Management of asthma exacerbation in adults – guidelines for primary care doctors

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Abstract

Asthma affects about 5% of the Polish adult population. Despite modern treatments, exacerbations still affect a significant percentage of patients. In order to improve treatment efficacy of asthma exacerbations in Poland, we decided to adapt the established international guidelines on the management of asthma exacerbations to match the reality of the Polish healthcare system. The adaptation process was guided by the ADAPTE Collaboration toolkit; its key stages included: determining health questions, search for guidelines and other relevant documents followed by assessment of their quality, selecting the best guidelines and recommendations to create an adapted guideline customised to match local conditions. The current guidelines are applicable to assessing the risk of asthma exacerbations, diagnostic management of patients with exacerbations, as well as treatment and prevention of exacerbations. The current guidelines apply to adults with known asthma. The document is intended for general practitioners (primary care physicians), GP registrars and general internal medicine registrars. The activities planned as a part of guideline implementation will include their publication in medical journals (printed and digital), presentation during medical congresses and conferences as well as trainings for physicians. The guidelines will be updated when the updated version of their source document becomes available containing significant changes to the recommendations regarding management of asthma exacerbations.

Introduction

Scope and purpose

The aim of the current guidelines on the management of asthma exacerbations in adults is to improve the safety of patients by ensuring appropriate prevention of exacerbations and appropriate treatment.

Target population of the guidelines

The current guidelines apply to adults with asthma.

Target audience of the guidelines

The document is intended primarily for general practitioners (primary care physicians), GP registrars and general internal medicine registrars. However, the information provided in the guidelines may also be useful for healthcare managers and representatives of healthcare financing institutions and institutions responsible for the healthcare system structure.

Implementation considerations

The current guidelines should not be seen as a legal standard of care for all patients. Instead, it provides some general management principles, which can aid clinical decision-making. Appropriate patient care options are always determined based on clinical situation and availability of treatments. All clinical decisions should always be consulted with the patient
or their carer (if a patient lacks capacity).

**Strength of recommendations**

The GINA Science Committee decided not to specify the strength of recommendations in their report, grading the quality of evidence supporting each recommendation instead. Similarly, the current guidelines provide the quality of evidence grade (see Table 1) supporting each recommendation only if the original document provided such information. Otherwise, the Polish adaptation does not provide the quality of evidence grade.

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

Exacerbations of asthma are episodes characterised by worsening in symptoms (dyspnoea, cough, wheeze and chest tightness), which represent a change from the patient’s usual status that is sufficient to require a change in treatment. The status asthmaticus (acute severe asthma, J46 according to the 10th revision of the International Statistical Classification of Diseases and Related Health Problems, ICD-10) is defined as an episode of severe, life-threatening exacerbation of asthma.

The epidemiologic data is limited. In 2010, an estimated 8.2% of U.S. adults had current asthma, and among these persons, approximately 50% had had an asthma attack during the past year.

Risk factors for asthma exacerbations

The key aspect in preventing asthma exacerbations is the awareness of risk factors, which include:

1) uncontrolled asthma symptoms (the key risk factor)
2) high use of short-acting β2-agonist (SABA), which indicates uncontrolled asthma symptoms; with increased mortality if > 1 x 200-dose canister/ month
3) inadequate use of ICS, non-adherence, poor inhaler technique
4) low forced expiratory volume in one second (FEV₁), especially if <60% predicted
5) excessive (>10%) variability of peak expiratory flow (PEF); daily diurnal PEF variability should be calculated using the following formula: \( \frac{[PEF_{\text{max}} - PEF_{\text{min}}]}{PEF_{\text{mean}}} \) and averaged over one week.
6) major psychological or socioeconomic problems
7) exposures: smoking, allergen exposure if sensitized
8) comorbidities: obesity, rhinosinusitis, confirmed food allergy
9) sputum or blood eosinophilia, elevated FeNO (in adults on long-term ICS)
10) pregnancy
11) ever intubated or in intensive care unit for asthma
12) ≥1 severe exacerbation in last 12 months

Items 1-9 are considered modifiable risk factors.

Clinical presentation – diagnosing exacerbations

Asthma exacerbation manifests as an increased severity of dyspnoea, cough, wheeze and chest tightness, which exceeds their usual day-to-day variability. The symptoms are usually
accompanied by a decline in lung function (decreased PEF or FEV₁) compared with the patient’s previous lung function or predicted values (or maximum values for that patient). Lung function measurements enable objective assessment of exacerbation severity. Some patients (more often males or those with near-fatal asthma) may perceive symptoms poorly. The asthma control test (ACT) is not a reliable tool to make a diagnosis of exacerbation.

Exacerbations usually occur in response to:

1) exposure to an external agent (e.g. viral upper respiratory tract infection, pollen or pollution) and/or

2) poor adherence with controller medication.

Some patients present more acutely and without exposure to known risk factors. Severe exacerbation can occur in patients with mild or well-controlled asthma.

**History and physical examination**

The **history** taken from a patient with asthma exacerbation (or their next of kin in patients with severe exacerbation) should ascertain the following:

1) duration of exacerbation

2) potential causes if known (e.g. allergen exposure or viral respiratory tract infection)

3) severity of asthma symptoms

4) presence and severity of other symptoms, in particular anaphylaxis

5) risk factors for exacerbations and asthma-related death (see Table 2)

6) all current medications, including doses and devices prescribed, adherence pattern, any recent dose changes and response to current therapy.

<table>
<thead>
<tr>
<th>Table 2. Factors that increase the risk of exacerbations and asthma-related death</th>
</tr>
</thead>
<tbody>
<tr>
<td>• a history of asthma exacerbation requiring intubation and mechanical ventilation</td>
</tr>
<tr>
<td>• hospitalization or emergency care (A&amp;E) visit for asthma exacerbation in the past year</td>
</tr>
<tr>
<td>• current or recent use of oral CS</td>
</tr>
<tr>
<td>• not currently using ICS</td>
</tr>
<tr>
<td>• overuse of SABA (using &gt; 1 x 200-dose canister/ month is a red flag)</td>
</tr>
<tr>
<td>• a history of psychiatric disease and/or psychosocial problems</td>
</tr>
<tr>
<td>• poor adherence with asthma medications or poor adherence with (or lack of) a written asthma action plan</td>
</tr>
</tbody>
</table>
Table 2. Factors that increase the risk of exacerbations and asthma-related death

- symptoms of food allergy

The **physical examination** of a patient with asthma exacerbation should assess:

1) vital signs: level of consciousness, temperature, heart rate, respiratory rate, blood pressure

2) signs of bronchoconstriction (prolonged expiration, wheezing, rhonchi) and other abnormal findings of chest assessment (suggesting alternative conditions which may explain worsened patient’s status, e.g. pneumonia, pneumothorax or heart failure)

3) additional findings, which facilitate objective assessment of exacerbation severity, such as ability to complete sentences or utter words, which may be impaired due to dyspnoea, and use of accessory muscles

4) non-respiratory signs suggesting alternative explanations of acute breathlessness (e.g. stridor, rash, lower extremity oedema).

The sensitivity of assessment based only on history and physical examination is limited, as symptom severity may not always accurately reflect the degree of bronchoconstriction in some patients.

**Additional investigations**

The following tests should be performed in a patient with asthma exacerbation in a primary care setting:

**Peak expiratory flow measurement or spirometry**

Lung function tests (PEF and spirometry) are intended for the assessment of exacerbation severity and treatment efficacy. They facilitate the decision to send patient home (e.g. with PEF >60-80% of predicted or personal best). In patients with asthma exacerbation, current PEF or FEV₁ values should be compared with previous measurements (if available) and with predicted or personal best values.

Lung function tests enable more objective, reliable assessment of exacerbation severity than clinical presentation.

**Comment:** Lung function tests should not be performed in patients who present with signs of severe exacerbation (see Table 3). PEF measurement can be preferred as easier and less demanding of a patient, except for the mildest cases, in which an accurate lung function assessment may affect subsequent management.

**Pulse oximetry**

Pulse oximetry facilitates assessing exacerbation severity. Saturation levels (SpO₂) < 90%
signal the need for aggressive therapy. Pulse oximetry is useful for titrating oxygen therapy (target SpO₂ is 93–95%) as well as for reviewing the response and the possibility to send the patient home (whereby SpO₂ of > 94% when breathing air is required).

**Assessing the severity of exacerbation**

Assessment of exacerbation severity should be based on the degree of dyspnoea, respiratory rate, heart rate, SpO₂ and PEF (or FEV₁) – see Table 3.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mild/ moderate</th>
<th>Severe</th>
<th>Life threatening</th>
</tr>
</thead>
<tbody>
<tr>
<td>dyspnoea/ body position</td>
<td>sits upright</td>
<td>sits hunched forwards</td>
<td>sits hunched forwards</td>
</tr>
<tr>
<td>speech</td>
<td>talks in phrases</td>
<td>talks in words</td>
<td>talks in words</td>
</tr>
<tr>
<td>level of consciousness</td>
<td>normal</td>
<td>agitated</td>
<td>drowsy, confused</td>
</tr>
<tr>
<td>respiratory rate</td>
<td>increased but ≤30 breaths per minute</td>
<td>&gt;30 breaths per minute</td>
<td>&gt;30 breaths per minute</td>
</tr>
<tr>
<td>accessory muscles in use</td>
<td>no</td>
<td>yes</td>
<td>paradoxical breathing</td>
</tr>
<tr>
<td>heart rate</td>
<td>100–120 bpm</td>
<td>&gt;120 bpm</td>
<td>&gt;120 bpm or bradycardia</td>
</tr>
<tr>
<td>PEF (% predicted)</td>
<td>PEF &gt;50%</td>
<td>PEF ≤50%</td>
<td>optionally</td>
</tr>
<tr>
<td>SpO₂ (when breathing air)</td>
<td>90–95%</td>
<td>&lt;90%</td>
<td>&lt;90%</td>
</tr>
</tbody>
</table>

**Criteria for hospitalization**

The decision about hospitalization should be based on:

1) clinical status
2) lung function
3) response to treatment
4) recent and past history of exacerbations
5) ability to manage at home.
Patients with severe or life-threatening exacerbation should be immediately transferred to hospital. Whilst awaiting the transfer, the treatment outlined below should be initiated.

**Comment:** The decision to admit or discharge should be based on the clinical status (including the ability to lie flat) and lung function 1 hour after commencement of treatment rather than the patient’s status on arrival.

The risk factors mentioned below should be considered to inform the decision to admit or discharge.

**Factors associated with increased need for admission include:**

1) female sex, older age and non-white race
2) use of more than eight SABA puffs in the previous 24 hours
3) CPR or other emergency medical intervention at the A&E
4) severe exacerbation (respiratory rate > 30 breaths/minute, oxygen saturation <90%, final PEF <50% predicted)
5) past history of severe exacerbations (e.g. intubation)
6) previous unscheduled office and A&E visits requiring use of oral CS.

Patients who are at risk of severe exacerbation and asthma-related death require **prompt medical intervention and close monitoring** (see Table 2).

**Management of asthma exacerbation**

**Management of mild/ moderate asthma exacerbation**

Patients with mild/ moderate asthma exacerbation can be managed by the GP in a primary care setting. They should remain in the primary care facility for at least 1 hour after treatment to be reviewed. If there is an improvement in vital signs and PEF (>60-80% of predicted or personal best), the patient does not need SABA and has SpO₂ >94% when breathing air, they can be sent home after having arranged follow-up visits.

**Comment:** Maintenance controller treatment with ICS at the dose 2-4 times higher than the usual dose should be continued for 10-14 days. With OCS, the maintenance treatment should be continued for 5-7 days (see Chapter 9: Follow-up after asthma exacerbation).

**Treatment:**

1) **SABA:**

Treatment of asthma exacerbation should start with SABA. It can be delivered by a pressurized metered-dose inhaler (pMDI) with a spacer or by a nebulizer. The efficacy of both is comparable in patients with mild/ moderate exacerbation [Evidence A]. No additional SABA is
needed if there is a good (PEF >60–80% of predicted or personal best) long-lasting (3–4 hours) response to initial treatment.

**Dosage:**

**By pMDI + spacer:** 4-10 puffs repeated every 20 minutes for 1 hour. After the first hour, depending on the response, the dose of SABA required varies from 4–10 puffs every 3–4 hours up to 6–10 puffs every 1–2 hours (or more often if needed). No additional SABA is needed if there is a good response to initial treatment (e.g. PEF >60–80% of predicted or personal best for 3–4 hours).

**Via nebulizer:** 2.5–5 mg of salbutamol, with the dose depending on the severity of exacerbation. A single dose of 2.5–5 mg administered over 30 minutes is usually sufficient. If needed, it can be repeated up to 4 times a day. Higher doses, up to 40 mg, can only be used in an inpatient setting.

**Drugs available in Poland:** fenoterol (pMDI 100 µg per puff), salbutamol (pMDI and DPI 100 µg per puff and 200 µg per puff, nebuliser solution 2.5g/2.5mL and 5mg/2.5mL)

2) **oxygen therapy**

Oxygen therapy should be used, if available, and titrated to maintain SpO₂ at 93–95%. Such modality gives better clinical outcomes and is safer than high-flow 100% oxygen therapy [Evidence B]. The unavailability of pulse oximeter is not a contraindication for oxygen therapy.

3) **OCS:**

OCS should be used in all patients, except for those with mildest exacerbations, especially if they fail to respond to an increase in reliever and controller medications after 2-3 days, deteriorate rapidly, have PEF or FEV₁ <60% of their personal best or predicted value, or have the history of sudden, severe exacerbations.

Prompt administration of systemic corticosteroids (oral or intravenous) improves clinical outcomes in patients with asthma exacerbation. Systemic corticosteroids should be administered to the patient within 1 hour of presentation, followed by a 5- to 7- day course with once a day (o.m.) administration [Evidence B]. Oral administration is as effective as intravenous. Systemic corticosteroids speed resolution of exacerbations and prevent relapse.

**Dosage:**

Prednisolone 1 mg/kg/day (maximum dose is 50 mg/day) or an equivalent dose of another OCS.

**Drugs available in Poland:** prednisone (tablets 1, 5, 10 and 20 mg), prednisolone (tablets 5 mg), methylprednisolone (tablets 4, 8 and 16 mg), triamcinolone (tablets 4 mg)
7.2. Management of severe asthma exacerbation

For patients presenting with life-threatening asthma exacerbation/ impaired consciousness, transfer to the A&E by the ALS ambulance (the “S” category ambulance in Poland) should be arranged. In the remaining cases, the BLS ambulance (the “P” category ambulance in Poland) is appropriate.

Treatment:

1) short-acting bronchodilator

These are best administered via an oxygen-powered nebuliser. If a nebuliser is not available, a pMDI + spacer is the preferred delivery method.

Dosage:

a) SABA: 2.5–5 mg of salbutamol via a nebuliser (consider continuous nebulisation at 10 mg/h or up to 10 doses administered every 20 minutes via a pMDI + spacer)

b) short-acting muscarinic antagonist: 0.5–0.75 mg of ipratropium bromide via a nebuliser or up to 10 doses administered via a pMDI + spacer

Drugs available in Poland: ipratropium (pMDI 20 μg per puff, nebuliser solution 0.25 mg/mL)

2) oxygen therapy: oxygen therapy should be titrated to maintain SpO2 at 93–95%

3) systemic corticosteroids: systemic corticosteroids, oral or intravenous (comparable efficacy), should be administered within the first hour of treatment, dosage as in mild/moderate exacerbation.

Management of exacerbations in patients with asthma-COPD overlap (ACO)

The treatment should be in line with the guidance for the management of asthma and COPD, including systemic CS administered shortly after presentation, stepped up inhaled bronchodilators (both short-acting β2-agonist and short-acting muscarinic antagonist should be used; dosage - as above), controlled oxygen therapy and antibiotics (if indicated).

Adverse effects of drugs used for the management of asthma exacerbations

Although drugs used for the management of asthma hardly give systemic adverse effects, the risk of adverse effects increases with higher doses of medications administered to patients with exacerbations.

Comment: Hypoxemia, which may occur in patients with asthma exacerbation, may increase
the risk of adverse effects of β₂-agonists. The most common adverse effects of β₂-agonists include:

1) tachycardia, and less often other arrhythmias (ectopic beats, atrial fibrillation)
2) skeletal muscle tremor
3) hypokalemia
4) hyperglycaemia.

Their presence and severity depend on the dose of a medication and the degree of hypoxemia. Therefore, high doses of β₂-agonists necessary to produce optimum bronchodilation should be used alongside oxygen therapy and corticosteroids, which can reduce the risk of adverse effects. The need to administer corticosteroids is likely to be overlooked, due to the short-term bronchodilation effect of β₂-agonists, which may ‘mask’ the severity of exacerbation.

**Medications, which should not be routinely used in the management of asthma exacerbation**

Medications, which should not be routinely used in the management of asthma exacerbation, include:

1) **theophylline** – due to low efficacy and high risk of adverse effects
2) **antibiotics** – unless there is a bacterial lower respiratory tract infection or pneumonia
3) **sedatives** – contraindicated in asthma exacerbation!
4) **adrenaline** – except for in patients whose bronchoconstriction is secondary to anaphylaxis.

**Assessing treatment response in patients with asthma exacerbation**

The following should be monitored in patients with asthma exacerbation as a part of treatment response assessment:

1) level of consciousness
2) respiratory rate
3) heart rate
4) SpO₂
5) severity of dyspnoea and other signs of exacerbation.

The patients should be periodically reviewed for the presence and severity of signs of exacerbation and changes in lung function (PEF measurement 1 hour after treatment commencement or earlier).
Patients with little or slow response to SABA treatment should be closely monitored.

Additional treatment should continue until PEF reaches a plateau or (ideally) returns to the patient’s previous best.

Patients who fail to respond to treatment, or who continue to deteriorate should be transferred immediately to an acute care facility.

**Follow-up after asthma exacerbation**

In patients, in whom a good control of exacerbation was achieved in a primary care setting, a follow-up appointment should be arranged for about 2–7 days later [Evidence D].

Once symptom control has been achieved, adherence should be assessed, and maintenance treatment planned. Maintenance treatment should include initiation or stepping up the controller for 2–4 weeks (of 2–3 months, depending on the cause of exacerbation). Most patients not currently taking controller medication should usually be commenced on regular ICS-containing therapy, as an exacerbation requiring medical care indicates that the patient is at increased risk of future exacerbations (see Chapter 5: Risk factors for asthma exacerbations) [Evidence B].

**Individualised asthma action plan**

All patients should be provided with a written, individualised asthma action plan, including current therapies and appropriate for the patient’s education and understanding levels. The asthma action plan enables the patient to self-manage and respond appropriately to worsening symptoms of exacerbation and/or changes in PEF, providing guidance as to changes to reliever and controller medications, how to use oral corticosteroids (OCS) and when and how to access medical care (GP/ambulance).

After a self-managed exacerbation, patients should see their primary care health care provider within 1–2 weeks, for assessment of symptom control and additional risk factors for exacerbations, and to identify the potential cause of the exacerbation. Patients should contact their doctor if they start taking OCS.

During the follow-up appointment after a self-managed exacerbation, the written asthma action plan should be reviewed to see whether an update is needed.

Table 4 presents possible options for treatment modification as a part of self-management of asthma exacerbations.
<table>
<thead>
<tr>
<th>Medications</th>
<th>Short-term change (1-2 weeks) for worsening asthma</th>
<th>Quality of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>increase usual reliever</td>
<td></td>
<td></td>
</tr>
<tr>
<td>– SABA</td>
<td>– for pMDI, add spacer</td>
<td>A</td>
</tr>
<tr>
<td>– low dose ICS/formoterol</td>
<td>– increase formoterol as needed up to the maximum of 72 µg/day</td>
<td>A</td>
</tr>
<tr>
<td>usual controller:</td>
<td>step up treatment:</td>
<td></td>
</tr>
<tr>
<td>– Maintenance and reliever ICS/formoterol</td>
<td>– continue maintenance ICS/formoterol and increase ICS/formoterol reliever (maximum formoterol total 72 µg/day)</td>
<td>A</td>
</tr>
<tr>
<td>– Maintenance ICS + SABA as reliever</td>
<td>– at least double ICS, consider increasing ICS to high dose (to maximum total of 2000 µg/day BDP equivalent)</td>
<td>B</td>
</tr>
<tr>
<td>– Maintenance ICS/formoterol + SABA as reliever</td>
<td>– quadruple maintenance ICS/formoterol (maximum formoterol 72 µg/day)</td>
<td>B</td>
</tr>
<tr>
<td>– Maintenance ICS/other LABA + SABA as reliever</td>
<td>– step up to higher dose formulation of ICS/other LABA or consider adding a separate ICS inhaler (to maximum total of 2000 µg/day BDP equivalent)</td>
<td>D</td>
</tr>
<tr>
<td>add OCS and contact your doctor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OCS (prednisone or prednisolone)</td>
<td>add OCS in severe exacerbations (PEF or FEV₁ &lt;60% personal best or predicted) or patient not responding to treatment over 48 hours</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>prednisolone 1mg/kg/day (50 mg max), usually for 5–7 days</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>tapering is not needed if a short-term (&lt;2 weeks) OCS course is prescribed</td>
<td>B</td>
</tr>
</tbody>
</table>
Treatment modifications as a part of self-management of exacerbations

1. **SABA**

Repeated dosing with inhaled short-acting beta2-agonist (SABA) bronchodilators provides temporary relief until the cause of the worsening symptoms passes or increased controller treatment has had time to take effect. SABA should be delivered via pMDI with a spacer or via a nebuliser. The need for repeated doses over more than 1–2 days signals the need to review, and possibly increase, controller treatment.

2. **Rapid-onset long-acting β2-agonists (formoterol)**

The use of the rapid-onset LABA, formoterol, in a separate inhaler is not recommended, in order to avoid the possibility of it being used without concomitant inhaled corticosteroids (ICS).

3. **Inhaled corticosteroids (ICS)**

At least doubling the ICS dose as a part of asthma action plan-based self-management of exacerbation improves asthma outcomes and reduces health care utilization. Quadrupling the ICS dose (to average of 2000mcg/day BDP equivalent) in response to PEF decrease limits the need for OCS.

In patients with an acute deterioration, high-dose ICS for 7–14 days (500–1600mcg BDP equivalent) is as effective as a short course of OCS [Evidence A].

4. **Combination ICS with LABA**

The combination of rapid-onset LABA (formoterol) and low dose ICS (budesonide or beclomethasone) in a single inhaler as both the controller and the reliever medication is effective in improving asthma control, and reduces exacerbations requiring OCS and hospitalizations. The maximum total formoterol dose is 72 µg/day.

The ICS dose may be further increased by adding a separate ICS inhaler.

Patient education

Patients after exacerbations are more likely to implement behavioural changes. They should be targeted for an asthma education program, if one is available. It is particularly true for patients discharged following an A&E presentation or hospitalization for asthma. Patients who were hospitalized may be particularly receptive to information and advice about their illness.

An educational program should contain in particular:

1) skills training to use inhaler devices effectively (up to 70–80% of patients are unable to use their inhaler correctly – poor inhaler technique leads to poor asthma control)

2) encouraging adherence (up to 50% of patients fail to take medications as directed at least part of the time)
as well as information regarding:

3) asthma

4) the causes of asthma exacerbations and the ways to prevent them

5) the actions the patient needs to take to respond to worsening symptoms or a subsequent exacerbation.

**Preventing asthma exacerbations**

The strategies to reduce the risk of exacerbations are shown in Table 5.

<table>
<thead>
<tr>
<th>Patient group/ risk factor</th>
<th>Treatment strategy</th>
<th>Quality of evidence(^a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>any patient with ≥1 risk factor for exacerbations (including poor symptom control)(^b)</td>
<td>regular use of ICS (inhaled CS)</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>a written action plan for the management of asthma</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>more frequent reviews</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>regular control of inhaler technique</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>identification of modifiable risk factors</td>
<td>D</td>
</tr>
<tr>
<td>≥1 severe exacerbation in last year</td>
<td>consider alternative controller regimens to reduce exacerbation risk, e.g. ICS/formoterol maintenance and reliever regimen</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>consider stepping up treatment if no modifiable risk factors</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>identify any avoidable triggers for exacerbations</td>
<td>C</td>
</tr>
<tr>
<td>exposure to tobacco smoke</td>
<td>encourage smoking cessation</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>consider higher dose of ICS if asthma poorly-controlled</td>
<td>B</td>
</tr>
<tr>
<td>low FEV(_1), especially if &lt;60% predicted</td>
<td>consider trial of 3 months’ treatment with high-dose ICS or 2 weeks’ OCS</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>exclude other lung disease, e.g. COPD</td>
<td>D</td>
</tr>
<tr>
<td><strong>Table 5. Treating modifiable risk factors to reduce exacerbations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>obesity</strong></td>
<td><strong>D</strong></td>
<td></td>
</tr>
<tr>
<td>suggest weight loss</td>
<td><strong>B</strong></td>
<td></td>
</tr>
<tr>
<td>distinguish asthma symptoms from symptoms due to restrictive lung diseases and/or obstructive sleep apnoea</td>
<td><strong>D</strong></td>
<td></td>
</tr>
<tr>
<td><strong>major psychological problems</strong></td>
<td><strong>D</strong></td>
<td></td>
</tr>
<tr>
<td>consider mental health assessment</td>
<td><strong>D</strong></td>
<td></td>
</tr>
<tr>
<td>help patient to distinguish between symptoms of anxiety and asthma; educate the patient how to manage panic attacks.</td>
<td><strong>D</strong></td>
<td></td>
</tr>
<tr>
<td><strong>major socioeconomic problems</strong></td>
<td><strong>D</strong></td>
<td></td>
</tr>
<tr>
<td>offer less expensive medications</td>
<td><strong>D</strong></td>
<td></td>
</tr>
<tr>
<td><strong>confirmed food allergy</strong></td>
<td><strong>A</strong></td>
<td></td>
</tr>
<tr>
<td>advise appropriate food avoidance and remind the patient to have injectable epinephrine on them at all times</td>
<td><strong>A</strong></td>
<td></td>
</tr>
<tr>
<td><strong>allergen exposure if sensitized</strong></td>
<td><strong>C</strong></td>
<td></td>
</tr>
<tr>
<td>consider possibility of reducing allergen exposure (consider cost)</td>
<td><strong>C</strong></td>
<td></td>
</tr>
<tr>
<td>consider step up of controller treatment</td>
<td><strong>D</strong></td>
<td></td>
</tr>
<tr>
<td>consider adding allergy immunotherapy, which is effective, but is associated with a risk of serious systemic adverse effects, when administered subcutaneously</td>
<td><strong>A</strong></td>
<td></td>
</tr>
<tr>
<td><strong>sputum eosinophilia</strong></td>
<td><strong>A</strong></td>
<td></td>
</tr>
<tr>
<td>increase ICS dose independent of level of symptom control</td>
<td><strong>A</strong></td>
<td></td>
</tr>
</tbody>
</table>

a Evidence quality in the table applies to the efficacy of a given treatment in the management of asthma (assessed by means of different endpoints) rather than risk reduction in patients after exacerbations.

b see chapter 5

c Comment: The patient and their next of kin should be provided with detailed, preferably written, instructions for how and when to use the prescribed medications.

ICS – inhaled corticosteroid(s), OCS – oral corticosteroid(s), COPD – chronic obstructive pulmonary disease
Review and update plan

The current document will be reviewed and updated as new important research data and the updated version of GINA global strategy containing significant changes to the recommendations regarding management of asthma exacerbations become available.
References


10. NICE Technology appraisal guidance; no. 278: Omalizumab for treating severe persistent allergic asthma. [Online]: https://www.nice.org.uk/guidance/ta278 [accessed on 28.06.2018]


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Abbreviations