

Asthma and Respiratory Foundation NZ

adult asthma guidelines: a quick reference guide

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ABSTRACT

The purpose of the Asthma and Respiratory Foundation NZ Adult Asthma Guidelines is to provide simple, practical and evidence-based recommendations for the diagnosis, assessment and management of asthma in adults (aged 16 and over) in a quick reference format. The intended users are health professionals responsible for delivering asthma care in the community and hospital Emergency Department settings, and those responsible for the training of such health professionals.

Abbreviations:

ABG	Arterial Blood Gas
ACT	Asthma Control Test
ACOS	Asthma/COPD overlap syndrome
COPD	Chronic obstructive pulmonary disease
CXR	Chest X-Ray
DHB	District Health Board
DPI	Dry-powder inhaler
ED	Emergency Department
FeNO	Fraction of expired nitric oxide
FEV ₁	Forced expiratory volume in one second
FVC	Forced vital capacity
HDU	High Dependency Unit
ICS	Inhaled corticosteroid
ICU	Intensive Care Unit
LABA	Long-acting beta-2 agonist
LAMA	Long-acting muscarinic antagonist
MDI	Pressurised Metered Dose Inhaler
NIV	Non-invasive ventilation
NSAID	Non-steroidal anti-inflammatory drug
PaO ₂ , PaCO ₂	Arterial oxygen and carbon dioxide tension
PEF	Peak expiratory flow
PHO	Primary Health Organisation
SABA	Short-acting beta-2 agonist
SpO ₂	Oxygen saturation measured by pulse oximetry
U + E	Urea and Electrolytes

Context

Providing health professionals with current best practice guidance sits within the Asthma and Respiratory Foundation NZ's work programme, as a priority action towards reducing New Zealand's significant respiratory health burden. Three important documents were released by the Foundation in 2015; *Te Hā Ora: The National Respiratory Strategy*,¹ *The Impact of Respiratory Disease in New Zealand: 2014 update*² and *He Māramatanga huangō: Asthma health literacy for Māori children in New Zealand*.³ These set the context of the growing incidence and impact of asthma in New Zealand, the inequalities suffered by Māori, Pacific peoples and low income families, and the holistic approach needed to tackle the issues.

Guidelines review

The following documents were reviewed to formulate these Adult Asthma Guidelines: The New Zealand Guidelines Group 2002, 'The Diagnosis and Treatment of Adult Asthma Best Practice Evidence-Based Guideline',⁴ the National Asthma Council of Australia 2015 'Australian Asthma Handbook Quick Reference Guide',⁵ the Global Initiative for Asthma 2016 'Asthma Management and Prevention' including the companion 'Pocket Guide'⁶ and the SIGN 2014 British Guidelines on the Management of Asthma including the 'Quick Reference Guide'.⁷ A systematic review was not performed, although relevant references were reviewed where necessary to formulate this guideline version, and referenced as required to clarify differences in recommendations made between guidelines. Readers are referred to the above published guidelines and handbooks for the more comprehensive detail that they provide.

Grading

No levels of evidence grades are provided due to the format of the Adult Asthma Guidelines which is based on related Quick Reference Guides. Readers are referred to the above published guidelines and handbooks for the level of evidence for the recommendations on which the guidelines are based.

Guideline development group

This group included representatives from a range of professions and disciplines relevant to the scope of the guidelines. The first draft was written by Richard Beasley.

Development of the Adult Asthma Guidelines was funded by the Asthma and Respiratory Foundation NZ. No funding was sought or obtained from pharmaceutical companies.

Peer review

The draft guidelines were peer-reviewed by a wide range of respiratory health experts and key professional organisations, including the New Zealand Nurses Organisation Te Rūnanga o Aotearoa and Respiratory sections, the Pasifika GP Network, PHARMAC, the Royal New Zealand College of General Practitioners, the Thoracic Society of Australia and New Zealand, and the Internal Medicine Society of Australia and New Zealand.

Presentation

The guidelines are primarily presented through tables and figures with the intention to provide an electronic format which can be used in clinical practice. Key references are provided where necessary to support recommendations that may differ from previous guidelines or current clinical practice.

Dissemination plan

The guidelines will be translated into tools for practical use by health professionals, and used to update existing consumer resources. They will be published in the New Zealand Medical Journal and the Asthma and Respiratory Foundation NZ website, and disseminated widely via a range of publications, training opportunities and other communication channels, to health professionals, nursing and medical schools, PHOs and DHBs.

Implementation

The implementation of the guidelines by organisations will require communication, education and training strategies.

Expiry date

2019

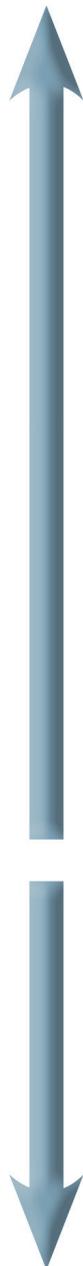
Diagnosis

- The diagnosis of asthma starts with the recognition of a characteristic pattern of symptoms and signs, in the absence of an alternative explanation.
- The key to making the diagnosis of asthma is to take a careful clinical history and then to undertake a clinical examination, document variable expiratory airflow limitation and assess response to inhaled bronchodilator and/or inhaled corticosteroid (ICS) treatment (Table 1, Figure 1). There is no reliable single 'gold standard' diagnostic test.

Practice points

- An increase in $FEV_1 \geq 12\%$ and $\geq 200\text{ml}$ from baseline after bronchodilator therapy are traditionally considered as diagnostic criteria for asthma. However, most people with asthma will not exhibit this degree of reversibility at any one assessment. There is a substantial overlap in bronchodilator reversibility between individuals with asthma, chronic obstructive pulmonary disease (COPD) and those with no respiratory disease, and as a result, no clear-cut divisions can be suggested.⁸

Table 1: Clinical features that increase or decrease the probability of asthma in adults.



<p>A. Asthma more likely</p> <ul style="list-style-type: none"> • Two or more of these symptoms: <ul style="list-style-type: none"> - Wheeze (most sensitive and specific symptom of asthma) - Breathlessness - Chest tightness - Cough. • Symptom pattern: <ul style="list-style-type: none"> - Typically worse at night or in the early morning - Provoked by exercise, cold air, allergen exposure, irritants, viral infections, beta blockers, aspirin or other NSAIDs - Recurrent or seasonal - Began in childhood. • History of atopic disorder or family history of asthma • Widespread wheeze heard on chest auscultation • Symptoms rapidly relieved by inhaled short-acting beta-2 agonist (SABA) • Airflow obstruction on spirometry ($FEV_1/FVC < 0.7$) • Increase in FEV_1 following bronchodilator, $>10\%$; the greater the increase, the greater the probability • Variability in PEF over time (highest-lowest PEF/mean), $>15\%$; the greater the variability, the greater the probability. <p>B. Asthma less likely</p> <ul style="list-style-type: none"> • Chronic productive cough in absence of wheeze or breathlessness • No wheeze when symptomatic • Normal spirometry or PEF when symptomatic • Symptoms beginning later in life, particularly in people who smoke • Increase in FEV_1 following bronchodilator, $<10\%$; the lesser the increase, the lower the probability • Variability in PEF over time, $<15\%$; the lesser the variability, the lower the probability • No response to trial of asthma treatment.

Measurement of bronchial responsiveness, blood eosinophils and FeNO may be informative.

- Alternative methods to identify variable airflow obstruction include repeat measures of spirometry with bronchodilator reversibility, peak flow variability with repeat measures at different times of the day and other specialist tests such as measures of bronchial hyper-responsiveness to exercise, methacholine or other provoking agents.
- In most patients, observing a symptomatic response to treatment may help confirm the diagnosis, but a limited response to bronchodilator or ICS does not rule out asthma.
- It may be difficult to distinguish between a diagnosis of asthma and COPD, particularly in adults with a smoking history, as they may have clinical features of both disorders.

This has led to the term ACOS (Asthma COPD Overlap Syndrome).

- The possibility of an occupational cause should be considered in all cases of adult onset asthma. If occupational asthma is suspected, it needs to be formally investigated, and this may require specialist referral.

Assessing asthma severity, control and future risk

Evaluation of asthma severity, the level of control and the risk of future events are all important components of the assessment of individuals with asthma.

Severity of asthma is defined by the treatment needed to maintain good control.

Figure 1:

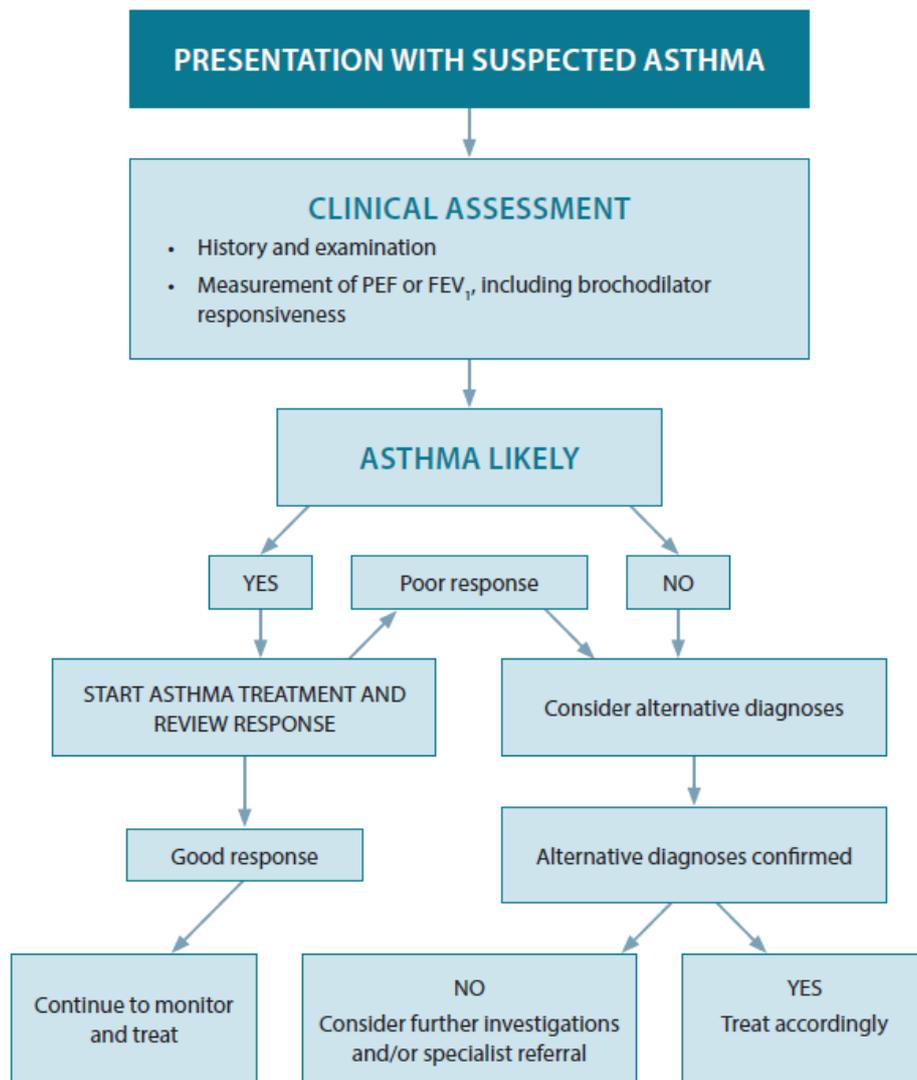


Table 2: Definition of levels of asthma symptom control, regardless of current treatment.

Good control	Partial control	Poor control
All of: <ul style="list-style-type: none"> Daytime symptoms ≤ 2 days per week Need for reliever ≤ 2 days per week[†] No limitation of activities No symptoms during night or on waking 	One or two of: <ul style="list-style-type: none"> Daytime symptoms > 2 days per week Need for reliever > 2 days per week[†] Any limitation of activities Any symptoms during night or on waking 	Three or more of: <ul style="list-style-type: none"> Daytime symptoms > 2 days per week Need for reliever > 2 days per week[†] Any limitation of activities Any symptoms during night or on waking

[†] Not including SABA taken prophylactically before exercise. (Record this separately and take into account when assessing management.)

Note: Recent asthma symptom control is based on symptoms over the previous four weeks.

Source: Adapted from Global Initiative for Asthma (GINA). Global strategy for asthma management and prevention. GINA; 2012. Australian Asthma Handbook v1.1 asset ID:33.

Practice points:

- For symptomatic patients, asthma severity can be determined only after a therapeutic trial of ICS for at least eight weeks. Start the therapeutic trial and book the follow-up appointment for eight weeks later.
- Severe asthma is asthma that remains uncontrolled despite optimal treatment, taken correctly. Patients who initially present with frequent symptoms often have mild asthma, which can be well controlled with ICS therapy.

Asthma symptom control is defined by the frequency of symptoms, the degree to which symptoms affect sleep and activity, and the need for reliever medication.

Practice point:

- Many patients under-report their asthma symptoms on general enquiry. Different methods for assessing asthma symptom control are available including:

i) Asthma Control Test (Figure 2)

This test has been widely validated^{9,10} and is recommended with the following cut points:

- ACT scores: 20–25: well controlled
- 16–19: partly controlled
- 5–15: poorly controlled

The latest version of the test can be accessed via <http://www.asthmacontrol.co.nz/>.

ii) Australian Asthma Handbook

This provides useful alternative questions that might be used to assess control (Table 2).⁵

Assessment of the risk of adverse outcomes including severe exacerbations, mortality and treatment-related adverse effects is also required (Table 3).

Practice point:

- High-risk patients can be identified by monitoring health care use (such as hospital admissions, ED and emergency and/or unplanned doctor visits) and medication requirements (such as courses of steroids, frequency of SABA prescriptions and more prescriptions for SABA than ICS).

Identifying management goals in collaboration with the patient

Managing asthma requires a partnership between the patient, their whānau and their healthcare team. This involves agreeing on management goals and a cycle based on repeated assessment, adjustment of treatment and review of responses as outlined in Figure 3.¹¹

Practice points:

- Check adherence and inhaler technique (and instruct patients using

Figure 2: The Asthma Control Test.

Is your asthma under control?



The first step to achieving control over your asthma is to know where you're at right now. That way, your health care professional (doctor, nurse or pharmacist) can help you reach the best asthma control possible.

This test is a way of working out your present level of asthma control.

Take five minutes now and do this simple test.

STEP 1 Answer these simple questions

Q1 In the **past four weeks**, how often did your asthma prevent you from getting as much done at work, school or home? **SCORE**

All of the time 1 Most of the time 2 Some of the time 3 A little of the time 4 Not at all 5

Q2 During the **past four weeks**, how often have you had shortness of breath?

More than once a day 1 Once a day 2 3 to 6 times a week 3 Once or twice a week 4 Not at all 5

Q3 During the **past four weeks**, how often did your asthma symptoms (wheezing, coughing, shortness of breath, chest tightness or pain) wake you up at night or earlier than usual in the morning?

4 or more times a week 1 2 to 3 nights a week 2 1 night a week 3 Less than 1 night a week 4 Not at all 5

Q4 During the **past four weeks**, how often have you used your reliever medication (such as your blue inhaler or rescue inhaler)?

3 or more times a day 1 1 or 2 times a day 2 2 or 3 times a week 3 Once a week or less 4 Not at all 5

Q5 How would you rate your asthma control during the **past four weeks**?

Not controlled 1 Poorly controlled 2 Somewhat controlled 3 Well controlled 4 Completely controlled 5

STEP 2 Add up each score to get the total

STEP 3 Turn this leaflet over to find out how well your asthma is controlled

TOTAL

What does your Asthma Control Test™ result mean?

Your test result is an assessment of your level of asthma control!^{1,2} It can help you and your health care professional decide if your asthma is controlled.



Score: 20-25

Well done. Your asthma appears to be controlled.² Even so, it can change over time so it's important to retest yourself regularly. Continue to talk to your health care professional about your asthma control.



Score: 19 or less

Your asthma may be uncontrolled or only partly controlled.² Talk to your health care professional about how you can improve it.

For further information about your asthma and what your test result might mean, make an appointment to see your health care professional.*

asthmacontrol.co.nz

Modified US version for use in New Zealand. This does not replace a full assessment from your Doctor. Asthma Control Test™ copyright, QualityMetric Incorporated 2002, 2004. All Rights Reserved. Asthma Control Test™ is a trade mark of QualityMetric Incorporated. Asthma Control Test is distributed by GlaxoSmithKline NZ Limited, Auckland.

References: 1. Nathan RA et al. *J Allergy Clin Immunol.* 2004;113:59-65. 2. Thomas M et al. *Prim Care Resp J.* 2009;18(1):41-49. TAPS N4809216FE/AST0005

*Please note that normal doctor fees will apply.

He pai tō whakahaere i tō mate huangō?



Ko te hīkoi tuatahi kia mau ai tō huangō ko te mōhio kei hea ko me tō huangō ināianei tonu. I tērā, ka taea e tō tohunga hauora (tākuta, nēhi me te kaiwhakararu) ki te āwhina i a koe kia taea ai te tiaki tino pai rawa atu i tō huangō.

Ko tēnei whakamātau he huarahi ki te tātai mahi i te taumata o te tiaki i tō huangō.

Kia rima meneti ināianei ki te mahi i te whakamātau ngāwari.

PAE 1 Whakautua ēnei pātai ngāwari

Q1 I ngā **wiki e whā o mau**, e hia ngā wā i aukatia ai koe e tō huangō ki te mahi i ngā mahi i te wāhi mahi, i te kōura, i te kāinga rānei? **KAUTE**

Ngā wā katoa 1 Te nuinga o te wā 2 Bāhi wā 3 Bāhi whangū ki 4 Kāore noa iho 5

Q2 I ngā **wiki e whā o mau**, e hia ō tūngāngā tangā?

Mā te aha te hīkoi wā 1 Kōwhiri wā 2 3 ki te 6 wā i te wā 3 Kōwhiri, ka hēnihi wā 4 Kāore noa iho 5

Q3 I ngā **wiki e whā o mau**, e hia ō ohonga ake i te pō, i te wā moata rawa i te ata nā ō tohu mate (te tīmohu, te tūngāngā, te kukū tangā i te poho, te kōharitari rānei)?

4 mō te ahuru 1 2 ki te 3 pō i te wā 2 1 ki te 2 pō i te wā 3 I te pō i te pō i te wā 4 Kāore noa iho 5

Q4 I ngā **wiki e whā o mau**, e hia ngā wāhanga i mahi ai koe i tō rongō whakaorora (pēnei i tō pūre whakangā kikorangi, tō papu whakangā whakaorora rānei)?

E 3 mō te ahuru whakaorora 1 I te 2 mō te ahuru whakaorora 2 2 ki te 3 mō te ahuru whakaorora 3 Kōwhiri, ka hēnihi wā i te wā 4 Kāore noa iho 5

Q5 Pēhea tō whakatau i tō tiaki i tō huangō i ngā **wiki e whā o mau**?

Kāore whakahaere 1 I te wā whakahaere 2 I te wā whakahaere 3 I te wā whakahaere 4 I te wā whakahaere 5

PAE 2 Tāpiritia ngā kaute kia oti te takepe

PAE 3 Hurihia te pānui nei ki te kimi ka pēhea te pai o te whakahaere o tō huangō

TATAU

He aha te tikanga o te putanga o tō Whakamātau Mau Huangō™?

He aromatawai tō putanga whakamātau o te kaha o tō whakahaere i tō mate huangō.^{1,2} Mā tēnei kōura ko tō pūkega tiaki hauora e āwhina pea ki te whakatau mēnā kei te pai te whakahaere i tō mate huangō.

Kaute: 20-25

Tino pai. Anō nei kei te mau tō huangō.² Heoi anō, ka āhei ki te whakarekē ia wā nō reira me whakamātau tonu i a koe ia wā. Kōrero tonu ki tō tohunga hauora mō te mau i tō huangō.

Kaute: 19, ihi iho rānei

Tēnā pea kei te āhua mau tō huangō, kei te mau kē tētahi wāhi anake.² Kōrero ki tō tohunga hauora mō te whakapiki ake.

Mō ētahi atu mōhiohio mō tō mate huangō, mō te tikanga pea o tō putanga whakamātau, tonoa he wā kia kite i tō pūkega tiaki hauora.*

asthmacontrol.co.nz

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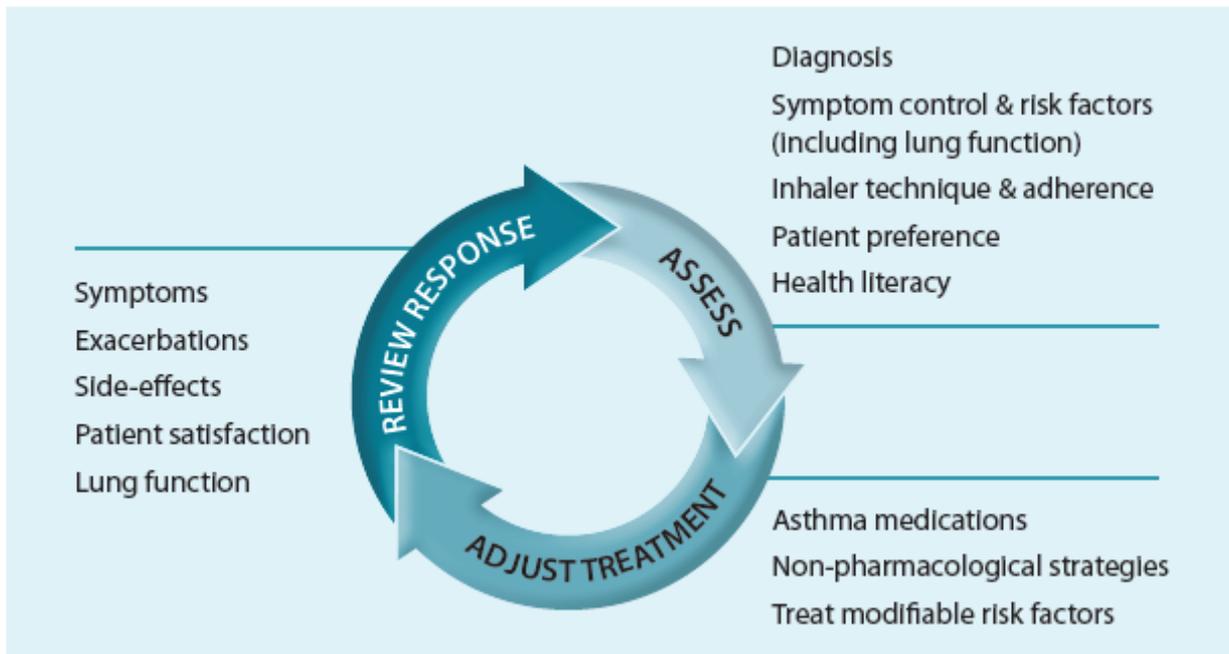
*Tēnā koe kia mōhio mo te tākuta he utu mo tēnei.

Asthma Control Test (ACT™) © 2002, 2007 Quality Metric Inc. All rights reserved. ACT™ is a trademark of QualityMetric Incorporated.

Table 3: Clinical features associated with increased risk of severe exacerbations and/or mortality.

<p>A. Asthma</p> <ul style="list-style-type: none"> • Poor symptom control • Hospitalisation or ED visit in the last year • High SABA use (>1 canister per month) • Home nebuliser • History of sudden asthma attacks • Impaired lung function (FEV₁ < 60% predicted) • Raised blood eosinophil count • ICU admission or intubation (ever) • Requirement for long-term or repeated courses of oral corticosteroids. <p>B. Comorbidity</p> <ul style="list-style-type: none"> • Psychotropic medications • Major psychosocial problems • Smoking • Alcohol and drug abuse • Aspirin or other NSAID sensitivity. <p>C. Other factors</p> <ul style="list-style-type: none"> • Underuse or poor adherence to ICS treatment • Discontinuity of medical care • Socioeconomic disadvantage • Māori and Pacific ethnicity • Occupational asthma.
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Figure 3: The control-based asthma management cycle.



Adapted from reference 6.

a physical demonstration of correct technique) at every visit.

- Consider alternative inhaler devices if persistent difficulty with technique.
- It is strongly recommended that a spacer is used with the pressurised metered dose inhaler (MDI) for the regular administration of ICS, ICS/long acting beta-2 agonist (LABA) and the administration of SABA in the setting of an acute attack. The two preferred methods are: one deep slow inhalation and a 10 second breath-hold, or 5–6 tidal breaths.

Initial treatment choices (when to add ICS)

- At initial diagnosis, all patients with asthma should be provided with a SABA to take as required for relief of symptoms.
- The key issue is when to start ICS therapy. There are proven benefits from the early introduction of ICS therapy in patients with mild or intermittent asthma and very few symptoms¹² but the adherence to ICS therapy in real world studies is generally poor. This has led to uncertainty in determining the right stage at which to start ICS. It is recommended that ICS therapy is introduced if patients have symptoms ≥ 2 times in the last week, with evidence of benefit in patients with less frequent symptoms.
- An exacerbation requiring oral corticosteroids in the previous year is widely regarded as a requirement for regular ICS therapy to reduce the risk of further exacerbations.
- The daily doses of ICS which achieve 80–90% of maximum obtainable

efficacy are shown in Table 4.^{13,14} These can be considered ‘standard’ doses for ICS, rather than ‘low’ doses as previously suggested.

- It is recommended that treatment with ICS is started at these standard doses. There is no greater benefit with initiation of ICS therapy at daily doses two to four times higher than these doses.¹⁵
- Higher doses may be used in patients in whom adequate control is not achieved, or the patient may be switched to ICS/ LABA combination therapy.
- ICS and ICS/LABA are best administered from an MDI with spacer or from a dry-powder inhaler (DPI).

Step up to ICS/ LABA therapy

- Combination ICS/LABA single-inhaler treatment may either be prescribed at a fixed maintenance dose with a SABA as reliever therapy or, only for budesonide/formoterol, as *Single ICS/LABA Maintenance and Reliever Therapy* (SMART regimen).
- The SMART regimen involves using the budesonide/formoterol combination inhaler for both regular maintenance use (once or twice daily), and for relief of symptoms (one actuation as required). Patients should not be prescribed a SABA reliever when taking the SMART regimen.
- The SMART regimen is more effective at reducing severe exacerbations than maintenance ICS/LABA with SABA reliever therapy.^{16,17,18} It is the preferred ICS/LABA regimen for treating patients at risk of severe exacerbations.
- Currently in New Zealand the SMART

Table 4: The recommended standard daily dose of ICS in adult asthma.

Beclomethasone dipropionate	400–500 µg/day
Beclomethasone dipropionate extrafine	200 µg/day
Budesonide	400 µg/day
Fluticasone propionate	200–250 µg/day

regimen is only approved for use with the budesonide/formoterol DPI.

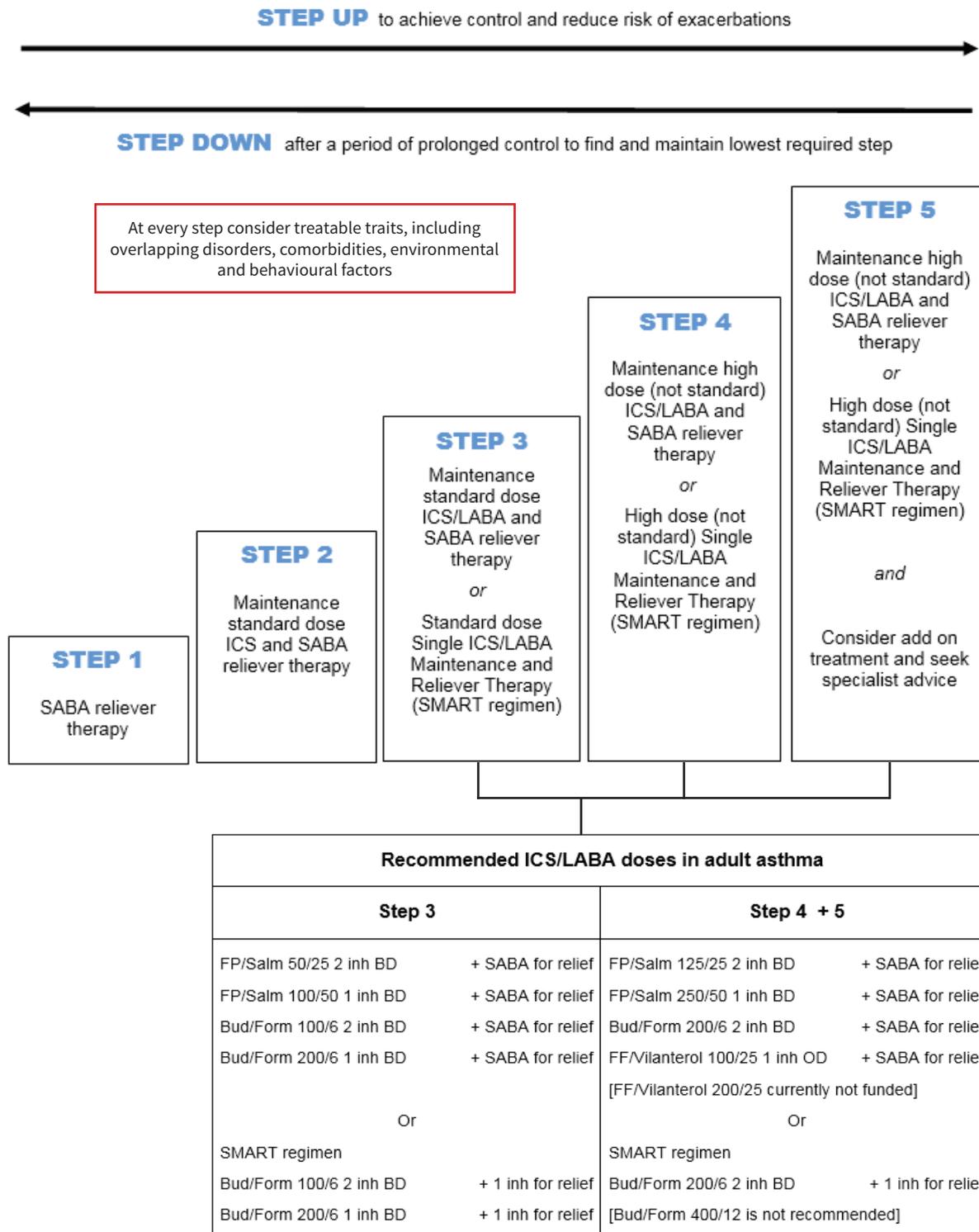
- LABA monotherapy is unsafe in patients with asthma and is a risk if patients are poorly adherent with ICS therapy.¹⁹ LABAs should not be prescribed in a separate inhaler from ICS in patients with asthma.

Stepwise approach to asthma treatment

Pharmacological treatment

In the stepwise approach to asthma management, patients step up and down as required to achieve and maintain control of their asthma and reduce the risk of exacerbations (Figure 4).

Figure 4: The stepwise approach to asthma treatment.



FP/Salm: Fluticasone Propionate/Salmeterol; Bud/Form: Budesonide/Formoterol; FF/Vilanterol: Fluticasone Furoate/Vilanterol; OD: once daily; BD: twice daily; SMART: Single ICS/LABA Maintenance and Reliever Therapy.

Practice points:

- Consider stepping up if uncontrolled symptoms, exacerbations or at increased risk, but check diagnosis, adherence, inhaler technique and modifiable risk factors first.
- Consider stepping down if symptoms are controlled for three months and low risk for exacerbations.²⁰ Ceasing ICS is not advised.
- At step 5, additional high dose ICS, oral steroids, monoclonal antibody therapy (IgE) and oral theophylline may be considered as add on treatment, with specialist review. The provision of a home nebuliser is not recommended.
- Alternative therapies such as sodium cromoglycate, nedocromil or montelukast may be considered in some patients at the lower steps.
- In asthma patients with features of COPD, long acting muscarinic antagonists (LAMA) may be considered.²¹
- At each step check inhaler technique, adherence to treatment, understanding of self-management plan and barriers to self-care.

Non-pharmacological measures

- The key non-pharmacological measures to improve asthma outcomes include smoking cessation, weight loss and breathing exercise programmes.
- Avoiding triggers which have been identified to provoke or precipitate attacks such as aspirin and other NSAIDs or attacks associated with features of anaphylaxis.
- Currently available house dust mite avoidance measures are not effective.²²
- Modifications to diet are unlikely to improve asthma control. Food avoidance should not be recommended unless an allergy or sensitivity has been confirmed.
- Exercise should be encouraged. If exercise provokes asthma it is a marker of poor control and should lead to a review of treatment.

- Limitation of exposure or removal from the workplace is crucial in the management of occupational asthma.
- Asthma control may be improved by a warm, dry domestic environment.²³
- Unflued gas heaters may make asthma symptoms worse.

Self-management

Self-management education based on a written, personalised, action plan improves health outcomes and should be offered to all people with asthma.^{11,24,25}

Practice points:

- Asthma action plans may be based on symptoms with or without peak flow measurements and comprise either three or four stages depending on patient and health professional preference.
- Asthma and Respiratory Foundation NZ asthma action plans (Figures 5A, 5B, 5C) can be downloaded from their website <http://asthmafoundation.org.nz/>:
 - ICS and SABA (three and four stage plan)
 - ICS/LABA and SABA (three stage plan)
 - Single ICS/LABA Maintenance and Reliever Therapy (SMART regimen)
- The peak flow level at which patients are guided to recognise worsening asthma is around 80% (of best), severe asthma at 60 to 70% (of best) and an asthma emergency at around 50% (of best).
- The four-stage plan has been shown to be effective in the management of asthma. In this plan there is an extra step giving patients the option of increasing the dose of ICS, up to four-fold, through increasing the frequency of use, and/or the dose at each use, when they recognise worsening asthma symptoms. Patients should be advised to return to their normal ICS dose once asthma symptoms have improved.
- The recommended action plans can be modified as required depending on patient and practitioner preference.

Figure 5A: Maintenance ICS and SABA reliever four-stage asthma action plan.

Name: _____ Doctor: _____
 Date of plan: _____ Doctor phone: _____

YOUR ASTHMA ACTION PLAN

Know your asthma symptoms Know when and how to take your medicine

Feeling good

Your asthma is under control when

- you don't have asthma symptoms most days (wheeze, tight chest, a cough or feeling breathless)
- you have no cough or wheeze at night
- you can do all your usual activities and exercise freely
- most days you don't need a reliever

Your peak flow reading is above _____

Preventer [name]	puffs	every morning
	puffs	every night
Reliever [name]	puffs	when you need it to relieve your asthma symptoms

Remember:
We strongly suggest that you use a spacer, if one can be used with your preventer inhaler

Carry your reliever at all times

Getting worse

Caution- your asthma is getting worse when

- you have symptoms most days (wheeze, tight chest, a cough or feeling breathless)
- you are waking at night with symptoms
- you are getting a cold
- you feel short of breath when you exercise

Your peak flow reading is below _____

Let's get prepared...

- Step up your preventer medicine:

Take _____ puffs four times each day

- Use your reliever as often as needed – through a spacer, if one can be used with your reliever inhaler

Other instructions:

Severe

Caution- your asthma is getting severe when

- your symptoms are getting severe (wheeze, tight chest, a cough or feeling breathless)
- your reliever is only helping for 2-3 hours, or you are using more than 12 puffs a day
- you feel you need to see your doctor

Your peak flow reading is below _____

Let's take action...

- Continue your medicine for "getting worse"
- Start prednisone if you have it:

Prednisone	mg	for	days
and then	mg	for	days

Important: You need to see your doctor today

Other instructions:

Emergency

Emergency

- your symptoms are getting more severe quickly
- you are finding it hard to speak or breathe
- your reliever is not helping much
- you are using your reliever every 1-2 hours

Your peak flow reading is below _____

Let's keep calm...

- Dial 111 for ambulance
- Keep using your reliever as often as needed – through a spacer, if one can be used with your reliever inhaler
- Even if you seem to get better seek medical help right away
- If you haven't started taking your prednisone, start now

Best peak flow: _____

Plan prepared by: _____

Next review date: _____

Signature: _____

Figure 5B: Maintenance ICS/LABA and SABA reliever three-stage asthma action plan or maintenance ICS and SABA reliever three-stage asthma action plan.

Name: _____ Doctor: _____
 Date of plan: _____ Doctor phone: _____

YOUR ASTHMA ACTION PLAN

Know your asthma symptoms Know when and how to take your medicine

Feeling good

Your asthma is under control when

- you don't have asthma symptoms most days (wheeze, tight chest, a cough or feeling breathless)
- you have no cough or wheeze at night
- you can do all your usual activities and exercise freely
- most days you don't need a reliever

Your peak flow reading is above _____

Preventer [name]	puffs	every morning
	puffs	every night
Reliever [name]	puffs	when you need it to relieve your asthma symptoms

Remember:
We strongly suggest that you use a spacer, if one can be used with your preventer inhaler.

Carry your reliever at all times

Severe

Caution- your asthma is getting severe when

- your symptoms are getting severe (wheeze, tight chest, a cough or feeling breathless)
- your reliever is only helping for 2-3 hours, or you are using more than 12 puffs a day
- you feel you need to see your doctor

Your peak flow reading is below _____

Let's take action...

- Continue your regular medicine
- Start prednisone if you have it:

Prednisone	mg	for	days
and then	mg	for	days

Important: You need to see your doctor today

Other instructions:

Emergency

Emergency

- your symptoms are getting more severe quickly
- you are finding it hard to speak or breathe
- your reliever is not helping much
- you are using your reliever every 1-2 hours

Your peak flow reading is below _____

Let's keep calm...

- Dial 111 for ambulance
- Keep using your reliever as often as needed – through a spacer, if one can be used with your reliever inhaler
- Even if you seem to get better seek medical help right away
- If you haven't started taking your prednisone, start now

Best peak flow: _____

Plan prepared by: _____

Next review date: _____

Signature: _____

Figure 5C: Single ICS/LABA Maintenance and Reliever Therapy (SMART) asthma action plan.

YOUR SMART* ASTHMA ACTION PLAN *Name:* _____ *Doctor:* _____
 *Single Maintenance and Reliever Therapy *Date of plan:* _____ *Doctor phone:* _____

Know your asthma symptoms **Know when and how to take your medicine**

Feeling good

Your asthma is under control when

- you don't have asthma symptoms most days (wheeze, tight chest, a cough or feeling breathless)
- you have no cough or wheeze at night
- you can do all your usual activities and exercise freely
- Most days you don't need your Symbicort inhaler

Your peak flow reading is above _____

Symbicort	dose(s)	every morning
Symbicort	dose(s)	every night
Symbicort	1 dose when you need it to relieve your asthma symptoms	

Remember:
 Your Symbicort is both a preventer and reliever - You do not need an extra inhaler as a reliever
 Carry your Symbicort at all times

Severe

Caution- your asthma is getting severe when

- your symptoms are getting severe (wheeze, tight chest, a cough or feeling breathless)
- your Symbicort is only helping for 2-3 hours, or you are using more than 8 doses a day in total (regular + reliever use)
- you feel you need to see your doctor

Your peak flow reading is below _____

Let's take action...

- Continue your regular Symbicort PLUS 1 dose of your Symbicort when needed to relieve symptoms
- Start prednisone if you have it:

Prednisone	mg	for	days
and then	mg	for	days

Important: You need to see your doctor today

Other instructions:

Emergency

Emergency

- your symptoms are getting more severe quickly
- you are finding it hard to speak or breathe
- your Symbicort is not helping much
- you are using your Symbicort every 1-2 hours

Your peak flow reading is below _____

Let's keep calm...

- Dial 111 for ambulance
- Keep using your Symbicort as often as needed
- Even if you seem to get better seek medical help right away
- If you haven't started taking your prednisone, start now

Best peak flow: _____

Plan prepared by: _____

Next review date: _____

Signature: _____

- The standard regimen for a course of prednisone in the situation of severe asthma is 40mg daily for five days. An alternative regimen is 40mg daily until definite improvement, and then 20mg daily for the same number of days.

Adherence to treatment should be routinely assessed and encouragement provided as part of the self-management education. For example, encourage patients to link their inhaler use with some other activity such as cleaning their teeth (and then rinsing their mouth).

Inhaler technique should be routinely assessed at consultations and training provided as part of self-management education. It is preferable to administer ICS

and ICS/LABA MDIs via a spacer, or to use a DPI.

The four-step adult asthma consultation, which includes guidance for writing an asthma action plan, is provided in the appendix.

Treatable traits

A key feature of the management of adult asthma is the recognition and treatment of overlapping disorders, comorbidities, environmental and behavioural factors, recently referred to as 'treatable traits'.²⁶ The assessment and management of some of the treatable traits may require specialist referral. One schema to consider is outlined in Table 5.

Table 5: Treatable traits in asthma.

<p>Overlapping disorders:</p> <ul style="list-style-type: none"> • COPD • Bronchiectasis • Allergic bronchopulmonary aspergillosis • Dysfunctional breathing including vocal cord dysfunction. <p>Comorbidities:</p> <ul style="list-style-type: none"> • Obesity • Gastro-oesophageal reflux disease • Rhinitis • Sinusitis • Depression/anxiety. <p>Environmental:</p> <ul style="list-style-type: none"> • Smoking • Occupational exposures • Provoking factors including aspirin, other NSAIDs and beta blockers. <p>Behavioural:</p> <ul style="list-style-type: none"> • Adherence • Inhaler technique.

Asthma in Māori^{1–3,27,28}

Māori rights in regards to health, recognised in Te Tiriti of Waitangi and other national and international declarations, promote both Māori participation in health-related decision making as well as equity of health outcomes for all New Zealanders. Currently Māori with asthma are more likely to be hospitalised or die due to asthma. Despite this, Māori with asthma are less likely to be prescribed ICS, have an action plan or receive adequate education. Major barriers to good asthma management for Māori include access to care, discontinuity and poor quality care, and reduced health literacy. Māori whānau have greater exposure to environmental triggers for asthma, such as smoking and poor housing. It is recommended that for Māori with asthma:

- Asthma providers should undertake clinical audit or other similar quality-improvement activities to monitor and improve asthma care and outcomes for Māori. The asthma action plan system of care,²⁴ including the SMART regimen have been shown to improve outcomes in Māori.²⁹
- A systematic approach to health literacy and asthma education for Māori whānau is required. The evidence of the health literacy demands, the barriers and facilitators, and steps to delivering excellent asthma management with Māori which are described in [He](#)

[maramatanga huango: Asthma health literacy for Māori children in New Zealand](#) also apply to adults.

- Asthma providers should support staff to develop cultural competency skills for engaging Māori with asthma and their whānau, in line with professional requirements. Information about the role of respiratory nurses working with Māori can be found on the New Zealand Nurses Organisation: http://www.nzno.org.nz/groups/colleges_sections/sections/respiratory_nurses.
- Māori leadership is required in the development of asthma management programmes that improve access to asthma care and facilitate ‘wrap around’ services to address the wider determinants (such as housing or financial factors) for Māori with asthma.

Asthma in Pacific peoples

Similar considerations are likely to apply to asthma in Pacific peoples who also have a disproportionate burden of asthma, including high rates of hospital admission, and should be considered a high-risk group requiring targeted care. Inclusive in this targeted approach is addressing risk factors such as poor housing, overcrowding, health literacy, obesity, smoking and poor access to health care services.

Asthma in pregnancy

Pregnancy can affect the course of asthma and women should be advised of the importance of maintaining good asthma control during pregnancy to avoid risk to both mother and baby.

- SABAs, ICS and LABAs should be used as normal during pregnancy.
- The risks to the baby of poor asthma control in pregnancy outweigh any theoretical risks associated with asthma medications.
- Oral steroids should be used as normal when indicated during pregnancy for women with severe asthma.
- Acute severe asthma in pregnancy is a medical emergency and should be treated in hospital.

Management of acute severe asthma (primary care, afterhours or ED)

Acute asthma management is based on:

- objective measurement of severity (Table 6)
- assessment of the need for referral to hospital and/or hospital admission (Table 7)
- administering treatment appropriate for the degree of severity and
- repeatedly reassessing the response to treatment.

Direct measurement of airflow obstruction is the best and most objective marker of asthma severity. This can be based on either the measurement of peak expiratory flow (PEF) or preferably FEV₁, if available, with both measures expressed as percent of the previous best or predicted normal values.

The levels of FEV₁ or PEF to signify severe and life-threatening asthma in these situations differ from (and are lower than) those used by patients in action plans in a non-health care setting.

Key priorities include identification of a life-threatening attack requiring urgent admission to an ICU or HDU, and a severe asthma attack requiring hospital admission (Table 7).

An evidence-based algorithm for the management of severe asthma can be used to guide treatment (Figure 6).³⁰⁻³⁶

Practice points:

- A lack of response to initial bronchodilator treatment and/or a requirement for repeat doses indicates the likely requirement for referral to hospital and/or admission.
- For most patients, initial treatment with a SABA via a spacer and oral steroids is likely to be sufficient. Reserve nebulised bronchodilators for those with severe asthma who do not respond to initial inhaled therapy.
- Magnesium sulphate is the preferred intravenous bronchodilator to be administered in life-threatening

Table 6: Levels of severity of acute asthma exacerbation.

Moderate asthma exacerbation:	<ul style="list-style-type: none"> • Increasing symptoms • FEV₁ or PEF >50% best or predicted • No features of acute severe asthma.
Severe asthma:	Any one of: <ul style="list-style-type: none"> • FEV₁ or PEF 30–50% best or predicted • Respiratory rate ≥25/min • Heart rate ≥110/min • Inability to complete sentences in one breath.
Life-threatening asthma:	Any one of the following in a patient with severe asthma: <ul style="list-style-type: none"> • FEV₁ or PEF <30% best or predicted • SpO₂ <92% or PaO₂ <60mmHg • PaCO₂ ≥45mmHg • Inability to talk# • Silent chest# • Cyanosis# • Feeble respiratory effort, exhaustion# • Hypotension or bradycardia#.

These are very late manifestations and reflect a patient at risk of imminent respiratory arrest.

Table 7: Criteria for referral to hospital and/or hospital admission.

- Patients with any feature of life-threatening asthma
- Patients with any feature of severe attack persisting after initial treatment
- Patients in whom other considerations suggest that admission may be appropriate:
 - Still have significant symptoms
 - Living alone/socially isolated
 - Psychosocial problems
 - Physical disability or learning difficulties
 - Previous near fatal attack
 - Exacerbation despite adequate dose of oral steroids pre-presentation
 - Presentation at night
 - Pregnancy.

asthma. There is no role for intravenous beta-2 agonists, unless inhaled treatment cannot be given. Similarly, there is no role for intravenous aminophylline.

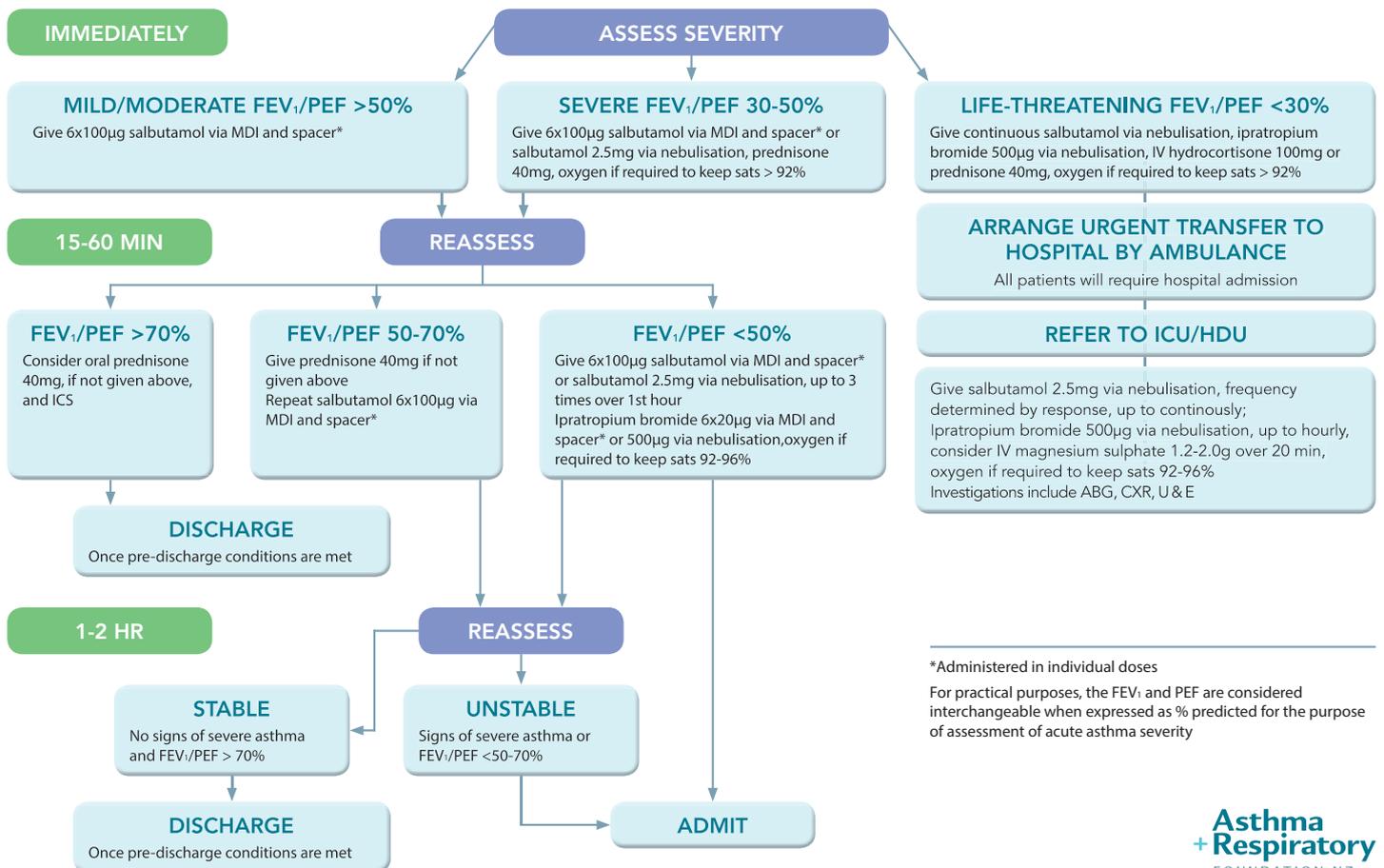
- There is no role for adrenaline (epinephrine) unless asthma is accompanied by anaphylaxis or angioedema.
- There is insufficient evidence to support the use of non-invasive ventilation (NIV) in life-threatening

asthma, outside an ICU or HDU setting, and as a result it is not recommended in other settings.

- For patients who are treated in primary care or discharged from the Afterhours or ED, long term management should be reviewed and an early follow-up appointment with their primary healthcare team should be arranged. All patients not taking ICS should be started on ICS before going home (Table 8).

Figure 6:

ALGORITHM FOR MANAGEMENT OF SEVERE ASTHMA



*Administered in individual doses
For practical purposes, the FEV₁ and PEF are considered interchangeable when expressed as % predicted for the purpose of assessment of acute asthma severity

Table 8: Pre-discharge considerations.

1. Most patients presenting with acute exacerbations of asthma should have a course of oral prednisone, 40mg daily for at least five days.
2. All patients should have an ICS started, or current use reinforced.
3. It is recommended that patients have prednisone and ICS dispensed prior to discharge to ensure there are no barriers to taking medication.
4. Before the patient goes home, ensure that the patient:
 - Understands treatment prescribed and the signs of worsening asthma
 - Has a peak flow meter and knows at what level to contact emergency medical help if worsens
 - Can use their inhalers correctly and has a supply of their medication
 - Arranges an early follow-up appointment with their primary healthcare team for review
 - Consider referral to a specialist respiratory service.

Appendix

The four-step adult asthma consultation

1. Assess asthma control	2. Consider other relevant clinical issues	3. Decide if increase or decrease in maintenance therapy required	4. Complete the asthma action plan
<p>Complete the Asthma Control Test (ACT) score</p> <p>20–25: well controlled 16–19: partly controlled 5–15: poorly controlled</p> <p>Review lung function tests Peak flow monitoring and/or Spirometry</p> <p>Review history of severe asthma attacks in last 12 months (requiring urgent medical review, oral steroids or bronchodilator nebuliser use)</p>	<p>Ask about compliance with maintenance treatment</p> <p>Check inhaler technique</p> <p>Enquire about clinical features associated with an increased risk</p> <p>Consider treatable traits</p> <p>Decide whether peak flow monitoring is indicated</p>	<p>Is a step up in the level of treatment required if asthma is not adequately controlled, poor lung function or recent severe exacerbation?</p> <p>Is a step down in the level of treatment possible if there has been a sustained period of good control?</p> <p>Is a change to the SMART regimen required in patients prescribed ICS/LABA treatment who have had a recent severe exacerbation?</p>	<p>Decide which plan to use:</p> <ul style="list-style-type: none"> • Three stage maintenance ICS + SABA reliever • Four stage maintenance ICS + SABA reliever <p>[This includes the instruction to increase dose and frequency of ICS in worsening asthma]</p> <ul style="list-style-type: none"> • Three stage ICS/LABA + SABA reliever • Single ICS/LABA Maintenance and Reliever Therapy [SMART] <p>For those with peak flow instructions, enter personal best recent peak flow and peak flow at each level in the plan. The recommended cut points of <80% for getting worse, <60 to 70% for severe asthma and <50% for an emergency are a reference guide only and can be adjusted according to clinical judgement depending on the patient.</p> <p>Enter the prednisone regimen. The standard regimen in severe asthma is 40mg daily for five days. An alternative regimen is 40mg daily until there is definite improvement and then 20mg daily for the same number of days.</p> <p>Enter additional instructions in the box provided. This may include avoidance of provoking factors such as aspirin.</p>

Figure 7A: Completing the maintenance ICS and SABA reliever four-stage asthma action plan.

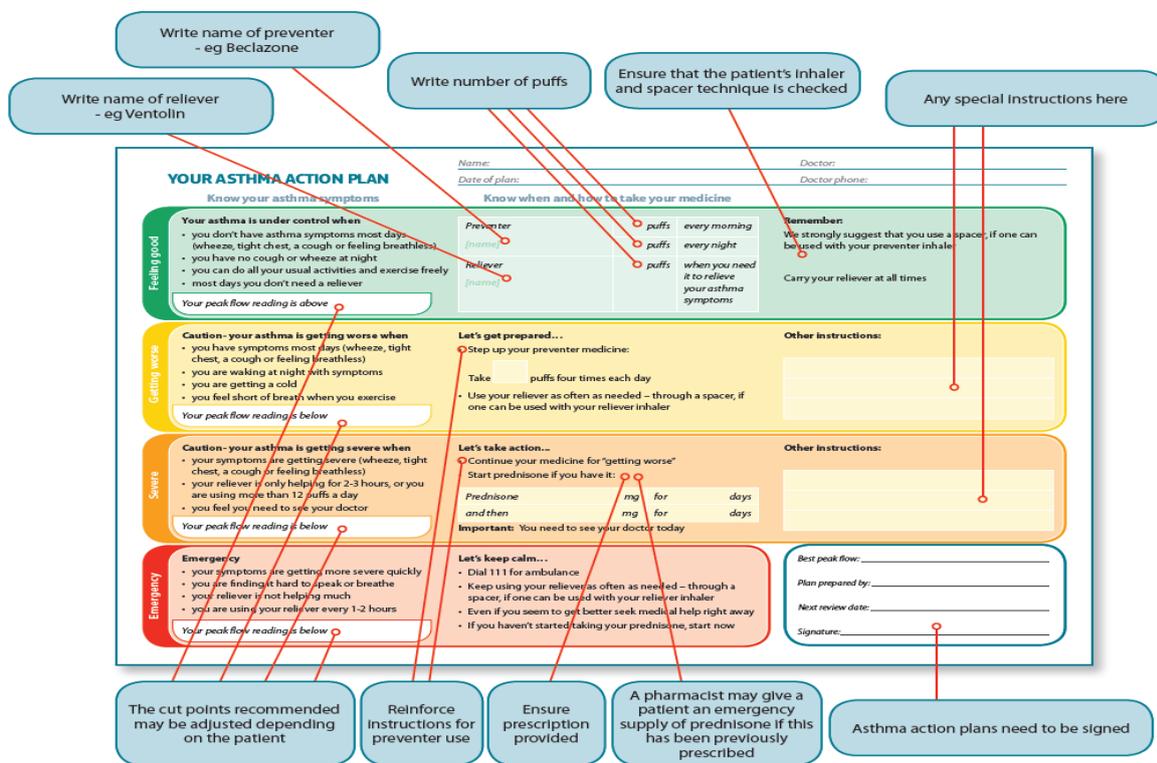


Figure 7B: Completing the maintenance ICS/LABA and SABA reliever or maintenance ICS and SABA reliever three-stage asthma action plan.

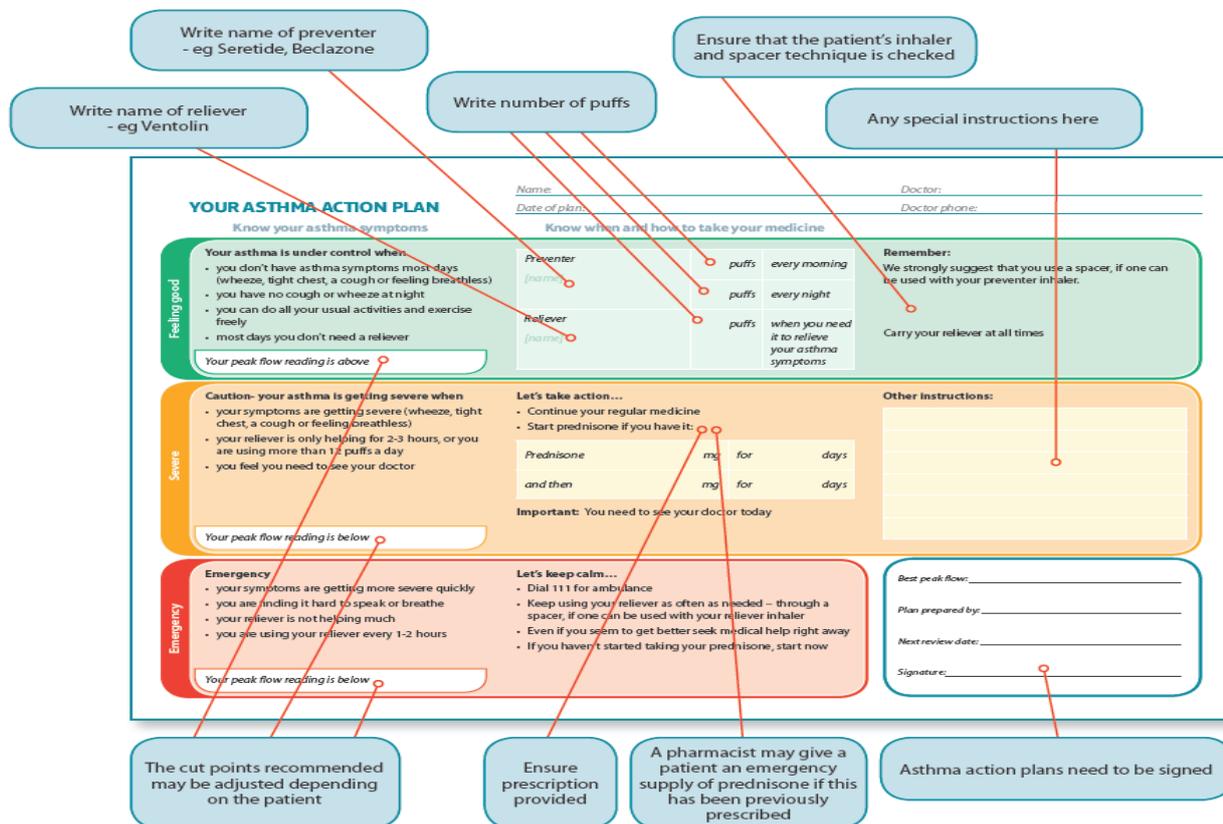


Figure 7C: Completing the Single ICS/LABA Maintenance and Reliever Therapy (SMART) asthma action plan.

YOUR SMART* ASTHMA ACTION PLAN
*Single Maintenance and Reliever Therapy

Name: _____ Doctor: _____
Date of plan: _____ Doctor phone: _____

Know your asthma symptoms

Know when and how to take your medicine

Feeling good

Your asthma is under control when

- you don't have asthma symptoms most days (wheeze, tight chest, a cough or feeling breathless)
- you have no cough or wheeze at night
- you can do all your usual activities and exercise freely
- Most days you don't need your Symbicort inhaler

Your peak flow reading is above _____

Symbicort	<input type="text"/> dose(s)	every morning
Symbicort	<input type="text"/> dose(s)	every night
Symbicort 1 dose when you need it to relieve your asthma symptoms		

Remember:
Your Symbicort is both a preventer and reliever - You do not need an extra inhaler as a reliever
Carry your Symbicort at all times

Caution - your asthma is getting severe when

- your symptoms are getting severe (wheeze, tight chest, a cough or feeling breathless)
- your Symbicort is only helping for 2-3 hours, or you are using more than 8 doses a day in total (regular + reliever use)
- you feel you need to see your doctor

Your peak flow reading is below _____

Let's take action...

- Continue your regular Symbicort PLUS 1 dose of your Symbicort when needed to relieve symptoms
- Start prednisone if you have it: mg for days

and then mg for days

Important: You need to see your doctor today

Other instructions:

Emergency

- your symptoms are getting more severe quickly
- you are finding it hard to speak or breathe
- your Symbicort is not helping much
- you are using your Symbicort every 1-2 hours

Your peak flow reading is below _____

Let's keep calm...

- Dial 111 for ambulance
- Keep using your Symbicort as often as needed
- Even if you seem to get better seek medical help right away
- If you haven't started taking your prednisone, start now

Best peak flow: _____
Plan prepared by: _____
Next review date: _____
Signature: _____

The cut points recommended may be adjusted depending on the patient

Ensure prescription provided

A pharmacist may give a patient an emergency supply of prednisone if this has been previously prescribed

Asthma action plans need to be signed

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Jim Reid is a member of the GlaxoSmithKline Expert Advisory Committee.

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