

Automating Systematic Literature Reviews (SLR) in Oncology: Development and Performance of a Proprietary Data Management and Maintenance System (DMS)

Rozee Liu¹, Oscar Correa², Sergio Zapatel², Evgeniya Correa², Anna Forsythe¹

¹Oncoscope-AI, Miami, FL, USA; ² Eviviz Inc., Vancouver, BC, Canada

BACKGROUND

- The accelerating volume and complexity of oncology evidence have made traditional manual SLRs increasingly difficult to conduct, maintain, and update
- Living SLR is a common concept of continuously updating an SLR as evidence becomes available. However, there is no standardization regarding the frequency of SLR updates in order to be qualified as a living SLR
- We developed a new concept of Real-Time AI-assisted Living Systematic Literature Review (REAL-SLR), where the SLR libraries are updated daily with the support of an agentic AI system and a data management system (DMS)

OBJECTIVES

→ This study describes the design, implementation, and performance of a proprietary DMS developed to automate the most resource-intensive SLR components while preserving methodological rigor, transparency, and auditability

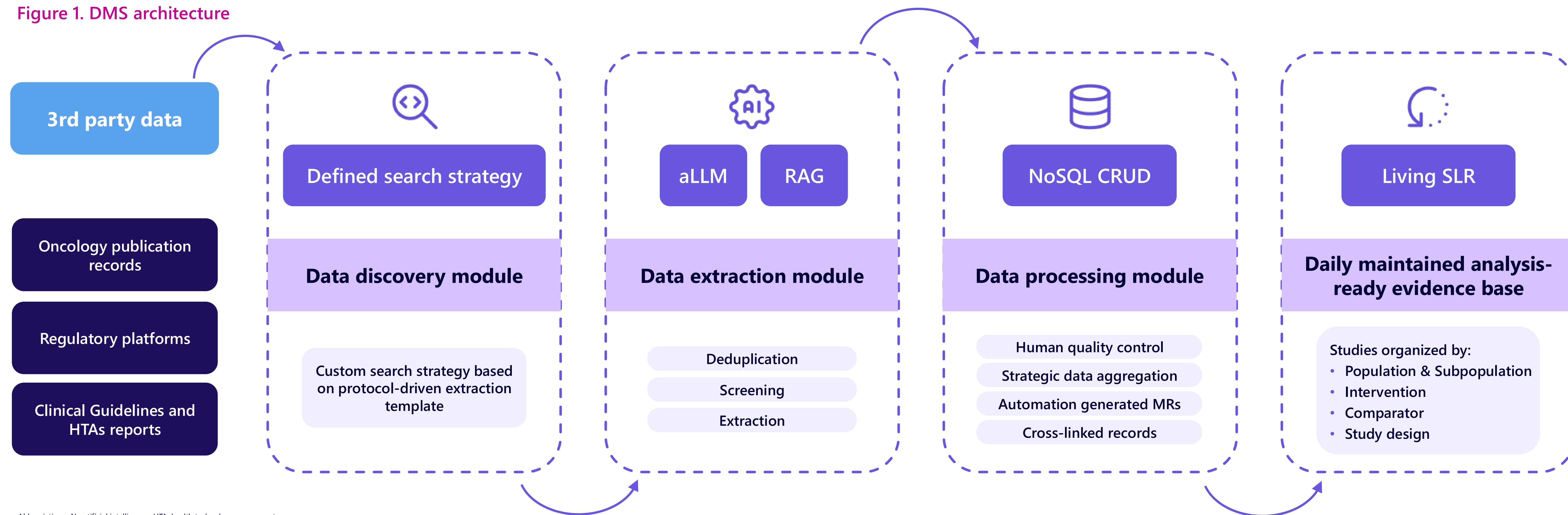
METHODS

- The DMS architecture is built on a NoSQL database with a data editor supporting full CRUD (Create, Read, Update, Delete) operations (**Figure 1**)
- Automated components include structured search execution in PubMed + conferences, deterministic rule-based deduplication, and automated master records (MRs) creation for each unique study
- An integrated agentic large language model (aLLM) system with retrieval-augmented generation (RAG) architecture supports screening + extraction, with human quality control and strategic data aggregation
- Each master record is cross-linked to external regulatory, guideline, and reimbursement resources

RESULTS

- System implementation resulted in three major efficiency gains. First, automated search execution, deduplication, screening, and data extraction are pre-scheduled and completed in ~5 minutes, compared with 6 hours required for a manual daily update (98.6%-time reduction) (**Figure 2**)
- Second, the DMS automatically generates MRs that aggregate study/publication-level data while prioritizing recent/relevant efficacy; human review of a pre-generated MR requires ~5 minutes, compared with 15 minutes for manual aggregation (66.7%-time reduction)
- Third, the DMS functions as a centralized data governance framework, passively maintaining data hygiene, versioning, and linkage of publications to unique studies (~20% reduction vs. ongoing project management and quality control effort)
- The system currently supports REAL-SLR containing 3,898 unique studies across four cancers: 1,527 non-small-cell lung, 924 breast, 738 prostate cancer, and 709 multiple myeloma, with new evidence incorporated daily

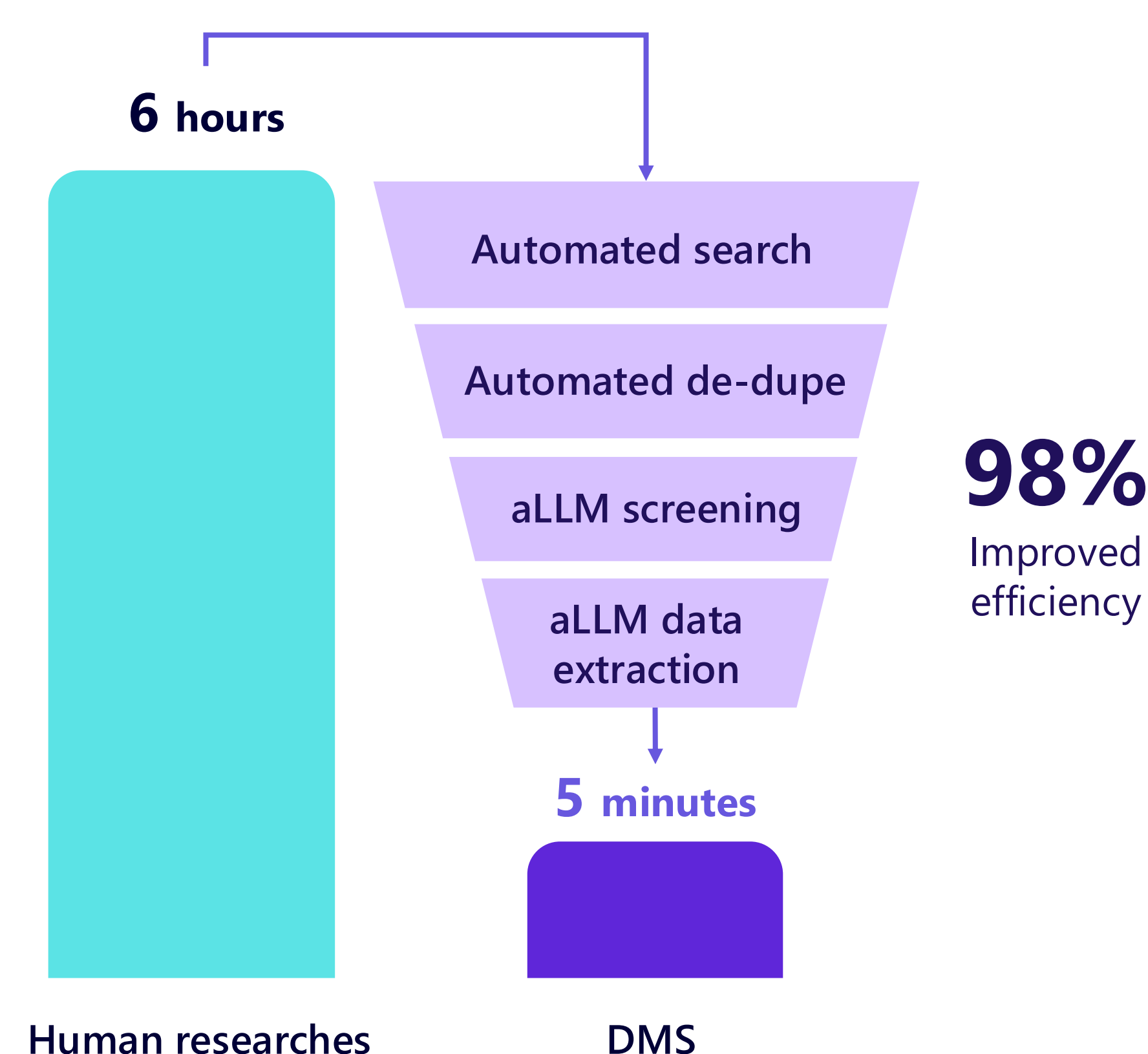
Figure 1. DMS architecture



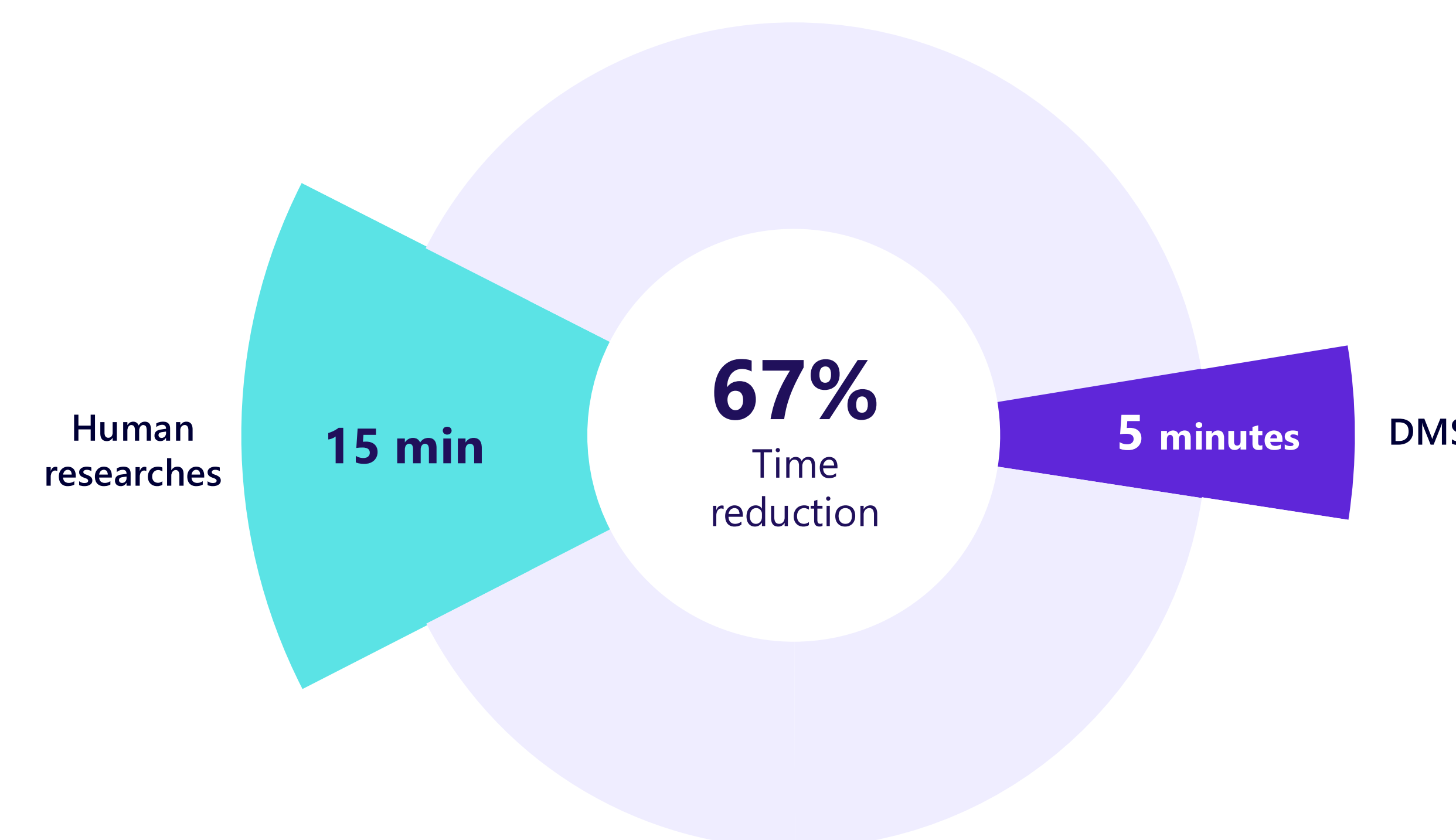
Abbreviations: AI, artificial intelligence; HTA, health technology assessments

Figure 2. Time savings comparing DMS vs. human researchers

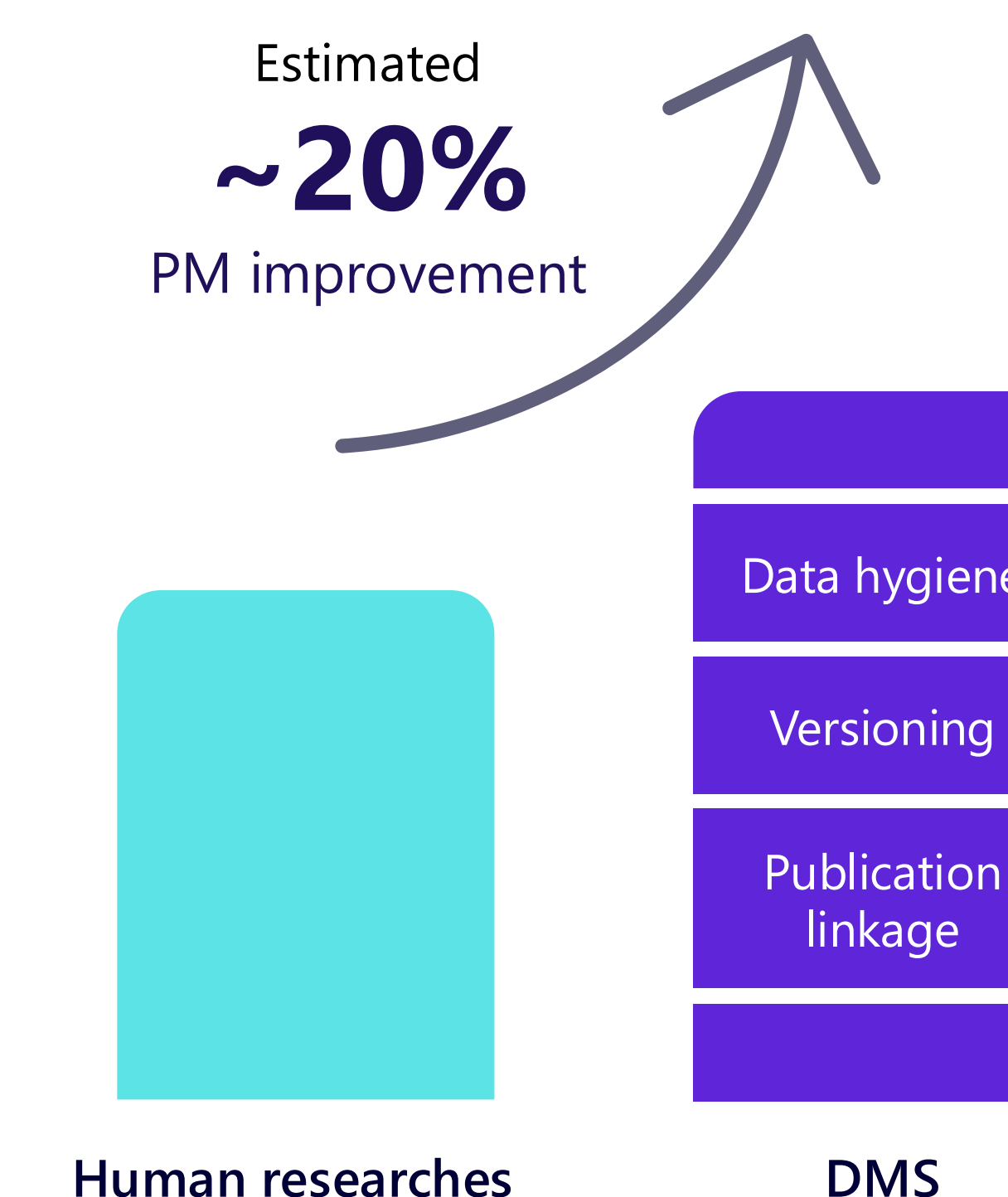
DMS vs. human researchers at daily SLR update



DMS vs. human researchers at master records creation



DMS vs. human researchers at project management (PM)



CONCLUSIONS

- A purpose-built DMS substantially improves the scalability, efficiency, and sustainability of oncology SLRs
- Combining programmatic workflows, rule-based automation, and aLLM/RAG-assisted data review and extraction enables creation and maintenance of a true Living SLR, thereby supporting faster HTA and regulatory decision making in rapidly evolving cancers

