Economic evaluations of medication safety interventions in primary and long-term care: A systematic review

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BACKGROUND

- Medications are the most common healthcare intervention, but errors can occur at any stage—prescribing, dispensing, administration, or monitoring
- Medication errors cost $42B globally; in England, ~237M errors/year cause 1,700 deaths and £98M in avoidable costs
- Most economic evidence on medication safety focuses on hospital settings
- Primary care interventions are often costly and lack robust cost-effectiveness evidence, limiting policy adoption

AIM

To identify and critically appraise existing economic evaluations of medication safety interventions in primary and long-term care to support policymakers in effective resource allocation.

METHODS

- Databases searched: EconLit, MEDLINE, APA PsycInfo, Embase (01/2004–09/2025)
- Study focus: Economic evaluations of primary and long-term care medication safety interventions
- Eligible outcomes: Prescribing errors, adverse drug events, hospitalisations, disease-specific outcomes
- Exclusions: Abstracts, commentaries, theses, expert opinions, pharmacogenetic interventions, non-English papers
- Study quality assessment: CHEERS, CONSORT, QHES, AdViSHE checklists
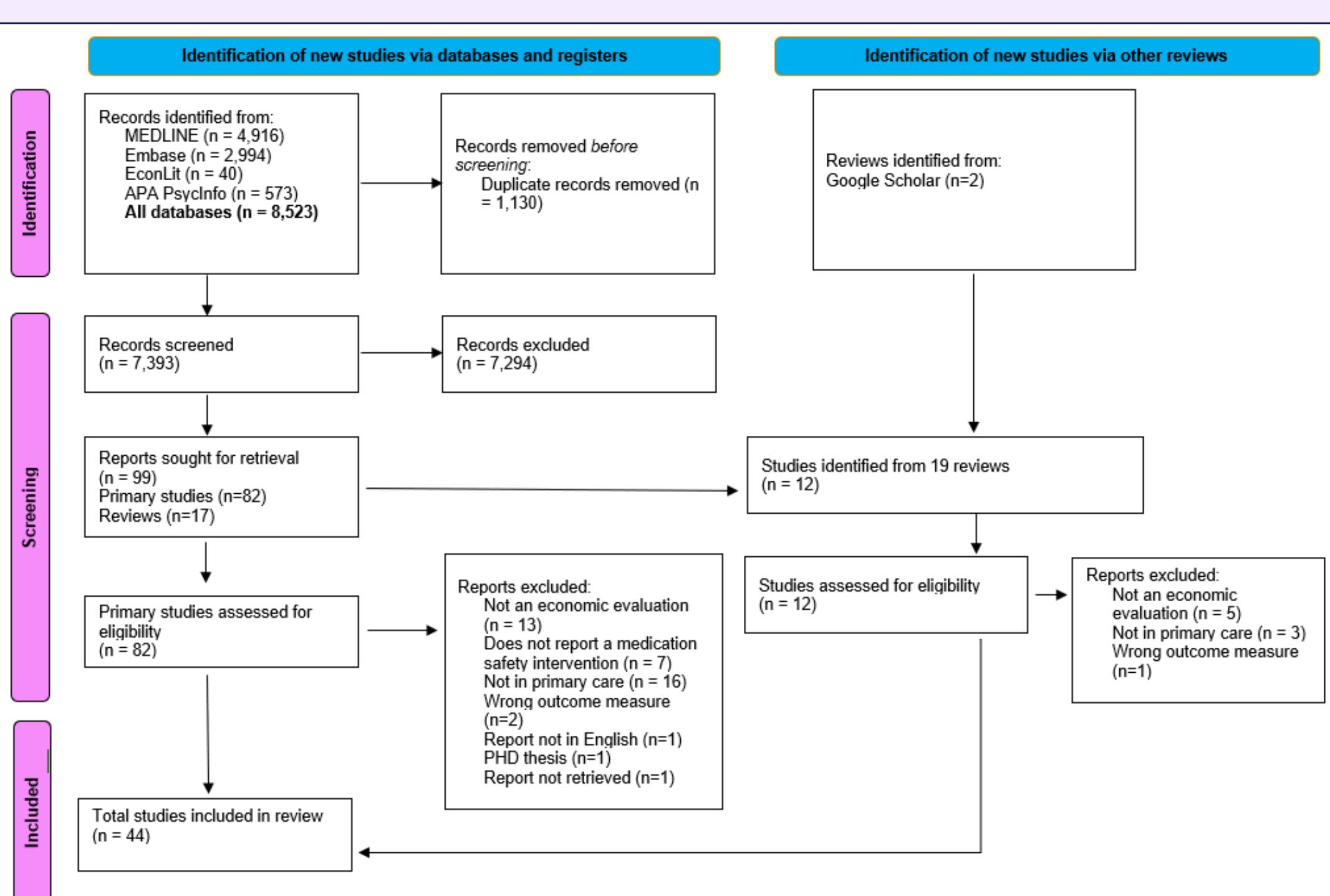
RESULTS

📝 **44 studies** met inclusion criteria: general/family practice (22), community pharmacy (11), and nursing/care/residential homes (11)

💊 Interventions included **pharmacy-led medication reviews (19)**, multidisciplinary reviews (5), GP-led reviews (1), deprescribing (9), disease management (4), care transitions (4), and IT-supported error identification (2)

RESULTS

👥 Studies predominantly targeted **older adults**, addressing **prescribing or monitoring errors**, with limited coverage of other medication use stages

💰 **Economic methods** were mainly cost-utility(16) and cost-consequence (18), with fewer cost-effectiveness (5) and cost-benefit analyses (5). Most drew on trial data (25) and a healthcare cost perspective (39)

🧮 **Ten studies were model based**: 4 decision trees, 3 decision tree-Markov hybrids, 2 state-transition simulation and 1 Markov model

📊 **Outcomes included** prescribing errors (9), hospital utilization (13), quality of life (15), falls (6), and adverse drug events (6)

📈 **Cost-effectiveness analysis results:** of 21 studies with incremental analyses, 14 found the interventions cost-effective—eight involving medication reviews

✅ **Reporting and methodological quality** of the studies was inconsistent, with poor model validation, limited transparency, minimal public and patient involvement, and weak handling of uncertainty or indirect costs. Quality has not improved over time
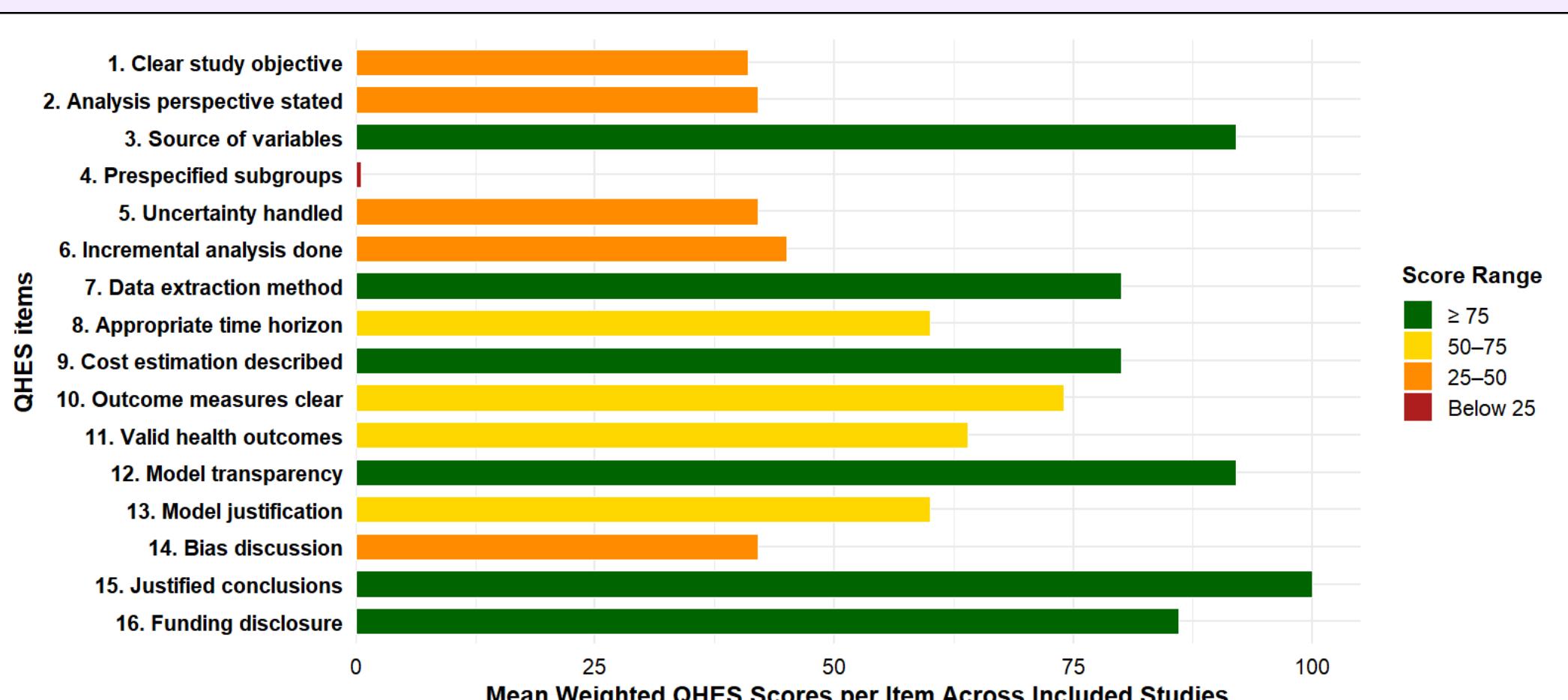
CONCLUSION

Medication Safety Interventions in Primary and Long-Term Care: Evidence & Gaps

- Can be cost-effective, despite variable study quality and poorly validated models
- Studies mainly focussed on prescribing/monitoring errors; little on tech interventions, high-risk patients, or digital interoperability
- Limited patient/public involvement (PPIE) in study planning and execution.
- Future research should address these gaps, supported by innovative interventions, policy support, and sustained funding for effective implementation

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