episodic wheeze

Differential Diagnoses

It is important to differentiate between viral induced wheeze, other causes of wheeze and asthma.

- **Pneumonia**: pyrexia >38.5°C, productive cough, asymmetry on auscultation
- **Croup**: inspiratory stridor, barking cough
- **Foreign body**: localized wheeze and reduced air entry
- **Epiglottitis**: dysphagia, drooling
- **Undiagnosed cystic fibrosis**
- **GORD**: vomiting, history of reflux as an infant
- **Anaphylaxis**

Features suggesting alternative diagnosis

- Symptoms present since birth
- Persistent wet or productive cough
- Failure to thrive
- Excessive vomiting

Acute Management

	Acute Asthma: Traffic light system for children		
	Green – Moderate	**Amber – Severe**	**Red – Life Threatening**
Activity	• Responds normally to social cues • Content/smiles • Stays awake/awakens quickly • Strong normal cry	• Altered response to social cues • No smile • Reduced activity • Parental anxiety	• Not responding normally or no response to social cues • Unable to rouse or if roused does not stay awake • Weak, high pitched or continuous cry • Appears ill

Skin	• Normal skin colour	• Normal skin colour • Pallor reported by parent/carer • Cool peripheries	• Pale, mottled, ashen • Cold extremities • CRT >3 secs
Respiratory	• No respiratory distress	• Tachypnoea •	• Significant respiratory distress • Grunting • Apnoeas • Poor respiratory effort • Exhaustion
Respiratory rate	• <12m: <50 breaths/min • >12m: <40 breaths/min	• <12m: 50-60 breaths/min • >12m: 40-60 breaths/min	• All ages:>60 breaths/min
O_2 Sats in air	• ≥ 95%	• 92-94%	• ≤ 92%
Chest recessions	• None	• Moderate	• Severe
Nasal flaring	• Absent	• May be present	• Present
Verbal	•	• Too breathless to talk or feed	• Not able to talk
Auscultation	• Good air entry • Mild-moderate wheeze	• Decreased air entry with marked wheeze	• Silent chest
O_2 Sats in air	• ≥ 95%	• 92-94%	• ≤ 92
Hydration	• CRT <2 secs • Tolerating 75% of fluid • Moist mucous membranes • Occasional cough induced vomiting	• 50-75% fluid intake over 3-4 feeds • Cough induced vomiting • Reduced urine output	• < 50% fluid intake over 2-3 feeds • Significantly reduced urine output
Circulation	• 2-5y: ≤ 140 bpm •	• 2-5y: >140 bpm •	• Hypotension
	Moderate	**Severe / Life Threatening**	

• Give 2-10 puffs of salbutamol via spacer ± facemask (given 1 puff at a time, inhaled separately) • Reassess 15-30 minutes post intervention •	• Immediate assessment by a doctor • Refer to hospital ED resus urgently via ambulance (999) • High flow oxygen via face mask to achieve SpO_2 >94% • Give 10 puffs of salbutamol via face mask or via O_2-driver nebuliser • If poor response add nebulised ipratropium bromide • Continue with further doses of bronchodilator while awaiting transfer

Good Response	Poor Response
• Check inhaler technique • Continue salbutamol 2-4 puffs, 4 hourly for 24 hours, then PRN • Arrange follow-up in 2-4 weeks with practice nurse	• Consider hospital admissions/999 • If clinical concern discuss with paediatrician on-call • If SpO_2 <94% give O_2 • Consider further dose of salbutamol while awaiting transfer • If poor response add nebulised ipratropium bromide

Acute Management

Acute Asthma Drug Doses	
Salbutamol (nebs)	<5y: 2.5mg
Ipratropium Bromide (nebs)	All ages: 250 micrograms

Inhalation Device

- For children <5y: pMDI + spacer with a mask is the first choice inhalation device
- Patients should be given adequate training in the use of the inhalation device
- Clean spacers once a month with mild detergent and allow to air dry. Replace every 6-12months.

Bronchodilators

- In the absence of severe and life-threatening features, SABA should be initiated using a metered dose inhaler (MDI) and spacer (with mask)

- Nebulised SABA and ipratropium bromide with oxygen should be initiated in children with hypoxia

Prednisolone

- Most acute attacks of wheezing in pre-school children are in non-allergic children, and are primarily driven by respiratory infections, therefore, these children are very unlikely to have elevated lower airway eosinophils which would response to corticosteroids during acute episodes
- Oral corticosteroids are often overused, and should only be considered if this has been recommended by secondary care.

Inhaled Indicators for Nebulised Bronchodilators

- SpO_2 <94%
- Unable to use inhaler and spacer
- Severe respiratory distress

Chronic Management

Intermittent Reliever Therapy

- Children should be prescribed a short-acting bronchodilator to relieve symptoms
- For many children, occasional use of reliever is all that's required

Short acting beta$_2$ agonists (SABAs)

Salbutamol

- Child, by aerosol inhalation: 100–200 micrograms (1–2 puffs); for persistent symptoms up to 4 times daily

Regular Preventer Therapy

Inhaled Corticosteroids

If there is a history of atopy or they present with severe symptoms then consider a trial of maintenance therapy. However, this is not always effective .

Beclometasone Dipropionate

Clenil Modulite: aerosol inhalation
50 mcg/dose and 100 mcg/dose; are licensed for use in children

Step 1: Trial ICS with beclomethasone dipropionate equivalent 200 micrograms twice daily for 6- 12 weeks then review. Ensure advice has been provided on correct technique and appropriate spacer device given.

Step 2: Stop ICS. If symptoms have not improved, check adherence and recheck technique and device. If symptoms have improved, wait and see if they return after stopping ICS

Step 2: If symptoms has improved on ICS and return, restart ICS at lowest effective dose

Leukotriene receptor antagonists (LTRAs)

Montelukast:
Consider if exercise induced asthma is a specific problem in a patient otherwise well controlled. Trial treatment for 4 weeks, if no benefit then discontinue. Risk of GI upset, and more rarely problems with sleep and behaviour

- 6m-5y: 4mg once daily in the evening, as a chewable tablet or granules

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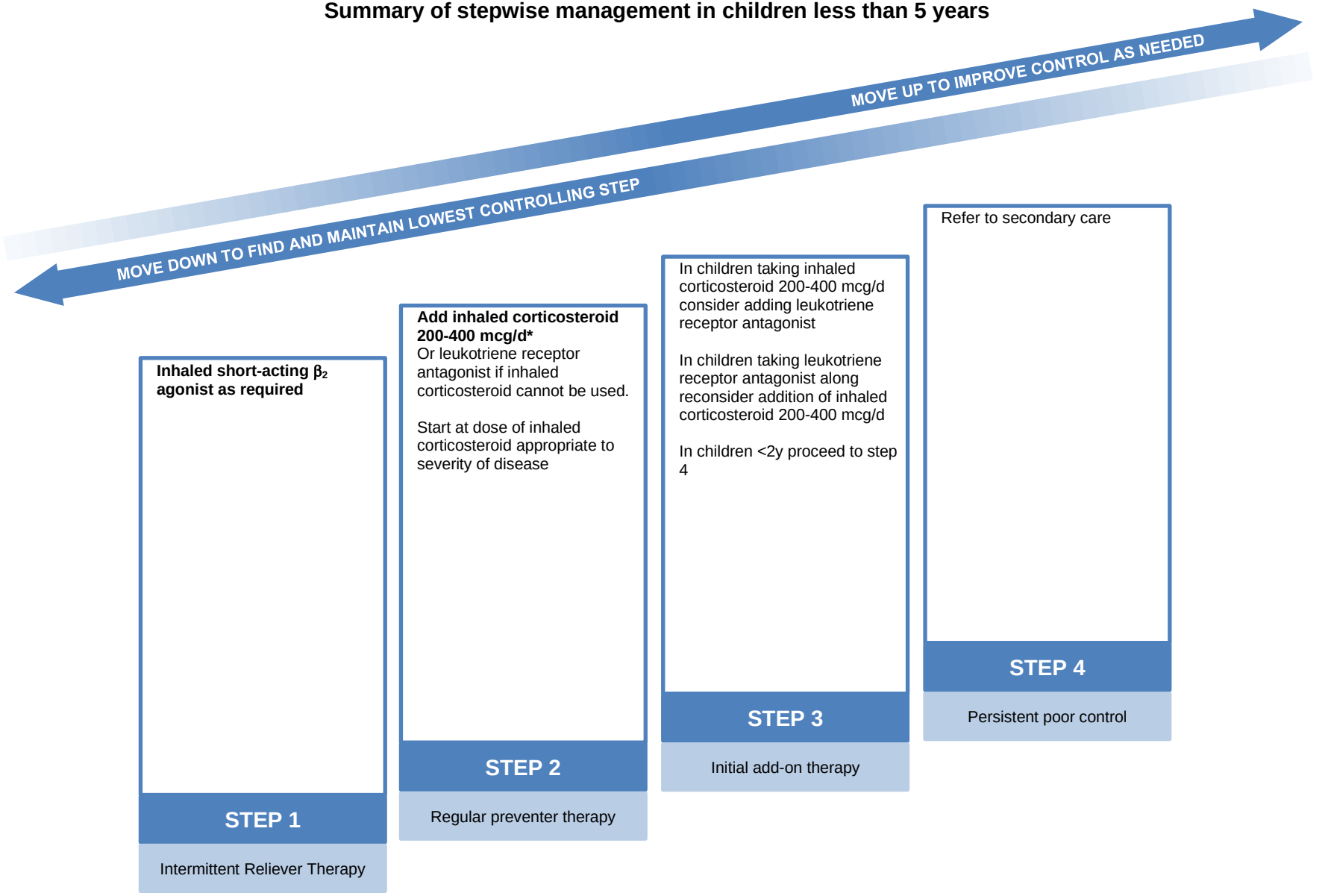
Summary of stepwise management in children less than 5 years



*BDP or equivalent

SYMPTONS VS TREATMENT

Indications for Referral

- Two or more courses of systemic corticosteroids in the previous 12 months (NOTE: oral corticosteroid in this age group should not be standard practice)
- Control not achieved on Step 4
- Children under 2y
- Diagnosis unclear

Information to include in referral letter

- Exacerbation history: number of exacerbations in past 12 months
- Any courses of oral steroids in past 12 months
- History of atopy: include any known triggers
- Current medication

Patient information leaflets/ PDAs

https://www.asthma.org.uk/advice/inhaler-videos/facemask-child/

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