

Global strategy for asthma management and prevention, GINA 2017

The Global Initiative for Asthma (GINA) has recently updated its strategy for asthma management and prevention for adults and children older than 5 years. Its recommendations are based on twice-yearly reviews of relevant evidence by an expert scientific committee, and provide a benchmark against which we can judge national guidance, which may not be updated as frequently.

Asthma is a heterogeneous disease, usually characterised by chronic airway inflammation. It is defined by the history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, together with variable expiratory airflow limitation.

The objectives of management are to ensure that patients can:

- Avoid troublesome symptoms during day and night
- Need little or no reliever medication
- Have productive, physically active lives
- Have normal or near normal lung function
- Avoid serious asthma exacerbations

Factors that may trigger or exacerbate asthma symptoms include viral infections, allergens (e.g. house dust mites, pollens), tobacco smoke, exercise and stress. Some drugs, e.g. beta-blockers, aspirin and NSAIDs can provoke asthma symptoms in some patients.

A stepwise approach to treatment should be tailored to the individual patient, and take account of effectiveness, safety and cost of available medications. Regular controller treatment, usually with inhaled corticosteroids (ICS) reduces the frequency and severity of symptoms and the risk of exacerbation.

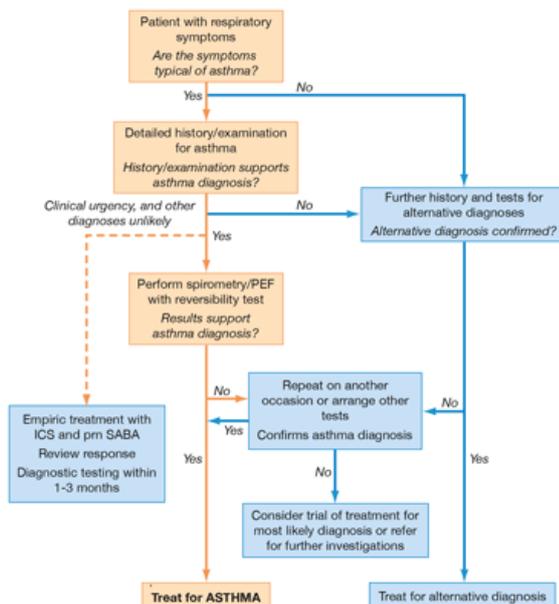
There is no definitive test for the diagnosis of asthma, and diagnosis should be based on two cardinal characteristics:

- A history of respiratory symptoms such as wheeze, shortness of breath, chest tightness and cough that vary over time and in intensity, and
- Variable expiratory airflow limitation.

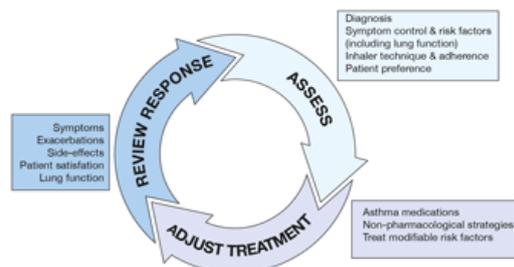
DIAGNOSIS

Diagnosis should be based on the history of characteristic symptom patterns and evidence of variable airflow limitation. If possible, the evidence should be documented before starting controller treatment as it is often more difficult to

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Diagnostic pathway for asthma. Adapted from GINA 2017 report



	STEP 1	STEP 2	STEP 3	STEP 4	STEP 5
Preferred controller choice		Low dose ICS	Low dose ICS/LABA**	Med/high ICS/LABA	Refer for add-on treatment e.g. tiotropium** anti-IgE anti-IL5*
Other controller options	Consider low dose ICS	Leukotriene receptor antagonists (LTRA) Low dose theophylline*	Med/high dose ICS Low dose ICS+LTRA (or + theoph*)	Add tiotropium** High dose ICS+LTRA (or + theoph*)	Add low dose OCS
Reliever	As-needed short-acting beta-agonist (SABA)		As-needed SABA or low dose ICS/formoterol*		
Remember to...	* Provide guided self-management education (self-monitoring + written action plan + regular review) ** Treat modifiable risk factors and comorbidities, e.g. smoking, obesity, anxiety * Advise about non-pharmacological therapies and strategies, e.g. physical activity, weight loss, avoidance of sensitizers where appropriate * Consider stepping up if uncontrolled symptoms, exacerbations or risks but check diagnosis, inhaler technique, adherence				

confirm the diagnosis afterwards.

Asthma treatment steps. Adapted from GINA 2017 report

Features that increase the probability of asthma

- More than one symptom (wheeze, shortness of breath, cough, chest tightness)
- Symptoms worse at night or in the early morning
- Symptoms vary over time and in intensity
- Symptoms are triggered by viral infections (colds), exercise, allergen exposure, changes in weather, laughter, or irritants such as car exhaust fumes, smoke or strong smells

Features that decrease the probability of asthma

- Isolated cough with no other respiratory symptoms
- Chronic production of sputum
- Shortness of breath associated with dizziness, light-headedness or peripheral tingling
- Chest pain
- Exercise-induced dyspnoea with noisy inspiration

Figure 1 shows the diagnostic flowchart for asthma

Testing

Lung function testing should be used to confirm airflow limitation. In asthma, lung function may vary between completely normal and severely restricted in the same patient.

Forced expiratory volume in 1 second (FEV1) from spirometry is more reliable than peak expiratory flow (PEF). Spirometry should be performed by well-trained operators with well maintained and regularly calibrated equipment.

If PEF is used, the same meter should be used each time as measurements may differ between meters by up to 20%.

Reduced FEV1 may be found with many other lung diseases (or poor spirometry technique) but a reduced ratio of FEV1 to forced vital capacity (FVC) indicates airflow limitation. FEV1/FVC ratio is normally more than 0.75-0.80 in adults, and more than 0.90 in children. Values less than these suggest airflow limitation.

Reversibility testing demonstrates rapid improvement in FEV1 within minutes of inhalation of a rapid-acting bronchodilator e.g. 200-400mcg salbutamol. It is more likely to be positive if bronchodilator treatment is withheld before test: SABA for ≥ 4 hours, LABA for ≥ 15 hours. An increase of $>12\%$ and $>200\text{ml}$ from baseline in adults, $>12\%$ predicted in children is positive.

Alternatively, excessive variability in twice-daily PEF over 2 weeks (average daily diurnal variability $>10\%$ in adults, 13% in children), or significant increase in lung function after 4 weeks' ICS treatment can be used to confirm a diagnosis of asthma.

- The greater the variation or the more times excess variation is seen, the more confident you can be of the diagnosis of asthma
- Testing may need to be repeated during symptoms, in the early morning, or after withholding bronchodilators
- Bronchodilator reversibility may be absent during severe exacerbations or viral infections. Next steps in testing depend on clinical urgency and availability of other tests.
- Physical examination in people with asthma is often normal but the most frequent finding is wheezing on auscultation, especially on forced expiration
- The diagnosis of asthma should be confirmed and the evidence documented. Depending on clinical urgency, this should preferably be done before starting controller treatment as confirmation of diagnosis is

more difficult after treatment has been started.

FeNO

The measurement of fractional exhaled nitric oxide (FeNO) is becoming more widely used. FeNO is modestly associated with eosinophilic airway inflammation, but has not been established as useful for ruling a diagnosis of asthma in or out. FeNO is higher in eosinophilic asthma but also in non-asthma conditions, e.g. bronchitis, atopy, allergic rhinitis and eczema, and it is not raised in some asthma phenotypes, e.g. neutrophilic asthma. Several other factors affect FeNO levels: it is lower in smokers, bronchoconstriction, and early in allergic response, and it may be higher or lower during viral infections.

In adults not previously treated with steroids, with non-specific respiratory symptoms, a finding of FeNO >50 parts per billion (ppb) is associated with a good short term response to ICS, but there are no long term studies on the safety of withholding ICS in patients with low initial FeNO. So in patients with a diagnosis, or suspected diagnosis, of asthma, **FeNO cannot be recommended at present for deciding against treatment with ICS.**

SPECIAL POPULATIONS

Cough as main or only presenting symptom

More common in children, worse at night. Lung function may be normal. Exclude cough caused by ACE inhibitors, gastroesophageal reflux, chronic upper airway cough syndrome (postnasal drip), chronic sinusitis and vocal cord dysfunction. Variability in lung function is important to confirm diagnosis

Occupational asthma

Ask every patient with adult onset asthma about work history and exposures (including hobbies) and whether their symptoms improve when they are not at work (weekends or holidays). It is important to confirm diagnosis objectively, because the patient may need to change their occupation, and to eliminate exposure as soon as possible. Specialist referral is usually necessary.

Athletes

Confirm diagnosis of asthma in athletes with lung function tests (may need referral for bronchial provocation testing). Exclude conditions that mimic or may be associated with asthma, such as rhinitis, vocal cord dysfunction, dysfunctional breathing, cardiac conditions and over-training.

The elderly

Asthma may be underdiagnosed in the elderly (poor perception, assumption that breathlessness is normal in old age, lack of fitness etc) or overdiagnosed (confusion with shortness of breath due to heart failure or ischaemic heart disease). Consider also COPD or asthma-COPD overlap if history of smoking.

Smokers and ex-smokers

Asthma and COPD may co-exist or overlap. Uncertainty in diagnosis should prompt early referral. Asthma-COPD has worse outcomes than either disease alone, and there is little good-quality evidence about how it should be treated as these patients are generally excluded from clinical trials.

Patients already taking a controller

For 25-30% of patients with a diagnosis of asthma in primary care, the diagnosis cannot be confirmed. If lung function is normal, repeat reversibility testing after withholding medication for >12 hours. If patient has frequent symptoms, consider stepping up ICS for 3 months and then repeat testing. If the patient has few symptoms, consider stepping down – ensure patient has a written asthma action plan and monitor carefully – and repeat lung function testing.

ASSESSMENT

Assess patients with a diagnosis of asthma at every opportunity, particularly when:

- They are symptomatic
- After a recent exacerbation
- When they request a repeat prescription, and
- At least once a year.

1. Assess symptom control and risk factors for future poor outcomes
2. Treatment issues – current treatment and side effects; inhaler technique; adherence; check the patient has a written asthma plan; ask about their attitudes and goals for their asthma
3. Consider comorbidities which may contribute to symptoms and reduce quality of life, and their treatment may complicate asthma management:
 - a. rhinitis
 - b. sinusitis
 - c. gastroesophageal reflux
 - d. obesity
 - e. sleep apnoea
 - f. depression and anxiety

Poor symptom control is a burden to patients and a risk factor for exacerbations

Potentially modifiable risk factors include:

- Uncontrolled asthma symptoms
- ICS not prescribed; poor adherence; incorrect inhaler technique
- High SABA use (increased mortality with >1x200 dose canister/month)
- Low FEV1 (especially if <60% predicted)
- Exposures (e.g. smoking, allergens)
- Comorbidities (obesity, rhinosinusitis, confirmed food allergy)
- Sputum or blood eosinophilia, elevated FeNO in allergic adults
- Pregnancy

Other risk factors for exacerbations

- Ever being intubated or in intensive care for asthma
- One or more severe exacerbations in the past 12 months

Questionnaires such as the Asthma Control Test (Act) only assess symptom control.

Inhaler technique

Most patients (80%) cannot use their inhaler correctly. To ensure effective inhaler use:

- Choose the most appropriate device for the patient before prescribing. Consider the medication, physical problems e.g. arthritis, patient skills and cost. For ICS by pressurised metered dose inhaler, prescribe a spacer.
- Check inhaler technique at every opportunity. Ask the patient to show you how they use their inhaler. Check their technique against a device-specific checklist.
- Correct, using a physical demonstration, and then check again.
- Confirm that you have checklists for each of the inhalers you prescribe, and that you can demonstrate correct technique on them. Information about devices and techniques can be found on the GINA website (www.ginasthma.org).

Adherence

Around half of patients (adults and children) do not take controller medications as prescribed. Non-adherence may be intentional (fear of side effects) or unintentional (forgetfulness). Ask 'How many days a week do you use it?' or 'Do you find it easier to remember in the morning or at night?' (not 'Do you use it?')

Check medication usage, from prescription date, inhaler date/dose counter, dispensing records.

Ask about attitudes and beliefs about asthma and medication.

TREATMENT

The long-term goals of asthma management are to achieve good symptom control and to minimise the risk of exacerbations, fixed airflow limitation and side effects of treatment.

Figure 2 gives GINA's recommended stepwise approach to asthma treatment.

Step 1. As needed SABA with no controller – only if symptoms are rare, there is no night-time wakening, no exacerbations in past year and normal FEV1.

Consider low dose ICS for patients with exacerbation risks

Step 2. Regular low dose ICS plus SABA as needed

Step 3. Low dose ICS/LABA either as maintenance treatment plus as-needed SABA, OR ICS/formoterol maintenance and reliever therapy (MART)

Consider medium dose ICS

Children (6-11 years) Medium dose ICS or low dose ICS/LABA

Step 4. Low dose ICS/formoterol (MART) or medium dose ICS/LABA as maintenance plus SABA as needed.

Consider: add on tiotropium by mist inhaler for patients ≥ 12 years with a history of exacerbations; high dose ICS/LABA – more side effects but little extra benefit; extra controller, e.g. LTRA or slow release theophylline.

Children (6-11 years): Refer for expert assessment and advice

Step 5. Refer for expert investigation and add-on treatment

Some patients may benefit from low dose oral corticosteroids (OCS) but long term systemic side effects are common

Stepping up

If symptoms and/or exacerbations persist despite 2-3 months of controller treatment, assess common issues before considering a sustained step up (for at least 2-3 months)

- Incorrect inhaler technique
- Poor adherence
- Modifiable risk factors e.g. smoking
- Comorbidities e.g. allergic rhinitis

Stepping down

Once good asthma control has been achieved and maintained for 3 months, consider stepping down to find the lowest treatment that controls both symptoms and exacerbations, and minimises side effects.

- Choose an appropriate time (no respiratory infection, patient not travelling, not pregnant)
- Document baseline status (symptom control and lung function), provide a written asthma action plan, monitor closely and book follow-up visit
- Step down through available options to reduce ICS dose by 25-50% at 2-3 month intervals
- Do not completely withdraw ICS in adults or adolescents with a diagnosis of asthma unless needed temporarily to confirm diagnosis. Make sure a follow-up appointment is arranged.

WRITTEN ASTHMA PLANS

All patients should be provided with a written asthma plan appropriate for their level of control and health literacy, so they know how to recognise and respond to worsening asthma.

It should include:

- The patient's usual medications
- When and how to increase medications (and start OCS)
- How to access medical care if symptoms fail to respond

The action plan can be based on symptoms and/or (in adults) PEF. Patients who deteriorate quickly should be advised to see their doctor immediately or go to A&E.

Repeated dosing with SABA provides temporary relief until the cause of worsening symptoms passes or increased controller treatment has had time to take effect. The need for repeated doses over more than 1-2 days signals the need to review and possibly increase controller treatment if this has not already been done.

There is emerging evidence that increasing ICS dose may prevent worsening asthma progressing to a severe exacerbation, and may avoid the need for OCS.

Self-management of worsening asthma in adults or adolescents

Effective asthma self-management requires:

- Self-monitoring of symptoms and/or lung function (PEF)
- Written asthma plan
- Regular medical review

All patients

- Increase reliever (increase frequency of SABA use, for pMDI add spacer)
- Early increase in ICS (at least double ICS, consider increasing ICS to high dose [maximum 2000 mcg/day])
- Review response

If PEF or FEV1 <60% best, not improving after 48 hours

- Continue reliever
- Continue controller
- Add prednisolone 40-50mg/day
- Contact doctor

(Ed. Ensure receptionists understand the urgency when patients request an appointment for worsening asthma)

Managing exacerbations in primary care

Assess exacerbation severity while starting SABA and oxygen. Assess dyspnoea (can patient speak in sentences?), respiratory rate, pulse rate, oxygen saturation and lung function (e.g. PEF). Check for anaphylaxis.

Consider alternative causes for acute breathlessness e.g. heart failure, upper airway dysfunction, inhaled foreign body or pulmonary embolism

Arrange immediate transfer to acute care (to ITU if patient is drowsy, confused or has a silent chest – for these patients immediately give inhaled SABA, inhaled ipratropium bromide, oxygen and systemic corticosteroids)

Start treatment with repeated doses of SABA (usually by pMDI and spacer), early OCS. Check response.

For severe exacerbations, add ipratropium bromide, and consider giving SABA by nebuliser.

Monitor patients closely and frequently during treatment and transfer to higher level care if worsening or failing to respond.

Decide need for hospitalisation based on clinical status, symptoms, response to treatment, recent and past history of exacerbations and ability to manage at home.

Arrange early follow up after any exacerbations, within 2-7 days.

Exacerbations often represent failures in long term asthma management, and provide opportunities for review. All patients must be followed up regularly until symptoms and lung function return to normal.

Identifying patients at risk of asthma-related death

These patients should be flagged for more frequent review:

- History of near-fatal asthma requiring intubation and ventilation
- Hospitalisation or emergency care for asthma in last 12 months
- Not currently using ICS or poor adherence with ICS
- Currently using or recently stopped using OCS (indicates severity of recent symptoms)
- Over-use of SABA – especially more than 1 inhaler/month
- Lack of written asthma action plan
- History of psychiatric disease or psychosocial problems
- Confirmed food allergy in a patient with asthma

This summary is taken from the GINA 2017 report, Global strategy for asthma management and prevention <http://ginasthma.org/2017-gina-report-global-strategy-for-asthma-management-and-prevention>

Please consult the report, or read the 2017 Pocket guide for asthma management and prevention before varying your practice from the current British Asthma Guideline, and be aware that not all the treatments recommended have a UK licence or have been approved by NICE and/or Scottish Medicines Consortium for use in UK practice.

References

GINA. 2017 Report, Global strategy for asthma management and prevention

<http://ginasthma.org/2017-gina-report-global-strategy-for-asthma-management-and-prevention/>

GINA 2017. Pocket guide for asthma management and prevention

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