

# DEFINE-RCT: Determining the effectiveness of a FeNO-guided asthma management intervention in primary care

<b>Submission date</b> 20/06/2022	<b>Recruitment status</b> No longer recruiting	<input type="checkbox"/> Prospectively registered <input type="checkbox"/> Protocol
<b>Registration date</b> 06/07/2022	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input type="checkbox"/> Results
<b>Last Edited</b> 08/10/2025	<b>Condition category</b> Respiratory	<input type="checkbox"/> Individual participant data <input checked="" type="checkbox"/> Record updated in last year

## Plain English summary of protocol

### Background and study aims

According to Asthma UK, around 5.4 million people in the UK receive treatment for asthma. Treatments include 'reliever' inhalers to open up the airways and 'preventer' inhalers, which contain steroids to reduce swelling (inflammation) in the airways.

Asthma is a difficult condition to treat because how a person feels does not always match how much inflammation is in their airways. Doctors and nurses in hospital clinics therefore sometimes use a simple breath test called fractional exhaled nitric oxide (FeNO) to measure inflammation in the airways. This helps them make sure that patients are taking their inhalers properly and are on the right dose of treatment to control inflammation in their airways and prevent asthma attacks. Measuring FeNO can also help doctors and nurses reduce treatment safely in patients who are not benefitting from it. This could potentially lessen side effects from medicines, improve quality of life, and save costs. Asthma UK says that around 75% of asthma patients had a check-up in their GP surgery in 2017. However, it is not clear from previous research whether FeNO should also be measured during these check-ups. The National Institute for Health and Care Excellence has asked for further research on this question.

We have developed an online intervention for doctors and nurses in GP surgeries to help them use FeNO to target and adjust asthma treatments more effectively. To find out how well the intervention works, we will do a study involving asthma patients from GP surgeries where health care professionals and patients will use our intervention for routine asthma check-ups. This will show how much our intervention, if effective, can contribute to reducing asthma attacks and improving quality of life and produce evidence to help policymakers make asthma services more efficient and cost-effective, improving asthma management in the community.

### Who can participate?

People aged 12 years or above who are on their general practice asthma register and whose asthma is being actively treated and monitored in primary care.

### What does the study involve?

For the participant, it involves being randomly allocated to either having their asthma reviewed with the FeNO test or having their asthma reviewed without the FeNO test over the next year.

Half of the people in the study will have the FeNO test; the other half will not. This will be decided at random, like tossing a coin, to make sure the results are fair.

What are the possible benefits and risks of participating?

The main advantage of taking part is an opportunity for you to contribute to research to improve how asthma is managed in GP surgeries. We do not yet know whether the FeNO test and online tool will improve care for patients with asthma; that is why we are doing this research. If you are allocated to the group of people who will be having the FeNO test:

- Your health care professional will be able to consider your FeNO result alongside the other information they normally consider during your asthma review.
- If you normally have your asthma review done over the telephone, you may have to go to the GP surgery or another clinic to have your FeNO test done.
- You may have concerns about Covid-19 infection as a result of having to be seen in person by a health care professional for your FeNO test. However, your GP surgery or clinic will put all necessary measures in place to keep you safe from Covid-19.

You may have concerns about researchers seeing your medical records. However, we would like to assure you that all data will be kept secure and confidential. We will ask you to spare a few extra minutes of your time to fill in our study questionnaires. However, your answers will be a valuable contribution towards our research, which may help improve care for asthma patients in the future.

Where is the study run from?

Primary Care Clinical Trial Unit, University of Oxford (UK)

When is the study starting and how long is it expected to run for?

April 2022 to March 2026

Who is funding the study?

National Institute for Health and Care Research (NIHR) (UK).

Who is the main contact?

Louise Jones, [define@phc.ox.ac.uk](mailto:define@phc.ox.ac.uk)

## Contact information

### Type(s)

Principal investigator

### Contact name

Dr Kay Wang

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## **Additional identifiers**

**Integrated Research Application System (IRAS)**  
307116

**Central Portfolio Management System (CPMS)**  
52036

**Protocol serial number**

RP-PG-0618-20002

## Study information

**Scientific Title**

Development and Evaluation of an online FeNO-guided asthma management INtervEntion in primary care: a pragmatic randomised controlled trial with nested economic and process evaluations

**Acronym**

DEFINE-RCT

**Study objectives**

To determine whether using an online Fractional concentration of Nitric Oxide in the exhaled air (FeNO)-guided asthma management intervention in primary care reduces the proportion of asthma patients who experience an acute exacerbation of asthma over a 12-month period.

**Ethics approval required**

Old ethics approval format

**Ethics approval(s)**

Approved 04/04/2022, London - Fulham Research Ethics Committee (Temple Quay House, 2 The Square, Bristol Research Ethics Committee Centre, BS1 6PN, UK; +44 207 104 8109; fulham.rec@hra.nhs.uk), ref: 22/LO/0139

**Study design**

Pragmatic parallel open randomized controlled trial

**Primary study design**

Interventional

**Study type(s)**

Other

**Health condition(s) or problem(s) studied**

Asthma

**Interventions**

The control arm will receive standard of care and follow routine primary care.

Participants in the FeNO (intervention) arm will have their FeNO measured at baseline and at 12 month follow up.

Randomisation of participants to the intervention or usual care will be performed using Sortition®. We will use blocked randomisation with random block sizes of 2 and 4. Randomisation will be stratified according to history of previous exacerbations during the 12-month period before baseline (one or more exacerbations versus no exacerbations).

**Intervention Type**

Device

## Phase

Phase III

## Drug/device/biological/vaccine name(s)

FeNO device

## Primary outcome(s)

Proportion of patients with one or more acute asthma exacerbations between baseline asthma review and 12 months.

## Key secondary outcome(s)

1. Number of acute exacerbations of asthma (count data, nr.) between baseline asthma review and 12 months
2. Defined daily doses between baseline asthma review and 12 months
3. Proportion of participants whose anti-inflammatory asthma medications are stepped up or stepped down between baseline asthma review and 12 months
4. Medication Adherence Rating Scale for Asthma (MARS-A) 5 item version score at baseline, 3 months and 12 months
5. Medication Possession Ratio between baseline asthma review and 12 months
6. Defined daily doses and proportions of participants who are high SABA users between baseline asthma review and 12 months
7. Peak expiratory flow rate at baseline and 12 months
8. Asthma Control Test (ACT) score at baseline and 3, 6, 9 and 12 months
9. Proportion of patients with one or more adverse events potentially consistent with asthma or other related respiratory or allergic conditions which are felt to be clinically severe based on the clinician's judgement between baseline asthma review and 12 months
10. Number of adverse events potentially consistent with asthma or other related respiratory or allergic conditions which are felt to be clinically severe based on the clinician's judgement between baseline asthma review and 12 months.

## Completion date

31/03/2026

## Eligibility

### Key inclusion criteria

1. Aged 12 years or above
2. On general practice asthma register AND meets one or more of the following criteria:
  - 2.1 Currently prescribed inhaled corticosteroids on fixed dose or Maintenance and Reliever Therapy (MART) regimen
  - 2.2 Three or more prescriptions for inhaled short-acting  $\beta$ 2-agonists in the last year
  - 2.3 One or more exacerbations of asthma in the last year\*
3. Permanently registered at participating GP surgery
4. Patient is willing and able to give informed consent or assent\*\* for participation in the study

\*Exacerbations of asthma will be defined as per the primary outcome definition

\*\*Patients aged 16 years or over will be required to give informed consent. Patients aged 12 to 15 years inclusive will be required to give informed assent. Informed consent from a parent or legal guardian will also be required for participants aged 12 to 15 years inclusive.

**Participant type(s)**

Patient

**Healthy volunteers allowed**

No

**Age group**

Mixed

**Lower age limit**

12 years

**Sex**

All

**Total final enrolment**

2599

**Key exclusion criteria**

1. Receiving oral corticosteroids or biologics as maintenance treatment for asthma. Biologics will include omalizumab, mepolizumab, reslizumab, benralizumab, dupilumab, plus any further biologic agents which may be licensed for use in asthma during the course of the study.
2. Being managed in or awaiting assessment by a specialist asthma clinic
3. Currently coded as having 'suspected asthma'
4. Known contraindication to treatment with corticosteroids
5. Unable or unwilling to be followed up for 12-month period after the baseline asthma review. The baseline asthma review will be the first asthma review conducted after informed consent or assent for study participation has been obtained.
6. Insufficient ability to speak or understand English
7. Treated with systemic corticosteroids or antibiotics for an acute exacerbation of asthma during the 2-week period before baseline. Health care professionals will be advised to postpone a patient's baseline asthma review if a patient has an acute exacerbation or has not yet recovered from an acute exacerbation by the time the review is scheduled. Health care professionals will be advised to consult the research team if they postpone a patient's baseline asthma review to a date more than 4 weeks after consent/assent was obtained.
8. Had a change in their asthma medication in the past 4 weeks. Health care professionals may postpone a patient's baseline asthma review if their asthma medication is changed after consent/assent is obtained but before their baseline asthma review is due to take place. Health care professionals will be advised to consult the research team if they postpone a patient's baseline asthma review to a date more than 4 weeks after consent/assent was obtained.
9. Taking part in another study involving any intervention for asthma

**Date of first enrolment**

30/06/2022

**Date of final enrolment**

14/06/2024

**Locations**

## **Countries of recruitment**

United Kingdom

England

## **Study participating centre**

### **Thames Valley and South Midlands CRN**

Unipart House

NIHR CRN: Thames Valley and South Midlands Offices Level 2 West

Garsington Rd

Oxford

United Kingdom

OX4 6PG

## **Study participating centre**

### **Wessex CRN**

7 Berrywood Business Village

Tollbar Way

Hedge End

Southampton

United Kingdom

SO30 2UN

## **Study participating centre**

### **East Midlands CRN**

Leicester Royal Infirmary

Knighton St

Leicester

United Kingdom

LE1 5WW

## **Sponsor information**

### **Organisation**

University of Oxford

### **ROR**

<https://ror.org/052gg0110>

## **Funder(s)**

**Funder type**

Government

**Funder Name**

National Institute for Health and Care Research

**Alternative Name(s)**

National Institute for Health Research, NIHR Research, NIHRresearch, NIHR - National Institute for Health Research, NIHR (The National Institute for Health and Care Research), NIHR

**Funding Body Type**

Government organisation

**Funding Body Subtype**

National government

**Location**

United Kingdom

## Results and Publications

**Individual participant data (IPD) sharing plan**

The data-sharing plans for the current study are unknown and will be made available at a later date

**IPD sharing plan summary**

Data sharing statement to be made available at a later date

**Study outputs**

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">HRA research summary</a>			28/06/2023	No	No
<a href="#">Study website</a>	Study website	11/11/2025	11/11/2025	No	Yes