ISPOR 2026

IDENTIFYING DRUG REPURPOSING OPPORTUNITIES WITH AI THROUGH LITERATURE REVIEW: A STRUCTURED APPROACH FOR DETECTING NOVEL THERAPEUTIC SIGNALS IN PUBLISHED STUDIES

MadeAi

MSR227

AUTHOR(S) **Angeline Dhas,** BS[1] | **Swathirajan C R,** Ph.D[2] | **Viji Queen,** PharmD[2] | **Vince Salerno,** PharmD, RPh[1]

[1]MadeAi, Cambridge, MA, USA, [2]MadeAi, Nagercoil, India.

Abstract

Objectives

Drug repurposing offers a cost-effective strategy to identify novel therapeutic applications for existing drugs. However, potential repurposing signals are usually dispersed within vast heterogeneous literature, often appearing as secondary endpoints, subgroup analyses, or exploratory outcomes challenging to detect during manual review. This study aimed to develop an AI-assisted, structured literature review for rapid detection of such signals, using iron supplementation as a proof-of-concept to demonstrate feasibility.

Methods

An AI-assisted systematic literature review was conducted using a predefined protocol incorporating eligibility criteria, search strategy, and comprehensive documentation, with human reviewer validation at every stage. PubMed search retrieved 2,140 records. Following AI-driven deduplication and screening with human oversight, 46 studies (anemia = 13; non-anemia = 33) were included for qualitative synthesis. AI-assisted extraction was applied to identify off-label therapeutic benefits with findings reviewed and interpreted by subject-matter experts.

Methodology & Findings

PROTOCOL CREATION
AI Protocol (Inc/Exc Criteria, Search Strategy, Documentation) + Reviewer Validation & Approval

SEARCH — PubMed 2,140 articles

DEDUPLICATION — Duplicates - 0 articles

TITLE/ABSTRACT SCREENING
AI automates T&A screening through intelligent study selection aligned with review objectives
Relevant - 853 articles
1,287 articles excluded

FULL-TEXT SCREENING
AI assists full-text screening by selecting relevant articles, with final validation performed by human reviewers.
Relevant - 46 articles
807 articles excluded

EXTRACTION/ANALYSIS
AI-driven extraction with analysis performed by human reviewers - 46 articles

EXTRACTION/ANALYSIS 46 articles

Anemia Patient: 13 Articles

Benefits
- Improved fertility, QoL, fatigue, and psychological outcomes
- Improved postoperative recovery, mobility, and respiratory function
- Enhanced exercise capacity and lactate performance
- Reduced hospital stay, infection risk, and fibromyalgia risk
- Improved treatment outcomes in CKD, cancer, and gynecological surgeries

Risks
- Nausea
- Epigastric discomfort
- Gastritis
- Diarrhea
- Treatment emergent adverse events (TEAEs)

Non-Anemia Patient: 33 Articles

Cardiovascular: 13 Articles

Benefits
- Reduced hospitalization, length of stay, and heart failure severity
- Improved QoL, exercise capacity, muscle strength, and endurance
- Improved cardiac, vascular, and ventricular function
- Improved functional outcomes with reduced mortality risk

Risks
- Cardiac adverse events (atrial fibrillation, ischemic chest pain)
- Cardiovascular hospitalization events
- Gastrointestinal adverse effects
  TEAEs and treatment discontinuation

CKD: 7 Articles

Benefits
- Improved fatigue, QoL, and functional outcomes
- Reduced cardiovascular and infection-related events and hospitalizations
- Improved gut microbiota with reduced all-cause mortality

Risks
- Hypersensitivity reactions (drug hypersensitivity, acute myocardial infarction, infusion-related reactions)
- Cardiovascular events (non-fatal myocardial infarction, stroke)
- Injection-site pain

Pregnancy: 5 Articles

Benefits
- Reduced hospital stay, complications, and postpartum depression
- Improved somatic growth and offspring outcomes
- Lower blood pressure, adiposity, and Crohn's disease risk

Risks
- No additional risks reported

IBD: 3 Articles

Benefits
- Improved functional outcomes
- Anti-inflammatory effects

Risks
- Bodily pain
- Hypophosphatemia
- Gastrointestinal adverse effects (abdominal discomfort, nausea, vomiting, diarrhea; formulation-dependent, e.g., lactoferrin, ferrous sulfate)

Cancer: 2 Articles

Benefits
- Reduces hospital stay and other cancer-related complications
- Improves survival outcomes in female glioblastoma patients

Risks
- No additional risks reported

HIV, Orthopedics & Immunological Disorder: 3 Articles

Benefits
- Reduced infection-related symptoms and improved gut microbiota in HIV conditions
- Reduced anaphylactic reactions and mortality in orthopedic patients

Risks
In HIV patients, iron supplementation was associated with:
- HIV-related respiratory symptoms including coughing and rhinorrhoea
- GI adverse effects including nausea, vomiting, diarrhoea, abdominal pain, constipation, and flatulence
- Headache

Results

Across multiple clinical indications, iron supplementation exhibited several off-label therapeutic benefits including improvements in fertility, fatigue, quality-of-life, exercise capacity, postoperative recovery, cardiopulmonary function, and psychological outcomes. Reductions in hospital stay, infection risk, transfusion needs, and disease-related hospitalizations were also noted. In cardiovascular and chronic kidney disease populations, iron therapy was associated with improved ventricular function, WHO functional status, and quality-of-life, with signals suggesting reduced hospitalization and mortality in specific settings. Ferric carboxymaltose emerged as a prominent formulation showing consistent functional and healthcare utilization benefits across diverse populations. Reported risks were generally limited and aligned with established safety profiles. The review process was completed in 84 hours using AI-assistance with an AI screening accuracy of 85%.

Conclusion

This proof-of-concept study demonstrates the feasibility and rapid utility of AI-assisted literature review methods for identifying early drug-repurposing signals from existing evidence. AI-driven detection can complement conventional review methodologies, facilitating systematic, reproducible hypothesis generation to inform downstream clinical and translational research, while maintaining human oversight and interpretability.