

Supplementary Materials

Continuity of care in the management of asthma attacks and relevance during a pandemic

Monica Fletcher¹, Thys van der Molen², Warren Lenney³, Isabelle Boucot,⁴ Bhumika Aggarwal⁵, Emilio Pizzichini⁶

¹The Usher Institute, University of Edinburgh, Edinburgh, UK

²Department of General Practice and GRIAG Research Institute, University Medical Center Groningen, University of Groningen, the Netherlands

³ Department of Pharmacy and Bioengineering, University of Keele, Staffordshire, UK

⁴Respiratory, GlaxoSmithKline, Brentford, London, UK

⁵Respiratory, General Medicines Emerging Markets, GlaxoSmithKline, Singapore 139234, Singapore

⁶Respiratory, Global Medical Expert, GlaxoSmithKline, Brazil

Corresponding author: Monica Fletcher. The Usher Institute, University of Edinburgh, Edinburgh, UK. Email: Monica.Fletcher@ed.ac.uk

Table S1. Treatment of acute attacks of asthma in primary care and acute care in adults and teenagers^{1,2,3}

Severity of attack	Primary care management	Acute care facility management
Life-threatening	<ul style="list-style-type: none"> • Urgent transfer to acute care facility • While waiting for transport, administer salbutamol (5mg) and ipratropium bromide (0.5 mg) via oxygen-driven nebuliser or via pMDI and spacer, commence prednisolone (40-50 mg) or hydrocortisone IV (100 mg), controlled oxygen therapy • Patient under close continuous observation of HCP in primary care facility until transport arrives • Written referral to ED/hospital 	<ul style="list-style-type: none"> • Most appropriately managed in acute care (e.g., ED or ICU) • Commence salbutamol 5 mg every 15–30 mins (or continuous administration 5–10 mg/h) via oxygen-driven nebuliser, add ipratropium bromide 0.5 mg 4–6 hourly, controlled oxygen therapy and oral prednisolone (or IV hydrocortisone 100 mg) • Measure ABGs • Discuss with senior clinician and ICU • Consider adding IV magnesium sulphate (1.2–2g over 20 min^a) • Correct any fluid and electrolyte disturbances • Transfer to ICU for possible intubation and mechanical ventilation
Severe	<ul style="list-style-type: none"> • Transfer to an acute care facility • While waiting, administer salbutamol via oxygen-driven nebuliser (5 mg) or via pMDI and spacer, commence prednisolone (40-50 mg) or hydrocortisone IV (100 mg), controlled oxygen therapy (aim SaO₂ 93–95%), maximum 98% • Patient to remain under close continuous observation of a HCP in the primary care facility until transport arrives • Written referral to ED/hospital 	<ul style="list-style-type: none"> • Most appropriately managed in ED, ICU or hospital ward • Commence salbutamol 5 mg every 15–30 mins via oxygen-driven nebuliser plus ipratropium bromide 0.5 mg 4–6 hourly, controlled oxygen therapy, and oral prednisolone (or IV hydrocortisone 100 mg) • Consider IV magnesium sulphate^b • Consider high-dose ICS within the first hour of presentation^c • Measure ABGs on initial presentation and after 1 hour • If continuing deterioration, discuss with senior clinician and ICU, treat as life-threatening and prepare for transfer to ICU • Monitor PEF 15–30 mins after initiating treatment

<p>Mild or Moderate</p>	<ul style="list-style-type: none"> • Administer salbutamol (100 µg/actuation) inhaler via spacer and pMDI, OCS 40–50 mg (adult), • Consider controlled flow oxygen if hypoxemic (aim SaO₂ 93–95%, maximum 98%) • Monitor SaO₂ and observe patient (minimum 1 hour) within primary care facility • Consider transfer to acute care if symptoms fail to improve or deteriorate • Symptoms resolved, minimal need for SABA – patient can be sent home with OCS, follow-up appointment, asthma action plan and preventative and relief therapy (consider increasing regular ICS dose if needed) 	<ul style="list-style-type: none"> • On presentation to ED, administer salbutamol (100 µg/actuation) inhaler via pMDI + spacer, or 5 mg via oxygen-driven nebuliser, consider adding ipratropium bromide 0.5 mg nebuliser 4–6 hourly, administer controlled oxygen (aim SaO₂ 93–95%, maximum 98%) if hypoxemic, and commence OCS • Measure lung function 1 hour after initial treatment • FEV₁/PEF at least 50% predicted or PB^d, normal physical examination, no distress, consider discharge home with primary care follow-up, asthma action plan and continued OCS • FEV₁/PEF <50% or continuing symptom deterioration, treat as severe and assess for hospital admission
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ABG, arterial blood gas; ED, emergency department; FEV₁, forced expiratory volume in 1 second; HCP, healthcare provider; ICS, inhaled corticosteroid; ICU, intensive care unit; IV, intravenous; OCS, oral corticosteroid; PB, personal best; PEF, peak expiratory flow; pMDI, pressurised metered-dose inhaler; SABA, short-acting β₂-agonist; SaO₂, saturated oxygen

^aDoses stated as per BTS recommendation³; ^bRecommended in NAEPP¹ and GINA²; ^cRecommended in GINA only²; ^dNAEPP: >70%¹, GINA 60-80%², BTS: >50%³

Figure S1. Example asthma action plan⁴

Image reproduced with permission from Asthma UK. The full asthma action plan resource and most up-to-date version is available at <https://www.asthma.org.uk/advice/resources/>

1 Every day asthma care:

My asthma is being managed well:

- With this daily routine I should expect/aim to have no symptoms.
- If I have not had any symptoms or needed my reliever inhaler for at least 12 weeks, I can ask my GP or asthma nurse to review my medicines in case they can reduce the dose.
- My personal best peak flow is:

My daily asthma routine:

My **preventer** inhaler (insert name/colour):

I need to take my **preventer** inhaler every day even when I feel well.

I take puff(s) in the morning and puff(s) at night.

My **reliever** inhaler (insert name/colour):

I take my **reliever** inhaler only if I need to

I take puff(s) of my reliever inhaler if any of these things happen:

- I'm wheezing
- My chest feels tight
- I'm finding it hard to breathe
- I'm coughing

Other medicines and devices (e.g spacer, peak flow meter) I use for my asthma every day:

2 When I feel worse:

My asthma is getting worse if I'm experiencing any of these:

- My symptoms are coming back (wheeze, tightness in my chest, feeling breathless, cough).
- I am waking up at night.
- My symptoms are interfering with my usual day-to-day activities (eg at work, exercising).
- I am using my reliever inhaler three times a week or more.
- My peak flow drops to below:

⚠ URGENT! If you need your reliever inhaler more than every four hours, you need to take emergency action now. See section 3.

What I can do to get on top of my asthma now:

If I haven't been using my preventer inhaler, I'll start using it regularly again or if I have been using it:

- Increase my preventer inhaler dose to puffs times a day until my symptoms have gone and my peak flow is back to my personal best.
- Take my reliever inhaler as needed (up to puffs every four hours).
- Carry my reliever inhaler with me when I'm out.

URGENT! See a doctor or nurse within 24 hours if you get worse at any time or you haven't improved after seven days.

Other advice from my GP about what to do if my asthma is worse (eg MART or rescue steroid tablets):

3 In an asthma attack:

I'm having an asthma attack if I'm experiencing any of these:

- My reliever inhaler is not helping or I need it more than every four hours.
- I find it difficult to walk or talk.
- I find it difficult to breathe.
- I'm wheezing a lot, or I have a very tight chest, or I'm coughing a lot.
- My peak flow is below:

What to do in an asthma attack

- 1 Sit up straight** – try to keep calm.
- 2 Take one puff of your reliever inhaler (usually blue)** every 30 - 60 seconds, up to a maximum of 10 puffs.
- 3 If you feel worse** at any point OR you don't feel better after 10 puffs call 999 for an ambulance.
- 4 Repeat step 2 after 15 minutes** while you're waiting for an ambulance.

After an asthma attack:

- If you dealt with your asthma attack at home, see your GP today.
- If you were treated in hospital, see your GP within 48 hours of being discharged.
- Finish any medicines they prescribe you, even if you start to feel better.
- If you don't improve after treatment, see your GP urgently.

What to do in an asthma attack if I'm on MART:

References

1. National Asthma Education and Prevention Program. *Expert Panel Report 3: guidelines for the diagnosis and management of asthma 2007*, <https://www.nhlbi.nih.gov/sites/default/files/media/docs/asthgdln_1.pdf> (2007). Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention.
2. Global Initiative for Asthma (GINA), 2021. <https://ginasthma.org/gina-reports/>. Accessed 2 July 2021The British Thoracic Society.
3. *BTS/SIGN British guideline on the management of asthma*, 2019. <<https://www.brit-thoracic.org.uk/standards-of-care/guidelines/btssign-british-guideline-on-the-management-of-asthma/>>
4. Asthma UK. *Filling in patient's asthma action plans*, <<https://www.asthma.org.uk/globalassets/health-advice/resources/adults/adult-asthma-action-plan.pdf>> (2019). Accessed 16 September 2021.