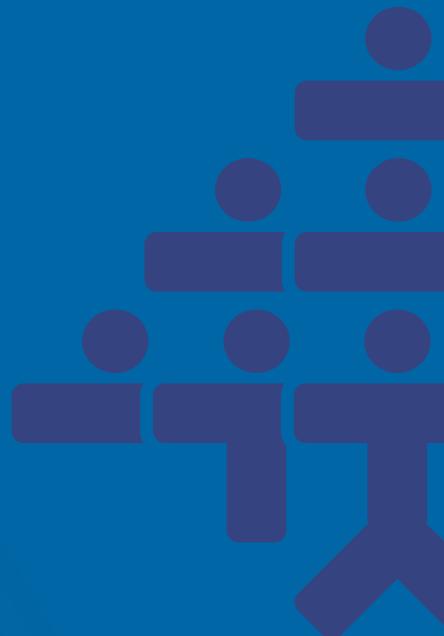

Asthma - Diagnosis, Assessment and Management in General Practice Quick Reference Guide



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Asthma - Diagnosis, Assessment and Management in General Practice

Quality and Safety in Practice Committee



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Evidence-Based Medicine

Evidence-based medicine is the conscientious, explicit and judicious use of current best evidence in making decisions about the care of individual patients.

In this document you will see that evidence and recommendations are graded according to the system used in the Global Initiative for Asthma (GINA) guidelines as outlined in Table 1.

Where possible, systematic review evidence is presented.

Table 1. Level of evidence based on GINA guidelines

Evidence level	Source of evidence	Definition
A	Randomized controlled trials (RCTs) and meta-analyses. Rich body of data.	Evidence is from endpoints of well-designed RCTs, meta-analyses of relevant studies, or strong observational evidence that provide a consistent pattern of findings in the population for which the recommendation is made. Category A requires substantial numbers of studies involving substantial numbers of participants.
B	Randomized controlled trials (RCTs) and meta-analyses. Limited body of data.	Evidence is from endpoints of intervention studies that include only a limited number of patients, post hoc or subgroup analysis of RCTs or meta-analysis of such RCTs. In general, Category B pertains when few randomized trials exist, they are small in size, they were undertaken in a population that differs from the target population of the recommendation, or the results are somewhat inconsistent.
C	Nonrandomized trials. Observational studies.	Evidence is from outcomes of uncontrolled or non-randomized trials or from observational studies.
D	Panel consensus judgment.	This category is used only in cases where the provision of some guidance was deemed valuable but the clinical literature addressing the subject was insufficient to justify placement in one of the other categories. The Panel Consensus is based on clinical experience or knowledge that does not meet the above listed criteria.

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Abbreviations

ACT	Asthma control test
AIR	Anti-inflammatory reliever therapy
ASI	Asthma Society of Ireland
COPD	Chronic obstructive pulmonary disease
DPI	Dry-powder inhaler
ED	Emergency department
FeNO	Fraction of expired Nitric Oxide
FEV₁	Forced expiratory volume in one second
FVC	Forced vital capacity
GINA	Global Initiative for Asthma
HSE	Health Service Executive
ICS	Inhaled corticosteroid
ICU	Intensive care unit
LABA	Long-acting beta-2 agonist
LAMA	Long-acting muscarinic antagonist
pMDI	Pressurised metered dose inhaler
NIV	Non-invasive ventilation
NSAID	Non-steroidal anti-inflammatory drug
OCS	Oral corticosteroids
PaO₂, PaCO₂	Arterial oxygen and carbon dioxide tension
PEF	Peak expiratory flow
SABA	Short-acting beta-2 agonist
SpO₂	Oxygen saturation measured by pulse oximetry
SPT	Skin prick testing
URTI	Upper respiratory tract infections

List of Tables

- Table 1. Level of evidence based on GINA guidelines
- Table 2. Questions recommended by GINA to assess asthma symptom control
- Table 3. Clinical features associated with increased risk of severe exacerbations and mortality
- Table 4. Inhaled Corticosteroids for use in adults and adolescents and total daily doses
- Table 5. Treatable traits in asthma
- Table 6. Levels of severity of acute asthma exacerbation
- Table 7. Criteria for referral to hospital and/or hospital admission
- Table 8. Pre-discharge considerations
- Table 9. Features suggesting a diagnosis of asthma in children under 6 years old.
- Table 10. Differential diagnosis of wheeze, cough and breathlessness in children under 6 years old
- Table 11. Assessing asthma control in children under 6 years old
- Table 12. Inhaled Corticosteroids for children under 6 years old and total daily doses
- Table 13. Advised delivery devices recommended for children 0-6 years old
- Table 14. Indications of the need for urgent treatment and immediate transfer to hospital.
- Table 15. Indications for immediate transfer to hospital in children less than 5 years
- Table 16. Dose and method of administration of treatments for moderate-severe exacerbations of asthma in children under 6 years old
- Table 17. Structured review of asthma control in General Practice

List of Figures

- Figure 1. Clinical features that increase or decrease the probability of asthma
- Figure 2. Summary of pathway for diagnosis of asthma
- Figure 3. GINA assess – adjust-review response cycle for asthma management
- Figure 4. Stepwise management of asthma in adults and adolescents 12+ years
- Figure 5. Selecting initial controller treatment in adults and adolescents with a diagnosis of asthma.
- Figure 6. Stepwise management of asthma in children. 6-11 years old
- Figure 7. Suggested initial controller treatment in children 6-11 years with a diagnosis of asthma
- Figure 8. Asthma Society of Ireland – self-management plan
- Figure 9. Summary of treatment acute asthma in adults, adolescents and children over 6 years old
- Figure 10. Probability of asthma diagnosis in children under 6 years old
- Figure 11. Step-wise treatment of asthma in children under 6 years old
- Figure 12. Key points in managing asthma exacerbations in children under 6 years old

Table of Contents

Introduction	8
Section 1 Background	10
Section 2 Diagnosis (Excluding Under 6 year olds)	11
Section 3 Assessing Asthma Severity, Control and Future Risk.....	14
Section 4 Identifying Management Goals in Collaboration with the Patient	16
Section 5 Inhaler Technique and Adherence	17
Section 6 Reliever Therapy	18
Section 7 Asthma Treatment	19
Section 8 Add-On Treatments	25
Section 9 Self-Management.....	27
Section 10 Treatable Traits	28
Section 11 Adolescents	29
Section 12 Asthma in Pregnancy	30
Section 13 Management of Acute Severe Asthma	31
Section 14 Asthma in Under 6 Years Old.....	35
Section 15 Assessment and Management of Asthma in Children Under 6 Years Old	40
Appendix 1 Structured Review of Asthma Control in General Practice	53
Appendix 2 Suggested Audits of Asthma Assessment and Management in General Practice - Potential Audits	54
References.....	55

Introduction

Asthma is a chronic inflammatory condition of the airways characterised by recurrent episodes of wheezing, breathlessness, chest tightness and coughing. Asthma is a common and potentially serious chronic disease that imposes a substantial burden on patients, their families and the community. It can cause significant respiratory symptoms and limitation of activity in all age groups. Asthma exacerbations often require urgent health care professional intervention and can be fatal.

There are about 450,000 patients with asthma in Ireland, which has the 4th highest prevalence of asthma in the world (1). Most patients are managed solely in general practice, but it remains sub-optimally controlled in the majority (2). The cost of asthma care in Ireland is estimated at €472 million per annum (3). Asthma cannot be prevented or cured but the clinical manifestations can be effectively controlled with appropriate treatment. When asthma is controlled, there should be no more than occasional recurrence of symptoms and severe exacerbations should be rare.

This revised guide is based on the 2019 update of the Global Initiative for Asthma (GINA) statement (4) and incorporates all the clinically relevant updates since the second edition of 'Asthma Control in General Practice' in 2013. This ICGP guide provides recommendations for the diagnosis and management of asthma in patients in general practice. The new GINA 2019 statement represents a significant change to previous documents with the recommendation that inhaled corticosteroids (ICS) are utilised at **all steps** in the asthma treatment pathway and, in patients who are not taking regular ICS, that they are administered whenever a reliever is used (not in under 6 years old) (4). In Ireland, the overuse of SABA as monotherapy for asthma is widespread and it has been demonstrated that this is a significant risk factor for exacerbations and death from asthma (5, 6). The new guideline included the use of combination LABA/ICS therapy use on an 'as required' basis in patients with mild asthma, without their use as maintenance therapy. This emphasises further the well-established evidence that places ICS as the cornerstone to controlling asthma. We are aware that this recommendation may evolve over time, as new evidence and data from real life studies emerge. The only currently available LABA/ICS combination which can be utilised in this way is formoterol/budesonide. In Ireland, however it must be stressed that its use in this manner in patients with asthma is not licensed and as such represents an 'off-label' use of the product.

A separate section on managing children under 6 years old has been added to this ICGP guide because this group are managed primarily in general practice and are included in the cycle of care in the under 6 years old contract. The management of asthma in this group requires involvement of parents/carers in all aspects of care. Good communication and education is essential to ensure that clear goals are set early and agreement with management plans are consistent between clinician and parent/carer. The use of a therapeutic trial is an important step in establishing a diagnosis because formal testing is difficult in this age group. It is important to review the diagnosis on a regular basis and monitor the treatment and any potential side effects.

In the COVID world, it is worth remembering that patients with asthma although not seemingly at higher risk of developing COVID require close monitoring of their asthma because uncontrolled asthma is a risk factor. The ICGP have specific guides regarding managing respiratory disease including asthma in the [COVID-19 clinical hub](#) section of the website.

Aim of this Document

The purpose of this document is to assist the healthcare professional to improve diagnostic accuracy; assess, treat and monitor asthma; develop an asthma management plan for individual patients; optimise asthma control; and manage exacerbations in line with approved protocols. The document is targeted at those delivering care in primary care. The quality of care outlined in this document cannot be fully implemented without the appropriate allocation of resources to practices involved in its delivery.

New Developments since 2013

The purpose of the 2020 ICGP QRG is to provide simple, practical and evidence-based recommendations for the diagnosis, assessment and management of asthma in adults and adolescents (aged 12 and over) and children in a quick reference format. The intended audience is healthcare professionals responsible for the management of asthma in primary care and those responsible for training these professionals.

The main changes in the 2020 update are:

1. Recommendation that all symptomatic asthma patients, including those with mild asthma should receive ICS. In those with mild asthma, this may be achieved through usage of
 - Regular ICS or
 - Inhaled short-acting beta₂-agonist (SABA) and low-dose ICS, both administered when required (prn), or
 - Inhaled low-dose budesonide/formoterol used on prn basis (Use of an inhaler containing a low-dose ICS, or a combination inhaler containing low-dose budesonide/formoterol in this manner is not licensed in Ireland, and, as such, represents an off-label use of these medicinal products).
2. Inclusion of new stepwise management algorithms including guidance on initiation of treatment
3. The role of LAMA therapy in severe asthma
4. The role of omalizumab in severe allergic asthma and anti-IL5 therapies in severe eosinophilic asthma

Section 1 Background

1.1 Context

Up to 20% of children and up to 8% of adults have asthma in Ireland and thus represents a major public health issue (7). Most of these patients are cared for in general practice by GPs and practice nurses. Overall asthma control remains suboptimal for the majority of patients. Structured care pathways are being developed to try to improve care for patients with asthma.

Good asthma control should have the following features:

- No troublesome symptoms by day or night
- Little or no needs for reliever medication
- No limitations in lifestyle
- Have normal lung function
- Avoid flare ups
- No hospitalisations or unscheduled visits

1.2 Guidelines Review

The ICGP published the adult asthma QRG in 2013 and since that publication, there have been a number of major advances in the treatment of asthma in adolescents and adults. It has been recognised that the investigation and management of asthma in adolescents and adults has a similar evidence base, which warrants the combining of guideline recommendations across these age groups. The major document which has been reviewed to formulate the 2020 update is the GINA 2019 Update Strategy. As previously, a systematic review was not performed; relevant references were reviewed where necessary to formulate this guideline version and referenced as required to support key recommendations. Readers are referred to the GINA 2019 Update strategy for the more comprehensive detail that it provides, accessed at <https://ginasthma.org>.

Section 2 Diagnosis (Excluding Under 6 year olds)

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 clinical history, undertake a focussed physical examination, document variable expiratory airflow limitation, and assess response to inhaled bronchodilator and/or ICS treatment (Figure 1). There is no reliable single 'gold standard' diagnostic test.



1. Asthma more likely

- Two or more of these symptoms
 - Wheeze (most sensitive and specific symptom of asthma)
 - Breathlessness
 - Chest tightness
 - Cough
- Symptom pattern
 - Intermittent
 - 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
 - Begins in childhood
- History of atopic disorder or family history of asthma
- Widespread wheeze heard on chest auscultation
- Symptoms rapidly relieved by inhaled SABA or budesonide/formoterol
- Airflow obstruction on spirometry ($FEV_1/FVC < 0.7$)
- Increase in FEV_1 following bronchodilator $\geq 12\%$; the greater the increase the greater the probability
- Variability in PEF over time (highest-lowest PEF/mean) $> 10\%$ over a 2 week time period; the greater the variability the greater the probability
- High FeNO ($> 40 \text{ ppb}$ in adults)

2. Asthma less likely

- Chronic productive cough in the 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 $< 12\%$; the lesser the increase the lower the probability
- Variability in PEF over time $< 10\%$ over a 2 week period; the lesser the variability the lower the probability
- No response to trial of asthma treatment
- Clinical features suggest an alternative diagnosis

Figure 1: Clinical features that increase or decrease the probability of asthma (Figure 1 is provided with permission from Asthma Respiratory Foundation New Zealand, NZ Adolescent & Adult Asthma Guidelines 2020, Available [here](#))

Section 2.1 Guide to Diagnosis

Section 2.1.1 History and Family History

Commencement of respiratory symptoms in childhood, a history of allergic rhinitis or eczema, or a family history of asthma or allergy, increases the probability that the respiratory symptoms are due to asthma. However, these features are not specific for asthma and are not seen in all asthma phenotypes. Patients with allergic rhinitis or atopic dermatitis should be asked specifically about respiratory symptoms.

Section 2.1.2 Physical Examination

Physical examination in people with asthma is often normal. The most frequent abnormality is expiratory wheezing (rhonchi) on auscultation but this may be absent or only heard on forced expiration. Wheezing may also be absent during severe asthma exacerbations, due to severely reduced airflow (so called 'silent chest') but at such times other physical signs of respiratory failure are usually present. Wheezing may also be heard with upper airway dysfunction, chronic obstructive pulmonary disease (COPD), respiratory infections or inhaled foreign body. Crackles (crepitations) and inspiratory wheezing are not typical features of asthma. Examination of the nose may reveal signs of allergic rhinitis or nasal polyposis.

Section 2.1.3 Lung Function Testing to Document Variable Expiratory Airflow Limitation

Asthma is characterised by variable expiratory airflow limitation i.e. expiratory lung function varies over time and in magnitude to a greater extent than in healthy populations. In asthma, lung function may vary between completely normal and severely obstructed in the same patient.

Practice Points

- A good focussed clinical history is the first step in making the diagnosis. It is however important to gather objective evidence of airflow obstruction as this increases the diagnostic accuracy.
- An increase in $\text{FEV}_1 \geq 12\%$ and $\geq 200\text{ml}$ from baseline after inhaled bronchodilator therapy has traditionally been considered indicative of airway reversibility and therefore part of the diagnostic criteria for asthma. However, most people with asthma will not exhibit this degree of reversibility at one assessment and normal spirometry does not exclude asthma. The greater the magnitude of reversibility with bronchodilator, the greater the likelihood that there is an asthma component to the disease.
- Alternative methods to identify variable airflow obstruction include repeat measures of spirometry with reversibility with bronchodilator, peak flow variability with repeat measures at different times of the day and other specialist tests such as bronchial challenge testing. Once the diagnosis has been confirmed, it is not necessary to undertake repeat or serial reversibility testing.
- In most patients, observing a symptomatic response to treatment may help confirm the diagnosis, however a limited response to inhaled bronchodilator or ICS does not rule out asthma. Measurement of FeNO can be helpful in guiding the dose of ICS needed but the role of FeNO testing in primary care has yet to be fully established.
- 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. If asthma is believed to be part of the presentation, management should always include an ICS. 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 requires specialist referral. The pathway for diagnosis is summarised in Figure 2. This pragmatic approach allows clinicians to consider alternative diagnoses.

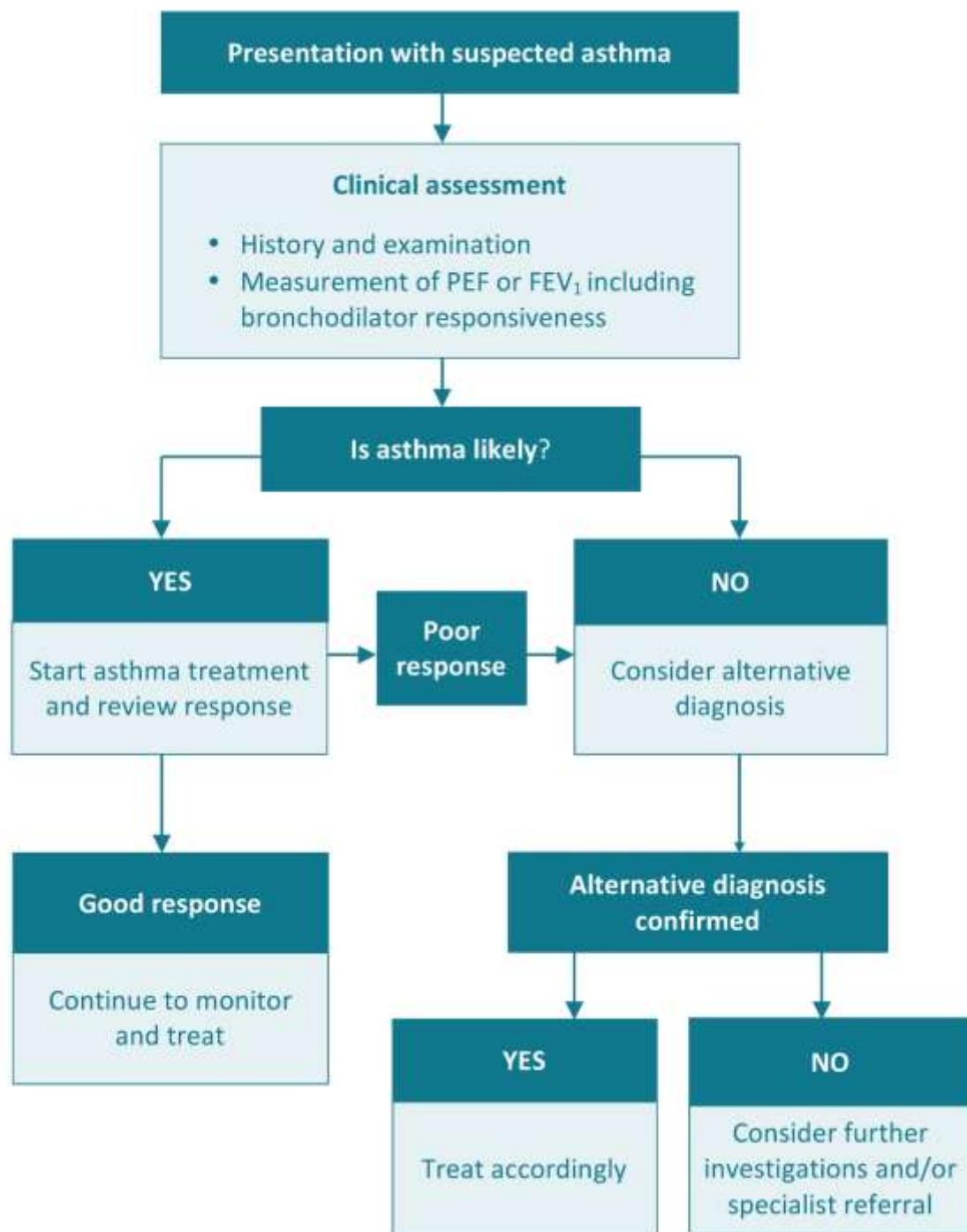


Figure 2: Summary of pathway for diagnosis of asthma (modified from BTS/SIGN asthma guidelines (8))

Section 3 Assessing Asthma Severity, Control and Future Risk

Evaluation of asthma severity, the level of asthma control and the risk of future events are very important components in assessing individuals with asthma.

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

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-based 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. Poor control is a burden to patients and a risk factor for flare-ups.

Practice Points

- Many patients under-report their asthma symptoms. Different methods for assessing asthma symptom control are available including the GINA questions regarding the last 4 weeks (Table 2).

Table 2: Questions recommended by GINA to assess asthma symptom control (with permission from GINA guideline 2020 (9))

Assessment of symptom control		Level of Asthma symptom control		
In the past 4 weeks, has the patient had:		Well controlled None of these	Partly controlled 1-2 of these	Uncontrolled 3-4 of these

- Asthma control is a key element to improve quality of life and reduce asthma mortality. It is essential that this is assessed at every opportunity as patients may consider poor asthma control as normal baseline for them. Structured questions are better than vague “how is your asthma?” type questions. All patients with poorly controlled asthma must be reviewed to address potential underlying issues. This includes patients with high use of SABAs, multiple courses of rescue medications or recurrent use of out-of-hours services and/or hospitalisations.
- A template of issues to be covered in the structured review is summarised in [Appendix 1](#).
- Assessment of the risk of adverse outcomes including severe exacerbations and mortality is also required (Table 3).

Table 3: Clinical features associated with increased risk of severe exacerbations

A. Asthma

- Poor symptom control (as above)
- Underuse or poor adherence to ICS treatment
- One or more exacerbations requiring oral corticosteroids in the last year
- Hospitalisation or ED visit in the last year
- High SABA use (>1 canister per month)
- History of sudden asthma attacks
- Impaired lung function (FEV₁ <60% predicted)
- Raised blood eosinophil count
- ICU admission or intubation (ever)
- Requirement for long term oral corticosteroids

B. Comorbidity

- Smoking
- Obesity
- Rhinitis
- Reflux
- Sleep apnoea
- Food allergy/anaphylaxis
- Alcohol and drug abuse
- Aspirin or other NSAID sensitivity

C. Other factors

- Discontinuity of medical care
- Socioeconomic disadvantage
- Psychiatric illness
- Occupational exposure

Practice Points

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

Patients with well controlled asthma should not require more than 1 “Blue” (SABA) inhaler per year

Section 4 Identifying Management Goals in Collaboration with the Patient

Managing asthma requires a partnership between the patient and their healthcare team. This involves agreeing management goals and a cycle based on repeated assessment, adjustment of treatment and review of responses as summarised in Figure 3. It is important that patients and clinicians have shared goals and that a partnership is developed. Health literacy and language barriers need to be considered.

The key cycle of **assess – adjust-review response** is summarised in Figure 3.

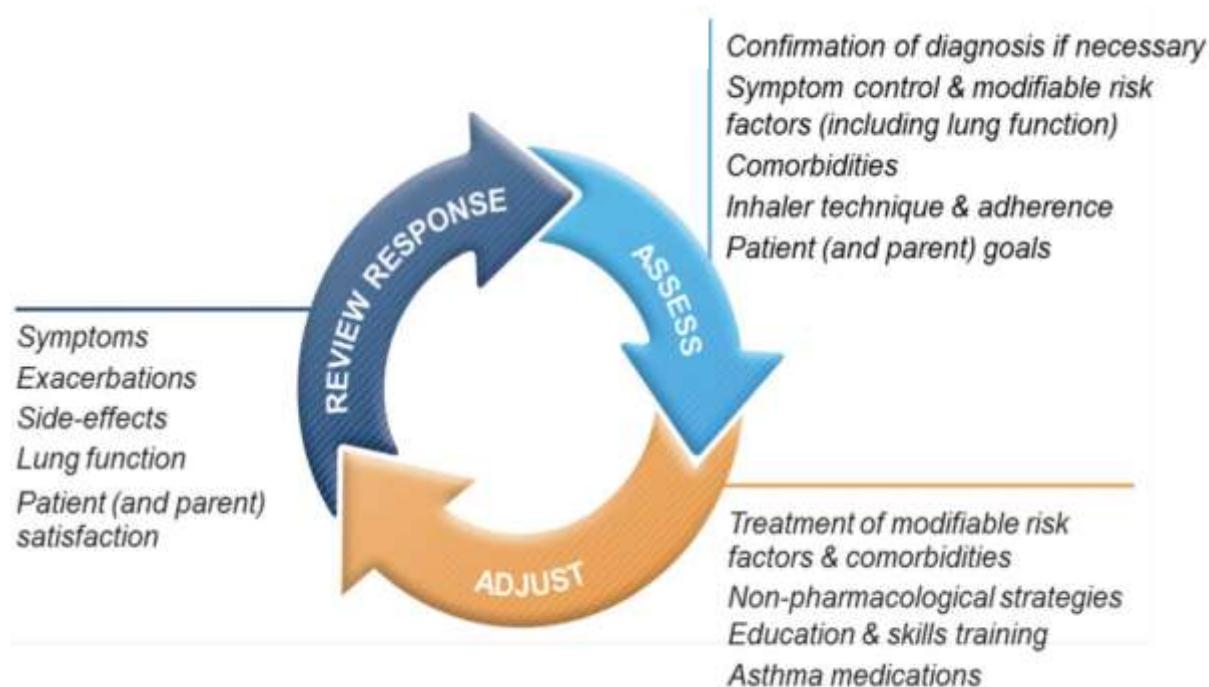


Figure 3: GINA assess – adjust-review response cycle for asthma management (with permission from GINA guideline 2020 (9))

Section 5 Inhaler Technique and Adherence

The main reasons for poor asthma control are inadequate inhaler technique and poor compliance/adherence (10, 11). It is recommended that the patient's inhaler technique is observed at every consultation, with instruction as required. The patient's preference and ability are important considerations in the choice of inhaler device. Metered dose inhalers (MDIs) can be used without a spacer device in most adults and children over 9 years of age but a spacer device improves drug delivery in all age groups and reduces side effects of medications.

The two preferred methods are

- One deep slow inhalation and a 10 second breath-hold

OR

- 5-6 tidal breaths, with one actuation of medication into the spacer at a time

The lower carbon footprint of dry-powder inhalers (DPIs) should be considered alongside other factors for patients who can use these devices effectively.

Adherence can be checked using multiple techniques e.g. questioning, diaries, apps, pharmacy dispensing records, new smart inhalers with built in technology. Patients' understanding of the regime should be confirmed, including their health beliefs, with their regimen tailored accordingly where possible.

Good inhaler technique and adherence should be confirmed before any increase in treatment is initiated. Allied healthcare professionals such as practice nurses and pharmacists may be well placed to undertake these checks. The inhaler that is prescribed should be the one that best suits the individual patient taking into account factors such as the ability of the patient to utilise the device, cost and frequency of administration (e.g. once vs twice daily dosing prn versus fixed dosing). The use of placebo devices can be helpful as can the use of online resources such as the [video clips](#) on the Asthma Society of Ireland (ASI) website. It is good practice to try to keep the same inhaler device for preventer and reliever where possible as having a single device for both is less confusing for patients and reduces errors when using the device.

The provision of a home nebuliser is generally not recommended, due to the potential for delay in seeking medical review with its repeated use in a severe exacerbation. The use of spacer devices is to be encouraged as they are an effective drug delivery device and can be used in the acute situation.

Practice Points

- Check adherence and inhaler technique (and instruct patients using a physical demonstration of correct technique) at every visit.
- Consider alternative inhaler devices if persistent difficulty with technique.

Section 6 Reliever Therapy

The GINA 2019 statement recommends ICS usage in symptomatic patients regardless of asthma severity, including those with mild disease i.e. at step 1 in the stepwise approach for asthma treatment.

The statement presents a number of options in terms of reliever therapy:

1. When SABA is used as the reliever therapy in patients with mild asthma (i.e. those at step 1), it is recommended that it is used in conjunction with an ICS i.e. the patient should take a brown inhaler (low-dose ICS) every time they use the blue inhaler (reliever) **or** that a combination inhaler containing low-dose Budesonide/Formoterol is utilised as prn reliever treatment. Use of an inhaler containing a low-dose ICS, or a combination inhaler containing low-dose budesonide/formoterol in this manner is not licensed in Ireland, and, as such, represents an off-label use of these medicinal products. The reality is that, in patients with mild asthma, adherence with prescribed daily ICS is poor; this risks exposing patients to over-reliance on SABA. **This approach, involving use of a low-dose ICS on each occasion that a SABA used as a reliever therapy (Step 1) may therefore be considered for a very small cohort of patients, i.e. those with asthma symptoms less than twice per month, and therefore requiring use of reliever therapy less than twice per month.** These patients can be identified through review of their prescribing history; they will typically have been prescribed 1-2 reliever inhalers over a 12-month period.
2. Use of as-needed SABA in conjunction with daily ICS or ICS/LABA (step 2-4)
3. Use of budesonide/formoterol as reliver therapy as a component of maintenance and reliever therapy (step 3-4)

Section 7 Asthma Treatment

7.1 Non-Pharmacological Measures

Key non-pharmacological measures to improve asthma outcomes include smoking cessation, weight loss, regular exercise and breathing exercises.

Avoid triggers that have been identified to precipitate attacks in particular attacks associated with features of anaphylaxis. Specifically, ascertain if sensitivity to aspirin and NSAIDs is an issue and consider aspirin-exacerbated respiratory disease in such patients, especially if there is a history of nasal polyps.

Currently house dust mite avoidance measures are not effective as an overall strategy to improve asthma control.

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 this is a marker of poor control and should lead to a review of treatment, rather than exercise avoidance.

Limitation of exposure or removal from the workplace is crucial in the management of occupational asthma. Early removal from exposure may lead to a complete remission.

Asthma control may be improved by a warm, dry domestic environment, which keeps mould levels low.

Unflued gas heaters may worsen asthma symptoms.

7.2 Pharmacological Treatment – Stepwise Approach

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.

The algorithms are for the adult and adolescent group (Figure 4) and for children in the 6-11 years old (Figure 6). Figure 5 and Figure 7 suggest initial medications to commence.

STEP 1

Preferred controller options - Low dose ICS whenever SABA is used or use low dose combination ICS/Formoterol (adults and adolescents). Low dose ICS when SABA is taken (children 6-11 years old).

Recommended for patients with symptoms less than twice per month. These patients can be identified through review of their prescribing history; they will typically have been prescribed 1-2 reliever inhalers over a 12-month period.

Adults and adolescents - Take low-dose ICS whenever SABA is used, or use a combination inhaler containing low-dose Budesonide/Formoterol when required. Use of an inhaler containing an ICS, or a combination inhaler containing Budesonide/Formoterol in this manner is not licensed in Ireland, and, as such, represents an off-label use of these medicinal products.

(Formoterol/Budesonide combination inhalers licensed and available under the Community Drug Schemes in Ireland include Symbicort® Turbohaler, DuoResp® Spiromax and Bufomix®. Of note Symbicort® Turbohaler 200/6 is dose equivalent to Bufomix® 160/4.5 and DuoResp® Spiromax 160/4.5)

NB - Other inhalers containing different combinations of ICS/LABA (Seretide®, Relvar® etc) cannot be prescribed for PRN usage as the LABA they contain does not act quickly enough to give rapid relief.

Children aged 6-11 years old – Take low-dose ICS when SABA is used. Use of an inhaler containing an ICS is not licensed in Ireland, and, as such, represents an off-label use of these medicinal products.

SABA-only treatment (Blue inhaler) of asthma is no longer recommended in adults and adolescents as it quickly establishes a pattern of reliance and a worse overall outcome.

STEP 2

Preferred controller options - Daily low-dose ICS plus as needed SABA (adults, adolescents and children) OR as needed low-dose ICS-formoterol (adults and adolescents)

Adults and adolescents - Treatment with regular low-dose ICS is highly effective in reducing asthma symptoms and reducing the risk of asthma-related exacerbations, hospitalisation and death.

In patients with mild asthma adherence to regular low-dose ICS may be poor, thus exposing the patients to SABA-only treatment. The alternative preferred controlled option in this patient cohort is therefore, a combination low-dose inhaler containing Budesonide/Formoterol used when required.

Other Step 2 Controlled Options - A leukotriene receptor antagonist (LTRA), Montelukast, may be considered where inhaled steroids are not acceptable or in patients with concomitant allergic rhinitis.

Children aged 6-11 years old – The preferred controller option for children aged 6-11 years old at Step 2 is low-dose ICS, with SABA used as needed as a reliever therapy.

Other controlled options for this patient cohort include LTRA, or taking low-dose ICS whenever SABA is used (this represents an off-label use of ICS).

STEP 3

Preferred controller options - Low dose ICS-LABA maintenance plus as-needed SABA OR low-dose ICS-formoterol maintenance and reliever therapy. Adults and adolescents; medium dose ICS plus as-needed SABA OR low-dose combination ICS-LABA plus as-needed SABA (children 6-11 years old)

Adults and adolescents - There are two preferred controlled options at Step 3 for adults and adolescents:

1. Combination low-dose ICS/LABA as maintenance treatment with as-needed SABA used as reliever, or
2. Low-dose Budesonide/Formoterol as both maintenance and reliever treatment

Other Step 3 Controlled Options - In adults and adolescents, the ICS can be increased from low to medium-dose, but this is less effective than addition of a LABA to low-dose ICS.

Children aged 6-11 years old – The preferred controller option for children aged 6-11 years old at Step 3 is to increase ICS to medium-dose or to change to a combination inhaler containing low-dose ICS/LABA. In both instances, SABA would be used as needed as a reliever therapy.

STEP 4

Preferred controller options - Low-dose ICS-formoterol as maintenance and reliver therapy (adults and adolescents) OR medium-dose ICS-LABA maintenance plus as-needed SABA (adults, adolescents and children).

Adults and adolescents - There are two preferred controlled options at Step 4 for adults and adolescents:

1. For patients previously on combination low-dose ICS/LABA as maintenance treatment with as-needed SABA used as reliever in Step 3, the ICS component can be increased to medium-dose.
2. Low-dose Budesonide/Formoterol as both maintenance and reliever treatment. The maintenance dose can be increased to medium-dose budesonide if necessary.

Use of LAMA as add-on therapy can be considered. It is indicated as add-on maintenance bronchodilator treatment in patients with severe asthma who have experienced one or more severe asthma exacerbations in the preceding year. It should be prescribed in patients who are not adequately controlled with a maintenance combination of high-dose ICS (≥ 800 mcg budesonide/day or equivalent) and a LABA.

Children aged 6-11 years old – If the child's asthma is not well controlled on moderate-dose ICS, they should be referred for expert assessment and advice. Their controller should be continued in the meantime.

STEP 5

Preferred controller options - Refer for phenotypic investigation and consideration of add-on treatment

Patients with persistent symptoms and/or exacerbations despite correct inhaler technique and good adherence with Step 4 treatment and in whom other controller options have been considered, should be referred to a specialist with expertise in investigation and management of severe asthma.

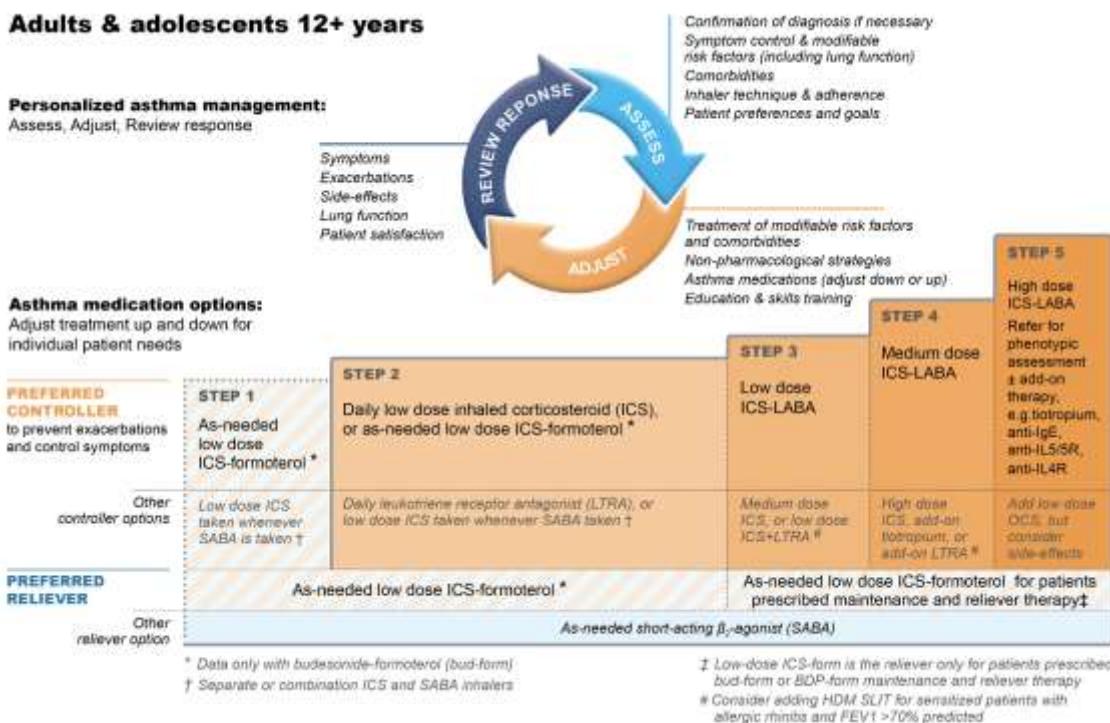


Figure 4: Stepwise management of asthma in adults and adolescents 12+ years (with permission from GINA guideline 2020 (9))

Initial treatment: adult or adolescents with a diagnosis of asthma

SELECTING INITIAL CONTROLLER TREATMENT IN ADULTS AND ADOLESCENTS WITH A DIAGNOSIS OF ASTHMA

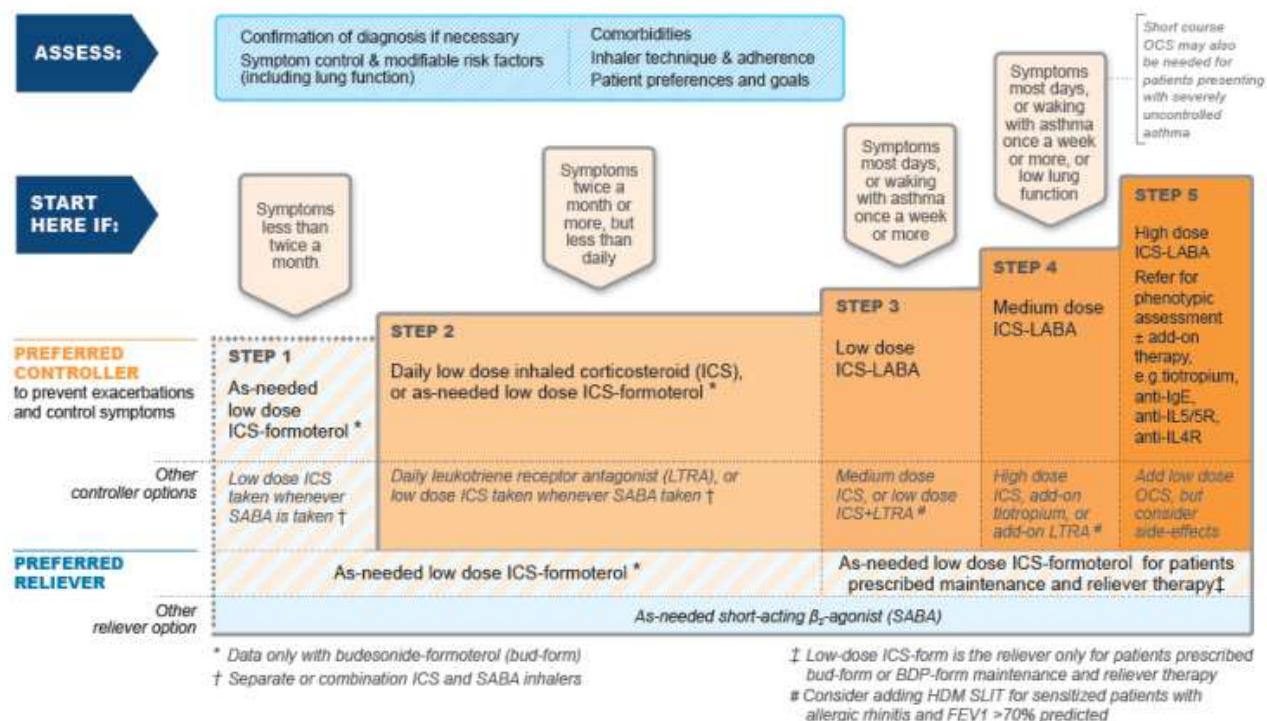


Figure 5: Selecting initial controller treatment in adults and adolescents with a diagnosis of asthma (with permission from GINA guideline 2020 (9))

The GINA asthma treatment strategy – children 6–11 years

Children 6–11 years

Personalized asthma management:
Assess, Adjust, Review response

Asthma medication options:
Adjust treatment up and down for individual child's needs

PREFERRED CONTROLLER
to prevent exacerbations and control symptoms

Other controller options

RELIEVER



Figure 6: Stepwise management of asthma in children 6–11 years old (with permission from GINA guideline 2020 (9))

Initial treatment: children 6–11 years with a diagnosis of asthma

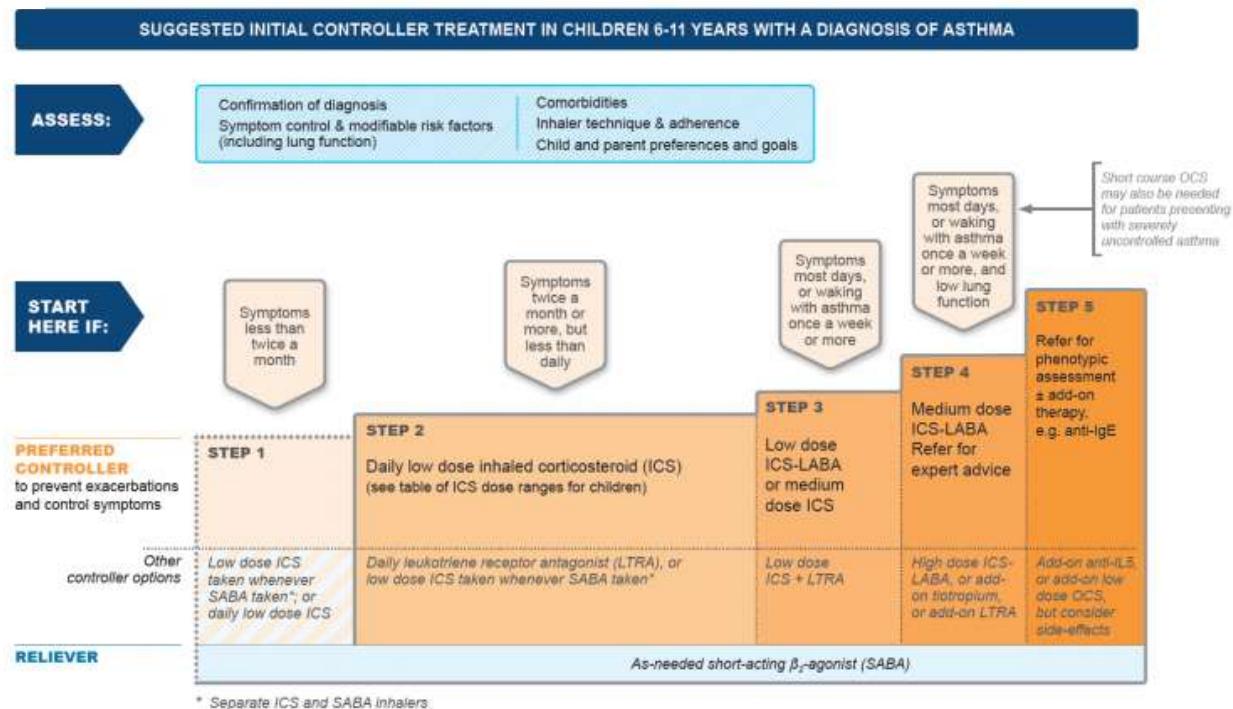


Figure 7: Suggested initial controller treatment in children 6–11 years with a diagnosis of asthma (with permission from GINA guideline 2020 (9))

Doses of ICS are summarised below (Table 4) and are a guide to prescribing. It should be noted that most benefit of ICS is seen at low doses and a careful review of inhaler technique and compliance should be checked prior to escalating the dose. Current and previous smoking may reduce the effects of ICS, which may be overcome with increased doses of ICS (12).

Practice Points

- Max dose of combination inhalers containing Formoterol/Budesonide when used for maintenance and reliever therapy is 12 puffs per day of Symbicort® Turbohaler 100/6 or 200/6, Bufeomix® 80/4.5 or 160/4.5 or DuoResp® Spiromax 160/4.5.
- Consider stepping up if patient has uncontrolled symptoms, exacerbations or at increased risk despite 2-3 months of confirmed adherence to prescribed therapy but check diagnosis, inhaler technique and modifiable risk factors first.
- Consider stepping down if symptoms are controlled for 3 months and the patient is at low risk for exacerbations. The dose of ICS is usually reduced by 25-50% when stepping down.
- At each step check inhaler technique, adherence to treatment, understanding of self-management plan, and barriers to self-care.
- Consider referral for specialist review and consider adding other treatments if persistent exacerbations or poor control despite step 4 treatment.

Table 4: Inhaled Corticosteroids for use in adults and adolescents and total daily doses

Adults and adolescents	Total daily ICS dose (mcg)		
	Low	Medium	High
Inhaled corticosteroid			
Beclometasone dipropionate (pMDI, HFA)	200-500	>500-1000	>1000
Budesonide (DPI)	200-400	>400-800	>800
Ciclesonide (pMDI, extrafine particle, HFA)	80-160	>160-320	>320
Fluticasone furoate (DPI)	100		200
Fluticasone propionate (DPI)	100-250	>250-500	>500
Fluticasone propionate (pMDI, HFA)	100-250	>250-500	>500
Children 6-11 years	Total daily ICS dose (mcg)		
	Low	Medium	High
Inhaled corticosteroid			
Beclometasone dipropionate (pMDI, HFA)	100-200	>200-400	>400
Budesonide (DPI)	100-200	>200-400	>400
Ciclesonide (pMDI, extrafine particle, HFA)	80	>80-160	>160
Fluticasone furoate (DPI)	50		n/a
Fluticasone propionate (DPI)	50-100	>100-200	>200
Fluticasone propionate (pMDI, HFA)	50-100	>100-200	>200

DPI: Dry Powder Inhaler; HFA: Hydrofluoroalkane; pMDI: pressurised Metered Dose Inhaler;

Section 8 Add-On Treatments

8.1 LAMA's

LAMA's are indicated as add-on maintenance bronchodilator treatment in patients with severe asthma who have experienced one or more severe asthma exacerbations in the preceding year. They should be prescribed in patients who are not adequately controlled with a maintenance combination of high-dose ICS (≥ 800 mcg budesonide/day or equivalent) and a LABA. There are two LAMA's that are licensed for us in this manner:

1. Tiotropium delivered via the Respimat device when added to high dose ICS/LABA treatment
2. Glycopyrronium delivered via the Breezhaler device within a combination inhaler with indacaterol and mometasone

8.2 LTRAs

Montelukast is a LTRA and may be considered as add-on treatment in asthma which is inadequately controlled with ICS and SABA alone. It is also useful in patients who cannot use inhalers or are steroid phobic or intolerant. It may also be useful when allergic rhinitis symptoms accompany the asthma. Clinicians should be aware of potential sleep disturbances and neuropsychiatric disturbances associated with LTRAs.

8.3 SLIT

Sublingual immunotherapy (SLIT) is recommended as a potential therapeutic option in step 3 of the guidelines in adult patients with sub-optimally controlled asthma despite low to high-dose ICS, with allergic rhinitis who are sensitised to house dust mite and have FEV1 $>70\%$. House dust mite desensitisation can be considered in selected patients with uncontrolled asthma, but is not currently reimbursed under the GMS or community drug scheme.

8.4 Biological Treatments

Monoclonal antibody treatments targeting specific inflammatory pathways have an established role in severe uncontrolled asthma. They may be effective for patients with severe asthma and elevated serum IgE or high blood eosinophil counts. They should be considered as add-on treatments in patients with severe disease and are prescribed by specialists in the management of severe asthma.

8.5 Other Medications

Additional high-dose ICS, oral steroids, and oral theophylline may be considered as other add-on treatments, with specialist review.

8.6 Specific Allergy Issues

Allergy requires a history of reaction to a given allergen as well as detection of specific IgE antibodies, either on serum or by skin prick testing (SPT). SPT has a high negative predictive value and a low risk of systemic allergic reactions but serum specific IgE may be more appropriate in certain settings e.g. patient unable to stop antihistamine medications, unstable asthma, pregnancy or dermatographism. Aeroallergens such as house dust mite, pollens or pet danders are most likely to be allergic triggers for asthma.

Allergen immunotherapy can offer clinical improvements in asthma, in carefully selected patients. Confirmation of specific IgE is required prior to starting but is not licenced in Ireland for this use. Asthma is the most significant risk factor for fatal food-related anaphylaxis. Failure to recognise and treat anaphylaxis contributes to the risk of fatality.

Practice Points

- Consider testing for allergen-specific IgE to aeroallergens in patients with allergic asthma
- Allergen immunotherapy may be considered in patients with allergic asthma and allergic rhinitis who have evidence of allergy to house dust mite and/or pollens
- All patients with asthma and food-related anaphylaxis should be referred to an immunologist/allergist

Section 9 Self-Management

Self-management based on a written, personalised, action plan, improves health outcomes and should be offered to and discussed with all patients with asthma. Self-management plans are underutilised in general but are a very effective way to reduce severe exacerbations. A variety of formats are available for patients and their families and the most appropriate source of information for the patient should be assessed, whether written, pictorial, electronic, app, etc. Self-management plans should be individualised and explained to the patient to allow the patient take control of the plan. The action plans can be downloaded from the ASI website and given to patients. An example is seen below.

GREEN ZONE		ORANGE ZONE		RED ZONE	
Everyday asthma care		When I am feeling unwell		When I am having an asthma attack	
ASSESSMENT		ASSESSMENT		ASSESSMENT	
My asthma is controlled:		My asthma symptoms include one or all of the following:		My asthma symptoms are getting worse and I have increased:	
<ul style="list-style-type: none">● I have no cough, wheeze, shortness of breath or chest tightness● I can exercise without asthma symptoms● My asthma symptoms do not wake me at night● I do not need to take days off school, college or work● I use my reliever inhaler twice a week or less (over the age of 6 years)● I use my reliever inhaler once a week or less (under the age of 6 years)		<ul style="list-style-type: none">● cough, wheeze, shortness of breath or chest tightness● I have symptoms with exercise● My asthma symptoms wake me at night● I need to take days off school, college or work due to asthma symptoms● I am taking my reliever inhaler more than twice a week (over the age of 6 years)● I am taking my reliever inhaler more than once a week (under the age of 6 years)● My peak flow is dropping● I feel like I have a cold or flu		<ul style="list-style-type: none">● cough, wheeze, shortness of breath or chest tightness● I have increased: cough, wheeze, shortness of breath or chest tightness● My reliever inhaler gives little or no relief● I find it difficult to talk or walk● I find it difficult to breathe● I have blue lips or fingernails● My peak flow is dropping further● The attack came on suddenly● I am breathing fast and using my tummy and neck muscles	
Action		Action		Action	
Controller inhaler		Controller inhaler		THIS IS AN EMERGENCY – ACT NOW	
When my asthma is controlled I take my controller medication everyday.		When I am feeling unwell I take my medication like this.		Follow the 5 steps below. If you are worried or not improving at any stage, CALL 999/112	
Name	Colour	Name	Colour	<ol style="list-style-type: none">1. Stay calm. Sit up straight – do not lie down.2. Take slow steady breaths.3. Take one puff of your reliever inhaler (blue) every minute. Use a spacer if available.4. People over 6 years can take up to 10 puffs in 10 minutes5. Children under 6 years can take up to 6 puffs in 10 minutes	
Number of puffs in the morning	Number of puffs at night	Number of puffs in the morning	Number of puffs at night	<p>It is safe to take additional puffs of your blue inhaler during an acute asthma attack.</p>	
I always rinse my mouth after I take my controller inhaler.				I always use a spacer with my inhaler if I have one	
Reliever inhaler		Reliever inhaler		I always use a spacer with my inhaler if I have one	
I take my reliever inhaler if I wheeze, cough, have chest tightness or I am finding it difficult to breathe.		Name			
Name	Colour	Number of puffs			
Number of puffs					
<ul style="list-style-type: none">● I should always carry my reliever inhaler.● I take two puffs of my reliever inhaler before exercise if needed.		<ul style="list-style-type: none">● If I am not improving and I have been prescribed Prednisolone tablets (steroid tablets) to keep at home, I should start taking them. Yes / No● If I continue to feel unwell and I am not improving, or I am concerned, I contact the GP/ Nurse/ out-of-hours Doctor/Emergency Department.			
When I am well, I also take my other medication.					
I always use a spacer with my inhaler if I have one					

Figure 8: Asthma Society of Ireland – self-management plan (with permission ASI)

Practice Points

- Asthma action plans should be based on symptoms with or without peak flow measurements
- Asthma action plans can be downloaded from the ASI website
- 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 recommended action plans can be modified as required depending on patient and practitioner preference
- Ensure issues such as adherence, inhaler technique and modifiable risk factors (smoking etc.,) are addressed when discussing self-management plans
- Action plans can be adjusted for patients with mild asthma at step 1 who are using combination inhaler containing low-dose Budesonide/Formoterol when required as monotherapy

Section 10 Treatable Traits

In patients with difficult to treat asthma a key feature of management is the recognition and treatment of overlapping disorders, comorbidities, environmental and behavioural factors, recently referred to as 'treatable traits'. The assessment and management of some of the treatable traits may require specialist referral. This is summarised in Table 5.

Table 5: Treatable traits in asthma (with permission from GINA guidelines (9))

Overlapping Disorders

- COPD
- Bronchiectasis
- Allergic bronchopulmonary aspergillosis
- Dysfunctional breathing including vocal cord dysfunction

Comorbidities

- Obesity
- Gastro-oesophageal reflux disease
- Rhinitis
- Sinusitis
- Depression/anxiety

Environmental

- Smoking
- Occupational exposures
- Provoking factors including aeroallergens
- Drugs such as aspirin, other NSAIDs and beta blockers

Behavioural

- Adherence
- Inhaler technique
- Health and cultural beliefs

Practice Point

- The treatable traits approach is particularly important for all patients with poorly controlled asthma and/or poor respiratory health.

Section 11 Adolescents

The pharmacological treatment of asthma in adolescents is similar to that in adults, however there are additional issues that need consideration.

Adolescence is a period of increased risk taking and decreased adherence, which may be due to forgetfulness, lack of routines, denial, beliefs about asthma or medication, difficulty using inhalers, fear of side-effects and embarrassment in front of peers. They may be taking on risky activities such as smoking, e-cigarettes (vaping) or drug taking. Parents/caregivers may play a key role in reminding adolescents to take medication.

Adolescents require an approach that enables them to take increasing responsibility. Many adolescents report difficulties in communicating with their healthcare professional. Healthcare professionals should ensure that adolescents have a developmentally appropriate understanding of their asthma and treatment. If they have had asthma for a long time, it will be necessary to transition from the childhood to adult-centric approach to care.

Practice Points

- Prioritise the relationship, offer continuity of care and emphasise confidentiality
- Attempt to instil a sense of control, that adherence will improve the adolescent's control over their asthma and their lives
- See adolescents individually first and then with parents/caregivers as appropriate. Ensure they know that, as they age, they need to take more responsibility for their own healthcare and can make appointments for themselves
- Explain risks of sharing inhalers with others (infection, inhaler runs out more quickly)
- Ask about smoking, vaping, drug taking and advise accordingly
- Assume that the young person is likely to have other health issues and questions.
- Consider simple treatment regimes. Ensure that the young person is aware of what to do if symptoms escalate and has someone to contact if they have concerns
- Arrange follow-up appointments and ensure the adolescent knows how and when to instigate appointments
- Ensure that the young person has an asthma management plan

Section 12 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.

The risks to the baby of poor asthma control in pregnancy outweigh any theoretical risks associated with asthma medications.

ICS, ICS/LABA and SABAs should be used as normal during pregnancy.

Stopping usual asthma medications during pregnancy is associated with adverse outcomes for both mother and baby.

Oral steroids should be used as normal when indicated for severe asthma exacerbations during pregnancy.

Acute severe asthma in pregnancy is a medical emergency and should be treated in hospital.

Consider early referral for specialist review in pregnant patients with poor asthma control or a history of exacerbations.

Practice Point

- Treat asthma as usual during pregnancy and early referral if there is poor asthma control or a recent exacerbation.

Section 13 Management of Acute Severe Asthma

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
- repeatedly assessing the response to treatment

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

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 6).

Table 6: Levels of severity of acute asthma exacerbation (with permission from GINA guidelines (9))

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%• 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 (with permission from GINA guidelines (9))

- 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 after bronchodilator treatment
 - 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 and especially if no means of communication or transport
 - Pregnancy
-

Practice Points

- A pragmatic rule is that 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.
- There is insufficient evidence to support the use of intramuscular adrenaline in severe asthma without anaphylaxis therefore intramuscular adrenaline is not recommended unless there are signs or clinical suspicion of anaphylaxis.
- Patients can deteriorate after initial improvement so it is advisable to monitor these patients closely especially for the first hour. This can be difficult in practice so good communications is important to ensure patients do not delay in seeking help. Also be cautious with patients who have poor asthma control or have any of the risk factors in Table 7.
- For patients who are treated in primary care or discharged from the Out of hours or ED, long-term management should be reviewed and an early follow-up appointment with their primary healthcare team should be arranged. Issues to be considered are summarised in Table 5.
- All patients not taking ICS should have an ICS prescribed before going home.
- Patients do not generally need antibiotics in acute asthma attacks unless features of infection are present such as temperature, purulent sputum or focal lung signs consistent with infection.
- The following algorithm (Figure 9) summarises the treatment of acute asthma (with permission from GINA guidelines (9))

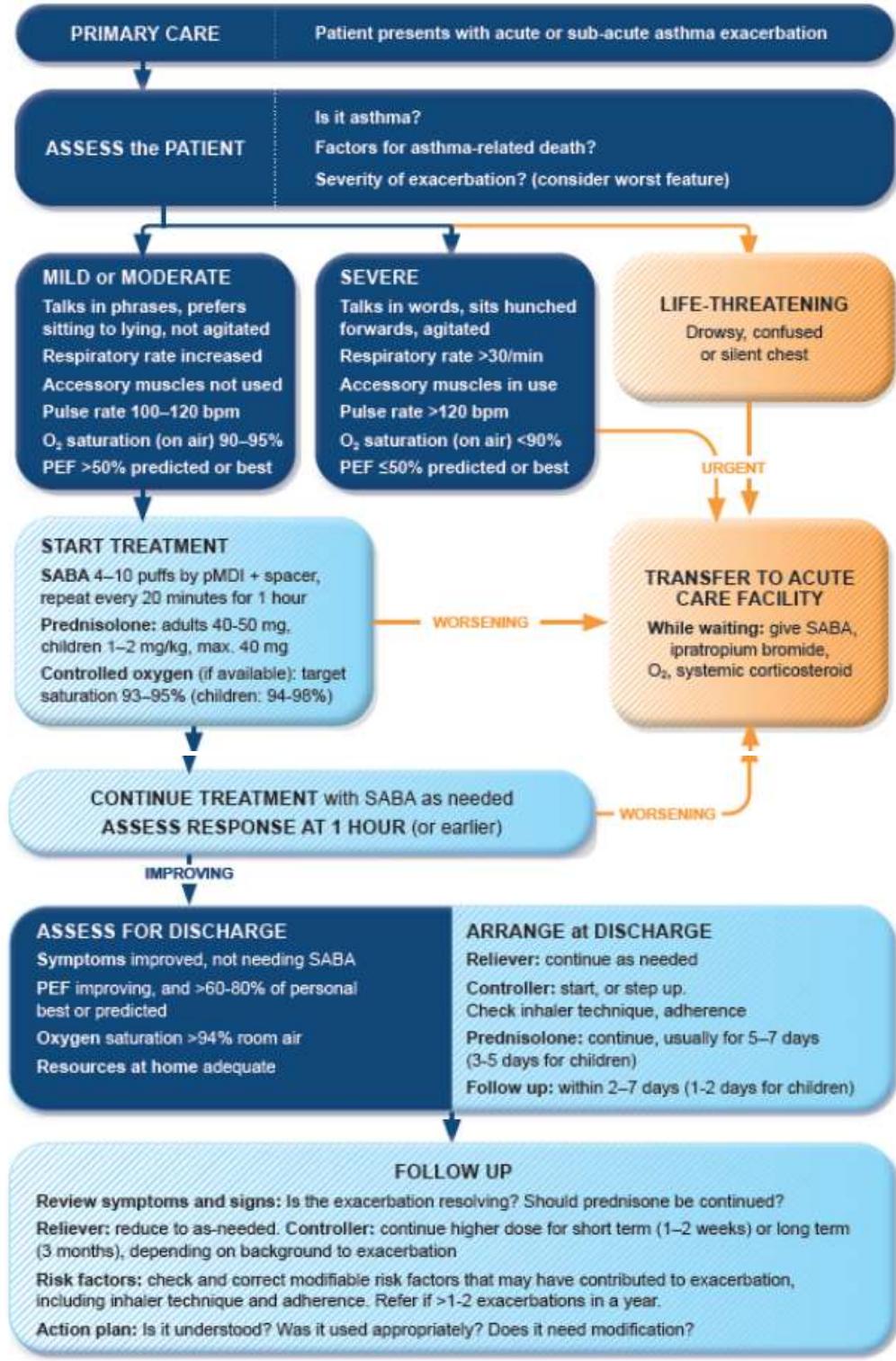


Figure 9: Summary of treatment acute asthma in adults, adolescents and children over 6 years old (with permission from GINA guidelines (9))

Table 8: Pre-discharge considerations

1. Most patients presenting with acute exacerbations of asthma should have a course of oral prednisolone, 40mg daily for 5 days.
 2. An acute exacerbation is an opportunity to review current medication and adherence. The importance of ICS needs to be emphasised and dosing and inhaler technique needs to be addressed.
 3. It is recommended that patients have prednisolone and ICS prescribed prior to discharge to ensure there are no barriers to taking medication. If seen in out of hours – ensure that they have medications such as oral steroids dispensed if the pharmacy is unavailable.
 4. Before the patient goes home, ensure that the patient:
 - Can use inhalers correctly and has a supply of medication.
 - Has a written self-management plan which includes the treatment prescribed, and when to seek further urgent medical review
 - Knows when to contact emergency medical help if worsens
 - Arranges an early follow-up appointment with their primary healthcare team for review
 - Consider referral to a specialist respiratory service
 - Ensure the above steps are documented
-

Section 14 Asthma in Under 6 Years Old

Key Points

Asthma affects almost 20% of children in Ireland (13).

Recurrent wheezing occurs in a large proportion of children under 6 years (mostly episodic viral wheeze). It can be difficult to label children as having asthma in this age group due to the variability of the condition and the lack of objective testing. Patterns of presentations combined with personal and family history and response to treatment help to guide GPs in this decision.

Typical features of asthma in this young age group include:

- Wheezing or coughing that occurs with exercise, laughing or crying in the absence of an apparent respiratory infection.
- History of other allergic disorders (eczema or allergic rhinitis), allergen sensitisation or asthma in a first-degree relative.
- Clinical improvement during 2-3 month of controller medication and worsening after cessation.

14.1 Asthma and Wheezing in Young Children

Asthma is the most common chronic disease of childhood and the leading cause of childhood morbidity from chronic disease as measured by school absences, emergency department visits and hospitalisations (8). Asthma often begins in early childhood; in up to half of people with asthma, symptoms commence during childhood. Atopy is present in the majority of children with asthma who are over 3 years old and allergen-specific sensitisation is one of the most important risk factors for the development of asthma (9).

14.2 Viral-Induced Wheezing

Recurrent wheezing occurs in a large proportion of children under 6 years. It is typically associated with upper respiratory tract infections (URTI), which occur in this age group around 6–8 times per year (14). Many young children may wheeze with viral infections (15). Therefore, deciding when wheezing with a respiratory infection is truly an initial or recurrent clinical presentation of childhood asthma or simply a viral wheeze is difficult.

14.3 Clinical Diagnosis of Asthma

It may be difficult to make a confident diagnosis of asthma in children under 6 years because episodic respiratory symptoms such as wheezing and cough are also common in children without asthma, particularly in those up to two years of age (16). Furthermore, it is not possible to routinely assess airflow limitation in this age group (17, 18). A probability-based approach, based on the pattern of symptoms during and between viral respiratory infections, may be helpful for discussion with parents/carers as outlined in Figure 10.

A diagnosis of asthma in young children is therefore based largely on symptom patterns combined with a careful clinical assessment of family history and physical findings.

Probability of asthma diagnosis in children 5 years and younger

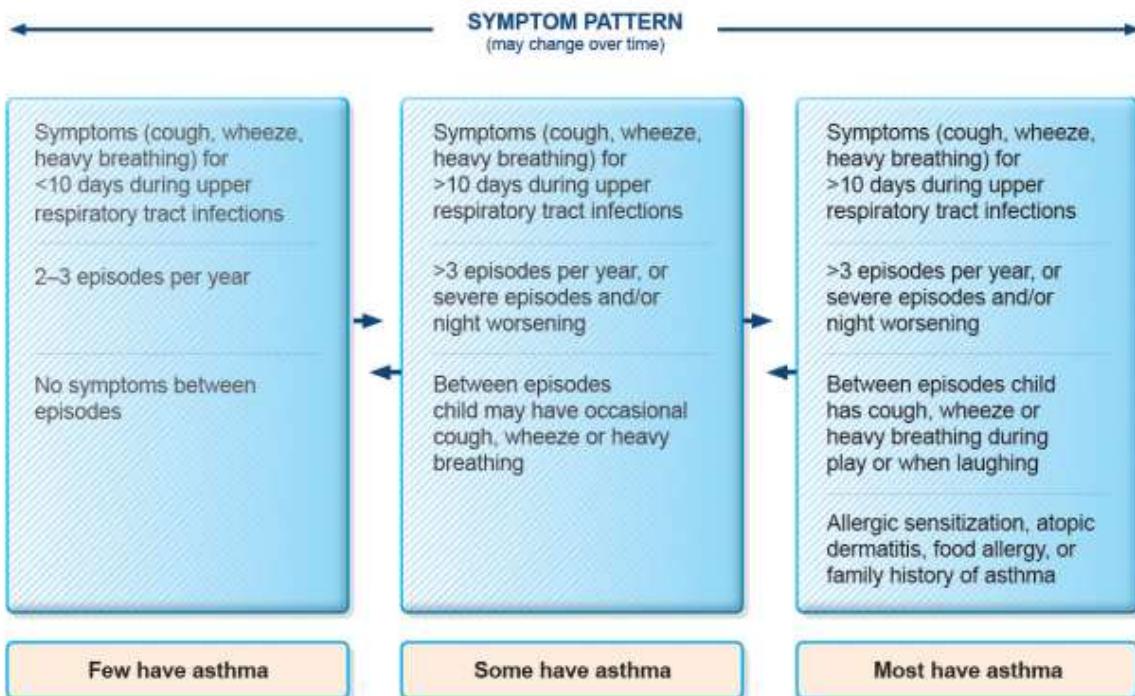


Figure 10: Probability of asthma diagnosis in children under 6 years old (with permission from GINA guidelines 2020)

14.4 Symptoms Suggestive of Asthma in Children Under 6 Years Old

As shown in Table 9 an asthma diagnosis in children under 6 years old can often be based on:

- Symptom patterns (wheeze, cough, breathlessness (typically manifested by activity limitation) and nocturnal symptoms or awakenings)
- Presence of risk factors for development of asthma
- Therapeutic response to controller treatment

Table 9: Features suggesting a diagnosis of asthma in children under 6 years old.

Feature	Characteristics suggesting asthma
Cough	Recurrent or persistent non-productive cough that may be worse at night or accompanied by some wheezing and breathing difficulties. Cough occurring with exercise, laughing, crying or exposure to tobacco smoke in the absence of an apparent respiratory infection
Wheezing	Recurrent wheezing, including during sleep or with triggers such as activity, laughing, crying or exposure to tobacco smoke or air pollution
Difficult or heavy breathing or shortness of breath	Occurring with exercise, laughing or crying
Reduced activity	Not running, playing or laughing at the same intensity as other children; tires earlier during walks (wants to be carried)
Past or family history	Other allergic disease (atopic dermatitis or allergic rhinitis) asthma in first-degree relatives
Therapeutic trial with low dose ICS and as-needed SABA	Clinical improvement during 2–3 months of controller treatment and worsening when treatment is stopped

14.4.1 Wheeze

Wheeze is the most common symptom associated with asthma in children. Wheezing occurs in several different patterns but a wheeze that occurs recurrently, during sleep or with triggers such as activity, laughing or crying, is consistent with a diagnosis of asthma. The wheeze is typically heard on auscultation during expiration. Clinician confirmation is important, as parents may describe any noisy breathing as ‘wheezing’.

14.4.2 Cough

Cough due to asthma is non-productive, recurrent and/or persistent and is usually accompanied by some wheezing episodes and breathing difficulties. A nocturnal cough (when the child is asleep) or a cough that occurs with exercise, laughing or crying, in the absence of an apparent respiratory infection, supports a diagnosis of asthma.

14.4.3 Activity and Social Behaviour

Physical activity is an important cause of asthma symptoms in young children. Young children with poorly controlled asthma often abstain from strenuous play or exercise to avoid symptoms but many parents are unaware of such changes in their children’s lifestyle. Parents may report irritability, tiredness and mood changes in their child as the main problems when asthma is not well controlled.

14.5 Tests to Assist in Diagnosis

While no tests diagnose asthma with certainty in children under 6 years old, the following are useful adjuncts.

14.6 Therapeutic Trial

A trial of treatment for at least 2–3 months with as-needed SABA and regular low-dose ICS may provide some guidance about the diagnosis of asthma. Response should be evaluated by symptom control (daytime and night-time) and the frequency of wheezing episodes and exacerbations. It is important to stop ICS after 3 months, even if symptoms improve, to see if symptoms return. Marked clinical improvement during treatment and deterioration when treatment is stopped, support a diagnosis of asthma. This can help to demonstrate to parents/carers the importance of adherence to the ICS. Due to the variable nature of asthma in young children, a therapeutic trial may need to be repeated in order to be certain of the diagnosis.

14.7 Differential Diagnosis

A definite diagnosis of asthma in this young age group is challenging but has important clinical consequences. It is particularly important in this age group to consider and exclude alternative causes that can lead to symptoms of wheeze, cough and breathlessness before confirming an asthma diagnosis. Key differential diagnoses are summarised in Table 10.

Table 10: Differential diagnosis of wheeze, cough and breathlessness in children under 6 years old

Condition	Typical features
Recurrent viral respiratory tract infections	Mainly cough, runny congested nose for <10 days; no symptoms between infections
Gastroesophageal reflux	Cough when feeding; recurrent chest infections; vomits easily especially after large feeds; poor response to asthma medications
Foreign body aspiration	Episode of abrupt, severe cough and/or stridor during eating or play; recurrent chest infections and cough; focal lung signs
Persistent bacterial bronchitis	Persistent wet cough; poor response to asthma medications
Tracheomalacia	Noisy breathing when crying or eating, or during upper airway infections (noisy inspiration if extrathoracic or expiration if intrathoracic); harsh cough; inspiratory or expiratory retraction; symptoms often present since birth; poor response to asthma medications
Tuberculosis	Persistent noisy respirations and cough; fever unresponsive to normal antibiotics; enlarged lymph nodes; poor response to bronchodilators or inhaled corticosteroids; contact with someone who has tuberculosis
Congenital heart disease	Cardiac murmur; cyanosis when eating; failure to thrive; tachycardia; tachypnea or hepatomegaly; poor response to asthma medications
Cystic fibrosis	Cough starting shortly after birth; recurrent chest infections; failure to thrive (malabsorption); loose greasy bulky stools
Primary ciliary dyskinesia	Cough and recurrent chest infections; neonatal respiratory distress, chronic ear infections and persistent nasal discharge from birth; poor response to asthma medications; situs inversus occurs in about 50% of children with this condition
Vascular ring	Persistently noisy breathing; poor response to asthma medications
Bronchopulmonary dysplasia	Infant born prematurely; very low birth weight; needed prolonged mechanical ventilation or supplemental oxygen; difficulty with breathing present from birth
Immune deficiency	Recurrent fever and infections (including non-respiratory); failure to thrive

14.8 Key Indications for Referral of a Child Under 6 Years Old for Diagnostic Investigations

Any of the following features suggest an alternative diagnosis and indicate the need for further investigations:

- Failure to thrive
- Neonatal or very early onset of symptoms (especially if associated with failure to thrive)
- Vomiting associated with respiratory symptoms
- Continuous wheezing
- Failure to respond to asthma controller medications
- Parental concern or request
- Focal lung or cardiovascular signs, or finger clubbing

Section 15 Assessment and Management of Asthma in Children Under 6 Years Old

15.1 Goals of Asthma Management

As with other age groups, the goals of asthma management in young children are

- To achieve good control of symptoms and maintain normal activity levels
- To minimise future risk; that is to reduce the risk of flare-ups, maintain lung function and lung development as close to normal as possible and minimise medication side-effects

Maintaining normal activity levels is particularly important in young children because engaging in play is important for their normal social and physical development. It is important to also elicit the goals of the parent/carer because these may differ from conventional medical goals.

The goals of asthma management are achieved through a partnership between the parent/carer and the health professional team, with a cycle of:

- Assess (diagnosis, symptom control, risk factors, inhaler technique, adherence, parent preference)
- Adjust treatment (medications, non-pharmacological strategies and treatment of modifiable risk factors)
- Review response including medication effectiveness and side-effects. This is carried out in combination with:
 - Education of parent/carer and child (depending on the child's age)
 - Skills training for effective use of inhaler devices and encouragement of good adherence
 - Monitoring of symptoms by parent/carer
 - A written asthma action plan

15.2 Assessment of Asthma

15.2.1 What does 'asthma control' mean?

Asthma control means the extent to which the manifestations of asthma are controlled, with or without treatment. It has two components (Table 11)

- A. The child's asthma status over the previous four weeks (symptom control)
- B. How asthma may affect them in the future (future risk)

In young children, as in older patients, it is recommended that both symptom control and future risk should be monitored. In young children, lung function testing is not feasible for monitoring asthma control.

15.2.2 Assessing Asthma Symptom Control

Defining satisfactory symptom control in children under 6 years old is problematic. Health care providers are almost entirely dependent on the reports of family members and carers, who may be unaware either of how often the child has experienced asthma symptoms or that their respiratory symptoms represent uncontrolled asthma.

Table 11 shows a working schema for assessing asthma control in children <6 years old, based on current expert opinion. It incorporates assessment of symptoms; the child's level of activity and their need for reliever/rescue treatment; and assessment of risk factors for adverse outcomes.

Table 11: Assessing asthma control in children under 6 years old (with permission GINA guideline 2019 (9))

A. Symptom control		Level of asthma symptom control				
		Well controlled	Partly controlled	Uncontrolled		
In the past 4 weeks, has the child had:	Daytime asthma symptoms for more than a few minutes, more than once a week?	Yes <input type="checkbox"/> No <input type="checkbox"/>	None of these 1–2 of these 3–4 of these			
	Any activity limitation due to asthma? (Runs/plays less than other children, tires easily during walks/playing?)	Yes <input type="checkbox"/> No <input type="checkbox"/>				
	Reliever medication needed* more than once a week?	Yes <input type="checkbox"/> No <input type="checkbox"/>				
	Any night waking or night coughing due to asthma?	Yes <input type="checkbox"/> No <input type="checkbox"/>				
B. Future risk for poor asthma outcomes						
Risk factors for asthma exacerbations within the next few months						
<ul style="list-style-type: none"> • Uncontrolled asthma symptoms • One or more severe exacerbations (ED attendance, hospitalization, or course of OCS) in previous year • The start of the child's usual 'flare-up' season (especially if autumn/fall) • Exposures: tobacco smoke; indoor or outdoor air pollution; indoor allergens (e.g. house dust mite, cockroach, pets, mold), especially in combination with viral infection • Major psychological or socio-economic problems for child or family • Poor adherence with controller medication, or incorrect inhaler technique • Outdoor pollution (NO₂ and particles) 						
Risk factors for persistent airflow limitation						
<ul style="list-style-type: none"> • Severe asthma with several hospitalizations • History of bronchiolitis 						
Risk factors for medication side-effects						
<ul style="list-style-type: none"> • Systemic: Frequent courses of OCS, high-dose and/or potent ICS • Local: moderate/high-dose or potent ICS; incorrect inhaler technique; failure to protect skin or eyes when using ICS by nebulizer or spacer with face mask 						

ICS: inhaled corticosteroids; OCS: oral corticosteroids; * Excludes reliever taken before exercise

Before stepping up treatment, ensure that the child's symptoms are due to asthma, and that the child has good inhaler technique and good adherence to existing treatment.

15.3 Asthma Treatment Steps for Children Under 6 Year Olds

15.3.1 Which Children Should Be Prescribed Regular Controller Treatment?

Intermittent or episodic wheezing of any severity may represent an isolated viral-induced wheezing episode, an episode of seasonal or allergen-induced asthma or unrecognised uncontrolled asthma. The initial treatment of wheezing is identical for all of these – a SABA every 4–6 hours as needed for one or more days until symptoms disappear. Further treatment of the acute wheezing episodes themselves is described below (see acute asthma exacerbations in children under 6 years old). However, uncertainty surrounds the addition of other drugs in these children, especially when the nature of the episode is unclear.

In general, the following principles apply:

- If the symptom pattern suggests a diagnosis of asthma (Table 9), respiratory symptoms are uncontrolled (Table 11) and/or wheezing episodes are frequent (e.g. three or more episodes in a season), regular controller treatment should be initiated (Step 2, Figure 11) and the response evaluated (Evidence D). Regular controller treatment may also be indicated in a child with less frequent but more severe episodes of viral-induced wheeze (Evidence D)
- If the diagnosis of asthma is in doubt and inhaled SABA therapy needs to be repeated frequently, e.g. more than every 6–8 weeks, a trial of regular controller treatment should be considered to confirm whether the symptoms are due to asthma (Evidence D)
- The treatment steps are summarised in Figure 11.

It is important to discuss the decision to prescribe controller treatment and the choice of treatment with the child's parents or carers. They should be aware of both the relative benefits and risks of the treatments and the importance of maintaining normal activity levels for their child's normal physical and social development.

STEP 1

Preferred option - As-needed inhaled SABA

- All children who experience wheezing episodes should be provided with inhaled SABA for relief of symptoms, although it is not effective in all children.
- Use of SABA for the relief of symptoms on average more than twice a week over a one month period indicates the need for a trial of controller medication.

Other options - For children with intermittent viral-induced wheeze and no interval symptoms, particularly those with underlying atopy in whom inhaled SABA medication is not sufficient, intermittent high-dose ICS may be considered but this is an unlicensed use of ICS. Due to the risk of side-effects, this should only be considered if the clinician is confident that the treatment will be used appropriately.

STEP 2

Initial controller treatment plus as-needed SABA.

Preferred option - Regular daily, low-dose ICS is recommended as the preferred initial treatment to control asthma in children under 6 years old.

Other options - In young children with persistent asthma, regular treatment with a LTRA modestly reduces symptoms and need for oral corticosteroids compared with placebo. Montelukast 4 mg tablets are licensed for use in children from two years of age, with the 4 mg granules licensed from six months of age. Warnings about side effects of LTRAs, such as sleep and mood disturbances should be discussed with parents.

For pre-school children with frequent viral-induced wheezing and interval asthma symptoms, as-needed (prn) or episodic ICS may be considered (unlicensed), but a trial of regular daily low-dose ICS should be undertaken first.

If good asthma control is not achieved with a given therapy, trials of the alternative Step 2 therapies are recommended prior to moving to Step 3.

STEP 3

If three months of initial therapy with a low-dose ICS fails to control symptoms, or if exacerbations continue to occur, check the following before any step-up in treatment is considered

- Is the diagnosis correct?
- Check and correct inhaler technique. Consider alternative delivery systems if indicated
- Confirm good adherence with the prescribed dose
- Enquire about risk factors such as allergen or tobacco smoke exposure

Preferred option - medium dose ICS (double the ‘low’ daily dose)

Doubling the initial low dose of ICS may be the best option (Evidence C). Assess response after three months.

- The child should be referred for expert assessment if symptom control remains poor and/or flare-ups persist, or if side effects of treatment are observed or suspected

Other options - Addition of a LTRA to low-dose ICS may be considered, based on data from older children (9).

STEP 4

Continue controller treatment and refer for expert assessment.

Preferred option - refer the child for expert advice and further investigation.

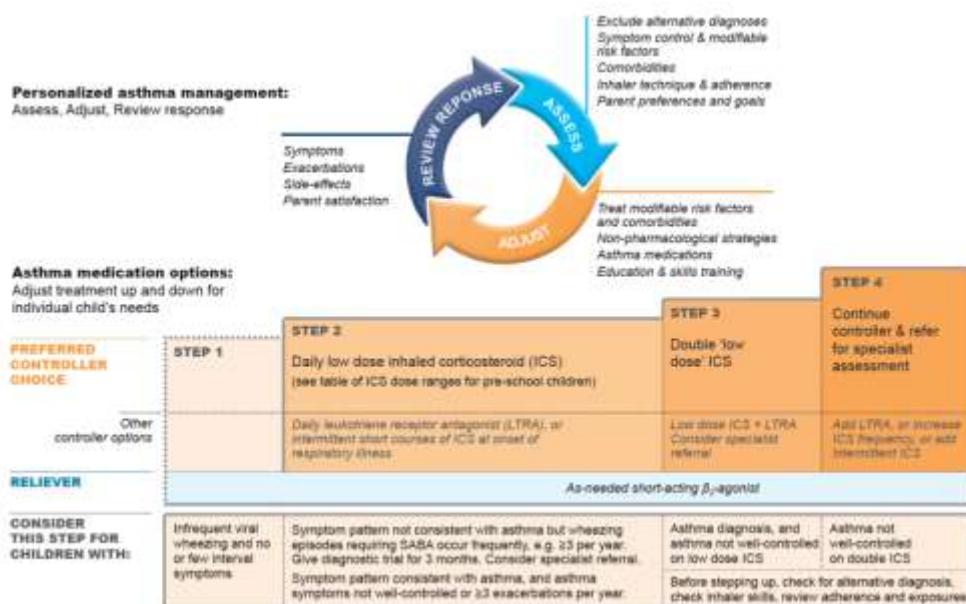


Figure 11: Step-wise treatment of asthma in children under 6 years old with permission from GINA guideline 2020 (9))

15.4 Daily Low-Doses of ICS for Children Under 6 Years

NB: Most benefit is achieved in children under 6 years with low-dose ICS.

Higher doses of ICS may give some additional clinical benefit but must be weighed against potential side-effects.

Table 12: Inhaled corticosteroids for children under 6 years old and total daily doses

Drug	Daily low-dose (mcg)
Beclometasone dipropionate (pMDI, HFA*)	100
Fluticasone dipropionate (pMDI, HFA*)	50

HFA: Hydrofluoroalkane; pMDI: pressurised Metered Dose Inhaler. * Licensed for children over four years of age

15.4.1 Device

It is important to discuss and demonstrate delivery devices for young children. The advised delivery devices recommended in young children are outlined in Table 13.

Table 13: Advised delivery devices recommended for children 0-6 years old

Age	Preferred device	Alternative device
0-3 years	Pressurised metered dose inhaler plus dedicated spacer with face mask	Nebuliser with face mask
4-6 years	Pressurised metered dose inhaler plus dedicated spacer with mouthpiece	Pressurised metered dose inhaler plus dedicated spacer with face mask or nebuliser with mouthpiece or face mask

Mask Suitable for Children

- 0-2 yr Babyhaler® spacer device
- 1-6 yr Aerochamber®/Freebreathe® device (Yellow)

15.6 Management of Worsening Asthma and Exacerbations in Children Under 6 Years Old

Key Points

Symptoms of exacerbations in young children

- Early symptoms of exacerbations in young children may include increased symptoms, increased coughing, especially at night, lethargy or reduced exercise tolerance, impaired daily activities including feeding and a poor response to reliever medications

Home management in a written asthma action plan

- Give a written asthma action plan to parents/carers of young children with asthma so they can recognise an impending severe attack, start treatment and identify when urgent hospital treatment is required
- Initial treatment at home is with inhaler SABA with review after 1 hour or earlier
- Parents/carers should seek urgent medical care if the child is acutely distressed, lethargic, fails to respond to initial bronchodilator therapy or is worsening especially in children <1 year of age
- Medical attention should be sought on the same day if inhaled SABA is needed more often than 3-hourly or for more than 24 hours
- There is no compelling evidence to recommend parent-initiated oral corticosteroids

Management of exacerbations in primary care or acute care facility

- Assess severity of the exacerbation while initiating treatment with SABA (2-6 puffs every 20 minutes for first hour) and oxygen (to be maintain saturation 94-96%)
- Recommend immediate transfer to hospital if there is no response to inhaled SABA within 1-2 hours if the child is unable to speak or drink, has a respiratory rate >40/minute or is cyanosed, if resources are lacking in the home or if oxygen saturation is <92% on room air.
- Consider oral prednisolone /prednisolone 1-2 mg/kg/day for up to 5 days for children attending an Emergency Department or admitted to hospital, up to a maximum of 20mg/day for 0-2 years and 30mg/kg/day for 3-5 years or dexamethasone 0.6mg/kg/day for 2 days. If there is failure of resolution or relapse of symptoms with dexamethasone, consideration should be given to switching prednisolone.

Arrange early follow-up after an exacerbation

- Children who have experienced an asthma exacerbation are at risk of further exacerbations. Arrange follow-up within 1 week of an exacerbation to plan ongoing asthma management.

15.7 Diagnosis of Flare Up

A flare-up or exacerbation of asthma in children under 6 years old is defined as an acute or sub-acute deterioration in symptom control that is sufficient to cause distress or risk to health and necessitates a visit to a health care provider or requires treatment with systemic corticosteroids.

Early symptoms of an exacerbation may include any of the following:

- An acute or sub-acute increase in wheeze and shortness of breath
- An increase in coughing, especially while the child is asleep
- Lethargy or reduced exercise tolerance
- Impairment of daily activities, including feeding
- A poor response to reliever medication

Upper respiratory symptoms frequently precede the onset of an asthma exacerbation, indicating the important role of viral URTI in precipitating exacerbations in many, although not all, children with asthma.

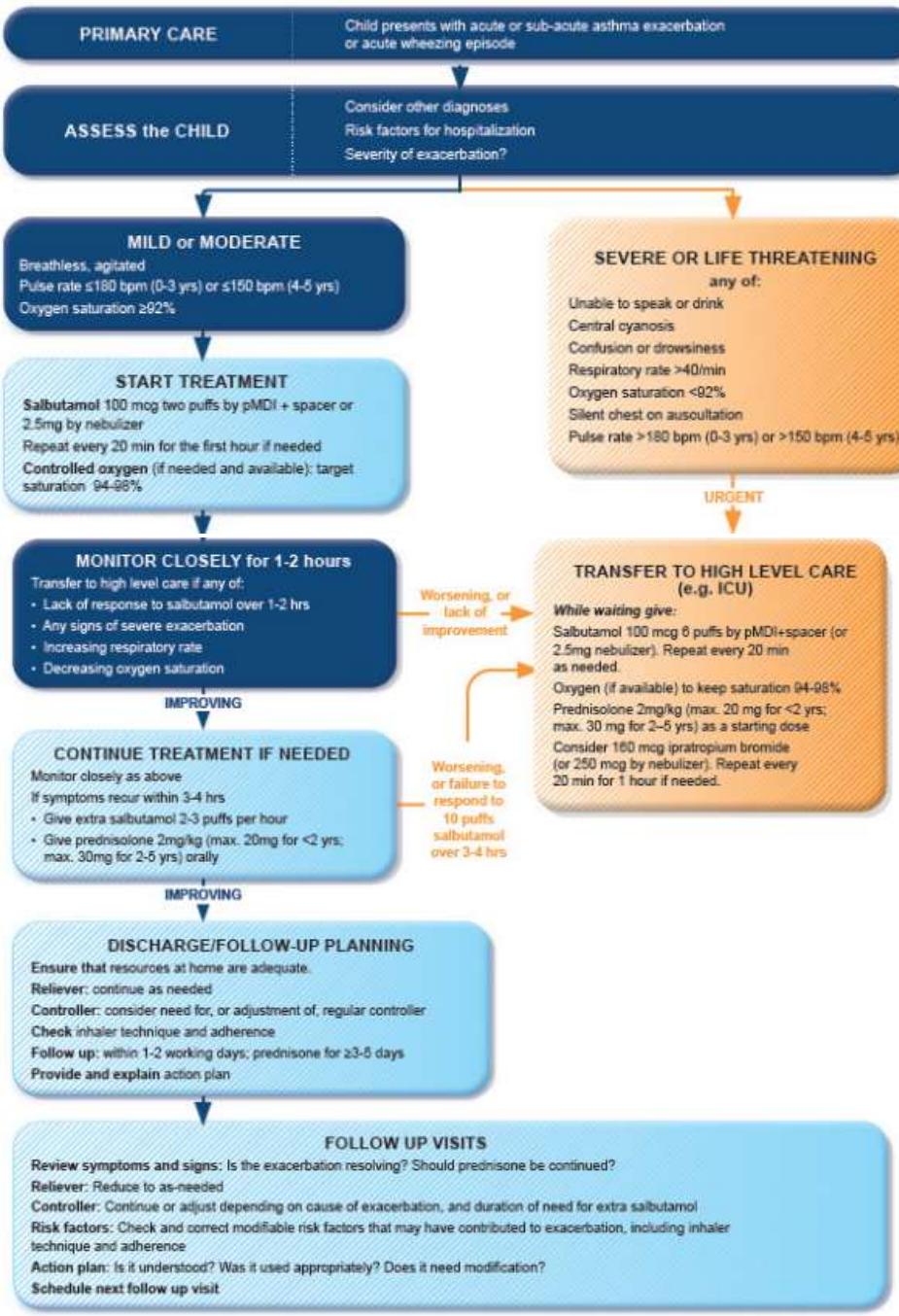


Figure 12: Management of acute asthma exacerbations in children under 6 years old in General Practice with permission from GINA guideline 2020 (9)

15.8 Assessment of Exacerbation Severity

Conduct a brief history and examination concurrently with the initiation of therapy. The presence of any of the features of a severe exacerbation listed in Table 14 are an indication of the need for urgent treatment and immediate transfer to hospital.

Table 14: Indications of the need for urgent treatment and immediate transfer to hospital (with permission from GINA guideline 2020 (9))

Symptoms	Mild	Severe*
Altered consciousness	No	Agitated, confused or drowsy
Oximetry on presentation (SaO_2)**	>95%	<92%
Speech [†]	Sentences	Words
Pulse rate	<100 beats/minute	>200 beats/minute (0–3 years) >180 beats/minute (4–6 years)
Central cyanosis	Absent	Likely to be present
Wheeze intensity	Variable	Chest may be quiet

*Any of these features indicates a severe asthma exacerbation **Oximetry, when available before treatment with oxygen or bronchodilator † The normal developmental capability of the child must be taken into account

15.9 Indications for Immediate Transfer to Hospital

Children with features of a severe exacerbation that fail to resolve within 1–2 hours despite repeated dosing with inhaled SABA, with or without oral corticosteroids (OCS), must be referred to hospital for observation and further treatment (Evidence D). Other indications are respiratory arrest or impending arrest; lack of supervision in the home or doctor's office; and recurrence of signs of a severe exacerbation within 48 hours (particularly if treatment with OCS has already been given). In addition, early medical attention should be sought for children less than 2 years of age as the risk of dehydration and respiratory fatigue is increased. Indications for immediate transfer of children under 6 years old to hospital are summarised in Table 15.

Table 15: Indications for immediate transfer to hospital in children less than 6 years old (with permission from GINA guideline 2020 (9))

Immediate transfer to hospital is indicated if a child under 6 years old with asthma has any of the following:	
At initial or subsequent assessment	<ul style="list-style-type: none"> • Child is unable to speak or drink • Cyanosis • Respiratory rate >40 per minute • Oxygen saturation <92% when breathing room air • Silent chest on auscultation
Lack of response to initial bronchodilator treatment	<ul style="list-style-type: none"> • Lack of response to 6 puffs of inhaled SABA (2 separate puffs, repeated 3 times) over 1-2 hours • Persisting tachypnoea* despite three administrations of inhaled SABA. Even if the child shows other clinical signs of improvement • Social environment that limits delivery of acute treatment or parent/carer unable to manage acute asthma at home • During transfer to hospital, continue to give inhaled SABA, oxygen (if available) to maintain saturations 94-98% and give a systemic corticosteroid.

*Normal respiratory rate <60 breaths/ minute in children 0-2 months, <50 breaths/minute in children 2-12 months,<40 breaths/minute in children 1-5 years.

15.10 Emergency Treatment and Initial Pharmacotherapy

Oxygen (when available)

Treat hypoxemia urgently with oxygen by face mask to achieve and maintain percutaneous oxygen saturation 94–98%. To avoid hypoxemia during changes in treatment, children who are acutely distressed should be treated immediately with oxygen and SABA i.e. 2.5 mg of salbutamol delivered by an oxygen-driven nebuliser (if available). This treatment should not be delayed and may be given before the full assessment is completed.

Bronchodilator Therapy

The initial dose of SABA may be given by a pMDI with spacer and mask or mouthpiece or an air-driven nebuliser or, if oxygen saturation is low, by an oxygen-driven nebuliser. For most children, pMDI plus spacer is favoured as it is more efficient than a nebuliser for bronchodilator delivery. The initial dose of SABA is two puffs of salbutamol (100 mcg per puff) or equivalent, except in acute, severe asthma when six puffs should be given. When a nebuliser is used, a dose of 2.5 mg salbutamol solution is recommended. The frequency of dosing depends on the response observed over 1–2 hours as per algorithm (Figure 12).

For children with moderate-severe exacerbations and a poor response to initial SABA, ipratropium bromide may be added, as 8 puffs of 20mcg (or 250mcg by nebuliser) every 20 minutes for 1 hour only.

Table 16: Dose and method of administration of treatments for moderate-severe exacerbations of asthma in children under 6 years old

Therapy	Dose and administration
Supplementary oxygen	Delivered by face mask (usually 1L/minute) to maintain oxygen saturation 94-98%
SABA	2-6 puffs of salbutamol by spacer or 2.5mg of salbutamol by nebuliser, every 20 minutes for first hour, then reassess severity. If symptoms persist or recur, give an additional 2-3 puffs per hour. Admit to hospital if >10 puffs required in 3-4 hours
Systemic corticosteroids	Given initial dose of oral prednisolone(1-2 mg/kg up to a maximum 20mg for children <2 years old ;30 mg for children 2-5 years old) OR intravenous methylprednisolone 1mg/kg 6 hourly on day 1
	ADDITIONAL OPTIONS IN FIRST HOUR OF TREATMENT
Ipratropium bromide	For children with moderate-severe exacerbations, 8 puffs of ipratropium bromide 20mcg (or 250mcg by nebuliser) every 20 minutes for 1 hour only.

15.11 Maintain Current Controller Treatment (if prescribed)

Children who have been prescribed maintenance therapy with ICS, LTRA or both should continue to take the prescribed dose during and after an exacerbation.

Inhaled Corticosteroids

For children not previously on ICS, an initial dose of ICS twice the low daily dose may be given and continued for a few weeks or months.

Oral Corticosteroids

For children with severe exacerbations, a dose of OCS equivalent to prednisolone 1–2 mg/kg/day, with a maximum of 20 mg/day for children under 2 years of age and 30 mg/day for children aged 2–6 years old , is currently recommended. A three to five day course is sufficient in most children and can be stopped abruptly.

15.12 Follow-up post flare-up

It is important that children along with parents/carers are reviewed following a flare up to try to identify factors which may have contributed to it – adherence to medications, correct delivery device and factors such as specific triggers along with factors such as smoking, obesity and dampness in housing. Advise parents/carers to use self-management plans to help manage any future events.

15.13 Assessing Future Risk of Adverse Outcomes

The relationship between symptom control and future risk of adverse outcomes such as exacerbations has not been sufficiently studied in young children. Although exacerbations may occur in children after months of apparently good symptom control, the risk is greater if current symptom control is poor. The future risk of harm due to excessive doses of inhaled or systemic corticosteroids must also be avoided. This can be minimised by ensuring that the prescribed treatment is appropriate and reduced to the lowest dose that maintains satisfactory symptom control and minimises exacerbations.

The child's height should be measured and recorded at least yearly, as growth velocity may be lower in the first 1-2 years of ICS treatment and poorly-controlled asthma can affect growth. The minimum effective dose of ICS to maintain good asthma control should be used. If decreased growth velocity is seen, other factors should be considered, including poorly-controlled asthma, frequent use of oral corticosteroids, poor nutrition and referral should be considered.

15.14 Treatment Steps to Control Asthma Symptoms and Minimise Future Risk for Children Under 6 Years Old

Asthma treatment in young children follows a stepwise approach (Figure 11), with medication adjusted up or down to achieve good symptom control and minimise future risk of exacerbations and medication side-effects. The need for controller treatment should be re-assessed regularly.

15.15 Before Considering a Step-Up of Controller Treatment

If symptom control is poor and/or exacerbations persist despite three months of adequate controller therapy, check the following before any step up in treatment is considered:

- Confirm that the symptoms are due to asthma rather than a concomitant or alternative condition (Table 10). Refer for expert assessment if the diagnosis is in doubt.
- Check and correct inhaler technique.
- Confirm good adherence with the prescribed dose.
- Enquire about risk factors such as allergen or tobacco smoke exposure (Table 9).

15.16 Asthma Self-Management Education for Carers of Young Children

Asthma self-management education should be provided to family members and carers of wheezy children under 6 years old when wheeze is suspected to be caused by asthma. An educational program should contain

- A basic explanation about asthma and the factors that influence it
- Training about correct inhalation technique
- Information on the importance of the child's adherence to the prescribed medication regimen
- A written asthma action plan

15.17 Written Asthma Action Plans (9)

Asthma action plans should be provided for the family/carers of all children with asthma, including those under 6 years old (Evidence D). Action plans, developed through collaboration between an asthma educator, the health care provider and the family, have been shown to be of value in older children, although they have not been extensively studied in children under 6 years old. A written asthma action plan includes:

- A description of how the parent or carer can recognise when symptom control is deteriorating
- The medications to administer
- When and how to obtain medical care, including telephone numbers of services available for emergencies e.g. doctors' offices, emergency rooms and hospitals, ambulance services and emergency pharmacies

Appendix 1 Structured Review of Asthma Control in General Practice

Table 17: Structured review of asthma control in general practice

Structured Review (Asthma Control in General Practice)		
Assessment	Review Treatment	Patient Education
<ul style="list-style-type: none">• Symptom Review<ul style="list-style-type: none">◦ Daytime symptoms◦ Nocturnal symptoms/awakening◦ Limitations of activities• Control status<ul style="list-style-type: none">◦ Need for reliever / rescue treatment◦ Acute attacks• Physical examination• Lung function (PEF or FEV₁)	<ul style="list-style-type: none">• Compliance• Inhaler technique• Smoking status• Physical activity• Weight management• Dietary advice• Vaccination• Motivational support• Smoking advice in household	<ul style="list-style-type: none">• Drug treatment<ul style="list-style-type: none">◦ Reliever vs controller◦ Inhaler technique• Monitoring control<ul style="list-style-type: none">◦ Symptoms◦ Actions to take◦ When to seek medical help
Patient Self-Management		
<p>My Asthma Action Plan Appendix</p> <ul style="list-style-type: none">• Review• Update		

Appendix 2 Suggested Audits of Asthma Assessment and Management in General Practice - Potential Audits

1. Audit number of patients who receive SABA treatment alone. Suggest review a number of these to see whether they require ICS treatment.
2. Audit the number of SABA prescriptions issued to patients requesting repeat prescriptions. Ideally patients only require 1 per annum if asthma controlled.
3. Audit number of patients with asthma who have a self-management plan issued to them.
4. Audit the number of patients who are seen within two weeks of an exacerbation.
5. Audit number of children attending who are enrolled on the cycle of care for asthma.

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