

# **Introduction to Asthma and COPD**

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# Definitions

## Asthma

Central to all definitions is the presence of symptoms (more than one of wheeze, breathlessness, chest tightness, cough) and of variable airflow obstruction. More recent descriptions of asthma in both children and adults have included airway hyper-responsiveness and airway inflammation as components of the disease (BTS, 2016)

Simply asthma is a long-term condition that affects your airways and - airway hyper-responsiveness - airway inflammation. You could say that someone with asthma has 'sensitive' airways that are inflamed and ready to react when they come into contact with something they don't like (asthma triggers/allergies e.g. dust, pet etc.)

## Symptoms

- shortness of breath
- wheezing
- tightness in the chest
- Coughing

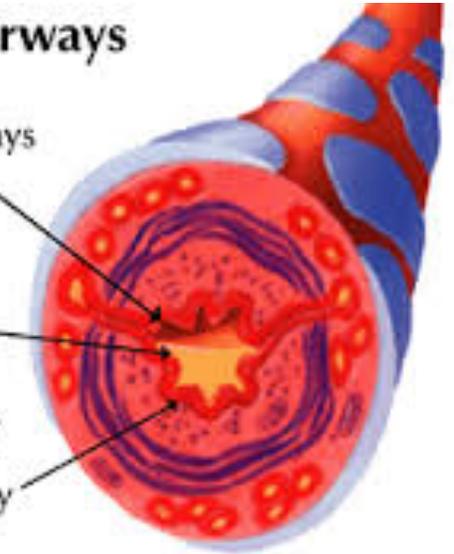
Our body produces hormones (e.g. steroids) that help to regulate inflammation, including the inflammation of the airways in asthma. This process tends to switch off when you sleep, so asthma is often worse at night and first thing in the morning.

## Asthma Airways

Inflamed Airways

Mucus fills airway

Muscle layer tightens around airway

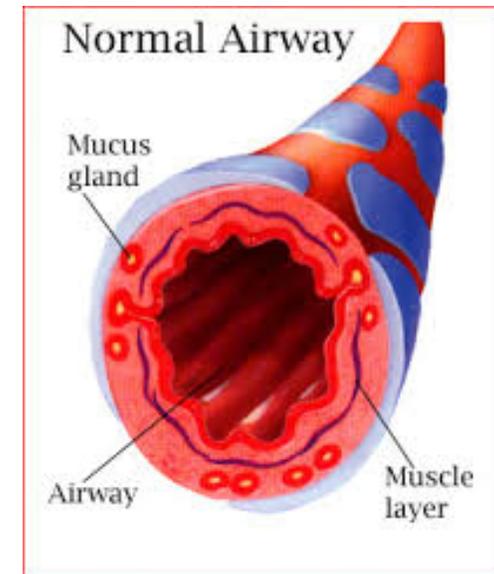


## Normal Airway

Mucus gland

Airway

Muscle layer



# Asthma Triggers

- **Pet allergens:** the allergens (which cause the allergic reaction in some people) are actually proteins found in the animal's flakes of skin (dander) - and are harmless for most people.
- **Colds & Flu:** although experts have known for some time that colds and flu can raise your risk of having an asthma attack, the exact reason for the link hasn't been well understood. The latest research we have suggests that when people with asthma get a cold or flu, there's a rise in levels of an inflammatory protein in the cells that line the airways. This can set off a range of other inflammatory reactions, including narrowing of the airways, which can lead to an asthma attack.
- **Stress:** stress causes a surge of stress hormones in our bodies. These are released to prepare us to either run away from danger or fight it. We react with symptoms such as a faster heart rate, tense muscles and breathing that is shallow and fast (hyperventilating). This change to our breathing pattern can put us at a higher risk of all our usual asthma symptoms, such as tight chest and coughing.
- **Another reason why stress can trigger** someone's asthma is because of the things people do when they're stressed. You may notice that you lose your temper more easily when you're under stress, and anger is itself an emotional asthma trigger. Stress can mean we drink or smoke more, both asthma triggers in their own right. People with asthma who are stressed may also feel less able or willing to take their asthma medicines as prescribed, especially if long term stress means they're also dealing with anxiety and depression



# Why do asthma triggers sometimes not cause symptoms?

The sensitivity of your airways can vary day to day, month to month, year to year. If your asthma's well managed, your triggers are less likely to cause symptoms.

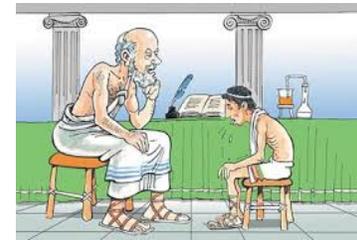
Also, your asthma symptoms can be caused by more than one asthma trigger at the same time. If this happens, it could cause a stronger reaction - for example, if you have a cold and you also come into contact with a cat. This can be why sometimes triggers do cause symptoms and why sometimes they don't.

## **Why can cold weather increase your risk of asthma symptoms or an asthma attack?**

People with asthma have airways that are very sensitive. Cold or damp air can enter the airways and trigger them to go into spasm, causing asthma symptoms, such as coughing, wheezing, shortness of breath and tightness in the chest. And winter can be a difficult time for people with asthma for other reasons too. It's near-impossible to avoid the cold and flu viruses that many people say make their asthma symptoms worse, although being vaccinated against flu each year can prevent you getting the most common strain of flu virus.

# Types of asthma

- Occupational asthma: occupational asthma is asthma that's caused directly by the work you do
- Difficult to control (can be treated with input by GP/PN) and severe asthma (5% out of the 17% needs more input by specialist services and still has great difficult to treat): About 17% of people with asthma have difficulty breathing almost all of the time and may often have potentially life-threatening asthma attacks. These people fall into two groups, although sometimes it can be tricky for a healthcare professional to work out which group they're in.
  - **Group 1:** Symptoms that can be treated with the treatment
  - **Group 2:** Symptoms that don't respond to the usual asthma treatments
- Adult onset asthma: It's difficult to say for sure what causes asthma in anyone, and we don't know for certain why some people develop it in adulthood. But there are some factors that may be linked:
  - Research shows that between nine and 15 per cent of adult onset asthma is caused by work-related factors for example, exposure to chemical irritants. Painting and farming are among the occupations that have been linked
  - Smoking and passive smoking can raise your risk over time.
  - Obesity might increase your chances of adult onset asthma, although the link isn't straightforward.
  - *Female hormones can be linked to adult-onset asthma and may be one of the reasons women are more likely than men to develop it. Stressful life events, such as family illness and relationship problems, can increase your risk of adult onset asthma. And some research has found people with very stressful jobs are 50 per cent more likely to develop asthma in adulthood.*



# What are the triggers for senior patients?

In older people, symptoms of asthma are less likely to be triggered by allergies, such as house dust mites, animals and pollen. Symptoms in adults are more likely to be triggered

- flu, colds or other viral infections
- exercise
- laughing or getting excited
- hormonal changes
- depression or anxiety
- some medicines
- irritants, such as cold air and chemical fumes

Symptom similarities with other conditions like COPD makes the diagnosis of asthma difficult in adult (especially senior) patients

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- Childhood asthma: some children diagnosed with asthma find that the condition improves or disappears completely as they get older. This is known as childhood asthma.
- Seasonal asthma: people who only experience asthma symptoms at certain times of the year are said to have 'seasonal asthma'. Sometimes asthma symptoms are triggered by things that are only around at certain times of the year - pollen is one example; cold weather is another. So while asthma is always a long-term condition, it's possible to be symptom-free when your triggers aren't around. If you think you've got seasonal asthma, or you've been diagnosed with seasonal asthma

# Diagnosis of Asthma

The diagnosis of asthma is a clinical one. The absence of consistent gold-standard diagnostic criteria means that it is not possible to make unequivocal evidence-based recommendations on how to make a diagnosis of asthma (BTS, 2016)

Asthma can be complex and take time to diagnose. This is because everyone's asthma is different. Getting a diagnosis for a child, for instance, is different from getting a diagnosis for an adult. And asthma symptoms can be intermittent so it can be tricky for a GP/PN or Respiratory Nurse to see the full picture.

Also, the reasons for breathlessness can vary and in adults, especially older adults, it can be more difficult to tell the difference between asthma and other conditions that cause similar symptoms such as pneumonia, heart disease, obesity, a panic attack, and chronic obstructive pulmonary disease (COPD).

- Detailed Hx (OPQRSTU)
- Reversible Spirometry (lung function testing)
- If spirometry results normal, challenge tests and/or measurement of Exhaled Nitric Oxide (FeNO) is suggested to identify eosinophilic inflammation. (An exhaled nitric oxide test can help with the diagnosis and treatment of asthma. It measures the level of nitric oxide gas in an exhaled sample of your breath. This sample is collected by having you breathe into the mouthpiece of a machine that performs the measurement: go to <https://www.youtube.com/watch?v=eU9kFUvGI08>)
- Two weeks peak flow diary
- *A trial of treatment usually lasts six weeks depending on what medicines you're given (some GPs are very keen in following this route)*

# .. INITIAL STRUCTURED CLINICAL ASSESSMENT

The predictive value of individual symptoms or signs is poor, and a structured clinical assessment including all information available from the history, examination and historical records should be undertaken. Factors to consider in an initial structured clinical assessment include:

## **Episodic symptoms**

More than one of the symptoms of wheeze, breathlessness, chest tightness and cough occurring in episodes with periods of no (or minimal) symptoms between episodes. Note that this excludes cough as an isolated symptom in children. For example:

- A documented history of acute attacks of wheeze, triggered by viral infection or allergen exposure with symptomatic and objective improvement with treatment
- Recurrent intermittent episodes of symptoms triggered by allergen exposure as well as viral infections and exacerbated by exercise and cold air, and emotion or laughter in children
- In adults, symptoms triggered by taking non-steroidal anti-inflammatory medication or beta blockers

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- Wheeze confirmed by a healthcare professional on auscultation y It is important to distinguish wheezing from other respiratory noises, such as stridor or rattly breathing. y Repeatedly normal examination of chest when symptomatic reduces the probability of asthma.

### **Evidence of diurnal variability**

- Symptoms which are worse at night or in the early morning.

### **Atopic history**

- Personal history of an atopic disorder (ie, eczema or allergic rhinitis) or a family history of asthma and/ or atopic disorders, potentially corroborated by a previous record of raised allergen-specific IgE levels, positive skin-prick tests to aeroallergens or blood eosinophilia.
- Absence of symptoms, signs or clinical history to suggest alternative diagnoses (including but not limited to COPD, dysfunctional breathing, obesity)

# ASSESS PROBABILITY OF ASTHMA BASED ON INITIAL STRUCTURED CLINICAL ASSESSMENT

## **In patients with a high probability of asthma**

- record the patient as likely to have asthma and commence a carefully monitored initiation of treatment (typically 6 weeks of inhaled corticosteroids)
- assess status with a validated symptom questionnaire and/or lung function tests (FEV1 at clinic visits or by domiciliary serial peak flows)

with a good symptomatic and objective response to treatment, confirm the diagnosis of asthma and record the basis on which the diagnosis was made

- if response is poor or equivocal, check inhaler technique and adherence, arrange further tests and consider alternative diagnoses.

## In patients with a high probability of asthma

- Adults and children who do not have any of the typical features on initial structured clinical assessment or who have symptoms suggestive of an alternative diagnosis have a low probability of asthma
- If there is a low probability of asthma and/or an alternative diagnosis is more likely, investigate for the alternative diagnosis and/or undertake or refer for further tests of asthma.

# INTERMEDIATE PROBABILITY

- Adults and children who have some, but not all, of the typical features of asthma on an initial structured clinical assessment or who do not respond well to a monitored initiation of treatment have an intermediate probability of asthma.
- **Spirometry, with bronchodilator reversibility as appropriate, is the preferred initial test for investigating intermediate probability of asthma in adults, and in children old enough to undertake a reliable test**
- In adults and children with an intermediate probability of asthma and airways obstruction identified through spirometry, undertake reversibility tests and/or a monitored initiation of treatment assessing the response to treatment by repeating lung function tests and objective measures of asthma control.
- In adults and children with an intermediate probability of asthma and normal spirometry results, undertake challenge tests and/or measurement of FeNO to identify eosinophilic inflammation.



*Allergy & Asthma  
Associates  
of Southern California*

Leading-edge, personalized care you can trust

Exhaled Nitric Oxide (eNO)  
monitors airway inflammation

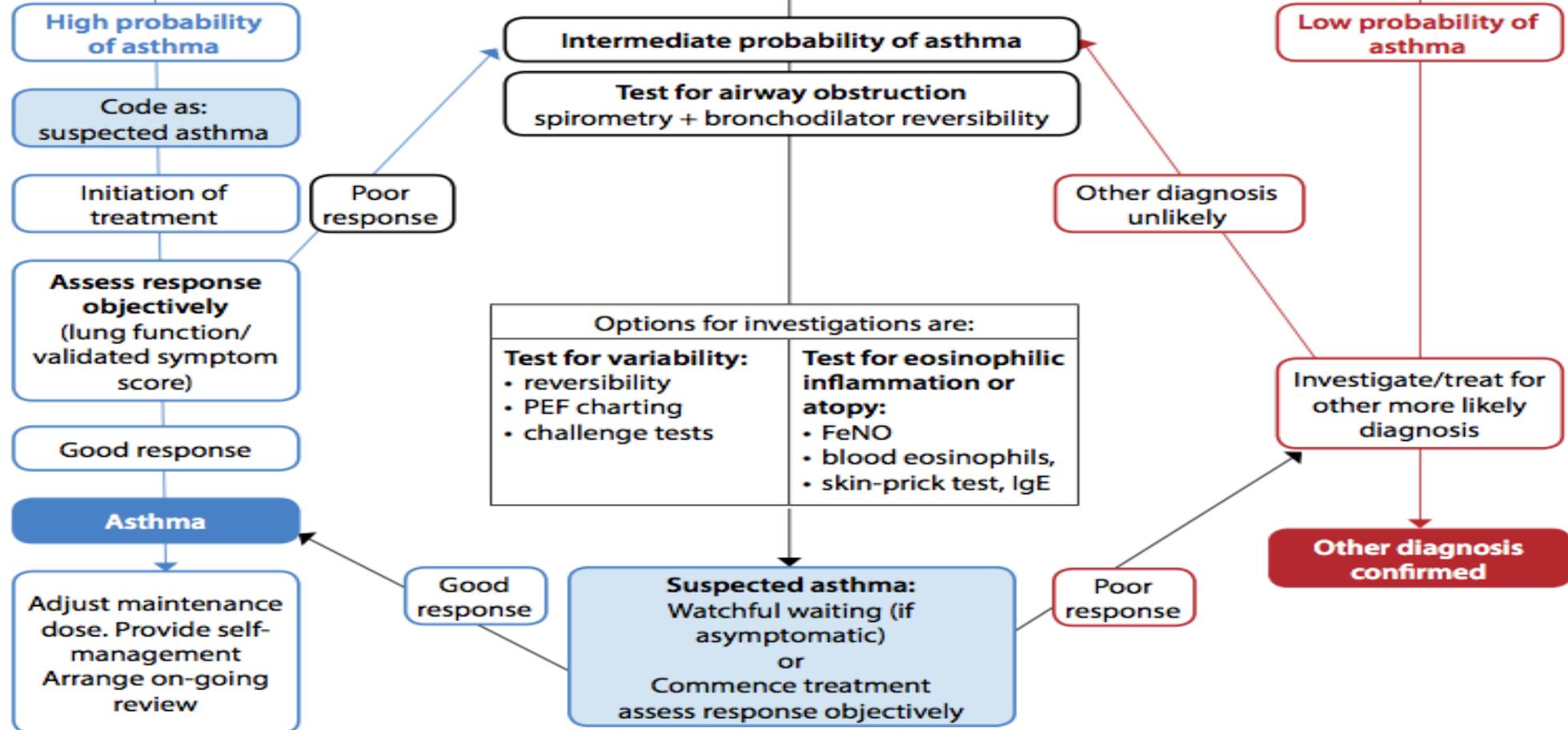
Breath test for adults and children with asthma

## DIAGNOSTIC ALGORITHM

Presentation with respiratory symptoms: wheeze, cough, breathlessness, chest tightness<sup>1</sup>

Structured clinical assessment (from history and examination of previous medical records) Look for:

- recurrent episodes of symptoms
- symptom variability
- absence of symptoms of alternative diagnosis
- recorded observation of wheeze
- personal history of atopy
- historical record of variable PEF or FEV<sub>1</sub>



<sup>1</sup> In children under 5 years and others unable to undertake spirometry in whom there is a high or intermediate probability of asthma, the options are monitored initiation of treatment or watchful waiting according to the assessed probability of asthma.

# DIAGNOSTIC INDICATIONS FOR REFERRAL

## ADULT

- Diagnosis unclear
- Suspected occupational asthma (symptoms that improve when patient is not at work, adult-onset asthma and workers in high-risk occupations)
- Poor response to asthma treatment
- Severe/life-threatening asthma attack

# Red flags' and indicators of other diagnoses

- Prominent systemic features (myalgia, fever, weight loss)
- Prominent systemic features (myalgia, fever, weight loss)
- Unexpected clinical findings (eg crackles, clubbing, cyanosis, cardiac disease, monophonic wheeze or stridor)
- Persistent non-variable breathlessness
- Chronic sputum production
- Chest X-ray shadowing

**Streamlined referral pathways should be developed for tests not available or appropriate in primary care.**

# SUPPORTED SELF MANAGEMENT

## Asthma Action Plan

Self-management education incorporating written personalised asthma action plans (PAAPs) improves health outcomes for people with asthma.

## Self Management in Practice

Asthma UK action plans and resources can be downloaded from their website:  
[www.asthma.org.uk/control](http://www.asthma.org.uk/control).

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All people with asthma (and/or their parents or carers) should be offered self-management education which should include a written personalised asthma action plan and be supported by regular professional review.

A In adults, written personalised asthma action plans may be based on symptoms and/or peak flows: symptom-based plans are generally preferable for children.

**! My asthma triggers**  
Taking my asthma medicine each day will help reduce my reaction to these triggers. Avoiding them where possible will also help.

**! My asthma review**  
I should have at least one routine asthma review every year. I will bring:

- My action plan to see if it needs updating
- My inhaler and spacer to check I'm using them in the best way
- Any questions about my asthma and how to cope with it.

Next asthma review date: \_\_\_/\_\_\_/\_\_\_

**GP/asthma nurse contact**

Name:

Phone number:

**Out-of-hours contact number**  
(ask your GP surgery who to call when they are closed)

Name:

Phone number:

**Get more advice & support from Asthma UK:**

 Speak to a specialist asthma nurse about managing your asthma on: **0300 222 5800**

 Get news, advice and download information packs at: **www.asthma.org.uk**



HA1080216 © 2016 Asthma UK registered charity number in England and Wales 802364 and in Scotland SCO39322. Last reviewed and updated 2016; next review 2019.  
\*Adams et al; Factors associated with hospital admissions and repeat emergency department visits for adults with asthma; Thorax 2000;55:566-573

# Use it, don't lose it!

Your action plan is a personal guide to help you stay on top of your asthma. Once you have created one with your GP or asthma nurse, it can help you stay as well as possible.

**People who use their action plans are four times less likely to end up in hospital because of their asthma.**

Your action plan will only work at its best to help keep you healthy if you:

- 1 Put it somewhere easy for you and your family to find** – you could try your fridge door, the back of your front door, or your bedside table. Try taking a photo and keeping it on your mobile phone or tablet.
- 2 Check in with it regularly** – put a note on your calendar, or a reminder on your mobile to read it through once a month. How are you getting along with your day-to-day asthma medicines? Are you having any asthma symptoms? Are you clear about what to do?
- 3 Keep a copy near you** – save a photo on your phone or as your screensaver. Or keep a leaflet in your bag, desk or car glove box.
- 4 Give a copy of your action plan or share a photo of it with a key family member or friend** – ask them to read it. Talk to them about your usual asthma symptoms so they can help you notice if they start. Help them know what to do in an emergency.
- 5 Take it to every healthcare appointment** – including A&E/consultant. Ask your GP or asthma nurse to update it if any of their advice for you changes. Ask them for tips if you're finding it hard to take your medicines as prescribed.

The step-by-step guide that helps you stay on top of your asthma

# Your asthma action plan

Fill this in with your GP or asthma nurse



 If you use a written asthma action plan you are **four times less likely** to be admitted to hospital for your asthma.\*

Name and date:

**Any asthma questions?**  
Call our friendly helpline nurses  
**0300 222 5800**  
(9am – 5pm; Mon – Fri)  
**www.asthma.org.uk**



## Every day asthma care:

My personal best peak flow is:

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

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

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

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

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

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

Other medicines I take for my asthma every day:

With this daily routine I should expect/aim to have no symptoms. If I haven't had any symptoms or needed my reliever inhaler for at least 12 weeks, ask my GP or asthma nurse to review my medicines in case they can reduce the dose.



People with allergies need to be extra careful as attacks can be more severe.



## When I feel worse:

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

This is what I can do straight away to get on top of my asthma:

**1** If I haven't been using my preventer inhaler, start using it regularly again or:

Increase my preventer inhaler dose to  puffs  times a day until my symptoms have gone and my peak flow is back to normal

Take my reliever inhaler as needed (up to  puffs every four hours)

**URGENT!** If I don't improve within 24 hours **make an emergency appointment to see my GP or asthma nurse.**

**2** If I have been given prednisolone tablets (steroid tablets) to keep at home:

Take  mg of prednisolone tablets (which is  x 5mg) **immediately** and again every morning for  days or until I am fully better.

**URGENT!** Contact my GP or asthma nurse today and let them know I have started taking steroids and mail



## In an asthma attack:

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



## THIS IS AN EMERGENCY TAKE ACTION NOW

**1** Sit up straight — don't lie down. Try to keep calm

**2** Take one puff of my reliever inhaler every 30 to 60 seconds up to a maximum of 10 puffs

**3** A) If I feel worse at any point while I'm using my inhaler

B) If I don't feel any better after 10 puffs

C) If I feel better: make an urgent same-day appointment with my GP or asthma nurse to get advice

CALL 999

Ambulance taking longer than 15 minutes? Repeat step **2**

If I feel better, and have made my urgent same-day appointment:

- Check if I've been given rescue prednisolone tablets
- If I have these I should take them as prescribed by my doctor or asthma nurse

**IMPORTANT!** This asthma attack information is not designed for people on a SMART or MART medicine plan. If you're on a SMART or MART medicine plan, please speak to your GP or asthma nurse to get the correct asthma attack information.

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**A hospital admission represents a window of opportunity to review self-management skills. No patient should leave hospital without a written personalised asthma action plan.**

- An acute consultation offers the opportunity to determine what action the patient has already taken to deal with the asthma attack. Their self-management strategy may be reinforced or refined and the need for consolidation at a routine follow up considered.
- A consultation for an upper respiratory tract infection or other known trigger is an opportunity to rehearse with the patient their self management in the event of their asthma deteriorating.
- Education should include personalised discussion of issues such as trigger avoidance and achieving a smoke-free environment to support people and their families living with asthma.
- Brief simple education linked to patient goals is most likely to be acceptable to patients

# NON-PHARMACOLOGICAL MANAGEMENT

There is a common perception amongst patients and carers that there are numerous environmental, dietary and other triggers of asthma and that avoiding these triggers will improve asthma and reduce the requirement for pharmacotherapy. Evidence that non-pharmacological management is effective can be difficult to obtain and more well-controlled intervention studies are required.

**Primary prevention relates to interventions introduced before the onset of disease and designed to reduce its incidence.**

## PHARMACOLOGICAL MANAGEMENT

The aim of asthma management is control of the disease.

- No daytime symptoms
- No night time awakening due to asthma
- No need for rescue medication
- No asthma attacks
- No limitations on activity including exercise
- Normal lung function (in practical terms FEV1 and/or PEF >80% predicted or best)
- Minimal side effects from medication.

## APPROACH TO MANAGEMENT

1. Start treatment at the level most appropriate to initial severity.
2. Achieve early control.
3. Maintain control by:
  - increasing treatment as necessary
  - decreasing treatment when control is good

**Before initiating a new drug therapy practitioners should check adherence with existing therapies, check inhaler technique and eliminate trigger factors.**

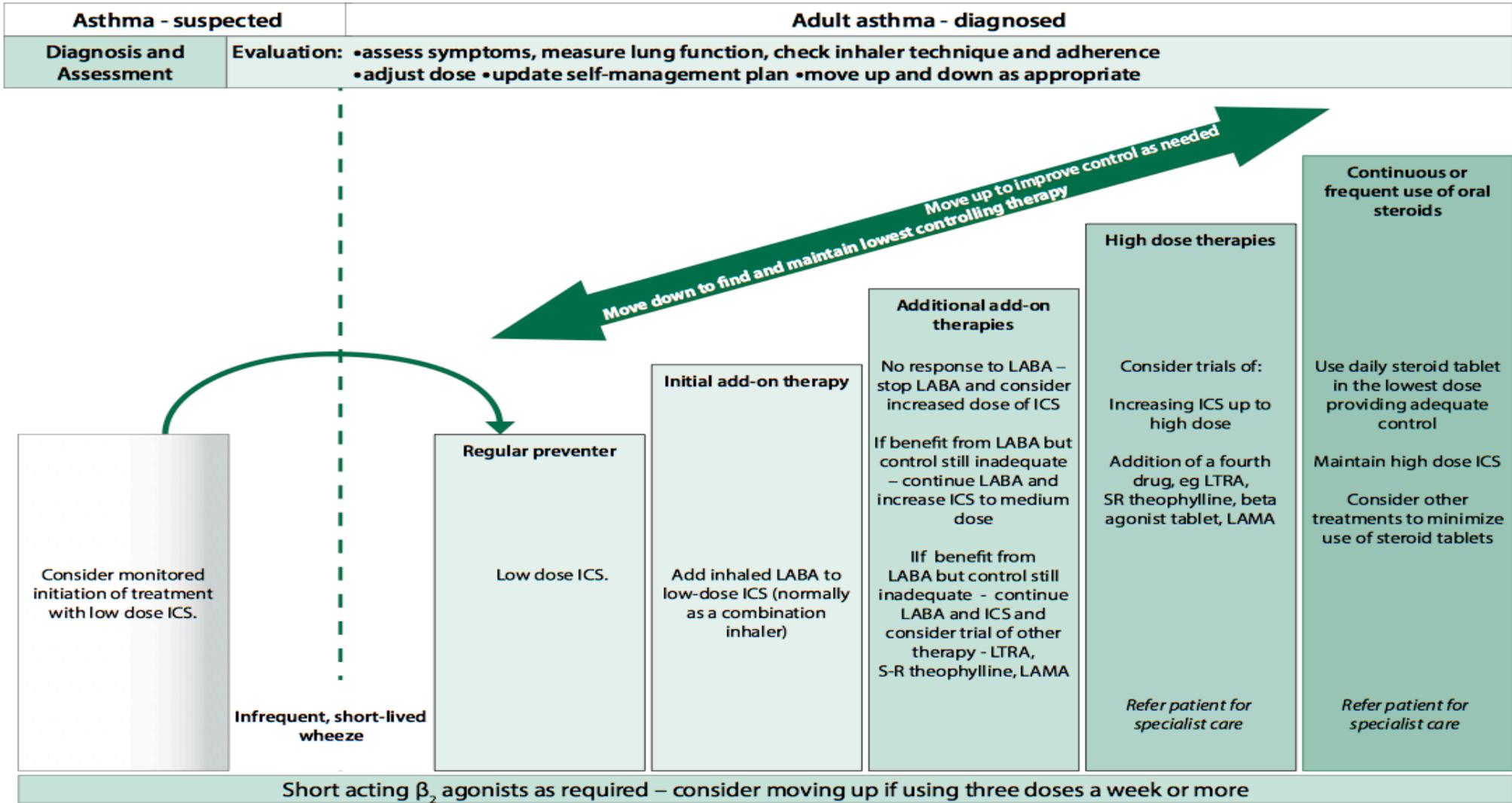
# The Stepwise Approach

## **Start treatment at the step most appropriate to initial severity.**

- Achieve early control
- Maintain control by: stepping up treatment as necessary/stepping down when control is good.
- Before initiating a new drug therapy practitioners should check adherence with existing therapies, inhaler technique and eliminate trigger factors.

## **Stepping Down**

- Regular review of patients as treatment is stepped down is important. When deciding which drug to step down first and at what rate, the severity of asthma, the side effects of the treatment, time on current dose, the beneficial effect achieved, and the patient's preference should all be taken into account.
- Patients should be maintained at the lowest possible dose of inhaled corticosteroid. Reduction in inhaled corticosteroid dose should be slow as patients deteriorate at different rates. Reductions should be considered every three months, decreasing the dose by approximately 25-50% each time.



# MANAGEMENT OF ACUTE ASTHMA IN ADULTS

Healthcare professionals must be aware that patients with severe asthma and one or more adverse psychosocial factors are at risk of death.

## Moderate Acute Asthma

- Increasing symptoms
- PEF >50–75% best or predicted
- No features of acute severe asthma

## Acute Severe Asthma

Any one of:

- PEF 33–50% best or predicted
- Respiratory rate  $\geq 25$ /min
- Heart rate  $\geq 110$ /min
- Inability to complete sentences in one breath

## LIFE-THREATENING ASTHMA

- PEF <33% best or predicted
- SpO<sub>2</sub> < 92%
- Silent chest
- Cyanosis
- Poor respiratory effort
- Arrhythmia
- Exhaustion
- Altered conscious level
- Hypotension

## NEAR-FATAL ASTHMA

Raised PaCO<sub>2</sub> and/or requiring mechanical ventilation with raised inflation pressures

# INITIAL ASSESSMENT OF SYMPTOMS, SIGNS AND MEASUREMENTS

<b>Clinical features</b>	Severe breathlessness (including too breathless to complete sentences in one breath), tachypnoea, tachycardia, silent chest, cyanosis or collapse None of these singly or together is specific and their absence does not exclude a severe attack
<b>PEF or FEV1</b>	PEF or FEV1 are useful and valid measures of airway calibre. PEF expressed as a % of the patient's previous best value is most useful clinically. In the absence of this, PEF as a % of predicted is a rough guide
<b>Pulse oximetry</b>	Oxygen saturation (SpO <sub>2</sub> ) measured by pulse oximetry determines the adequacy of oxygen therapy and the need for arterial blood gas (ABG) measurement. The aim of oxygen therapy is to maintain SpO <sub>2</sub> 94–98%
<b>Blood gases (ABG)</b>	Patients with SpO <sub>2</sub> < 92% or other features of life-threatening asthma require ABG measurement
<b>Chest X-ray</b>	Chest X-ray is not routinely recommended in patients in the absence of: <ul style="list-style-type: none"><li>-suspected e.g. pneumothorax</li><li>-- suspected consolidation</li><li>-- life-threatening asthma</li><li>-- failure to respond to treatment satisfactorily</li><li>-- requirement for ventilation</li></ul>

# ASTHMA IN PREGNANCY

**Several physiological changes occur during pregnancy which could worsen or improve asthma. Pregnancy can affect the course of asthma, and asthma and its treatment can affect pregnancy outcomes.**

- Women should be advised of the importance of maintaining good control of their asthma during pregnancy to avoid problems for both mother and baby.
- Monitor pregnant women with moderate/severe asthma closely to keep their asthma well controlled
- Advise women who smoke about the dangers for themselves and their babies and give appropriate support to stop smoking.

The following drugs should be used as normal during pregnancy:

- short-acting  $\beta_2$  agonists
- long-acting  $\beta_2$  agonists
- inhaled corticosteroids
- oral and intravenous theophyllines

**Use steroid tablets as normal when indicated during pregnancy for women with severe asthma.**

**Steroid tablets should never be withheld because of pregnancy.**

# Asthma attacks

## **You're having an asthma attack if any of the following happens:**

- Your reliever isn't helping or lasting over four hours
- Your symptoms are getting worse (cough, breathlessness, wheeze or tight chest)
- You're too breathless or it's difficult to speak, eat or sleep
- Your breathing is getting faster and it feels like you can't get your breath in properly

## **What to do in an asthma attack**

- Help patient to sit up straight - don't lie down. Try to keep calm.
- Assist patient to take one puff of their reliever inhaler (usually blue) every 30-60 seconds, up to a maximum of 10 puffs.
- If they feel worse at any point while using their inhaler or they don't feel better after 10 puffs or they are worried at any time, call 999 for an ambulance.
- If the ambulance is taking longer than 15 minutes repeat step 2.

**If your symptoms improve and you don't need to call 999, you still need to make an urgent same-day appointment with your GP or asthma nurse.**



Questions  
are  
guaranteed in  
life;  
Answers  
aren't.