The British Thoracic Society
Scottish Intercollegiate Guidelines Network

British Guideline on the Management of Asthma

Quick Reference Guide

May 2008

revised June 2009

KEY TO EVIDENCE STATEMENTS AND GRADES OF RECOMMENDATIONS

LEVELS OF EVIDENCE

1^{++}	High quality meta-analyses, systematic reviews of randomised controlled trials (RCTs), or RCTs with a very low risk of bias
1^{+}	Well conducted meta-analyses, systematic reviews of RCTs, or RCTs with a low risk of bias
1^{-}	Meta-analyses, systematic reviews of RCTs, or RCTs with a high risk of bias
2^{++}	High quality systematic reviews of case control or cohort studies High quality case control or cohort studies with a very low risk of confounding or bias and a high probability that the relationship is causal
2^{+}	Well conducted case control or cohort studies with a low risk of confounding or bias and a moderate probability that the relationship is causal
2^{-}	Case control or cohort studies with a high risk of confounding or bias and a significant risk that the relationship is not causal
3	Non-analytic studies, eg case reports, case series
4	Expert opinion

GRADES OF RECOMMENDATION

Note: The grade of recommendation relates to the strength of the evidence on which the recommendation is based. It does not reflect the clinical importance of the recommendation.

A	At least one meta-analysis, systematic review of RCTs, or RCT rated as 1^{++} and directly applicable to the target population*; or* A body of evidence consisting principally of studies rated as 1^{+}, directly applicable to the target population, and demonstrating overall consistency of results
B	A body of evidence including studies rated as 2^{++}, directly applicable to the target population, and demonstrating overall consistency of results*; or* Extrapolated evidence from studies rated as 1^{++} or 1^{+}
C	A body of evidence including studies rated as 2^{+}, directly applicable to the target population and demonstrating overall consistency of results*; or* Extrapolated evidence from studies rated as 2^{++}
D	Evidence level 3 or 4*; or* Extrapolated evidence from studies rated as 2^{+}

GOOD PRACTICE POINTS

☑	Recommended best practice based on the clinical experience of the guideline development group

Applies only to adults · Applies to all children · Applies to children 5-12 · Applies to children under 5 · General

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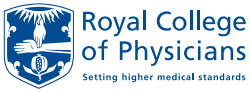
The College of
Emergency Medicine



May 2008

Revised June 2009

ISBN 978 1 905813 29 2

First published 2003
Revised edition published 2008
Revised edition published 2009

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DIAGNOSIS IN CHILDREN

INITIAL CLINICAL ASSESSMENT

B **Focus the initial assessment in children suspected of having asthma on:**
- **presence of key features in history and examination**
- **careful consideration of alternative diagnoses.**

CLINICAL FEATURES THAT INCREASE THE PROBABILITY OF ASTHMA

- More than one of the following symptoms - wheeze, cough, difficulty breathing, chest tightness **-** particularly if these are frequent and recurrent; are worse at night and in the early morning; occur in response to, or are worse after, exercise or other triggers, such as exposure to pets; cold or damp air, or with emotions or laughter; or occur apart from colds
- Personal history of atopic disorder
- Family history of atopic disorder and/or asthma
- Widespread wheeze heard on auscultation
- History of improvement in symptoms or lung function in response to adequate therapy.

CLINICAL FEATURES THAT LOWER THE PROBABILITY OF ASTHMA

- Symptoms with colds only, with no interval symptoms
- Isolated cough in the absence of wheeze or difficulty breathing
- History of moist cough
- Prominent dizziness, light-headedness, peripheral tingling
- Repeatedly normal physical examination of chest when symptomatic
- Normal peak expiratory flow (PEF) or spirometry when symptomatic
- No response to a trial of asthma therapy
- Clinical features pointing to alternative diagnosis

With a thorough history and examination, a child can usually be classed into one of three groups:
- **high probability** – diagnosis of asthma likely
- **low probability** – diagnosis other than asthma likely
- **intermediate probability** – diagnosis uncertain.

☑ Record the basis on which a diagnosis of asthma is suspected.

DIAGNOSIS IN CHILDREN

HIGH PROBABILITY OF ASTHMA

☑ In children with a **high probability** of asthma:

- start a trial of treatment
- review and assess response
- reserve further testing for those with a poor response.

LOW PROBABILITY OF ASTHMA

☑ In children with a **low probability** of asthma consider more detailed investigation and specialist referral.

INTERMEDIATE PROBABILITY OF ASTHMA

☑ In children with an **intermediate probability** of asthma who can perform spirometry and have **evidence of airways obstruction**, assess the change in FEV_1 or PEF in response to an inhaled bronchodilator (reversibility) and/or the response to a trial of treatment for a specified period:

- if there is significant reversibility, or if a treatment trial is beneficial, a diagnosis of asthma is probable. Continue to treat as asthma, but aim to find the minimum effective dose of therapy. At a later point, consider a trial of reduction, or withdrawal, of treatment.
- if there is no significant reversibility, and treatment trial is not beneficial, consider tests for alternative conditions.

C **In children with an intermediate probability of asthma who can perform spirometry and have no evidence of airways obstruction:**

- **consider testing for atopic status, bronchodilator reversibility and if possible, bronchial hyper-responsiveness using methacholine, exercise or mannitol**
- **consider specialist referral.**

☑ In children with an **intermediate probability** of asthma who cannot perform spirometry, offer a trial of treatment for a specified period:

- if treatment is beneficial, treat as asthma and arrange a review
- if treatment is not beneficial, stop asthma treatment, and consider tests for alternative conditions and specialist referral.

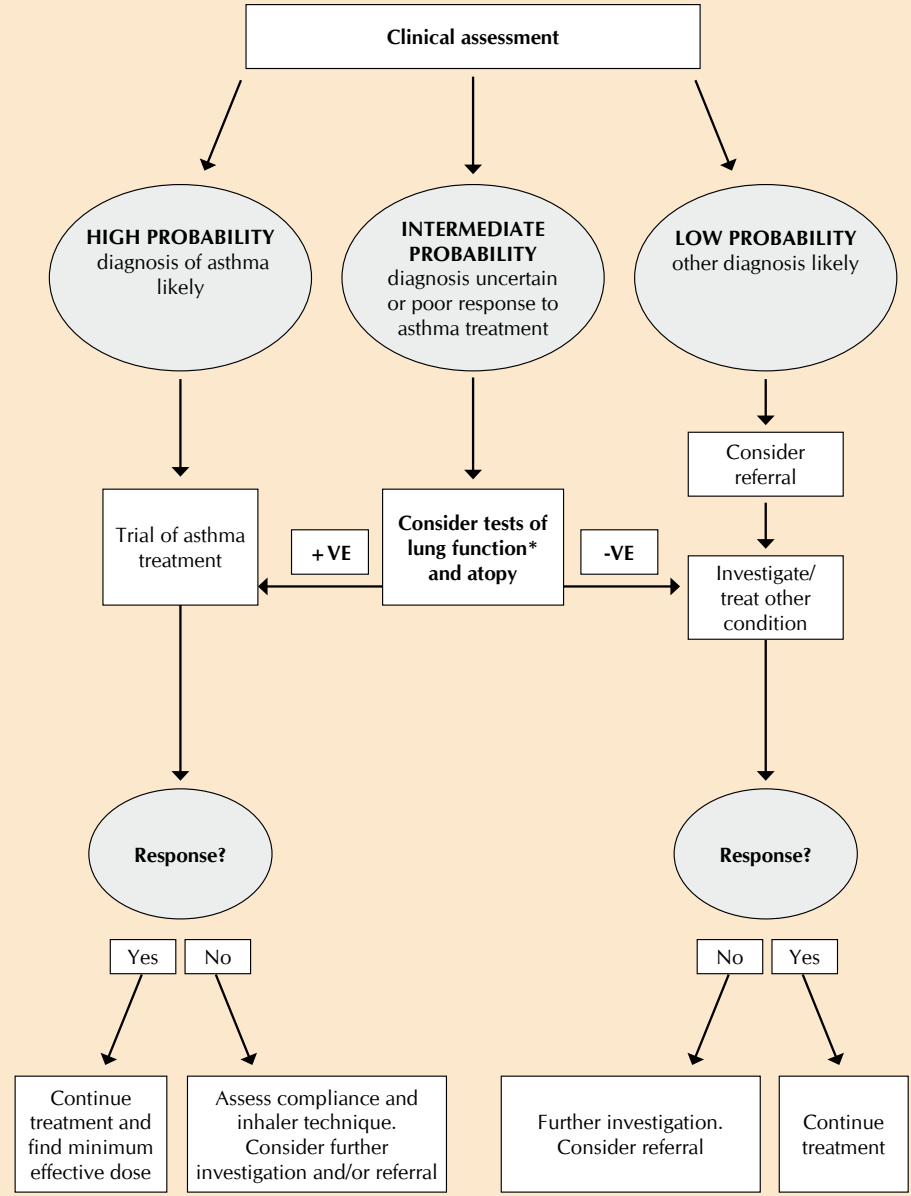
In some children, particularly the under 5s, there is insufficient evidence for a firm diagnosis of asthma but no features to suggest an alternative diagnosis.

Possible approaches (dependent on frequency and severity of symptoms) include:

- **watchful waiting with review**
- **trial of treatment with review**
- **spirometry and reversibility testing.**

Remember - The diagnosis of asthma in children is a clinical one. It is based on recognising a characteristic pattern of episodic symptoms in the absence of an alternative explanation.

Presentation with suspected asthma in children



* *Lung function tests include spirometry before and after bronchodilator (test of airway reversibility) and possible exercise or methacholine challenge (tests of airway responsiveness).*
Most children over the age of 5 years can perform lung function tests.

DIAGNOSIS IN ADULTS

INITIAL ASSESSMENT

The diagnosis of asthma is based on the recognition of a characteristic pattern of symptoms and signs and the absence of an alternative explanation for them. The key is to take a careful clinical history.

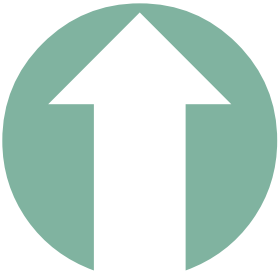
☑ Base initial diagnosis on a careful assessment of symptoms and a measure of airflow obstruction:

- in patients with a **high probability** of asthma move straight to a trial of treatment. Reserve further testing for those whose response to a trial of treatment is poor.
- in patients with a **low probability** of asthma, whose symptoms are thought to be due to an alternative diagnosis, investigate and manage accordingly. Reconsider the diagnosis of asthma in those who do not respond.
- the preferred approach in patients with an **intermediate probability** of having asthma is to carry out further investigations, including an explicit trial of treatments for a specified period, before confirming a diagnosis and establishing maintenance treatment.

D **Spirometry is the preferred initial test to assess the presence and severity of airflow obstruction.**

CLINICAL FEATURES THAT INCREASE THE PROBABILITY OF ASTHMA

- More than one of the following symptoms: wheeze, breathlessness, chest tightness and cough, particularly if:
  - ~ symptoms worse at night and in the early morning
  - ~ symptoms in response to exercise, allergen exposure and cold air
  - ~ symptoms after taking aspirin or beta blockers
- History of atopic disorder
- Family history of asthma and/or atopic disorder
- Widespread wheeze heard on auscultation of the chest
- Otherwise unexplained low FEV_1 or PEF (historical or serial readings)
- Otherwise unexplained peripheral blood eosinophilia

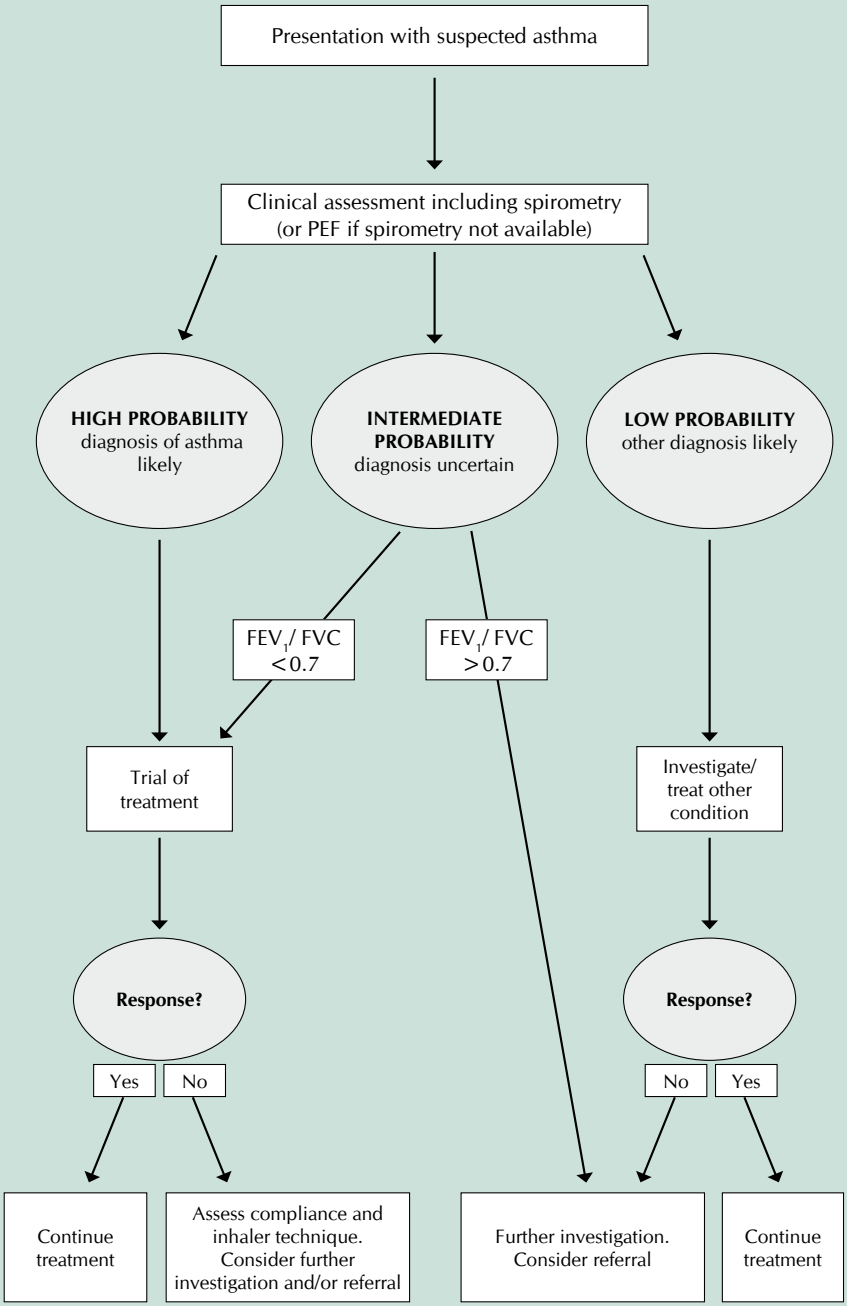


CLINICAL FEATURES THAT LOWER THE PROBABILITY OF ASTHMA

- Prominent dizziness, light-headedness, peripheral tingling
- Chronic productive cough in the absence of wheeze or breathlessness
- Repeatedly normal physical examination of chest when symptomatic
- Voice disturbance
- Symptoms with colds only
- Significant smoking history (ie > 20 pack-years)
- Cardiac disease
- Normal PEF or spirometry when symptomatic*

** A normal spirogram/spirometry when not symptomatic does not exclude the diagnosis of asthma. Repeated measurements of lung function are often more informative than a single assessment.*

Presentation with suspected asthma in adults



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. Evidence that non-pharmacological management is effective can be difficult to obtain and more studies are required.

PROSPECTS FOR THE PRIMARY PREVENTION OF ASTHMA		
	Research Findings	**Recommendation**
Allergen avoidance	There is no consistent evidence of benefit from domestic aeroallergen avoidance.	Insufficient evidence to make a recommendation.
Breastfeeding	Evidence of protective effect in relation to early asthma.	C **Breast feeding should be encouraged for its many benefits, and as it may also have a potential protective effect in relation to early asthma.**
Modified milk formulae	Trials of modified milk formulae have not included sufficiently long follow up to establish whether there is any impact on asthma.	In the absence of any evidence of benefit from the use of modified infant milk formulae it is not possible to recommend it as a strategy for preventing childhood asthma.
Nutritional supplementation	There is limited, variable quality evidence investigating the potential preventative effect of fish oil, selenium and vitamin E intake during pregnancy.	There is insufficient evidence to make any recommendations on maternal dietary supplementation as an asthma prevention strategy.
Immunotherapy	More studies are required to establish whether immunotherapy might have a role in primary prophylaxis.	No recommendation can be made at present.
Microbial exposure	This is a key area for further work with longer follow up to establish outcomes in relation to asthma.	There is insufficient evidence to indicate that the use of dietary probiotics in pregnancy reduces the incidence of childhood asthma.
Avoidance of tobacco smoke	Studies suggest an association between maternal smoking and an increased risk of infant wheeze.	C **Parents and parents-to-be should be advised of the many adverse effects that smoking has on their children including increased wheezing in infancy and increased risk of persistent asthma.**
DIETARY MANIPULATION		
	Research Findings	**Recommendation**
Fish oils and fatty acid	Results from studies are inconsistent and further research is required.	No recommendation for use.
Electrolytes	Limited intervention studies suggest either negligible or minimal effects.	No recommendation can be made at present.
Weight reduction	Studies show an association between increasing body mass index and symptoms of asthma.	C **Weight reduction is recommended in obese patients with asthma to promote general health and to improve asthma control.**

NON-PHARMACOLOGICAL MANAGEMENT

PROSPECTS FOR THE SECONDARY PREVENTION OF ASTHMA		
	Research Findings	**Recommendation**
Air pollution	Studies suggest an association between air pollution and aggravation of existing asthma.	Further research is required on the role of indoor pollutants in relation to asthma.
House dust mites	Measures to decrease house dust mites reduce the numbers of house dust mites, but do not have an effect on asthma severity.	☑ In committed families, multiple approaches to reduce exposure to house dust mite may help.
Pets	There are no controlled trials on the benefits of removing pets from the home. If you haven't got a cat, and you've got asthma, you probably shouldn't get one.	No recommendation can be made at present.
Smoking	Direct or passive exposure to cigarette smoke adversely affects quality of life, lung function, need for rescue medications and long term control with inhaled steroids.	C **Parents with asthma should be advised about the dangers to themselves and their children with asthma and offered appropriate support to stop smoking.**
Immunotherapy	Allergen specific immunotherapy is beneficial in the management of patients with allergic asthma.	B **Immunotherapy can be considered in patients with asthma where a clinically significant allergen cannot be avoided. The potential for severe allergic reactions to the therapy must be fully discussed with patients.**
COMPLEMENTARY AND ALTERNATIVE MEDICINES		
	Research Findings	**Recommendation**
Acupuncture	Research studies have not demonstrated a clinically valuable benefit and no significant benefits in relation to lung function.	Insufficient evidence to make a recommendation.
Buteyko technique	The Buteyko breathing technique specifically focuses on control of hyperventilation. Trials suggest benefits in terms of reduced symptoms and bronchodilator usage but no effect on lung function.	B **Buteyko breathing technique may be considered to help patients to control the symptoms of asthma.**
Family therapy	May be a useful adjunct to medication in children with asthma.	☑ In difficult childhood asthma, there may be a role for family therapy as an adjunct to pharmacotherapy.
Herbal and Chinese Medicines	Trials report variable benefits.	Insufficient evidence to make a recommendation.
Homeopathy	Studies looking at individualised homeopathy are needed.	Insufficient evidence to make a recommendation.
Hypnosis and relaxation therapies	No evidence of efficacy. Muscle relaxation could conceivably benefit lung function in patients with asthma.	Larger blinded trials are needed before a recommendation can be made.
Ionisers	Air ionisers are of no benefit in reducing symptoms.	A **Air ionisers are not recommended for the treatment of asthma.**
Physical exercise therapy	Studies suggest that such interventions make one fitter, but there is no effect on asthma	No evidence of specific benefit.

PHARMACOLOGICAL MANAGEMENT

The aim of asthma management is control of the disease. Control is defined as:

- **no daytime symptoms**
- **no night time awakening due to asthma**
- **no need for rescue medication**
- **no exacerbations**
- **no limitations on activity including exercise**
- **normal lung function (in practical terms FEV_1 and/or PEF >80% predicted or best)**

with minimal side effects

THE STEPWISE APPROACH

1. Start treatment at the step most appropriate to initial severity.
2. Achieve early control
3. Maintain control by:
   - ↑ stepping up treatment as necessary
   - ↓ stepping down when control is good

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

All doses of inhaled steroids refer to beclometasone (BDP) given via CFC-MDIs (metered dose inhaler). Although now almost phased out, this is the device used in most of the evidence base that supports current asthma management. Adjustment to dose should be made for other devices and corticosteroid molecules.

COMBINATION INHALERS

Revised 2009

In selected adult patients at step 3 who are poorly controlled or in selected adult patients at step 2 (above BDP 400 mcg/day who are poorly controlled), the use of budesonide/formoterol in a single inhaler as rescue medication instead of a short-acting β_2 agonist, in addition to its regular use as controller therapy has been shown to be an effective treatment regimen. Patients taking rescue budesonide/formoterol once a day or more should have their treatment reviewed. Careful education of patients about the specific issues around this management strategy is required.

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 steroid. Reduction in inhaled steroid 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.

EXERCISE INDUCED ASTHMA

☑ For most patients, exercise-induced asthma is an expression of poorly controlled asthma and regular treatment including inhaled steroids should be reviewed.

A A C A C C A C A C

If exercise is a specific problem in patients taking inhaled steroids who are otherwise well controlled, consider the following therapies:

- **leukotriene receptor antagonists**
- **long-acting β_2 agonists**
- **chromones**
- **oral β_2 agonists**
- **theophyllines**

A A **Immediately prior to exercise, inhaled short-acting β_2 agonists are the drug of choice.**

Applies only to adults · Applies to all children · Applies to children 5-12 · Applies to children under 5 · General

Patients should start treatment at the step most appropriate to the initial severity of their asthma. Check concordance and reconsider diagnosis if response to treatment is unexpectedly poor.

MOVE UP TO IMPROVE CONTROL AS NEEDED

MOVE DOWN TO FIND AND MAINTAIN LOWEST CONTROLLING STEP

STEP 1
Mild intermittent asthma

Inhaled short-acting β_2 agonist as required

STEP 2
Regular preventer therapy

Add inhaled steroid 200-800 mcg/day*
400 mcg is an appropriate starting dose for many patients

Start at dose of inhaled steroid appropriate to severity of disease.

STEP 3
Initial add-on therapy

1. **Add inhaled long-acting β_2 agonist (LABA)**
2. **Assess control of asthma:**
   - **good response to LABA -** continue LABA
   - **benefit from LABA but control still inadequate** - continue LABA and increase inhaled steroid dose to 800 mcg/day* (if not already on this dose)
   - **no response to LABA** - stop LABA and increase inhaled steroid to 800 mcg/ day.*If control still inadequate, institute trial of other therapies, leukotriene receptor antagonist or SR theophylline

STEP 4
Persistent poor control

Consider trials of:
- increasing inhaled steroid up to 2000 mcg/day*
- addition of a fourth drug e.g. leukotriene receptor antagonist, SR theophylline, β_2 agonist tablet

STEP 5
Continuous or frequent use of oral steroids

Use daily steroid tablet in lowest dose providing adequate control

Maintain high dose inhaled steroid at 2000 mcg/day*

Consider other treatments to minimise the use of steroid tablets

Refer patient for specialist care

* BDP or equivalent

SYMPTOMS vs TREATMENT

Summary of stepwise management in children aged 5-12 years

Patients should start treatment at the step most appropriate to the initial severity of their asthma. Check concordance and reconsider diagnosis if response to treatment is unexpectedly poor.

MOVE UP TO IMPROVE CONTROL AS NEEDED

MOVE DOWN TO FIND AND MAINTAIN LOWEST CONTROLLING STEP

STEP 1

Mild intermittent asthma

Inhaled short-acting β_2 agonist as required

STEP 2

Regular preventer therapy

Add inhaled steroid 200-400 mcg/day* (other preventer drug if inhaled steroid cannot be used) 200 mcg is an appropriate starting dose for many patients

Start at dose of inhaled steroid appropriate to severity of disease.

STEP 3

Initial add-on therapy

1. **Add inhaled long-acting β_2 agonist (LABA)**
2. **Assess control of asthma:**
   - **good response to LABA** - continue LABA
   - **benefit from LABA but control still inadequate** - continue LABA and increase inhaled steroid dose to 400 mcg/day* (if not already on this dose)
   - **no response to LABA** - stop LABA and increase inhaled steroid to 400 mcg/ day.*If control still inadequate, institute trial of other therapies, leukotriene receptor antagonist or SR theophylline

STEP 4

Persistent poor control

Increase inhaled steroid up to 800 mcg/day*

STEP 5

Continuous or frequent use of oral steroids

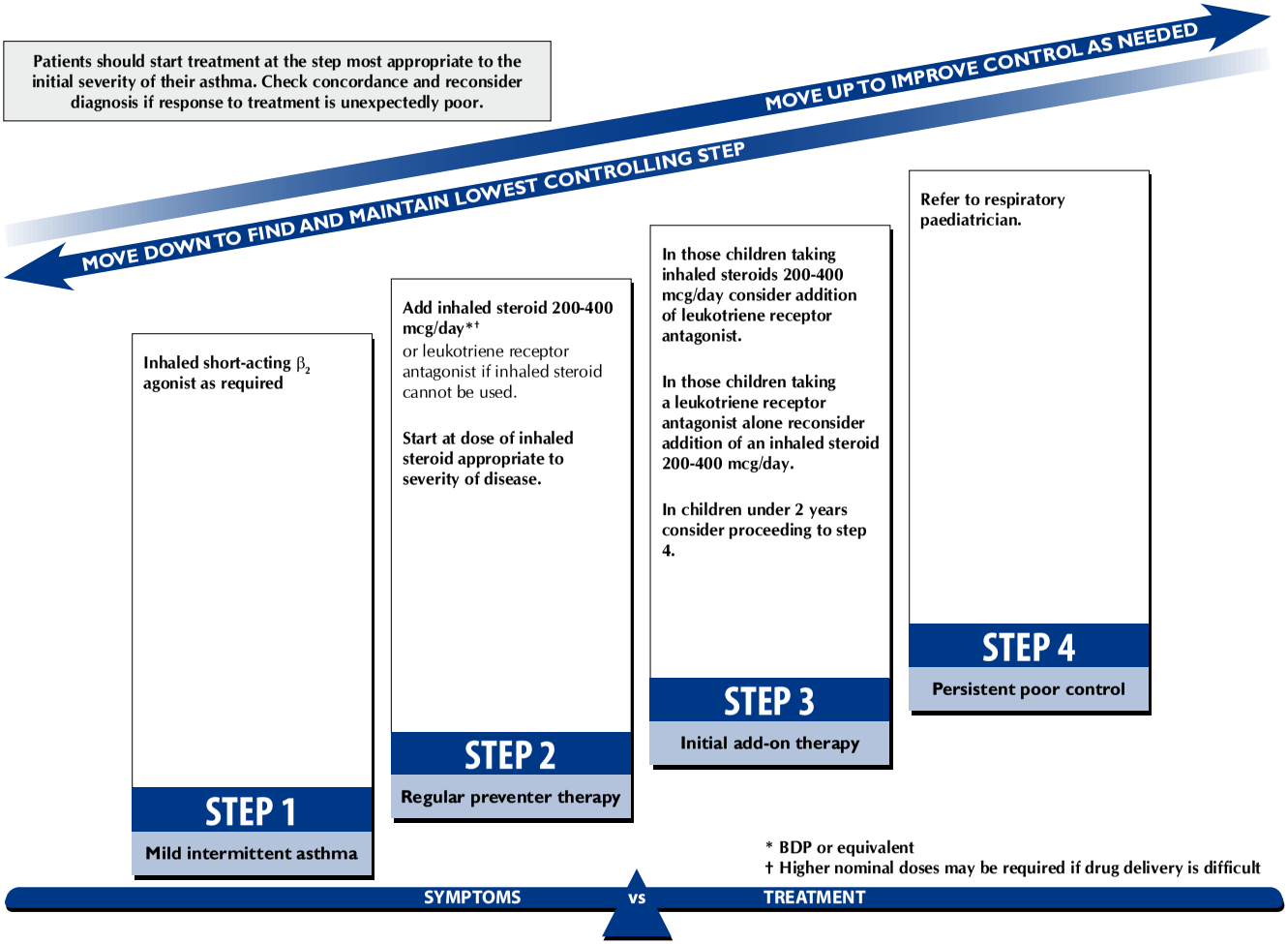
Use daily steroid tablet in lowest dose providing adequate control

Maintain high dose inhaled steroid at 800 mcg/day*

Refer to respiratory paediatrician

*** BDP or equivalent**

SYMPTOMS **vs** **TREATMENT**



Applies only to adults
Applies to all children
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General

INHALER DEVICES

TECHNIQUE AND TRAINING

B ☑ ☑ **Prescribe inhalers only after patients have received training in the use of the device and have demonstrated satisfactory technique.**

β_2 AGONIST DELIVERY

ACUTE ASTHMA

A A B **Children and adults with mild and moderate exacerbations of asthma should be treated by pMDI + spacer with doses titrated according to clinical response.**

STABLE ASTHMA

A **In children aged 5-12, pMDI + spacer is as effective as any other hand held inhaler.**

A **In adults pMDI ± spacer is as effective as any other hand held inhaler, but patients may prefer some types of DPI.**

INHALED STEROIDS FOR STABLE ASTHMA

A **In children aged 5-12 years, pMDI + spacer is as effective as any DPI.**

A **In adults, a pMDI ± spacer is as effective as any DPI.**

CFC PROPELLANT PMDI VS HFA PROPELLANT PMDI

A
A
A

- **Salbutamol HFA can be substituted for salbutamol CFC at 1:1 dosing.**
- **HFA BDP pMDI (Qvar) may be substituted for CFC BDP pMDI at 1:2 dosing. This ratio does not apply to reformulated HFA BDP pMDIs.**
- **Fluticasone HFA can be substituted for fluticasone CFC at 1:1 dosing.**

PRESCRIBING DEVICES

☑

- The choice of device may be determined by the choice of drug
- If the patient is unable to use a device satisfactorily, an alternative should be found
- The patient should have their ability to use an inhaler device assessed by a competent health care professional
- The medication needs to be titrated against clinical response to ensure optimum efficacy
- Reassess inhaler technique as part of structured clinical review.

INHALER DEVICES IN CHILDREN UNDER 5

In young (0-5 years) children, little or no evidence is available on which to base recommendations.

☑ In children aged 0-5 years, pMDI and spacer are the preferred method of delivery of β_2 agonists or inhaled steroids. A face mask is required until the child can breathe reproducibly using the spacer mouthpiece. Where this is ineffective a nebuliser may be required.

MANAGEMENT OF ACUTE ASTHMA IN ADULTS

ASSESSMENT OF SEVERE ASTHMA

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

☑
- Keep patients who have had near fatal asthma or brittle asthma under specialist supervision indefinitely
- A respiratory specialist should follow up patients admitted with severe asthma for at least one year after the admission

INITIAL ASSESSMENT

MODERATE EXACERBATION

- increasing symptoms
- PEF >50-75% best or predicted
- no features of acute severe asthma

ACUTE SEVERE

Any one of:
- PEF 33-50% best or predicted
- respiratory rate ≥25/min
  heart rate ≥110/min
- inability to complete sentences in one breath

LIFE THREATENING

In a patient with severe asthma any one of:
- PEF <33% best or predicted
- SpO_2 <92%
- PaO_2 <8 kPa
- normal $PaCO_2$ (4.6-6.0 kPa)
- silent chest
- cyanosis
- poor respiratory effort
- arrhythmia
- exhaustion, altered conscious level

NEAR FATAL

Raised $PaCO_2$ and/or requiring mechanical ventilation with raised inflation pressures

Clinical features	Severe breathlessness (including too breathless to complete sentences in one breath), tachypnea, tachycardia, silent chest, cyanosis or collapse *None of these singly or together is specific and their absence does not exclude a severe attack*
PEF or FEV_1	PEF or FEV_1 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
Pulse oximetry	Oxygen saturation (SpO_2) measured by pulse oximetry determines the adequacy of oxygen therapy and the need for arterial blood gas (ABG). The aim of oxygen therapy is to maintain SpO_2 94–98%
Blood gases (ABG)	Patients with SpO_2<92% or other features of life threatening asthma require ABG measurement
Chest X-ray	Chest X-ray is not routinely recommended in the absence of: - suspected pneumomediastinum or pneumothorax - suspected consolidation - life threatening asthma - failure to respond to treatment satisfactorily - requirement for ventilation

Revised 2009

MANAGEMENT OF ACUTE ASTHMA IN ADULTS

CRITERIA FOR ADMISSION

B **Admit patients with any feature of a life threatening or near fatal attack.**

B **Admit patients with any feature of a severe attack persisting after initial treatment.**

C **Patients whose peak flow is greater than 75% best or predicted one hour after initial treatment may be discharged from ED, unless there are other reasons why admission may be appropriate.**

TREATMENT OF ACUTE ASTHMA

OXYGEN

Revised 2009

C ▪ **Give supplementary oxygen to all hypoxaemic patients with acute asthma to maintain an SpO_2 level of of 94-98%. Lack of pulse oximetry should not prevent the use of oxygen.**

A ▪ **In hospital, ambulance and primary care, nebulised β_2 agonist bronchodilators should be driven by oxygen.**

C ▪ **The absence of supplemental oxygen should not prevent nebulised therapy being given if indicated.**

STEROID THERAPY

A **Give steroids in adequate doses in all cases of acute asthma.**

☑ Continue prednisolone 40-50 mg daily for at least five days or until recovery.

OTHER THERAPIES

B **Consider giving a single dose of IV magnesium sulphate for patients with:**
- **acute severe asthma who have not had a good initial response to inhaled bronchodilator therapy**
- **life threatening or near fatal asthma.**

☑ IV magnesium sulphate (1.2-2 g IV infusion over 20 minutes) should only be used following consultation with senior medical staff.

B **Routine prescription of antibiotics is not indicated for patients with acute asthma.**

β_2 AGONIST BRONCHODILATORS

A **Use high dose inhaled β_2 agonists as first line agents in acute asthma and administer as early as possible. Reserve intravenous β_2 agonists for those patients in whom inhaled therapy cannot be used reliably.**

☑ In acute asthma with life threatening features the nebulised route (oxygen-driven) is recommended.

A **In patients with severe asthma that is poorly responsive to an initial bolus dose of β_2 agonist, consider continuous nebulisation with an appropriate nebuliser.**

IPRATROPIUM BROMIDE

B **Add nebulised ipratropium bromide (0.5 mg 4-6 hourly) to β_2 agonist treatment for patients with acute severe or life threatening asthma or those with a poor initial response to β_2 agonist therapy.**

REFERRAL TO INTENSIVE CARE

Refer any patient:
- requiring ventilatory support
- with acute severe or life threatening asthma, failing to respond to therapy, evidenced by:
  - deteriorating PEF
  - persisting or worsening hypoxia
  - hypercapnea
  - ABG analysis showing ↓ pH or ↑ H^+
  - exhaustion, feeble respiration
  - drowsiness, confusion, altered conscious state
  - respiratory arrest

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MANAGEMENT OF ACUTE ASTHMA IN CHILDREN AGED OVER 2 YEARS

ACUTE SEVERE	LIFE THREATENING
SpO_2 < 92% PEF 33-50% ▪ Can't complete sentences in one breath or too breathless to talk or feed ▪ Pulse >125 (>5 years) or >140 (2 to 5 years) ▪ Respiration >30 breaths/min (>5 years) or >40 (2 to 5 years)	SpO_2 < 92% PEF < 33-50% best or predicted ▪ Hypotension ▪ Silent chest ▪ Exhaustion ▪ Cyanosis ▪ Confusion ▪ Poor respiratory effort ▪ Coma

CRITERIA FOR ADMISSION

Revised 2009 ☑ β_2 agonists should be given as first line treatment. Increase β_2 agonist dose by two puffs every two minutes according to response up to ten puffs.

☑
- Children with acute asthma in primary care who have not improved after receiving up to 10 puffs of β_2 agonist should be referred to hospital. Further doses of bronchodilator should be given as necessary whilst awaiting transfer
- Treat children transported to hospital by ambulance with oxygen and nebulised β2 agonists during the journey.

Revised 2009 ☑ Paramedics attending to children with acute asthma should administer nebulised salbutamol driven by oxygen if symptoms are severe whilst transferring the child to the emergency department.

☑ Children with severe or life threatening asthma should be tranferred to hospital urgently.

B **Consider intensive inpatient treatment for children with SpO_2 <92% on air after initial bronchodilator treatment.**

The following clinical signs should be recorded:

- **Pulse rate -** increasing tachycardia generally denotes worsening asthma; a fall in heart rate in life threatening asthma is a pre-terminal event
- **Respiratory rate and degree of breathlessness -** ie too breathless to complete sentences in one breath or to feed
- **Use of accessory muscles of respiration -** best noted by palpation of neck muscles
- **Amount of wheezing -** which might become biphasic or less apparent with increasing airways obstruction
- **Degree of agitation and conscious level -** always give calm reassurance

NB Clinical signs correlate poorly with the severity of airways obstruction. Some children with acute asthma do not appear distressed.

TREATMENT OF ACUTE ASTHMA

OXYGEN

☑ Children with life threatening asthma or SpO2 <94% should receive high flow oxygen via a tight fitting face mask or nasal cannula at sufficient flow rates to achieve normal saturations.

β2 AGONIST BRONCHODILATORS

A
- **Inhaled β_2 agonists are the first line treatment for acute asthma**
- **A pMDI + spacer is the preferred option in mild to moderate asthma.**

B **Individualise drug dosing according to severity and adjust according to the patient's response.**

Revised 2009 B **Consider early addition of a single bolus dose of IV salbutamol (15 mcg/kg over 10 minutes) in severe cases where the patient has not responded to initial inhaled therapy.**

Revised 2009 ☑ Discontinue long-acting β_2 agonists when short-acting β_2 agonists are required more often than four-hourly.

MANAGEMENT OF ACUTE ASTHMA IN CHILDREN AGED OVER 2 YEARS

STEROID THERAPY

A	**Give prednisolone early in the treatment of acute asthma attacks.**
☑	▪ Use a dose of 20 mg prednisolone for children aged 2 to 5 years and a dose of 30 - 40 mg for children >5 years. Those already receiving maintenance steroid tablets should receive 2 mg/kg prednisolone up to a maximum dose of 60 mg ▪ Repeat the dose of prednisolone in children who vomit and consider IV steroids ▪ Treatment for up to three days is usually sufficient, but the length of course should be tailored to the number of days necessary to bring about recovery. Weaning is unnecessary unless the course of steroids exceeds 14 days.

OTHER THERAPIES

A	**If symptoms are refractory to initial β_2 agonist treatment, add ipratropium bromide (250 mcg/ dose mixed with the nebulised β_2 agonist solution).**
☑	Repeated doses of ipratropium bromide should be given early to treat children poorly responsive to β_2 agonists.
A C	▪ **Aminophylline is not recommended in children with mild to moderate acute asthma** ▪ **Consider aminophylline in an HDU or PICU setting for children with severe or life threatening bronchospasm unresponsive to maximal doses of bronchodilators plus steroids.**
☑	Do not give antibiotics routinely in the management of acute childhood asthma.

MANAGEMENT OF ACUTE ASTHMA IN CHILDREN AGED UNDER 2 YEARS

- The assessment of acute asthma in early childhood can be difficult
- Intermittent wheezing attacks are usually due to viral infection and the response to asthma medication is inconsistent
- The differential diagnosis of symptoms includes:
  - aspiration pneumonitis
  - pneumonia
  - bronchiolitis
  - tracheomalacia
  - complications of underlying conditions such as congenital anomalies and cystic fibrosis
- Prematurity and low birth weight are risk factors for recurrent wheezing

TREATMENT OF ACUTE ASTHMA

β_2 AGONIST BRONCHODILATORS

B	**Oral β_2 agonists are not recommended for acute asthma in infants.**
A	**For mild to moderate acute asthma, a pMDI + spacer is the optimal drug delivery device.**

STEROID THERAPY

B	**Consider steroid tablets in infants early in the management of moderate to severe episodes of acute asthma in the hospital setting.**
☑	Steroid tablet therapy (10 mg of soluble prednisolone for up to three days) is the preferred steroid preparation for use in this age group.
B	**Consider inhaled ipratropium bromide in combination with an inhaled β_2 agonist for more severe symptoms.**

ASTHMA IN PREGNANCY

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

Revised 2009

D **Women with asthma should be advised of the importance of good control of their asthma during pregnancy to avoid problems for both mother and baby.**

C **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.

DRUG THERAPY IN PREGNANCY

Revised 2009

B **Use short acting β_2 agonists as normal during pregnancy.**

C
- **Use long acting β_2 agonists as normal**
- **Use inhaled steroids as normal**
- **Use oral and intravenous theophyllines as normal.**

C **Use steroid tablets as normal when indicated for severe asthma. Steroid tablets should never be withheld because of pregnancy.**

Revised 2009

D **Leukotriene antagonists may be continued in women who have demonstrated significant improvement in asthma control with these agents prior to pregnancy not achievable with other medications.**

ACUTE ASTHMA IN PREGNANCY

Revised 2009

C **Give drug therapy for acute asthma as for the non-pregnant patient, including systemic steroids and magnesium sulphate.**

D
- **Acute severe asthma in pregnancy is an emergency and should be treated vigorously in hospital**

Revised 2009

- **Deliver high flow oxygen immediately to maintain saturation 94-98%.**

☑
- Continuous fetal monitoring is recommended for severe acute asthma

Revised 2009

- For women with poorly controlled asthma there should be close liaison between the respiratory physician and obstetrician, with early referral to critical care physicians for women with acute severe asthma

MANAGEMENT DURING LABOUR

C
D
- **If anaesthesia is required, regional blockade is preferable to general anaesthesia**
- **Use prostaglandin F2α with extreme caution because of the risk of inducing bronchoconstriction.**

☑
- Advise women:
  - that acute asthma is rare in labour
  - to continue their usual asthma medications in labour
- Women receiving steroid tablets at a dose exceeding prednisolone 7.5 mg per day for > 2 weeks prior to delivery should receive parenteral hydrocortisone 100 mg 6-8 hourly during labour
- In the absence of acute severe asthma, reserve caesarean section for the usual obstetric indications.

DRUG THERAPY IN BREASTFEEDING MOTHERS

C
- **Encourage women with asthma to breast feed**
- **Use asthma medications as normal during lactation.**

DIFFICULT ASTHMA

Difficult asthma is defined as persistent symptoms and/or frequent exacerbations despite treatment at step 4 or 5

ASSESSING DIFFICULT ASTHMA

D **Patients with difficult asthma should be systematically evaluated, including:**

- **confirmation of the diagnosis of asthma**
- **identification of the mechanism of persisting symptoms and assessment of adherence with therapy.**

D **This assessment should be facilitated through a dedicated multidisciplinary difficult asthma service, by a team experienced in the assessment and management of difficult asthma.**

FACTORS THAT CONTRIBUTE TO DIFFICULT ASTHMA

POOR ADHERENCE

C **Poor adherence with maintenance therapy should be considered as a possible mechanism in difficult asthma.**

PSYCHOSOCIAL FACTORS

C **Healthcare professionals should be aware that difficult asthma is commonly associated with coexistent psychological morbidity.**

D **Assessment of coexistent psychological morbidity should be performed as part of a difficult asthma assessment - in children this may include a psychosocial assessment of the family.**

MONITORING AIRWAY RESPONSE

B **In patients with difficult asthma, consider monitoring induced sputum eosinophil counts to guide steroid treatment.**

ORGANISATION AND DELIVERY OF CARE

ROUTINE PRIMARY CARE

A	All people with asthma should have access to primary care services delivered by doctors and nurses with appropriate training in asthma management.

STRUCTURED REVIEW

B	Consider carrying out routine reviews by telephone for people with asthma.
A	In primary care, people with asthma should be reviewed regularly by a nurse or doctor with appropriate training in asthma management. The review should incorporate a written action plan.
C	▪ General practices should maintain a register of people with asthma ▪ Clinical review should be structured and utilise a standard recording system
B	Feedback of audit data to clinicians should link guidelines recommendations to management of individual patients.

PATIENT SUBGROUPS

D	Healthcare professionals who provide asthma care should have heightened awareness of the complex needs of ethnic minorities, socially disadvantaged group, adolescents, the elderly and those with communication difficulties.

ACUTE EXACERBATIONS

C	Manage hospital inpatients in specialist rather than general units.
B	Clinicians in primary and secondary care should treat asthma according to recommended guidelines.
A	Discharge form hospital or ED should be a planned, supervised event which includes self-management planning. It may safely take place as soon as clinical improvement is apparent.
A	All people attending hospital with acute exacerbations of asthma should be reviewed by a clinician with particular expertise in asthma management, preferably within 30 days.

PATIENT EDUCATION

ASTHMA ACTION PLANS

Written personalised action plans as part of self-management education have been shown to improve health outcomes for people with asthma

SELF-MANAGEMENT IN PRACTICE

The 'Be in Control' asthma action plan from Asthma UK can be downloaded direct from the their website: **www.asthma.org.uk/control**
It can also be obtained by contacting the organisation directly (0845 7 01 02 03)

☑
- A hospital admission represents a window of opportunity to review self-management skills. No patient should leave hospital without a written personalised action plan and the benefit may be greatest at first admission.
- An acute consultation offers the opportunity to determine what action the patient has already taken to deal with the exacerbation. 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 self-management in the event of their asthma deteriorating
- Brief simple education linked to patient goals is most likely to be acceptable to patients.

A
- **Patients with asthma should be offered self-management education that focuses on individual needs, and be reinforced by a written personalised action plan**
- **Prior to discharge, in-patients should receive written personalised action plans, given by clinicians with expertise in asthma management.**

A **Introduce personalised action plans as part of a structured educational discussion.**

B **Initiatives which encourage regular, structured review explicitly incorporating self management education should be used to increase ownership of personalised action plans.**

CONCORDANCE AND COMPLIANCE

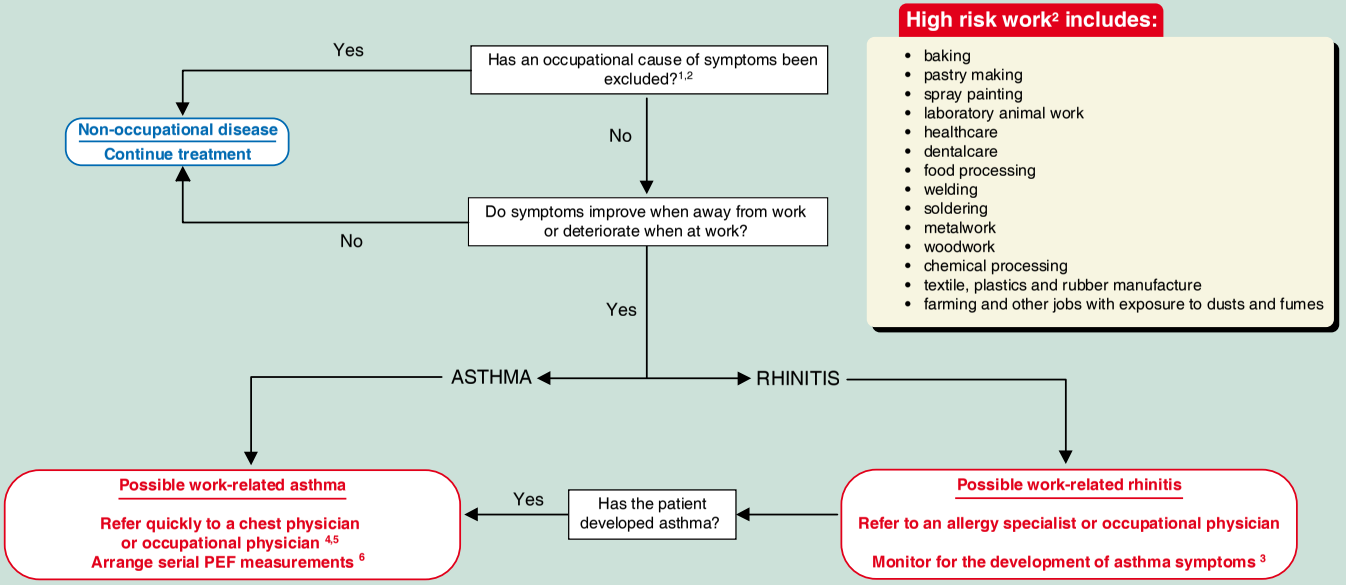
☑ Provide simple, verbal and written instructions and information on drug treatment for patients and carers.

☑ Computer repeat-prescribing systems provide a useful index of compliance.

PRACTICAL TIPS FOR IMPROVING COMPLIANCE

- ***Ask open-ended questions like "If we could make one thing better for your asthma what would it be?" This may help to elicit a more patient-centred agenda***
- ***Make it clear you are listening and responding to the patient's concerns and goals***
- ***Reinforce practical information and negotiated treatment plans with written instruction***
- ***Consider reminder strategies***
- ***Recall patients who miss appointments***

WORK-RELATED ASTHMA AND RHINITIS: CASE FINDING AND MANAGEMENT IN PRIMARY CARE



High risk work[2] includes:

- baking
- pastry making
- spray painting
- laboratory animal work
- healthcare
- dentalcare
- food processing
- welding
- soldering
- metalwork
- woodwork
- chemical processing
- textile, plastics and rubber manufacture
- farming and other jobs with exposure to dusts and fumes

1. At least 1 in 10 cases of new or reappearance of childhood asthma in adult life are attributable to occupation.
2. Enquire of adult patients with rhinitis or asthma about their job and the materials with which they work.
3. Rhino-conjunctivitis may precede IgE-associated occupational asthma; the risk of developing asthma being highest in the year after the onset of rhinitis.
4. The prognosis of occupational asthma is improved by early identification and early avoidance of further exposure to its cause
5. Confirm a diagnosis supported by objective criteria and not on the basis of a compatible history alone because of the potential implications for employment.
6. Arrange for workers whom you suspect of having work-related asthma to perform serial peak flow measurements at least four times a day.

Guidelines for the Identification, Management and Prevention of Occupational Asthma • www.bohrf.org.uk/content/asthma.htm

Applies only to adults
Applies to all children
Applies to children 5-12
Applies to children under 5
General

British Thoracic Society,
17 Doughty Street, London WC1N 2PL
www.brit-thoracic.org.uk

Scottish Intercollegiate Guidelines Network
Elliott House, 8 -10 Hillside Crescent, Edinburgh EH7 5EA
www.sign.ac.uk