

# Biomarkers of asthma remission after tezepelumab treatment

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<b>Registration date</b> 12/05/2023	<b>Overall study status</b> Ongoing	<input type="checkbox"/> Statistical analysis plan <input type="checkbox"/> Results
<b>Last Edited</b> 12/05/2025	<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

Asthma affects over 350 million people in the world. About 5-10% of people with asthma have severe disease. Asthma is a lung disease associated with inflammation (swelling) of the airways. Certain proteins made by the body, called interleukins, can make this inflammation worse. White blood cells (called eosinophils) are also involved in the inflammation of the airways.

Tezepelumab is a medicine that elicits broad inhibitory effects on pathways that are key to asthma inflammation. It causes reductions in levels of a broad spectrum of proteins (eg, interleukin [IL]-5, IL-13) and blood eosinophils, immunoglobulin [Ig]E and fractional exhaled nitric oxide [FeNO], all of which are responsible for inflammation of the airways.

It is given as an injection under the skin and may help reduce inflammation in the airways of people with asthma. Previous research studies in people with severe asthma have shown tezepelumab to be safe, well tolerated, and provides clinically meaningful improvements in asthma control, including reduced incidence of exacerbations and hospitalizations in patients with severe asthma, and it is now approved for the treatment of severe asthma in the UK. Research studies have shown that people who received tezepelumab experienced about half as many asthma exacerbations (severe episodes of asthma or attacks) compared to those given placebo (dummy) injections.

In this research study the researchers want to observe all participants having tezepelumab injections as part of their normal clinical care. They would like to try and understand what might be causing the high levels of disease control, including the absence of symptoms and exacerbations. By doing this they hope to be able to obtain information that may help to improve asthma treatment in the future.

The researchers will study the effect of the medicine 'tezepelumab' on all aspects of asthma such as changes in quality of life, symptoms, inflammation and breathing tests.

### Who can participate?

Patients aged 18 years and over following a clinical decision to initiate tezepelumab for severe asthma after meeting licensing, local and national guidelines

### What does the study involve?

Every participant taking part in the study will be receiving the medication tezepelumab injections as part of their normal clinical care. Participants will be asked to attend a total of

seven scheduled visits at the study centre. Visit 0 and Visit 1 can be combined where feasible to do so. In between study visits participants will be asked to complete some breathing tests at home. They will be asked to monitor their peak flow (maximum rate a person can breathe out) and a test for exhaled nitric oxide (FeNO) every day for the first 4 weeks of the study and then once a week afterwards. This is to monitor the usual variation in their asthma symptoms and airway function, and how this might change if they become unwell.

What are the possible benefits and risks of participating?

There is no guarantee that participants will receive any benefit from this study, and taking part in this study may or may not improve their asthma. Information from this study may help asthma treatment in the future. There are possible risks, disadvantages and inconveniences with any research study. The individual risks of each procedure and investigation are described fully in the participant information sheet. Participants will also potentially have more tests and procedures if they take part in the study, compared to standard hospital visits. Study visits could take more time than standard hospital visits and they will have more blood taken. Each study visit can last about 1-3 hours. Participants will have to do additional monitoring of their asthma at home as the study requires them to keep track of their peak flow reading and lung inflammation with FeNO (about 10 minutes).

Where is the study run from?

This is a research project organised by the NIHR Leicester Biomedical Research Centre – Respiratory at Glenfield Hospital. This study is part of a larger programme of studies, called 3TR. 3TR is a European research group aimed at improving the treatment of asthma and COPD. This study is being conducted by a group of clinical and academic experts from UK universities and Europe, together with pharmaceutical companies who have an interest in asthma. The sponsor of the study is the University of Leicester (UK). The sponsor is the organisation responsible for ensuring that the study is carried out correctly.

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

March 2023 to December 2028

Who is funding the study?

AstraZeneca

Who is the main contact?

1. UK project management team, [abc-3tr@leicester.ac.uk](mailto:abc-3tr@leicester.ac.uk)
2. Prof. Chris Brightling, [ceb17@leicester.ac.uk](mailto:ceb17@leicester.ac.uk)

**Study website**

<https://3trbio.com/>

## Contact information

**Type(s)**

Public

**Contact name**

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## Additional identifiers

**EudraCT/CTIS number**

Nil known

**IRAS number**

323812

**ClinicalTrials.gov number**

Nil known

**Secondary identifying numbers**

UoL0902, IRAS 323812, CPMS 55639

## Study information

**Scientific Title**

Biomarkers and mechanisms of asthma remission following treatment with tezepelumab in adults with severe asthma – 3TR ABC

**Acronym**

TEZEBIO – 3TR ABC

**Study objectives**

Asthma remission following treatment with tezepelumab is related to baseline phenotype and biomarker(s) or early changes in biomarkers.

**Ethics approval required**

Ethics approval required

**Ethics approval(s)**

Approved 20/04/2023, East Midlands - Nottingham 1 Research Ethics Committee (Health Research Authority, 2nd Floor, Equinox House, City link, Nottingham, NG2 4LA, United Kingdom; +44 (0)2071048115; Nottingham1.rec@hra.nhs.uk), ref: 23/EM/0072

**Study design**

Multi-centre multi-national observational study

**Primary study design**

Observational

**Secondary study design**

Longitudinal study

**Study setting(s)**

Hospital

**Study type(s)**

Treatment

**Participant information sheet**

Not available in web format, please use the contact details to request a participant information sheet

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

Severe asthma

**Interventions**

TEZEBIO – 3TR ABC is a multi-centre observational study of patients with severe asthma following initiation of treatment with tezepelumab (anti-TSLP) as part of their standard of care. Participants will be extensively characterised at baseline; reviewed throughout the year with formal clinical and biological assessment at 4, 16, 52 weeks, 2 years and 3 years. Asthma remission will be defined for each domain: asthma control, lung function, and exacerbations as a composite measure and independently. Biomarkers and multi-omic analysis will be undertaken in the biosamples to determine biological pathways and bio-signatures associated with asthma remission. The primary outcome will be assessed at 1 year. This study is one of three arms aligned to the 3TR (taxonomy, treatment, targets and remission) EU-IMI consortium asthma biologics consortium (3TR-ABC).

**Intervention Type**

Other

### **Primary outcome measure**

1. Adequacy of asthma control and change in asthma control measured using the Asthma Control Questionnaire 5 Questions (ACQ5)  $<1.5$ , assessed at 1 year
2. Pulmonary function measured using post-bronchodilator (post BD) Forced Expiratory Volume in 1 Second (FEV1) percent predicted, at 1 year
3. Exacerbations history, assessed using medical history at 1 year
4. Oral corticosteroids use, assessed using medical history and current medications at 1 year

### **Secondary outcome measures**

Current secondary outcome measures as of 30/07/2024:

#### **1. Patient-reported outcomes:**

- 1.1. Adequacy of asthma control and change in asthma control measured using the Asthma Control Questionnaire 5 Questions (ACQ5), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.2. Physical and emotional impact of asthma measured using Asthma Quality of Life Questionnaire (AQLQ), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.3. Quality of life in people with severe asthma measured using the Self-Assessment Questionnaire (SAQ), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.4. Health-related quality of life measured using the EQ5D5L health status questionnaire, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.5. Effect of health problems on ability to work and perform regular activities measured using the Work Productivity and Activity Impairment General Health (WPAI:GH) questionnaire, assessed visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.6. Quality of life and symptom control in allergic rhinitis measured using the Sino-Nasal Outcome Test-22 Questionnaire (SNOT22), assessed visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.7. Symptoms associated with dysfunctional breathing patterns measured using the Nijmegen Questionnaire (NQ), assessed visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.8. Subjective measure of sleepiness measured using the Epworth Sleepiness Scale (ESS), assessed visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.9. Symptoms of anxiety and depression measured using the Hospital Anxiety and Depression Scale (HADS), assessed visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.10. Level of fatigue during daily activities measured using the Functional Assessment of Chronic Illness Therapy (FACIT) fatigue scale, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.11. Cognition measured using the Cognitive Failures Questionnaire, Screen for Cognitive Impairment in Psychiatry (SCIP), Trail Making test (TMT) part B (specific sites), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16) and visit 4 (week 52).
- 1.12. Treatment effectiveness measured using the Global evaluation treatment efficacy (GETE), patient and physician-related response, assessed at visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.13. Treatment effectiveness measured using the Visual analogue scale (VAS) scale 3TR question (patient and physician perceived), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.14 Symptoms measured using Symptoms VAS at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.

2. Lung function measured using:

2.1. Pre and post BD spirometry, assessed at visit 1 (week 0).

2.2. Post BD Forced Expiratory Volume in 1 Second (FEV1) assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.

2.3. Mannitol test, assessed at visit 1 (week 0) and visit 4 (week 52).

3. Biomarkers measured using:

3.1. Blood: differential cell count, total IgE and transcriptome (and in a subgroup scRNA), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years). Specific IgE if not done with skin prick tests (cat dander, dog dander, house dust mite, grass pollen and Aspergillus IgE) and immunophenotyping, methylome (DNA collected for possible later eQTL analyses depending upon transcriptome data), assessed at visit 1 (week 0).

3.2. Nasal sampling: nasal brushings, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.

3.3. Breath: Fractional exhaled nitric oxide (FeNO) assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit; and breathomics assessed at visit 1 (week 0), visit 2 (week 4), and visit 4 (week 52).

3.4. Sputum: cell differential, transcriptome, micro/metagenomics and proteomics, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.

3.5. Saliva: Microbiome analysis and DNA, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.

3.6. Urine: Urinary lipid mediators and metabolomics, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.

3.7. Thoracic CT (specific sites), assessed at visit 1 (week 0)

3.8. Stool (optional): micro/metagenomics, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

3.9. Bronchoscopy (optional): brush biopsy, bronchial biopsies and broncho-alveolar lavage (BAL) for transcriptome, protein, micro/metagenomics, cellular and structural analyses, assessed at visit 1 (week 0).

3.10. Mucosal biopsies: histological analysis of cells and inflammatory mediators, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years)

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Previous secondary outcome measures as of 19/01/2024:

1. Patient-reported outcomes:

1.1. Adequacy of asthma control and change in asthma control measured using the Asthma

Control Questionnaire 5 Questions (ACQ5), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.2. Physical and emotional impact of asthma measured using Asthma Quality of Life Questionnaire (AQLQ), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.3. Quality of life in people with severe asthma measured using the Self-Assessment Questionnaire (SAQ), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.4. Health-related quality of life measured using the EQ5D5L health status questionnaire, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.5. Effect of health problems on ability to work and perform regular activities measured using the Work Productivity and Activity Impairment General Health (WPAI:GH) questionnaire, assessed visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.6. Quality of life and symptom control in allergic rhinitis measured using the Sino-Nasal Outcome Test-22 Questionnaire (SNOT22), assessed visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.7. Symptoms associated with dysfunctional breathing patterns measured using the Nijmegen Questionnaire (NQ), assessed visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.8. Subjective measure of sleepiness measured using the Epworth Sleepiness Scale (ESS), assessed visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.9. Symptoms of anxiety and depression measured using the Hospital Anxiety and Depression Scale (HADS), assessed visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.10. Level of fatigue during daily activities measured using the Functional Assessment of Chronic Illness Therapy (FACIT) fatigue scale, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.11. Cognition measured using the Cognitive Failures Questionnaire, Screen for Cognitive Impairment in Psychiatry (SCIP), Trail Making test (TMT) part B (specific sites), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16) and visit 4 (week 52).

1.12. Treatment effectiveness measured using the Global evaluation treatment efficacy (GETE), patient and physician-related response, assessed at visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.13. Treatment effectiveness measured using the Visual analogue scale (VAS) scale 3TR question (patient and physician perceived), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.14 Symptoms measured using Symptoms VAS at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.

## 2. Lung function measured using:

2.1. Pre and post BD spirometry, assessed at visit 1 (week 0).

2.2. Post BD Forced Expiratory Volume in 1 Second (FEV1) assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.

2.3. Mannitol test, assessed at visit 1 (week 0) and visit 4 (week 52).

### 3. Biomarkers measured using:

- 3.1. Blood: differential cell count, total IgE and transcriptome (and in a subgroup scRNA), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years). Specific IgE if not done with skin prick tests (cat dander, dog dander, house dust mite, grass pollen and Aspergillus IgE) and immunophenotyping, methylome (DNA collected for possible later eQTL analyses depending upon transcriptome data), assessed at visit 1 (week 0).
- 3.2. Nasal sampling: nasal brushings, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.
- 3.3. Breath: Fractional exhaled nitric oxide (FeNO), and ReCIVA for breathomics, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 3.4. Sputum: cell differential, transcriptome, micro/metagenomics and proteomics, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.
- 3.5. Saliva: Microbiome analysis and DNA, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.
- 3.6. Urine: Urinary lipid mediators and metabolomics, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.
- 3.7. Thoracic CT (specific sites), assessed at visit 1 (week 0)
- 3.8. Stool (optional): micro/metagenomics, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 3.9. Bronchoscopy (optional): brush biopsy, bronchial biopsies and broncho-alveolar lavage (BAL) for transcriptome, protein, micro/metagenomics, cellular and structural analyses, assessed at visit 1 (week 0).
- 3.10. Mucosal biopsies: histological analysis of cells and inflammatory mediators, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years)

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### Previous secondary outcome measures as of 11/08/2023:

#### 1. Patient-reported outcomes:

- 1.1. Adequacy of asthma control and change in asthma control measured using the Asthma Control Questionnaire 5 Questions (ACQ5), assessed at visit 1 (week 0), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.
- 1.2. Physical and emotional impact of asthma measured using Asthma Quality of Life Questionnaire (AQLQ), assessed at visit 1 (week 0), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.3. Quality of life in people with severe asthma measured using the Self-Assessment Questionnaire (SAQ), assessed at visit 1 (week 0), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.4. Health-related quality of life measured using the EQ5D5L health status questionnaire, assessed at visit 1 (week 0), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.5. Effect of health problems on ability to work and perform regular activities measured using the Work Productivity and Activity Impairment Questionnaire (WPAI), assessed visit 1 (week 0), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.6. Quality of life and symptom control in allergic rhinitis measured using the Sino-Nasal Outcome Test-22 Questionnaire (SNOT22), assessed visit 1 (week 0), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).



- 1.7. Symptoms associated with dysfunctional breathing patterns measured using the Nijmegen Questionnaire (NQ), assessed visit 1 (week 0), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.8. Subjective measure of sleepiness measured using the Epworth Sleepiness Scale (ESS), assessed visit 1 (week 0), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.9. Symptoms of anxiety and depression measured using the Hospital Anxiety and Depression Scale (HADS), assessed visit 1 (week 0), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.10. Level of fatigue during daily activities measured using the Functional Assessment of Chronic Illness Therapy (FACIT) fatigue scale, assessed at visit 1 (week 0), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.11. Cognition measured using the Cognitive Failures Questionnaire, Screen for Cognitive Impairment in Psychiatry (SCIP), Trail Making test (TMT) (specific sites), assessed at visit 1 (week 0), visit 3 (week 16) and visit 4 (week 52).
- 1.12. Treatment effectiveness measured using the Global evaluation treatment efficacy (GETE), patient and physician-related response, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 1.13. Treatment effectiveness measured using the Visual analogue scale (VAS) scale 3TR question (patient and physician perceived), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

## 2. Lung function measured using:

- 2.1. Pre and post BD spirometry, assessed at visit 1 (week 0).
- 2.2. Post BD Forced Expiratory Volume in 1 Second (FEV1) assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.
- 2.3. Mannitol test, assessed at visit 1 (week 0) and visit 4 (week 52).

## 3. Biomarkers measured using:

- 3.1. Blood: differential cell count, total IgE and transcriptome (and in a subgroup scRNA), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years). Specific IgE if not done with skin prick tests (cat dander, dog dander, house dust mite, grass pollen and Aspergillus IgE) and immunophenotyping, methylome (DNA collected for possible later eQTL analyses depending upon transcriptome data), assessed at visit 1 (week 0).
- 3.2. Nasal sampling: nasal brushings, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.
- 3.3. Breath: Fractional exhaled nitric oxide (FeNO), and ReCIVA for breathomics, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 3.4. Sputum: cell differential, transcriptome, micro/metagenomics and proteomics, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.
- 3.5. Oral gargle: Microbiome analysis, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.
- 3.6. Urine: Urinary lipid mediators and metabolomics, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.
- 3.7. Thoracic CT (specific sites), assessed at visit 1 (week 0)
- 3.8. Stool (optional): micro/metagenomics, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).
- 3.9. Bronchoscopy (optional): brush biopsy, bronchial biopsies and broncho-alveolar lavage (BAL)

for transcriptome, protein, micro/metagenomics, cellular and structural analyses, assessed at visit 1 (week 0).

3.10. Mucosal biopsies: histological analysis of cells and inflammatory mediators, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years)

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#### Previous secondary outcome measures:

##### 1. Patient-reported outcomes:

1.1. Adequacy of asthma control and change in asthma control measured using the Asthma Control Questionnaire 5 Questions (ACQ5), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.

1.2. Physical and emotional impact of asthma measured using Asthma Quality of Life Questionnaire (AQLQ), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.3. Quality of life in people with severe asthma measured using the Self-Assessment Questionnaire (SAQ), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.4. Health-related quality of life measured using the EQ5D5L health status questionnaire, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.5. Effect of health problems on ability to work and perform regular activities measured using the Work Productivity and Activity Impairment Questionnaire (WPAI), assessed visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.6. Quality of life and symptom control in allergic rhinitis measured using the Sino-Nasal Outcome Test-22 Questionnaire (SNOT22), assessed visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.7. Symptoms associated with dysfunctional breathing patterns measured using the Nijmegen Questionnaire (NQ), assessed visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.8. Subjective measure of sleepiness measured using the Epworth Sleepiness Scale (ESS), assessed visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.9. Symptoms of anxiety and depression measured using the Hospital Anxiety and Depression Scale (HADS), assessed visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.10. Level of fatigue during daily activities measured using the Functional Assessment of Chronic Illness Therapy (FACIT) fatigue scale, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.11. Cognition measured using the Cognitive Failures Questionnaire, Screen for Cognitive Impairment in Psychiatry (SCIP), Trail Making test (TMT) (specific sites), assessed at visit 1 (week 0), visit 3 (week 16) and visit 4 (week 52).

1.12. Treatment effectiveness measured using the Global evaluation treatment efficacy (GETE), patient and physician-related response, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

1.13. Treatment effectiveness measured using the Visual analogue scale (VAS) scale 3TR question (patient and physician perceived), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

## 2. Lung function measured using:

2.1. Pre and post BD spirometry, assessed at visit 1 (week 0).

2.2. Post BD Forced Expiratory Volume in 1 Second (FEV1) assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.

2.3. Mannitol test, assessed at visit 1 (week 0) and visit 4 (week 52).

## 3. Biomarkers measured using:

3.1. Blood: differential cell count, total IgE and transcriptome (and in a subgroup scRNA), assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years). Specific IgE if not done with skin prick tests (cat dander, dog dander, house dust mite, grass pollen and Aspergillus IgE) and immunophenotyping, methylome (DNA collected for possible later eQTL analyses depending upon transcriptome data), assessed at visit 1 (week 0).

3.2. Nasal sampling: nasal brushings, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.

3.3. Breath: Fractional exhaled nitric oxide (FeNO), and ReCIVA for breathomics, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

3.4. Sputum: cell differential, transcriptome, micro/metagenomics and proteomics, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.

3.5. Oral gargle: Microbiome analysis, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.

3.6. Urine: Urinary lipid mediators and metabolomics, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years), and unscheduled exacerbation visit at sites where feasible/applicable.

3.7. Thoracic CT (specific sites), assessed at visit 1 (week 0)

3.8. Stool (optional): micro/metagenomics, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years).

3.9. Bronchoscopy (optional): brush biopsy, bronchial biopsies and broncho-alveolar lavage (BAL) for transcriptome, protein, micro/metagenomics, cellular and structural analyses, assessed at visit 1 (week 0).

3.10. Mucosal biopsies: histological analysis of cells and inflammatory mediators, assessed at visit 1 (week 0), visit 2 (week 4), visit 3 (week 16), visit 4 (week 52), visit 5 (2 years), visit 6 (3 years)

## Overall study start date

01/03/2023

## Completion date

31/12/2028

# Eligibility

## Key inclusion criteria

1. Adult ( $\geq 18$  years old)

2. Clinical decision to initiate tezepelumab for severe asthma after meeting licensing, local and national guidelines

3. Be able to give valid written consent; compliant with study procedures and study visits

## Participant type(s)

Patient

**Age group**

Adult

**Lower age limit**

18 Years

**Sex**

Both

**Target number of participants**

156

**Key exclusion criteria**

1. Known hypersensitivity to the active substance of tezepelumab or any of the excipients
2. Participation in an interventional clinical trial within 3 months of visit 1 or receipt of any investigational medicinal product within 3 months or 5 half-lives. Participation in other observational studies is acceptable if in the view of the investigator it will not impact the study outcomes
3. Other clinically significant medical disease or uncontrolled concomitant disease that is likely, in the opinion of the investigator, to require a change in therapy or impact the ability to participate in the study

**Date of first enrolment**

31/08/2023

**Date of final enrolment**

31/12/2025

## **Locations**

**Countries of recruitment**

England

Northern Ireland

Scotland

United Kingdom

**Study participating centre**

**University Hospitals of Leicester NHS Trust**

Glenfield Hospital

Grobby Rd

Leicester

United Kingdom

LE3 9QP

**Study participating centre**  
**Manchester University NHS Foundation Trust**  
Cobbett House  
Oxford Road  
Manchester  
United Kingdom  
M13 9WL

**Study participating centre**  
**NHS Greater Glasgow and Clyde**  
J B Russell House  
Gartnavel Royal Hospital  
1055 Great Western Road Glasgow  
Glasgow  
United Kingdom  
G12 0XH

**Study participating centre**  
**University Hospital Southampton NHS Foundation Trust**  
Southampton General Hospital  
Tremona Road  
Southampton  
United Kingdom  
SO16 6YD

**Study participating centre**  
**Belfast Health and Social Care Trust**  
Trust Headquarters  
A Floor - Belfast City Hospital  
Lisburn Road  
Belfast  
United Kingdom  
BT9 7AB

**Study participating centre**  
**Guys and St Thomas' NHS Foundation Trust**  
Sydney Street  
London  
United Kingdom  
SW3 6NP

# Sponsor information

## Organisation

University of Leicester

## Sponsor details

Research & Enterprise Division

Research Governance Office

University of Leicester

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RGOsponsor@le.ac.uk

## Sponsor type

University/education

## Website

<https://le.ac.uk/research/regi>

## ROR

<https://ror.org/04h699437>

# Funder(s)

## Funder type

Industry

## Funder Name

AstraZeneca

## Alternative Name(s)

AstraZeneca PLC, Pearl Therapeutics

## Funding Body Type

Government organisation

## Funding Body Subtype

For-profit companies (industry)

## Location

# Results and Publications

## Publication and dissemination plan

A publication plan will be written by the Trial Management Group (TMG) and the Patient and Public Involvement (PPI) group during the study with the sponsor and funder approvals. It is envisaged that the results of the study will be published in newsletters and presented in public webinars for participants, lay media and the relevant peer-reviewed journals. Individual response tezepelumab will be provided by the local clinical teams to the participants as part of their standard of care.

## Intention to publish date

31/08/2028

## Individual participant data (IPD) sharing plan

The datasets generated and/or analysed during this study will be included in the subsequent results publication.

## IPD sharing plan summary

Published as a supplement to the results publication

## Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">HRA research summary</a>			20/09/2023	No	No