Managing an asthma attack in various settings:

Suzanne Bailey, Lisa Cook,
CYP Asthma Transformation Team
Nov 2024

Introduction

- We are:

Surrey Heartlands CYP Asthma Team
'Beating Asthma Together'

Team members are:

Suzanne Bailey – ICS CYP Clinical Respiratory Lead/Senior Specialist CYP Asthma Practitioner – suzanne.bailey5@nhs.net

Specialist CYP Asthma Practitioner – Lisa Cook – lisa.cook40@nhs.net

Charlotte Arnold and Julia Newman – CYP Long Term Conditions Transformation Leads

Project Manager: Kayode Arokodare

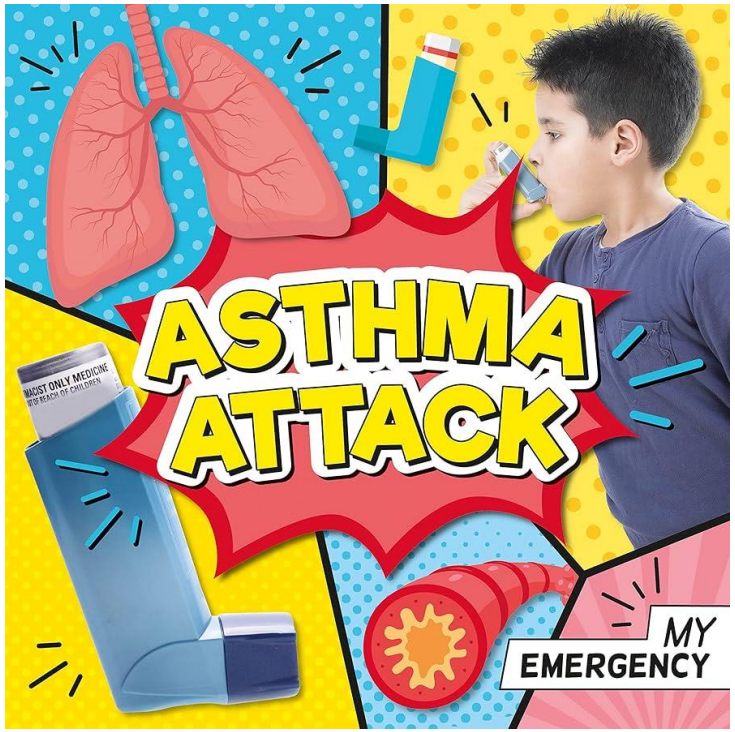
Keeping an eye on us and the budget are Fiona Whitaker and Kylie Langridge, and we also have support from Nicola Mundy from Surrey County Council

Team email address: syheartlands.childrensasthma@nhs.net

Training outcomes

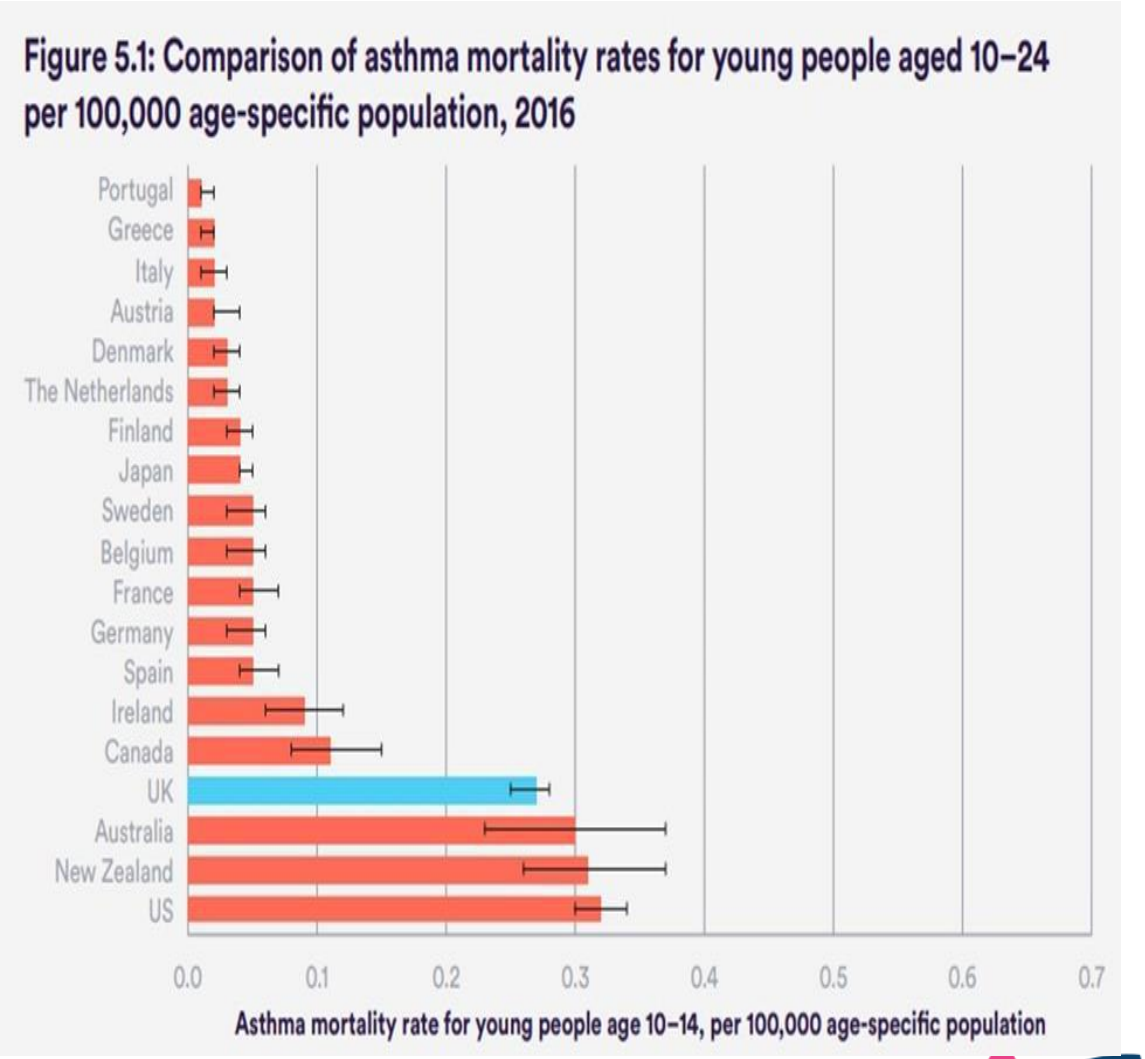
To identify how to manage an asthma attack in various settings including:

- ❑ **Primary care**
- ❑ **A & E**
- ❑ **In hospital**
- ❑ **How to follow up post asthma attack**



Asthma deaths in CYP aged 10-14 years

- Asthma affects 1 in 11 CYP and is the commonest long-term medical condition in UK.
- The UK has one of the highest prevalence, emergency admission and death rates for childhood asthma in Europe.
- Young people with asthma are more likely to have mental health problems, worse exam results and leave school earlier.
- The National Review of Asthma Deaths 2014 highlighted that two-thirds of asthma deaths are preventable – and 10 years on deaths are at the same level or worse. The over reliance on reliever inhalers (usually blue) seems to be a key driver for excess asthma deaths.



Management of acute asthma in children in general practice

Age 2–5 years

ASSESS AND RECORD ASTHMA SEVERITY

Moderate asthma	Acute severe asthma	Life-threatening asthma
• SpO_2 ≥92% • Able to talk • Heart rate ≤140/min • Respiratory rate ≤40/min	• SpO_2 <92% • Too breathless to talk • Heart rate >140/min • Respiratory rate >40/min • Use of accessory neck muscles	SpO_2 <92% plus any of: • Silent chest • Poor respiratory effort • Agitation • Confusion • Cyanosis
• β_2 bronchodilator: - via spacer ± facemask* • Consider oral prednisolone 20 mg	• Oxygen via facemask to maintain SpO_2 94–98% if available • β_2 bronchodilator - via nebuliser (preferably oxygen-driven), salbutamol 2.5 mg - *or*, if nebuliser not available, via spacer* • Oral prednisolone 20 mg	• Oxygen via facemask to maintain SpO_2 94–98% if available • β_2 bronchodilator with ipratropium: - via nebuliser (preferably oxygen-driven), salbutamol 2.5 mg and ipratropium 0.25 mg every 20 minutes - *or*, if nebuliser and ipratropium not available, β_2 bronchodilator via spacer* • Oral prednisolone 20 mg *or* IV hydrocortisone 50 mg if vomiting
IF POOR RESPONSE ARRANGE ADMISSION	**Assess response to treatment 15 mins after β_2 bronchodilator** **IF POOR RESPONSE REPEAT β_2 BRONCHODILATOR AND ARRANGE ADMISSION**	**REPEAT β_2 BRONCHODILATOR VIA OXYGEN-DRIVEN NEBULISER WHILST ARRANGING IMMEDIATE HOSPITAL ADMISSION**

GOOD RESPONSE
- Continue β_2 bronchodilator via spacer or nebuliser, as needed but not exceeding 4 hourly
- **If symptoms are not controlled repeat β_2 bronchodilator and refer to hospital**
- Continue prednisolone until recovery (minimum 3-5 days)
- Arrange follow-up clinic visit within 48 hours
- Consider referral to secondary care asthma clinic if 2nd attack within 12 months.

POOR RESPONSE
- Stay with patient until ambulance arrives
- Send written assessment and referral details
- Repeat β_2 bronchodilator via oxygen-driven nebuliser in ambulance

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

NB: If a patient has signs and symptoms across categories, always treat according to their most severe features

Age >5 years

ASSESS AND RECORD ASTHMA SEVERITY

Moderate asthma	Acute severe asthma	Life-threatening asthma
• SpO_2 ≥92% • Able to talk • Heart rate ≤125/min • Respiratory rate ≤30/min • PEF ≥50% best or predicted	• SpO_2 <92% • Too breathless to talk • Heart rate >125/min • Respiratory rate >30/min • Use of accessory neck muscles • PEF 33–50% best or predicted	SpO_2 <92% plus any of: • Silent chest • Poor respiratory effort • Agitation • Confusion • Cyanosis • PEF <33% best or predicted
• β_2 bronchodilator: - via spacer* • Consider oral prednisolone 30–40 mg	• Oxygen via facemask to maintain SpO_2 94–98% if available • β_2 bronchodilator - via nebuliser (preferably oxygen-driven), salbutamol 5 mg - *or*, if nebuliser not available, via spacer* • Oral prednisolone 30–40 mg	• Oxygen via facemask to maintain SpO_2 94–98% if available • β_2 bronchodilator with ipratropium: - via nebuliser (preferably oxygen-driven), salbutamol 5 mg and ipratropium 0.25 mg every 20 minutes - *or*, if nebuliser and ipratropium not available, β_2 bronchodilator via spacer* • Oral prednisolone 30–40 mg *or* IV hydrocortisone 100 mg if vomiting
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NB: If a patient has signs and symptoms across categories, always treat according to their most severe features

* β_2 bronchodilator via spacer given one puff at a time, inhaled separately using tidal breathing; according to response, give another puff every 60 seconds up to a maximum of 10 puffs

Annex 6

https://www.brit-thoracic.org.uk/quality-improvement/guidelines/asthma/

Managing an asthma attack in primary care
Moderate asthma

2-5 years

O2 saturations ≥ 92 %
Able to talk
Heart rate ≤ 140bpm
Respiratory rate ≤ 40

Over 5's

O2 saturations ≥ 92%
Able to talk
Heart rate ≤ 125bpm
Respiratory rate ≤ 30 per minute
PEF ≥50% best or predicted

Give β2 bronchodilator via spacer one puff at a time.
Inhaled separately using tidal breathing; according to response, give another puff every 60 seconds up to a maximum of 10 puffs

β2 Bronchodilator via spacer and facemask
Consider oral prednisolone

β2 Bronchodilator via spacer
Consider oral prednisolone

Evaluate response

Poor response

- Arrange admission

Good response

- Continue β2 bronchodilator via spacer or nebuliser, as needed but not exceeding 4 hourly
- If symptoms are not controlled repeat β2bronchodilator and refer to hospital
- Continue prednisolone until recovery (minimum 3-5 days)
- Arrange follow-up clinic visit within 48 hours
- Consider referral to secondary care asthma clinic if 2nd attack within 12 months.

Managing an asthma attack in primary care
Acute severe asthma

2-5 years

- ❑ Oxygen saturations < 92%
- ❑ Too breathless to talk
- ❑ Heart rate > 140bpm
- ❑ Respiratory rate > 40
- ❑ Use of accessory neck muscles

Over 5 years

- ❑ O2 saturations <92%
- ❑ Too breathless to talk
- ❑ Heart rate > 125bpm
- ❑ Respiratory rate > 30
- ❑ Use of accessory muscles
- ❑ PEF 33-50% best or predicted

Oxygen via facemask to maintain SpO2 94–98%

if available

- ❑ Give β2bronchodilator - via nebuliser (preferably oxygen-driven), check age for dose of salbutamol
- ❑ If nebuliser not available, via spacer
- ❑ Oral prednisolone, check age for dose
- ❑ Assess response to treatment 15 mins after β2 bronchodilator

Poor response

- IF POOR RESPONSE REPEAT β2 BRONCHODILATOR AND ARRANGE ADMISSION
- Stay with patient until ambulance arrives
- Send written assessment and referral details
- Repeat β2bronchodilator via oxygen-driven nebuliser in ambulance

Good response

- Continue β2 bronchodilator via spacer or nebuliser, as needed but not exceeding 4 hourly
- If symptoms are not controlled repeat β2bronchodilator and refer to hospital
- Continue prednisolone until recovery (minimum 3-5 days)
- Arrange follow-up clinic visit within 48 hours
- Consider referral to secondary care asthma clinic if 2nd attack within 12 months.

Managing an asthma attack in primary care
Life threatening asthma

2-5 years

- ❑ Oxygen saturations < 92%
- ❑ Plus any:
- ❑ Silent chest
- ❑ Poor respiratory effort
- ❑ Agitation
- ❑ Confusion
- ❑ Cyanosis

Over 5's

- ❑ O2 saturations < 92% plus any :
- ❑ Silent chest
- ❑ Poor respiratory effort
- ❑ Agitation
- ❑ Confusion
- ❑ Cyanosis
- ❑ PEF < 33% or predicted

Oxygen via facemask to maintain SpO2 94–98% if available

Life threatening asthma

β2bronchodilator with ipratropium: - via nebuliser (preferably oxygen-driven), salbutamol and ipratropium every 20 minutes, check age for dose.

β2bronchodilator via spacer

Oral prednisolone or IV hydrocortisone if vomiting, check age for dose

REPEAT β2 BRONCHODILATOR VIA OXYGEN-DRIVEN NEBULISER WHILST ARRANGING IMMEDIATE HOSPITAL ADMISSION

- **POOR RESPONSE**
- **Stay with patient until ambulance arrives**
- **Send written assessment and referral details**
- **Repeat β2bronchodilator via oxygen-driven nebuliser in ambulance**

LOWER THRESHOLD FOR ADMISSION

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

NB: If a patient has signs and symptoms across categories, always treat according to their most severe features

Managing an Asthma Attack in an ED setting

Management of acute asthma in children in emergency department

Age 2–5 years

ASSESS AND RECORD ASTHMA SEVERITY

Moderate asthma	Acute severe asthma	Life-threatening asthma
• SpO_2 ≥92% • No clinical features of severe asthma **NB: If a patient has signs and symptoms across categories, always treat according to their most severe features**	• SpO_2 <92% • Too breathless to talk or eat • Heart rate >140/min • Respiratory rate >40/min • Use of accessory neck muscles	SpO_2 <92% plus any of: • Silent chest • Poor respiratory effort • Agitation • Confusion • Cyanosis
First line treatments		
• β_2 bronchodilator: - via spacer ± facemask* • Consider oral prednisolone 20 mg	Oxygen via face mask/nasal prongs to achieve SpO_2 94–98%	
	• β_2 bronchodilator - via nebuliser (preferably oxygen-driven), salbutamol 2.5 mg - *or*, if nebuliser not available, via spacer* • Oral prednisolone 20 mg or IV hydrocortisone 4 mg/kg if vomiting • **If poor response** add 0.25 mg nebulised ipratropium bromide to every nebulised β_2 bronchodilator and repeat every 20 minutes for 2 hours according to response	• β_2 bronchodilator with ipratropium: - via nebuliser (preferably oxygen-driven), salbutamol 2.5 mg and ipratropium 0.25 mg • Repeat bronchodilators every 20–30 minutes • Oral prednisolone 20 mg or IV hydrocortisone 4 mg/kg if vomiting **Discuss with senior clinician, PICU team or paediatrician**
Reassess within 1 hour		
Second line treatments		
DISCHARGE PLAN • Continue β_2 bronchodilator 4 hourly as necessary • Continue prednisolone 20 mg daily until recovery (minimum 3–5 days) • Advise to contact GP if not controlled on above treatment • Provide a written asthma action plan • Review regular treatment • Check inhaler technique • Arrange GP follow up within 48 hours • Arrange hospital asthma clinic follow up in 4–6 weeks if 2nd or subsequent attack in past 12 months.	• Consider 2nd line treatments – see Annex 8 • Admit all cases if features of severe attack persist after initial treatment • Arrange transfer to PICU/HDU if poor response to treatment as per local guidelines	

Age >5 years

ASSESS AND RECORD ASTHMA SEVERITY

Moderate asthma	Acute severe asthma	Life-threatening asthma
• SpO_2 ≥92% • PEF ≥50% best or predicted • No clinical features of severe asthma **NB: If a patient has signs and symptoms across categories, always treat according to their most severe features**	• SpO_2 <92% • PEF 33–50% best or predicted • Heart rate >125/min • Respiratory rate >30/min • Use of accessory neck muscles	SpO_2 <92% plus any of: • PEF<33% best or predicted • Silent chest • Poor respiratory effort • Altered consciousness • Cyanosis
First line treatments		
• β_2 bronchodilator: - via spacer* • Oral prednisolone 30–40 mg	Oxygen via face mask/nasal prongs to achieve SpO_2 94–98%	
	• β_2 bronchodilator - via nebuliser (preferably oxygen-driven), salbutamol 5 mg - *or*, if nebuliser not available, via spacer* • Oral prednisolone 30–40 mg or IV hydrocortisone 4 mg/kg if vomiting • **If poor response** add 0.25 mg nebulised ipratropium bromide to every nebulised β_2 bronchodilator and repeat every 20 minutes for 2 hours according to response	• β_2 bronchodilator with ipratropium: - via nebuliser (preferably oxygen-driven), salbutamol 5 mg and ipratropium 0.25 mg • Repeat bronchodilators every 20–30 minutes • Oral prednisolone 30–40 mg or IV hydrocortisone 4 mg/kg if vomiting **Discuss with senior clinician, PICU team or paediatrician**
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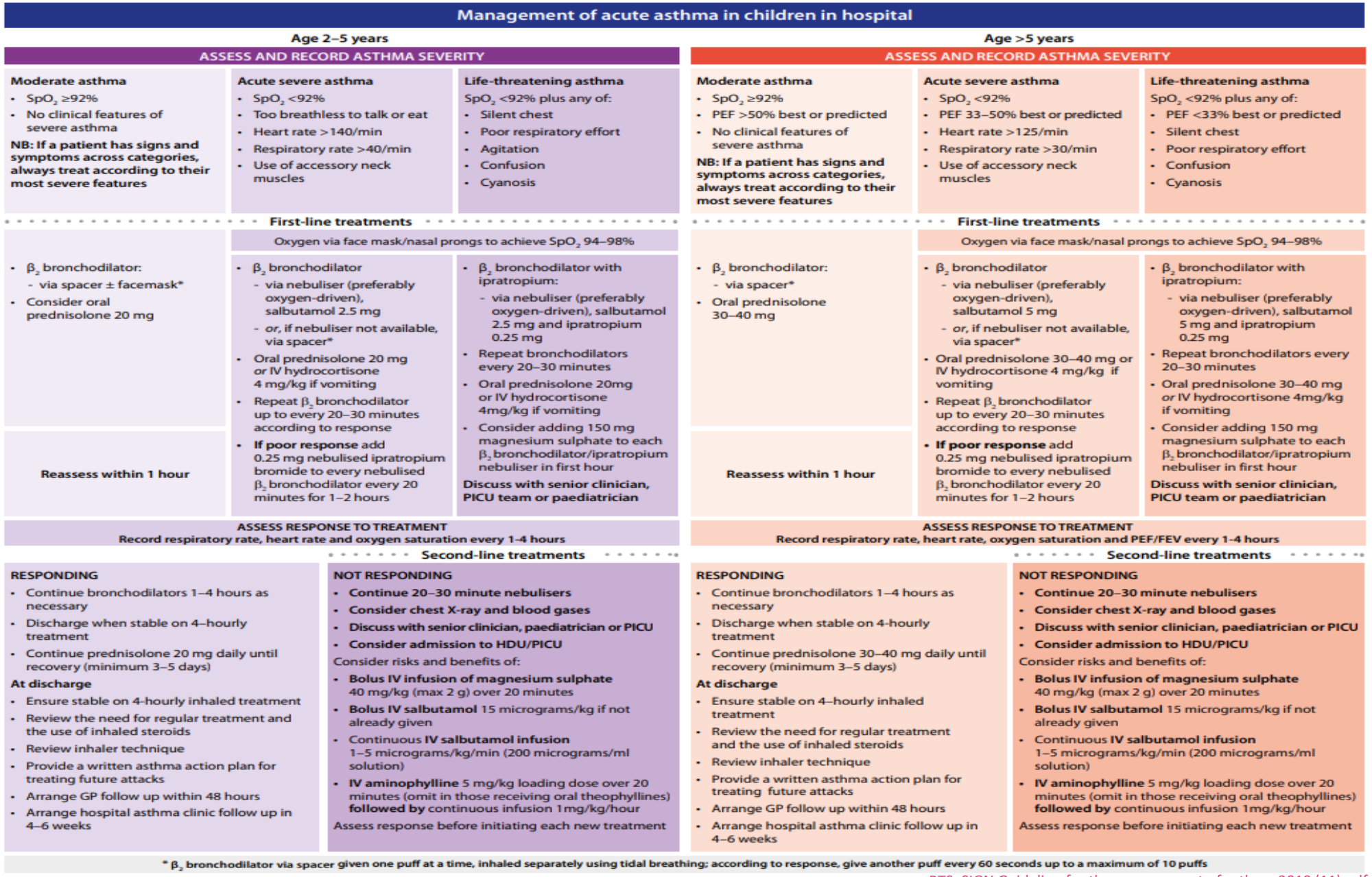
* β_2 bronchodilator via spacer given one puff at a time, inhaled separately using tidal breathing; according to response, give another puff every 60 seconds up to a maximum of 10 puffs

Annex 7

British guideline on the management of asthma

BTS_SIGN Guideline for the management of asthma 2019 (11).pdf

Management of acute asthma in children in hospital



Annex 8

BTS_SIGN Guideline for the management of asthma 2019 (11).pdf

In more detail – Assessment & First line Treatment

Age 2-5 years

Moderate, Acute Severe, or Life Threatening

Assessment of severity

A – Airway: if crying and/or speaking they have an airway

B – Breathing – respiratory rate, work of breathing, other signs of respiratory distress, cyanosis (colour of skin (in dark skinned people check mucus membranes and nailbeds), audible wheeze/stridor, auscultate the chest, spO2. Note studies show pulse oximetry can over-estimate true SaO2 in people with dark skins. Link is here

C – Circulation – check hands and fingers, colour, mottling, cold, hot, measure cap refill, HR, peripheral pulses, ask about input/output, BP

D – Disability –assess AVPU, if necessary, examine pupils,

E – Exposure – ensure chest is exposed for assessment of any chest deformities and work of breathing

Age >5years

Moderate, Acute Severe, or Life Threatening

First line treatment

Moderate:
bronchodilator with spacer
Consider prednisolone for age 2-5 yrs
Give prednisolone if over 5 years

Reassess in 1 hour

Acute Severe:
Oxygen
Bronchodilator via neb
Oral Prednisolone or IV hydrocortisone
If poor response add ipratropium and repeat every 20 mins for 2 hours according to response (back-to-back or burst therapy)

Life threatening:
Bronchodilator with ipratropium via neb repeating every 20-30 mins (back-to-back or burst therapy) .
Oral prednisolone or IV hydrocortisone

Discuss with senior clinician and/or retrieval team

BTS_SIGN Guideline for the management of asthma 2019 (11).pdf

Second line treatment

Assess response to treatment 1-4 hourly

Responding:

- Continue bronchodilators 1-4 hourly as necessary
- Discharge when stable on 4 hourly treatment
- Continue prednisolone if started for minimum of 3-5 days
- DISCHARGE

Not responding:

- Continue 20-30 minute nebs
- Consider CXR and blood gases
- Discuss with senior clinician and/or retrieval team
- Consider the need for HDU/PICU

Consider the risks and benefits of:

- IV magnesium sulphate
- Bolus IV salbutamol
- Infusion IV salbutamol
- IV aminophylline

Assess response before initiating new treatment

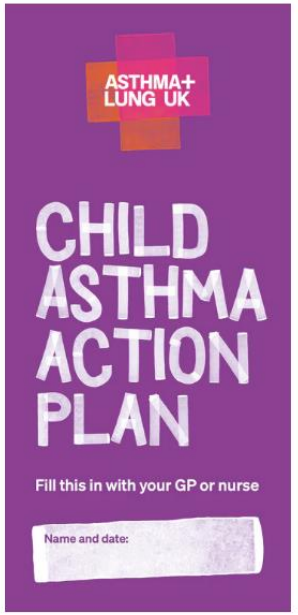
BTS_SIGN Guideline for the management of asthma 2019 (11).pdf

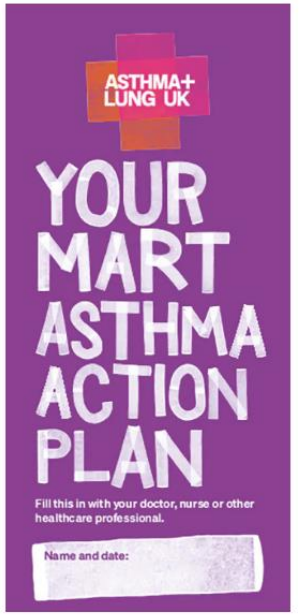
Discharge Plan

BTS_SIGN Guideline for the management of asthma 2019 (11).pdf

DISCHARGE PLAN

- Consider Bronchodilator 4 hourly as necessary
- Review regular treatment and the use of inhaled steroids
- Check inhaler technique
- Continue prednisolone daily until recovery (minimum 3-5 days)
- Advise to contact GP if not controlled on above treatment
- Provide a written asthma action plan including advice on treating future attacks.
- Arrange GP follow up within 48 hours
- Arrange hospital asthma clinic follow up in 4-6 weeks if 2nd or subsequent attack in the past 12 months.





COMING SOON:

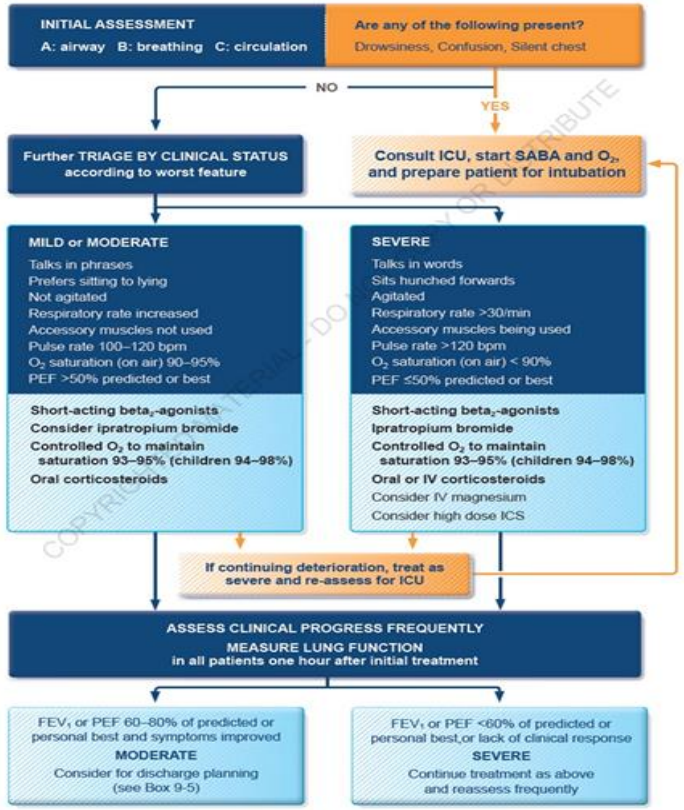
Surrey Heartlands CYP Asthma Post Asthma/Wheeze Attack Discharge Bundle

GINA-2024-Strategy-Report-24_05_22_WMS.pdf (SECURED)

EMERGENCY DEPARTMENT MANAGEMENT OF EXACERBATIONS (ADULTS, ADOLESCENTS, CHILDREN 6–11 YEARS)

Severe exacerbations of asthma are life-threatening medical emergencies, which are most safely managed in an acute care setting e.g., emergency department (Box 9-6, p.171). Infection control procedures should be followed. Management of asthma in the intensive care unit is beyond the scope of this report and readers are referred to a comprehensive review.[748]

Box 9-6. Management of asthma exacerbations in acute care facility (e.g., emergency department)



See list of abbreviations (p.11).

- GINA have produced a similar flowchart with slightly less detail.
- National guidelines are often adapted to suit each locality.

Follow up in primary care after an asthma attack. Why?

- To prevent readmission or further asthma attack, educate to prevent relapse, optimize treatment and prevent delay seeking future assistance (BTS,2019)
- Going to A & E or being admitted to hospital for an asthma attack increases the risk for another asthma attack (NRAD,2014)
- The NRAD (2014) found that “nineteen (10%) of those who died did so within 28 days of being treated in hospital for an asthma attack.”

When?

- Follow up in primary care within 2 working days (BTS,2019)
- GINA (2024) 1-2 days

What should the review involve?

Reasons for asthma attack

Possible actions the patient should take to prevent future emergency presentations

Medication should be altered if needed.

- Patient should be provided with an asthma action plan (BTS,2019)

Follow up 4-6 weeks- Why

- Check compliance and Reinforce messages of good control
- Gina (2024) states “the patient should be followed to ensure that asthma symptoms return to well controlled and that their lung function returns to their personal best”
- Check asthma is still well controlled after the attack
- Establish causes of the attack, have these causes now been resolved
- What was compliance like before the patient had the attack, did they have a preventer inhaler, were they using it?
- Check symptoms have improved after changing treatment
- . After starting or adjusting medicines for asthma, review the response to treatment in 4 to 8 weeks (NICE 2017)

CYP Asthma/Wheeze Post Attack Review in Primary Care

NHS Surrey Heartlands

Follow-up of the child is recommended **48-72 hours** following attendance at ED or urgent care setting
See patient to determine whether the attack is over AND identify modifiable risk factors to prevent future attacks

Is the asthma attack over?

No

Take action:

- Assess severity of symptoms
- Consider need for further OCS - if further OCS needed ensure further review
- Consider need to optimise treatment

OR

- Administer treatment
- Send to ED or call 999

Yes

If the CYP is recovering well, consider why did the asthma attack happen?

Is this poor symptom control?

- Check is SABA use ≥3 inhalers in last 12 months (suggesting poor control)
- Is ICS medication use < 75% of expected in last 12 months (suggesting poor adherence) *See here on Surrey PAD for how long an inhaler should last*
- Check inhaler technique – a spacer must be used with a pMDI
- Discuss adherence with the CYP – what are the barriers/challenges to taking regular ICS?
- Are there any avoidable triggers?

Was there a failure to recognise risk?

- Ensure the CYP and parent/carer have received asthma education
- Ensure they have a current self-management asthma action plan which has been explained with a copy for school
- Does the CYP have factors that increase the risk of asthma-related death?

Take action:

- Optimise treatment
- Ensure a full asthma review or follow-up is completed ideally within 4 weeks, including inhaler technique
- Refer to secondary care if ≥ 2 exacerbations in 12 months, or poorly controlled despite medium dose ICS/LABA, or if other concerns

Factors that increase the risk of asthma related death in CYP:

Asthma history

- Previous near fatal asthma
- Overuse of SABA
- Repeated ED attendances and/or admissions in the past year

Other modifiable factors

- Poor adherence to ICS or clinic appointments
- Co-morbidities such as Obesity, food allergy
- Exposure to second hand smoke / vaping
- Psychosocial problems

Surrey Heartlands CYP Asthma Toolkit

SURREY HEARTLANDS
Health and Care Partnership

SURREY COUNTY COUNCIL

NHS

Please take 5 minutes to complete this form and give some feedback about the session.

https://forms.office.com/e/LycPurhHaS