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Do published search filters to identify diagnostic test accuracy studies perform adequately?

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Objective

Many search filters to identify diagnostic test accuracy studies have been published and increasing numbers of systematic reviews of diagnostic tests are being undertaken. How well do search filters designed to retrieve studies of diagnostic test accuracy perform in identifying studies to inform health technology assessments and systematic reviews?

Methods

• We identified diagnostic test accuracy search filters by searching MEDLINE, our own files and asking experts.

• We applied the search filters to a case study: a systematic review of diagnostic test accuracy studies for urinary tract infections (UTI) in young children.[1]

• The review searches had involved searching a number of databases and had not used diagnostic search filters.

• The records of the studies (identified from a number of databases) included in the published systematic review were identified in Ovid MEDLINE.

• The performance of the filters in identifying those known relevant records was tested.

• Our findings were compared to those of other publications which have tested the performance of diagnostic search filters.

Results

• We identified 23 published and unpublished search filters.

• The systematic review of UTI included 179 studies.[1] 138 of these studies were originally identified from searches of MEDLINE. 160 studies (160/179) could subsequently be identified on MEDLINE by author searches.

• The filters' performance in retrieving those 160 studies varied from 20.6% to 86.9% for sensitivity and from 1% to 9.4 % for precision.

• The strategy published by Vincent performed best in terms of sensitivity, and offered the best performance in terms of the trade-off between sensitivity and precision.[2]

• Other strategies produced better precision than the Vincent filter, but at sacrifices of sensitivity that led to the loss of approximately two thirds of the relevant records.

Table 1: Performance of tested search filters in finding diagnostic test accuracy studies, in order of sensitivity.

Diagnostic filters	Number of records retrieved (NRR)	Number of gold standard records retrieved (NGS) (n=160)	Sensitivity (NGS/160) x 100	Precision (NGS/NRR) x 100
Vincent 2003[2]	4228	139	86.9%	3.3%
Falck-Ytter 2004[5]	9231	118	73.8%	1.3%
CASP 2002[6]	9593	117	73.1%	1.2%
Southampton A[7]	11563	113	70.6%	1.0%
Southampton E[7]	11523	113	70.6%	1.0%
Bachmann A 2002 sensitive[8]	7326	112	70%	1.5%
Haynes 1994 sensitive[9]	7447	112	70%	1.5%
Aberdeen[7]	9325	111	69.4%	1.2%
CRD C [7]	9480	111	69.4%	1.2%
Haynes 2004 sensitive[10]	8853	111	69.4%	1.3%
Southampton D[7]	9817	105	65.6%	1.1%
CRD A[7]	3897	84	52.5%	2.2%
Deville 2002[11]	2109	83	51.9%	3.9%
Bachmann C 2002[8]	1858	78	48.8%	4.2%
Miner Library[12]	4385	77	48.1%	1.8%
Deville 2000[13]	1679	74	46.3%	4.4%
HTBS[7]	1999	74	46.3%	3.7%
Southampton B[7]	1572	72	45%	4.6%
CRD B[7]	1544	64	40%	4.1%
Haynes 1994 specific[9]	720	53	33.1%	7.4%
Southampton C[7]	589	50	31.3%	8.5%
Bachmann B 2002[8]	522	49	30.6%	9.4%
Haynes 2004 specific[10]	489	33	20.6%	6.7%

Table 2. Performance of search filters offering greater than 69% sensitivity, in order of precision

Diagnostic filters	Sensitivity (%)	Precision (%)
Vincent 2003[2]	86.9%	3.3%
Bachmann A 2002 sensitive[8]	70%	1.5%
Haynes 1994 sensitive[9]	70%	1.5%
Falck-Ytter 2004[5]	73.8%	1.3%
CASP 2002[6]	73.1%	1.2%
Southampton A[7]	70.6%	1.0%
Southampton E[7]	70.6%	1.0%

Discussion

• Our results, from a single large case study, broadly support those from a number of smaller case studies conducted by Leeflang et al and a single case study conducted by Mitchell et al.[3-4]

• The search filters we tested do not offer an adequate trade-off between sensitivity and precision to be used to identify studies for systematic reviews.

• Although current search tools may not be optimal, there is scope for further research and, as the search environment develops, better tools should be feasible.

Key messages

• Diagnostic test search filters are not yet efficient enough to be used to retrieve studies efficiently for systematic reviews.

• Encouraging better research method reporting and indexing would make searching more efficient.

• Search filter performance data using results from further reviews should be collected to gain a better picture of filter performance.

• The development of more effective search filters should be explored.

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