FeNO testing in asthma diagnosis

National Asthma Council | Australian Asthma Handbook

Fractional exhaled nitric oxide (FeNO) is a useful diagnostic test in the investigation of suspected asthma.

The National Asthma Council's Australian Asthma Handbook recommends including a FeNO test when referring patients for diagnostic spirometry testing in an accredited respiratory function laboratory.

What is the FeNO test?

The FeNO breath test measures nitric oxide released by airway epithelial cells, as a marker of airway inflammation. It is reimbursed by the Medicare Benefits Schedule when performed in an accredited respiratory function laboratory, in combination with spirometry (with bronchodilator responsiveness test), and reported by a respiratory expert.

Airway inflammation in asthma

Most people's asthma is associated with type 2 inflammation of airways,[1] characterised by raised blood eosinophil count or raised FeNO level.[2] Type 2 inflammation is suppressed by inhaled corticosteroids (ICS), systemic corticosteroids, and some monoclonal antibody therapies (e.g. dupilumab).[3]

When should GPs* use FeNO testing in asthma diagnosis?

Request FeNO test if referring a patient to an accredited respiratory function laboratory for diagnostic spirometry (check the laboratory's age restrictions).

Is FeNO testing mandatory for asthma diagnosis?

No. In patients 6 years and over, asthma can be confirmed by a positive bronchodilator responsiveness test on spirometry, or a positive bronchial provocation (challenge) test (Figure 1). In children 1–5 years, asthma is a clinical diagnosis.

How is FeNO interpreted?

In a patient with symptoms suggesting asthma and unlikely to be explained by other conditions, the diagnosis of asthma is supported by raised FeNO level (≥25 ppb for ages ≤11 years; ≥40 ppb for ages ≥12 years).[4,5] Normal FeNO does not rule out asthma.[4]

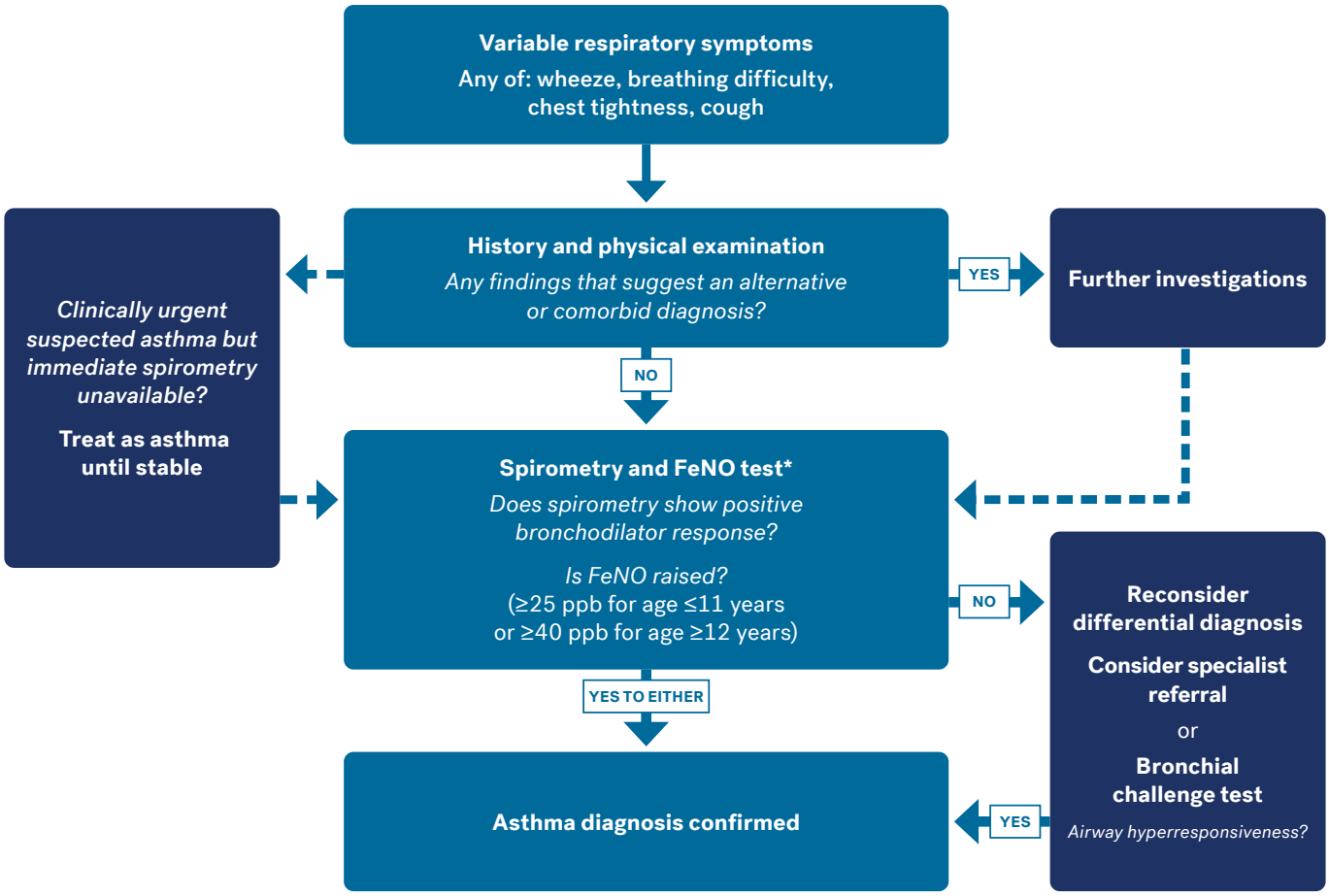
Notes: Normal FeNO ranges depend on age, height, and sex, and reference ranges differ between testing centres. Individuals' levels fluctuate, and results also differ between measuring devices and testing protocols.[6]

Diagnostic FeNO cut-points for asthma vary between guidelines: typically 40–50 ppb for adults and 25–35 ppb for children 5–18 years. Sensitivity and specificity vary according to population.

FeNO can be elevated by acute respiratory viral infection, allergic rhinitis/rhinosinusitis, or eosinophilic bronchitis, and suppressed by smoking, ICS, systemic corticosteroids, and some monoclonal antibody therapies (e.g. dupilumab).[3] FeNO may be normal in patients with non-type 2 asthma (e.g. neutrophilic inflammation) or obesity.[3]

** General practitioners or other primary care health professionals performing a diagnostic assessment for a patient with suspected asthma.*

Figure 1. Diagnosis of asthma in patients 6 years and over



FeNO: fractional exhaled nitric oxide; FEV_1: forced expiratory volume in 1 second

** If available when spirometry conducted in an accredited respiratory function laboratory.*

REFERENCES: 1. Fahy JV, et al. Nat Rev Immunol 2015; 15: 57-65. **2.** Brusselle GG, et al. N Engl J Med 2022; 386: 157-171. **3.** Loewenthal L, et al. Semin Respir Crit Care Med 2022; 43: 635-645. **4.** Louis R, et al. Eur Respir J 2022: 2101585. **5.** BTS, NICE, SIGN, [F] Evidence reviews for diagnostic accuracy of fractional exhaled nitric oxide (FeNO) measures BTS/NICE/SIGN collaborative guideline NG245: nice.org.uk/guidance/ng245/evidence. **6.** Högman M, et al. Eur Respir J 2024; 63: 2300370.

For more information, refer to the National Asthma Council's Australian Asthma Handbook: asthmahandbook.org.au

Australian Asthma Handbook lung function tests: asthmahandbook.org.au/lung-function-tests

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