Keeping up-to-date with information retrieval research: **Su**mmarized **Re**search in **Info**rmation Retrieval for HTA

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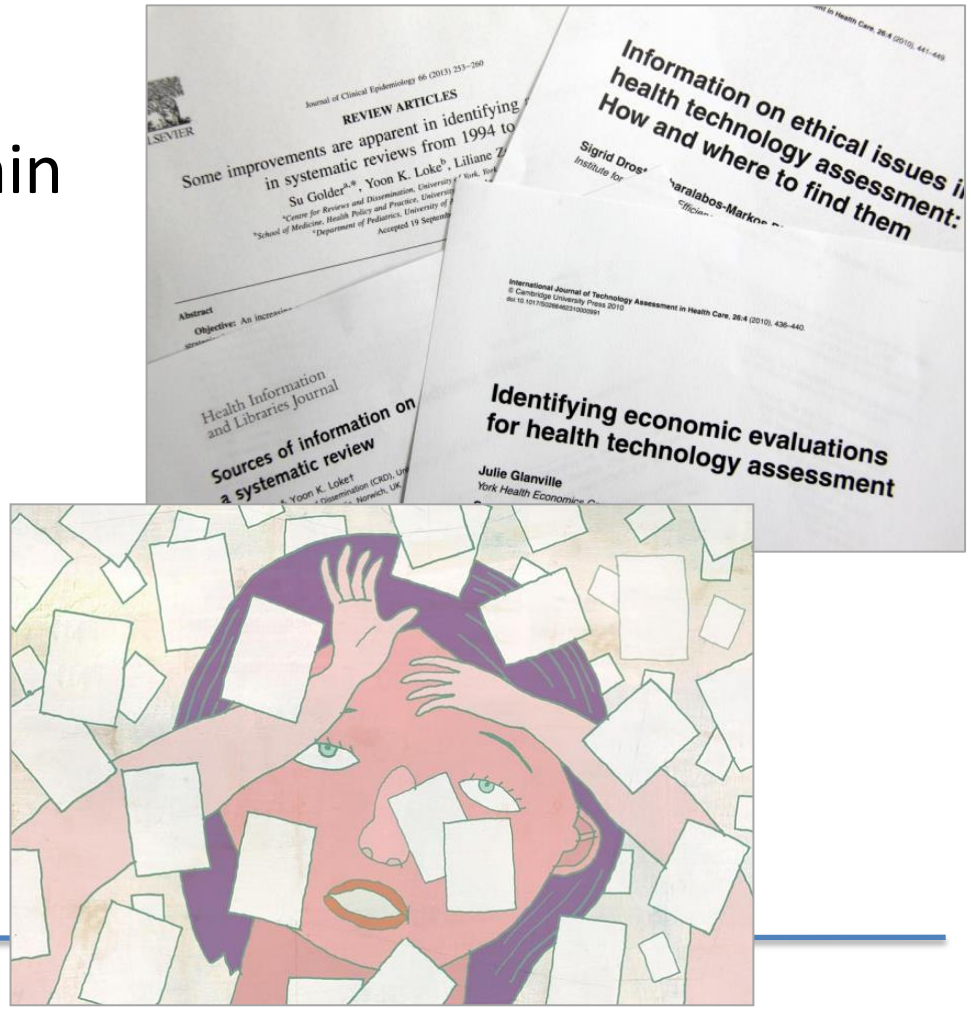
Author Conflicts of Interest

The authors are members of the SuRe Info Steering Group.

Challenge

To keep current on the latest developments within information retrieval for systematic reviews, health technology assessments and other evidence syntheses



What is SuRe Info?

- An open access web resource produced by the Health Technology Assessment International (HTAi) Interest Group on Information Retrieval (IRG).
- A resource that summarizes the current best research evidence about information retrieval for HTA.
- Created for information specialists and others working in information retrieval.
- Updated every six months.

Creating SuRe Info - an overview

- Topic-specific search strategies are run in selected relevant databases; information from other sources is also gathered.
- Publications fulfilling the SuRe Info inclusion criteria receive a structured abstract containing a brief critical appraisal ("publication appraisal").
- Key messages from the appraisals are summarized into topic-specific chapters.

SuRe Info contents

Chapters on general search methods common across all health technologies

* = ongoing

** = planned

Sources to search:

Value of searching different sources*

Value of using different search approaches

Service providers and search interfaces

Designing search strategies:

Strategy development

Search filters

Other limits: language, date

Peer reviewing search strategies

Documenting and reporting the search process

Searching grey literature**

SuRe Info contents - continued

Chapters describing the methods to use when searching for specific aspects of health technologies

Health problem and current use of technology

Description and technical characteristics of technology

Safety

Diagnostic accuracy

Clinical effectiveness* **HTA Core Model®**

Costs and economic evaluation

Ethical analysis

Organizational aspects*

Social aspects*

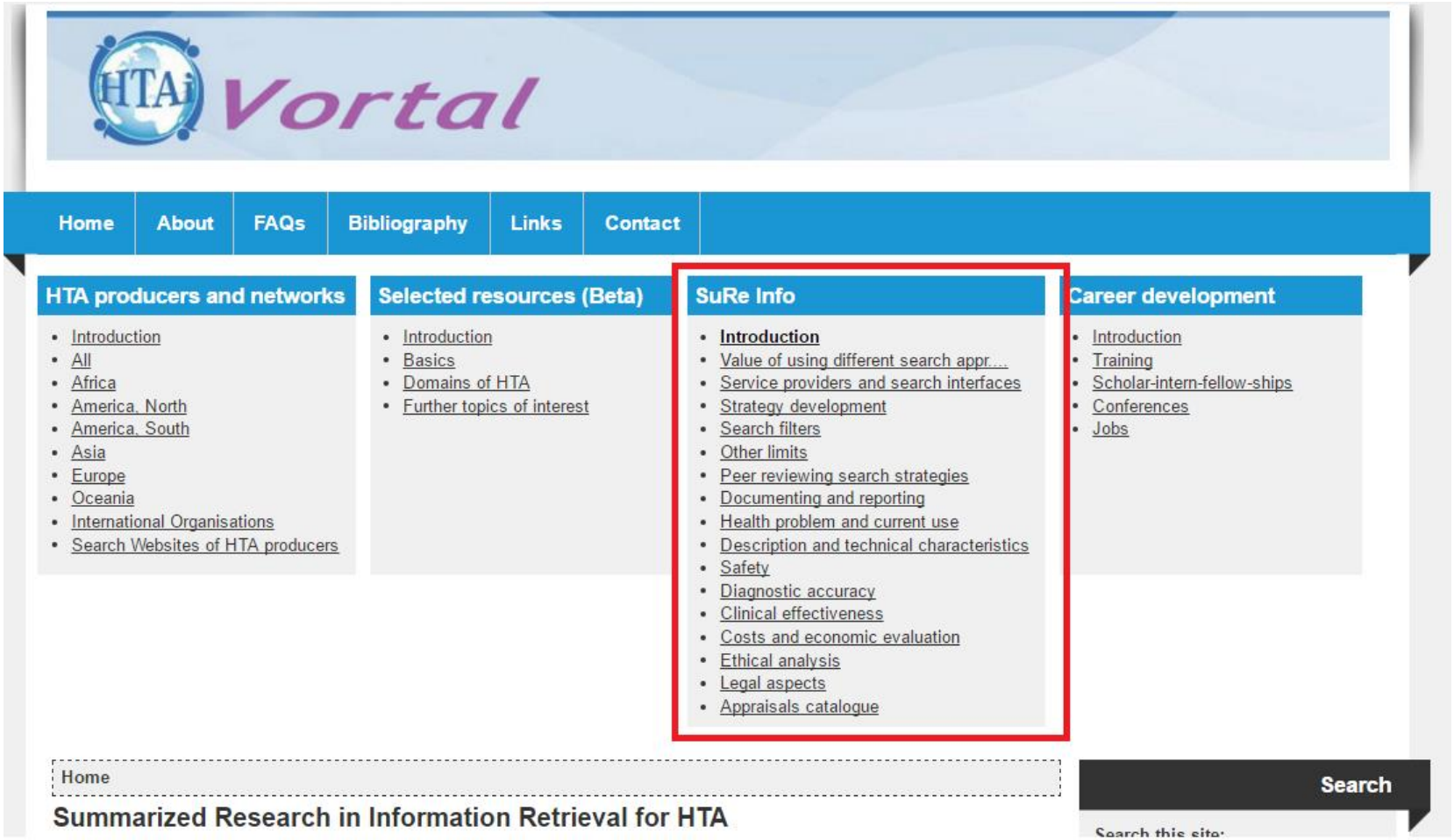
Legal aspects

Qualitative research*

* = ongoing

SuRe Info is part of the HTAi Vortal

but also has its own URL for easy access: http://www.sure-info.org



SuRe Info in everyday work

I am planning a search on cost-effectiveness of bioresorbable coronary scaffolds, and would like to see what the current research evidence says about how and where to search.

How can SuRe Info help?

Search strategy development chapter

Search strategy development

Author(s):
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Last revised:
2016-03-30

Introduction

The Cochrane Information Retrieval Methods Group have published an evidence-based chapter on search methods for the Cochrane Handbook (1), which provides the basis for this summary alongside guidance produced by the Centre for Reviews and Dissemination (2) and the Agency for Healthcare Research and Quality (AHRQ) (3).

The revised and updated searching chapter of the Cochrane Handbook is in preparation. To avoid duplication of effort with the development of the Cochrane Handbook, appraisals have not been prepared for studies in this chapter. Once the revised Cochrane Handbook is available it will be used to update this chapter.

Sensitivity and precision

In order to retrieve as many studies relevant to the review as possible, and to compensate for the limitations of information source records and indexing, search strategy development and construction should aim for sensitivity (1). Increasing the sensitivity of a search increases the possibility of identifying all relevant studies, but also tends to reduce precision because the number of irrelevant results is increased (1, 2). Sampson et al examined a cross section of 94 health related systematic reviews that reported the flow of bibliographic records through the review process and found that search precision of approximately 3% was typical (4). The number of results retrieved, which therefore must be screened against eligibility criteria, has implications for the resources required to conduct a systematic review. This trade-off between sensitivity and precision should be acknowledged and discussed with the wider review team, and an appropriate balance sought within the context of the resources available.

Structuring the search

The Cochrane Handbook suggests a search strategy should be structured around the main concepts being examined by the review. For reviews of interventions, this can be expressed using PICO (Patient (or Participant or Population), Intervention, Comparison and Outcome). It is usually seen as undesirable to include all elements of the PICO in the search strategy as some concepts are often poorly described or non-existent in the title and abstract of a database record or the assigned indexed terms. For reviews of many interventions a search may reasonably be comprised of the population, intervention, and a study design filter (1) if appropriate. A validated search filter is recommended where one exists for the concept of interest (3).

In some topic areas, for example complex interventions, where many of the concepts are particularly ill-defined it is preferable to use a broader search strategy (such as searching only for the population or intervention) and increase the resources allocated to sifting records (2). Alternatives to the PICO framework have also been evaluated for searches in some fields; examples include the SPIDER tool to structure searches for qualitative and mixed methods research (5) and the BeHEMoTh tool to structure searches for theory (6). Methley et al tested the SPIDER search tool in a systematic narrative review of qualitative literature, comparing it with use of the PICO tool and a modified version of PICO with added qualitative search terms (PICOS) (7). The authors concluded that where comprehensiveness is a key factor the PICO tool should be used preferentially due to the risk of missing relevant studies using the SPIDER tool.

Search strategy development chapter - continued

Selecting search terms

The Cochrane Handbook recommends that in order to identify as many relevant records as possible, search strategies should combine subject headings selected from the database's controlled vocabulary or thesaurus (with appropriate "explosions") and a wide range of free-text terms (1). The choice of free-text terms should include consideration of synonyms, related terms and variant spellings.

Methods for identifying search terms have traditionally included techniques such as checking the bibliographic records of known relevant studies, consulting topic experts and scanning database subject indexing guides (3). However, text mining is a rapidly developing tool with potential application in a range of tasks associated with the production of systematic reviews, including the identification of search terms (2). The ASSERT project is a collaboration between the UK National Centre for Text Mining and the EPPI-Centre which investigated the utility of text mining techniques in this context. This includes the use of TerMine, a tool to identify and extract the most significant terms in a collection of documents (8). In a study carried out whilst identifying evidence on community engagement in public health interventions, O'Mara-Eves et al determined whether additional search terms were generated through the use of a text mining tool (TerMine) (9). The authors found that text mining revealed useful synonyms and terms associated with 'community engagement' that had not previously been considered, but that in many cases the terms had already been identified by the reviewers as relevant. The authors conclude that text mining helped to identify relevant search terms for a broad topic that is inconsistently referred to in the literature.

Researchers from the German HTA agency IQWiG have reported their initial research into "objectively derived" search strategies using term frequency analysis from a gold-standard test set of records. It is argued that this method ensures the process of selecting search terms is transparent and reproducible. It allows a searcher with little specialist knowledge of the search topic to make decisions on the inclusion of terms that are informed by evidence. However, it is unclear how this method would perform in topic areas where there are a limited number of studies from which to produce the gold standard test set (10).

In a recent study which aimed to validate an 'objective approach' to strategy development using text analysis methods, the researchers reported that the 'objective approach' for the development of search strategies was noninferior to the 'conceptual approach' (11). Subsequent correspondence on this publication (12, 13) and the authors' responses to this correspondence (14, 15) has debated the study conclusions and the strengths and limitations of the methods used for this research.

Combining search terms with Boolean operators and other search syntax

The Cochrane Handbook describes how a search strategy should be built up using controlled vocabulary terms, text words, synonyms and related terms for each concept at a time, joining together each of the terms within each concept with the Boolean 'OR' operator. The sets of terms may then be combined with AND which limits the results to those records that contain at least one search term from each of the sets. If an article does not contain at least one of the search terms from each of the sets then it will not be retrieved. Cochrane advise against the use of the NOT operator where possible to avoid inadvertently excluding relevant records (1).

The AHRQ manual refers searchers to the PRESS (Peer Review of Electronic Search Strategies) Checklist (16) and states that search strategies should make use of the advanced search techniques such as truncation, wildcards and proximity searching described in this document (3).

Testing search strategies and deciding when to stop searching

Search strategies should be tested to ensure they are fit for purpose: that they find relevant studies. This is difficult to ascertain but testing of search strategies can be carried out informally by expert review, checking that known relevant documents are retrieved by the strategy, or by comparing against previously published strategies (3).

Costs and economic evaluation chapter

Costs and economic evaluation

Author(s):
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Last revised:
2017-03-31

Introduction

This domain focuses on the importance of obtaining information about costs and outcomes as well as efficacy and effectiveness when evaluating new technologies. Economic evaluation is an important part of health technology assessment because it assists with priority-setting between different health technologies. An economic evaluation identifies, measures, values and compares the costs and outcomes of a technology with its relevant comparator.

This domain overlaps with the effectiveness domain and the organizational domain (1).

Guidance on conducting searching as part of systematic reviews of economic evaluations has recently been published (2).

Sources to search

There are some databases which identify and collect economic evaluations and health economics studies (3,4,5,6) to promote efficient retrieval. These databases are built largely from MEDLINE and Embase, but offer a variety of value added information such as critical appraisals, results, categorisations and indexing. These databases can save time in identifying economic evaluations, but may not be comprehensive because of publication lags or geographical focus (e.g. the Cost-Effectiveness Analysis (CEA) registry). NHS EED ceased updating at the end of 2014 and is available only as a closed database. HEED is no longer available.This means that sensitive searches should also include searches of general medical databases such as MEDLINE and Embase (3,4,7,8,9). Searching Science Citation Index and conference abstracts (via websites as well as Embase) may also increase retrieval (7). Pitt et al. conducted a bibliometric analysis of full economic evaluations of health interventions published in 2012-14, comparing, among other things, the sensitivity and specificity of searches in 14 databases (10). This study confirms that Econlit is not a high yield resource for economic evaluations and suggests that Scopus may be a useful resource to search, which may merit investigation.

Searching non-database sources is likely to identify further studies outside of commercial journal publications (7).

The majority of recent reviews of economic evaluations have not followed published searching approaches in detail and are also currently poorly reported (11). Reviews should report the searches explicitly and search a range of resources (2,11). The following information sources should be considered when searching for economic evaluations and utility studies:

- Specialist economic databases (CEA Registry is a live database; Paediatric Economic Database Evaluation (PEDE) is a database of pediatric economic evaluations; NHS EED closed at the end of 2014 (12,13,14)
- Technology assessment databases (the Health Technology Assessment (HTA) database)
- General medical literature databases (MEDLINE, Embase) (12)
- Websites of HTA agencies
- Grey literature (conferences such as ISPOR and HTAi; the RePEC economic working papers collection) (3,4)
- Collections of utility studies including ScHARRHUD and instrument websites (15), as well as utility mapping collections (http://www.herc.ox.ac.uk/downloads/herc-database-of-mapping-studies).

Searches to identify information to populate economic models may involve a range of resources ranging from statistical sources to bibliographic databases (3,4,16,17,18,19). Guidance on suggested minimum searching levels for model parameters is available, although the author notes that much of the guidance has not been empirically tested (20).

Costs and economic evaluation chapter - continued

Designing search strategies

Principles of systematic review methodology should be followed for the design of search strategies to identify economic evaluations. The development of sensitive subject searches within the specific economic evaluation databases is recommended to capture the population and the intervention of interest (3,4,21). An overview of methods for systematic reviews of health economic interventions suggests that a systematic search should use relevant elements of PICO combined with an economic search filter (14). Shemilt is more cautious still, suggesting that only intervention search terms may be required and focus can be achieved by adding the population concept (12). However, there is no requirement to add an economic evaluation search filter to searches within economic evaluation databases because they are pre-filtered (3,6). Search filters for economic studies can be considered (in combination with concepts capturing the population and/or intervention) in general bibliographic databases such as MEDLINE or Embase (14). Published search filters, which can be identified from the InterTASC Information Specialists' Sub-Group (ISSG) Search Filter Resource tend to have high sensitivity but poor precision (22,24). CADTH offers a more precision maximizing search filter for rapid reviews (25). Search strategies to identify cost-effectiveness information may need to be adapted from those developed for searching for effectiveness studies (26). Searching for particular economic methods may require the use of several techniques (27).

Searches to inform specific parameters of decision models may not be required to be as extensive and systematic as those to identify economic evaluations, as decision models are developed in an organic way, some parameters do not require the identification of comprehensive evidence and also it may not be feasible to conduct extensive searches for all parameters of a model (3,17, 20). Health state utility values (HSUVs) are important parameters in decision models and searching for them requires specific techniques (16) as well as the use of a search filter (28). Searching for cost of illness/burden of illness can make use of population search terms (perhaps taken from an accompanying effects review) (12).

Reference list

- (1) EUnetHTA Joint Action 2 Work Package 8. HTA Core Model version® 2.0; 2013 (pdf). [Further reference details] [Publication appraisal] [Free full text]
- (2) Thielen FW, Van Mastrigt G, Burgers LT, Bramer WM, Majoie H, Evers S, et al. How to prepare a systematic review of economic evaluations for clinical practice guidelines: database selection and search strategy development (part 2/3). Expert Rev Pharmacoecon Outcomes Res. 2016; 1–17. [Further reference details] [Publication appraisal] [Free full text]
- (3) Glanville J, Paisley S. Searching for evidence on resource use, costs, effects and cost-effectiveness. In: Shemilt I et al (eds). Evidence based economics. Oxford:Wiley-Blackwell;2010. [Further reference details] [Publication appraisal] [Free Full text]

Publication appraisal

Appraisal of: Wood H, Arber M, Glanville JM. Systematic reviews of economic evaluations: how extensive are their searches? Int J Technol Assess Health Care. 2017 Mar 27:1-7.

Reviewer(s):

David Kaunelis
Kelly Farrah

Full Reference:

Systematic reviews of economic evaluations: how extensive are their searches?

Short description:

This study evaluated the search methodology of recent systematic reviews of economic evaluations. A sample of 42 reviews identified through a MEDLINE search was analyzed. The analysis included: databases searched (general & specialist), health technology assessment sources searched, and supplementary search techniques used. The search approaches used in the systematic reviews were compared to two current recommendations: 1) the minimum search resources from the National Institute for Health and Care Excellence (NICE) economic search requirements for single technology appraisals; 2) the resources recommended in the costs and economic evaluation chapter of SuRe Info. A majority (55%) of the reviews did not meet either the NICE or SuRe Info recommendations. The data collection was hindered by lack of clarity and errors in search methodology reporting within the systematic reviews. It is likely that current recommendations on searching for economic evaluations will change due to the recent closure of two specialized databases (NHS EED & HEED).

Limitations stated by the author(s):

The sample of systematic reviews was pragmatic and limited to papers which were freely available or available through the authors' subscription access. Additionally, the sample was limited to English language systematic reviews only. Reviews were determined to be systematic reviews if the review authors identified them as such; however, it is possible that the review authors may have mislabeled narrative reviews as systematic. Because of lack of clarity in search methodology reporting, reviews that vaguely mentioned searching "The Cochrane Library" were assumed to have searched all databases contained by this resource, which may have overestimated the use of the NHS EED and HTA databases.

Limitations stated by the reviewer(s):

No additional limitations detected by the reviewers.

Study Type:

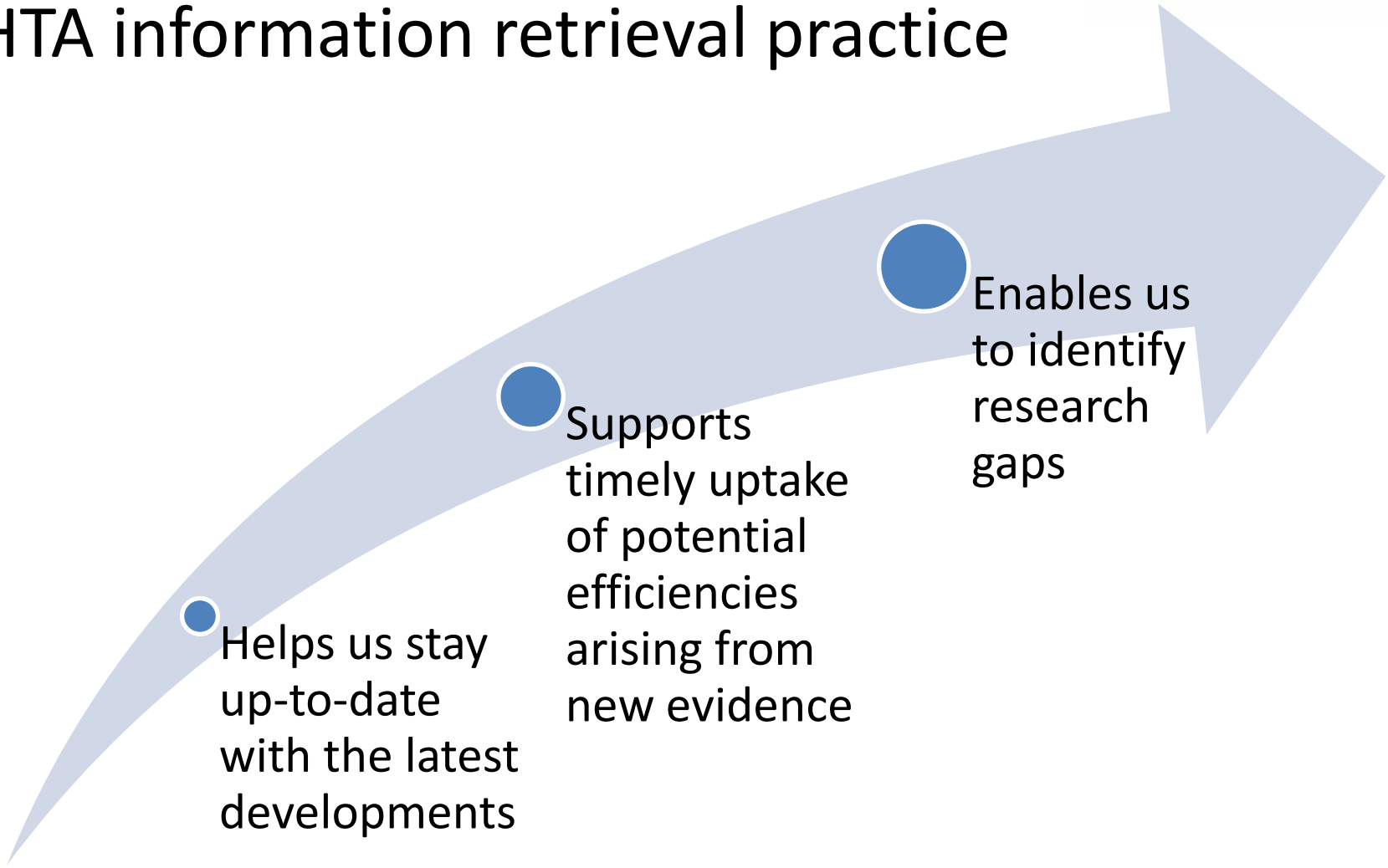
Single study
Tags: Databases Economics Grey literature

Summary

SuRe Info:

- Is an open access web resource.
- Provides an overview of current research evidence for major issues in information retrieval for HTA.
- Helps searchers stay up-to-date with the latest developments in the field of information retrieval.
- Offers research-based advice in everyday searching issues.

The role of SuRe Info in the HTA information retrieval practice



Future plans

- The HTA Core Model® already provides links to SuRe Info chapters for domain-specific guidance on information retrieval issues.
- We look forward to future collaboration with EUnetHTA and other networks.
- We plan to carry out targeted marketing.
- We plan to undertake a user survey.

The SuRe Info project team

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Thank you!

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