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Benchmarking AI-supported evidence synthesis tools for health technology assessment (HTA) evidence generation

A comparative assessment across the evidence lifecycle

BACKGROUND

HTA evidence generation relies on interconnected activities including systematic literature reviews (SLRs), clinical evidence synthesis, real-world evidence evaluation, and economic modelling.

Increasing evidence volumes and frequent updates under HTA and Joint Clinical Assessment (JCA) frameworks have intensified operational burdens.

Numerous artificial intelligence (AI)-supported evidence synthesis tools have emerged; however, their ability to support the broader HTA evidence-generation lifecycle remains unclear.

OBJECTIVES

This study evaluated AI-supported SLR tools across the HTA evidence-generation (EviGen) pipeline.

METHODS

A scoping review of publicly available AI-supported SLR software was conducted using websites, documentation, white papers, conference abstracts, and reference lists. Tools relevant to oncology HTA were identified and mapped against a predefined EviGen framework.

Capabilities were assessed across eight steps spanning evidence-generation: (1) protocol design, (2) search strategy development, (3) screening and review, (4) data extraction, (5) evidence synthesis, (6) risk-of-bias assessment, (7) interpretation, and (8) reporting. Published performance benchmarks were reviewed.

KEY TAKEAWAYS

Current AI-supported evidence synthesis tools automate selected SLR tasks but do not support the HTA evidence-generation lifecycle or continuous evidence maintenance.

As HTA and JCA increasingly require timely, transparent, and continuously updated evidence, living evidence frameworks integrating AI, governance, and reproducibility may represent the next step in HTA evidence generation.

RESULTS

- Nine AI-supported HTA tools were identified.
- Seven supported AI-assisted screening and review, while only a minority supported downstream evidence-synthesis activities.
- Four tools reported screening performance benchmarks, with sensitivity ranging from 14%-99%, specificity from 46%-99%, and false-negative rates from 21%-39%.
- No identified tool supported all eight EviGen steps, and none enabled continuous living evidence maintenance.
- Most solutions automated review tasks rather than end-to-end evidence generation.
- To address these gaps, a comprehensive Real-Time AI-Assisted Living Systematic Literature Review (REAL-SLR) framework was developed in which evidence identification, screening, extraction, synthesis, and evidence mapping are continuously maintained, while bias assessment, interpretation, and reporting remain project-specific.

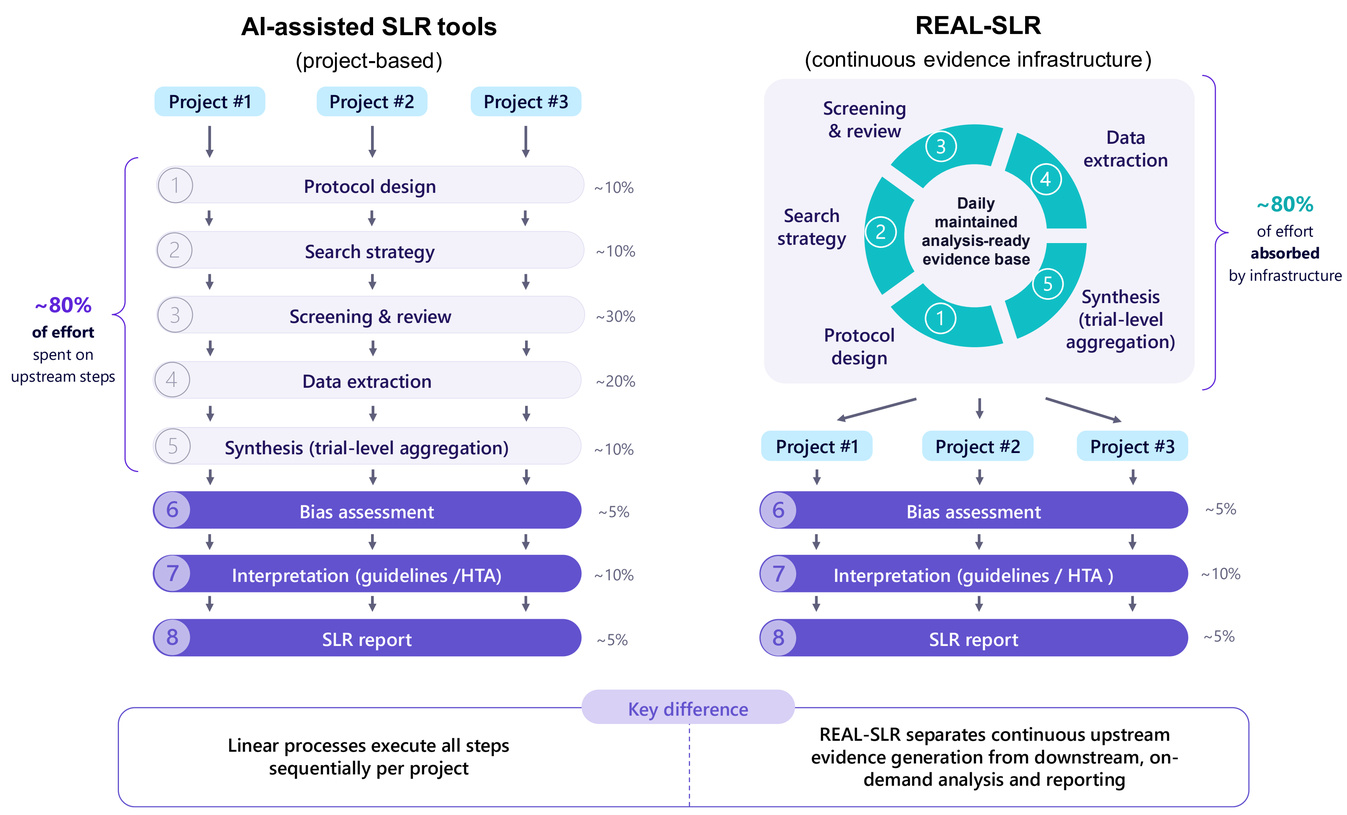
Table1. **AI-assisted SLR tools and the SLR processes that they support**

Tool	Protocol design	Search strategy	Screening & review	Data extraction	Synthesis (publications trial grouping)	Interpretation (guidelines / HTA context)	Bias assessment	SLR report (guidelines / HTA context)	Exports / Outputs
DistillerSR[1]	⚠ Configuration possible but not a formal protocol authoring tool	⚠ Supported (can be documented and operationalized	✓ **AI-assisted** Sensitivity: 14%* Specificity: 95%* False negative: 21%*	✓ **AI-assisted**	⚠ Grouping via custom fields but not enforced hierarchically	✓	✗	⚠ CSV structured data download	⚠ CSV structured data download
Covidence[2]	✗	✗	✓ **AI-assisted** Uses most relevant sorting	✓	✗	⚠ Basic RoB templates; limited customization	✗	⚠ CSV structured data download	⚠ CSV structured data download
EPPI-Reviewer[3]	⚠ Configuration possible but not a formal protocol authoring tool	✗	✓ **AI-assisted** Uses priority screening	✓	✗	✓	✗	⚠ CSV structured data download	⚠ CSV structured data download
Nested Knowledge[4]	⚠ Configuration possible but not a formal protocol authoring tool	⚠ Supported (can be documented and operationalized	✓ **AI-assisted** Sensitivity: 99%* Specificity: 46%* False negative: n/a	✓ **AI-assisted**	✓	✓ **AI-assisted**	✓ **AI-assisted**	✓	✓
Rayyan[5]	✗	✗	✓ **AI-assisted** Sensitivity: 78%* Specificity: 99%* False negative: 21%*	✗	✗	✗	✗	✗	⚠ Exports available but limited formatting and reporting features
Abstrackr[6]	✗	✗	✓ **AI-assisted** Sensitivity: 60%* Specificity: 99%* False negative: 39%*	✗	✗	✗	✗	✗	✗
ExaCT[7]	✗	✗	✗	✓ **AI-assisted**	✗	✗	✗	✗	⚠ Exports extracted data but not full SLR reposts
RobotReviewer[8]	✗	✗	✗	✗	✗	✓ **AI-assisted**	✗	⚠ Outputs bias reports but not full SLR reporting formats	⚠ Outputs bias reports but not full SLR reporting formats
LaserAI[9]	✗	✗	✓ **AI-assisted** No published validation benchmarks	✓ **AI-assisted**	⚠ Supports extraction concepts relationship specification	✓	✓	✗	⚠ Generates summaries but not submission-ready, standardized reports

*Published performance metrics may vary by dataset, review context and tool version.

Notes: Information reflect capabilities described in publicly available sources as of May 05, 2026. Feature availability and AI performance are tool- and version- dependent and subject to change. Many tools support additional features beyond those listed.

Figure 1. **REAL-SLR Framework**



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