Specialist Pharmacy Service

NICE Bites

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A summary of prescribing recommendations from NICE guidance

Asthma

NICE NG80; 2017

This guideline covers diagnosing, monitoring and managing asthma in adults and young people/children. It does not cover managing severe asthma or acute asthma attacks.

Definition of terms

BDR	bronchodilator reversibility
DPI	dry powder inhaler
FeNO	fractional exhaled nitric oxide
FEV1	forced expiratory volume in 1 second
FVC	forced vital capacity
ICS	inhaled corticosteroid
IgE	immunoglobulin E
LABA	long-acting beta$_2$ agonist
LTRA	leukotriene receptor antagonist
MART	maintenance and reliever therapy
pMDI	pressurised metered dose inhaler
PC20	provocative concentration of methacholine causing a 20% fall in FEV1

Clinical assessment

- See Algorithm A for initial clinical assessment in adults and young people/children with suspected asthma.
- Take a structured clinical history in people with suspected asthma. Specifically, check for:
  - wheeze, cough or breathlessness, and any daily or seasonal variation in these symptoms,
  - any triggers that make symptoms worse,
  - a personal or family history of atopic disorders.
- **Do NOT** use symptoms alone without an objective test to diagnose asthma.
- **Do NOT** use a history of atopic disorders alone to diagnose asthma.
- Examine people with suspected asthma to identify expiratory polyphonic wheeze and signs of other causes of respiratory symptoms, but be aware that even if examination results are normal the person may still have asthma.
- Treat people immediately if they are acutely unwell at presentation, and perform objective tests for asthma (e.g. FeNO, spirometry and peak flow variability) if the equipment is available and testing will not compromise treatment of the acute episode.
- If objective tests for asthma cannot be done immediately for people who are acutely unwell at presentation, carry them out when acute symptoms have been controlled, and advise people to contact their healthcare professional immediately if they become unwell while waiting to have objective tests.
- Be aware that the results of spirometry and FeNO tests may be affected in people who have been treated empirically with inhaled corticosteroids.
- **Do NOT** offer the following as diagnostic tests for asthma:
  - skin prick tests to aeroallergens,
  - serum total and specific IgE,
  - peripheral blood eosinophil count,
  - exercise challenge (to adults ≥17 years).
- Use skin prick tests to aeroallergens or specific IgE tests to identify triggers after a formal diagnosis of asthma has been made.

Occupational asthma

- Check for possible occupational asthma by asking employed people with suspected new-onset asthma, or established asthma that is poorly controlled:
  - are symptoms better on days away from work?
  - are symptoms better when on holiday?
- Make sure all answers are recorded for later review.
- Refer people with suspected occupational asthma to an occupational asthma specialist.

Objective tests

- A number of methods and assessments are available to determine the likelihood of asthma. These include:
  - **spirometry and peak flow** – measure airflow obstruction,
  - **BDR** – a measure of the ability to reverse an obstruction in the airways using drugs that widen the airways (bronchodilators). See **Table 1.**
  - **testing for airway inflammation** – this is increasingly used as a diagnostic strategy in clinical practice and includes measuring FeNO.
- Those responsible for planning diagnostic service support to primary care (e.g. clinical commissioning groups) should consider establishing asthma diagnostic hubs to achieve economies of scale and improve the practicality of implementing the recommendations in this guideline.

Diagnosing asthma in children and young people

- For children <5 years with suspected asthma, treat symptoms based on observation and clinical judgement, and review the child on a regular basis.
- If they still have symptoms when they reach 5 years, carry out objective tests.

Objective tests

- Offer spirometry to children/young people (aged 5 to 16 years) with symptoms of asthma.
- Consider a BDR test in children/young people (aged 5 to 16 years) if spirometry shows an obstruction (see **Table 1**).
- If diagnostic uncertainty remains after spirometry and BDR, consider FeNO.
- If diagnostic uncertainty remains after FeNO monitor peak flow variability for 2 to 4 weeks.
- See Algorithm B for interpretation of objective tests for asthma in children/young people aged 5 to 16 years.
- If a child is unable to perform objective tests at aged 5 years:
  - continue to treat based on observation and clinical judgement,
  - try doing the tests again every 6 to 12 months until satisfactory results are obtained,
  - consider referral for specialist assessment if a child repeatedly cannot perform objective tests and is not responding to treatment.
- Record the basis for a diagnosis of asthma in a single entry in the person's medical records, alongside the coded diagnostic entry.

Please go to www.nice.org.uk/ to check for any recent updates to this guideline.

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Table 1. Positive test thresholds for objective tests in adults, young people and children aged ≥5 years

Test	Population	Positive result
FeNO	Adults ≥17 years	≥40 ppb
	Children/young people aged 5 to 16 years	≥35 ppb
Obstructive spirometry	Adults ≥17 years and children/young people aged 5 to 16 years	FEV1/FVC ratio < 70% (or below the lower limit of normal if this value is available)
Bronchodilator reversibility test (BDR)	Adults ≥17 years	Improvement in FEV1 of ≥12% and increase in volume of ≥200 ml
	Children/young people aged 5 to 16 years	Improvement in FEV1 of ≥12%
Peak flow variability	Adults ≥17 years and children/young people aged 5 to 16 years	Variability >20%
Direct bronchial challenge test with histamine or methacholine	Adults ≥17 years	PC20 of ≤8 mg/ml
	Children/young people aged 5 to 16 years	Not applicable

Diagnosis in adults aged ≥17 years

- Offer a FeNO test if a diagnosis of asthma is being considered (See NICE DG12: Measuring fractional exhaled nitric oxide concentration in asthma: NIOX MINO, NIOX VERO and NObreath) then offer spirometry.
- Carry out a BDR test if spirometry shows an obstruction.
- See Algorithm C for interpretation of objective tests for asthma in adults ≥17 years.
- If diagnostic uncertainty remains after FeNO, spirometry and BDR, monitor peak flow variability for 2 to 4 weeks.
- If diagnostic uncertainty remains after measuring peak flow variability, offer a direct bronchial challenge test with histamine**U** or methacholine**U**.
- If a direct bronchial challenge test is not available:
  - suspect asthma and review diagnosis after treatment, **OR**
  - refer to a centre with access to histamine or methacholine challenge testing.
- Be aware that a person's current smoking status can lower FeNO levels both acutely and cumulatively. However, a high level remains useful in supporting a diagnosis of asthma.
- Record the basis for a diagnosis of asthma in a single entry in the person's medical records, alongside the coded diagnostic entry.

Treatment and management

Pharmacological treatment

- Take into account possible reasons for uncontrolled asthma, before starting or adjusting medicines for asthma in adults, young people and children. These may include:
  - alternative diagnoses,
  - lack of adherence,
  - suboptimal inhaler technique,
  - smoking (active or passive),
  - occupational exposures,
  - psychosocial factors,
  - seasonal or environmental factors.
- After starting or adjusting medicines for asthma, review the response to treatment in 4 to 8 weeks.
- If ICS maintenance therapy is needed, offer regular daily ICS rather than intermittent or 'when required' ICS therapy. See Table 2 for ICS doses.
- Adjust dose of ICS maintenance therapy over time, aiming for the lowest dose required for effective asthma control.
- Ensure that a person with asthma can use their inhaler device:
  - at any asthma review, either routine or unscheduled,
  - whenever a new type of device is supplied.

U unlicensed indication. Obtain and document informed consent.

ICS doses

- ICS doses and their pharmacological strengths vary across different formulations. In general, people with asthma should use the smallest doses of ICS that provide optimal control for their asthma, in order to reduce the risk of side effects.

Table 2. ICS doses

Adult dose	Adults aged ≥17 years
LOW	≤400 micrograms budesonide or equivalent
MODERATE	>400 micrograms to 800 micrograms budesonide or equivalent
HIGH	>800 micrograms budesonide or equivalent
Paediatric dose	**Young people/children ≤16 years**
LOW	≤200 micrograms budesonide or equivalent
MODERATE	>200 micrograms to 400 micrograms budesonide or equivalent
HIGH	>400 micrograms budesonide or equivalent

Treatment pathway

- This section is for people with newly diagnosed asthma or asthma that is uncontrolled on their current treatment. Where the recommendations represent a change from traditional clinical practice, people whose asthma is well controlled on their current treatment should **NOT** have their treatment changed purely to follow this guidance.

Adults ≥17 years

- Offer a SABA as reliever therapy to adults with newly diagnosed asthma.
- For adults with asthma who have infrequent, short-lived wheeze and normal lung function, consider treatment with SABA reliever therapy alone.
- Offer a low dose of an ICS as first-line maintenance therapy to adults with:
  - symptoms at presentation that clearly indicate the need for maintenance therapy (e.g. asthma-related symptoms ≥3 times a week, or causing waking at night), **OR**
  - asthma that is uncontrolled with a SABA alone.
- If asthma is uncontrolled:
  - on a low dose of ICS as maintenance therapy, offer a LTRA in addition to the ICS and review the response to treatment in 4-8 weeks,
  - on a low dose of ICS and an LTRA as maintenance therapy, offer a LABA in combination with ICS, and review LTRA treatment. Discuss whether or not to continue LTRA treatment taking into account the degree of response,
  - on a low dose of ICS and a LABA, with or without an LTRA, as maintenance therapy, offer to change the person's ICS and LABA maintenance therapy to a MART regimen with a low maintenance ICS dose,

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- on a MART regimen with a low maintenance ICS dose, with or without an LTRA, consider increasing the ICS to a moderate maintenance dose (either continuing on a MART regimen or changing to a fixed-dose of an ICS and a LABA, with a SABA as a reliever therapy),
- on a moderate maintenance ICS dose with a LABA (either as MART or a fixed-dose regimen), with or without an LTRA, consider:
  - increasing ICS to a high maintenance dose (this should only be offered as part of a fixed-dose regimen, with a SABA used as a reliever therapy), **OR**
  - a trial of an additional drug (e.g. a long-acting muscarinic receptor antagonist or theophylline), **OR**
  - seeking advice from a healthcare professional with expertise in asthma.

Young people/children aged 5-16 years

- Offer a SABA as reliever therapy to young people/children with newly diagnosed asthma.
- For young people/children with asthma who have infrequent, short-lived wheeze and normal lung function, consider treatment with SABA reliever therapy alone.
- Offer a paediatric low dose of an ICS as the first-line maintenance therapy to young people/children with:
  - symptoms at presentation that clearly indicate the need for maintenance therapy (e.g. asthma-related symptoms ≥3 times a week, or causing waking at night) **OR**
  - asthma that is uncontrolled with a SABA alone.
- If asthma is uncontrolled in young people/children:
  - on a paediatric low dose of ICS as maintenance therapy, consider an LTRA* in addition to the ICS and review the response to treatment in 4 to 8 weeks.
  - on a paediatric low dose of ICS and an LTRA* as maintenance therapy, consider stopping the LTRA and starting a LABA* in combination with the ICS.
  - on a paediatric low dose of ICS and a LABA* as maintenance therapy, consider changing their ICS and LABA maintenance therapy to a MART**U**$^{<12\ years}$ regimen with a paediatric low maintenance ICS dose. Ensure that the young person/child is able to understand and comply with the MART regimen,
  - on a MART**U**$^{<12\ years}$ regimen with a paediatric low maintenance ICS dose, consider increasing the ICS to a paediatric moderate maintenance dose (either continuing on a MART regimen or changing to a fixed-dose of an ICS and a LABA*, with a SABA as a reliever therapy).
  - on a paediatric moderate maintenance ICS dose with LABA (either as MART **U**$^{<12\ years}$ or a fixed-dose regimen), consider seeking advice from a healthcare professional with expertise in asthma and consider either:
    - increasing the ICS dose to paediatric high maintenance dose (only as part of a fixed-dose regimen, with a SABA used as a reliever therapy), **OR**
    - a trial of an additional drug (e.g. theophylline).

Children <5 years

- It can be difficult to confirm asthma diagnosis in young children, therefore these recommendations apply to children with suspected or confirmed asthma.
- Asthma diagnosis should be confirmed when the child is able to undergo objective tests.
- Offer a SABA as reliever therapy to children <5 years with suspected asthma. This should be used for symptom relief alongside all maintenance therapy.
- Consider an 8-week trial of a paediatric moderate dose of an ICS in children <5 years with:
  - symptoms at presentation that clearly indicate the need for maintenance therapy (e.g. asthma-related symptoms ≥3 times a week, or causing waking at night), **OR**
  - suspected asthma that is uncontrolled with a SABA alone.
- After 8 weeks, stop ICS treatment and continue to monitor the child's symptoms:
  - if symptoms did not resolve during the trial period, review whether an alternative diagnosis is likely,
  - if symptoms resolved then reoccurred within 4 weeks of stopping ICS treatment, restart the ICS at a paediatric low dose as first-line maintenance therapy,
  - if symptoms resolved but reoccurred beyond 4 weeks after stopping ICS treatment, repeat the 8-week trial of a paediatric moderate dose of ICS.
- If suspected asthma is uncontrolled:
  - on a paediatric low dose of ICS as maintenance therapy, consider an LTRA* in addition to the ICS.
  - on a paediatric low dose of ICS and an LTRA* as maintenance therapy, stop the LTRA and refer the child to a healthcare professional with expertise in asthma for further investigation and management.

Self-management

- Offer an asthma self-management programme, comprising a written personalised action plan and education, to adults, young people and children aged ≥5 years with a diagnosis of asthma (and their families/carers if appropriate).
- Consider an asthma self-management programme, comprising a written personalised action plan and education, for the families or carers of children <5 years with suspected or confirmed asthma.
- Within a self-management programme:
  - offer an increased dose of ICS for 7 days to adults (≥17 years) who are using an ICS in a single inhaler, when asthma control deteriorates,
  - consider an increased dose of ICS for 7 days to children and young people (aged 5 to 16 years) who are using an ICS in a single inhaler, when asthma control deteriorates
- Clearly outline in the person's asthma action plan how and when to do this, and what to do if symptoms do not improve.
- When increasing ICS treatment:
  - consider quadrupling the regular ICS dose,
  - **Do NOT** exceed the maximum licensed daily dose.

Decreasing maintenance therapy

- Consider decreasing maintenance therapy when a person's asthma has been controlled with their current maintenance therapy for at least 3 months.
- Discuss with the person (or their family/carer if appropriate) the potential risks and benefits of decreasing maintenance therapy.
- When reducing maintenance therapy:
  - stop or reduce dose of medicines in an order that takes into account the clinical effectiveness when introduced, side effects and the person's preference.
  - only consider stopping ICS treatment completely for people who are using low dose ICS alone as maintenance therapy and are symptom free.
- Agree with the person (or their family/carer if appropriate) how the effects of decreasing maintenance therapy will be monitored and reviewed, including self-monitoring and a follow-up with a healthcare professional.
- Review and update the person's asthma action plan when decreasing maintenance therapy.

*check individual SPC for licensed indications in children/young people.

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Risk stratification
- Consider using risk stratification to identify people with asthma who are at increased risk of poor outcomes, and use this information to optimise their care. Base risk stratification on factors such as non-adherence to asthma medicines, psychosocial problems and repeated episodes of unscheduled care for asthma.

Monitoring asthma control
- Monitor asthma control at every review. If control is suboptimal:
  - confirm the person's adherence to prescribed treatment in line with the recommendations on assessing adherence in the NICE guideline on medicines adherence,
  - review the person's inhaler technique,
  - review if treatment needs to be changed,
  - ask about occupational asthma and/or other triggers, if relevant.
- Consider using a validated questionnaire (e.g. the Asthma Control Questionnaire or Asthma Control Test) to monitor asthma control in adults.
- Monitor asthma control at each review in adults, children and young people ≥5 years using either spirometry or peak flow variability testing.
- **Do NOT** routinely use FeNO to monitor asthma control.
- Consider FeNO measurement as an option to support asthma management in people who are symptomatic despite using inhaled corticosteroids. (see NICE DG12; Measuring fractional exhaled nitric oxide concentration in asthma)
- **Do NOT** use challenge testing to monitor asthma control.
- Observe and give advice on the person's inhaler technique:
  - at every consultation relating to an asthma attack, in all care settings,
  - when there is deterioration in asthma control,
  - when the inhaler device is changed,
  - at every annual review,
  - if the person asks for it to be checked.

Inhaler devices
Young people/children
- For the use of inhaler systems in children and young people (aged 5 to 15 years) with chronic asthma see NICE TA38; Inhaler devices for routine treatment of chronic asthma in older children (aged 5 to 15 years).
- In addition to therapeutic need (including chosen drug and dose), take the following factors into account when choosing inhaler devices for individual children with chronic asthma:
  - ability of the child to develop and maintain an effective technique with the specific device,
  - suitability of a device for the child's and carer's lifestyles, considering factors such as portability and convenience,
  - child's preference for and willingness to use a particular device.
- Also consider the following specific guidance:
  - a press-and-breathe pMDI and suitable spacer device is recommended as first-line choice for delivery of ICS as part of regular planned dailyhj treatment, with the aim of maximising benefits of preventive therapy in attaining good asthma control, and minimising potential systemic absorption. If an individual child's adherence to the press-and-breathe pMDI and spacer combination is likely to be so poor as to undermine effective asthma control, consider other devices (taking into account evidence of equivalence of clinical effectiveness), bearing in mind the need to minimise risks of systemic absorption of corticosteroids,
  - in the case of other inhaled drugs, primarily bronchodilators, consider a wider range of devices to take account of their more frequent spontaneous use, greater need for portability, and clear feedback that symptom response provides to the device user. In such circumstances the factors outlined above are likely to be of greater importance in choosing a device.,
  - where more than one device satisfies the considerations outlined above in a particular child, choose the device with the lowest overall cost (taking into account daily required dose and product price per dose).
- On selection of an inhaler device, it is important to consider other aspects of asthma care that influence effective delivery of inhaled therapy, including:
  - individual practical training in the use of the specific device,
  - monitoring of effective inhaler technique and adherence to therapy,
  - regular (i.e. no less than annual) review of inhaler needs, which may change over time with increasing age.

Children <5 years
- For the use of inhaler systems in children <5 years with chronic asthma see NICE TA10; Guidance on use of inhaler systems (devices) in children aged < 5 years with chronic asthma
- For children <5 years with chronic stable asthma both corticosteroids and bronchodilator therapy should be routinely delivered by pMDI and spacer system, with a facemask where necessary.
- Where this combination is not clinically effective for the child, and depending on the child's condition, nebulised therapy may be considered and in the case of children aged 3 to 5 years, a DPI may also be considered.
- Choice of pMDI device and spacer should be primarily governed by specific individual need and the likelihood of good compliance. Once these factors have been taken into account, choose on the basis of cost minimisation.

Additional resources
For guidance on managing non-adherence to medicines in people with asthma, see NICE CG76; Medicines adherence.

NICE Key therapeutic topic (KTT5): Asthma:medicines optimisation priorities

Inhaler prescribing information:
RightBreathe at https://www.rightbreathe.com/

Recommendations – wording used such as 'offer' and 'consider' denote the strength of the recommendation.

Drug recommendations – the guideline assumes that prescribers will use a drug's Summary of Product Characteristics (SPC) to inform treatment decisions.

Please go to www.nice.org.uk/ to check for any recent updates to this guideline.