

An optimal search filter for retrieving articles reporting select adverse event rates among rheumatoid arthritis patients in real-world settings



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Background

Pfizer, Inc. is a pharmaceutical company committed to pursuing scientific breakthroughs and transformational therapies for patients worldwide. The Inflammation and Immunology (I&I) team within the Global Medical Epidemiology (GME) group has a focus of establishing a deep understanding of immune-mediated diseases to advance the development of medicines and further its post-marketing use. The team routinely conducts and publishes rigorous epidemiologic research to inform Pfizer's regulatory decision-making.

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Learning Objectives

1. Create an effective search string for accessing literature on real-world data (RWD) for a specified disease area.
2. Understand how to conduct literature reviews and the relevant components to make the review robust.
3. Contribute to the preparation and interpretation of results from observational research output for the Pfizer Global Medical Epidemiology team.
4. Apply my growing knowledge as an MPH student to understand the importance of using real-world evidence (RWE) to inform regulatory decision-making.

Activities

- Developed a "gold standard" set of articles that addresses the incidence of select adverse events (AE) in RA patients using RWD
- Worked with an external vendor, EpiExcellence, to construct a search string that would capture relevant literature on the incidence of select AE in RA patients using RWD
- Conducted epidemiologic landscape assessments on indications of interest to identify new disease targets for Pfizer therapies

Deliverables

- An abstract of the methods study titled, "An optimal search filter for retrieving articles reporting select adverse event rates among rheumatoid arthritis patients in real-world data"
 - Presents study purpose, rationale, methods, and data extraction
- A robust literature review of Celiac Disease that encompasses the epidemiology, risk factors, natural progression, biological causes, and severity of the disease

Rheumatoid Arthritis (RA) is a chronic and systemic inflammatory disease characterized by symmetrical polyarticular arthritis and significant disease burden. RA patients experience a broad range of co-morbidities. Compared with the general population, RA patients are at a higher risk for major adverse cardiovascular events (MACE) and malignancies. These patients are also treated with multiple classes of agents each of which carry significant benefits as well as risks¹. Analyzing the real-world estimates of adverse event rates in RA is critical to understanding patient experience in routine clinical care.

Methods

A cross-sectional study of articles published in the calendar period of 2019-2022 was conducted to assess the search accuracy of an optimal search string compared to a manually derived set of articles.

In Web of Science, "Rheumatoid Arthritis" AND "Observational Studies" were used as search terms along with the filter to select for Rheumatology journals of the highest Science Citation Index. The following top five relevant journals were selected for analysis:

- Annals of the Rheumatic Diseases
- Rheumatology
- Rheumatology International
- Modern Rheumatology
- Clinical Rheumatology

Relevant literature was established by the following criterion:

Table 1: Criterion for manually screening and selecting relevant literature.

Component	Criterion
Population	Adult Patients with RA (18+)
Intervention	Any
Comparator	Any
Outcomes	Incidence (rates, proportions, raw numbers) of: <ul style="list-style-type: none">• Major adverse cardiovascular event (MACE)• Myocardial infarction (MI)• Venous thromboembolism (VTE)• Malignancy excluding non-melanoma skin cancer (NMSC)• Serious infection (SI)• Mortality
Study Type	Observational, Longitudinal
Geography	Any
Publication Dates	From January 01, 2019, to December 31, 2022

A "gold standard" set of articles was created by gathering relevant literature from each issue of the selected journals with the defined time period. An optimal search string was constructed, and the obtained literature was compared to statistically assess sensitivity and positive predictive value.

Population

Results

The number of relevant articles obtained by the manual search was 125. The composition of the optimal search string is defined as following with each component joined by an AND:

1. **Rheumatoid Arthritis:** (("arthritis, rheumatoid"[MeSH Terms] OR ("arthritis"[Text Word] AND "rheumatoid"[Text Word]))
2. **Observational, longitudinal studies using RWD:** ("epidemiology"[MeSH Subheading] OR "epidemiologic methods"[MeSH Terms] OR "observational study"[Publication Type] OR "observational"[Text Word] OR "real world"[Text Word] OR "administrative claims, healthcare"[MeSH Terms] OR ("claims"[Text Word] AND "data"[Text Word]) OR "medical records systems, computerized"[MeSH Terms] OR ("electronic"[Text Word] AND "record"[Text Word]) OR "longitudinal"[Text Word] OR "prospective"[Text Word] OR "retrospective"[Text Word] OR "cohort studies"[MeSH Terms] OR ("cohort"[Text Word] AND ("study"[Text Word] OR "studies"[Text Word])) OR "registries"[MeSH Terms] OR "registry"[Text Word] OR "registries"[Text Word])
3. **Filters (has abstract, English, published 2019 – 2022):** "hasabstract"[All Fields] AND "English"[Language] AND 2019/01/01:2022/12/28[Date - Publication]
4. **Filters (excludes case reports, editorials, letters, trials, animal studies):** NOT ("case reports"[Publication Type] OR "editorial"[Publication Type] OR "letter"[Publication Type] OR "clinical trial"[Publication Type]) NOT (("Animals"[MeSH Terms] OR "Animal Experimentation"[MeSH Terms] OR "models, animal"[MeSH Terms] OR "Vertebrates"[MeSH Terms]) NOT ("Humans"[MeSH Terms] OR "Human experimentation"[MeSH Terms]))
5. **Selected Journals:** ("Annals of the rheumatic diseases"[Journal] OR "rheumatology oxford england"[Journal] OR "Clinical rheumatology"[Journal] OR "Rheumatology international"[Journal] OR "Modern rheumatology"[Journal])

The optimal search string yielded 223 articles. The sensitivity value was calculated as $(TP/TP+FN) = (44/44+125) = 26.04\%$ and the positive predictive value as $(TP/TP+FP) = (44/44+178) = 19.82\%$.

Lessons Learned

- Understanding the importance of using real-world estimates to characterize an indication of interest
- Analyzing quality literature to build a robust epidemiologic landscape assessment for immune-mediated diseases
- Constructing a search string that captures relevant literature to fulfill a research objective
- Communicating analytical findings to a larger team and incorporating meaningful feedback into my work
- Effectively collaborate with various professionals on post-marketing surveillance and natural history studies

Public Health Implications

RWE can be used to assess the effectiveness of medical therapeutics and provide a reference point for regulatory decision-making. RWD are important for understanding the epidemiology of AEs in the general patient population as it can contextualize the relative risks of therapeutics². Qualitative studies have found that difficulties in answering clinical questions stem from inadequate time required for finding the information and selecting an optimal search string³. While clinicians support the use of evidence from real-world settings, they do not have the time to find and apply it in practice as they often lack an effective search strategy^{4,5}. As such, this study provides a means for a quick extraction of relevant articles and overall contributes to a more holistic understanding of the disease space to better support RA patients.

References and/or acknowledgements

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