PCRS Position Statement

Diagnosis of asthma in children and young people (CYP)

June 2025

Introduction and background

Childhood asthma is the most common chronic disease in childhood. A Clinical Practice Research Database (CPRD) study of almost 500,000 children and young people (CYP) in the UK showed a physician recorded prevalence of asthma of 10.2% in 2018 with an increase in prevalence of exacerbations over the previous 10-year period. [1] However, there is evidence of over- and under-diagnosis in about 30% in mixed populations of adults and CYP.[2] This is particularly problematic in pre-school children where there is difficulty carrying out objective testing.

Over-diagnosis can lead to unnecessary medication costs and side effects, and a delay in making the real diagnosis. Under-diagnosis of asthma can lead to a delay in initiating effective asthma therapy with inhaled corticosteroids (ICS). Such delay can cause needless suffering, exacerbations of asthma and was considered a major factor as the cause of death in the National Review of Asthma Deaths (NRAD) in 2014.[3] Timely and accurate diagnosis of asthma in CYP is therefore essential and a key element of the NHS Transformation Plan for CYP.[4,5]

The Global Initiative for Asthma (GINA) statement was updated in 2024[6] and has a comprehensive separate section on diagnosis and management of children aged 5 and under with asthma. In the UK the British Thoracic Society (BTS)/Scottish Intercollegiate Guideline Network (SIGN) Asthma Guideline group has collaborated with the National Institute for Health and Clinical Excellence (NICE) Asthma Guideline Group to produce a Joint British Asthma Guideline which was launched on 27 November 2024.[7] Unlike the GINA statement, which is based on clinical evidence alone, the BTS/NICE/SIGN asthma guideline considers cost-effectiveness. This can lead to discrepancies in the two sets of guidance, especially regarding objective testing for asthma in CYP.

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As a summary, this policy statement advocates:

- A diagnosis of asthma is based on the presence of a structured clinical history, clinical examination and a positive trial of treatment (ICS) in pre-school children (under 5 years old).
- In children aged 5 years and over, objective tests should be carried out, ideally fractional exhaled nitric oxide (FeNO) initially and spirometry with bronchodilator reversibility as second line. Peak flow variability and blood eosinophils can be helpful as third- and fourth-line diagnostic tools when used accurately and appropriately.
- Where there are difficulties in accessing objective tests and there is a high probability of asthma, a trial of ICS can be used, with documentation of a positive response using a validated symptom questionnaire such as the paediatric Asthma Control Test (ACT) or the paediatric Asthma Control Questionnaire (ACQ).
- If there is still diagnostic doubt, a referral to secondary care should be made.

Key issues

Diagnosis in children under 5 (NICE/BTS/SIGN) and 5 and under (GINA)

It is generally accepted that making a diagnosis of asthma in this age group is difficult owing to the challenges with objective testing and large overlap with other conditions.

History and examination

A diagnosis of asthma is far less likely in a child under 2 years of age, where there is a higher chance of an alternative diagnosis and evidence of eosinophilic inflammation in the lungs is rare in symptomatic children.

In general terms, a diagnosis of asthma should be made in pre-school children on the basis of a characteristic history, examination (mainly to help rule out alternative diagnoses) and a positive response to a trail of ICS.

Whilst awaiting a firm diagnosis, a SNOMED code of 'suspected asthma' should be used. It is recommended that objective tests should be attempted when the child reaches the age of 5 and, if still unable to perform the tests, this should be reviewed annually until a firm diagnosis is made.

Table 1. Main differential diagnosis of pre-school asthma

Condition	Features
Recurrent viral infection (most common)	Recurrent wheeze, cough associated with viral infections only (no symptoms in between)
Pertussis	Protracted paroxysms of coughing often with vomiting and/or stridor
Persistent bacterial bronchitis	Persistent wet cough, poor response to asthma medications, can be associated with basal crackles
Tuberculosis	Persistent symptoms, fever, enlarged lymph nodes, contact, potential contact with someone with tuberculosis
Cystic fibrosis	Cough starting neonatally, failure to thrive, loose greasy stools
Congenital heart disease	Cyanosis when feeding, failure to thrive, tachycardia, cardiac murmur
Foreign body aspiration	Episodes of abrupt cough and/or breathlessness
Gastro-oesophageal reflux	Cough when feeding and vomits easily after feeds
Tracheomalacia (congenital narrowing trachea)	Noisy breathing (inspiratory and/or expiratory) when eating or crying often present from birth

Table 1 shows the differential diagnoses of a young child presenting with recurrent cough and/or wheeze.

The probability of asthma increases where:

- There is recurrent cough and/or wheeze (it should be noted that isolated 'cough variant' asthma is rare in children).
- There is no failure to thrive (although a child may not be thriving with severe symptoms).
- Symptoms occur in between bouts of viral infections – for example, on running, laughing, exposure to potential triggers (e.g., air pollution) – and often occur at night.
- There is a past or family history of other allergic disease, especially maternal asthma and a history of atopic dermatitis.
- Examination may be normal or reveal the presence of wheeze. There is an absence of physical signs to suggest an alternative diagnosis.

Trial of therapy

Both GINA and BTS/NICE/SIGN guidance recommend an 8–12-week trial of therapy with 'low-dose paediatric' ICS (budesonide 100–200 µg or equivalent per day) and a short-acting beta-2 agonist (SABA) for symptom relief. If the symptoms are resolved, then consider stopping the ICS and SABA and reviewing after 3 months. **If, in the interim the symptoms recur, this should be considered as a positive trial of therapy, a diagnosis of asthma recorded and treatment resumed with ICS and SABA.**

If there is a poor response to therapy, then consider factors such as poor adherence, including parent understanding of condition, poor inhaler technique, persistent aggravating factors and consider an alternative diagnosis and referral to secondary care.

Referral to secondary care

In addition to a failure to respond to a trial of therapy, the following should suggest a need for secondary care referral:

- History suggesting a low possibility of asthma or viral-induced wheeze
- Failure to thrive
- Neonatal or early onset of symptoms (especially if associated with failure to thrive)
- Continuous wheezing
- Focal cardiovascular or lung signs or finger clubbing.

Children and young people (CYP) 5–16 (BTS/NICE/SIGN) and 6 and over (GINA)

The BTS/ NICE/SIGN guideline and GINA statement agree that: A diagnosis of asthma in school age children and young people is based on the presence of characteristic symptoms and confirmed by an objective test.

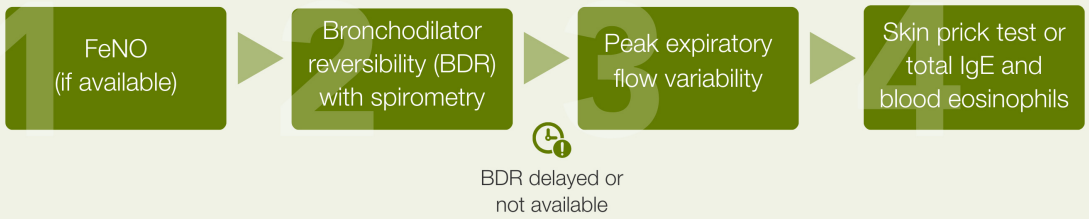
Whilst awaiting a firm diagnosis, a SNOMED code of 'suspected asthma' should be used.

Figure 1. BTS/SIGN/NICE.
Recommended objective tests for confirming asthma in children and young people (aged 5–16)

Children and young people (5-16)

(with a history of suggestive asthma)

Recommended objective tests for diagnosing asthma in children and young people (5-16)



Fractional exhaled nitric oxide (FeNO)	Measure FeNO in children with a history suggestive of asthma. Diagnose asthma (providing characteristic symptoms are present) if FeNO levels are >35 ppb.
Spirometry	If the FeNO level is not raised or FeNO testing is not available, diagnose asthma via reversibility testing with spirometry. An increase in forced expiratory volume in 1 second post-bronchodilator (e.g., 400 µg salbutamol) by 12% or more from baseline or >10% predicted normal.
Peak expiratory flow rate (PEFR)	If spirometry is delayed (or unavailable), measure PEFR twice daily for 2 weeks. Diagnose asthma if PEFR variability is more than 13%.
Blood eosinophils and IgE - Skin prick testing	If asthma is not confirmed by FeNO or bronchodilator reversibility, either perform skin prick testing or immunoglobulin E (IgE) level and eosinophil count. Diagnose asthma if there is evidence of sensitisation or a raised IgE level and a raised blood eosinophil level of more than 0.5×109 per litre.
Specialist input	If there is still doubt in diagnosis, refer to a paediatric respiratory specialist.

History and examination

The characteristic features of the history and examination are the same as for pre-school children (see above, with less emphasis on 'failure to thrive'). However, there is a fundamental difference between GINA and BTS/NICE/SIGN regarding which objective tests should be used. GINA states that tests of expiratory flow limitation (peak flow variability, bronchodilator reversibility testing) are key, whereas BTS/NICE/SIGN emphasise testing with measures of atopic disease (fractional exhaled nitric oxide (FeNO), blood eosinophilia or skin prick testing).

To avoid confusion, and as the BTS/ NICE/SIGN approach has been economically evaluated, the BTS/NICE/SIGN approach advocated by PCRS is shown in Figure 1.

Objective diagnostic testing is particularly challenging in children due to limited access in primary care, difficulty in performing tests, lack of trained staff for interpretation and results often being inconsistent and inconclusive. Tests of bronchodilator reversibility may be negative if the patient is already receiving ICS or is asymptomatic. FeNO and blood eosinophil levels can be lowered by ICS, so the GINA statement suggests re-testing when the child is symptomatic or by gradual reduction/withdrawal of ICS over a 2–4-week period (providing the child is asymptomatic) and then re-testing.

Problems with implementation in primary care

The main barrier to implementation of the NICE/BTS/SIGN and GINA proposals is inequity of access to objective tests, principally spirometry and FeNO. Measurement of blood eosinophils and IgE is invasive and not generally welcomed by children or parents. Skin prick testing is even less available.

The NHS Transformation Plan for CYP[5] suggests that:

1. Integrated Care System organisations should develop diagnostic hubs where spirometry and FeNO suitable for children are available and trained health professionals competent in carrying out tests and interpretation.
2. There should be a named health professional for CYP with asthma in an Integrated Care System.

PCRS position

PCRS pragmatic approach to diagnosis of asthma in CYP

A diagnosis of asthma is based on the presence of a structured clinical history and clinical examination and a positive trial of ICS in pre-school children. In children aged 5 and over, objective tests should be carried out, ideally FeNO initially and spirometry with bronchodilator reversibility as second line. Measurement of peak flow variability can be helpful in some children where there is good adherence and measurement of blood eosinophils (if acceptable to the child/young person) can be diagnostic in the presence of a characteristic clinical picture.

Where there are difficulties in accessing objective tests and there is a high probability of asthma, a trial of ICS can be used with documentation of a positive response using a validated symptom questionnaire such as the paediatric Asthma Control Test (ACT) or paediatric Asthma Control Questionnaire (ACQ).

If there is still diagnostic doubt, referral should be made to secondary care.

Once a diagnosis of asthma has been made, parents/carers should be encouraged to share this, and an agreed asthma action plan, with the child's/young person's school or pre-school.

Key PCRS position points

- In children aged under 5 years of age it is difficult to make a firm diagnosis because of lack of testing; however, this should not prevent initiation of treatment if based on a structured clinical history and examination suggesting the diagnosis and a positive response to an 8–12-week course of ICS. There is strong evidence for medication safety in this age group. Usually, objectives should be used to confirm the tests when the child reaches the age of 5 and then annually if unsuccessful.
- In CYP over 5 years of age, a diagnosis of asthma is made based on a structured clinical history and examination and positive objective testing, ideally with FeNO or spirometry.
- Where there are difficulties in accessing FeNO and/or spirometry, objective tests can be carried out using peak expiratory flow rate or measurement of blood eosinophils. A positive response to an 8-week trial of ICS can be acceptable as an objective test providing the symptomatic response is recorded and documented by means of a validated questionnaire such as the paediatric ACQ or paediatric ACT.
- Parents/guardians should be encouraged to share a diagnosis of asthma with the child's school or pre-school.
- Referral to secondary care should be made where there is diagnostic doubt or there is a poor response to appropriate therapy.

References

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