

Secondary data use of tocilizumab clinical studies to address regulatory needs for rare and pediatric trials

Submission date 12/01/2026	Recruitment status No longer recruiting	☐ Prospectively registered ☐ Protocol
Registration date 16/01/2026	Overall study status Ongoing	☐ Statistical analysis plan ☐ Results
Last Edited 16/01/2026	Condition category Musculoskeletal Diseases	☐ Individual participant data ☒ Record updated in last year

Plain English summary of protocol

Background and study aims

Rare diseases (RD) affect up to 36 million people across the EU. Although many medicines have been authorized, 95% of these diseases still have no treatment options. It is difficult to test new drugs for rare diseases because there are very few patients, and their symptoms can vary widely. This makes it hard for regulators to decide if a new treatment is safe and effective.

The INVENTS project aims to solve these problems by using advanced computer modeling and simulation methods. By using existing data from previous clinical trials, researchers will develop new evidence tools and in silico trials (computer-simulated trials). These tools will help predict how well a treatment works, even when only a small amount of patient data is available. The goal is to make the drug approval process faster and more reliable so that patients with rare diseases can access life-saving treatments sooner.

Who can participate?

This specific study is a retrospective study, meaning it uses data that have already been collected from past clinical trials. No new patients are being recruited to join this study. The data used in this research comes from around 10,000 participants who took part in 20 previous studies of the drug tocilizumab. These participants included:

1. Adult patients with rheumatoid arthritis (a common inflammatory disease).
2. Adults and children with rare inflammatory diseases, including:
 - 2.1. Polyarticular juvenile idiopathic arthritis
 - 2.2. Systemic juvenile idiopathic arthritis
 - 2.3. Giant cell arteritis
 - 2.4 Systemic sclerosis

What does the study involve?

Researchers will analyze existing data from the 20 tocilizumab trials to build and test mathematical models. The study involves:

1. Data analysis: using computer software to look at how the drug moves through the body (pharmacokinetics) and how it affects the disease (pharmacodynamics).
2. Comparison: comparing traditional trial results with results generated by new modelling

methods to see if the models are accurate.

3. Virtual patients: creating virtual patient cohorts to simulate how different groups of people might respond to a treatment.

The team will look at patient characteristics (like age and weight), drug doses, blood test results (like C-reactive protein), and physical symptoms (like joint swelling or skin thickness) and disease scores that were recorded in the original trials.

What are the possible benefits and risks of participating?

Because this study uses secondary data (information already collected years ago), there are no direct physical risks to the participants, and they do not need to take any new medications or attend extra appointments.

While individual participants do not benefit directly, the project will help future patients with rare diseases by making it easier and faster to develop and approve new treatments.

The main risk in this type of research is data privacy. To minimize this, all data is pseudonymized, meaning names, initials, and specific dates are removed or changed so that individuals cannot be easily identified. The data is kept in a highly secure environment managed by the Health Data Hub (HDH).

Where is the study run from?

The study is led by INSERM (the French National Institute of Health and Medical Research) in France. The data controller responsible for the project is F. Hoffmann-La Roche Ltd based in Basel, Switzerland. Research is carried out by a group (consortium) of experts from universities and institutions across Europe, including the UK, Netherlands, Austria, Sweden, the Netherlands and Germany.

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

The original clinical trials provided data from patients who were enrolled between 2005 and 2016. For this new research project, data analysis is scheduled to take place from November 2024 to October 2029. The results and the computer code used are expected to be published between 2027 and 2031.

Who is funding the study?

INVENTS has received funding from the European Union's Horizon Europe Research and Innovation program under grant agreement 101136365, the Swiss State Secretariat for Education, Research and Innovation (SERI) and the UKRI Innovative UK under their Horizon Europe Guarantee scheme. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Health and Digital Executive Agency. Neither the European Union nor the granting authority can be held responsible for them.

Who is the main contact?

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European Commission funding Grant call

HORIZON-HLTH-2023-IND-06

Study information

Scientific Title

Innovative designs, extrapolation, simulation methods and evidence - tools for rare diseases addressing regulatory needs
(INVENTS project) - secondary data use of tocilizumab clinical studies

Acronym

INVENTs - tocilizumab

Study objectives

The Primary Objective of this study will be to describe per population of interest, the characteristics of patients exposed to tocilizumab from early-stage clinical trials to real-world studies.

Exploratory objectives of this protocol are the objectives defined in the INVENTS project, submitted and accepted by the EU. The INVENTS project is based on 7 objectives: 5 major

methodological objectives, 1 objective focused on regulatory perspectives and 1 objective dedicated to use cases useful for the research. All objectives are complementary and interconnected:

Objective #1 (INVENTS Work package 1): Improving robustness of model-based treatment effect estimation and extrapolation methods

Objective #2 (INVENTS Work package 2): Developing an in silico trials workflow using modelling and simulation, clinical trial and RWD to cope with missing knowledge

Objective #3 (INVENTS Work package 3): Increasing robustness of small population confirmatory trials using validated and credible models

Objective #4 (INVENTS Work package 4): Proposing evidence synthesis approaches using computational models, clinical studies, RWD and virtual cohorts

Objective #5 (INVENTS Work package 5): Developing evidence-based tools for regulatory decision making in RD

Objective #6 (INVENTS Work package 6): Integrating patient engagement and regulatory perspectives

Objective #7 (INVENTS Work package 7): provide use cases for the methods developed in work packages 1-5 and provide relevant data and disease area expertise.

Ethics approval required

Ethics approval required

Ethics approval(s)

Approved 25/04/2024, CESRESS- Comité Éthique et Scientifique pour les Recherches, les Études et les Évaluations dans le domaine de la Santé (HDH 9 rue Georges Pitard, Paris, 75015, France; -; hdh@health-data-hub.fr), ref: 17337354

Primary study design

Observational

Secondary study design

Secondary data use of 20 studies (interventional and non-interventional) evaluating tocilizumab.

Study type(s)

Health condition(s) or problem(s) studied

Systemic/polyarticular juvenile idiopathic arthritis, giant cell arteritis and rheumatoid arthritis

Interventions

The methods that will be developed during this study will enable the exploitation of novel and improved clinical trial designs, in silico trials and real-world data (including real-world data from patients' care) analysis approaches supporting drug development in rare diseases. The European Medicine Agency and European national regulators (including Health Technology Assessment bodies) will be supplied with a general framework and evidence-tools allowing better informed decision-making thanks to reliable data augmentation techniques and tools allowing studies with small sample sizes to reach high level evidence, ideally matching the level obtained through large, randomized studies. Most importantly, small populations, including patients suffering from rare diseases, will benefit from an increased and faster access to efficacious and safe treatments.

Beyond this project, this workflow could be used in other disease settings when evaluating small sample evidence which is the goal of precision medicine

The mobilization of the clinical data from Roche clinical studies will allow the acquisition of a lot

of additional knowledge to help improve consistency and efficiency of the drug evaluation process for rare disease by augmenting clinical evidence without compromising its scientific integrity and providing regulators assessment credibility criteria.

Intervention Type

Drug

Phase

Not Applicable

Drug/device/biological/vaccine name(s)

tocilizumab

Primary outcome(s)

1. A statistical report containing only aggregated data will be generated describing patient characteristics per population of interest: moderate to severe active rheumatoid arthritis, giant cell arteritis, systemic sclerosis-ild, polyarticular juvenile idiopathic arthritis or systemic juvenile idiopathic arthritis measured using descriptive statistics performed on patient characteristics included in the studies at baseline (before first administration of tocilizumab)

Key secondary outcome(s)**Completion date**

31/12/2029

Eligibility

Key inclusion criteria

All patients included in the 20 clinical studies.

Healthy volunteers allowed

No

Age group

All

Lower age limit

1 Days

Upper age limit

100 Years

Sex

All

Total final enrolment

10096

Key exclusion criteria

GDPR non compliant countries

Date of first enrolment

01/01/2005

Date of final enrolment

01/01/2017

Locations

Countries of recruitment

Scotland

Argentina

Australia

Austria

Belgium

Brazil

Bulgaria

Canada

Czech Republic

Denmark

France

Germany

Greece

Hungary

Israel

Italy

Mexico

Netherlands

Norway

Poland

Portugal

Singapore

Slovakia

Spain

Sweden

Switzerland

Thailand

United States of America

Study participating centre

Alder Hey Children's NHS Foundation Trust Laboratory

Alder Hey Hospital

Eaton Road

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England

L12 2AP

Study participating centre

UCL Great Ormond Street Institute of Child Health

30 Guilford Street

London

England

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Study participating centre

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Foresterhill Road

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AB25 2ZN

Study participating centre

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Pogmoor Road

Barnsley

England

S75 2EP

Study participating centre
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Welcome Building, Blue Zone
Edgbaston
Birmingham
England
B15 2TH

Study participating centre
Colchester General Hospital - (nics)
Colchester Dist General Hosp
Turner Road
Colchester
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CO4 5JL

Study participating centre
Chapel Allerton Hospital
Chapeltown Road
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LS7 4SA

Study participating centre
NIHR Moorfields Biomedical Research Centre
Moorfields Eye Hospital NHS Foundation Trust
162 City Road
London
England
EC1V 2PD

Study participating centre
Freeman Road Hospital
Freeman Road
High Heaton
Newcastle upon Tyne
England
NE7 7DN

Study participating centre

Barking, Havering and Redbridge University Hospitals NHS Trust

Queens Hospital

Rom Valley Way

Romford

England

RM7 0AG

Study participating centre

Haywood Hospital

High Lane

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ST6 7AG

Study participating centre

Royal Cornwall Hospitals NHS Trust

Royal Cornwall Hospital

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Sponsor information

Organisation

F. Hoffmann-La Roche

Funder(s)

Funder type**Funder Name**

HORIZON EUROPE Health

Alternative Name(s)

Health, Cluster 1: Health, Polo tematico 1: Salute, Salute, Cluster 1: Gesundheit, Gesundheit, Pôle 1: Santé, Santé, Zoskupenie 1: Zdravie, Zdravie

Funding Body Type

Government organisation

Funding Body Subtype

National government

Location

Funder Name

Swiss State Secretariat for Education, Research and Innovation (SERI)

Funder Name

UK Research and Innovation

Alternative Name(s)

UKRI

Funding Body Type

Government organisation

Funding Body Subtype

National government

Location

United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan

The datasets to be used in INVENTS were collected during clinical trials. The participants received an information related to the processing of their data for the purpose of the trial. All but two of these clinical trials were conducted prior to the entry into force of GDPR and thus could not have satisfied the requirements introduced by this regulation. In addition, the INVENTS project was not foreseen at the time, and without GDPR, no re-information mechanism was planned.

For concerned persons based in France, Roche will provide a collective information notice on its website (<https://www.roche.fr/fr/patients/patient-information-portal.html>), with the information content defined by GDPR article 14 in French and in English.

IPD sharing plan summary

Stored in non-publicly available repository