Hunting for Randomised Controlled Trials (RCTs): A Comparison of Search Filters Designed to Identify RCTs

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Objectives

- This study aimed to compare the precision and sensitivity of three search filters designed to identify randomised controlled trials (RCTs).

Background

- A variety of search filters for use in electronic databases have been designed in order to identify studies with particular study designs, such as RCTs.
- These filters are used to identify studies of interest in systematic and other literature reviews; therefore, their accuracy is important.
- It has previously been shown that the accuracy of search filters for RCTs is highly variable, with a range of 1.2-99.5% sensitivity.
- This study compared three commonly used search filters for RCTs developed by Cochrane, the Scottish Intercollegiate Guidelines Network (SIGN) and the British Medical Journal (BMJ). All 3 filters contain a mixture of Medical Subject Heading (MeSH), text word and publication type terms (Figure 1).
- Searches were conducted on 15th June 2015 in the Ovid MEDLINE and MEDLINE In-Process databases.

Methods

- Three search filters were compared:
  - The SIGN Randomised Controlled Trials MEDLINE Search Filter1
  - The BMJ MEDLINE Randomised Controlled Trial Search Strategy
- Differences in records retrieved by the filters were explored by reviewing samples of records uniquely identified by each filter. A sample of 400 records uniquely identified through each filter was selected in 4 batches; the first 100 records, the last 100 records and 2 batches of 100 records from the middle of the search result list.
- For comparison, a sample of 400 articles retrieved by all three filters was also reviewed.
- Articles were eligible for inclusion if they were:
  - RCTs
  - Systematic reviews, meta-analyses or pooled analyses of RCTs
  - Articles in which the study design was not clear and those behind paywalls for which the study design could not be determined from the title and abstract were excluded from the analysis.
- The sensitivity of each filter was estimated by comparing the results identified by each filter to a list of publications included in a randomly selected Cochrane Collaboration systematic literature review (SLR) of taxane-containing regimens for breast cancer:
  - First, the MEDLINE database was searched to identify which of the included studies were available in this database.
  - Results from each filter were then searched for the 39 identified RCTs.
- The precision of each filter was also determined by calculating the proportion of RCTs retrieved in each sample of 400 articles uniquely identified by each of the three filters.

Results

Precision

- The Cochrane search filter uniquely identified the largest number of articles (1,003,716). A sample of 400 of these articles consisted of 0 (0.00%) RCTs and 3 (0.75%) SLRs, meta-analyses or pooled analyses of RCTs, corresponding to a precision score of 0.75% (Figure 2).
- The SIGN search filter uniquely identified 500,127 articles of which a sample of 386 contained 8 (2.07%) RCTs and 1 (0.26%) meta-analysis, corresponding to a precision score of 2.33%.
- The BMJ search filter uniquely identified the fewest articles (84,938). Of a sample of 400, 5 (1.25%) were RCTs and 5 (1.25%) were meta-analyses, corresponding to a precision score of 2.50%. This was the highest precision score of all three of the search filters investigated.
- For comparison, a total of 476,551 records were identified by all three search filters. A sample of 384 records from this group contained 230 (59.90%) RCTs and 18 (4.68%) SLRs, meta-analyses or pooled analyses of RCTs, corresponding to a precision score of 64.58%.

Sensitivity

- In this analysis, the sensitivity of each search filter was inversely related to its precision for the sample of records it uniquely identified.
- The Cochrane RCT filter appeared to be the most sensitive as it identified 39/39 (100%) of RCTs included in the randomly selected Cochrane review. The SIGN filter found 38/39 (sensitivity 97%) and the BMJ filter was the least sensitive, finding 37/39 (sensitivity 95%) (Figure 2).
- The publication that the SIGN filter failed to identify was not the same as either of the two publications that the BMJ filter failed to identify.

Study Limitations

- The sample size of 400 studies examined from each search filter was a very small proportion of the total number of search results identified by each filter, which limits the strength of the conclusions that can be drawn from the results.
- 39 studies were used to assess the sensitivity of each filter; however, the accuracy of this assessment could be improved in further investigations with a more comprehensive list of RCTs for each filter to detect.

Conclusions

- The Cochrane search filter uniquely identified the greatest number of publications of all three filters and also had the highest sensitivity, whereas the BMJ filter uniquely identified the fewest publications and had the lowest sensitivity of the three.
- All three search filters had a sensitivity of over 90%; however, there were differences in the RCTs that each filter identified and failed to identify.
- Within the samples examined from each filter, none of the results uniquely identified by each of the three filters had a precision level above 2.50%, whereas in the sample of articles identified by all three filters, the precision increased to 64.58%.
- The sensitivity and precision of different search filters for RCTs can vary. This should be taken into account when designing search strategies for systematic reviews.

References