A primary care perspective on the new British asthma guideline

Bronwen Thompson discusses the revisions to the BTS/SIGN guideline with **Dr Hilary Pinnock**

This guideline update[1] is significant. It builds on previous asthma guidelines so is an evolution rather than a revolution but, importantly, it focuses on being relevant and practical to implement in primary care. This is highly appropriate because the key chapters which have been updated are those on diagnosis and pharmacological treatment.

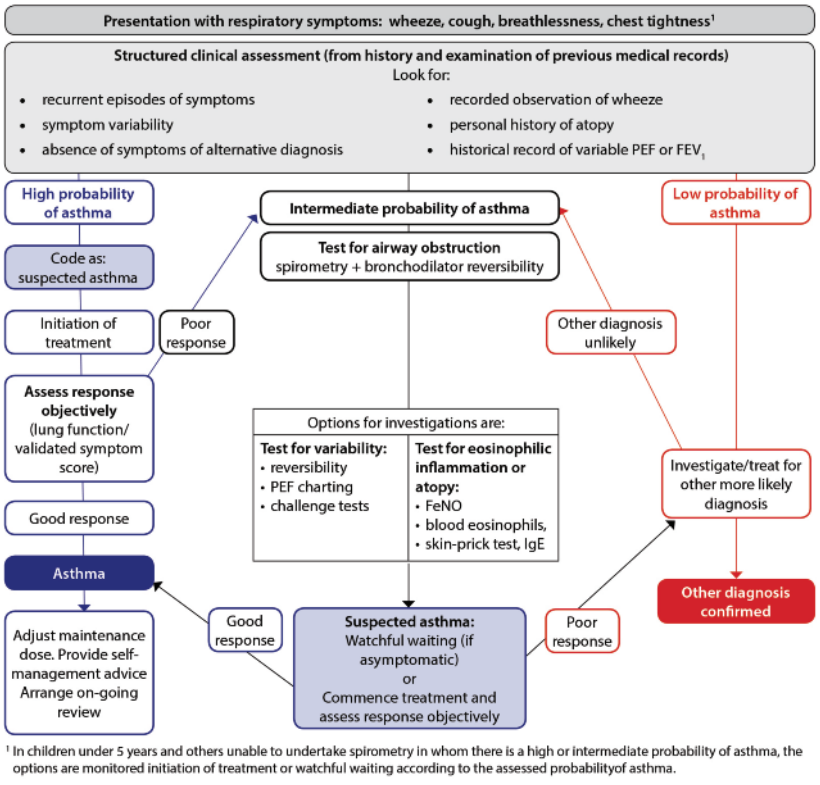
Diagnosing asthma

Diagnosing asthma is not straightforward. Asthma is a condition that fluctuates over time, so it may take time to make an accurate diagnosis.

Key messages about diagnosis

- Diagnosis of asthma is based on a structured clinical assessment informed by objective tests for variable airway obstruction or airway inflammation and supported or refuted by monitored initiation of treatment.
- There is no single conclusive test to confirm asthma: all tests have false positive and false negatives.
- Use time to help you make the diagnosis comparing signs and tests when the patient is symptomatic with results when they are asymptomatic – and use the READ code for 'suspected asthma' until a diagnosis is confirmed.
- Keep good records while exploring the possibility of asthma – you may need to review the basis on which a diagnosis was made in the future.

Figure 1: Diagnostic algorithm



Reproduced with permission from the British Guideline on the Management of Asthma 2016.

(See page 54 for more information on the diagnostic tests for asthma)

What's new/different on diagnosis in this guideline update?

- A new schematic to illustrate the diagnosis pathway according to probability (Figure 1, p. 29).
- A comprehensive table comparing different objective tests (Table 1, pp.18–20).
- Introduction of the concept of an 'initial structured clinical assessment' (3.3.1, p.21).
- Introduction of the concept of a 'monitored initiation of therapy' (Table 3, p. 24).
- Diagnosis in children and adults is considered together, although there are still separate tables for alternative diagnoses.

There is no single test that can conclusively determine whether a cluster of symptoms is asthma (or not), so the guideline recommends an initial assessment of the probability of asthma based on a 'structured clinical assessment'. This is a comprehensive review of the full patient history and previous consultations, alongside the symptoms described by the patient. Depending on whether the patient is considered to have a high, medium or low probability of asthma, a set of further investigations will be appropriate. Because it may take several weeks or months to confirm a diagnosis, the READ code 'suspected asthma' should be used in the interim. High quality record keeping is critical in order that the basis for a diagnosis can be checked in the future.

The guideline emphasises that diagnostic tests form only one part of an asthma diagnosis and some tests may give false negatives (e.g. spirometry, peak flows), especially when the patient is asymptomatic. However, quality assured spirometry is regarded as the pivotal test for demonstrating airway obstruction in adults and children old enough to perform the test. The definition of obstruction is based on the FEV_1/FVC ratio. This ratio varies with age; using the lower limit of normal (as opposed to a fixed ratio of 70%) will avoid under-diagnosis in children and over-diagnosis in the elderly. A range of other investigations may be used to demonstrate variability and/or inflammatory/atopic status in order to help confirm or refute the diagnosis.

The draft NICE guideline on asthma diagnosis and monitoring in 2015 raised the profile of fractional exhaled nitric oxide (FeNO) as a potentially mainstream test for asthma. The British Asthma Guideline positions FeNO as a useful approach to detecting eosinophilic inflammation which provides supportive (but not conclusive) evidence of a diagnosis of asthma. Raised FeNO levels indicate steroid responsiveness, and levels fall after treatment with steroids. Blood eosinophila, raised allergen-specific IgE and a positive skin prick test indicate atopic status and are also associated with asthma. Importantly, normal spirometry does not exclude asthma; indeed, only a minority of people with asthma in primary care will have obstructive spirometry and reversibility at the time when it is tested. There are a number of confounders which may influence FeNO results but, unlike lung function, may still be positive in an asymptomatic patient. A comprehensive table detailing the sensitivities and specificities of all diagnostic tests is included (Table 1 see page 54).

The concept of a 'trial of therapy' has been developed into a 'monitored initiation of therapy' for people in whom there is a high probability of asthma.

Pharmacological treatment

Pharmacological treatment remains the mainstay of asthma treatment and there have been some important changes to treatment options since the last guideline update in 2014. There are some significant changes to the familiar 'steps' of asthma management.

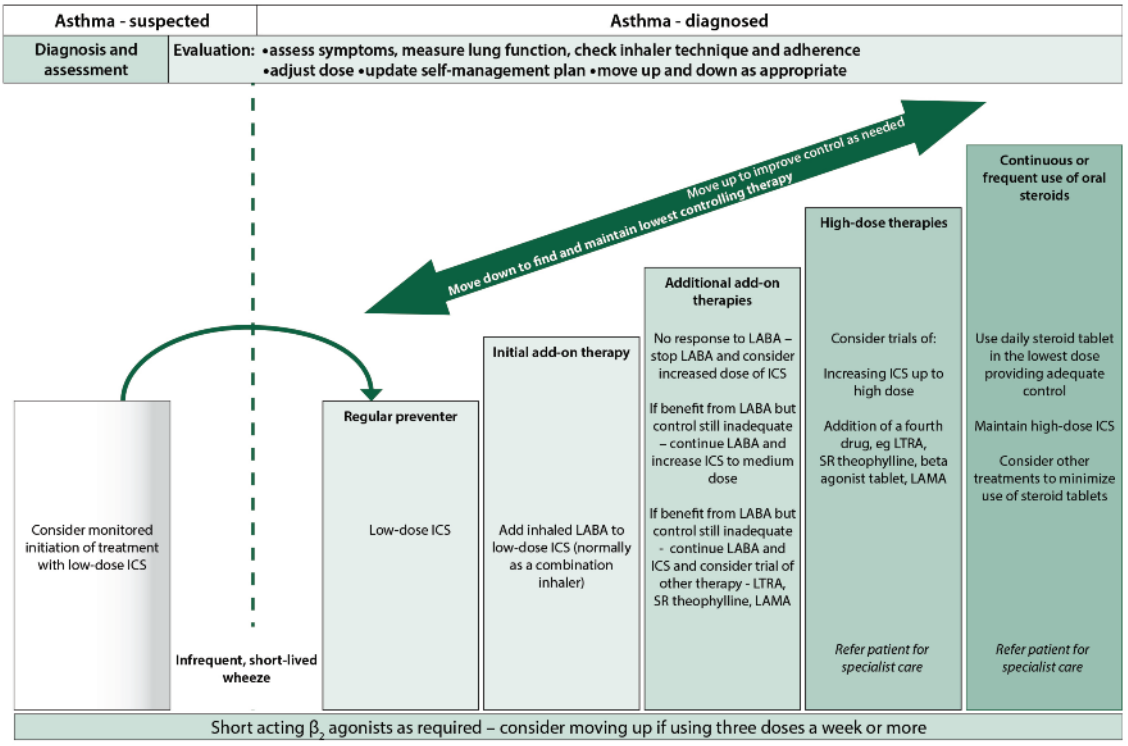
The numbering of steps has been replaced by descriptions. One of the reasons for this is that, due to important changes to the recommendations on early steps, it could cause confusion if we continue to refer to them as Steps 1–3.

- In all but a few patients, preventive therapy with low-dose inhaled corticosteroids (ICS) should be initiated from diagnosis. Important lessons from the National Review of Asthma Deaths about the overuse of short-acting bronchodilators have been taken on board. So most patients will now start on the step to be known as 'regular inhaled preventer'. If control is not achieved at any step, patients move through 'initial add-on therapy', 'additional add-on therapies', 'high dose therapies', and 'continuous or frequent use of oral steroids' until they are controlled.
- Short-acting beta-agonist (SABAs) should be prescribed for anyone with symptomatic asthma for symptom relief. However, monotherapy with SABAs is now recommended only for those with infrequent short-lived wheeze (typically occasional exercise-induced symptoms lasting no more than an hour or two). Using more than three doses of SABA a week should prompt a review and consideration of moving up to the next step of therapy. Anyone prescribed more than one SABA inhaler device a month should be identified and have their asthma assessed urgently.
- The former Step 3 has been divided into 'initial add-on therapy' and 'additional add-on therapies'. 'Initial add-on therapy' is the ad-

Key messages about asthma prescribing

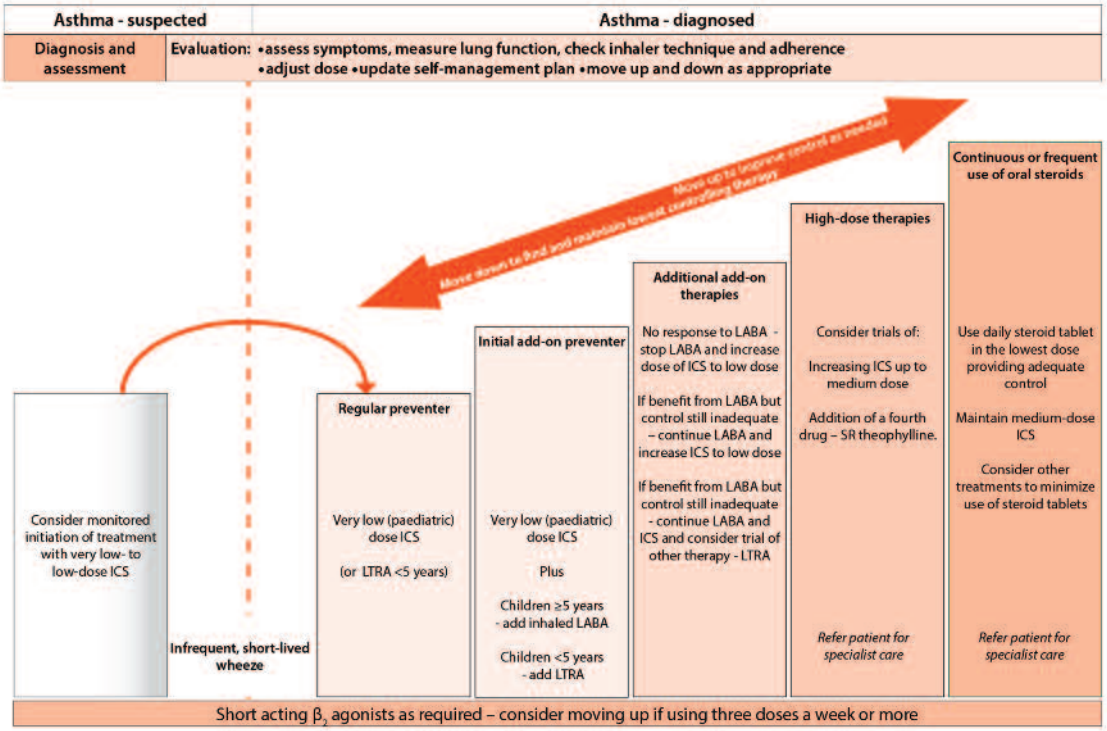
- Preventive treatment should be the basis for asthma management in almost all people with asthma.
- The guidance on preventer medication has been clarified and the old 'step 3' divided into two options to emphasise that the evidence for adding a LABA takes precedence over either options (especially in adults).
- The numbered steps have been replaced with descriptions.
- Inhaled steroids have been categorised into bands by strength – very low (children), low, medium, high.
- Inhalers should be prescribed by brand name to ensure patients receive the right inhaler.
- Referral for specialist opinion is recommended if the patient is on 'high dose therapies' or 'continuous or frequent use of oral steroids'.

Figure 2: Summary of management in adults



Reproduced with permission from the British Guideline on the Management of Asthma 2016.

Figure 3: Summary of management in children



Reproduced with permission from the British Guideline on the Management of Asthma 2016.

What's new/different in pharmacological management

- Numbered steps have been removed in favour of descriptions.
- Former Step 1 – SABAs only – has more or less gone in favour of immediate preventer treatment.
- More than one SABA inhaler a month should trigger urgent review and action.
- Former Step 3 has now been divided into two – 'initial add-on therapy' and 'additional add-on therapies'.
- ICS are no longer compared with BDP as reference product for strength. Instead, all ICS are categorised into bands (very low, low, medium and high) to enable comparison.
- Recommendation that all patients on high dose therapies and continuous or frequent use of oral steroids are referred to specialist care (adults and children).
- Inhaler prescriptions should be written by brand name to avoid patients being given an inhaler which they have not been trained to use.

dition of a long-acting beta2 agonist (LABA) to the low-dose ICS, usually as a combination to prevent inadvertent LABA monotherapy. If this is ineffective, the LABA should be discontinued, diagnosis confirmed, adherence and inhaler technique addressed before additional options are considered (e.g. increasing ICS dose, trials of alternative add-on therapy). In young children in whom the evidence for LABA is less clear, leukotriene receptor antagonists (LTRA) are an early treatment option.

Previous versions of the guideline have used beclometasone (BDP) as a reference ICS against which other steroids are compared. However, the development of an increasing range of ICS and inhaler devices means that this comparison is no longer helpful. All ICS are now banded into very low, low, medium or high dose categories to enable comparison and to determine equivalence. The new banding of ICS by strength should be more accurate and more straightforward in practice. Two tables indicate the licensed doses of all ICS for adults and children (Tables 9 and 10).

The guideline update recommends that both children and adults on high dose therapies and continuous or frequent use of oral steroids are referred for specialist care. This is clearly indicated in the Figures showing the summaries of stepwise management.

For the first time, under 'Key recommendations for implementation', the guideline highlights that inhalers should be written by brand name to avoid a patient being dispensed a device which they have not used before. This is particularly important now that increasingly familiar compounds are being made available in a range of inhaler devices. They also emphasise that patients should receive training in use of a particular device and be able to demonstrate that they can use it correctly before it is prescribed.

Other changes to the guidelines include the sections on adherence and telehealth.

What you can do

- Ask yourself: how are you demonstrating a quality diagnosis of asthma, have you worked towards the diagnosis in a systematic way, have you recorded the reasons why you made this diagnosis clearly so that you feel confident in the diagnosis, does your patient know and understand the diagnosis and will the healthcare practitioner coming after you also feel confident about how you made a diagnosis when they have read your notes?
- If you are the asthma lead for your practice: make sure all your colleagues are aware of the new guidance.

Adherence – assessing adherence is an important component of asthma reviews and non-adherence should always be considered as a (common) cause of poor control before stepping up treatment. In this update, guidance is given on the questions to ask to get an accurate view of adherence, using prescribing records to assess adherence and tailored suggestions for ways of encouraging improved adherence.

Telehealthcare – may be used to support self-management, facilitate monitoring and 'games' may influence behaviour change. The guideline also highlights how remote consultations (phone and e-mail) could provide convenient care and computerised decision support has potential. The evidence suggests that these technological options deliver similar outcomes to traditional care and may be considered as an option according to the clinical context and preferences of the patient and professional.

Conclusion

This update has real value for primary care where the majority of diagnosis and prescribing takes place. The diagnosis chapter provides a pragmatic, structured approach to suspecting and confirming a diagnosis of asthma. The chapter on prescribing highlights the important role of preventive treatments and gives greater guidance on the sequence of treatments and when to refer for specialist opinion and support. Accurate diagnosis, appropriate use of effective medication and supported self-management can help to reduce the considerable morbidity and mortality still associated with asthma.

Acknowledgements
PCRS-UK wishes to thank the British Thoracic Society for permission to reproduce Figures 1-3 and the table of diagnostic tests from the British Guideline on the Management of Asthma 2016

References

1. SIGN 153: British guideline on the management of asthma. National Clinical Guideline. September 2016. https://www.brit-thoracic.org.uk/standards-of-care/guidelines/btssign-british-guideline-on-the-management-of-asthma/ (last accessed 22 November 2016).

Further Information

a. Pinnock H. A structured approach is key to diagnosing asthma. *Guidelines in Practice* 2016;**19**(11):13-31. Available at: www.guidelinesinpractice.co.uk/a-structured-approach-is-key-to-diagnosing-asthma
b. Pinnock H. Guidelines-BTS/SIGN British guideline on the management of asthma: 2016 update (video). 2016. Available at: www.guidelines.co.uk/bts-sign/asthma

BTS/SIGN Asthma Guideline – Summary of Diagnostic Tests

Strategy	Description*	Parameter*	Range of predictive values* (Note that a single value indicates data from a single study)				Comments**
			Sens[i]	Spec[ii]	PPV[iii]	NPV[iv]	
Clinical assessment							
Symptoms and signs	The commonest symptoms assessed were cough and wheeze and, in adults, shortness of breath.	Cough in adults Wheeze in adults Dyspnoea in adults Cough in schoolchildren[20] Wheeze in children[20] Cough in pre-school children Wheeze in pre-school children Shortness of breath in pre-school children	16–66% 9–76% 11–73% 63% 59% 88% 54% 76%	26–64% 34–87% 38–71% 75% 93% 7% 57% 52%	8–44% 10–81% 41–59% 14% 34% 76% 80% 84%	18–92% 28–94% 26–70% 97% 97% 15% 27% 40%	As isolated symptoms cough, wheeze and shortness of breath are neither sensitive, nor specific for asthma. Most children with asthma have intermittent cough, wheeze and exercise-induced symptoms, but ony about a quarter of children with these symptoms have asthma. Note that the single study in pre-school children compared current symptoms with a diagnosis of asthma two years later.
	Symptom variability	Episodic symptoms in adults Diurnal symptoms in adults Symptoms after exercise in adults Episodic symptoms in children[21,22] Symptoms after exercise in children[21,22] Nocturnal symptoms in children[21,22]	9–40% 30–56% 5–40% 36–93% 82–94% 57–84%	36–91% 36–83% 32–93% 35–93% 59–73% 58–78%	14–86% 48–76% 5–81% 40–94% 54–86% 64–85%	18–93% 18–67% 58–84% 62–90% 79–91% 57–82%	Asking about episodic symptoms improves the positive predictive values in children compared to current symptoms.
	Combinations of symptoms (typically cough, wheeze, chest tightness, dyspnoea, exercise symptoms)	Symptom scores in adults Symptom scores in children[20-22] Symptoms of cough and wheeze in pre-school children	60% 45–83% 49%	66% 85–97% 59%	44–94% 80%	66–97% 51%	Combinations of symptoms are clinically more helpful than isolated symptoms, especially in children. For example, two thirds of children with a cluster of cough, wheeze, chest tightness, dyspnoea and exercise symptoms have asthma. Asthma is unlikely if a child does not have at least some of these symptoms.
History of atopy	Personal/family history of atopic/ allergic diseases	Personal history of atopy in adults Personal history of rhinitis/eczema in pre-school children Family history of atopy in adults Family history of atopy in children	54–55% 47–62% 26–60% 43–44%	68–74% 20–75% 56–83% 57–70%	46–76% 72–86% 44–74% 51–77%	45–79% 14–30% 38–70% 24–62%	Past history (personal or family) of atopic disease has poor sensitivity and specificity for asthma.

Table 1: Summary of individual diagnostic tests

Acknowledgements
PCRS-UK wishes to thank the British Thoracic Society for permission to reproduce Table 1 - summary of diagnostic tests from the British Guideline on the Management of Asthma 2016. Please see the full guideline available at https://www.brit-thoracic.org.uk/standards-of-care/guidelines/btssign-british-guideline-on-the-management-of-asthma/ for more information and reference citations shown in the table

BTS/SIGN Asthma Guideline – Summary of Diagnostic Tests

Strategy	Description*	Parameter*	Range of predictive values* (Note that a single value indicates data from a single study)				Comments**
Strategies for demonstrating airway obstruction							
Spirometry	Regard a FEV_1/FVC ratio of less than 70% as a positive test for obstructive airway disease.	Obstructive spirometry in adults Obstructive spirometry in children (5-18 yrs)	23–47% 52%	31–100% 73%	45–100% 75%	18–73% 49%	In the four larger studies (adults and children), the NPV was between 18% and 54% which means that more than half of patients being investigated who have normal spirometry will have asthma (ie false negatives).
Strategies for demonstrating variability in airway obstruction							
Broncho-dilator reversibility	In adults, regard an improvement in FEV_1 of ≥12% and ≥200 ml as a positive test. In children regard an improvement in FEV_1 of ≥12% as a positive test.	Bronchodilator reversibility in adults Bronchodilator reversibility in schoolchildren (using a threshold of 9% change in FEV_1)[70]	17–69% 50%	55–81% 86%	53–82%	22–68%	In these secondary care populations, about 1 in 3 people with a positive reversibility test will not have asthma (the cohorts all included people with COPD); and at least 1 in 3 people with a negative bronchodilator reversibility test will have asthma.
Challenge tests	Regard a PC_{20} value of 8 mg/ml or less as a positive test.	Methacholine challenge in adults. Methacholine challenge in children[30,42,71]	51–100% 47–86%	39–100% 36–97%	60–100% 20%	46–100% 94%	Challenge tests are a good indicator for those with a definitive diagnosis of asthma already (based upon clinical judgment, signs and symptoms and response to anti-asthma therapy)
	Fall in FEV_1≥15% at cumulative dose of ≤635 mg is positive	Mannitol in adults Mannitol in children	56% 63%	75% 81%	80%	49%	These data are from a single study in adults and children with symptoms of asthma on questionnaire.
	Exercise challenge	Exercise challenge in adults Exercise challenge in children	26–80% 69–72%	100% 69–72%	100% 90–99%	0% 5–73%	The studies in adults had very small sample sizes. The larger study in children had a false positive rate of 1% (PPV 99%).
Peak flow charting	Monitor peak flows for 2-4 weeks, calculate mean variability. Regard ≥20% variability as a positive test.	PEF charting in adults in a population study - using mean variability of >20% - using mean variability of >15% - using diurnal variation >15% on >3 days/week PEF charting in children - using variation >12.3% (95th centile)	 46% 3–5% 20% 50%	 80% 98–99% 97% 72%	 97% 60–67% 82% 48%	 10% 60% 64% 74%	It is not clear whether the patients in these studies were symptomatic at the time of the charting, and results may not reflect clinical use in symptomatic populations. One study concluded that the number of days with diurnal variation was more accurate than calculating the mean variation.

Acknowledgements
PCRS-UK wishes to thank the British Thoracic Society for permission to reproduce Table 1 - summary of diagnostic tests from the British Guideline on the Management of Asthma 2016. Please see the full guideline available at https://www.brit-thoracic.org.uk/standards-of-care/guidelines/btssign-british-guideline-on-the-management-of-asthma/ for more information and reference citations shown in the table

BTS/SIGN Asthma Guideline – Summary of Diagnostic Tests

Strategy	Description*	Parameter*	Range of predictive values* (Note that a single value indicates data from a single study)				Comments**
Strategies for detecting eosinophilic inflammation or atopy							
FeNO	Adults: Regard a FeNO level of 40 ppb or more as a positive test Children 5–16yrs: regard a FeNO level of 35 ppb or more as a positive test.	FeNO in adults FeNO in schoolchildren	43–88% 57%	60–92% 87%	54–95% 90%	65–93% 49%	These studies are all in secondary care populations. Approximately 1 in 5 adults with a positive FeNO test will not have asthma (ie false positives) and 1 in 5 adults with a negative FeNO test will have asthma (ie false negatives).
Blood eosinophils	Suggested thresholds for blood eosinophils: Adults >4.15% Children ≥4%[64]	Blood eosinophils in adults Blood eosinophils in children	15–36% 55–62%	39–100% 67–84%	39–100% 56–69%	27–65% 73%	Elevated blood eosinophil level is poorly predictive. The threshold varies in these studies from 4.0 to 6.3%.
IgE		Any allergen-specific IgE >0.35 kU/l in adults Total IgE in adults >100 kU/l	54–93% 57%	67–73% 78%	5–14% 5%	95–99% 99%	A normal IgE substantially reduces the probability of asthma in adults with a false negative rate of less than 1 in 10, although a positive result is poorly predictive.
Skin prick testing		Any positive test (wheal ≥3 mm) in adults Any positive test (wheal ≥3 mm) in children	61–62% 44–79%	63–69% 56–92%	14–81% 65–92%	39–96% 36–79%	

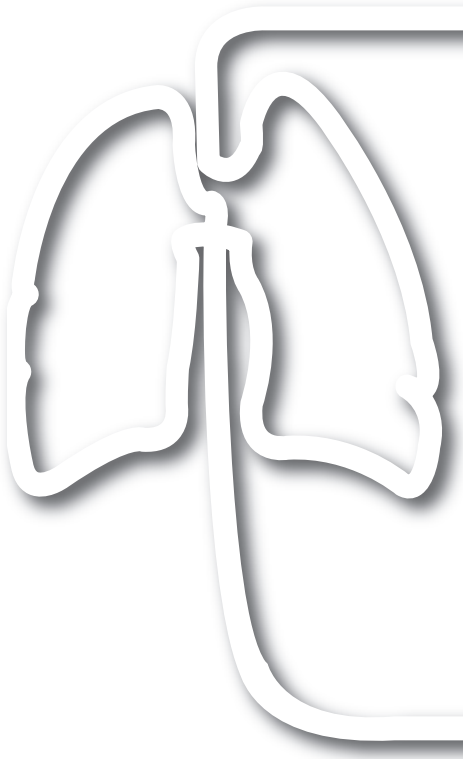
Notes:
* Data derived from NICE evidence tables unless otherwise specified.[19] Only studies reporting sensitivity, specificity, PPV and NPV are included here
** Comments have been added by the guideline development group as an aid to interpretation of the data presented.
i Sensitivity (Sens) is the probability of a test being positive when asthma is present
ii Specificity (Spec) is the probability of a test being negative when asthma is absent
iii Positive predictive value (PPV) is the proportion of patients with a positive test who actually have asthma (100 minus the PPV is the proportion of patients with a false positive test)
iv Negative predictive value (NPV) is the proportion of patients with a negative test who do not have asthma (100 minus the NPV is the proportion of patients with asthma but in whom test was negative)

Reference tests
In most of the studies, the reference test was spirometry plus either bronchodilator reversibility or a challenge test, although some studies also included a 'typical history of attacks' or diurnal variation, or used physician diagnosis. Studies evaluating methalcholine challenge tests used physician diagnosis or bronchodilator reversibility and/or diurnal peak flow variability. In children, the reference tests used were physician diagnosed asthma plus spirometry, or documented history of wheeze on at least two occasions, and variability in FEV_1 over time or on exercise testing.

Acknowledgements
PCRS-UK wishes to thank the British Thoracic Society for permission to reproduce Table 1 - summary of diagnostic tests from the British Guideline on the Management of Asthma 2016. Please see the full guideline available at https://www.brit-thoracic.org.uk/standards-of-care/guidelines/btssign-british-guideline-on-the-management-of-asthma/ for more information and reference citations shown in the table

PCRS-UK Membership - Join Today

Helping you to deliver high value patient centred respiratory care



- ✓ **Quarterly membership** publication Primary Care Respiratory Update providing an overview the latest respiratory research, policy and best practice
- ✓ **Membership emails and news alerts** making it easy to keep up to date
- ✓ **Huge savings on registration** for our annual national primary care conference
- ✓ **Professional development support** including access to our clinical leadership programme
- ✓ **Friendly community** of like minded peers passionate about respiratory care

PRIMARY CARE RESPIRATORY SOCIETY UK
PCRS UK

It pays to join if you are a respiratory lead for your practice or a respiratory health professional working in the community -

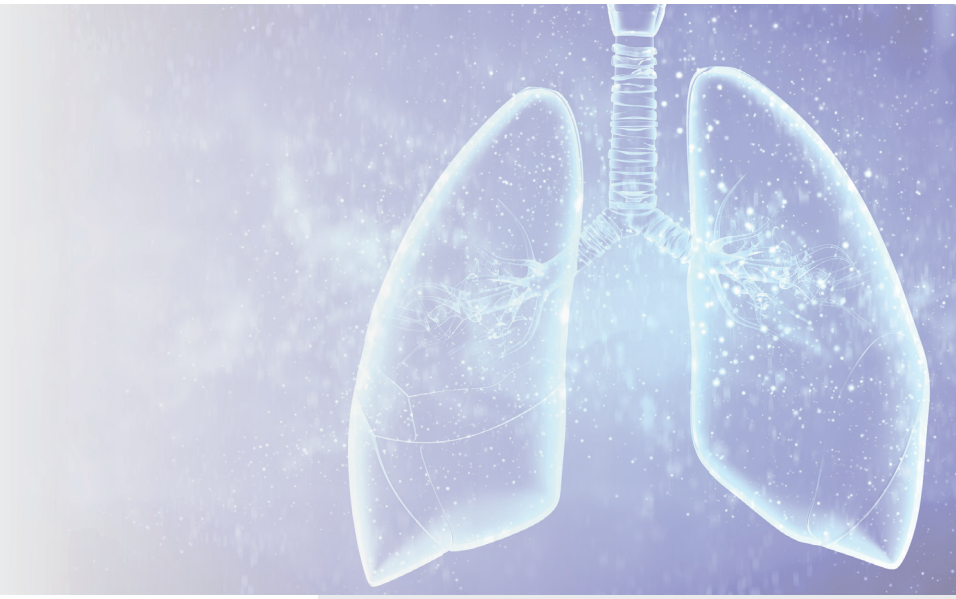
annual membership just £59 inclusive of VAT

Inspiring best practice in respiratory care

a natureresearch journal

npj | Primary Care Respiratory Medicine

Call for Papers



npj Primary Care Respiratory Medicine is an online-only, open access journal, publishing papers representing important advances of significance to specialists within the fields of primary care and respiratory medicine.

Submit your manuscript, and benefit from:

- Comprehensive and rigorous peer review.
- Wide visibility through inclusion in leading indexing and abstracting services.
- Manuscripts submitted to *npj Primary Care Respiratory Medicine* do not need to adhere to our formatting requirements at the point of initial submission; formatting requirements only apply at the time of acceptance.
- Professionally written Editorial Summaries accompany each article, opening up your research to the wider primary care community.

Published in partnership with

International Primary Care Respiratory Group IPCRG

PRIMARY CARE RESPIRATORY SOCIETY UK PCRS

All content is indexed within PubMed, PubMed Central, MEDLINE, Scopus and Web of Science

2015 IMPACT FACTOR*

Primary Care Respiratory Journal:* 2.434

npj Primary Care Respiratory Medicine:* 1.447*

2015 Journal Citation Report (Thomson Reuters, 2016)

* Due to the change of title in April 2014, the journal has been assigned two Impact Factors: one relating to the old title and one relating to the new title.

** *npj Primary Care Respiratory Medicine* has only received a partial Impact Factor due to its launch midway through the Impact Factor calculation.

Part of the Nature Partner Journals series

npj nature partner journals