GIG CYMRU NHS WALES
Bwrdd Iechyd Prifysgol Aneurin Bevan University Health Board

Name:	Unit No:
Date of Birth:	
Address:	
(Place addressograph here)	

INTEGRATED PAEDIATRIC WHEEZE PATHWAY

- **Acute asthma attacks should be considered a failure of preventive therapy**
- **A hospital admission presents a window of opportunity to optimise preventer therapy and review self management skills**
- **Exercise caution with prescribing steroids in children under 4 years of age**
- **No child should leave hospital without a written personalised action plan**

THIS PATHWAY SHOULD BE USED ALONGSIDE THE ASTHMA EDUCATION PACKS, TO BE GIVEN TO EACH FAMILY AT ADMISSION

SCOPE OF THE PATHWAY

This guideline is based on the 2016 British Thoracic Society guidelines and 2017 NICE guidelines on the management of asthma, and has been devised with the intention of being used for all children with asthma who present with an acute asthmatic episode, including first presentations.

It can also be used for children over the age of 1 year presenting with viral induced wheeze (exercise caution whilst using steroids in the 1-4 year age group)

It is to be used in Royal Gwent Hospital, Newport and Nevill Hall Hospital, Abergavenny in the following settings:

- CAU
- Accident and emergency
- All Paediatric wards

The pathway should be terminated if the child is admitted under PICU and therefore intubated and ventilated.

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References

British Thoracic Society / Scottish Intercollegiate Guidelines Network, British guideline on the management of asthma, A national clinical guideline, Revised edition published 2016

British National Formulary for Children 2016-2017. British Medical Association, Royal Pharmaceutical Society of Great Britain, Royal College of Paediatrics and Child Health, and the Neonatal and Paediatric Pharmacists Group

Asthma: diagnosis, monitoring and chronic asthma management, NICE guideline [NG80]

Royal College of Physicians, Why asthma still kills, The National Review of Asthma Deaths (NRAD), Confidential Enquiry report (May 2014)

ADMISSION DETAILS

Name: Unit No:

Date of Birth:

Address:

(Place addressograph here)

Admission Date: ____ /____ /____

Admission Time: _____:_____

Consultant:

Accompanied by:

Parent/Carer:

Parent / Carer:

Siblings:

Telephone Number:

Parental responsibility:

Known to asthma nurse: Yes ❑ No ❑

Known to consultant: Yes ❑ No ❑

If yes, consultant name:

Health Visitor:

Social Worker:

Religious needs:

First language spoken:

School:

Is patient independent and fully mobile:

Yes / <2yrs ❑ (No further action to be taken)
No ❑

TREATMENT IN THE LAST 24 HOURS:

Inhaled bronchodilator usage: Inhaler ❑ Nebuliser ❑

*Dose given:*_____

*How frequently:*_____

Any oral steroids: Yes ❑ No ❑ *If yes, when and dose:* _____

Any other medication: _____

Did they bring their: reliever inhaler ❑ spacer ❑

OBSERVATIONS ON ADMISSION:

Weight (kg): _____ BP: ____/____ HR (bpm): _____ O_2 Sats: _____

Height (m): _____ Temp (˚C): ____ Resp Rate: ____

Nursing comments

Admitting nurse name:

Signature:

ADMISSION HISTORY:

PAST MEDICAL HISTORY:

Known asthma: Yes ❑ No ❑ **Previous episode of wheeze? Yes ❑ No ❑**

Family history:

Name:	Unit No:
Date of Birth:	
Address:	
(Place addressograph here)	

	Asthma	Eczema	Hay fever
Patient			
Mother			
Father			
Siblings			

Smoking:

Pets:

Allergies:

Please circle as appropriate

Exercise cough:	Yes	No	With a cold	*How often*_____
Night cough:	Yes	No	With a cold	*How often*_____
Wheeze:	Yes	No	With a cold	*How often*_____
Breathlessness:	Yes	No	With a cold	*How often*_____
Chest tightness:	Yes	No	With a cold	*How often*_____

Frequency of reliever use when well: <3x per week ≥3x per week Daily >1+ per day

Number of school days missed in last 6 months: _____

Number of courses of Prednisolone in last 12 months: _____

Number of GP attendances in last 12 months: _____

Number of A&E visits/admissions in last 12 months: _____

Previous PICU/HDU admissions: _____

Medications:

Inhaler name	Strength	Dose	Device

Other medication	Dose	Route	Frequency

EXAMINATION:

ASSESSMENT OF SEVERITY OF EPISODE:

Moderate	❑
Acute Severe	❑
Life-threatening	❑

GENERAL MANAGEMENT FOR ALL PATIENTS:

- **Give Prednisolone within the first hour of treatment of an acute asthma attack.**
- **Consider** steroids in children with pre-school wheeze if they have a severe attack with sats <92% in air / recurrent wheezy episodes/ poor response to initial treatment of wheeze / already on preventers
- **Most with viral induced wheeze WON'T need steroids**
- Mandatory measurement of oxygen saturations.
- Aim to keep $Sp0_2$ between 94-98%

LIFE THREATENING

$Sp0_2$ <92% PLUS any one

- Silent chest
- Cyanosis
- Poor Respiratory Effort
- Exhaustion
- Confusion
- Hypotension

ACUTE SEVERE

Too breathless to talk or feed
Or cannot complete sentences

Use of accessory muscles

HR:
>125 bpm in children > 5 yrs
>140 bpm in children 1-5 yrs

Resp Rate:
>30 bpm in children >5 yrs
>40 bpm in children 1-5 yrs

$Sp0_2$ <92%

MODERATE

Able to talk in sentences

Moderate recession

HR:
≤125 bpm in children >5 yrs
≤140 bpm in children 1-5 yrs

Resp Rate:
≤30 bpm in children >5 yrs
≤40 bpm in children 1-5 yrs

$Sp0_2$ ≥92%

PLAN:

Oral prednisolone	□	**10 puffs Salbutamol via spacer**	□
Back to back Salbutamol via inhaler	□	**Back to back triple nebs**	□
IV access	□	**IV hydrocortisone**	□

Name: **Signature:** **Grade:**

Paediatric Wheeze Integrated Care Flowchart

Name: Unit No:

Date of Birth:

Address:

(Place addressograph here)

MODERATE

1. Salbutamol inhaler, up to 10 puffs
2. Oral Prednisolone

ACUTE SEVERE / LIFE THREATENING

CHECK SATS

92% OR MORE

1. Back to back salbutamol inhalers
2. Oral prednisolone

<92%

1. O2 via face mask/nasal prongs
2. Salbutamol + Ipratropium + Magnesium - nebulised 3 times in the first hour

Re-assess severity & response to treatment after 1 hour

MODERATE

1. Salbutamol 1-4hrly inhalers

If improvement → moderate pathway

If not → give triple nebs

1. IV access and bloods
2. IV Hydrocortisone
3. Urgent Middle Grade review
4. Consider bolus of IV Salbutamol

1. IV Salbutamol bolus if not already given
2. Continue Salbutamol nebulised every hour
3. Continue Ipratropium nebulised every 4-6hrs
4. Arrange HDU transfer and inform Paediatric Consultant
5. CXR, blood gas and IV fluids
6. IV Salbutamol infusion (ECG monitoring & 12 hourly U&E)
7. If good clinical response, change to 3 hourly Salbutamol and 6 hourly

In case of poor response discuss with Paediatric Consultant
Discussion with WATCH team if indicated

Re-assess severity & response to treatment after maximum 4 hours

Step up treatment if there is no objective improvement

Discontinue long acting beta agonists while on frequent doses of Salbutamol

Inhaled steroids may be continued at usual doses

Add IV Aminophylline loading and infusion (monitor levels after 4-6 hours)
Omit loading dose if on Theophyllines
Anti-emetics may be needed (Ondansetron)

Add IV Magnesium Sulphate

If improvement, consider weaning every 4-6 hours

Wean and stop IV therapies, before decreasing the frequency of nebulised Salbutamol

1 Hour Review (Date/Time)

Heart rate	Resp rate	Sats	FiO2 or L/min	Temp

Tick if the following are present: Examination:

Subcostal recessions	
Intercostal recessions	
Tracheal tug	
Nasal flaring	

Impression: Improving? □ Not improving □ **Step up treatment if there is no objective improvement**

Plan:

Time of next review: Signed:

4 Hour Review (Date/Time)

Heart rate	Resp rate	Sats	FiO2 or L/min	Temp

Tick if the following are present: Examination:

Subcostal recessions	
Intercostal recessions	
Tracheal tug	
Nasal flaring	

Impression: Improving? □ Not improving □ **Step up treatment if there is no objective improvement**

Plan:

Time of next review: Signed:

8 Hour Review (Date/Time)

Heart rate	Resp rate	Sats	FiO2 or L/min	Temp

Tick if the following are present: Examination:

Subcostal recessions	
Intercostal recessions	
Tracheal tug	
Nasal flaring	

Impression: Improving? □ Not improving □ **Step up treatment if there is no objective improvement**

Plan:

Time of next review: Signed:

CONTINUATION SHEET

Name: Unit No:

Date of Birth:

Address:

(Place addressograph here)

DATE/TIME	

CONSULTANT WARD ROUND (Name:)

Seen by:

Admission details:

Examination:

Plan:

Name: **Signature:** **Grade:**

	Yes	No
Does the child need to start preventer therapy?		
If already on preventer, does the dose need adjusting?		
Do they need general paediatric follow up?		
Do they need referral to the respiratory consultants?		
Do they need an asthma nurse referral?		
If they need respiratory referral, has the letter been done?		
Have you completed their asthma plan and discharge checklist?		

GP follow up within 2 working days of discharge for any admission

General Paediatric follow-up 3 months:

- Any asthma admission (4yrs or older)

Respiratory Consultant referral if:

- 2 or more admissions / attendances with asthma in the last 12 months
- PICU or HDU admission
- Already on 2 or more preventer therapies
- 3 or more admissions with viral wheeze in the last 12 months

Asthma nurse referral if:

- HDU or PICU admission

PLEASE DISCUSS ANY PICU TRANSFERS WITH THE RESPIRATORY TEAM BEFORE DISCHARGE

DOSES OF DRUGS IN THE PATHWAY

DRUG	ROUTE	DOSE	SPECIAL CONSIDERATIONS
Salbutamol	MDI	Up to 10 puffs	Via spacer
	Nebulised	1-4 years: 2.5mg ≥5 years: 5mg	
	IV Bolus	1-23mth: 5mcg/kg over 5 mins 2-17yrs: 15mcg/kg over 5 mins **(Maximum 250micrograms)**	
	IV Infusion	1-2mcg/kg/min	**12hrly U&E** **Continuous ECG Monitoring**
Ipratropium	Nebulised	<12 years: 250mcg ≥12 years: 500mcg	
Prednisolone	Oral	1-2 yrs: 10mg 2-5 yrs: 20mg > 5 yrs: 30-40mg Those already receiving maintenance steroid tablets should receive 2 mg/kg of Prednisolone (**max 60 mg**)	Treatment for up to 3 days is usually sufficient. Length of course should be tailored to the number of days necessary for recovery. Weaning is unnecessary unless the course of steroids exceeds 14 days **Repeat dose if vomited**
Hydrocortisone	IV	4mg/kg 6 hourly **(Max 100mg/dose)**	Reserved for those who are having life threatening events
Aminophylline	IV Bolus	5mg/kg over 20 mins **(Maximum 500mg)**	NOT to be given if already on regular Theophylline
	IV Infusion	1 month -11 years: 1mg/kg/hr 12-17 years: 0.7mg/kg/hr	Send level after 4-6 hours of commencing infusion and 24hrly thereafter (Stop infusion for 15 mins before collecting the level) Adjust dose according to plasma Theophylline level (10-20mg/L or 55-110micromol/L)
Magnesium Sulphate	Nebulised	150mg	Use 3 times in first hour, in combination with Salbutamol and Ipratropium
	IV bolus	2-17 years: 40mg/kg (**Maximum 2g)** over 20 mins at least	Monitor BP and respiration

PLEASE ENSURE PERSONALISED ACTION PLAN IS COMPLETED AND GIVEN TO PARENTS

INTRAVENOUS INFUSIONS

How to prepare Salbutamol Infusion

IV LOADING DOSE: For 1 year: Dose = 5micrograms/kg (0.1ml/kg) (**MAXIMUM 250 micrograms)**
For 2-17 years: Dose = 15 micrograms/kg (0.3ml/kg) (**MAXIMUM 250 micrograms)**
Final concentration – 50 micrograms/ml *For both peripheral and central line use*

Preparation:

1. Take 0.5ml (500 micrograms) of Salbutamol from a 5mg in 5 ml (1mg/ml) ampoule
2. Make up to 10ml by adding 9.5ml of Sodium Chloride 0.9% or Dextrose 5%
3. Run loading dose over 5 minutes under cardiac monitoring in HDU setting

CONTINUOUS IV INFUSION: *Final concentration – 200 micrograms/ml* *For both peripheral and central line use*

For a bag: 1. Add 68ml (68mg) of intravenous preparation of Salbutamol 5mg in 5ml to a 250ml Baxter manufactured bag of sodium chloride 0.9% or glucose 5% (accurate fill volume = 271ml) to make a final bag volume of 339ml

For a 50ml syringe:
1. Withdraw 40ml of Sodium Chloride 0.9% or Dextrose 5%
2. Add 10ml (10mg) of intravenous preparation of Salbutamol 5mg in 5ml

RATE OF INFUSION:
1 microgram/kg/min = 0.3ml/kg/hr 2 micrograms/kg/min = 0.6ml/kg/hr *__Discard bag 24 hours after preparing__*

Salbutamol infusion should be used in a HDU set up with continuous ECG monitoring and U&Es 12-hourly.

How to prepare Aminophylline

IV LOADING DOSE should be used if there is no improvement with IV loading dose of Salbutamol and continuous Salbutamol infusion:
*5mg/kg (**MAXIMUM 500mg)** over 20 mins*

DO NOT use this if the child is already on oral Theophylline

Follow with **MAINTENANCE DOSE:** *Final concentration – 1mg/ml*
2-11years: 1mg/kg/hr
12-17 years: 0.7mg/kg/hr

INFUSION BAG :

1. Add 11ml (275mg) of intravenous Aminophylline (250mg/10ml) to a 250ml **Baxte**r manufactured bag of Sodium chloride 0.9% or glucose 5% (accurate fill volume = 271ml) to make a final bag volume of 282ml
2. This gives a final concentration of 1mg/ml

How to prepare Magnesium Sulphate

IV LOADING DOSE should only be given after discussion with Consultant or on advice from PICU

10% Magnesium: 40mg/kg (0.4ml/kg of 100mg/1ml solution)
Maximum dose = 2 grams (20ml of 10% solution)

The preferred solution is 10% as it can be used peripherally as well as centrally.
If 10% is not available then use 50% solution. To obtain 50ml of 10% solution using 50% strength:

1. Draw up 10ml of 50% Magnesium Sulphate and dilute up to 50ml with Dextrose 5% **OR** Sodium Chloride 0.9% **OR Dextrose 5% with Sodium Chloride 0.9%**

NEBULISED:

1. Draw up 1ml of magnesium sulphate 50% ampoule and make up to 10ml with **sodium chloride 0.9**%. This gives a concentration of magnesium sulphate 50mg in 1ml.
2. Give 3ml (150mg) of the above solution via the nebuliser 3 times in the first hour. To be given in combination with Salbutamol and Ipratropium nebulisers.
3. The 50mg/1ml solution for nebulisation can be used to provide all 3 nebulised doses then discard the remaining solution.