Birmingham Children's Hospital NHS
NHS Foundation Trust

Paediatric Clinical Assessment Tools For

Acute Asthma

CPADS - 51884/16

Purpose of this Guideline

This Guideline is intended to act as a quick reference guide to some of the most common medical conditions for unscheduled healthcare attendances in children and young people (ages 0-16), which are: respiratory tract infections (croup/ bronchiolitis), asthma, fever, gastroenteritis and abdominal pain. It is aimed to assist primary care professionals when treating children and guide appropriate escalation. Parent / Carer information leaflets are included.

Clinicians are expected to take this guideline fully into account when exercising their clinical judgement. The guidance does not, however, override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient or carer.

When you feel a GP review in a specific time period is clinically appropriate, but falls outside of the 'in hours' GP service, please advise your patient/family to call NHS 111 (at an agreed time interval/ level of deterioration depending on your concerns) and advise that there is a 'predetermined plan to speak with an Out of Hours GP'.

Please provide your patient/family with a letter detailing your clinical findings and concerns to help the Out of Hours GP. The patient should also be given the appropriate Parent / Carer information leaflets.

The clinical assessment tools were arrived at after careful consideration of the evidence available including, but not exclusively SIGN, NICE Guidelines, Birmingham Children's Hospital guidelines, existing Birmingham Children's Hospital Information Leaflets, EBM date and NHS Evidence.

With thanks to the team at Gloucestershire CCG who produced the original Big 6 Pathways, on which this guideline is based.

Normal Values

Normal values at different ages (APLS, Edition 5)

Age of child (years)	Under 1	1–2	2–5	5–12	Over 12
Respiratory rate	30–40	25–35	25–30	20–25	15–20
Heart rate	110–160	100–150	95–140	80–120	60–100
Systolic blood pressure	80–90	85–95	85–100	90–110	100–120

Calculations for commonly used emergency drugs (APLS, Edition 5)

	Formula	Maximum dose
Weight (kg)	**Child 0–12 months** Weight = (0.5 × age in months) + 4	
	Child 1–5 years Weight = (2 × age in years) + 8	
	Child 6–12 years Weight = (3 × age in years) + 7	
Energy (J)	4 J/kg	150–200 J biphasic for first shock 150–360 J biphasic for subsequent shocks
Tube size	**Pre-term babies** 2.5 mm tube **Babies** usually 3 or 3.5 mm tube **Children >1 year** Tube size = (age in years/4) + 4	
Fluid Bolus (IV or IO)	20 mL/kg of 0.9% saline **Exceptions:** Trauma/DKA/cardiac problems use 10 mL/kg of 0.9% saline	500 mL of 0.9% saline in trauma/ DKA/cardiac problems 1000 mL of 0.9% saline
Lorazepam	100 micrograms/kg (IV or IO)	Max single dose 4 mg
Adrenaline (IV or IO)	10 micrograms/kg (0.1 mL/kg of 1:10,000 strength)	Max single dose 1 mg
Glucose 10% (IV or IO)	2–5 mL/kg of 10% dextrose	150–160 mL of 10% dextrose single bolus

UK immunisation schedule

Age of child (months)	Rota virus (oral vaccine)	Diphtheria and tetanus	Pertussus	Polio	Hib	PCV	MenC	MMR	HPV	No. of injections
2 months	✓	✓	✓	✓	✓	✓				2
3 months	✓	✓	✓	✓	✓		✓			2
4 months		✓	✓	✓	✓	✓	✓			3
12 months					✓		✓			1

Neonatal Fluid Requirments

Age	Total volume of fluid required per day (mL/kg)
Day 1	60
Day 2	90
Day 3	120
Day 4 to 28	150

Clinical Assessment Tool

Acute Asthma in child 2-16 years

Child presenting with suspected acute exacerbation of asthma - assess for signs of severity

Green features and no amber or red

Moderate Exacerbation

- Give 2-10 puffs of ß agonist via a spacer (with a face-mask in younger children)
- Ensure good technique
- Increase ß agonist dose by 2 puffs every 2 minutes upto 10 puffs according to response.
- Consider oral prednisolone 1-2mg/kg (max 40mg)

Assess response

Good response

Good Response:

- Advise patients to continue using ß agonist via spacer as needed- but not exceeding 4 hourly.
- Give asthma information leaflet
- Give prednisolone for 3 days
- Arrange GP asthma clinic follow up within 48hours.

Deterioration? → Amber features and no red

Amber features and no red

Severe Exacerbation

- Give oxygen via a face-mask/nasal prongs to achieve $Sp0_2$ 94-98%
- Give ß agonist 10 puffs via spacer± facemask or 2.5mg nebulised salbutamol
- Give appropriate dose of oral Prednisolone (1-2mg/kg - max 40mg)

If symptoms are not controlled:

- repeat ß agonist via oxygen driven nebuliser.
- Refer to hospital - ambulance +/- 999
- Discus with paediatric registrar via BCH switchboard **(0121 333 9999)**
- Stay with child until ambulance arrives.

Any red features

Life Threatening

- Give oxygen via a facemask to achieve $Sp0_2$ 94-98%
- Call 999 for an emergency ambulance
- Give Nebulised ß agonist (2.5mg Salbutamol) and Ipratropium: (under 12yrs: 250micrograms, 12-18yrs: 500micrograms) via oxygen driven nebuliser
- Give oral Prednisolone (1-2mg/kg - max 40mg)
- Repeat back to back ß agonists while waiting for ambulance to arrive
- Continually assess the child after each intervention
- Ensure continuous oxygen delivery
- Stay with child until ambulance arrives.

Lower threshold for admission if:

- Attack in late afternoon or at night
- Recent hospital admission or previous severe attack
- Concern over social circumstances or ability to cope at home.

Acute Asthma Table 1: Traffic light system for identifying severity of illness

	Green - low risk	Amber - intermediate risk	Red - High Risk
Behaviour	Normal	Anxious / Agitated	Exhaustion / Confusion
Talking	In sentences / normal	Not able to complete a sentence in one breath	Not able
Respiratory	2-5 years: less than 40 breaths/min 5-12 years: less than 30 breaths /min 12-16 years: less than 25 breaths/min	2-5 years: more than 40 breaths/min Over 5 years: more than 30 breaths/min	As Amber plus: Low respiratory rate Silent chest
Heart Rate	Within normal range*	2-5 years: more than 140 beats/min Over 5 years: more than 125 beats/min (>5 years) *Consider influence of fever &/or Salbutamol	As Amber plus: Hypotension
Sa02	More than 92% in air	Less than 92% in air	As Amber plus: Cyanosis
PEFR	More than 50% of predicted (Refer to Acute Asthma table 2)	33-50% of predicted (Refer to Acute Asthma table 2)	less than 33% of predicted (Refer to Acute Asthma table 2)

*Refer to page 1 for normal values

Outpatient Referral Criteria for Birmingham Children's Hospital

General Paediatrics

- Patients on Step 3 of BTS asthma management guidelines
- Any HDU admissions for asthma
- Repeated ED attendances with asthma/wheeze
- More than 3 admissions in the preceding 12 months
- Poorly controlled asthma including frequent use of bronchodilators and/or oral steroids

Respiratory Medicine

- Uncontrolled asthma at BTS step 3 and above
- Persistent airflow obstruction (FEV1 <70% predicted) despite above therapy
- Recurrent severe exacerbation- one PICU or 2 HDU admissions requiring iv aminophylline/salbutamol
- Alternate day oral Prednisolone
- More than 6 admissions in 12 months
- Where diagnosis of asthma is under question or additional diagnosis (e.g. bronchiectasis) is under consideration or **warning signs** present

Warning signs:

- Symptoms present since birth
- Failure to thrive
- Persisting *wet* cough
- Presence of stridor and wheeze
- Clinical signs of chronic chest e.g. clubbing
- Associated symptoms of choking with feeds/solids in otherwise healthy child

Acute Asthma Table 2 -
Predicted Peak Flow: for use with EU / EN13826 scale PEF metres only

Height (m)	Height (ft)	Predicted PEFR (L/min)	Height (m)	Height (ft)	Predicted PEFR (L/min)
0.85	2'9"	87	1.30	4'3"	212
0.90	2'11"	95	1.35	4'5"	233
0.95	3'1"	104	1.40	4'7"	254
1.00	3'3"	115	1.45	4'9"	276
1.05	3'5"	127	1.50	4'11"	299
1.10	3'7"	141	1.55	5'1"	323
1.15	3'9"	157	1.60	5'3"	346
1.20	3'11"	174	1.65	5'5"	370
1.25	4'1"	192	1.70	5'7"	393

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Information for Parents / Carers:

Caring for your child with Asthma / Wheeze

What is asthma?

If you have asthma, the bronchi (the airways in the lungs) will be inflammed and more sensitive than normal. Asthma can start at any age, but it most commonly starts in childhood. At least 1 in 10 children, and 1 in 20 adults have asthma. In an asthma/ wheeze attack the muscle of the air passages in the lungs go into spasm and the lining of the airways swell. As a result, the airways become narrower and breathing becomes difficult.

What causes asthma in children?

In young pre- school children, wheezing is usually brought on by a viral infection- causing a cold, ear or throat infection. Some people call this 'viral-induced wheeze' or "wheezy bronchitis'. Most children will grow out of it, as they get to school age. Children who have ongoing/recurrent symptoms may be given the diagnosis of asthma.

In older children, viruses are still the commonest cause of wheezing. But other specific triggers may also cause an asthma attack such as:

- An allergy e.g. animals
- Pollens and mould particularly in hay-fever season
- Cigarette smoke
- Extremes of temperature
- Stress
- Exercise (However, sport and exercise are good for you if you have asthma. If necessary, an inhaler can be used before exercise to prevent symptoms from developing)

Your child may be having an asthma attack if any of the following happens:

- Their reliever (blue inhaler) isn't helping or lasting over four hours.
- Their symptoms are getting worse (cough, breathlessness, wheeze or tight chest)
- They are too breathless or it's difficult to speak, eat or sleep
- Their breathing may get faster and they feel like they can't get their breath properly
- Young children may complain of a tummy ache.

What to do if your child has an asthma attack:

1. Immediately give your child 2-4 puffs of their reliever inhaler (usually blue). Remember to use a spacer
2. Help your child to sit down and ask them to take slow, steady breaths. Keep them calm and reassure them
3. If they do not start to feel better, give them 2-4 puffs of their reliever inhaler (one puff at a time) every two minutes. They can take up to ten puffs
4. If they do not start to feel better after taking their inhaler as above, or if you are worried at any time call 999
5. If your child continues to feel unwell while awaiting the ambulance, continue to give a puff a minute until symptoms improve or ambulance arrives

If your child's symptoms improve and you do not need to call 999, you still need to take them to see a doctor or asthma nurse within 24 hours of an asthma attack.

Most people who have an asthma attack will have warning signs for a few days before the attack. These include having to use the blue reliever inhaler more often; changes in peak flow meter readings, and increased symptoms, such as waking up in the night. Don't ignore these warning signs, as they indicate that your child's asthma control is poor and they risk having a severe attack.

It is an emergency if your child is

- Breathing very fast and using their neck or tummy muscles to breathe.
- Too breathless to talk, eat or drink.
- Tired, pale or blue around the lips.

Action

- **You must seek medical advice immediately – dial 999**

Whilst you are waiting for the ambulance give your child 10 puffs of the blue inhaler using the spacer. You can continue to give 1 puff every minute until help arrives.

Asthma/Wheeze Advice Guide

How is your child?

Red

- Drowsy
- Has severe wheeze
- Unable to speak in sentences
- Unable to take fluids and is getting tired
- Is unable to respond with loss of consciousness
- Breathless, with heaving of the chest

You need urgent help
Please phone 999 or go to the nearest Accident and Emergency

Amber

- Wheezing and breathless
- Not responding to usual reliever treatment
- Needing reliever treatment more than every 4 hours

You need to contact a doctor or nurse today
Please ring your GP surgery or call NHS 111 - dial 111

Green

- Requiring to use their reliever regularly throughout the day for cough or wheeze but is not breathing quickly
- Able to continue day to day activities
- Change in peak flow meter reading

Self care
Using the advice in this guide you can provide the care your child needs at home

Name of Child .....

Age ..... Date/Time advice given .....

Further advice / Follow up .....

.....

Name of professional .....

Signature of professional .....

Asthma/Wheeze Management Plan

Regular treatment

Name of inhaler and strength	Dose	
Preventer (brown/ orange/purple/red)	..... puffs in the morning	..... puffs at bedtime
Reliever (blue)		
Other asthma medications	Give ..... puffs when coughing, wheezing or breathless and 10-15 minutes before exercise	

Remember to use the spacer!

Only 1 puff at a time

Your child's asthma is under control if

- They have very few or no asthma symptoms – wheezing, coughing, shortness of breath.
- They can do all their normal activities without symptoms.

Action

- Continue your child's regular asthma medicines.

What to do when my child is

- Coughing or wheezing more than usual.
- Waking up at night with asthma symptoms.
- Needing their blue inhaler more than usual.
- Has a cold.

Action

- Give 4 puffs of the blue inhaler every 4-6 hours.
- If your child is not better after 5 days see your GP or practice nurse.
- If your child remains unwell see next step.

What do I do when my child is

- Short of breath, wheezing or coughing constantly.
- Needing their blue inhaler every 3-4 hours.
- Unable to do their normal activities.

Action

- Give up to 6-10 puffs of blue inhaler every 4 hours.
- If your doctor has advised oral steroids give – Prednisolone …….mg (…….tablets) once a day each morning for 3-5 days as advised.
- Make an appointment for your child to see your GP or practice nurse today. If it's outside normal opening hours ring the GP emergency number for advice.

Following your child's medical review please give

Day 1

10 puffs of the blue reliever inhaler every 4 hours.

Prednisolone tablets …….mg (…….tablets) in the morning.

If your child needs their inhaler more often get urgent medical advice.

Day 2

4-6 puffs of the blue reliever inhaler every 4-6 hours.

Prednisolone tablets: ……. mg (…….tablets) in the morning.

Get medical advice if your child needs their inhaler more often than this.

Days 3-4

2-4 puffs of the blue inhaler as needed and follow the plan in this leaflet

Some Useful Phone Numbers

GP Surgery
(make a note of the number here)

……..

NHS 111 - Dial 111
(available 24hrs - 7 days a week)

GP Out of Hours Service
Appointments booked via NHS 111
Open from 6:30pm - 8:30am,
7 days a week

For online advice:

NHS Choices www.nhs.uk
(available 24hrs - 7 days a week)

Urgent Care Centre:

Warren Farm Urgent Care Centre
Warren Farm Road, Birmingham, West Midlands, B44 0PU
8.00am-8.00pm

Erdington Health and Wellbeing Walk In Centre
196 High Street, 1st Floor, Erdington, Birmingham, B23 6SJ
8.00am-8.00pm

Washwood Heath Urgent Care Centre
Clodeshall Road, Washwood Heath, Birmingham, West Midlands, B8 3SN
9.00am-9.00pm

The Hill Urgent Care Centre
Sparkhill Primary Care Centre, 856 Stratford Road, Sparkhill, Birmingham, B11 4BW
8.00am-8.00pm

South Birmingham GP Walk In Centre
0121 415 2095
15 Katie Road, Selly Oak, Birmingham, B29 6JG.
8.00am-8.00pm

Birmingham NHS Walk In Centre
0121 255 4500
Lower Ground Floor, Boots The Chemists Ltd, 66 High Street, Birmingham, West Midlands, B4 7TA

Mon-Fri: 8.00am – 7.00pm
(last patient seen at 6:30pm)
Sat: 9.00am – 6.00pm
(last patient seen at 5:30pm)
Sun: 1.00am – 4.00pm
(last patient seen at 3:30pm)

Solihull UCC
Solihull Hospital, Lode Lane, Solihull, B91 2JL
8.00am-8.00pm

Summerfield GP and Urgent Care Centre
Summerfield Primary Care Centre, 134 Heath Street, Winson Green, Birmingham, B18 7AL.
8.00am-8.00pm

If you require an interpreter, inform the member of staff you are speaking with.

Data Protection

Looking after and sharing information about your child

We have a duty of care to help patients and families understand how information about them is kept and shared and we include the following information in all our patient leaflets:

Information is collected about your child relevant to their diagnosis, treatment and care. We store it in written records and electronically on computer. As a necessary part of that care and treatment we may have to share some of your information with other people and organisations who are either responsible or directly involved in your child's care. This may involve taking your child's information off site. We may also have to share some of your information for other purposes, such as research etc. Any information that is shared in this way will not identify your child unless we have your consent. If you have any questions and/or do not want us to share that information with others, please talk to the people looking after your child or contact PALS (Patient Advice and Liaison Service) on 0121 333 8403.

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