Study Protocol

P5-C2-001

DARWIN EU® - Characterising the use of JAK inhibitors in Europe: a Drug Utilisation Study Update

26/05/2026

Version 4.0

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Public

CONTENTS

Study title[1]	DARWIN EU® - Characterising the use of JAK inhibitors in Europe: a Drug Utilisation Study Update
Protocol version	V4.0
Date	26/05/2026
EUPAS number	EUPAS1000000998
Active Substance	JAK inhibitor (abrocitinib, baricitinib, filgotinib, tofacitinib, upadacitinib)
Medicinal Product	N/A
Research question and objectives	This study aims to identify and characterise new JAK inhibitor (JAKi) initiation. The specific objectives are: 1. To estimate the incidence of new JAKi initiation overall and for each individual JAKi ingredient. 2. To characterise new JAKi initiation and treatment for each individual JAKi, overall and stratified by indication.
Countries of study	Croatia, Denmark, Finland, Germany, Spain, Sweden
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[1]This is a routinely repeated study from P3-C1-001 with EUPAS1000000424.

LIST OF ABBREVIATIONS

Acronyms/terms	Description
ATC	Anatomical Therapeutic Chemical
CC	Coordination centre
CI	Confidence Interval
CDM	Common Data Model
DARWIN EU®	Data Analysis and Real-World Interrogation Network
DDD	Defined Daily Dose
DK-DHR	Danish Data Health Registries
DOI	Declaration of Interests
DQD	Data Quality Dashboard
DRE	Digital Research Environment
DTZ	Data Transfer Zone
DUS	Drug Utilisation Study
ED	Emergency Department
EHR	Electronic Health Records
EMA	European Medicines Agency
ENCePP	European Network of Centres for Pharmacoepidemiology and Pharmacovigilance
Erasmus MC	Erasmus Medical Center
EU	European Union
EUPAS	EU Post-Authorisation Studies Register
FDA	Food and Drug Administration
FinOMOP-THL	Finnish Care Register for Health Care
GDPR	General Data Protection Regulation
GP	General Practitioner
HI-SPEED	Health Impact - Swedish Population Evidence Enabling Data-linkage
IQR	Interquartile Range
IQVIA DA Germany	IQVIA Disease Analyzer Germany
ICD	International Classification of Diseases
IP	Inpatient
IPCI	Integrated Primary Care Information
IRB	Institutional Review Board
JAKi	Janus kinase inhibitor/s
MACE	Major adverse cardiovascular event
NAJS	Croatian National Public Health Information System
OHDSI	Observational Health Data Sciences and Informatics
OMOP	Observational Medical Outcomes Partnership

Acronyms/terms	Description
OP	Outpatient
ORAL	Oral Rheumatoid Arthritics Trial
Q25	25th Percentile
Q75	75th Percentile
RA	Rheumatoid Arthritis
RxNorm	Medical prescription normalised
SD	Standard Deviation
SNOMED	Systemised Nomenclature of Medicine
TNF	Tumour Necrosis Factor
VID	Valencia Health System Integrated Dataset
WHO	World Health Organisation

1. TITLE

DARWIN EU® - Characterising the use of JAK inhibitors in Europe: a Drug Utilisation Study Update

2. DESCRIPTION OF THE STUDY TEAM

Study team role	Names	Organisation
Principal Investigator	Elin Rowlands Daniel Prieto-Alhambra	University of Oxford
Data Scientist	Kim López-Güell Edward Burn	University of Oxford
Epidemiologist	Amy Lam	University of Oxford
Clinical Domain Expert	Daniel Prieto-Alhambra	University of Oxford
Study Manager	Natasha Yefimenko Nosova	Erasmus MC
Data source	**Names**	**Data Partner Organisation***
Croatian National Public Health Information System (NAJS)	Marko Čavlina Antea Jezidžić Anamaria Jurčević Karlo Pintarić Ivan Pristaš Jakov Vuković	Croatian Institute of Public Health
Danish Data Health Registries (DK-DHR)	Elvira Bräuner Susanne Bruun	Danish Medicines Agency
Finnish Care Register for Health Care (FinOMOP-THL)	Toni Lehtonen Laura Salonen Petteri Hovi	Finnish Institute for Health and Welfare
IQVIA Disease Analyser Germany (IQVIA DA Germany)	Ellen Gerritsen Akram Mendez Gargi Jadhav Dina Vojinovic	IQVIA
Valencian Health System Integrated Dataset (VID)	Celia Robles Cabaniñas Fran Llopis Cardona Gabriel Sanfélix Gimeno	The Foundation for the Promotion of Health and Biomedical Research of Valencia Region
Health Impact - Swedish Population Evidence Enabling Data-linkage (HI-SPEED)	Huiqi Li Fredrik Nyberg Rickard Ljung Talbäck Mats Marcel Ballin	Swedish Medical Products Agency - Gothenburg University

*Data partners do not have an investigator role. Data partners execute code at their data source, review, and approve their results.

3. ABSTRACT

Title

DARWIN EU® - Characterising the use of JAK inhibitors in Europe: a Drug Utilisation Study Update

Rationale and background

JAK inhibitor (JAKi) therapy has been gaining popularity for the treatment of several autoimmune conditions, including rheumatoid arthritis, inflammatory bowel disease, and atopic dermatitis. Previous evidence suggests that JAKi use is associated with an increased risk of cardiovascular events, cancer, and opportunistic infections; however, these findings were mainly in rheumatoid arthritis (RA) populations, while evidence is limited for other indications with different demographics by short follow up durations and small sample sizes. Further research is needed to better establish the risks associated with JAKi use, especially for indications where JAKi use was only recently approved.

The current study aims to identify the incidence of new JAKi initiation over time and to characterise new use of JAKi in Europe to inform the feasibility of future safety studies. This is a rerun of a previous study with the same aim, which intends to expand on the countries, as well as the period, covered by the previous report.

Research question and objectives

The current study aims to identify the incidence of new JAKi initiation over time in Europe and to characterise JAKi initiators to inform the feasibility of future safety studies.

The specific objectives of this study are:

1. To estimate the incidence of new JAKi initiation, overall and for each individual JAKi ingredient.
2. To characterise JAKi initiators for each individual JAKi, overall and stratified by indication.

Methods

This is a cohort study.

For the second objective, the index date will be the date of JAKi therapy initiation, and individuals are followed up until the discontinuation of JAKi therapy.

Population

The JAKi initiation incidence cohort will include all individuals present in the selected data source from 1st January 2018 until the end of available data, with at least 365 days of prior data visibility.

The JAKi initiators characterisation cohorts will include all new JAKi initiations, for each individual JAKi, from 1st January 2018 until the end of available data, with at least 365 days of prior data visibility and no previous respective JAKi use.

Variables

Drugs of interest:

abrocitinib, filgotinib, baricitinib, upadacitinib, tofacitinib

Indications of JAKi initiation:

alopecia areata, atopic dermatitis, axial spondyloarthritis, inflammatory bowel disease, juvenile arthritis, juvenile idiopathic arthritis, psoriatic arthritis, rheumatoid arthritis, and unknown indication

Other JAKi initiators characteristics:

age, sex, and time from first diagnosis of indication to JAKi therapy initiation.

Treatment characteristics:

treatment duration

Data sources

1. Croatia: Croatian National Public Health Information System (NAJS)
2. Denmark: Danish Data Health Registries (DK-DHR)
3. Finland: Finnish Care Register for Health Care (FinOMOP-THL)
4. Germany: IQVIA Disease Analyser Germany (IQVIA DA Germany)
5. Spain: Valencia Health System Integrated Dataset (VID)
6. Sweden: Health Impact - Swedish Population Evidence Enabling Data-linkage (HI-SPEED)

Study size

No sample size has been calculated. As this is a feasibility assessment study, results based on all available data will be presented. Based on a preliminary feasibility assessment, the expected number JAKi users in the data sources included in this study range from 2800 (NAJS) to 12,800 (HI-SPEED).

Statistical analysis

Incidence of new JAKi initiation, overall and for each individual JAKi ingredient, will be calculated annually as the number of new JAKi initiations per 100,000 person-years of the population at risk of getting exposed during the period for each calendar year, with 95% Poisson exact confidence intervals. For each JAKi ingredient, new JAKi initiators will be characterised in terms of age at initiation, sex, history of diagnoses indicating potential indication, and prior use of other JAKi ingredients, overall and stratified by potential indication. Time from first diagnosis of indication to first JAKi initiation and treatment duration of the first drug era will be reported for each JAKi ingredient stratified by indication. Time from first diagnosis of indication to treatment initiation and treatment duration will be summarised, providing the minimum, p25, median, p75, and maximum duration.

4. AMENDMENTS AND UPDATES

None.

5. MILESTONES

Study milestones and deliverables	Planned dates*
Draft Study Protocol	27 March 2026
Final Study Protocol	April 2026
Creation of Analytical code	April 2026
Execution of Analytical Code on the data	May 2026
Draft Study Report	June 2026
Final Study Report	To be confirmed with EMA

*Planned dates are dependent on obtaining approvals from the internal review boards of the data sources and deliverables review cycles.

6. RATIONALE AND BACKGROUND

JAK inhibitor (JAKi) therapy has been gaining popularity for the treatment of several autoimmune conditions, including rheumatoid arthritis (RA), inflammatory bowel disease, and atopic dermatitis. The first JAKi, tofacitinib, was approved by the European Medicines Agency (EMA) for the management of rheumatoid arthritis in 2017.[1] An FDA-requested study (the Oral Rheumatoid Arthritics Trial (ORAL) Surveillance trial) showed a higher risk of major adverse cardiovascular events (MACE), cancer, and adjudicated opportunistic infection with tofacitinib compared to tumour necrosis factor (TNF) inhibitors in individuals aged 50 years or older with at least one cardiovascular risk factor.[2, 3] Further research has been conducted on the safety profile of JAKi for other indications, including psoriatic arthritis, ulcerative colitis, and atopic dermatitis.[4–6] It was shown that risk of venous thrombotic events of JAK inhibitor initiation was similar to placebo in individuals with atopic dermatitis and ulcerative colitis.[5, 6] Incidence of adverse events, including herpes zoster infection and thrombotic events, remained similar with longer follow-up up to two years in psoriatic arthritis individuals with JAK inhibitor.[4] A recent meta-analysis focusing on the JAKi initiation for immune-mediated skin conditions, including atopic dermatitis, alopecia areata, and vitiligo, also showed no significant difference between JAKi and placebo or active comparators in the composite outcome of MACE and all-cause mortality, as well as risk of venous thrombotic events.[7] However, the available evidence, especially in other indications than RA, has been limited by short duration of follow-up and limited sample size and more research is needed to understand the safety profile in these populations. Since the new indications were approved relatively recently and the use of JAKi within those has so far not been that common, the sample size for these indications is an issue and hampers future research. Therefore, a study in a federated network such as DARWIN EU® might be a solution.

The current study aims to identify the incidence of new JAKi initiation over time and to characterise new use of JAKi in Europe to inform the feasibility of future safety studies.

This study is a routine repeated study of a previous DARWIN EU® study EUPAS1000000424 focused on identifying and characterising new use JAKi. This study is now being repeated to include more recent data and additional data sources.

7. RESEARCH QUESTION AND OBJECTIVES

Research questions

The current study aims to identify the incidence of new JAKi initiation over time and to characterise new JAKi initiations in Europe to inform the feasibility of future safety studies.

Research objectives

The specific objectives of this study are:

1. To estimate the incidence of new JAKi initiation, overall and for each individual JAKi ingredient.
2. To characterise new JAKi initiators for each individual JAKi, overall and stratified by indication.

8. RESEARCH METHODS

8.1. Study design

A descriptive cohort study will be conducted using routinely collected health data from five European data sources.

The incidence of new JAKi initiation will be estimated.

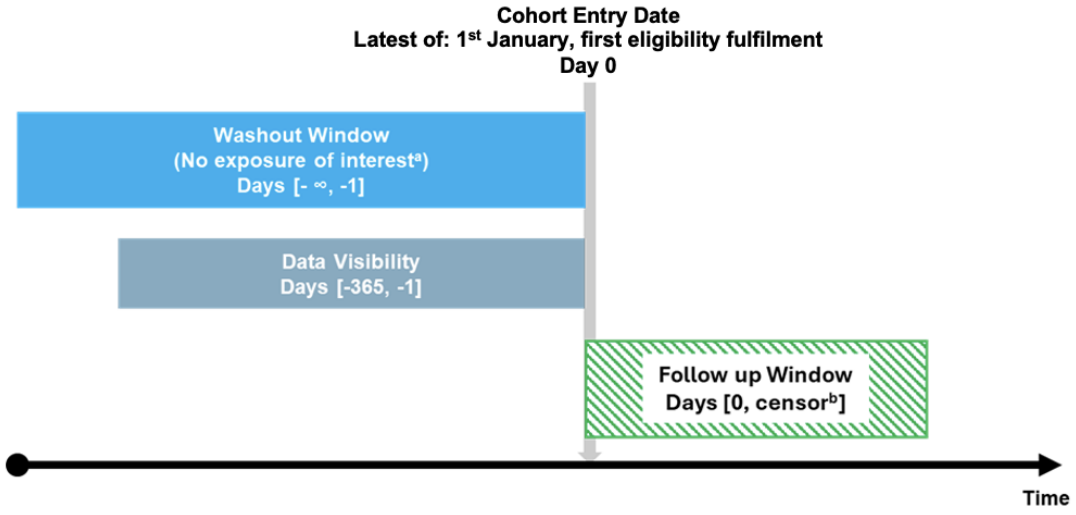

Figure 1. HARPER study design diagram Objective 1 – JAKi initiation incidence.

a. Exposures of interest: any JAKi, individual JAKi ingredient
b. Earliest of: 31st December of each year, loss of follow-up, end of data availability, initiation of exposure of interest

JAKi initiators will be characterized.

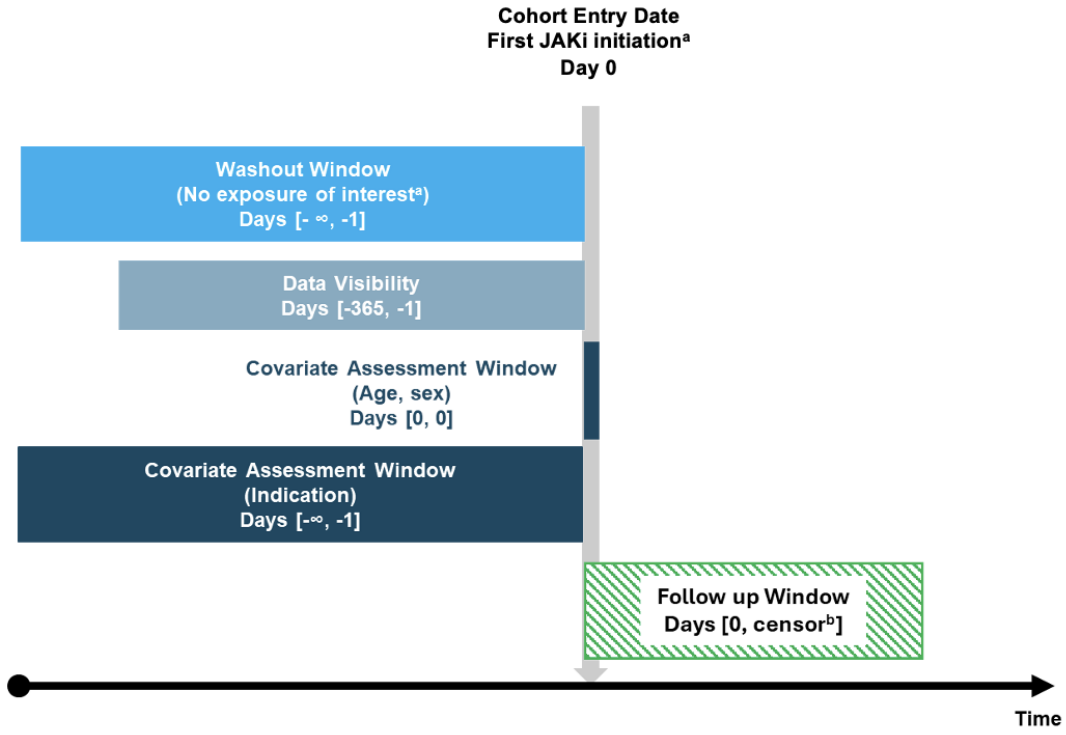

Figure 2. HARPER study design diagram Objective 2 – JAKi initiators characterisation.

a. Exposure of interest: individual JAKi ingredient
b. Earliest of: end of treatment with index exposure of interest, death, loss to follow-up, end of data availability

8.2. Follow-up

For **treatment initiation incidence estimation** (objective 1)

Eligible individuals will begin to contribute person time from the latest of the following: (1) study start date, (2) date at which the observation period starts (i.e. 1st January of each year), or (3) date eligibility criteria are first fulfilled. Respective study participants will stop contributing person time at the earliest date of the following: (1) date on which the observation period ends (i.e. 31st December of each year), (2) end of data availability, or (3) date of first JAKi exposure, if applicable (outcome of the incidence analysis).

For **patients characterisation** (objectives 2)

Eligible individuals will be followed from the date of first JAKi exposure until the earliest of (1) end of index JAKi treatment exposure, (2) death, (3) loss to follow-up, or (4) end of data availability.

8.3. Study population with inclusion and exclusion criteria

For **treatment initiation incidence estimation** (objective 1)

All individuals available in the respective data sources during the study period, with at least 365 days of data visibility, will be included.

Different exclusion criteria will be applied corresponding to each outcome of the JAKi exposure incidence rate analysis (as defined in **Section 8.6.2.**). For incidence of first JAKi ever initiation, individuals with any JAKi exposure before index date will be excluded. For incidence of individual JAKi ingredient (abrocitinib/baricitinib/filgotinib/upadacitinib/tofacitinib) initiation, only individuals with respective JAKi exposure before index date will be excluded.

For **patients characterisation** (objectives 2)

All individuals available in the respective data sources during the study period who newly initiated JAKi and have at least 365 days of data visibility before JAKi initiation will be included. Individuals with specific JAKi exposure before the start of study period will be excluded.

8.4. Study setting and data sources

This study will be conducted using six data sources onboarded for DARWIN EU® network of data partners from six European countries. These data sources have been selected based on geographic representativeness and availability of data on JAK inhibitors. The selected data sources cover Croatia, Denmark, Finland, Germany, Spain, and Sweden. The results generated from these data sources will therefore cover regions of Northern, Central, and Southern Europe. All data were *a priori* mapped to the Observational Medical Outcomes Partnership (OMOP) Common Data Model (CDM).

Table 1. Description of the selected data sources.

Country	Name of Data source	Health Care setting	Type of Data	Number of active individuals	Calendar period covered by each data source	Contributing to
Croatia	NAJS	Primary care GP, secondary care specialist, hospital inpatient care	EHR, registries, other	4.3M	02/2014–06/2025	Objective 1 and 2
Denmark	DK-DHR	Community pharmacists, secondary care specialist, hospital inpatient care	EHR, registries, other	5.98M	01/1995–10/2025	Objective 1 and 2
Finland	FinOMOP-THL	Primary care GP, primary care specialist, secondary care specialist, hospital inpatient care	EHR, registries	5.7M	01/2011–12/2024	Objective 1 and 2
Germany	IQVIA DA Germany	Primary care GP, primary care specialist	EHR	4.72M	02/1992–06/2025	Objective 1 and 2
Spain	VID	Primary care GP, primary care specialist, secondary care specialist, hospital inpatient care, other	EHR, registries	5.58M	01/2009–12/2024	Objective 1 and 2
Sweden	HI-SPEED	Primary care GP, secondary care specialist, hospital inpatient care	Registries	10.6M	01/2015–08/2025	Objective 1 and 2

DK-DHR = Danish Data Health Registries; EHR = Electronic Health Record; FinOMOP-THL = Finnish Care Register for Health Care; GP = General Practitioner; HI-SPEED = Health Impact - Swedish Population Evidence Enabling Data-linkage; IQVIA DA Germany = IQVIA Disease Analyzer Germany; NAJS = Croatian National Public Health Information System; VID = Valencia Health System Integrated Dataset.

The previous study on the same objectives included the following data sources: FinOMOP-THL (01/2017 – 10/2024), IPCI (01/2017 – 06/2024), IQVIA DA Germany (01/2017 – 06/2024), NLHR (01/2017 – 12/2023), and VID (01/2018 – 12/2021). See full protocol and documentation for that study here.

Data sources selection

These data sources fulfil the criteria required in terms of data quality, completeness, timeliness, and representativeness for a drug utilisation study while covering different regions of Europe. See more details on fitness for use assessment in **Annex II**.

8.5. Study period

The study period starts from 1st January 2018 and follows until end of available data for each included data source (see **Table 1**).

8.6. Variables

8.6.1. Exposure

No exposure variable will be defined for Objective 1. The incident use of JAKi will be the outcome of the analyses, as described in **Section 8.6.2** below.

Exposure of interest in the characterisation of JAKi initiators (Objective 2) will be the initiation of treatment (first ever use) of the following JAKi: abrocitinib, baricitinib, filgotinib, tofacitinib, and upadacitinib.

The preliminary concept sets used for the identification of exposures are described in **Annex IV**. These codes will be refined during the study execution following the DARWIN EU® phenotyping standard processes, which involve the review of code lists by clinical experts and the review of phenotypes after their execution in the participating data sources.

8.6.2. Outcome

For Objective 1, the incident use of JAKi will be the outcome in the analyses.

For the incidence of first JAKi ever initiation, the outcome will be defined as first prescription/dispensation of any JAKi. For incidence of individual JAKi ingredient (abrocitinib/baricitinib/filgotinib/tofacitinib/upadacitinib) initiation, the outcome will be defined as first prescription/dispensation of respective individual JAKi ingredient.

The preliminary concept sets used for the identification of outcomes are described in **Annex IV**. These codes will be refined during the study execution following the DARWIN EU® phenotyping standard processes, which involve the review of code lists by clinical experts and the review of phenotypes after their execution in the participating data sources.

8.6.3. Covariates, including confounders, effect modifiers, and other variables

Objective 2:

The covariates for this objective are as follows:

- Sex
    - Female/male
- Age at index date, namely:
    - Mean/median age
    - Proportion of individuals stratified within age groups (0–3, 4–12, 13–18, 19–40, 41–60, >60).

- Pre-specified indicated condition for JAKi, defined by condition recorded before index date (yes/no for each indication). Potential indications of JAKi will be defined by any records of the above-mentioned pre-specified conditions before the first exposure of specific individual JAKi ingredients. Multiple indications are allowed per individual.
    - Alopecia areata
    - Atopic dermatitis
    - Axial spondyloarthritis
    - Inflammatory bowel disease
    - Juvenile arthritis
    - Juvenile idiopathic arthritis
    - Psoriatic arthritis
    - Rheumatoid arthritis
    - Unknown indication (defined as none of the predefined indications were found)
- Time from first indication to first JAKi initiation, estimated separately for each prespecified indication (more than one per individual possible) and presented in months.
- Duration of index JAKi treatment era (months).
- Prior use of other JAKi (yes/no) and the number of JAKi ingredients used before the index JAKi initiation

The following covariates will be used for stratification in the patient characterisation.

- Predefined potential indications.

The concept sets used for the identification of covariates were validated for the previous study (P3-C1 001) and are described in **Annex IV**. However, an additional validation will be conducted using the current vocabularies to identify and incorporate any new, relevant concepts. This validation will follow the DARWIN EU® phenotyping standard processes, which involve the review of code lists by clinical experts and the review of phenotypes after their execution in the participating data sources.

8.7. Study size

No sample size has been calculated for this study. As this is a feasibility assessment study, results based on all available data will be presented. Based on the preliminary feasibility assessment, the expected number of individuals to be involved in each data source would be approximately between 2800 (NAJS) to 12800 (HI-SPEED).

8.8. Analysis

8.8.1. Federated network analyses

All analyses will be conducted separately for each data source and will be carried out in a federated manner, allowing analyses to be run locally without sharing individuals' data.

Before sharing the study package, test runs of the analytics will be performed on a subset of the data sources, and quality control checks will be performed. After all the tests are passed (see **Annex III**), the final package will be released in a version-controlled study repository for execution against all the participating data sources.

8.8.2. Data privacy protection

The data partners will locally execute the analytics against the OMOP CDM in R Studio and review and approve the default aggregated results. They will then be made available to the Principal Investigators and study team in secure online repository of DTZ (Data Transfer Zone). All results will be locked and timestamped for reproducibility and transparency. The study results of all data sources will be checked, after which they are made available to the team, and the Study Dissemination Phase can start. All analyses will be conducted separately for each data source, and will be carried out in a federated manner, allowing analyses to be run locally without sharing individual-level data. Cell counts <5 will be suppressed when reporting results to comply with the data source's privacy protection regulations.

8.8.3. Statistical model specification and assumptions of the analytical approach considered

The R package *IncidencePrevalence*[8] will be used to derive the incidence of JAKi initiation in the population level DUS, while R package *CohortCharacteristics*[9] will be used for the patient characterisation and *DrugUtilisation*[10] for treatment characterisation in the individual level DUS. All packages mentioned above were developed by DARWIN EU®.

Incidence of new JAKi initiation (measured as prescription or dispensation), overall and for each individual JAKi ingredient, will be calculated annually as the number of individuals with a first JAKi prescription/dispensation per 100,000 person-years of the population at risk of getting exposed during the period for each calendar year. Those study individuals who enter the denominator population will then contribute time at risk up to their first use during the study period or if they do not have a drug exposure, they will contribute time at risk, as described above in **Section 8.2**. Incidence rates will be given together with 95% Poisson exact confidence intervals. Illustration of the calculation of incidence use of the medicines of interest is shown below in **Figure 3**.

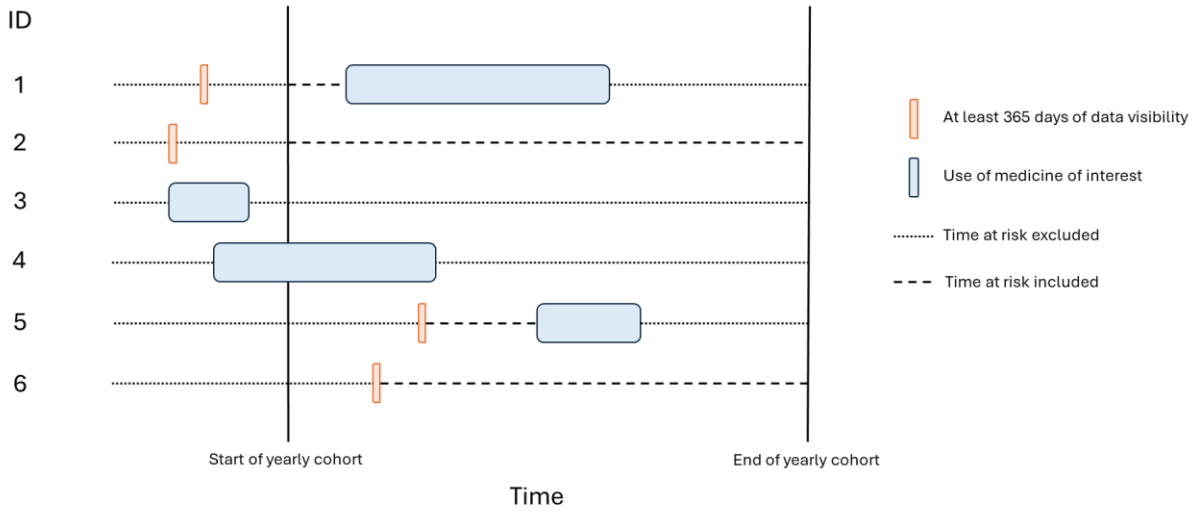

Figure 3. Illustration of the calculation of incidence on use of medicines of interest.

An example of incidence calculation is shown in **Figure 3**. Individuals (ID 1, 2) with sufficient data visibility will be included in the incidence calculation contributing to the time at risk (denominator). Individuals will contribute the time at risk until initiation of drug of interest (ID 1) or the end of follow-up for yearly cohort (ID 2). For individuals with exposure to JAKi before the start of the yearly cohort (ID 3) or with exposure at the start of the yearly cohort (ID 4) will not be included for the annual incidence calculation. Individuals will only contribute time at risk if they have sufficient data visibility. Therefore, as illustrated by ID 5 and 6, individuals are only included and contribute to the denominator from the point with at least 365 days of

data visibility.

For the incidence of each individual JAKi ingredient, only use of the specific individual JAKi ingredient will be considered. These individuals with previous exposure of other JAKi will be allowed to be included in the denominator during the calculation of population-level incidence. Each analysis on individual JAKi ingredients will be independent of other JAKi exposures. In other words, individuals with exposure to different JAKi will be counted multiple times in different analyses.

Characteristics

JAKi initiators will be characterised in terms of age, sex, and time from first diagnosis of prespecified indication to first JAKi exposure. Treatment characterisation will include indication and duration of treatment. Reporting on patient-level characterisation will be stratified by each individual JAKi ingredient and indication.

Duration of Treatment

Duration of JAKi therapy will be defined as follows: exposure starts at date of the first prescription, e.g. the index date the individual entered the cohort. For each prescription, the estimated duration of use will be retrieved from the drug exposure table in the data sources, using the start and end date of the exposure (see **Annex II** for explanation of how prescription end-dates are obtained in each data source). Subsequent prescriptions will be combined into continuous exposed episodes (drug eras) if the distance in days between end of the first exposure and start of the second exposure is ≤90 days. For the included individuals, the duration of JAKi initiation will be calculated by sum of duration of first drug era during the study period. Treatment duration will be summarised providing the minimum, p25, median, p75, and maximum duration.

8.8.4. Output

Output will include the following:

A PDF report including an executive summary and the following tables and figures:

- Table 1. Patient characterisation of abrocitinib initiators, overall and stratified by indication.
- Table 2. Patient characterisation of baricitinib initiators, overall and stratified by indication.
- Table 3. Patient characterisation of filgotinib initiators, overall and stratified by indication.
- Table 4. Patient characterisation of tofacitinib initiators, overall and stratified by indication.
- Table 5. Patient characterisation of upadacitinib initiators, overall and stratified by indication.
- Figure 1. Incidence of new JAKi initiation among the individuals without prior exposure to any JAKi.
- Figure 2. Incidence of new JAKi initiation among the individuals without prior exposure to the same JAKi ingredient.

An interactive dashboard will be generated by incorporating all the results (tables and figures) included in the PDF report mentioned above.

Table 1–5. Patient characterisation of JAKi initiators, overall and stratified by indication (one table per JAKi ingredient).

Variable	Variable level	Estimate	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
JAKi ingredient								
Number records	–	N						
Number subjects	–	N						
Age	–	Median [Q25 – Q75]						
		Mean (SD)						
		Range						
Age group	0 to 3	N (%)						
	4 to 12	N (%)						
	13 to 18	N (%)						
	19 to 40	N (%)						
	41 to 60	N (%)						
	61 to 150	N (%)						
Sex	Female	N (%)						
	Male	N (%)						
Treatment duration (months)	–	Median [Q25 – Q75]						
		Mean (SD)						
		Range						
Co-morbid indications	Rheumatoid arthritis	N (%)						
	Atopic dermatitis	N (%)						
	Alopecia areata	N (%)						
	Axial spondylitis	N (%)						

Variable	Variable level	Estimate	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
	Inflammatory bowel disease	N (%)						
	Juvenile arthritis	N (%)						
	Juvenile idiopathic arthritis	N (%)						
	Psoriatic arthritis	N (%)						
Prior JAK inhibitor use[1]	Abrocitinib	N (%)						
	Baricitinib	N (%)						
	Filgotinib	N (%)						
	Tofacitinib	N (%)						
	Upadacitinib	N (%)						
	No previous JAKi use	N (%)						
Number of prior JAKi ingredient initiated	–	Median [Q25 – Q75]						
Alopecia areata								
Number records	–	N						
Number subjects	–	N						
Age	–	Median [Q25 – Q75]						
		Mean (SD)						
		Range						
Sex	Female	N (%)						
	Male	N (%)						
Treatment duration (months)	–	Median [Q25 – Q75]						
		Mean (SD)						
		Range						

Variable	Variable level	Estimate	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
Co-morbid indications	Rheumatoid arthritis	N (%)						
	Atopic dermatitis	N (%)						
	Axial spondylitis	N (%)						
	Inflammatory bowel disease	N (%)						
	Juvenile arthritis	N (%)						
	Juvenile idiopathic arthritis	N (%)						
	Psoriatic arthritis	N (%)						
Prior JAK inhibitor use[1]	Abrocitinib	N (%)						
	Baricitinib	N (%)						
	Filgotinib	N (%)						
	Tofacitinib	N (%)						
	Upadacitinib	N (%)						
	No previous JAKi use	N (%)						
Number of prior JAKi ingredient initiated	–	Median [Q25 – Q75]						
Atopic dermatitis								
Number records	–	N						
Number subjects	–	N						
Age	–	Median [Q25 – Q75]						
		Mean (SD)						
		Range						
Sex	Female	N (%)						
	Male	N (%)						

Variable	Variable level	Estimate	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
Treatment duration (months)	–	Median [Q25 – Q75]						
		Mean (SD)						
		Range						
Co-morbid indications	Rheumatoid arthritis	N (%)						
	Alopecia areata	N (%)						
	Axial spondylitis	N (%)						
	Inflammatory bowel disease	N (%)						
	Juvenile arthritis	N (%)						
	Juvenile idiopathic arthritis	N (%)						
	Psoriatic arthritis	N (%)						
Prior JAK inhibitor use[1]	Abrocitinib	N (%)						
	Baricitinib	N (%)						
	Filgotinib	N (%)						
	Tofacitinib	N (%)						
	Upadacitinib	N (%)						
	No previous JAKi use	N (%)						
Number of prior JAKi ingredient initiated	–	Median [Q25 – Q75]						
Axial spondylitis								
Number records	–	N						
Number subjects	–	N						
Age	–	Median [Q25 – Q75]						
		Mean (SD)						

Variable	Variable level	Estimate	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
		Range						
Sex	Female	N (%)						
	Male	N (%)						
Treatment duration (months)	–	Median [Q25 – Q75]						
		Mean (SD)						
		Range						
Co-morbid indications	Rheumatoid arthritis	N (%)						
	Atopic dermatitis	N (%)						
	Alopecia areata	N (%)						
	Inflammatory bowel disease	N (%)						
	Juvenile arthritis	N (%)						
	Juvenile idiopathic arthritis	N (%)						
	Psoriatic arthritis	N (%)						
Prior JAK inhibitor use[1]	Abrocitinib	N (%)						
	Baricitinib	N (%)						
	Filgotinib	N (%)						
	Tofacitinib	N (%)						
	Upadacitinib	N (%)						
	No previous JAKi use	N (%)						
Number of prior JAKi ingredient initiated	–	Median [Q25 – Q75]						
Inflammatory bowel disease								
Number records	–	N						

Variable	Variable level	Estimate	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
Number subjects	–	N						
Age	–	Median [Q25 – Q75]						
		Mean (SD)						
		Range						
Sex	Female	N (%)						
	Male	N (%)						
Treatment duration (months)	–	Median [Q25 – Q75]						
		Mean (SD)						
		Range						
Co-morbid indications	Rheumatoid arthritis	N (%)						
	Atopic dermatitis	N (%)						
	Alopecia areata	N (%)						
	Axial spondylitis	N (%)						
	Juvenile arthritis	N (%)						
	Juvenile idiopathic arthritis	N (%)						
	Psoriatic arthritis	N (%)						
Prior JAK inhibitor use[1]	Abrocitinib	N (%)						
	Baricitinib	N (%)						
	Filgotinib	N (%)						
	Tofacitinib	N (%)						
	Upadacitinib	N (%)						
	No previous JAKi use	N (%)						

Variable	Variable level	Estimate	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
Number of prior JAKi ingredient initiated	–	Median [Q25 – Q75]						
Juvenile arthritis								
Number records	–	N						
Number subjects	–	N						
Age	–	Median [Q25 – Q75]						
		Mean (SD)						
		Range						
Sex	Female	N (%)						
	Male	N (%)						
Treatment duration (months)	–	Median [Q25 – Q75]						
		Mean (SD)						
		Range						
Co-morbid indications	Rheumatoid arthritis	N (%)						
	Atopic dermatitis	N (%)						
	Alopecia areata	N (%)						
	Axial spondylitis	N (%)						
	Inflammatory bowel disease	N (%)						
	Juvenile idiopathic arthritis	N (%)						
	Psoriatic arthritis	N (%)						
Prior JAK inhibitor use[1]	Abrocitinib	N (%)						
	Baricitinib	N (%)						
	Filgotinib	N (%)						

Variable	Variable level	Estimate	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
	Tofacitinib	N (%)						
	Upadacitinib	N (%)						
	No previous JAKi use	N (%)						
Number of prior JAKi ingredient initiated	–	Median [Q25 – Q75]						
Juvenile idiopathic arthritis								
Number records	–	N						
Number subjects	–	N						
Age	–	Median [Q25 – Q75]						
		Mean (SD)						
		Range						
Sex	Female	N (%)						
	Male	N (%)						
Treatment duration (months)	–	Median [Q25 – Q75]						
		Mean (SD)						
		Range						
Co-morbid indications	Rheumatoid arthritis	N (%)						
	Atopic dermatitis	N (%)						
	Alopecia areata	N (%)						
	Axial spondylitis	N (%)						
	Inflammatory bowel disease	N (%)						
	Juvenile arthritis	N (%)						
	Psoriatic arthritis	N (%)						

Variable	Variable level	Estimate	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
Prior JAK inhibitor use[1]	Abrocitinib	N (%)						
	Baricitinib	N (%)						
	Filgotinib	N (%)						
	Tofacitinib	N (%)						
	Upadacitinib	N (%)						
	No previous JAKi use	N (%)						
Number of prior JAKi ingredient initiated	–	Median [Q25 – Q75]						
Psoriatic arthritis								
Number records	–	N						
Number subjects	–	N						
Age	–	Median [Q25 – Q75]						
		Mean (SD)						
		Range						
Sex	Female	N (%)						
	Male	N (%)						
Treatment duration (months)	–	Median [Q25 – Q75]						
		Mean (SD)						
		Range						
Co-morbid indications	Rheumatoid arthritis	N (%)						
	Atopic dermatitis	N (%)						
	Alopecia areata	N (%)						
	Axial spondylitis	N (%)						

Variable	Variable level	Estimate	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
	Inflammatory bowel disease	N (%)						
	Juvenile arthritis	N (%)						
	Juvenile idiopathic arthritis	N (%)						
Prior JAK inhibitor use[1]	Abrocitinib	N (%)						
	Baricitinib	N (%)						
	Filgotinib	N (%)						
	Tofacitinib	N (%)						
	Upadacitinib	N (%)						
	No previous JAKi use	N (%)						
Number of prior JAKi ingredient initiated	–	Median [Q25 – Q75]						
Rheumatoid arthritis								
Number records	–	N						
Number subjects	–	N						
Age	–	Median [Q25 – Q75]						
		Mean (SD)						
		Range						
Sex	Female	N (%)						
	Male	N (%)						
Treatment duration (months)	–	Median [Q25 – Q75]						
		Mean (SD)						
		Range						
Co-morbid indications	Atopic dermatitis	N (%)						

Variable	Variable level	Estimate	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
	Alopecia areata	N (%)						
	Axial spondylitis	N (%)						
	Inflammatory bowel disease	N (%)						
	Juvenile arthritis	N (%)						
	Juvenile idiopathic arthritis	N (%)						
	Psoriatic arthritis	N (%)						
Prior JAK inhibitor use[1]	Abrocitinib	N (%)						
	Baricitinib	N (%)						
	Filgotinib	N (%)						
	Tofacitinib	N (%)						
	Upadacitinib	N (%)						
	No previous JAKi use	N (%)						
Number of prior JAKi ingredient initiated	–	Median [Q25 – Q75]						

DK-DHR = Danish Data Health Registries; EHR = Electronic Health Record; FinOMOP-THL = Finnish Care Register for Health Care; GP = General Practitioner; HI-SPEED = Health Impact - Swedish Population Evidence Enabling Data-linkage; IQVIA DA Germany = IQVIA Disease Analyzer Germany; NAJS = Croatian National Public Health Information System; VID = Valencia Health System Integrated Dataset; SD = Standard Deviation; Q25 = 25th Percentile; Q75 = 75th Percentile; JAKi = Janus kinase inhibitor/s.
[1]Note this should not include the index JAKi ingredient.

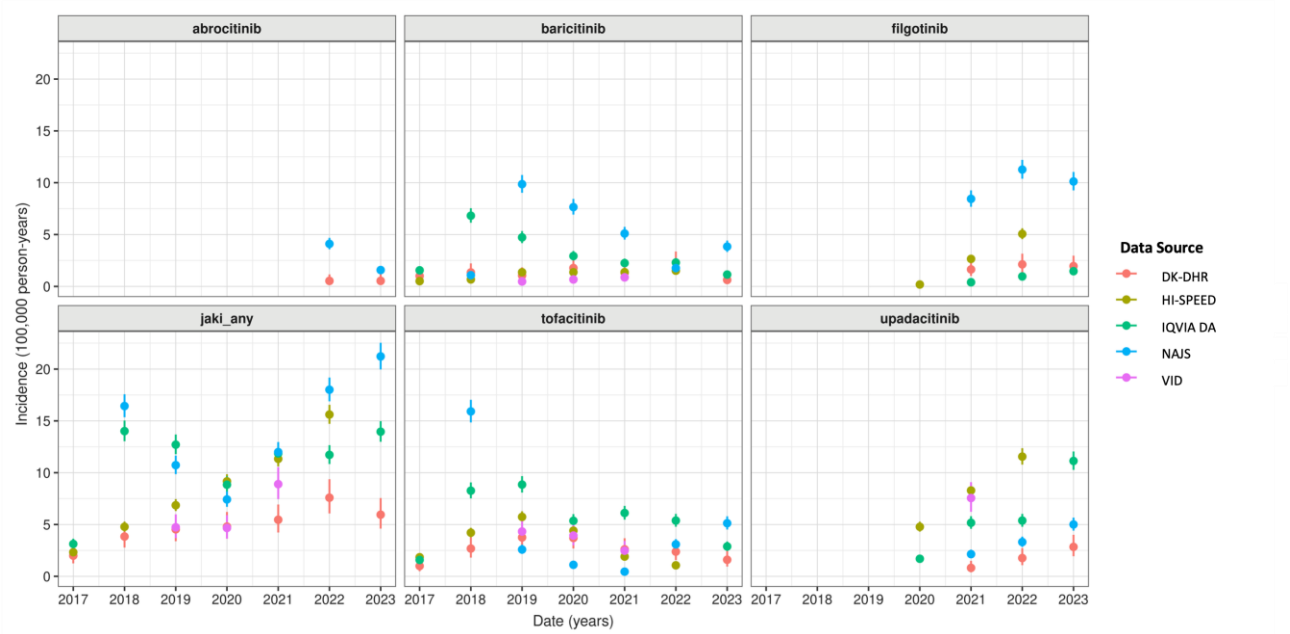

Figure 1–2. Incidence of new JAKi initiation among the individuals without prior exposure to any JAKi / without prior exposure to the same JAKi ingredient.

Note: This plot shows results from the previous study (P3-C1-001). FinOMOP-THL will be included in the actual figures. This plot is for illustrative purposes.
DK-DHR = Danish Data Health Registries; EHR = Electronic Health Record; FinOMOP-THL = Finnish Care Register for Health Care; GP = General Practitioner; HI-SPEED = Health Impact - Swedish Population Evidence Enabling Data-linkage; IQVIA DA Germany = IQVIA Disease Analyzer Germany; NAJS = Croatian National Public Health Information System; VID = Valencia Health System Integrated Dataset; JAKi = Janus kinase inhibitor/s.

8.9. Evidence synthesis

Results from analyses described in **Section 8.8** will be presented separately for each data source, and no meta-analysis of results will be conducted.

9. STRENGTHS AND LIMITATIONS

The study will be informed by routinely collected health care data, and it is important to consider several factors that may influence the interpretation of the results. This study will include data from multiple healthcare settings across six European countries (Croatia, Denmark, Finland, Germany, Spain, and Sweden), including four national linked registries data sources (NAJS, DK-DHR, FinOMOP-THL, HI-SPEED), one nationwide primary care data source (IQVIA DA Germany), and one regional linked registries data source (VID), to ensure European representativeness. They were selected in order to maximise the capture of JAKi administration/prescription.

For all data sources, the indication of JAKi use will be identified via a proxy based on pre-defined conditions recorded prior to the date of therapy initiation. Since the completeness of recordings of comorbidities used for patient characterisation may vary across data sources, recording of potential indication may be incomplete or misclassification can occur.

In NAJS and FinOMOP-THL, no treatment duration is available; however, we will impute treatment duration in these data sources by linking consecutive prescriptions to approximate continuous use. Additionally, NAJS includes primary care drug records from 2015–2025 and secondary conciliatory care records from 2016–2024, which means it is not possible to confirm whether a patient's first recorded JAKi use reflects their true treatment initiation. Both DK-DHR and IQVIA DA Germany calculate treatment durations using

defined daily dose (DDD), which may lead to some inaccurate treatment end dates. Additionally, in DK-DHR treatment duration is only available for EHR dispensing records. This will be taken into consideration when interpreting the results.

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11. ANNEXES

ANNEX I. Description of data sources

National Public Health Information System (NAJS)

#	Section	Description
1	Data source identification and country	NAJS (Croatian National Public Health Information System) Croatia
2	Data partner information section	Croatian Institute of Public Health Department of Data Science and Analytics
3	Coverage and timespan	Data collection since: 1998 Extent: Nation-wide. Geographic coverage covers whole Croatia, with various levels of resolution for different registries. Current estimates for the population in Croatia will be available at: https://podaci.dzs.hr/hr/podaci/stanovnistvo/procjena-stanovnistva/ for each year. The total and active person count in the NAJS data is larger than the current population of Croatia. This explained by: a) the person table included deceased and all previously insured people and b) there is no information about insurance ending, c) healthcare is also used by people with dual citizenship from neighbouring countries It is known that a lot of people emigrated (300k-400k) and weren't included in the last population census but still are in the NAJS database. There is also an influx of immigrant workers that are insured and registered but weren't included in the census.
4	Healthcare setting / type of data	Primary care – General Practitioner, and secondary care – specialists (ambulatory or hospital outpatient care), and hospital inpatient care. Primary care – gps, and secondary care – specialists (ambulatory or hospital outpatient care), and hospital inpatient care. For both inpatient and outpatient setting diagnoses, medication, procedures, and measurements are captured. The year of availability of information depends on the setting • 2014-2025 for biochemical lab tests in primary care from EHR patients records (measurements with results) • 2015-2025 for primary care data from EHR patient records (conditions, procedures, and drug prescriptions) • 2015- 2024 for inpatient hospital data from EHR administrative records (conditions, procedures, measurements without results and drug administrations) • 2016-2025 for health risk assessment data entered by GPs (measurements with results - height, weight…) • 2016-2022 for secondary conciliatory care data from EHR administrative records (conditions, procedures, measurements without results and drug administrations) • 2016-2022 for emergency care data from EHR patient records (conditions) • 2017-2025 for hospital records from registry data (conditions and procedures) • 2020-2025 for vaccination data from EHR patient records
5	Data collection process	Inpatient hospital billing systems, and Other. Data is entered by clinicians at healthcare contact, then combined by CIPH into the NAJS database and integrated with registries for public health purposes.
6	General representativeness	The data is collected from the evidence of public health records collected for public health purposes, as the majority of health care in Croatia is public and under single health insurance provider. Personal details are collected to a better extent for insured individuals compared to uninsured patients, who are excluded in the ETL process.
7	Data content /source coding	Medication prescriptions are recorded with ATC codes with an additional 3 digit code denoting the package. Diagnoses with ICD10 codes (Australian modification). Procedures with local source codes. Lab results with local source codes.
8	Data Harmonisation	The data has been mapped to the OMOP CDM v5.4 and the OMOP standard vocabularies (SNOMED, RxNorm, LOINC). The format, structural and semantic conformance has been verified upon onboarding into the DARWIN EU® data network. Records from 2017 include insured patients with reliable IDs. Uninsured patients do not have reliable IDs. For example, if a patient changed her status from insured to uninsured, or vice versa,

#	Section	Description
		she could be counted several times, as could tracking records from before 2017 and after. By using the unique personal identifier for Croatian citizens, it can be checked and verified.
9	Quality control (data source specific)	There is a network of registry personnel (leaders, administrators, coders, sources) working on data coverage and other quality dimensions. An analytical team routinely checks for erroneous entries in hospital records, removing double entries, false dates, and overlapping stays. Entries without enough data or with obviously erroneous dates from primary care analysis are being excluded.
10	Linkage	The national death registry is updated yearly, with one year lag, but the fact of someone's death (just the date) is updated daily, without the cause of death or any other additional details. Primary care is updated weekly and hospital level care monthly. Specific registries are included in NAJS (e.g. diabetes registry), where inclusion criteria vary across these registries.
11	Vital status	NAJS is linked to the national death registry.
12	Limitations	Hospital data is available from 2017 onwards. This is often used as start of data collection, while laboratory and GP data is captured before that (since 2014 and 2015 respectively). Drug duration is often not available and set to 1 day for administration and 30 days for prescription. Hospital discharge summaries are currently not captured in NAJS. Hospital drug administration data is less reliable than prescription data from primary care, with some drugs (monoclonal antibodies / precision medicine drugs) that require additional approval not being recorded at all.
13	Main references	No main reference provided.
14	Link to HMA-EMA catalogue and data source webpage	HMA-EMA Catalogue entry: https://catalogues.ema.europa.eu/data-source/1111155 Website: https://www.hzjz.hr/nacionalni-javnozdravstveni-informacijski-sustav-najs/

Danish Data Health Registries (DK-DHR)

#	Section	Description
1	Data source identification and country	DK-DHR (Danish Data Health Registries) Denmark
2	Data partner information section	Danish Medicines Agency (DKMA) Data Analytics Centre (DAC)
3	Coverage and timespan	Data collection since: 1995 Extent: Nation-wide. The data is representative of the entire Danish population.
4	Healthcare setting / type of data	Community pharmacists, and secondary care – specialists (ambulatory or hospital outpatient care), and hospital inpatient care. The following data elements are collected: diagnosis (including rare diseases and pregnancy data), hospital admissions, discharge and ICU data, Cause of death, Drug prescriptions, dispensing, vaccination and contraception, Procedures (surgical and non-surgical hospital), and Sociodemographic information (sex and age only).
5	Data collection process	Outpatient electronic health records, and Inpatient hospital electronic health records, and Registries, and Other. All causes of deaths, all retrieved drug prescriptions, all records of vaccinations, all hospital inpatient and outpatients contacts including disease diagnoses and hospital surgical and non-surgical procedures, histologically confirmed incident cancers, laboratory test results for the entire Danish population from 1/1/1995 onwards.
6	General representativeness	The data is representative of the entire Danish population. Healthcare is free in Denmark, so we do not expect any bias in data collection based on socio-economic status.

#	Section	Description
7	Data content /source coding	Diagnoses and causes of death are collected using the ICD-10 vocabulary. ATC and RxNorm are used for Drugs. SNOMED codes are used for Procedures.
8	Data Harmonisation	The data has been mapped to the OMOP CDM v5.4 and the OMOP standard vocabularies (SNOMED, RxNorm, LOINC). The format, structural and semantic conformance has been verified upon onboarding into the DARWIN EU® data network. Patients have unique identifiers used to link datasets.
9	Quality control (data source specific)	The data we have received relating to nationwide Danish Health Data registries offer an opportunity for large-scale, population-based studies with several advantages 1) Their large size improves the precision of estimates and enables the study of rare exposures and outcomes with long-term latency, 2) Inclusion of nearly all individuals in the target population ensures that the data reflect routine clinical care and all clinical segments of the source population, 3) Data are collected independently of each research study, thus minimising certain types of bias, e.g. non-response, and the influence from attention to the research question on the diagnostic process. Before the source data is sent to us, the Danish Health Data Authority runs and does comprehensive checks of the registry table data validity of the variables, breaks in data, changes in variable coding, missingness, etc. We perform checks of missingness/completeness in relation to requested variables. In essence, we are receiving a dump of a mirror of the data that is controlled by the SDS. The documentation performed by SDS is available online, in Danish primarily https://www.esundhed.dk/Dokumentation (all variables), but also in English https://sundhedsdatastyrelsen.dk/da/english/health_data_and_registers/national_health_registers
10	Linkage	There is no linkage in this data source.
11	Vital status	The Cause of Death registry (DAR) is used, the cause of death is collected using ICD-10 codes.
12	Limitations	DK-DHR has the following limitations, which may be relevant confounders for certain complex Darwin EU studies: - We lack information on key socio-economic status (SES) factors, such as occupation, education, and income. These variables may be important for analysis in some studies. - We only have complete data on lifestyle factors (such as smoking status and weight) for pregnant women. - We have no information on patient contacts in primary care (visits to the GP). Consequently, the incidence of chronic diseases like Type 2 Diabetes (T2D) and asthma must be determined using drug prescriptions as a proxy. Stillborn children will not have any records in our CDM. This means that e.g. birth length of stillborns is not recorded.
13	Main references	Schmidt M, Schmidt SAJ,Adelborg K,Sundbøll J,Laugesen K,Ehrenstein V,Sørensen HT "The Danish health care system and epidemiological research: from health care contacts to database records." Clinical epidemiology (2019): 31372058
14	Link to HMA-EMA catalogue and data source webpage	HMA-EMA Catalogue entry: https://catalogues.ema.europa.eu/data-source/1111217 Website: https://sundhedsdatastyrelsen.dk/da/english/health_data_and_registers/healthdatadenmark

Finnish Care Register for Health Care (FinOMOP-THL)

#	Section	Description
1	Data source identification and country	FinOMOP-THL (Finnish Care Register for Health Care) Finland
2	Data partner information section	FinOMOP (FinOMOP) The Department of Data and Analytics
3	Coverage and timespan	Data collection since: 1998 Extent: Nation-wide. The current CDM population comprises all persons having been alive and residing in Finland since the beginning of 2011.

#	Section	Description
4	Healthcare setting / type of data	Primary care – General Practitioner, and primary care specialists (e.g. paediatricians), and secondary care – specialists (ambulatory or hospital outpatient care), and hospital inpatient care, and other (specify). THL maintains health registers that cover both public and private, primary, and specialised inpatient, urgent and outpatient health care encounters in Finland, starting from 2011. The entire public sector and private inpatient encounters have been included since 2011, while private outpatient encounters, including occupational care, are included since 2020. Since 1998, the Care Register for Health Care (TerveysHilmo) has covered both public outpatient and inpatient specialized care and private inpatient care. Since 2009, the Finnish National Vaccination Register has covered all vaccinations from the public sector and from a large part of private vaccination providers, with the data coverage from both sections being very good to complete from 2020 onwards. Since 2011, the Register of Primary Health Care Visits (AvoHilmo) has covered public primary care. Since 2020, the register has also covered private outpatient care and occupational care. In addition, the CDM also contains positive COVID-19 test results from the Finnish National Infectious Diseases Register. The register itself covers all laboratory confirmations for around 70 specific microbes from 1995 onwards, but only COVID-19 has currently been mapped to the CDM. The CDM also includes prescription records from multiple different sources. Both Care Register for Health Care and Register of Primary Health Care Visits contain very basic prescription data recorded during health care encounters that include just the ATC-code and trade name of medication. More comprehensive prescription data from Kanta Prescription Centre, maintained by Social Insurance Institution of Finland (Kela), has been integrated into the CDM since its 2024 release. The Kanta Prescription records are based electronic prescriptions, which were adopted by most public health care providers in 2010 and by most private providers by 2017.
5	Data collection process	Outpatient electronic health records, and Inpatient hospital electronic health records, and Registries. Data is entered by clinicians upon healthcare contact and processed by THL (Kela in the case of Kanta Prescription Centre).
6	General representativeness	The THL data has national coverage and is therefore well representative of the Finnish population. Using the complete population as a basis for the person table also serves to facilitate calculations on a population level, e.g. incidence rates.
7	Data content /source coding	The following coding systems have been OMOP-mapped, typically to a good level of completeness: ICD10fi Finnish Extension, ICPC-2, ATC, Toimenpideluokitus (procedure classification adapted from the Nordic Classification of Surgical Procedures (NCSP)), Terveydenhuollon erikoisalat (Hilmo specific provider speciality), Rokotustapa (AR/YDIN National classification for vaccine administration), Tupakointistatus (AR/YDIN National classification for smoking status). Vaccinations are identified on product level based on batch number, trade name, vaccine title, and ATC-code. This is mapped on brand and type in the OMOP CDM.
8	Data Harmonisation	The data has been mapped to the OMOP CDM v5 and the OMOP standard vocabularies. The format, structural and semantic conformance has been verified upon onboarding into the DARWIN EU® data network. Each patient in THL has a unique identifier.
9	Quality control (data source specific)	The source data collection undergoes a structural and semantic validation before entry into the source database. Additionally, some coded variables undergo quality assessment against the respective code systems post entry into the database. The source registers are also assessed for completeness and coverage, with the aim of improving future collection in the areas where data is lacking.
10	Linkage	THL is already a linkage of multiple Finnish registries (see above).
11	Vital status	The National Population registry data forms the basis for forming the patient population. This ensures an up-to-date location (municipality of residence) of patients, as well as complete death occurrences (although not the cause of death).
12	Limitations	All drug records in the CDM are currently based on prescriptions. Kanta Prescription Centre also includes information on drug dispensings, but these have not currently been converted into OMOP CDM. Depending on the type of the medication, a single prescription can be for up to two

#	Section	Description
		years dosage of the drug. This means a patient can have up to two-year breaks between observations while actively using the drug. Observation of a prescription also does not mean that the patient necessarily bought or used the medication. The CDM does not currently have meaningful end dates or days of supply for drug exposure. This information is not available for Care Register for Health Care or Register of Primary Health Care Visits, and for Kanta Prescription Centre it is only available in unstructured, free-form format that has not been converted into OMOP CDM. The source system for prescription drug data is only available to the DP until Dec-2023, therefore drug_exposure records from this source are only available in that time range. Not all private health care records are covered for the CDM's entire follow-up time from 2011 onwards. For Register of Primary Health Care Visits and Finnish National Vaccination Register, records from private health care have been available from 2020 onwards. For Kanta Prescription Centre, the coverage of private health care records has been good from 2017 onwards. The inclusion of private health care mainly presents itself as an increase in the number of observations, meaning that it has to be accounted for when interpreting any time series data from the CDM.
13	Main references	Häkkinen, Pirjo; Mölläri, Kaisa; Saukkonen, Sanna-Mari; Väyrynen, Riikka; Mielikäinen, Lasse; Järvelin, Jutta "Hilmo - Sosiaali- ja terveydenhuollon hoitoilmoitus 2020 : Määrittelyt ja ohjeistus : Voimassa 1.1.2020 alkaen" Terveyden ja hyvinvoinnin laitos (2019):
14	Link to HMA-EMA catalogue and data source webpage	HMA-EMA Catalogue entry: https://catalogues.ema.europa.eu/data-source/1111187;https://catalogues.ema.europa.eu/data-source/1111191 Website: https://thl.fi/en/statistics-and-data/data-and-services/register-descriptions;https://www.kanta.fi/en/research-and-knowledge-management

IQVIA Disease Analyser (IQVIA DA Germany)

#	Section	Description
1	Data source identification and country	IQVIA DA Germany (IQVIA Disease Analyser Germany) Germany
2	Data partner information section	IQVIA
3	Coverage and timespan	Data collection since: 1989 Extent: Nation-wide. GP and specialists in Germany using specific patient management software.
4	Healthcare setting / type of data	Primary care – General Practitioner, and primary care specialists (e.g. paediatricians). Diagnoses, medication, and procedures from an ambulatory setting. Medications are recorded as prescriptions of marketed products.
5	Data collection process	Outpatient electronic health records. By clinicians at healthcare contact.
6	General representativeness	No specific details on general representativeness given.
7	Data content /source coding	Prescription is on product code level (German PZN), ICD10, NFC, Local lab coding.
8	Data Harmonisation	The data has been mapped to the OMOP CDM v5.4 and the OMOP standard vocabularies (SNOMED, RxNorm, LOINC). The format, structural and semantic conformance has been verified upon onboarding into the DARWIN EU® data network. There can be patients registered under different ID numbers, because there is no linkage between different GPs.
9	Quality control (data source specific)	Data is quality checked on plausibility.
10	Linkage	No.

#	Section	Description
11	Vital status	Death information is derived from medical events.
12	Limitations	No database-specific limitations documented. General limitations for the data type applicable.
13	Main references	No main reference provided.
14	Link to HMA-EMA catalogue and data source webpage	HMA-EMA Catalogue entry: https://catalogues.ema.europa.eu/data-source/104282 Website: https://www.iqvia.com/

Valencia Health System Integrated Dataset (VID)

#	Section	Description
1	Data source identification and country	VID (Valencia Health System Integrated Dataset) Comunitat Valenciana, Spain
2	Data partner information section	FISABIO Health Services Research & Pharmacoepidemiology Unit
3	Coverage and timespan	Data timespan: 2009-2024 Extent: Regional. The VID covers the general population of the Valencia region, comprising 10.7% of the Spanish population. The total active population is estimated to be around 5,300,000.
4	Healthcare setting / type of data	Primary care – GPs and paediatricians, and secondary care – specialists (ambulatory or hospital outpatient care), emergency department care and hospital inpatient care. Both primary and secondary care settings are covered, where visits, diagnoses, medications, measurements, and procedures are recorded. The population information system collects sociodemographic, health coverage, and mortality data. The Electronic prescription and dispensing system captures all information related to medication (active ingredient, strength, duration, indication, etc.). Emergency department and hospital admissions are registered, providing information on dates, diagnoses, and procedures. Measurements are captured additionally from the vaccine information system and the Microbiological surveillance network. Mortality is also captured.
5	Data collection process	Outpatient electronic health records, and Inpatient hospital electronic health records, and Registries, and Other. Data extraction is performed by clinical IT personnel. Data is released by the health authorities on a project basis and can only be used for such purposes.
6	General representativeness	The population captured by the VID should represent the Valencia region well, as the VID contains data of the general population covered by the universal public health care system. About 97% of the population in this region is covered by public care.
7	Data content /source coding	Prescribed and dispensed medications are coded with the ATC system. The indications of each prescription, as well as procedures are coded using ICD9CM and ICD10ES.
8	Data Harmonisation	The data has been mapped to the OMOP CDM v5.4 and the OMOP standard vocabularies (SNOMED, RxNorm, LOINC). The format, structural and semantic conformance has been verified upon onboarding into the DARWIN EU® data network.
9	Quality control (data source specific)	The data is reviewed carefully with the IT personnel who perform the extraction of data and then by a senior researcher with expertise in RWD management in the HSRP unit. Several quality check scripts are run against the received data. Finally, a senior researcher with RWD and clinical expertise assesses the completeness, consistency, and quality of the data extraction. If any inconsistency or error is detected, the dataset is requested and extracted again.
10	Linkage	VID also contains hospital discharge records, emergency care discharge records, birth registry, congenital anomaly registry, perinatal mortality registry, cancer registry, pharmacy prescription and dispensing records, vaccine records, and microbiology records. Mother- and father-child

#	Section	Description
		linkage is also available. Most databases are updated daily, but certain registries, such as the congenital anomaly registry and perinatal mortality registries, are updated yearly.
11	Vital status	Mortality dates and causes of death are available in the mortality registry and the perinatal mortality registry.
12	Limitations	A subgroup of women (born before 1953) is not mapped into OMOP CDM yet. General limitations for the data type applicable.
13	Main references	García-Sempere A, Orrico-Sánchez A,Muñoz-Quiles C,Hurtado I,Peiró S,Sanfélix-Gimeno G,Diez-Domingo J "Data Resource Profile: The Valencia Health System Integrated Database (VID)." International journal of epidemiology (2020): 31977043
14	Link to HMA-EMA catalogue and data source webpage	HMA-EMA Catalogue entry: https://catalogues.ema.europa.eu/data-source/1111174

Health Impact - Swedish Population Evidence Enabling Data-linkage (HI-SPEED)

#	Section	Description
1	Data source identification and country	HI-SPEED (Health Impact - Swedish Population Evidence Enabling Data-linkage) Sweden
2	Data partner information section	SMPA-GU: - Pharmacoepidemiology and Analysis Department (FeA), Läkemedelsverket, Box 26, 751 03 Uppsala, Sweden - School of Public Health and Community Medicine, Institute of Medicine, University of Gothenburg, Box 469, 405 30 Gothenburg, Sweden
3	Coverage and timespan	Data collection since: 2015 Extent: Nation-wide. The catchment area includes the whole of Sweden, covering the full population of approximately 11.7 million.
4	Healthcare setting / type of data	Primary care – General Practitioner, and secondary care – specialists (ambulatory or hospital outpatient care), and hospital inpatient care. Primary care (GPs) is available only for the 2 largest regions (~40% of national population) The following data elements are collected: Socio-demographics, dispensed drug prescriptions, cause of death, diagnoses and procedures from secondary (specialist) care and inpatient visits or clinical events, as well as from primary care visits (40%pop only).
5	Data collection process	Registries. The data is acquired from the relevant Swedish national and regional registries, only once all legislative, GDPR and ethical approvals have been granted. Therefore only relevant data is passed on, which will then be entered and processed by the study team. The data are updated several times annually.
6	General representativeness	The coverage includes all patients of all sociodemographic characteristics. Therefore it should mirror the source population to a very good extent.
7	Data content /source coding	Medicines are coded with ATC and NPLID (National Product ID), ICD10-SE is used for diagnoses and the Swedish procedure coding system (KVA) is used for clinical procedures.
8	Data Harmonisation	The data has been mapped to the OMOP CDM v5.4 and the OMOP standard vocabularies (SNOMED, RxNorm, LOINC). The format, structural and semantic conformance has been verified upon onboarding into the DARWIN EU® data network. Patients have a uniquely id across datasets.
9	Quality control (data source specific)	The source data are obtained from the relevant Swedish National and Regional Registers. The registers perform some regular quality controls on their data. After receiving the data, we

#	Section	Description
		perform additional checks and cleaning. We also run regular quality checks on the data we manage.
10	Linkage	Data on specialist care is acquired from the National Patient Register, mortality information is provided by the Cause-Of-Death Registry. Drug data is provided by the Patient Drug Register. And similarly for other registers. Data are linked very accurately using the national personal ID number, and pseudonymized before delivery to HI-SPEED. All data are updated 2-4 times per year.
11	Vital status	Data on death and underlying + contributing causes-of-death are extracted from the Cause-of-Death registry (i.e. based on death certificates).
12	Limitations	General limitations for the data type applicable. This is a research project where all studies require ethics approval. Data collection since: 2015 for most data, except prescribed drug register (from 2018), and some COVID-related data (tests, vaccination) from 2020 Primary care is only available for a subset.
13	Main references	Nyberg F, Franzén S,Lindh M,Vanfleteren L,Hammar N,Wettermark B,Sundström J,Santosa A,Björck S,Gisslén M "Swedish Covid-19 Investigation for Future Insights - A Population Epidemiology Approach Using Register Linkage (SCIFI-PEARL)." Clinical epidemiology (2021): 34354377
14	Link to HMA-EMA catalogue and data source webpage	HMA-EMA Catalogue entry: https://catalogues.ema.europa.eu/node/4463/ Website: https://www.gu.se/en/research/scifi-pearl

ANNEX II. Fitness for use assessment

Data source justification for inclusion and key characteristics

Theme / Issue	Croatia (NAJS)	Denmark (DK-DHR)	Finland (FinOMOP-THL)	Germany (IQVIA DA Germany)	Spain (VID)	Sweden (HI-SPEED)
Care settings covered	Primary care GP, secondary care specialist, hospital inpatient care	Community pharmacists, secondary care specialist, hospital inpatient care	Primary care GP, primary care specialist, secondary care specialist, hospital inpatient care	Primary care GP, primary care specialist	Primary care GP, primary care specialist, secondary care specialist, hospital inpatient care, other	Primary care GP, secondary care specialist, hospital inpatient care
Feasibility (person count)	2800	3500	4800	11200	6300	12800
Data availability and follow-up	Sufficient (median follow-up: 3840 days)	Sufficient (median follow-up: 7920 days)	Sufficient (median follow-up: 5020 days)	Sufficient (median follow-up: 121 days)	Sufficient (median follow-up: 5840 days)	Sufficient (median follow-up: 3890 days)
Treatment duration	Based on assumptions (30 days for prescriptions, 1 day for administrations)	Available, but only for EHR dispensing records.	Based on assumptions (30 days for prescriptions and dispensations)	Available, with some assumptions used to impute missing values.	Available.	Available.
IRB timelines	Feasible (1 to 3 months)	Feasible (blanket approval)	Feasible (blanket approval)	Feasible (blanket approval)	Feasible (1 to 3 months)	Feasible (less than 1 month)

DK-DHR = Danish Data Health Registries; FinOMOP-THL = Finnish Care Register for Health Care; HI-SPEED = Health Impact - Swedish Population Evidence Enabling Data-linkage; IQVIA DA Germany = IQVIA Disease Analyzer Germany; NAJS = Croatian National Public Health Information System; VID = Valencia Health System Integrated Dataset

National Public Health Information System (NAJS)

NAJS will be included in this study because it is a population based registry data source that provides relevant information on treatment of interest in the general population, as NAJS includes records of drugs prescribed/dispensed in specialist outpatient settings, which is the setting where JAKi are mainly prescribed.

Based on a preliminary feasibility assessment, the expected number of person counts for JAKi initiation in NAJS will be 2800. Moreover, data availability and follow-up in NAJS is sufficient, as data availability starts in February 2014, and the date of most recent data extraction is June 2025, which aligns with the study period. The median follow-up of the first observation period in NAJS is 3840 days (interquartile range (IQR): 3310 – 3930).

There are some study specific limitations present in NAJS. For example, drug records from primary care are only available from 2015–2025, while those from secondary conciliatory care are available from 2016–2024.

Actual end date of drug prescription and administration records are not available in NAJS, therefore an assumption of 30-day exposure has been applied to prescriptions, and an assumption of 1-day exposure has been applied to drug administration records.

Lastly, IRB approval for NAJS is estimated to take 1–3 months, which makes the execution of this study feasible within the current study timelines.

Danish Data Health Registries (DK-DHR)

DK-DHR will be included in this study because it is a nationwide registry data source that provides relevant information on treatment of interest in the general population, as DK-DHR includes records of drugs prescribed/dispensed in specialist outpatient settings, which is the setting where JAKi are mainly prescribed.

Based on a preliminary feasibility assessment, the expected number of person counts for JAKi initiation in DK-DHR will be 3500. Moreover, data availability and follow-up in DK-DHR is sufficient, as data availability starts in January 1995, and the date of most recent data extraction is October 2025, which aligns with the study period. The median follow-up in DK-DHR is 7920 days (IQR: 2610 – 10900).

In DK-DHR, treatment duration is calculated as the amount prescribed divided by the DDD. However, this is only available for EHR dispensing records. End date is not available for drug records originating from the patient registry.

Lastly, DK-DHR does not need additional IRB approval.

Finnish Care Register for Health Care (FinOMOP-THL)

FinOMOP-THL will be included in this study because it is a nationwide registry data source that provides relevant information on treatment of interest in the general population, as FinOMOP-THL includes records of drugs prescribed/dispensed in primary and secondary healthcare settings, which is the setting where JAKi are mainly prescribed. FinOMOP-THL also includes both drug prescription and dispensing records.

Based on a preliminary feasibility assessment, the expected number of person counts for JAKi initiation in FinOMOP-THL will be 4800. However, this feasibility count is based on the data cut as of end of 2023. It is expected to have an update in mid-May 2026, with data up to early 2026. Together with data availability starting in January 2011, it is therefore expected that data availability and follow-up in FinOMOP-THL will be sufficient for the study and align with the study period. The median follow-up in FinOMOP-THL is 5020 days (IQR: 4030 – 5020).

Actual end date of drug prescription and dispensing records are not available in FinOMOP-THL, and an assumption of 30-day exposure has been applied to both prescription and dispensing records.

Lastly, FinOMOP-THL does not need additional IRB approval.

IQVIA Disease Analyser (IQVIA DA Germany)

IQVIA DA Germany will be included in this study because it is a primary care data source that provides relevant information on the outcomes and exposures of interest in the general population.

Based on a preliminary feasibility assessment, the expected number of person counts for JAKi initiation in IQVIA DA Germany will be 11200.Moreover, data availability and follow-up in IQVIA DA Germany is sufficient, as data availability starts in February 1992, and the date of most recent data extraction is June 2025, which aligns with the study period. The median follow-up of the first observation period in IQVIA DA Germany is 121 days (IQR: 0 – 1570). Additionally, IQVIA DA Germany includes records of drugs prescribed/dispensed in specialist outpatient settings, which is the setting where JAKi are mainly prescribed.

There are some study specific limitations present in IQVIA DA Germany. In IQVIA DA Germany, each individual's observation period is defined by their last interaction with the primary care system. This affects which individuals are considered "at risk" for the medicines of interest (i.e. included in the denominator), particularly in the most recent months of data, where healthier or infrequent users may no longer appear

active. As a result, denominators used to calculate incident JAKi use may show an artificial decrease while incident users remain. This will be considered when interpreting results.

Treatment duration in IQVIA DA Germany is calculated as the prescribed amount divided by the DDD. For drug records where DDD is missing, the most frequent daily dosage for the drug is used (oral solid forms) or the assumed average maintenance dose per day (other forms).

Lastly, IRB approval is not required for IQVIA DA Germany.

Valencia Health System Integrated Dataset (VID)

VID will be included in this study because it is a registry data source that provides relevant information on the outcomes and exposures of interest in the general population.

Based on a preliminary feasibility assessment, the expected number of person counts for JAKi initiation in VID will be 6300. Moreover, data availability and follow-up in VID is sufficient, as data availability starts in January 2009, and the date of most recent data extraction is December 2024, which aligns with the study period. The median follow-up of the first observation period in VID is 5840 days (IQR: 4460 – 5840). Additionally, VID includes records of drugs prescribed/dispensed in specialist outpatient settings, which is the setting where JAKi are mainly prescribed.

There are some study specific limitations present in VID. VID is a regional data source, and complete coverage of the region is expected. However, in VID, women born before 1953 are not included in the current data source, which means the results will not fully represent the general population. However, considering the age range of JAKi initiators (over 40 years), most JAKi initiations should be captured when using VID's current data source.

Actual end date of drug prescription and dispensing records are available in VID.

Lastly, IRB approval for VID is estimated to take 1–3 months, which makes the execution of this study feasible within the current study timelines.

Health Impact - Swedish Population Evidence Enabling Data-linkage (HI-SPEED)

HI-SPEED will be included in this study because it is a registry data source that provides relevant information on the outcomes and exposures of interest in the general population.

Based on a preliminary feasibility assessment, the expected number of person counts for JAKi initiation in HI-SPEED will be 12800. Moreover, data availability and follow-up in HI-SPEED is sufficient, as data availability starts in January 2015, and the date of most recent data extraction is August 2025, which aligns with the study period. The median follow-up of the first observation period in HI-SPEED is 3890 days (IQR: 3330 – 3890). Additionally, HI-SPEED includes records of drugs prescribed/dispensed in specialist outpatient settings, which is the setting where JAKi are mainly prescribed.

There are some study specific limitations present in HI-SPEED. In HI-SPEED, primary care records have incomplete coverage (available for the two largest regions in Sweden, covering approximately 40% of the national population), but secondary care records are nationwide. As JAKi drugs are mainly prescribed in specialist outpatient settings though, most JAKi initiations should therefore be captured in HI-SPEED. A second limitation would be that, as drug records are only available from 2018 onwards, it is not possible to confirm whether a patient's first recorded JAKi use reflects their true treatment initiation. This will be taken into consideration when interpreting the results.

Actual end date of drug dispensing records are available in HI-SPEED.

Lastly, IRB approval for HI-SPEED is estimated to take less than one month, which makes the execution of this study feasible within the current study timelines.

ANNEX III. Operational and reporting considerations

DATA MANAGEMENT

Data management

All data sources have previously mapped their data to the OMOP common data model. This enables the use of standardised analytics and using DARWIN EU® tools across the network, since the structure of the data and the terminology system is harmonised. The OMOP CDM was developed and maintained by the Observational Health Data Sciences and Informatics (OHDSI) initiative and is described in detail on the wiki page of the CDM: https://ohdsi.github.io/CommonDataModel and in The Book of OHDSI: http://book.ohdsi.org.

The analytic code for this study will be written in R and will use standardized analytics wherever possible. Each data partner will execute the study code against their data source containing patient-level data and then return the results (csv files), which will only contain aggregated data. The results from each of the contributing data sites will then be combined in tables and figures for the study report.

Data storage and protection

For this study, participants from various EU member states will process personal data from individuals that is collected in national/regional electronic health record data sources. Due to the sensitive nature of this personal medical data, it is important to be fully aware of ethical and regulatory aspects and to strive to take all reasonable measures to ensure compliance with ethical and regulatory issues on privacy.

All data sources used in this study are already used for pharmaco-epidemiological research and have a well-developed mechanism to ensure that European and local regulations dealing with ethical use of the data and adequate privacy control are adhered to. In agreement with these regulations, rather than combining person level data and performing only a central analysis, local analyses will be run, which generate non-identifiable aggregate summary results.

The output files are stored in the DARWIN EU® Digital Research Environment (DRE). These output files do not contain any data that allow identification of subjects included in the study. The DRE implements further security measures to ensure a high level of stored data protection to comply with the local implementation of the General Data Protection Regulation (GDPR) (EU) 679/20161 in the various member states.

QUALITY CONTROL

Data source quality control

When defining drug cohorts, non-systemic products will be excluded from the list of included codes summarised on the ingredient level.

When defining cohorts for indications, a systematic search of possible codes for inclusion will be identified using the *CodelistGenerator* R package (https://github.com/darwin-eu/CodelistGenerator). This package allows the user to define a search strategy and will use this to query the vocabulary tables of the OMOP common data model so as to find potentially relevant codes. In addition, the *PhenotypeR* (https://github.com/OHDSI/PhenotypeR) and *DrugExposureDiagnostics* (https://cran.r-project.org/web/packages/DrugExposureDiagnostics/index.html) R packages will be run, if needed, to assess the use of different codes across the data sources contributing to the study and identify any codes potentially omitted in error.

The study code will be based on DARWIN EU® R packages: *IncidencePrevalence* to estimate Incidence and Prevalence, *DrugUtilisation* to characterise the drug use, and *CohortCharacteristics* to characterise the cohort by indication. These packages will include numerous automated unit tests to ensure the validity of the codes, alongside software peer review and user testing. The R package will be made publicly available via GitHub.

PLANS FOR DISSEMINATING AND COMMUNICATING STUDY RESULTS

A PDF report including an executive summary, and the specified tables and/or figures will be submitted to EMA by the DARWIN EU® CC upon completion of the study.

An interactive dashboard incorporating all the results (tables and figures) will be provided alongside the PDF report. The full set of underlying aggregated data used in the dashboard will also be made available, if requested.

ANNEX IV. List of stand-alone documents

Table S1. Preliminary code list for JAKi.

Concept name	Class	ATC code	Ingredient Concept ID	Include descendants
Abrocitinib	JAKi	D11AH08	1758974	Yes
Baricitinib	JAKi	L04AF02	1510627	Yes
Filgotinib	JAKi	L04AF04	35891916	Yes
Tofacitinib	JAKi	L04AF01	42904205	Yes
Upadacitinib	JAKi	L04AF03	1361580	Yes

Table S2. Preliminary list of medicines definitions.

Indication	Concept name	Concept ID	Domain	Vocabulary
Alopecia areata	Alopecia areata	141933	Condition	SNOMED
	Non-scarring alopecia	4031164	Condition	SNOMED
	Alopecia totalis	4056343	Condition	SNOMED
	Diffuse alopecia	4065243	Condition	SNOMED
	Ophiasis	4239312	Condition	SNOMED
	Diffuse alopecia areata	4263194	Condition	SNOMED
	Alopecia due to disturbance of hair cycle	4291286	Condition	SNOMED
	Alopecia due to underlying disease	4297823	Condition	SNOMED
	Chronic diffuse alopecia	4299701	Condition	SNOMED
	Concentric alopecia areata	4300094	Condition	SNOMED
	Circumscribed alopecia areata of scalp	4300910	Condition	SNOMED
	Circumscribed alopecia areata of eyelashes/eyebrows	4300911	Condition	SNOMED
	Circumscribed alopecia areata of beard area	4300912	Condition	SNOMED
	Circumscribed alopecia areata of limbs	4300913	Condition	SNOMED
	Circumscribed alopecia areata of trunk	4300914	Condition	SNOMED
	Alopecia universalis	4312756	Condition	SNOMED
Atopic dermatitis	Atopic dermatitis	133834	Condition	SNOMED
	Exacerbation of atopic dermatitis	1340257	Condition	OMOP Extension
	Acute infantile eczema	4002519	Condition	SNOMED
	Atopic dermatitis of bilateral hands	4031012	Condition	SNOMED
	Photoaggravated atopic dermatitis	4031013	Condition	SNOMED
	Constitutional eczema of hand	4031016	Condition	SNOMED
	Inverse pattern atopic dermatitis	4031630	Condition	SNOMED
	Constitutional eczema of foot	4031634	Condition	SNOMED

Indication	Concept name	Concept ID	Domain	Vocabulary
	Photosensitive atopic dermatitis	4033671	Condition	SNOMED
	Constitutional eczema of hands and feet	4033672	Condition	SNOMED
	Constitutional fingertip eczema	4033770	Condition	SNOMED
	Atopic neurodermatitis	4066382	Condition	SNOMED
	Besnier's prurigo	4066727	Condition	SNOMED
	Erythrodermic atopic dermatitis	4080927	Condition	SNOMED
	Follicular atopic dermatitis	4080928	Condition	SNOMED
	Pruriginous atopic dermatitis	4080929	Condition	SNOMED
	Chronic lichenified atopic dermatitis	4206125	Condition	SNOMED
	Flexural eczema	4210912	Condition	SNOMED
	Chronic atopic dermatitis of hand	4223478	Condition	SNOMED
	Acute atopic dermatitis of hand	4223641	Condition	SNOMED
	Infantile eczema	4236759	Condition	SNOMED
	Flexural atopic dermatitis	4290734	Condition	SNOMED
	Prurigo pattern atopic dermatitis	4290736	Condition	SNOMED
	Atopic dermatitis aggravated by type 1 im mune reaction	4290737	Condition	SNOMED
	Xerosis due to atopic dermatitis	4290738	Condition	SNOMED
	Atopic dermatitis of eyelid	4290740	Condition	SNOMED
	Atopic dermatitis of scalp	4296190	Condition	SNOMED
	Cheilitis due to atopic dermatitis	4296191	Condition	SNOMED
	Childhood atopic dermatitis	4296192	Condition	SNOMED
	Adult atopic dermatitis	4296193	Condition	SNOMED
	Adult atopic dermatitis persistent from chi ldhood	4297362	Condition	SNOMED
	Impetiginized atopic dermatitis	4297478	Condition	SNOMED
	Acute constitutional eczema	4297494	Condition	SNOMED
	Chronic constitutional eczema	4297495	Condition	SNOMED
	Generalized atopic dermatitis	4298597	Condition	SNOMED
	Atopic dermatitis of face	4298598	Condition	SNOMED
	Infantile atopic dermatitis	4298599	Condition	SNOMED
	Adult atopic dermatitis recurrent in adult l ife	4298600	Condition	SNOMED
	Adult atopic dermatitis commencing in ad ult life	4298601	Condition	SNOMED
	Chronic infantile eczema	4321570	Condition	SNOMED
	Atopic dermatitis caused by animal dande r	40482226	Condition	SNOMED
	Ankylosing spondylitis	437082	Condition	SNOMED

Indication	Concept name	Concept ID	Domain	Vocabulary
Ankylosing spondylitis	Axial spondyloarthritis with peripheral joint involvement	607398	Condition	SNOMED
	Exacerbation of ankylosing spondylitis	1340249	Condition	OMOP Extension
	Chest deformity due to ankylosing spondylitis	3654715	Condition	SNOMED
	Ankylosing spondylitis with organ / system involvement	4035614	Condition	SNOMED
	Ankylosing spondylitis with multisystem involvement	4035741	Condition	SNOMED
	Juvenile spondyloarthropathy	4079735	Condition	SNOMED
	Juvenile ankylosing spondylitis	4083681	Condition	SNOMED
	Axial spondyloarthritis	36716891	Condition	SNOMED
	Non-radiographic axial spondyloarthritis	37017494	Condition	SNOMED
	Ankylosing spondylitis co-occurrent with anterior uveitis	37203959	Condition	SNOMED
Inflammatory bowel disease	Chronic ulcerative rectosigmoiditis	77317	Condition	SNOMED
	Chronic ulcerative ileocolitis	78799	Condition	SNOMED
	Ulcerative colitis	81893	Condition	SNOMED
	Chronic ulcerative enterocolitis	194077	Condition	SNOMED
	Crohn's disease of large bowel	194684	Condition	SNOMED
	Crohn's disease of small and large intestines	195575	Condition	SNOMED
	Crohn's disease of small intestine	195585	Condition	SNOMED
	Crohn's disease	201606	Condition	SNOMED
	Acute ulcerative pancolitis	602593	Condition	SNOMED
	Acute left-sided ulcerative colitis	602594	Condition	SNOMED
	Acute ulcerative rectosigmoiditis	602607	Condition	SNOMED
	Exacerbation of Crohn's disease	1340297	Condition	OMOP Extension
	Exacerbation of ulcerative colitis	1340490	Condition	OMOP Extension
	Exacerbation of ulcerative proctocolitis	1340491	Condition	OMOP Extension
	Ulcerative ileocolitis	4025853	Condition	SNOMED
	Acute ulcerative colitis	4029372	Condition	SNOMED
	Severe chronic ulcerative colitis	4031048	Condition	SNOMED
	Crohn's disease of terminal ileum	4055020	Condition	SNOMED
	Crohn's disease of oral soft tissues	4055884	Condition	SNOMED
	Eosinophilic ulcerative colitis	4086978	Condition	SNOMED
	Juvenile arthritis in Crohn disease	4115377	Condition	SNOMED

Indication	Concept name	Concept ID	Domain	Vocabulary
	Crohn's disease of gingivae	4122617	Condition	SNOMED
	Crohn's stricture of colon	4131542	Condition	SNOMED
	Crohn's disease in remission	4142544	Condition	SNOMED
	Ulcerative proctocolitis	4166480	Condition	SNOMED
	Crohn's disease of colon	4177488	Condition	SNOMED
	Exacerbation of ulcerative colitis	4187900	Condition	SNOMED
	Crohn's disease of duodenum	4210469	Condition	SNOMED
	Exacerbation of Crohn's disease of large in testine	4212991	Condition	SNOMED
	Exacerbation of Crohn's disease of small in testine	4212992	Condition	SNOMED
	Toxic megacolon due to ulcerative colitis	4225691	Condition	SNOMED
	Crohn's disease of jejunum	4239382	Condition	SNOMED
	Crohn's disease of rectum	4242392	Condition	SNOMED
	Crohn's disease of ileum	4244235	Condition	SNOMED
	Crohn's disease of intestine	4246693	Condition	SNOMED
	Iritis with Crohn's disease	4253620	Condition	SNOMED
	Iritis with ulcerative colitis	4259504	Condition	SNOMED
	Gastrointestinal Crohn's disease	4264850	Condition	SNOMED
	Crohn's disease of pylorus	4266370	Condition	SNOMED
	Crohn's disease of skin	4290835	Condition	SNOMED
	Crohn's disease of scrotum	4292361	Condition	SNOMED
	Crohn's disease of vulva	4297643	Condition	SNOMED
	Metastatic Crohn's disease of skin	4297644	Condition	SNOMED
	Crohn's disease of penis	4299294	Condition	SNOMED
	Mild chronic ulcerative colitis	4301738	Condition	SNOMED
	Moderate chronic ulcerative colitis	4302002	Condition	SNOMED
	Crohn's disease of pyloric antrum	4323289	Condition	SNOMED
	Crohn's disease of esophagus	4340114	Condition	SNOMED
	Perianal Crohn's disease	4340812	Condition	SNOMED
	Crohn's disease of stomach	4342643	Condition	SNOMED
	Ulcerative enterocolitis	4342656	Condition	SNOMED
	Crohn's disease of small intestine with ste nosis	36686095	Condition	SNOMED
	Crohn disease of anal canal	36715915	Condition	SNOMED
	Crohn's disease of gastrointestinal anasto mosis	36716695	Condition	SNOMED
	Arthritis co-occurrent and due to Crohn's disease	36716986	Condition	SNOMED

Indication	Concept name	Concept ID	Domain	Vocabulary
	Extraintestinal Crohn's	37111373	Condition	SNOMED
	Crohn disease of appendix	37116446	Condition	SNOMED
	Perianal fistula due to Crohn's disease	37116713	Condition	SNOMED
	Duodenal ulcer due to Crohn disease	37162851	Condition	SNOMED
	Gastrointestinal anastomotic ulcer due to Crohn disease	37162865	Condition	SNOMED
	Gastric ulcer due to Crohn disease	37162871	Condition	SNOMED
	Crohn's disease of parastomal skin	37162884	Condition	SNOMED
	Colorectal Crohn disease	37162889	Condition	SNOMED
	Ileojejunal Crohn disease	37162890	Condition	SNOMED
	Crohn disease of rectum in remission	37170088	Condition	SNOMED
	Left sided ulcerative colitis in remission	37170100	Condition	SNOMED
	Crohn disease of small intestine in remissi on	37170274	Condition	SNOMED
	Ulcerative rectosigmoiditis in remission	37172295	Condition	SNOMED
	Crohn disease of colon in remission	37172426	Condition	SNOMED
	Crohn disease of small intestine and large intestine in remission	37172546	Condition	SNOMED
	Ulcerative pancolitis in remission	37172721	Condition	SNOMED
	Chronic ulcerative colitis	40479837	Condition	SNOMED
	Ulcerative pancolitis	40479839	Condition	SNOMED
	Chronic left-sided ulcerative colitis	40481367	Condition	SNOMED
	Chronic ulcerative pancolitis	40482241	Condition	SNOMED
	Left sided ulcerative colitis	40482865	Condition	SNOMED
	Crohn disease of upper gastrointestinal tra ct	42537666	Condition	SNOMED
	Ulcerative colitis in remission	44783784	Condition	SNOMED
	Abscess of intestine co-occurrent and due to chronic ulcerative pa ncolitis	46269838	Condition	SNOMED
	Abscess of intestine co-occurrent and due to chronic ulcerative re ctosigmoiditis	46269848	Condition	SNOMED
	Complication due to Crohn's disease of lar ge intestine	46269874	Condition	SNOMED
	Fistula of large intestine due to Crohn's dis ease	46269875	Condition	SNOMED
	Intestinal obstruction due to Crohn's disea se of large intestine	46269876	Condition	SNOMED
	Rectal hemorrhage due to Crohn's disease of large intestine	46269877	Condition	SNOMED

Indication	Concept name	Concept ID	Domain	Vocabulary
	Abscess of intestine co-occurrent and due to Crohn's disease of small and large intestine	46269878	Condition	SNOMED
	Complication due to Crohn's disease of small and large intestines	46269879	Condition	SNOMED
	Fistula of intestine due to Crohn's disease of small and large intestine	46269880	Condition	SNOMED
	Intestinal obstruction due to Crohn's disease of small and large intestine	46269881	Condition	SNOMED
	Rectal hemorrhage due to Crohn's disease of small and large intestines	46269882	Condition	SNOMED
	Abscess of intestine co-occurrent and due to Crohn's disease of small intestine	46269883	Condition	SNOMED
	Complication due to Crohn's disease of small intestine	46269884	Condition	SNOMED
	Fistula of small intestine due to Crohn's disease	46269885	Condition	SNOMED
	Intestinal obstruction due to Crohn's disease of small intestine	46269886	Condition	SNOMED
	Rectal hemorrhage due to Crohn's disease of small intestine	46269887	Condition	SNOMED
	Abscess of intestine co-occurrent and due to Crohn's disease	46269888	Condition	SNOMED
	Complication due to Crohn's disease	46269889	Condition	SNOMED
	Intestinal obstruction due to Crohn's disease	46269890	Condition	SNOMED
	Rectal hemorrhage due to Crohn's disease	46269891	Condition	SNOMED
	Abscess of intestine co-occurrent and due to ulcerative colitis	46269951	Condition	SNOMED
	Abscess of intestine co-occurrent and due to Crohn's disease of large intestine	46274073	Condition	SNOMED
Juvenile arthritis	Pauciarticular juvenile rheumatoid arthritis	72705	Condition	SNOMED
	Chronic polyarticular juvenile rheumatoid arthritis	72714	Condition	SNOMED
	Acute polyarticular juvenile rheumatoid arthritis	75621	Condition	SNOMED
	Monarticular juvenile rheumatoid arthritis	75622	Condition	SNOMED
	Macrophage activation syndrome due to juvenile systemic onset arthritis	603150	Condition	SNOMED
	Persistent onset antinuclear antibody negative juvenile idiopathic oligoarthritis	608034	Condition	SNOMED
	Persistent onset antinuclear antibody positive juvenile idiopathic oligoarthritis	608035	Condition	SNOMED

Indication	Concept name	Concept ID	Domain	Vocabulary
	Rheumatoid factor positive and anti-citrullinated protein antibody positive juvenile polyarthritis	608041	Condition	SNOMED
	Rheumatoid factor positive and anti-citrullinated protein antibody negative juvenile polyarthritis	608042	Condition	SNOMED
	Rheumatoid factor negative and anti-citrullinated protein antibody negative juvenile polyarthritis	608043	Condition	SNOMED
	Rheumatoid factor negative and anti-citrullinated protein antibody positive juvenile polyarthritis	608044	Condition	SNOMED
	Extended oligoarticular onset antinuclear antibody positive juvenile idiopathic arthritis	608075	Condition	SNOMED
	Extended oligoarticular onset antinuclear antibody negative juvenile idiopathic arthritis	608076	Condition	SNOMED
	Uveitis due to persistent onset antinuclear antibody negative juvenile idiopathic oligoarthritis	608092	Condition	SNOMED
	Uveitis due to persistent onset antinuclear antibody positive juvenile idiopathic oligo arthritis	608093	Condition	SNOMED
	Uveitis due to extended onset antinuclear antibody negative juvenile idiopathic oligo arthritis	608094	Condition	SNOMED
	Uveitis due to extended onset antinuclear antibody positive juvenile idiopathic oligo arthritis	608095	Condition	SNOMED
	Juvenile idiopathic arthritis of left hand	762178	Condition	SNOMED
	Juvenile idiopathic arthritis of right hand	762180	Condition	SNOMED
	Exacerbation of juvenile idiopathic arthritis	1340385	Condition	OMOP Extension
	Early onset polyarticular juvenile chronic arthritis	4035612	Condition	SNOMED
	Juvenile chronic arthritis	4079731	Condition	SNOMED
	Juvenile psoriatic arthritis	4079733	Condition	SNOMED
	Juvenile psoriatic arthritis with psoriasis	4079734	Condition	SNOMED
	Juvenile arthritis of inflammatory bowel disease	4079736	Condition	SNOMED
	Late onset polyarticular juvenile chronic arthritis	4083558	Condition	SNOMED
	Juvenile psoriatic arthritis without psoriasis	4083680	Condition	SNOMED
	Juvenile arthritis in ulcerative colitis	4114447	Condition	SNOMED

Indication	Concept name	Concept ID	Domain	Vocabulary
	Juvenile arthritis in Crohn disease	4115377	Condition	SNOMED
	Systemic onset juvenile chronic arthritis	4116447	Condition	SNOMED
	Juvenile seropositive polyarthritis	4132809	Condition	SNOMED
	Juvenile seronegative polyarthritis	4132810	Condition	SNOMED
	Juvenile idiopathic arthritis, oligoarthritis	4132811	Condition	SNOMED
	Juvenile idiopathic arthritis, persistent olig oarthritis	4132812	Condition	SNOMED
	Anterior uveitis due to juvenile idiopathic arthritis	4211939	Condition	SNOMED
	Juvenile rheumatoid arthritis	4253901	Condition	SNOMED
	Juvenile idiopathic arthritis, enthesitis rela ted arthritis	4253902	Condition	SNOMED
	Chronic arthritis of juvenile onset	4257971	Condition	SNOMED
	Juvenile idiopathic arthritis, undifferentiat ed arthritis	4257972	Condition	SNOMED
	Juvenile idiopathic arthritis	4259507	Condition	SNOMED
	Still's disease with juvenile onset and/or a dult onset	4261026	Condition	SNOMED
	Juvenile idiopathic arthritis, extended olig oarthritis	4261027	Condition	SNOMED
	Juvenile rheumatoid arthritis of left knee	37204148	Condition	SNOMED
	Juvenile rheumatoid arthritis of right knee	37204149	Condition	SNOMED
	Juvenile idiopathic arthritis, persistent mo noarthritis	37207517	Condition	SNOMED
	Juvenile rheumatoid arthritis of bilateral k nees	37209479	Condition	SNOMED
	Acute polyarticular juvenile idiopathic arth ritis	42535150	Condition	SNOMED
	Polyarticular juvenile idiopathic arthritis	42535177	Condition	SNOMED
Juvenile idiopathic arthritis	Juvenile chronic arthritis	4079731	Condition	SNOMED
	Juvenile seronegative polyarthritis	4132810	Condition	SNOMED
	Chronic arthritis of juvenile onset	4257971	Condition	SNOMED
Psoriatic arthritis	PsAPASH syndrome	1076201	Condition	SNOMED
	Exacerbation of psoriatic arthritis	1340448	Condition	OMOP Exte nsion
	Progression of psoriatic arthritis	1340520	Condition	OMOP Exte nsion
	Arthritis mutilans	4025831	Condition	SNOMED
	Psoriatic dactylitis	4035742	Condition	SNOMED
	Psoriatic arthritis with spine involvement	4064048	Condition	SNOMED
	Juvenile psoriatic arthritis	4079733	Condition	SNOMED

Indication	Concept name	Concept ID	Domain	Vocabulary
	Juvenile psoriatic arthritis with psoriasis	4079734	Condition	SNOMED
	Psoriatic arthritis with distal interphalangeal joint involvement	4083682	Condition	SNOMED
	Iritis with psoriatic arthritis	4132495	Condition	SNOMED
	Polyarticular psoriatic arthritis	37160369	Condition	SNOMED
	Oligoarticular psoriatic arthritis	37160379	Condition	SNOMED
	Psoriatic arthritis	40319772	Condition	SNOMED
	Psoriatic arthritis mutilans	46274123	Condition	SNOMED
Rheumatoid arthritis	Rheumatoid arthritis	80809	Condition	SNOMED
	Felty's syndrome	81097	Condition	SNOMED
	Rheumatoid lung disease	256197	Condition	SNOMED
	Rheumatoid arthritis disease severity level [RAPID3]	1176038	Observation	LOINC
	Rheumatoid arthritis (RA) disease activity, low (RA)	2107558	Observation	CPT4
	Rheumatoid arthritis (RA) disease activity, moderate (RA)	2107559	Observation	CPT4
	Rheumatoid arthritis (RA) disease activity, high (RA)	2107560	Observation	CPT4
	Disease prognosis for rheumatoid arthritis assessed, poor prognosis documented (RA)	2107561	Observation	CPT4
	Disease prognosis for rheumatoid arthritis assessed, good prognosis documented (RA)	2107572	Observation	CPT4
	Patient receiving <10 mg daily prednisone (or equivalent), or RA activity is worsening, or glucocorticoid use is for less than 6 months (RA)	2108719	Observation	CPT4
	Patient receiving >=10 mg daily prednisone (or equivalent) for longer than 6 months, and improvement or no change in disease activity (RA)	2108720	Observation	CPT4
	Patient receiving first-time biologic disease modifying anti-rheumatic drug therapy for rheumatoid arthritis (RA)	2108721	Observation	CPT4
	Patient not receiving first-time biologic disease modifying anti-rheumatic drug therapy for rheumatoid arthritis (RA)	2108722	Observation	CPT4
	Spindling of fingers of bilateral hands due to rheumatoid arthritis	3654567	Condition	SNOMED
	Diffuse interstitial rheumatoid disease of lung	4028118	Condition	SNOMED

Indication	Concept name	Concept ID	Domain	Vocabulary
	Rheumatoid arthritis with multisystem involvement	4035427	Condition	SNOMED
	Seropositive rheumatoid arthritis	4035611	Condition	SNOMED
	Dilated cardiomyopathy due to rheumatoid arthritis	4060405	Condition	SNOMED
	Rheumatoid arthritis monitoring	4078299	Observation	SNOMED
	Seronegative rheumatoid arthritis	4083556	Condition	SNOMED
	Polyneuropathy in rheumatoid arthritis	4102493	Condition	SNOMED
	Myopathy due to rheumatoid arthritis	4107913	Condition	SNOMED
	Rheumatoid arthritis of shoulder	4114439	Condition	SNOMED
	Rheumatoid arthritis of distal interphalangeal joint of finger	4114440	Condition	SNOMED
	Rheumatoid arthritis of first metatarsophalangeal joint	4114441	Condition	SNOMED
	Rheumatoid arthritis of interphalangeal joint of toe	4114442	Condition	SNOMED
	Flare of rheumatoid arthritis	4114444	Condition	SNOMED
	Rheumatoid arthritis of distal radioulnar joint	4115050	Condition	SNOMED
	Rheumatoid arthritis of tibiofibular joint	4115051	Condition	SNOMED
	Rheumatoid arthritis - hand joint	4115161	Condition	SNOMED
	Rheumatoid arthritis of sternoclavicular joint	4116148	Condition	SNOMED
	Rheumatoid arthritis of acromioclavicular joint	4116149	Condition	SNOMED
	Rheumatoid arthritis of hip	4116150	Condition	SNOMED
	Rheumatoid arthritis of knee	4116151	Condition	SNOMED
	Rheumatoid arthritis of talonavicular joint	4116152	Condition	SNOMED
	Rheumatoid arthritis of lesser metatarsophalangeal joint	4116153	Condition	SNOMED
	Rheumatoid arthritis of cervical spine	4116439	Condition	SNOMED
	Rheumatoid arthritis of elbow	4116440	Condition	SNOMED
	Rheumatoid arthritis of wrist	4116441	Condition	SNOMED
	Rheumatoid arthritis of metacarpophalangeal joint	4116442	Condition	SNOMED
	Rheumatoid arthritis of proximal interphalangeal joint of finger	4116443	Condition	SNOMED
	Rheumatoid arthritis of sacroiliac joint	4116444	Condition	SNOMED
	Rheumatoid arthritis of ankle	4116445	Condition	SNOMED
	Rheumatoid arthritis of subtalar joint	4116446	Condition	SNOMED
	Rheumatoid arthritis of multiple joints	4117686	Condition	SNOMED

Indication	Concept name	Concept ID	Domain	Vocabulary
	Rheumatoid arthritis - ankle and/or foot	4117687	Condition	SNOMED
	Seropositive erosive rheumatoid arthritis	4147418	Condition	SNOMED
	Rheumatoid arthritis of foot	4179378	Condition	SNOMED
	Rheumatic arthritis of temporomandibular joint	4179528	Condition	SNOMED
	Rheumatoid arthritis of temporomandibular joint	4179536	Condition	SNOMED
	Acute rheumatic arthritis	4216531	Condition	SNOMED
	Subacute rheumatic arthritis	4243205	Condition	SNOMED
	Rheumatoid vasculitis	4271003	Condition	SNOMED
	Rheumatoid pericarditis	4296152	Condition	SNOMED
	Cutaneous atrophy due to rheumatoid arthritis	4297650	Condition	SNOMED
	Uveitis-rheumatoid arthritis syndrome	4311391	Condition	SNOMED
	Deformity of wrist due to rheumatoid arthritis	4330635	Condition	SNOMED
	Deformity of foot due to rheumatoid arthritis	4334806	Condition	SNOMED
	Rheumatoid arthritis of left shoulder	35609009	Condition	SNOMED
	Rheumatoid arthritis of right shoulder	35609010	Condition	SNOMED
	Rheumatoid arthritis disease activity level [CDAI]	36304514	Observation	LOINC
	Rheumatoid arthritis of joint of spine	36683391	Condition	SNOMED
	Rheumatoid factor positive rheumatoid arthritis	36684997	Condition	SNOMED
	Seropositive rheumatoid arthritis of shoulder joint	36684998	Condition	SNOMED
	Rheumatoid arthritis of left ankle	36685017	Condition	SNOMED
	Rheumatoid arthritis of left elbow	36685018	Condition	SNOMED
	Rheumatoid arthritis of left foot	36685019	Condition	SNOMED
	Rheumatoid arthritis of left wrist	36685020	Condition	SNOMED
	Rheumatoid arthritis of right ankle	36685021	Condition	SNOMED
	Rheumatoid arthritis of right elbow	36685022	Condition	SNOMED
	Rheumatoid arthritis of right foot	36685023	Condition	SNOMED
	Rheumatoid arthritis of right wrist	36685024	Condition	SNOMED
	Rheumatoid arthritis of bilateral temporomandibular joints	36686999	Condition	SNOMED
	Rheumatoid arthritis of right temporomandibular joint	36687000	Condition	SNOMED
	Rheumatoid arthritis of left temporomandibular joint	36687001	Condition	SNOMED

Indication	Concept name	Concept ID	Domain	Vocabulary
	Rheumatoid arthritis of bilateral elbows	36687002	Condition	SNOMED
	Rheumatoid arthritis of bilateral hips	36687003	Condition	SNOMED
	Rheumatoid arthritis of bilateral ankles	36687005	Condition	SNOMED
	Rheumatoid arthritis of bilateral wrists	36687006	Condition	SNOMED
	Rheumatoid arthritis of left knee	37108590	Condition	SNOMED
	Rheumatoid arthritis of right knee	37108591	Condition	SNOMED
	Seropositive rheumatoid arthritis of multiple joints	37108714	Condition	SNOMED
	Seropositive rheumatoid arthritis of left hip	37207804	Condition	SNOMED
	Seropositive rheumatoid arthritis of left knee	37207805	Condition	SNOMED
	Seropositive rheumatoid arthritis of right hip	37207806	Condition	SNOMED
	Seropositive rheumatoid arthritis of right knee	37207807	Condition	SNOMED
	Seronegative rheumatoid arthritis of left hand	37207808	Condition	SNOMED
	Seronegative rheumatoid arthritis of multiple joints	37207809	Condition	SNOMED
	Seronegative rheumatoid arthritis of right hand	37207810	Condition	SNOMED
	Bilateral rheumatoid arthritis of feet	37209321	Condition	SNOMED
	Bilateral rheumatoid arthritis of knees	37209322	Condition	SNOMED
	Bilateral rheumatoid arthritis of hands	37209323	Condition	SNOMED
	Seronegative rheumatoid arthritis of bilateral hands	37209328	Condition	SNOMED
	Seropositive rheumatoid arthritis of bilateral hands	37209329	Condition	SNOMED
	Bilateral deformity of feet due to rheumatoid arthritis	37309722	Condition	SNOMED
	Bilateral deformity of wrists due to rheumatoid arthritis	37309723	Condition	SNOMED
	Bilateral deformity of hands due to rheumatoid arthritis	37309724	Condition	SNOMED
	Rheumatoid lung disease with rheumatoid arthritis	37395590	Condition	SNOMED
	Disease activity score in rheumatoid arthritis	40481048	Measurement	SNOMED
	Disease activity score in rheumatoid arthritis using C-reactive protein	40481959	Measurement	SNOMED
	Disease activity score 28 joint in rheumatoid arthritis	40482839	Measurement	SNOMED

Indication	Concept name	Concept ID	Domain	Vocabulary
	Disease activity score in rheumatoid arthritis using C-reactive protein	40484633	Measurement	SNOMED
	Rheumatoid arthritis of left hand	42534834	Condition	SNOMED
	Rheumatoid arthritis of left hip	42534835	Condition	SNOMED
	Rheumatoid arthritis of right hand	42534836	Condition	SNOMED
	Rheumatoid arthritis of right hip	42534837	Condition	SNOMED
	Deformity of right hand co-occurrent and due to rheumatoid arthritis	42534838	Condition	SNOMED
	Deformity of left hand co-occurrent and due to rheumatoid arthritis	42534839	Condition	SNOMED
	Deformity of right foot co-occurrent and due to rheumatoid arthritis	42534840	Condition	SNOMED
	Deformity of left foot co-occurrent and due to rheumatoid arthritis	42534841	Condition	SNOMED
	Rheumatoid arthritis without erosion	42536657	Condition	SNOMED
	Rheumatoid arthritis with erosion of joint	42539550	Condition	SNOMED
	Rheumatoid arthritis monitoring invitation by SMS (short message service) text messaging	42689679	Observation	SNOMED
	Rheumatoid arthritis monitoring SMS (short message service) text message first invitation	42689680	Observation	SNOMED
	Rheumatoid arthritis monitoring SMS (short message service) text message second invitation	42689681	Observation	SNOMED
	Rheumatoid arthritis monitoring SMS (short message service) text message third invitation	42689682	Observation	SNOMED
	Delivery of rehabilitation for rheumatoid arthritis	44790163	Procedure	SNOMED
	Rheumatoid arthritis annual review	44808003	Observation	SNOMED
	Rheumatoid arthritis monitoring invitation	44811073	Observation	SNOMED
	Rheumatoid arthritis monitoring invitation first letter	44811151	Observation	SNOMED
	Rheumatoid arthritis monitoring invitation second letter	44811152	Observation	SNOMED
	Rheumatoid arthritis monitoring invitation third letter	44811153	Observation	SNOMED
	Rheumatoid arthritis monitoring verbal invitation	44811154	Observation	SNOMED
	Rheumatoid arthritis monitoring telephone invitation	44811155	Observation	SNOMED
	Deformity of hand due to rheumatoid arthritis	46273442	Condition	SNOMED

Table S3–4. Incidence of new JAKi initiation among the individuals without prior exposure to any JAKi; Incidence of new JAKi initiation among the individuals without prior exposure to the same JAKi ingredient.

Incidence start date	Incidence end date	Estimate name	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
2018-01-01	2024-12-31							
		Denominator (N)						
		Person-years						
		Outcome (N)						
2018-01-01	2018-12-31	Incidence 100,000 person-years [95% CI]						
		Denominator (N)						
		Person-years						
		Outcome (N)						
2019-01-01	2019-12-31	Incidence 100,000 person-years [95% CI]						
		Denominator (N)						
		Person-years						
		Outcome (N)						
2020-01-01	2020-12-31	Incidence 100,000 person-years [95% CI]						
		Denominator (N)						
		Person-years						
		Outcome (N)						
2021-01-01	2021-12-31	Incidence 100,000 person-years [95% CI]						
		Denominator (N)						
		Person-years						
		Outcome (N)						
2022-01-01	2022-12-31	Incidence 100,000 person-years [95% CI]						
		Denominator (N)						
		Person-years						
		Outcome (N)						
2023-01-01	2023-12-31	Incidence 100,000 person-years [95% CI]						

Incidence start date	Incidence end date	Estimate name	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
		Denominator (N)						
		Person-years						
		Outcome (N)						
2024-01-01	2024-12-31	Incidence 100,000 person-years [95% CI]						
		Denominator (N)						
		Person-years						
		Outcome (N)						
2018-01-01	2024-12-31	Incidence 100,000 person-years [95% CI]						
		Denominator (N)						
		Person-years						
		Outcome (N)						
2018-01-01	2018-12-31	Incidence 100,000 person-years [95% CI]						
		Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2019-01-01	2019-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2020-01-01	2020-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2021-01-01	2021-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						

Incidence start date	Incidence end date	Estimate name	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
		Incidence 100,000 person-years [95% CI]						
2022-01-01	2022-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2023-01-01	2023-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2024-01-01	2024-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2018-01-01	2024-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2018-01-01	2018-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2019-01-01	2019-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2020-01-01	2020-12-31	Denominator (N)						

Incidence start date	Incidence end date	Estimate name	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2021-01-01	2021-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2022-01-01	2022-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2023-01-01	2023-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2024-01-01	2024-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2018-01-01	2024-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2018-01-01	2018-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						

Incidence start date	Incidence end date	Estimate name	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
		Incidence 100,000 person-years [95% CI]						
2019-01-01	2019-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2020-01-01	2020-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2021-01-01	2021-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2022-01-01	2022-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2023-01-01	2023-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2024-01-01	2024-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2018-01-01	2024-12-31	Denominator (N)						

Incidence start date	Incidence end date	Estimate name	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2018-01-01	2018-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2019-01-01	2019-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2020-01-01	2020-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2021-01-01	2021-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2022-01-01	2022-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2023-01-01	2023-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						

Incidence start date	Incidence end date	Estimate name	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
		Incidence 100,000 person-years [95% CI]						
2024-01-01	2024-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2018-01-01	2024-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2018-01-01	2018-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2019-01-01	2019-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2020-01-01	2020-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2021-01-01	2021-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2022-01-01	2022-12-31	Denominator (N)						

Incidence start date	Incidence end date	Estimate name	Data source name					
			NAJS	DK-DHR	FinOMOP-THL	IQVIA DA Germany	VID	HI-SPEED
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2023-01-01	2023-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						
2024-01-01	2024-12-31	Denominator (N)						
		Person-years						
		Outcome (N)						
		Incidence 100,000 person-years [95% CI]						

DK-DHR = Danish Data Health Registries; EHR = Electronic Health Record; FinOMOP-THL = Finnish Care Register for Health Care; GP = General Practitioner; HI-SPEED = Health Impact - Swedish Population Evidence Enabling Data-linkage; IQVIA DA Germany = IQVIA Disease Analyzer Germany; NAJS = Croatian National Public Health Information System; VID = Valencia Health System Integrated Dataset; CI = Confidence Interval; JAKi = Janus kinase inhibitor/s.

ANNEX V. ENCePP checklist for study protocols

ENCePP Checklist for Study Protocols (Revision 4)

Study title: DARWIN EU® - Characterising the use of JAK inhibitors in Europe: a Drug Utilisation Study Update

EU PAS Register® number: EUPAS1000000998
Study reference number (if applicable): P5-C2-001

Section 1: Milestones	**Yes**	**No**	**N/A**	**Section Number**
1.1 Does the protocol specify timelines for				
1.1.1 Start of data collection[1]	☒	☐	☐	8.5
1.1.2 End of data collection[2]	☒	☐	☐	8.5
1.1.3 Progress report(s)	☐	☐	☒	
1.1.4 Interim report(s)	☐	☐	☒	
1.1.5 Registration in the EU PAS Register®	☐	☐	☒	
1.1.6 Final report of study results.	☒	☐	☐	5

Comments:

Section 2: Research question	**Yes**	**No**	**N/A**	**Section Number**
2.1 Does the formulation of the research question and objectives clearly explain:	☐	☐	☐	
2.1.1 Why the study is conducted? (e.g. to address an important public health concern, a risk identified in the risk management plan, an emerging safety issue)	☒	☐	☐	6,7
2.1.2 The objective(s) of the study?	☒	☐	☐	7
2.1.3 The target population? (i.e. population or subgroup to whom the study results are intended to be generalised)	☒	☐	☐	7
2.1.4 Which hypothesis(-es) is (are) to be tested?	☐	☐	☒	
2.1.5 If applicable, that there is no *a priori* hypothesis?	☐	☐	☒	

Comments:

[1] Date from which information on the first study is first recorded in the study dataset or, in the case of secondary use of data, the date from which data extraction starts.
[2] Date from which the analytical dataset is completely available.

Section 3: Study design		**Yes**	**No**	**N/A**	**Section Number**
3.1	Is the study design described? (e.g. cohort, case-control, cross-sectional, other design)	☒	☐	☐	8.1
3.2	Does the protocol specify whether the study is based on primary, secondary or combined data collection?	☒	☐	☐	8.4
3.3	Does the protocol specify measures of occurrence? (e.g. rate, risk, prevalence)	☒	☐	☐	8.8
3.4	Does the protocol specify measure(s) of association? (e.g. risk, odds ratio, excess risk, rate ratio, hazard ratio, risk/rate difference, number needed to harm (NNH))	☐	☐	☒	
3.5	Does the protocol describe the approach for the collection and reporting of adverse events/adverse reactions? (e.g. adverse events that will not be collected in case of primary data collection)	☐	☐	☒	

Comments:

Section 4: Source and study populations		**Yes**	**No**	**N/A**	**Section Number**
4.1	Is the source population described?	☒	☐	☐	8.3,8.4
4.2	Is the planned study population defined in terms of:				
	4.2.1 Study time period	☒	☐	☐	8.5
	4.2.2 Age and sex	☒	☐	☐	8.6.3
	4.2.3 Country of origin	☒	☐	☐	8.4
	4.2.4 Disease/indication	☒	☐	☐	8.6.1
	4.2.5 Duration of follow-up	☒	☐	☐	8.2
4.3	Does the protocol define how the study population will be sampled from the source population? (e.g. event or inclusion/exclusion criteria)	☒	☐	☐	8.3

Comments:

Section 5: Exposure definition and measurement		**Yes**	**No**	**N/A**	**Section Number**
5.1	Does the protocol describe how the study exposure is defined and measured? (e.g. operational details for defining and categorising exposure, measurement of dose and duration of drug exposure)	☒	☐	☐	8.6.1
5.2	Does the protocol address the validity of the exposure measurement? (e.g. precision, accuracy, use of validation sub-study)	☐	☐	☒	
5.3	Is exposure categorised according to time windows?	☐	☐	☒	

Section 5: Exposure definition and measurement	**Yes**	**No**	**N/A**	**Section Number**
5.4 Is intensity of exposure addressed? (e.g. dose, duration)	☒	☐	☐	8.8.3
5.5 Is exposure categorised based on biological mechanism of action and taking into account the pharmacokinetics and pharmacodynamics of the drug?	☐	☐	☒	
5.6 Is (are) (an) appropriate comparator(s) identified?	☐	☐	☒	

Comments:

Section 6: Outcome definition and measurement	**Yes**	**No**	**N/A**	**Section Number**
6.1 Does the protocol specify the primary and secondary (if applicable) outcome(s) to be investigated?	☒	☐	☐	8.6.2
6.2 Does the protocol describe how the outcomes are defined and measured?	☐	☐	☒	
6.3 Does the protocol address the validity of outcome measurement? (e.g. precision, accuracy, sensitivity, specificity, positive predictive value, use of validation sub-study)	☐	☐	☒	
6.4 Does the protocol describe specific outcomes relevant for Health Technology Assessment? (e.g. HRQoL, QALYs, DALYS, health care services utilisation, burden of disease or treatment, compliance, disease management)	☐	☐	☒	

Comments:

Section 7: Bias	**Yes**	**No**	**N/A**	**Section Number**
7.1 Does the protocol address ways to measure confounding? (e.g. confounding by indication)	☐	☐	☒	
7.2 Does the protocol address selection bias? (e.g. healthy user/adherer bias)	☐	☐	☒	
7.3 Does the protocol address information bias? (e.g. misclassification of exposure and outcomes, time-related bias)	☐	☐	☒	

Comments:

Section 8: Effect measure modification		Yes	No	N/A	Section Number
8.1	Does the protocol address effect modifiers? (e.g. collection of data on known effect modifiers, sub-group analyses, anticipated direction of effect)	☒	☐	☐	8.6.3

Comments:

Section 9: Data sources		Yes	No	N/A	Section Number
9.1	Does the protocol describe the data source(s) used in the study for the ascertainment of:				
	9.1.1 Exposure? (e.g. pharmacy dispensing, general practice prescribing, claims data, self-report, face-to-face interview)	☒	☐	☐	8.4
	9.1.2 Outcomes? (e.g. clinical records, laboratory markers or values, claims data, self-report, patient interview including scales and questionnaires, vital statistics)	☐	☐	☒	
	9.1.3 Covariates and other characteristics?	☒	☐	☐	8.6.3
9.2	Does the protocol describe the information available from the data source(s) on:				
	9.2.1 Exposure? (e.g. date of dispensing, drug quantity, dose, number of days of supply prescription, daily dosage, prescriber)	☒	☐	☐	8.4
	9.2.2 Outcomes? (e.g. date of occurrence, multiple event, severity measures related to event)	☐	☐	☒	
	9.2.3 Covariates and other characteristics? (e.g. age, sex, clinical and drug use history, co-morbidity, co-medications, lifestyle)	☒	☐	☐	8.4
9.3	Is a coding system described for:				
	9.3.1 Exposure? (e.g. WHO Drug Dictionary, Anatomical Therapeutic Chemical (ATC) Classification System)	☒	☐	☐	8.6.1
	9.3.2 Outcomes? (e.g. International Classification of Diseases (ICD), Medical Dictionary for Regulatory Activities (MedDRA))	☐	☐	☒	
	9.3.3 Covariates and other characteristics?	☒	☐	☐	8.8.3
9.4	Is a linkage method between data sources described? (e.g. based on a unique identifier or other)	☐	☐	☒	

Comments:

Section 10: Analysis plan		Yes	No	N/A	Section Number
10.1	Are the statistical methods and the reason for their choice described?	☒	☐	☐	8.8
10.2	Is study size and/or statistical precision estimated?	☐	☐	☒	
10.3	Are descriptive analyses included?	☒	☐	☐	8.8

Section 10: Analysis plan	**Yes**	**No**	**N/A**	**Section Number**
10.4 Are stratified analyses included?	☒	☐	☐	8.8
10.5 Does the plan describe methods for analytic control of confounding?	☐	☐	☒	
10.6 Does the plan describe methods for analytic control of outcome misclassification?	☐	☐	☒	
10.7 Does the plan describe methods for handling missing data?	☐	☐	☒	
10.8 Are relevant sensitivity analyses described?	☐	☐	☒	

Comments:

Section 11: Data management and quality control	**Yes**	**No**	**N/A**	**Section Number**
11.1 Does the protocol provide information on data storage? (e.g. software and IT environment, database maintenance and anti-fraud protection, archiving)	☒	☐	☐	Annex III
11.2 Are methods of quality assurance described?	☒	☐	☐	Annex III
11.3 Is there a system in place for independent review of study results?	☐	☐	☒	

Comments:

Section 12: Limitations	**Yes**	**No**	**N/A**	**Section Number**
12.1 Does the protocol discuss the impact on the study results of:				
12.1.1 Selection bias?	☐	☐	☒	
12.1.2 Information bias?	☒	☐	☐	9
12.1.3 Residual/unmeasured confounding? (e.g. anticipated direction and magnitude of such biases, validation sub-study, use of validation and external data, analytical methods).	☐	☐	☒	
12.2 Does the protocol discuss study feasibility? (e.g. study size, anticipated exposure uptake, duration of follow-up in a cohort study, patient recruitment, precision of the estimates)	☒	☐	☐	8.4

Comments:

Section 13: Ethical/data protection issues	**Yes**	**No**	**N/A**	**Section Number**
13.1 Have requirements of Ethics Committee/ Institutional Review Board been described?	☒	☐	☐	Annex II

Section 13: Ethical/data protection issues	**Yes**	**No**	**N/A**	**Section Number**
13.2 Has any outcome of an ethical review procedure been addressed?	☐	☐	☒	
13.3 Have data protection requirements been described?	☒	☐	☐	Annex III

Comments:

Section 14: Amendments and deviations	**Yes**	**No**	**N/A**	**Section Number**
14.1 Does the protocol include a section to document amendments and deviations?	☒	☐	☐	4

Comments:

Section 15: Plans for communication of study results	**Yes**	**No**	**N/A**	**Section Number**
15.1 Are plans described for communicating study results (e.g. to regulatory authorities)?	☒	☐	☐	Annex III
15.2 Are plans described for disseminating study results externally, including publication?	☒	☐	☐	Annex III

Comments:

Name of the main author of the protocol: Elin Rowlands

Date: 26/03/26206

Signature: E.J. Rowlands

ANNEX VI. Glossary

Additional definitions are available in the EMA Glossary of terms https://www.ema.europa.eu/en/about-us/glossaries.

Aggregated Data

Data collected and combined from multiple sources to generate summary information, typically anonymised.

Benefit-Risk Assessment

Evaluation of the positive therapeutic effects of a medicine compared to its risks (e.g. side effects).

Common Data Model (CDM)

A standardized data structure that enables data from multiple sources to be harmonized, making analysis consistent and reproducible. DARWIN EU® utilises the OMOP CDM maintained by the OHDSI community.

Complex Studies (C3)

Studies requiring the development or customisation of specific study designs, protocols, and Statistical Analysis Plans (SAPs), with extensive collection or extraction of data. Examples include etiological studies measuring the strength and determinants of an association between an exposure and the occurrence of a health outcome in a defined population considering sources of bias, potential confounding factors, and effect modifiers.

Coordination Centre (CC)

The central hub responsible for managing and overseeing the activities within DARWIN EU®. It is based at Erasmus University Medical Centre in Rotterdam, the Netherlands.

Data Access

The process of obtaining permission to use specific datasets for regulatory or scientific studies.

Data Quality Framework

A set of standards and procedures to ensure accuracy, completeness, timeliness, and consistency of data used in DARWIN EU®.

Data Source

A data source or repository of structured health-related data, such as electronic health records (EHRs), insurance claims, or registries.

DARWIN EU®

The European Medicines Agency's (EMA) federated network of real-world data sources designed to generate evidence to support regulatory decision-making.

EMA (European Medicines Agency)

The regulatory body responsible for the evaluation and supervision of medicinal products in the EU, overseeing DARWIN EU®.

Evidence Generation

The process of analysing real-world data to produce scientific information that can inform healthcare or regulatory decisions.

Federated Network

A data infrastructure where data remain at their original location but can be analysed in a harmonised way across multiple partners using a common model and tools.

GDPR (General Data Protection Regulation)

The EU regulation governing the protection of personal data and privacy, crucial to how DARWIN EU® handles health data.

Health Technology Assessment (HTA)

A systematic evaluation of properties and impacts of health technology, often using DARWIN EU® data to support assessments.

Metadata

Descriptive information about a data source (e.g. its content, quality, and structure), essential for identifying relevant data sources in DARWIN EU® studies.

Off-the-Shelf Studies (OTS)

Studies for which a standard protocol per study/analysis type and standardised analytics may be developed and applied or adapted, typically relating to a descriptive research question. This includes studies on disease epidemiology, for example, the estimation of the prevalence or incidence of health outcomes in defined time periods and population groups, or drug utilisation studies at the population or patient level.

OHDSI (Observational Health Data Sciences and Informatics)

An open-science collaborative community that develops tools and standards (including the OMOP CDM) to enable large-scale analytics of observational health data. OHDSI provides the technical and scientific foundation for DARWIN EU®'s analytical ecosystem.

Patient-Level Data

Data related to individuals, de-identified, used for longitudinal or detailed analyses.

OMOP (Observational Medical Outcomes Partnership)

A common data model (CDM) that standardises the structure and content of observational healthcare data, enabling systematic analysis across disparate datasets. DARWIN EU® uses the OMOP CDM to ensure interoperability and consistency in real-world evidence generation.

Real-World Data (RWD)

Data relating to individual health status or healthcare delivery that is collected from routine clinical practice rather than from randomised controlled trials.

Real-World Evidence (RWE)

Clinical evidence derived from the analysis of RWD, used to inform decisions by regulators, payers, or clinicians.

Regulatory Decision-Making

The process by which authorities like EMA assess data to authorise, monitor, or modify the use of medicines in the EU.

Routine Repeated Studies (RR)

Studies that are either Off-the-Shelf or Complex studies repeated on a regular basis, following the same protocol and study code, but with updated data and/or different data partners.

Study Protocol

A detailed plan describing how a specific real-world study will be conducted, including objectives, design, data sources, and analyses.

Very Complex Studies (C4)

Studies which cannot rely only on electronic health care data sources, or which would require complex methodological work, for example, due to the occurrence of events that cannot be defined by existing diagnosis codes, including events that do not yet have a diagnosis code, where it may be necessary to combine a diagnosis code with other data such as results of laboratory investigations. These studies might require the collection of data prospectively, or the inclusion of new (not previously onboarded) data sources.