Worcestershire Acute Hospitals NHS Trust

MANAGEMENT OF ACUTE ASTHMA/WHEEZE IN CHILDREN >2 YEARS

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Key Documents Owner:	Dr Onyon /Dr Watson	Consultant Paediatrician
Approved by:	Paediatric Quality Improvement meeting	
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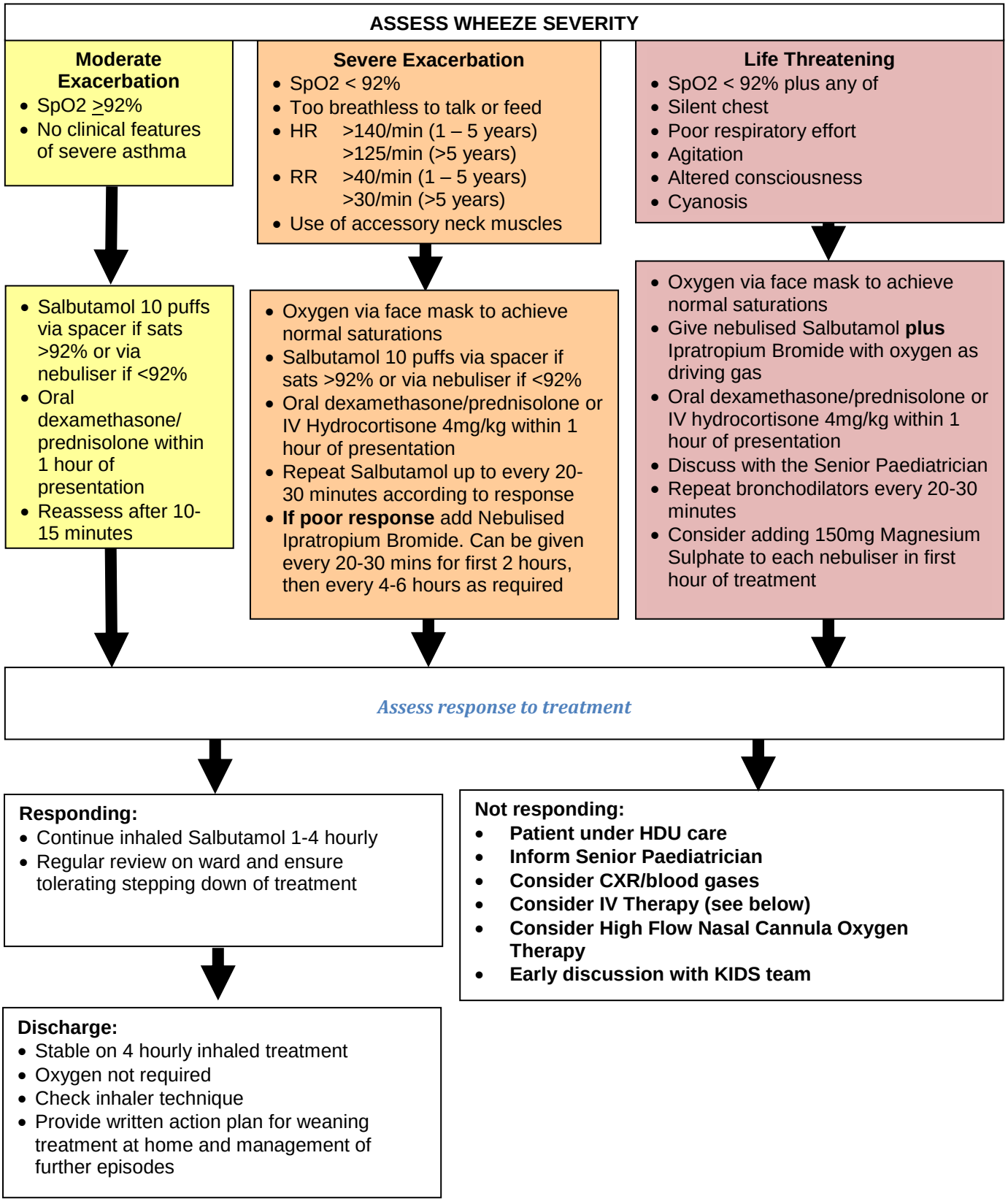
Date of review: This is the most current document and should be used until a revised version is in place	9th February 2027	

Key Amendments

Date	Amendment	Approved by
19th Nov 2020	Document extended for 1 year	Dr J West/Paediatric QIM
26th March 2021	Document approved with no amendments	Paediatric Guideline Review Day Meeting
9th Feb 2024	Dexamethasone and changes to weaning plans Document replaces Asthma pathway documents	Paediatric Guideline Review Day Meeting



*If child < 5 years without diagnosis of asthma, consider oral steroids only if child has interval symptoms strong history or family history of atopy, or if severe exacerbation

CHOICE OF STEROID

A single dose of Dexamethasone has been shown to be non-inferior to a 3 day course of Prednisolone in the management of wheeze[1]. Due to its better tolerability, particularly in younger children, this can be given as first line treatment to most patients.

Dexamethasone dose: 300micrograms/kg single dose (maximum dose 16mg)

Children under the care of the respiratory team with difficult to treat asthma may require more prolonged courses of steroid and should be given prednisolone. This can be discussed with Paediatric on-call or a member of the paediatric respiratory team, but priority should be given to early administration of systemic steroids (within 1 hour of arrival).

Prednisolone dose:

- **1mg/kg orally, round up to nearest 5mg**

Maximum doses for age:

- **<2 years: 10mg**
- **2-5 years: 20mg**
- **>5 years: 30mg**
- **>12 years: 40mg**

IV THERAPY IN LIFE THREATENING ASTHMA

There is no formal first/second IV line therapy, and this can be decided by the clinician taking into account ease of administration, evidence of salbutamol toxicity and the current clinical picture.

Magnesium Sulphate

- 40mg/kg infused over 20 minutes

Salbutamol

- 15 microgram/kg bolus administered over 5 minutes (max per dose 250micrograms)
- IV infusion to start at 1microgram/kg/minute (can use 0.5-2microgram/kg/min)
- Monitor for toxicity if salbutamol dose higher than 20micrograms/min
- Doses higher than 2microgram/kg/min should only be used in PICU setting

Aminophylline

- 5 mg/kg loading dose over 20 minutes (omit in those receiving oral Theophyllines)
- IV infusion 1mg/kg/hour

DISCHARGE

Patients can be safely discharged when stable salbutamol inhalers at least 4 hours apart. An Asthma/Wheeze Discharge Checklist should be filled out by ward staff and all patients/carers should receive a Personal Asthma/Wheeze Action Plan on discharge. Parents should be educated on signs of respiratory distress and how/when to administer inhalers at home.

FOLLOW UP

All patients admitted with wheeze should be advised to make an appointment with their GP within 2 working days of discharge.

Patients with recurrent admissions (3 or more), or difficulties around education can be referred to respiratory nurse-led clinic.

Patients with a diagnosis of asthma, or those on regular preventer medications should have follow up within 4 weeks from discharge by a member of the paediatric respiratory team.

Those who have required HDU/PICU care should also be referred to Respiratory Consultant Clinic (Dr Onyon/Dr Watson).

CHILDREN UNDER 2 YEARS

If known to be responsive to bronchodilators, can use pathway for >2 years

If first episode, give 10 puffs salbutamol via spacer, or nebuliser if sats <92%. Reassess after 20 minutes, paying attention to changes in wheeze, respiratory rate, and oxygen saturations. If felt to be responsive, can use pathway for >2 years.

If not responsive to bronchodilators, consider alternative diagnosis and treat accordingly.
The differential diagnosis includes aspiration pneumonitis, pneumonia, bronchiolitis, tracheomalacia, and complications of underlying conditions such as congenital anomalies and Cystic Fibrosis.

Steroid Therapy

Consider steroids in infants early in the management of moderate to severe episodes of acute asthma in the hospital setting, see earlier guidance on choice of steroid.

Ipratropium Bromide

The addition of Ipratropium Bromide to Salbutamol for acute severe asthma may lead to some improvement in clinical symptoms and reduce the need for more intensive treatment. Repeated doses of Ipratropium Bromide should be given early to treat children poorly responsive to 2 agonist as frequently as every 30 minutes for the first 2 hours.

WHEN TO REFER TO SECONDARY CARE

- Inadequate symptom control at Step 3 move to Step 4 asthma treatment and refer
- 3 or more admissions with acute exacerbations
- 3 or more exacerbations requiring steroids in 12 months
- 3 or more presentations at Accident and Emergency with asthma

INDICATIONS FOR SPECIALIST REFERRAL IN CHILDREN WITH ASTHMA

- Diagnosis unclear or in doubt
- Symptoms present from birth or perinatal lung problem
- Excessive vomiting or posseting
- Severe upper respiratory tract infection
- Persistent wet or productive cough
- Family history of unusual chest disease
- Failure to thrive
- Nasal polyps
- Unexpected clinical findings eg focal signs, abnormal voice or cry, dysphagia,

- inspiratory stridor
- Failure to respond to conventional treatment (particularly inhaled corticosteroids above 400 mcg/day or frequent use of steroid tablets)
- Parental anxiety or need for reassurance

CLINICAL FEATURES THAT INCREASE THE PROBABILITY OF ASTHMA

More than one of the following symptoms: wheeze, cough, difficulty breathing, chest tightness, particularly if these symptoms:

· are frequent and recurrent

· are worse at night and in the early morning

· occur in response to, or are worse after, exercise or other triggers, such as exposure to pets, cold or damp air, or with emotions or laughter

· occur apart from colds

· Personal history of atopic disorder

· Family history of atopic disorder and/or asthma

· Widespread wheeze heard on auscultation

· History of improvement in symptoms or lung function in response to adequate therapy

CLINICAL FEATURES THAT LOWER THE PROBABILITY OF ASTHMA

· Symptoms with colds only, with no interval symptoms

· Isolated cough in the absence of wheeze or difficulty breathing

· History of moist cough

· Prominent dizziness, light-headedness, peripheral tingling

· Repeatedly normal physical examination of chest when symptomatic

· Normal peak expiratory flow (PEF) or spirometry when symptomatic

· No response to a trial of asthma therapy

· Clinical features pointing to alternative diagnosis

OTHER DIAGNOSES

Clinical clue	Possible diagnosis
PERINATAL AND FAMILY HISTORY	
Symptoms present from birth	Chronic lung disease of prematurity, PCD, CF
Family history of unusual chest disease	CF, Neuromuscular disorders, PCD
Severe upper respiratory tract disease	PCD
SYMPTOMS AND SIGNS	
Persistent moist cough	PBB, Bronchiectasis, Recurrent aspiration, PCD, CF
Excessive vomiting	GERD (w/without aspiration)
Dysphagia	Swallowing problems (w/without aspiration)
Breathlessness with light headedness and peripheral tingling	Dysfunctional breathing, Panic attacks
Inspiratory stridor	Tracheal or laryngeal disorder
Abnormal voice or cry	Laryngeal problems
Focal signs in chest	Developmental anomaly, FB, Post-infective syndrome
Persistent wheeze	Extrinsic intra thoracic airway compression, Airway-malacia, Luminal obstruction, CF, FB
Finger clubbing	CF, Bronchiectasis
Failure to thrive	CF, GERD

CF, cystic fibrosis; FB, foreign body; GERD, gastro-esophageal reflux disease; PBB, protracted bacterial bronchitis; PCD, primary ciliary dyskinesia.

(Ullman *et al* 2018)

FURTHER INVESTIGATIONS IF REQUIRED

- Peak flow
- Spirometry over 5
- Allergy testing - Positive skin tests, blood eosinophilia ≥4%, or a raised specific IgE to cat, dog or mite, increase the probability of asthma in a child with wheeze, particularly in children over five years of age. It is important to recognise that non-atopic wheezing is as frequent as atopic wheezing in school-age children.
- Symptom diaries
- Chest x-ray

NON-PHARMACOLOGICAL TREATMENT

- House dust mite avoidance
- Avoidance of tobacco smoke and other air pollutants
- Education
- Weight reduction

REFERENCES

1. British National Formulary for Children (BNFC) Available at https://bnfc.nice.org.uk/ Accessed February 2024

2. Ullmann, N., Mirra, V., Di Marco, A., Pavone, M., Porcaro, F., Negro, V., Onofri, A. and Cutrera, R., 2018. Asthma: differential diagnosis and comorbidities. *Frontiers in pediatrics*, *6*, p.276.

3. Wei at al. Oral Dexamethasone vs. Oral Prednisone for Children With Acute Asthma Exacerbations: A Systematic Review and Meta-Analysis. Frontiers in Pediatrics. 2019 Dec 13;7:503. doi: 10.3389/fped.2019.00503.