An overview of systematic reviews of economic evaluations (SREEs) on cancer screening: landscape, quality and recommendations

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Key findings

☞ Items expected to be reported in a SREE of cancer screening but were under-reported included: screening update (37%), adherence (37%), societal resource cost (13%) and equity analysis (0%).

☞ SREEs are expected to report on items identified by the AMSTAR-2 checklist but only 10% accounted for risk of bias in individual studies included in the review, 7% reported on the sources of funding for included studies, 3% provided a list of excluded studies.

☞ Most SREEs concluded on the relative CE of screening, but recommended further studies to address evidence uncertainty and lack of generalizability of findings to other settings.

Background

o Numerous SREEs have been performed to examine the value for money of cancer screening
o However, the evidence and the quality of these SREEs has not been systematically assessed

Objectives

To review and to summarize
o The evidence in SREEs of cancer screening
o Their methodological quality
o Their policy and research recommendations

Methods

o Medline, Embase, EconLit, and NHSEED databases were searched between 2012-2022 in June 2022 (see PRISMA chart)
o Two independent researchers screened the titles/abstracts and full text articles.
o SREEs were examined on the completeness of their reporting based on key data fields[1]. Methodological quality was assessed using the AMSTAR-2 checklist

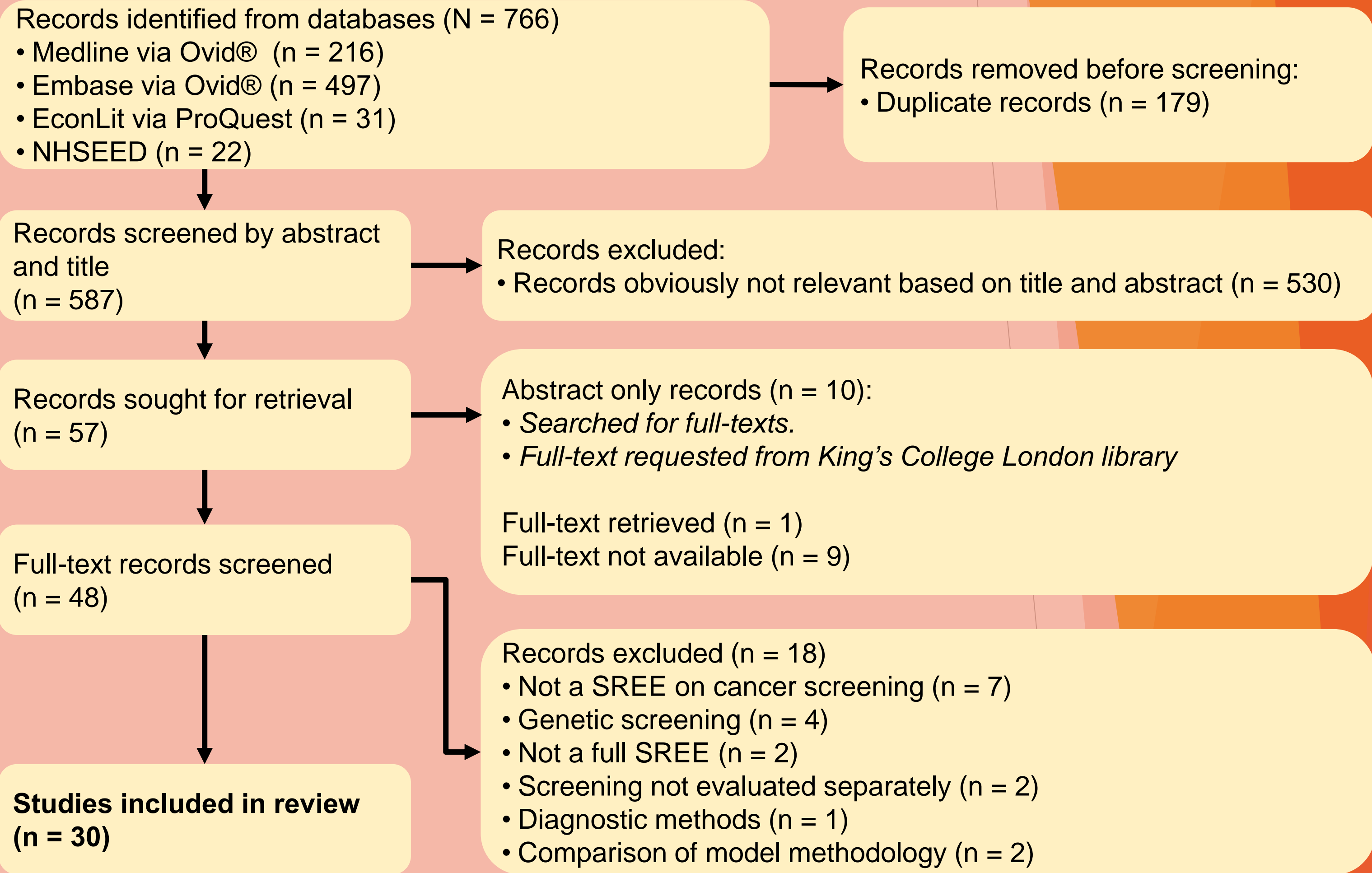| Inclusion criteria	Exclusion criteria
• SREEs published since 2012 • SREEs relating to cancer screening - any cancer type, any screening type	• SRs of clinical effectiveness studies • SREEs of interventions to increase the uptake of screening • SREEs on screening that also include studies on primary prevention methods or treatment methods, but do not separate the studies in the analysis • SREEs of genetic screening studies • Conference proceedings, guideline summaries, opinion articles, SR protocols, SRs of costing studies • Abstracts only or full texts that are not available to download

Results

o Of 766 unique articles screened, 30 SRs were included covering 9 cancer screening types including breast (23%), colorectal (23%), gastric (10%) and liver (10%). Screening methods included imaging (80%), laboratory testing (57%) or physical examinations (13%). Location of screening included in the general population (60%), hospital (10%). Primary care (7%) or community settings (3%)
o 37% reported on screening uptake and adherence, 0% discussed equity issues.
o AMSTAR-2 ratings were between 31%-85%
o 87% performed duplicate screening of articles
o Only 6.7% reported the funding sources of included EEs.
o The majority of SREEs came to conclusions on the relative CE of cancer screening, but further studies were needed to address uncertainty and lack of generalizability of findings into other settings

Discussion and conclusions

o Overall improvement of the methodological quality of SREEs needed – using the AMSTAR-2 checklist as part of the protocol design may help to improve this
o There is no accepted tool for assessing the risk of bias in model-based EEs[2,3] reflecting the low use of them. A review tool is needed
o Equity is important in terms of access to screening programmes[4,5], but this was not considered as part of the EEs included in the SREEs reviewed. Equity should be considered as part of the future EEs
o Heterogeneity means results should be generalized with caution, with many studies recommending further real-world research to reduce uncertainty.

Selection of studies from databases (PRISMA chart)

Records identified from databases (N = 766)
• Medline via Ovid® (n = 216)
• Embase via Ovid® (n = 497)
• EconLit via ProQuest (n = 31)
• NHSEED (n = 22)

Records removed before screening:
• Duplicate records (n = 179)

Records screened by abstract and title (n = 587)

Records excluded:
• Records obviously not relevant based on title and abstract (n = 530)

Records sought for retrieval (n = 57)

Abstract only records (n = 10):
• Searched for full-texts.
• Full-text requested from King's College London library

Full-text retrieved (n = 1)
Full-text not available (n = 9)

Full-text records screened (n = 48)

Records excluded (n = 18)
• Not a SREE on cancer screening (n = 7)
• Genetic screening (n = 4)
• Not a full SREE (n = 2)
• Screening not evaluated separately (n = 2)
• Diagnostic methods (n = 1)
• Comparison of model methodology (n = 2)

Studies included in review (n = 30)

Key data fields results: fields reported by <50% of SREEs

Data field	Number	%
E7. Scenario analysis methods/results	14	46.7
E4. Costs converted into the same currency	13	43.3
D2. Model data sources	13	43.3
A4. Target population residence	12	40.0
C11. Coverage, adherence, participation, uptake	11	36.7
D3. Characterising baseline risk of cancer	11	36.7
C11. Coverage, adherence, participation, uptake	11	36.7
C14. Overdiagnosis, overtreatment, lead-time bias	10	33.3
C2. Screening components	8	26.7
C7. Risk identification method	7	23.3
B7. All-cause mortality costs	6	20.0
C8. Resource used in screening pathway	6	20.0
C12. Sample size	5	16.7
B4. Non-health outcomes	4	13.3
C10. Societal resource cost	4	13.3
B5. Health consequence types	3	10.0
C6. Recruitment method/setting	3	10.0
B6. Societal consequence types	2	6.7
C4. Professional staff involved in pathway	1	3.3
B8. Cost measurement method in RCT	0	0
E8. Equity analysis methods/results	0	0

AMSTAR-2 checklist Number and % studies rated "Yes".

AMSTAR-2 item	Number	Yes (%)
5. Did the review authors perform study selection in duplicate?	26	86.7
16. Did the review authors report any potential sources of conflict of interest, including any funding they received for conducting the review?	26	86.7
14. Did the review authors provide a satisfactory explanation for, and discussion of, any heterogeneity observed in the results of the review?	23	76.7
13. Did the review authors account for RoB in individual studies when interpreting/ discussing the results of the review?	13	43.3
1: Did the research questions and inclusion criteria for the review include the components of PICO?	12	40.0
4. Did the review authors use a comprehensive literature search strategy?	9	30.0
6. Did the review authors perform data extraction in duplicate?	9	30.0
8. Did the review authors describe the included studies in adequate detail? (Key Fields table)	5	16.7
9. Did the review authors use a satisfactory technique for assessing the RoB in individual studies that were included in the review?	3	10.0
10. Did the review authors report on the sources of funding for the studies included in the review?	2	6.7
7. Did the review authors provide a list of excluded studies and justify the exclusions?	1	3.3
11. If meta-analysis was performed did the review authors use appropriate methods for statistical combination of results?	1	3.3
12. If meta-analysis was performed, did the review authors assess the potential impact of RoB in individual studies on the results of the meta-analysis or other evidence synthesis?	0	0.0
15. If they performed quantitative synthesis did the review authors carry out an adequate investigation of publication bias (small study bias) and discuss its likely impact on the results of the review?	0	0.0

Commissioning and research recommendation summary: Colorectal cancer example (see appendices for full table)

Study	Commissioning recommendations	Implications / future research topics
Khalili et al, 2020	All CRC screening techniques were shown to be CE when compared with no screening	Further research is needed to determine the most optimal technique for CRC screening

Appendices

References: 1) Kwon et al., 2022 2) Mühlberger et al., 2021 3) Philips et al., 2006 4) Edwards & McIntosh, 2019; 5) Squires et al., 2016
Abbreviations: **CE**, cost-effectiveness; **EE**, economic evaluation; **SR**, systematic reviews; **SREE**, systematic review of economic evaluations.