Algorithm C Objective tests for asthma in adults aged 17 and over

Order of tests
- Measure FeNO first followed by spirometry in adults with symptoms of asthma
- Carry out BDR test if spirometry shows an obstruction

Interpretation of test results for adults aged 17 and over with symptoms suggestive of asthma

- Does spirometry show an obstruction?
  - Yes
    - Are FeNO levels 40 ppb or more?
      - Yes
        - Are FeNO levels between 25 and 39 ppb?
          - Yes
            - Is there variability in peak flow readings?
              - Yes
                - Suspect asthma and review diagnosis after treatment
              - No
                - Consider alternative diagnoses or referral for a second opinion
          - No
            - Is there variability in peak flow readings?
              - Yes
                - Diagnose with asthma
              - No
                - Consider alternative diagnoses or referral for a second opinion
      - No
        - Are FeNO levels between 25 and 39 ppb?
          - Yes
            - Is there variability in peak flow readings?
              - Yes
                - Diagnose with asthma
              - No
                - Consider alternative diagnoses or referral for a second opinion
          - No
            - Is there variability in peak flow readings?
              - Yes
                - Diagnose with asthma
              - No
                - Consider alternative diagnoses or referral for a second opinion

- Is there reversible airflow obstruction?
  - Yes
    - Are FeNO levels 40 ppb or more?
      - Yes
        - Are FeNO levels between 25 and 39 ppb?
          - Yes
            - Is there variability in peak flow readings?
              - Yes
                - Diagnose with asthma
              - No
                - Consider alternative diagnoses or referral for a second opinion
          - No
            - Is there variability in peak flow readings?
              - Yes
                - Diagnose with asthma
              - No
                - Consider alternative diagnoses or referral for a second opinion
      - No
        - Are FeNO levels between 25 and 39 ppb?
          - Yes
            - Is there variability in peak flow readings?
              - Yes
                - Diagnose with asthma
              - No
                - Consider alternative diagnoses or referral for a second opinion
          - No
            - Is there variability in peak flow readings?
              - Yes
                - Diagnose with asthma
              - No
                - Consider alternative diagnoses or referral for a second opinion

- Does spirometry show an obstruction?
  - No
    - Is there variability in peak flow readings?
      - Yes
        - Are FeNO levels 40 ppb or more?
          - Yes
            - Are FeNO levels between 25 and 39 ppb?
              - Yes
                - Is there variability in peak flow readings?
                  - Yes
                    - Diagnose with asthma
                  - No
                    - Consider alternative diagnoses or referral for a second opinion
              - No
                - Is there variability in peak flow readings?
                  - Yes
                    - Diagnose with asthma
                  - No
                    - Consider alternative diagnoses or referral for a second opinion
          - No
            - Are FeNO levels between 25 and 39 ppb?
              - Yes
                - Is there variability in peak flow readings?
                  - Yes
                    - Diagnose with asthma
                  - No
                    - Consider alternative diagnoses or referral for a second opinion
              - No
                - Is there variability in peak flow readings?
                  - Yes
                    - Diagnose with asthma
                  - No
                    - Consider alternative diagnoses or referral for a second opinion

Abbreviations:
FeNO, fractional exhaled nitric oxide
BDR, bronchodilator reversibility

Positive test thresholds
Obstructive spirometry: FEV1/FVC ratio less than 70% (or below the lower limit of normal if available)
FeNO: 40 ppb or more
BDR: improvement in FEV1 of 12% or more and increase in volume of 200 ml or more
Peak flow variability: variability over 20%
Direct bronchial challenge test with histamine or methacholine: PC20 of 8 mg/ml or less

This algorithm is based on recommendations from NICE’s guideline on asthma, diagnosis, monitoring and chronic asthma management (2017)