Validation of Five Search Filters for Retrieval of Clinical Guidelines Produced Low Precision

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Introduction

Clinical practice guidelines (CPGs) are recommendations intended to assist providers to make informed decisions about patient care.[1] CPGs are standards intended to:
- improve quality of care;
- reduce variation in practice; and
- ensure care is delivered based on patient values and individual preferences.[2]

Surveys of healthcare providers reported that electronic databases such as MEDLINE are frequently used to retrieve CPGs. Barriers when searching for CPGs include a lack of time and skills to complete searches efficiently.[3,4] Search filters designed for use in databases provide a more efficient way to retrieve CPGs by maximizing the number of relevant results while minimizing the number of irrelevant results.[5]

Objective

Our aim is to validate search filters for retrieval of CPGs in Ovid MEDLINE, Ovid Embase, and PubMed, and measure their sensitivity and precision.

Methods

Our protocol was registered in the PROSPERO database (CRD42018105865), in the Open Science Framework (osf.io/rju4f), and as a pre-print.[6]

Search for guidelines filters (Fig 1. Step 1)
A search for filters for retrieving CPGs was conducted in Google using the following terms: guidelines AND (search filters, or search hedges, or databases). The InterTASC Information Specialists Sub-group Search Filter Resource was also searched.[7]

Developing the validation set (Fig.1 Step 2)
We searched the TRIP and Epistemonikos databases to create a validation set. CPGs had to meet the following eligibility criteria:
- Provide recommendations for the treatment of any clinical condition;
- Contain a methods section in the manuscript;
- Contain a reference list; and
- Produced by a group of authors or an organization.

Randomisation
The citations were imported into Excel, de-duplicated, and randomly sorted using the RAND function. Screening started with the lowest random number and progressed until at least 100 eligible guidelines were identified.

Screening
The citations were independently screened by pairs of researchers in full text. The included set of references to CPGs formed our validation set.

Sensitivity and precision (Fig.1 Step 3)
Sensitivity and precision were calculated, with corresponding confidence intervals of proportions for binomial data. Search filter performance was tabulated and compared.

Table 1. Sensitivity and precision of search filters in MEDLINE

Search filter	Number of records retrieved from MEDLINE[a]	Number of test set CPGs retrieved (n = 101)	Sensitivity % (95% CI)	Precision % (95% CI)
CADTH broad	425,689	93	92.1 (85.0 – 96.5)	0.02 (.018 - .027)
CADTH narrow	181,332	89	88.1 (80.2 – 93.7)	0.05 (.039 - .060)
UTSPH guidelines/ recommendations	981,088	88	87.1 (79.0 – 93.0)	0.01 (.007 - .011)
UTSPH consensus statements/guidel ines	662,502	88	87.1 (79.0 – 93.0)	0.01 (.011 - .016)
MDACCL	117,285	89	88.1 (80.2 – 93.7)	0.08 (.061 - .093)

Abbreviations for tables: CI, confidence interval; CADTH, Canadian Agency for Drugs and Technologies in Health; MDACCL, MD Anderson Cancer Center Library; UTSPH, University of Texas School of Public Health. [a] MEDLINE Ovid search date December 6, 2018. Ovid MEDLINE(R) and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily

Main Message

- Five filters for retrieval of clinical practice guidelines produced high sensitivity and low precision.
- We recommend searching guideline-specific resources (e.g. TRIP, Clinical Practice Guidelines Portal, GIN, Epistemonikos) as a more efficient approach.

Table 2. Sensitivity and precision of search filters in Embase

Search filter	Number of records retrieved from Embase[a]	Number of test set CPGs retrieved (n = 88)	Sensitivity % (95% CI)	Precision % (95% CI)
CADTH broad	881,729	86	97.7 (92.0 – 99.7)	0.01 (.008 - .012)
CADTH narrow	502,824	86	97.7 (92.0 – 99.7)	0.02 (.014 - .021)
UTSPH guidelines/ recommendations	983,355	85	96.6 (90.4 – 99.3)	0.01 (.007 - .011)
UTSPH consensus statements/guidel ines	1,145,818	85	96.6 (90.4 – 99.3)	0.01 (.006 - .009)
MDACCL	169,258	79	89.8 (81.5 – 95.2)	0.05 (.037 - .058)

[a] Embase Ovid search date December 6, 2018.

Table 3. Sensitivity and precision of search filters in PubMed

Search filter	Number of records retrieved from PubMed[a]	Number of test set CPGs retrieved (n = 101)	Sensitivity % (95% CI)	Precision % (95% CI)
CADTH broad	686,864	99	98.0 (93.0 – 99.8)	0.01 (.012 - .018)
CADTH narrow	189,082	96	95.0 (88.8 – 98.4)	0.05 (.041 - .062)
UTSPH guidelines/ recommendations	655,177	92	91.1 (83.8 – 95.8)	0.01 (.011 - .017)
UTSPH consensus statements/guidel ines	655,177	92	91.1 (83.8 – 95.8)	0.01 (.011 - .017)
MDACCL	117,614	96	95.0 (88.8 – 98.4)	0.08 (.066 - .1)

[a] PubMed search dates: December 9, 2018.

Results

From a total of 713 records retrieved from the TRIP and Epistemonikos databases, 691 remained after duplicate removal. The 691 records were randomly sorted and screened sequentially.
- 478 records were screened at full text.
- 369 were excluded, and of these:
  - 47 did not have a methods section;
  - 16 did not have a reference section.
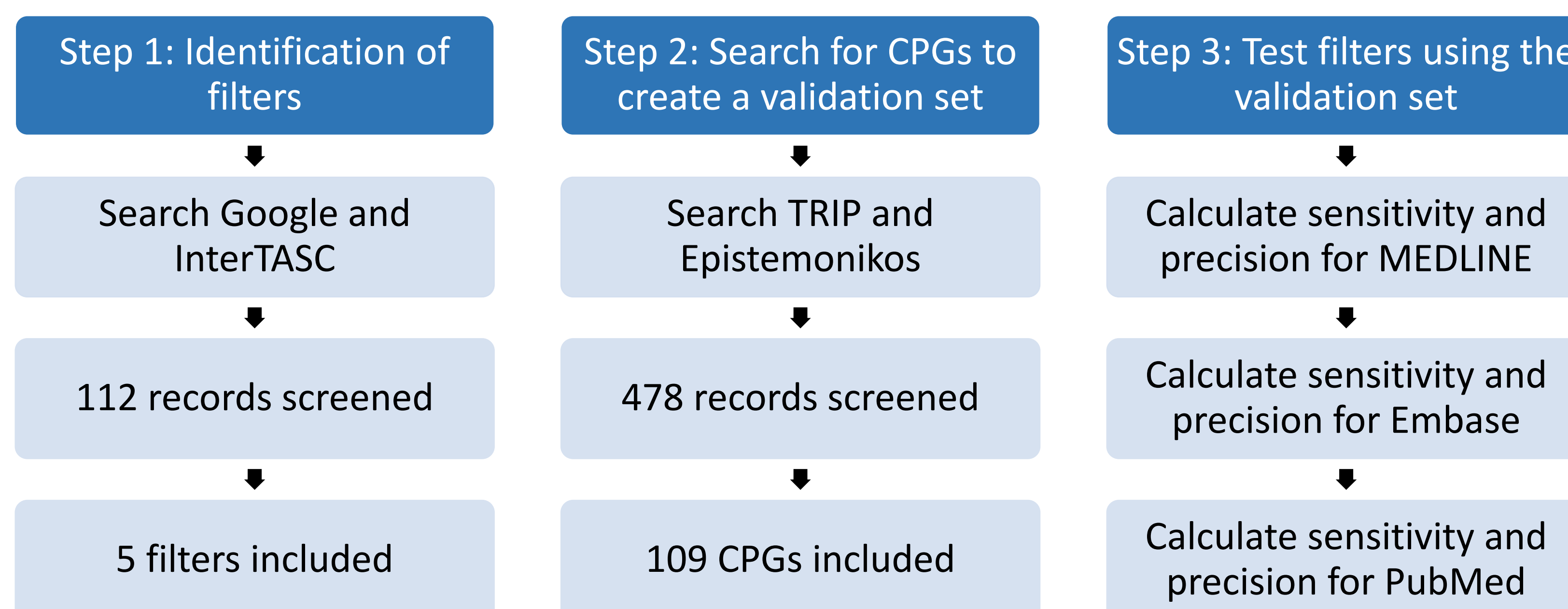
109 CPGs were included:
- 101 CPGs were available/indexed in Ovid MEDLINE and PubMed;
- 88 were indexed in Ovid Embase.

Sensitivity is the percentage of relevant records that are retrieved by a filter. Precision is the percentage of total retrieved records that are relevant. The sensitivity and precision are provided in **Tables 1, 2 and 3**. Validation of the five filters for CPGs revealed high sensitivity (>87%) and very low precision (<1%). The CADTH broad filter had the highest sensitivity across all three databases.

Conclusions

- To our knowledge, this is the first empirical study to undertake validation of search filters for clinical practice guidelines.
- Given the difficulty and limited time available for searching the medical literature, clinical practice guidelines are important summaries of evidence for healthcare providers.
- Due to the very low precision of the search filters, knowledge users will have to shift through over 1000 citations to retrieve one relevant citation.
- When guideline filters are appended to a search for specific clinical conditions, it is likely that the search will achieve greater precision.
- For knowledge users who have time, human resource, or financial restraints, we recommend conducting a focused search for CPGs in guideline-specific resources such as the CMA Infobase, ECRI Guidelines Trust, Guidelines International Network (GIN), Clinical Practice Guidelines Portal, TRIP, Epistemonikos, or the National Institute for Health and Care Excellence guidelines databases.

Figure 1. Process for validating five search filters for retrieval of clinical practice guidelines (CPGs)

Step 1: Identification of filters	Step 2: Search for CPGs to create a validation set	Step 3: Test filters using the validation set
Search Google and InterTASC	Search TRIP and Epistemonikos	Calculate sensitivity and precision for MEDLINE
112 records screened	478 records screened	Calculate sensitivity and precision for Embase
5 filters included	109 CPGs included	Calculate sensitivity and precision for PubMed

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References

1. Rosenfeld RM, Shiffman RN: Clinical practice guideline development manual: a quality-driven approach for translating evidence into action. Otolaryngol Head Neck Surg. 2013 Jan;148(1 Suppl):S1-55.
2. Keiffer MR: Utilization of clinical practice guidelines: barriers and facilitators. Nurs Clin North Am. 2015;50(2):327-345.
3. Clarke MA, Belden JL, Koopman RJ, Steege LM, Moore JL, Canfield SM, Kim MS. Information needs and information-seeking behaviour analysis of primary care physicians and nurses: a literature review. Health Info Libr J.2013;30(3):178-190.
4. Ely JW, Osheroff JA, Chambliss ML, Ebell MH, Rosenbaum ME. Answering physicians' clinical questions: obstacles and potential solutions. JAMA 2005;12(2):217-224.
5. Wilczynski NL, McKibbon KA, Haynes RB. Sensitive Clinical Queries retrieved relevant systematic reviews as well as primary studies: an analytic survey. J Clin Epi 2011;64(12):1341-1349.
6. Lunny CA, Salzwedel DM, Liu T, Ramasubbu C, Gerrish S, Puil L, Mintzes B, Wright JM. Protocol for the validation of four search strategies for retrieval of Clinical Practice Guidelines in MEDLINE, Embase and PubMed. PeerJ Preprints 2018;6:e27149v27141.
7. InterTASC Information Specialists' Sub-Group: ISSG Search Filter Resource. https://sites.google.com/a/york.ac.uk/issg-search-filters-resource/home.

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