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

Submission date 20/06/2022	**Recruitment status** No longer recruiting	[_] Prospectively registered [_] Protocol
Registration date 06/07/2022	**Overall study status** Ongoing	[_] Statistical analysis plan [_] Results
Last Edited 08/10/2025	**Condition category** Respiratory	[_] Individual participant data [X] 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 been 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

Contact information

Type(s)
Principal investigator

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Additional identifiers

Clinical Trials Information System (CTIS)
Nil known

Integrated Research Application System (IRAS)
307116

ClinicalTrials.gov (NCT)
Nil known

Protocol serial number
IRAS 307116, CPMS 52036, 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 β2-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
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Study participating centre
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Study participating centre
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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?
HRA research summary			28/06/2023	No	No
Study website	Study website	11/11/2025	11/11/2025	No	Yes