NON-INTERVENTIONAL STUDY (NIS) PROTOCOL

Study information

Title	An evaluation of early use patterns to assess the effectiveness of Xeljanz® (tofacitinib citrate) in rheumatoid arthritis: A retrospective non-interventional database study of observational data embedded within Optimising Patient outcome in Australian RheumatoLogy - Quality Use of Medicines Initiative (OPAL-QUMI)
Protocol number	A3921292
Protocol version identifier	1.0
Date of last version of protocol	29 March 2017
EU Post Authorisation Study (PAS) register number	*Study awaiting registration*
Active substance	Tofacitinib citrate
Medicinal product	Xeljanz®
Research question and objectives	To understand the treatment patterns (line of therapy, combination with other therapies or monotherapy), clinical effectiveness, patient reported outcomes and treatment adherence of Australian adult patients with rheumatoid arthritis who are receiving tofacitinib. To describe the safety profile of tofacitinib in Australian adult patients with rheumatoid arthritis.
Author	Associate Professor Paul Bird

TABLE OF CONTENTS

1. LIST OF ABBREVIATIONS

Abbreviation	Definition
AE	Adverse Event
AEM	Adverse Event Monitoring
ATC	Anatomical Therapeutic Chemical
bDMARD	Biologic Disease-Modifying Anti-Rheumatic Drug
CDAI	Clinical Disease Activity Index
cDMARD	Conventional Disease-Modifying Anti-Rheumatic Drug
CRP	C-Reactive Protein
DAS28	Disease Activity Score For Rheumatoid Arthritis
DMARD	Disease-Modifying Anti-Rheumatic Drug
ESR	Erythrocyte Sedimentation Rate
EU	European Union
FACIT	Functional Assessment Of Chronic Illness Therapy
GPP	Good Pharmacoepidemiology Practices
HAQ-DI	Health Assessment Questionnaire – Disease Index
HCRU	Health Care Resource Utilisation
HL7	Health Level Seven
HREC	Human Research Ethics Committee
ICD-10	International Classification of Diseases 10
ICMJE	International Committee of Medical Journal Editors
IEC	Independent Ethics Committee
IRB	Institutional Review Board

Abbreviation	Definition
ISPE	International Society for PharmacoEpidemiology
JAK	Janus Kinase
LOINC	Logical Observation Identifiers Names and Codes
MP	Multiprocessor
NIS	Non-Interventional Study
NSAID	Non-Steroidal Anti-Inflammatory Drug
OPAL	Optimising Patient outcome in Australian rheumatoLogy
PASS	Post-Authorisation Safety Study
PBS	Pharmaceutical Benefits Scheme
PRO	Patient Reported Outcome
QOL	Quality of Life
QUMI	Quality Use of Medicines Initiative
RA	Rheumatoid Arthritis
S4S	Software 4 Specialists (Clinical Software Developers For OPAL)
SAP	Statistical Analysis Plan
SDAI	Simple Disease Activity Index
SJC	Swollen Joint Count
TJC	Tender Joint Count
tsDMARD	Targeted Synthetic Disease Modifying Anti-Rheumatic Drug
VAS	Visual Analogue Scale
WHO	World Health Organisation

2. RESPONSIBLE PARTIES

Main Author

Name, degree(s)	Title	Affiliation	Address
Paul Bird, PhD, GradDipMRI, FRACP, BMed (Hons)	Associate Professor	Director, Combined Rheumatology Practice Director, Optimus Clinical Research	Suite 4, Level 1 19 Kensington Street, Kogarah NSW 2217

Principal Investigator(s) of the Protocol

Name, degree(s)	Title	Affiliation	Address
Paul Bird, PhD, GradDipMRI, FRACP, BMed (Hons)	Associate Professor	Director, Combined Rheumatology Practice Director, Optimus Clinical Research	Suite 4, Level 1 19 Kensington Street, Kogarah NSW 2217
Candida da Fonseca Pereira, PhD, MBA	Field Medical Advisor	Pfizer Australia	38-42, Wharf Rd, West Ryde, NSW 2114
Howard Fox, MB BS, DRCOG	Medical Director I and I	Pfizer Australia	38-42, Wharf Rd, West Ryde, NSW 2114
Joanna Leadbetter BSc(Hons) MSc PhD	Senior Statistician	WriteSource Medical Pty Ltd	PO Box 1521, Lane Cove NSW 1595

3. ABSTRACT

Title: An evaluation of early use patterns to assess the effectiveness of Xeljanz® (tofacitinib citrate) in rheumatoid arthritis: A retrospective non-interventional database study of observational data embedded within Optimising Patient outcome in Australian RheumatoLogy - Quality Use of Medicines Initiative (OPAL-QUMI).

Version: 1.0 dated 29 March 2017

Main Author: Associate Professor Paul Bird, Director, Combined Rheumatology Practice Director, Optimus Clinical Research, Suite 4, Level 1, 19 Kensington Street, Kogarah NSW 2217

Rationale and Background: Tofacitinib is a potent, selective inhibitor of the Janus kinase (JAK) family of kinases and is a targeted synthetic Disease-Modifying Anti-Rheumatic Drug (tsDMARD) indicated for the treatment of rheumatoid arthritis (RA). It was approved for use in Australia in February 2015 and subsidised through the Pharmaceutical Benefits Scheme (PBS) from October 2015. Limited data exist to described the characteristics and outcomes of patients who receive tofacitinib in a real-world setting. This study aims to use the OPAL registry to provide real-world evidence about the evidence regarding general treatment patterns, clinical effectiveness, treatment adherence and patient-reported outcomes (PROs) among RA patients being treated with tofacitinib in the post-approval setting. This non-interventional study is designated as a Post-Authorisation Safety Study (PASS) and is conducted voluntarily by Pfizer.

Research Question and Objectives: To understand the patterns of treatment (lines of therapy, and use as combination or monotherapy), clinical effectiveness, PROs and treatment adherence among Australian adult patients with RA treated with tofacitinib. Similar data will also be collected for patients treated with biologic disease-modifying anti-rheumatic drugs (bDMARDs) to provide descriptive information about clinical management of RA in real-world Australian clinical practice.

The primary objectives of the study are to describe tofacitinib treatment patterns among Australian adult patients with RA, as defined by line of usage, dosing patterns, use as monotherapy or in combination with conventional DMARDs (cDMARDs) and reasons for discontinuation of tofacitinib; to assess the clinical effectiveness of tofacitinib, as defined by disease severity markers (Disease Activity Score-28 (DAS28), Clinical Disease Activity Index (CDAI), Simple Disease Activity Index (SDAI)) and percent of patients reaching targeted treatment goals (remission or low disease activity), in Australia; and to assess PROs (Health Assessment Questionnaire – Disease Index (HAQ-DI), Functional Assessment Of Chronic Illness Therapy (FACIT)-Fatigue, Health Care Resource Utilisation (HCRU)) and treatment adherence in Australian adult patients with RA who are prescribed tofacitinib.

Secondary objectives are to describe bDMARD treatment patterns among Australian adult patients with RA, as defined by line of usage, dosing patterns, use as monotherapy or in combination with cDMARDs and reasons for discontinuation of bDMARDs; to assess PROs (HAQ-DI, FACIT-Fatigue, HCRU) and treatment adherence in Australian adult patients with

RA who are prescribed bDMARDs; and to describe the safety profile of Australian adult patients with RA who have been prescribed tofacitinib.

Study Design: This is a retrospective non-interventional cohort study and will involve extracting real-world patient data from the Australian OPAL registry.

Population: Data from adult patients (aged 18 years or older) with a diagnosis of RA, who have received treatment with tofacitinib or a bDMARD and have at least 1 year of follow-up will be extracted from the OPAL registry database. In order to address the observational nature of the database, propensity score matching will be undertaken between the tofacitinib and bDMARD groups. Propensity score matching will be based on age, sex, DAS28 and baseline treatment combinations. A ratio of 1 tofacitinib to every 5 bDMARD patients will be used.

Variables: The following variables will be analysed: exposure (tofacitinib or bDMARDs), baseline characteristics (e.g. baseline health, treatment history, clinical characteristics, PROs, treatment history) and outcomes (treatment patterns, clinical effectiveness, PROs and safety).

Data Sources: All data for this study will be obtained from the OPAL registry. The OPAL – Quality Use of Medicines Initiative is a point of care observational registry database (1). Currently approximately 80 Australian rheumatologists and more than 35,000 patients with rheumatic disease are participating in the registry. Data are captured into individual clinician's servers during routine clinical consultations, using the purpose-built worksheets in the Audit4 software (2). Data de-identified for patient, clinic and clinician are exported from each of the OPAL member's local server to a central server for analysis.

Study Size: 500 patients administered tofacitinib and 2,500 patients administered bDMARDs.

Data Analysis: Descriptive summaries will be performed for each data cut and at the final analysis. No comparative analyses will be undertaken. Analyses will be repeated in the overall population and the propensity score matched population.

4. AMENDMENTS AND UPDATES

None.

5. MILESTONES

Milestone	Planned date
Protocol approval	29 March 2017
Human Research Ethics Committee (HREC) submission	30 March 2017
Registration in the EU PAS register	31 March 2017
Start data collection	31 March 2017
End data collection	01 September 2018
Interim report 1: 1st data cut*	01 March 2017
Interim report 2: 2nd data cut*	01 September 2017
Interim report 3: 3rd data cut*	01 March 2018
Final study report	01 March 2019

**Dates are subject to change, depending on the number of tofacitinib and bDMARDs patients enrolled and the duration of follow-up at the time to ensure that the agreed number of patients have been enrolled and the agreed follow-up data collected at the time of each report. Data reports will be available within four weeks of data cut, except for the first data cut, which will be available within eight weeks of the data cut.*

6. RATIONALE AND BACKGROUND

Rheumatoid diseases such as rheumatoid arthritis (RA) have a significant negative impact on patients' health-related quality of life (QOL), and present a significant economic burden. Maximisation of health-related QOL is the primary goal of treatment. This is achieved through symptom and inflammation control, prevention of progressive structural damage, preservation or normalisation of function and social participation, and targeting remission (1, 3). Treatment of RA usually involves a multifaceted approach that includes pharmacologic and non-pharmacologic strategies. Non-pharmacologic therapy may include physical, occupational, and psychological therapy, and surgery, while pharmacological therapy usually consists of various combinations of non-steroidal anti-inflammatory drugs (NSAIDs), analgesics, corticosteroids, and synthetic or biologic disease modifying anti-rheumatic drugs (DMARDs).

Recently, a new oral targeted synthetic DMARD (tsDMARD), tofacitinib, has become available. Tofacitinib is a potent, selective inhibitor of the Janus kinase (JAK) family of kinases with a high degree of selectivity against other kinases in the human genome. It was approved for use in Australia in February 2015 and included in the Pharmaceutical Benefits

Scheme (PBS) (reimbursement) in October 2015. Limited data exist to describe the characteristics and outcomes of patients who receive tofacitinib in the real-world setting.

Patient Reported Outcomes (PROs) complement physician and laboratory measures in providing scientific evidence to support decisions regarding clinical therapy. The Outcome Measures in Rheumatology International consensus effort, the American College of Rheumatology, and the European League Against Rheumatism have recognized the importance of including a variety of PROs in randomized controlled trials (4-6).

This study aims to use the Optimising Patient outcome in Australian rheumatoLogy (OPAL) registry to provide real-world evidence regarding general treatment patterns, clinical effectiveness, treatment adherence and PROs among RA patients being treated with tofacitinib in the post-approval setting. Similar data will be collected for patients treated with bDMARDs to provide context in a real-world clinical practice setting. No formal comparisons between patients treated with tofacitinib and bDMARDs will be performed.

This non-interventional study is designated as a Post-Authorisation Safety Study (PASS) and is conducted voluntarily by Pfizer.

7. RESEARCH QUESTION AND OBJECTIVES

Research Question

To understand the patterns of treatment (lines of therapy, and use as combination or monotherapy), clinical effectiveness, PROs and treatment adherence among Australian adult patients with RA treated with tofacitinib. Similar data will also be collected for patients treated with bDMARDs to provide descriptive information about clinical management of RA in real-world Australian clinical practice.

Objectives

The primary objectives of the study are:

1. To describe tofacitinib treatment patterns among Australian adult patients with RA, which are defined as follows:
    - Line of usage (e.g. first-line, second-line) and dosing patterns
    - Use as monotherapy and in combination with cDMARDs
    - Reasons for discontinuation of tofacitinib
2. To assess the clinical effectiveness of tofacitinib, as defined by disease severity markers (DAS28, CDAI, SDAI) and percent of patients reaching targeted treatment goals (remission or low disease activity), in Australia
3. To assess PROs (HAQ-DI, FACIT-Fatigue, HCRU) and treatment adherence in Australian adult patients with RA who are prescribed tofacitinib

Secondary objectives are:

1. To describe bDMARD treatment patterns among Australian adult patients with RA, which are defined as follows:

    - Line of usage (e.g. first-line, second-line) and dosing patterns
    - Use as monotherapy or in combination with cDMARDs
    - Reasons for discontinuation of bDMARD

2. To assess PROs (HAQ-DI, FACIT-Fatigue, HCRU) and treatment adherence in Australian adult patients with RA who are prescribed bDMARDs.

3. To describe the safety profile of Australian adult patients with RA who have been prescribed tofacitinib.

8. RESEARCH METHODS

8.1. Study design

This is a retrospective, non-interventional cohort study of treatment patterns in patients prescribed tofacitinib or bDMARDs, and will involve extracting real-world patient data from the Australian OPAL registry. Data will be extracted for the period 01 February 2015 until 01 September 2018.

All drugs will be prescribed and all follow-up visits will be captured as part of normal medical practice. Patient therapeutic strategies will not be determined by the study protocol.

8.2. Setting

Data will be extracted from the Australian OPAL registry database. The OPAL database collects information from individual clinicians' servers during routine clinical consultations, using purpose-built worksheets in Audit4 software. Pathology and imaging reports are electronically transferred from the pathology and radiology providers and are incorporated into the patient's medical record. This software serves as the patient's medical record.(2)

The activities of OPAL Rheumatology Ltd have received overarching ethics approval from the University of New South Wales Human Research Ethics Committee, based on a patient opt-out arrangement. De-identified data are exported from the clinician's server and encrypted. Aggregated data are sent to the OPAL Study Committee and study statistician. All research undertaken by OPAL requires the prospective approval of a properly constituted Australian Human Research Ethics Committee.

The database has collected information on more than 32,000 patients from 42 rheumatologist clinics (and approximately 80 individual rheumatologists) around Australia. Of these 23,000 have a diagnosis of RA.

Tofacitinib was approved by the Therapeutic Goods Administration in February 2015, so the start of the sample selection window will correspond to the time of approval.

The sample selection window is 01 February 2015 to 01 September 2017. Patients will be followed for a minimum one year, so the sampling window is 01 February 2015 to 01 September 2018.

It is estimated that approximately 500 patients taking tofacitinib, and more than 2,500 patients taking bDMARDs will be enrolled in this study, however all relevant available data will be extracted. Data cuts occur in March 2017, September 2017, March 2018 and September 2018.

This study includes adult patients (aged 18 years or older) with a diagnosis of RA, who have received treatment with tofacitinib or a bDMARD and have at least 1 year of follow-up.

8.2.1. Inclusion criteria

Patients must meet all the following inclusion criteria to be eligible for inclusion in the study:

1. Diagnosed with RA, based on DAS28;
2. At least 18 years of age on the date of commencement of tofacitinib or a bDMARD;
3. Received at least one prescription for tofacitinib or a bDMARD; and
4. Have at least 1 year of follow-up since prescription of the index DMARD (tofacitinib or a bDMARD).

8.2.2. Exclusion criteria

Patients meeting any of the following criteria will not be included in the study:

1. Diagnosis with any autoimmune rheumatic disease or inflammatory bowel disease except for RA (e.g. psoriatic arthritis, ankylosing spondylitis, psoriasis Crohn's disease or ulcerative colitis).

8.2.3. Propensity score matching

Because of the observational nature of the data, analyses will be repeated both in the overall population, and also in a propensity score matched population. Propensity score matching increases the comparability of the observed baseline characteristics in patients treated with tofacitinib and bDMARDs. The propensity score is the conditional probability of receiving treatment (e.g. tofacitinib versus other biologic agent), which is estimated using logistic regression.

The following independent covariates will be included as predictor variables in the propensity score:

- Patient age group at index
    - 18-34
    - 35-44
    - 45-54
    - 55-64
    - 65-74
    - >75
- Sex
    - Male
    - Female
- DAS28
- Select baseline treatments combinations (where baseline is the index date)
    - Methotrexate monotherapy
    - Methotrexate + other conventional DMARD(s)
    - Conventional DMARD(S) other than methotrexate
    - Neither methotrexate nor other conventional DMARD(s)

Tofacitinib users will be matched to bDMARD through propensity score matching in a ratio of one tofacitinib user to five bDMARD users (1:5). The use of an initial caliper width of 0.20 is recommended. Matching will be determined by examining the propensity score distribution (density plot) in both the original sample and the matched sample, and by comparing standardized difference (in means and proportions) between the groups on the matched cohort; a difference above 0.1 is considered indicative of substantial difference in that covariate.(7) In addition, characteristics will be compared using chi-square, t statistics, and standardized differences.

In the comparative secondary outcomes, regression adjustment will be used to reduce bias due to residual differences (imbalance) in observed baseline covariates between the two treatment groups i.e. those variables where a substantial difference still exists after matching will be included in any formal analyses as covariates.

Propensity score matching might not be feasible for reasons such as insufficient sample size within treatment groups of interest or insufficient overlap between groups (a loss of 50% or

more tofacitinib patients i.e. there are zero appropriate matches found for over 50% of tofacitinib patients during the propensity score matching exercise). In this case, only descriptive analyses will be conducted rather than matching analyses.

Further information on the propensity score matching method is available in the Statistical Analysis Plan (SAP).

8.3. Variables

The primary exposure of interest is an initial prescription for tofacitinib or a bDMARD identified during the sample selection window. The date of the first prescription after the start of the sample selection window will serve as the study index date and the beginning of the post-index period.

Index DMARD: the agent of interest identified during the sample selection window (01 February 2015 to 01 September 2017) using Anatomical Therapeutic Chemical (ATC) codes. If the patient has been prescribed more than one of the drugs of interest (i.e. tofacitinib or bDMARD), the index DMARD will be considered tofacitinib for those ever receiving tofacitinib, or the first prescription of a bDMARD ('*bDMARD group*') if the patient has never received tofacitinib.

8.3.1. Exposure

Prior to the full assessment of the outcomes related to the exposure, the prescription data will be evaluated for missing data (e.g. strength, or quantity) and to identify implausible values (e.g. usually high quantity, or dosage). Implausible values will be adjudicated by two experienced rheumatologists who are members of the OPAL board and independent of the Sponsor. The recommended dosing schedule for tofacitinib and bDMARD is shown in Table 8.3.1

Table 8.3.1: Recommended dosage for DMARDs

Agent	Recommended Dose*
Abatacept	Weight based dosing (500 mg if < 60 kg; 750 mg if 60 to 100 kg; 1 g if > 100 kg) administered as intravenous infusion over 30 minutes.
Adalimumab	40 mg sc fortnightly, or 40 mg weekly in patients not taking methotrexate.
Anakinra	100 mg per day administered as a subcutaneous injection.
Certolizumab	400 mg (as 2 injections of 200 mg each on one day) at weeks 0, 2 and 4, followed by a maintenance dose of 200 mg every 2 weeks. Alternatively, a maintenance dose of 400 mg every 4 weeks may be given.
Etanercept	50 mg weekly given as a subcutaneous injection, either once weekly as a single injection or twice weekly as two separate 25 mg injections given 3 to 4 days apart.

Golimumab	50 mg given as a subcutaneous injection once a month, on the same date each month.
Infliximab	Patients not previously treated with infliximab: initially 3 mg/kg to be followed with additional 3 mg/kg infusion doses at 2 and 6 weeks after the first infusion then 8 weeks thereafter. Doses may be adjusted in increments of 1.5 mg/kg up to a maximum of 7.5 mg/kg.
Rituximab	1,000 mg by intravenous infusion followed by 1,000 mg by intravenous infusion two weeks later.
Tocilizumab	8 mg/kg every four weeks as an intravenous infusion, with doses not exceeding 800 mg, *or* 162 mg weekly subcutaneously.
Tofacitinib	5 mg twice daily orally.

**Recommended dose based on Australian prescribing information.*

8.3.2. Baseline

Baseline characteristics of interest are listed in Table 8.3.2. Baseline is defined as the measurements taken at the index date, or the closest measurement before the index date.

Table 8.3.2: Baseline characteristics

Variable	Role	Data source(s)	Operational definition
Baseline Health	Baseline characteristic	OPAL	Presence of comorbidities
Clinical characteristics	Baseline characteristic	OPAL	Disease duration, disease severity, disease activity (DAS28, SDAI, CDAI, Tender Joint Count (TJC), Swollen Joint Count (SJC))
Health assessment	Baseline characteristic	OPAL	General health (HAQ-DI, Visual Analogue Scale (VAS))
Patient reported outcomes and treatments	Baseline characteristic	OPAL	Number, sequence and duration of previous DMARDs (HAQ-DI, HCRU, FACIT-fatigue)
Treatment history	Baseline characteristic, potential confounder	OPAL	Dose and prior duration of treatment with DMARDs
Concomitant therapy	Baseline characteristic,	OPAL	Type and dose of

	potential confounder		concomitant cDMARDs

8.3.3. Outcomes

Analyses will be presented for the overall population and for the propensity score match population.

8.3.3.1. Treatment patterns

Treatment patterns for patients in the 'tofacitinib group' and the 'bDMARD group' will include line of usage, dose, frequency, and concomitant cDMARDs. Reasons for discontinuation will be collected.

8.3.3.2. Clinical effectiveness

Clinical effectiveness will be assessed using disease severity (remission, low, moderate, high), DAS28, CDAI and SDAI scores. The proportion of patients reaching targeted treatment goals will be reported.

8.3.3.3. Patient reported outcomes

Patient reported outcomes include Health Assessment Questionnaire for rheumatoid arthritis (HAQ-DI) score, Functional Assessment of Chronic Illness Therapy – Fatigue (FACIT-Fatigue) score, and Health-care resource use questionnaire (HCRU) score.

8.3.3.4. Safety

Safety variables include adverse events.

8.4. Data sources

All data for this study will be obtained from the OPAL registry. The OPAL – Quality Use of Medicines Initiative is a point of care observational registry database (1). Currently approximately 80 Australian rheumatologists and more than 35,000 patients with rheumatic disease are participating in the registry. Participating rheumatologists use an electronic patient management program that captures patient- and disease-specific details during routine physician-patient consultations.

OPAL members are based largely in private practice; however, this is representative of the Australian rheumatology community. OPAL members run clinics and collect data from both urban and rural clinics.

Data are captured into individual clinician's servers during routine clinical consultations, using the purpose-built worksheets in the Audit4 software (2). Audit4 serves as the patient's medical record and produces the clinical correspondence for the consultation. Diagnoses are made by individual rheumatologists rather than being criteria based. Pathology and imaging reports are electronically transferred from the providers and incorporated into the patient's medical record.

The primary rheumatological condition and comorbidities are coded using the World Health Organisation (WHO) International Classification of Diseases 10 (ICD-10), and medications are mapped to the WHO Anatomical Therapeutic Chemical Classification System (ATC). There are condition specific "clinical worksheets" such as a homunculus for tender and swollen joint counts, visual analogue scales and automatic calculation of DAS28 (Erythrocyte Sedimentation Rate (ESR) or C-reactive protein (CRP)).

Data de-identified for patient, clinic and clinician can be exported from each of the OPAL member's local server to a central server for analysis based on a predefined ethics-approved protocol.

8.5. Study size

Data will be extracted for at least 500 tofacitinib and 2,500 bDMARD patients. A sample size of 500 and 2,500 patients, respectively, would ensure acceptably precise estimates of treatment patterns and clinical effectiveness.

The study will continue until one year follow up has been achieved for at least 500 tofacitinib and 2,500 bDMARD patients. Patients who discontinue tofacitinib will also be followed up for at least 1 year.

8.6. Data management

De-identified data will be extracted from the OPAL database. Permission to extract the data from the individual clinician's Audit4 software is obtained three to four weeks prior to the data extraction.

The sample selection window will be 01 February 2015 to 01 September 2017 and all patient with a bDMARD prescription during this time who meet the other eligibility criteria will be included in the extracted data set. A minimum of one year will occur for all sampled patients and therefore data up to 01 September 2018 will be included in the study.

The number and percentage of missing values will be included in the description of baseline characteristics. Missing values will not be imputed.

The patterns and predictors of missing variables will be explored for those covariates with 10% or greater missing values.

Analyses will be conducted using Stata Multiprocessor (MP) V14 (or higher), or equivalent statistical software.

8.7. Data analysis

Patients meeting the inclusion and exclusion criteria described above will be categorised into one of two mutually exclusive drug cohorts, based on the type of DMARD received:

- Tofacitinib
- All bDMARDs

Baseline has been defined in Section 8.3.2.

All continuous variables will be summarised using n (non-missing sample size), mean, standard deviation, median, minimum and maximum. The frequency and percentages (based on the non-missing sample size) or observed levels will be reported for all categorical measures.

Descriptive summaries will be produced for each data cut, providing there is sufficient data available, and again at the final analysis.

All summaries are descriptive and there are no comparative analyses being undertaken, therefore, no adjustments for multiple data cuts and multiple endpoints are required.

Patients who discontinue their index treatment (tofacitinib or bDMARD) will continue to be followed for a period of 1 year.

Further information, and sample tables can be found in the SAP.

8.7.1. Patient demographics

Patient demographics will be summarised descriptively. Data will be presented overall, and by treatment group (tofacitinib and bDMARD).

8.7.2. Treatment patterns

The number of patients prescribed tofacitinib or another bDMARD will be summarised. Information on length of follow-up (e.g. mean, standard deviation, median, minimum, maximum) for the tofacitinib and bDMARD groups will be calculated. Adherence to treatment will be calculated.

Further information can be found in the SAP.

8.7.3. Clinical effectiveness

The following summaries will be performed for patients in the tofacitinib treatment group. Summaries will be performed at baseline, 12, 24, 52, 78, 104 weeks with change from baseline also summarised at each post-baseline time point.

- DAS28
- DAS28 change from baseline
- CDAI
- CDAI change from baseline
- SDAI
- SDAI change from baseline
- Number and % of patients reaching targeted treatment goals

8.7.4. Patient reported outcomes

The following summaries will be performed for patients in the tofacitinib treatment group. Summaries will be performed at baseline, 12, 24, 52, 78, 104 weeks with change from baseline also summarised at each post-baseline time point.

- HAQ-DI
- HAQ-DI change from baseline
- FACIT-Fatigue
- FACIT-Fatigue change from baseline
- HCRU
- HCRU change from baseline

8.7.5. Safety

Exploratory and descriptive analysis of the most common adverse events (e.g. infections) will be performed. No specific categories are prospectively planned, but more detailed evaluations will be undertaken if any safety signals are identified. These detailed evaluations will not involve review of unstructured data from patient records. Briefly, the clinical software developers for OPAL, Software 4 Specialists (S4S) will identify the centers and treating physicians corresponding to the patients with the safety signal. OPAL will send an investigative guideline to the treating physician who will perform the requested investigations and record the data on OPAL. Afterwards, S4S will extract and de-identify all the data from these patients and OPAL will review the de-identified and aggregated data.

Detailed methodology for summary and statistical analyses of data collected in this study will be documented in a Statistical Analysis Plan (SAP), which will be dated, filed and maintained by the sponsor. The SAP may modify the plans outlined in the protocol; any major modifications of primary endpoint definitions or their analyses would be reflected in a protocol amendment.

8.8. Quality control

The Audit4 software is used at the point of care, and as such is a source document. Thus the data that is provided by clinicians to OPAL is a subset of the data that is a legal document which the clinician must ensure is accurate. For chemical pathology results, Audit4 has an internal quality control and only accepts values in the database where there is a corresponding Logical Observation Identifiers Names and Codes (LOINC) code and matching units as provided in the Health Level Seven (HL7) message from the pathology provider service. No additional formal quality control procedures are in place for OPAL.

8.9. Strengths and limitations of the research methods

8.9.1. Strengths

This is a retrospective cohort study of real-world evidence; thus real-world treatment patterns can be described.

8.9.2. Limitations

This is a retrospective study based on data in the OPAL registry. The analyses are therefore limited by the availability of data in this database. Data fields in the Audit4 software are not mandatory so there will likely be missing data points. The sample size, variables, and study duration have been selected to minimize the impact of this.

The Audit4 software records medically significant events, which are not necessarily serious adverse events and therefore it will be not be possible to stratify data into serious and non-serious adverse events.

The source data will be subject to logic checks in the software programming and individual clinicians are responsible for accurate data entry. Patient classifications are based solely on the physician's diagnosis.

The database only covers outpatient visits; inpatient visits are not included in this analysis.

8.10. Other aspects

Not applicable.

9. PROTECTION OF HUMAN SUBJECTS

9.1. Patient information and consent

All parties will ensure protection of patient personal data and will not include patient names on any sponsor forms, reports, publications, or in any other disclosures, except where required by laws. In case of data transfer, Pfizer will maintain high standards of confidentiality and protection of patient personal data.

The activities of OPAL Rheumatology Ltd have received overarching ethics approval from the University of New South Wales Human Research Ethics Committee, based on a patient opt-out arrangement. De-identified data are exported from the clinician's server; encrypted and aggregated data are sent to the OPAL Study Committee and study statistician. All research undertaken by OPAL requires the prospective approval of a properly constituted Australian Human Research Ethics Committee. This study does not require additional informed consent to be obtained from patients.

Confidentiality of patient records will be maintained at all times. All study reports will contain aggregate data only and will not identify individual patients or physicians. At no time during the study will the sponsor receive patient identifying information.
Ethics approval will be sought by OPAL Rheumatology Ltd.

9.2. Patient withdrawal

Not applicable.

9.3. Institutional Review Board (IRB)/Independent Ethics Committee (IEC)

The activities of OPAL Rheumatology Ltd have received overarching ethics approval from University of New South Wales Human Research Ethics.

9.4. Ethical conduct of the study

The study will be conducted in accordance with legal and regulatory requirements, as well as with scientific purpose, value and rigor and follow generally accepted research practices described in Guidelines for Good Pharmacoepidemiology Practices (GPP) issued by the International Society for Pharmacoepidemiology (ISPE) (8).

10. MANAGEMENT AND REPORTING OF ADVERSE EVENTS/ADVERSE REACTIONS

This study includes unstructured data (e.g., narrative fields in the database) that will be converted to structured (i.e., coded) data solely by a computer using automated/algorithmic methods and/or data that already exist as structured data in an electronic database. There is no anticipated human review of patient-level unstructured data to be performed as part of this protocol, and therefore, it is generally not possible to link (i.e., identify a potential association between) a particular product and medical event for any individual.

11. PLANS FOR DISSEMINATING AND COMMUNICATING STUDY RESULTS

This protocol will be registered on the Register of Post-Authorisation Studies. A clinical study report of all results will be generated, and results of this study will be submitted to a peer-reviewed journal. Authorship of the manuscript will be based on International Committee of Medical Journal Editors (ICMJE) criteria.

12. COMMUNICATION OF ISSUES

In the event of any prohibition or restriction imposed (e.g. clinical hold) by an applicable Competent Authority in any area of the world, or if the investigator is aware of any new information which might influence the evaluation of the benefits and risks of a Pfizer product, Pfizer should be informed immediately.

In addition, the investigator will inform Pfizer immediately of any urgent safety measures taken by the investigator to protect the study patients against any immediate hazard, and of any serious breaches of this NIS protocol that the investigator becomes aware of.

13. REFERENCES

1. Tymms K, Littlejohn G. OPAL: a clinician driven point of care observational data management consortium. Clin Exp Rheumatol. 2014;32(5 Suppl 85):S-150-2.
2. Roberts L, Arnold M, Bird P, Burnet S, De Jager J, Littlejohn G, et al. ARA-P39 Optimising patient outcomes in Australian rheumatology (OPAL) - a quality use of medicines initiative (QUMI) with >7000 rheumatoid arthritis (RA) patients. Internal medicine journal. 2011;41:9-38.
3. Smolen JS, Breedveld FC, Burmester GR, Bykerk V, Dougados M, Emery P, et al. Treating rheumatoid arthritis to target: 2014 update of the recommendations of an international task force. Ann Rheum Dis. 2016;75(1):3-15.
4. Felson DT, Anderson JJ, Boers M, Bombardier C, Chernoff M, Fried B, et al. The American College of Rheumatology preliminary core set of disease activity measures for

rheumatoid arthritis clinical trials. The Committee on Outcome Measures in Rheumatoid Arthritis Clinical Trials. Arthritis Rheum. 1993;36(6):729-40.
5. Kirwan JR, Tugwell PS. Overview of the patient perspective at OMERACT 10--conceptualizing methods for developing patient-reported outcomes. J Rheumatol. 2011;38(8):1699-701.
6. Gossec L, Dougados M, Rincheval N, Balanescu A, Boumpas DT, Canadelo S, et al. Elaboration of the preliminary Rheumatoid Arthritis Impact of Disease (RAID) score: a EULAR initiative. Ann Rheum Dis. 2009;68(11):1680-5.
7. Austin PC. An Introduction to Propensity Score Methods for Reducing the Effects of Confounding in Observational Studies. Multivariate Behav Res. 2011;46(3):399-424.
8. Public Policy Committee - International Society of Pharmacoepidemiology. Guidelines for good pharmacoepidemiology practice (GPP). Pharmacoepidemiol Drug Saf. 2016;25(1):2-10.

14. LIST OF TABLES

Please refer to the *Statistical Analysis Plan.*

15. LIST OF FIGURES

Please refer to the *Statistical Analysis Plan.*

ANNEX 1. LIST OF STAND ALONE DOCUMENTS

None.

ANNEX 2. ADDITIONAL INFORMATION

Not applicable.