Integrating Agentic AI with LLM Workflows for Cohort Comparison in Healthcare Analytics

RWD108

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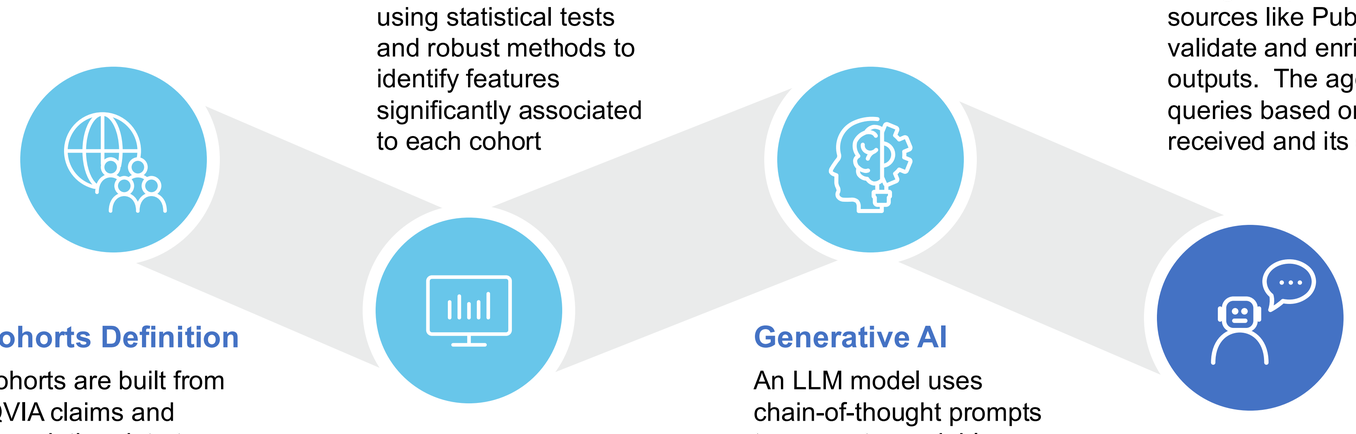
INTRODUCTION

In healthcare analytics, deriving actionable insights from complex patient data remains a critical challenge. While analytics tools and dashboards enable cohort profiling, they often require extensive manual exploration and yield an overwhelming volume of findings—many of which may be trivial or redundant.

To address these limitations, we present an enhanced version of the **Cohort Comparison Synthesis (CCS)** framework, which integrates *Agentic AI* to augment generative summaries with literature-based findings.

METHOD



AGENTIC AI

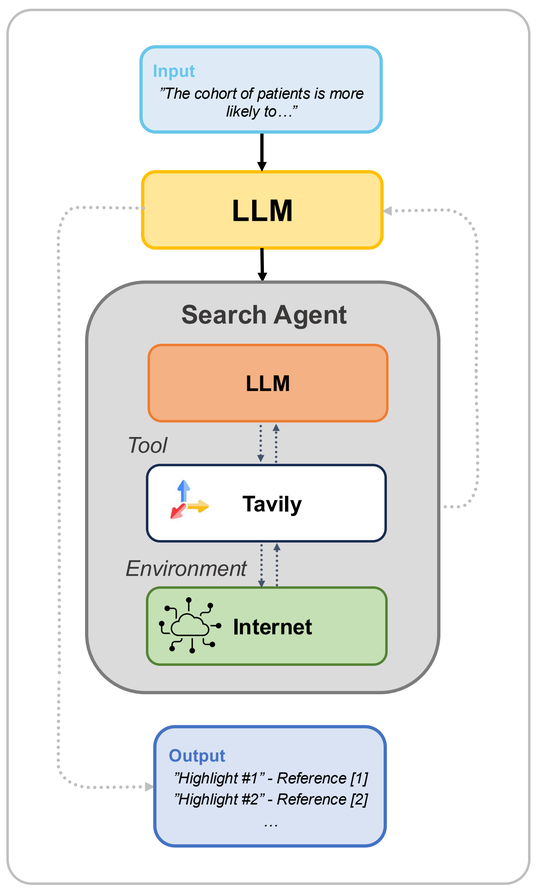


Figure 1: The Agentic AI workflow of CCS

1. LLM (CSS) receives a description of the cohort
2. LLM (CSS) scopes the queries to validate the summary
3. Search Agent executes the queries
4. LLM (CSS) analyses the agent output and interprets it
5. LLM (CSS) produces references and crucial points

RESULTS

Summary

The COPD cohort is predominantly composed of older patients, with a **higher likelihood of being in the 60-79**, and especially the 80+ age groups compared to the other cohort. These patients are more likely to receive respiratory therapies including **LABA/LAMA combinations, ICS/LABA/LAMA therapies**, and mono or combined regimens involving bronchodilators and inhaled corticosteroids. There is a remarkably higher use of medications specifically designed for COPD, such as olodaterol/tiotropium bromide, glycopyrronium/indacaterol, umeclidinium bromide/vilanterol, and aclidinium bromide among others. Patients in this cohort also have an **increased likelihood of cardiovascular comorbidities**, including a greater use of beta blockers, diuretics, antihypertensives, and antithrombotic agents.. Finally, **oral corticosteroid exposure is notably higher in this cohort**, particularly at cumulative doses of 1000 mg or more.

COPD cohort summary

Figure 2: The summary generated by the Generative AI component of CCS when contrasting the main characteristics of German patients affected by respiratory conditions (COPD and Asthma)

Literature findings

Age distribution

"According to a study, the mean age of COPD patients in Germany is 71 years, with 86% of patients aged 60 years and older. Particularly, the prevalence of COPD increases with age, reaching 10.3% among people aged 80 years and older"

Unmet needs in patients with COPD in Germany: a retrospective, cross-sectional study – Herth et al. (2024)

Co-Meds for Cardiovascular and Metabolic Conditions

"The German COSYCONET study indicates that a significant number of COPD patients have comorbid cardiovascular conditions, with over 50% of patients showing some form of cardiovascular disease including hypertension. The prevalence increases with patient age."

The Diagnosis and Treatment of COPD and Its Comorbidities Jorres et al. (2023)

Therapeutic Options for COPD Management

"In Germany, the usage of therapies such as LABA + LAMA, ICS/LABA/LAMA combinations, and LAMA monotherapies is common for COPD management. Triple therapy usage is often recommended when patients experience exacerbations or symptoms despite prior treatment"

Characteristics of Users and New Initiators of Single- and Multiple-Inhaler Triple Therapy for Chronic Obstructive Pulmonary Disease in Germany Bee et al. (2024)

Exposure to Oral Corticosteroids

"A significant portion of COPD patients is on oral corticosteroids (OCS), often due to the high number of exacerbations requiring it. Studies highlight a substantial need to reduce reliance on OCS to minimize side effects"

Unmet needs in patients with COPD in Germany: a retrospective, cross-sectional study – Herth et al. (2024)

Figure 3: Extracts of the literature findings from the Agentic AI component of CCS to support the cohort profiling

CONCLUSIONS

- **Robust approach**: CCS combines statistical rigour, generative and agentic AI to streamline insight generation in healthcare
- **Broad Applicability**: The modular design supports the use across therapeutic areas, enabling evidence-based decisions
- **Scalable Architecture**: A flexible framework that allows easy integration of additional agents for diverse analytical tasks

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