

# McMaster Premium Literature Service (PLUS) performed well for identifying new studies for updated Cochrane reviews

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## Abstract

**Objective:** We compared the performance of McMaster Premium Literature Service (PLUS) and Clinical Queries (CQs) to that of the Cochrane Controlled Trials Register, MEDLINE, and EMBASE for locating studies added during an update of reviews.

**Study Design and Setting:** A sample of new studies in updated Cochrane systematic reviews was used as a reference standard. Searches were performed for each study in each database. Where a new study was not indexed in PLUS, we examined the effect on the review of excluding the study.

**Results:** Ninety-eight updated Cochrane reviews were identified. For the 87 reviews with a usable meta-analysis, PLUS contained all new studies for 13 reviews. No statistically significant difference between PLUS and non-PLUS new studies was found when ratio of odds ratios (RORs) were pooled across 39 reviews (ROR<sub>95%</sub>: 0.99; 95% confidence interval: 0.87–1.14). Thirty-five updated reviews had no new studies indexed in PLUS, but conclusions were seldom altered by addition of new studies.

**Conclusions:** PLUS included less than a quarter of the new studies in Cochrane updates, but most reviews appeared unaffected by the omission of these studies. Reviewers should consider adopting PLUS and CQ filters to improve the efficiency of keeping their reviews up to date. © 2012 Elsevier Inc. All rights reserved.

**Keywords:** Databases; Bibliographic; MEDLINE; Meta-analysis as topic; Information science; Evidence-based medicine; Knowledge translation

## 1. Introduction

Systematic reviews serve as important syntheses of primary medical literature for clinical decision-making [1] and inform the content of other evidence-based information resources, including practice guidelines [2,3]. Updating a review with newly available studies is necessary to ensure the continued utility and validity of the review [4–6]. Traditionally, review updates require a comprehensive new electronic literature search followed by manual screening of search results [4–6]. Electronic searches yield large update result sets containing very few eligible studies [7]. The resources required to conduct a review are correlated with the number of citations returned by bibliographic searches [8]. Ideally, research resources should only be expended to update a review that requires updating for continued validity [9]. Furthermore, the need for updating should be readily

apparent at the time of publication of new relevant studies, rather than waiting for an arbitrary period. Searching only a subset of literature, preappraised for methodological quality, may reduce the size of an update search result set but could increase the risk of error in findings because of reduced sensitivity [10].

Empirical metaepidemiological studies use formal statistical methods to test for relationships between putative moderators of results and observed (actual) results in a sample of primary research or reviews [11]. This approach has found use in identifying sources of systematic bias in both controlled trials (e.g., allocation concealment [12]) and meta-analyses (e.g., language [13] of included publications). We used a metaepidemiological approach to provide researchers with a solid basis on which to judge the usefulness of alternative strategies tested for updating systematic reviews.

The McMaster Premium Literature Service (PLUS) database, a product of the McMaster Health Knowledge Refinery, contains high-quality preappraised studies [14,15]. PLUS has accumulated less than 25,000 records since 2003, whereas approximately 3.2 million records

Conflict of interest: The McMaster Premium Literature Service belongs to McMaster University, a not-for-profit publicly funded institution.

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**What is new?****Key finding:**

- Eighty-seven percent of Cochrane systematic reviews are not updated within the 2 years mandated by the Cochrane Collaboration.
- Searching only the McMaster Premium Literature Service (PLUS) for new studies relevant to updating an existing review produced equivalent results to more traditional and resource-intensive literature searching.
- Clinical Queries (CQ)-sensitive filters for treatments (randomized controlled trials [RCTs]) demonstrated high sensitivity for detecting RCTs.

**What this adds to what was known?**

- Relative recall rate for literature in electronic databases is not an appropriate measure of search performance (the degree to which key relevant new trials could be located).
- Less comprehensive and more efficient search methods for literature to be included in an updated systematic review did not appear to introduce bias into sampled reviews.
- Confirms high sensitivity of CQ treatment filters for MEDLINE and EMBASE previously demonstrated.

**What is the implication, what should change now?**

- Alternative methods for identifying new literature for systematic review inclusion are needed to improve the efficiency of the review update process.
- Cochrane Editorial Review Groups and reviewers should consider using McMaster PLUS to identify significant new trials that may change the results of their reviews.
- Electronic database searches for the purpose of identifying literature for systematic reviews should incorporate CQ filters where possible to reduce citation screening burden.

were added to MEDLINE over the past 5 years [16]. PLUS searches will yield fewer studies for updating a systematic review, but these will be of higher quality. PLUS may provide an efficient alternative for updating systematic reviews.

PLUS is generated through a four-stage process reviewed in detail elsewhere [14]. Briefly, a selection of more than 120 clinically oriented journals (Appendix C) are reviewed manually to identify articles meeting basic methodological criteria for the study of treatments, diagnosis,

prognosis, and etiology of human health problems. Articles passing the quality criteria are then rated for relevance (the extent to which the article was pertinent to practice in the rater's clinical discipline) and newsworthiness (something that clinicians in the rater's discipline were unlikely to know) by multiple practicing clinicians. Fifteen percent of the screened literature passed through the highly reproducible selection process in 2009 [17].

Clinical Queries (CQs) filters offer a more efficient means of searching databases such as MEDLINE [18] and EMBASE [19]. The search filters were developed by hand-searching a large cross section of literature to identify search terms most likely to retrieve original or review articles meeting certain criteria (Table 2) for quality and purpose [10]. The CQ-sensitive therapy filter identifies randomized controlled trials (RCTs) in MEDLINE with 99.3% sensitivity, 70% specificity, and 10% precision compared with unfiltered searches.

We propose that researchers planning a search of literature for producing a systematic review or meta-analysis should only adopt search methods with empirical evidence of effectiveness (unlikely to introduce systematic bias). We hypothesized that PLUS contains the key new studies needed to accurately update a systematic review, and, therefore searching PLUS alone for this new literature produces equivalent and accurate updated reviews, compared with searches of MEDLINE, EMBASE, or Cochrane Registry of Trials. We did not expect PLUS to locate all new trials of interest and so tested supplemental searches of MEDLINE and EMBASE using CQ filters [18,20]. Tests were performed to detect differences, if any, between studies retrieved in PLUS and studies retrieved elsewhere.

**2. Methods***2.1. Identification of updated systematic reviews*

All records of the Cochrane Database of Systematic Reviews (CDSRs) as supplied to the National Library of Medicine from issue 1, 2008 through issue 3, 2009 were screened to identify systematic reviews that had undergone an update. Each record was reviewed for inclusion in duplicate by independent readers using the criteria in Table 1. Disagreements between readers were resolved through discussion and consensus. Inter-rater agreement on eligibility was assessed using unweighted Cohen's  $\kappa$  [21].

*2.2. Identification of reference standard of newly added randomized trials*

To test the effects of our interventions for reducing literature screening burden for reviewers, we attempted to reproduce certain elements of the review update process. This required the identification of all RCTs added to a review during an update. This "reference standard" was generated by abstracting study names and associated publication

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