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Journal of Clinical Epidemiology 65 (2012) 651−659

Journal of Clinical Epidemiology

# Search filters can find some but not all knowledge translation articles in MEDLINE: an analytic survey

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Accepted 26 October 2011; Published online 16 March 2012

**Abstract**

**Objective:** Advances from health research are not well applied giving rise to over- and underuse of resources and inferior care. Knowledge translation (KT), actions and processes of getting research findings used in practice, can improve research application. The KT literature is difficult to find because of nonstandardized terminology, rapid evolution of the field, and it is spread across several domains. We created multiple search filters to retrieve KT articles from MEDLINE.

**Study Design and Setting:** Analytic survey using articles from 12 journals tagged as having KT content and also as describing a KT application or containing a KT theory.

**Results:** Of 2,594 articles, 579 were KT articles of which 201 were about KT applications and 152 about KT theory. Search filter sensitivity (retrieval efficiency) maximized at 83%−94% with specificity (no retrieval of irrelevant material) approximately 50%. Filter performances were enhanced with multiple terms, but these filters often had reduced specificity. Performance was higher for KT applications and KT theory articles. These filters can select KT material although many irrelevant articles also will be retrieved.

**Conclusion:** KT search filters were developed and tested, with good sensitivity but suboptimal specificity. Further research must improve their performance. 

*Keywords:* Diffusion of innovation; Information dissemination; Evidence-based medicine; Knowledge translation; Search strategies; MEDLINE

## 1. Introduction

More than US $125 billion were spent in 2003 worldwide on health research. The benefits of the results are not well applied across all groups of people involved in health and health care [1]. Patients do not know the requirements of disease prevention or treatment [2] or necessarily trust the information they currently receive from their health professionals [3]. If patients have adequate and accurate information they make better decisions, become more active in their self-care, and consume fewer health care resources [4,5]. Clinicians are not current in their practices, which leads to less than optimal care. For example, elderly patients are often either over- or undermedicated [4,5], and overuse of surgery occurs [6]. Institutions and decision makers do not support systems that facilitate best practices, as, for example, prophylactic antibiotic use for elective general surgery [7] or the management of patients with stroke in U.K. hospitals [8]. Lavis et al. [9] point out that only four of eight health policies in Canada used citable health services research in at least one of the two stages of the policy-making process.

Knowledge translation (KT), the process of getting research into practice in health care, holds promise of improving the use of existing health care knowledge. A number of other terms refer to the same or related concepts, including knowledge transfer, knowledge exchange, research utilization, implementation science, uptake, and dissemination [10]. To show the variation in the use of KT terms, we have published a list of 100 terms that are related to KT. Our analysis of articles in the health care literature showed that only 46 of these 100 terms were used by the authors in their titles

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0895-4356/$ - see front matter 
doi: 10.1016/j.jclinepi.2011.10.014

**What is new?**

- Retrieval of knowledge translation (KT) material from MEDLINE is challenging. General KT articles are harder to retrieve than studies of applications or theoretical articles in KT.
- Search filters can be built, but their performance is less than ideal. Filters can retrieve approximately 85%−90% of the required KT material, but the retrievals will likely be large and include a substantial number of irrelevant articles.
- Retrieval efficiency of KT material in MEDLINE is similar to that of retrieval of KT material from CINAHL.
- The filters can be used although more work needs to be done to improve the performance of the filters, especially on improving the specificity (nonretrieval of irrelevant material).

and abstracts of more than 500 KT articles [11]. No single term was uniquely associated with all the KT material.

Getting knowledge used in practice [12] across disciplines provides multiple challenges. The growing body of KT literature includes general articles, studies of successful KT interventions, theories, methods, and frameworks to facilitate the movement of research into practice [13,14], with each discipline using its own vocabulary and methods [15]. One of the challenges to those interested in adopting or facilitating adoption of new knowledge and skills is identifying effective KT practices and frameworks across these disciplines. Without good retrieval of KT material we miss important advances or are forced to ''rediscover'' previously known evidence that supports change.

To synthesize and apply the evidence of KT best practices, clinicians, researchers, and decision makers need to be able to effectively identify studies and theory articles. Search filters for large electronic databases can optimize retrieval, capturing articles of interest (true positives) while minimizing the number of articles that are not of interest (false positives). Such search filters have been developed for methodological aspects of studies [16,17] and also for content [18,19].

Our objective was to produce search filters for KT articles in the major health care database, MEDLINE. We have previously published similar filters for CINAHL [20]. Defining KT has been a challenge for many groups. As with many researchers we started with the Canadian Institute of Health Research (CIHR) definition as our standard [21], similar to the approach taken by the authors of the KT series in this journal headed by Straus et al. [22−27]. We assumed that the KT literature has two natural subgroups of articles, those describing interventions designed to change behaviors (KT applications) and those related to the theory and understanding of KT (KT theory) as well as more general articles on KT. Educational materials, such as patient handouts also are part of the broad field of KT. In this study, we sought to develop and validate search filters to retrieve articles with content related to KT (general KT articles, educational instruments, KT applications, and KT theory) as well as KT applications and KT theory separately. We used the MEDLINE database via Ovid Technologies, Inc. searching system for KT filter development.

## 2. Materials and methods

Ethics approval was not needed as published studies were analyzed. Using a diagnostic test assessment framework, we developed and validated search filters for KT literature in MEDLINE. A gold standard database was created by hand searching the biomedical literature (see below); articles were classified as of interest to KT (KT articles) or not related to KT (non-KT articles). The KT articles were further classified as to whether they also were KT applications, KT theory, both, or neither. We also tagged patient handouts or summaries to educate clinicians and others involved in patient care as KT educational instruments (diffusion tools). These documents included, for example, *JAMA*'s ''Patient Page,'' *Annals of Internal Medicine's* ''Summaries for Patients,'' and *BMJ*'s ''ABC of (disease).'' We produced MEDLINE search filters in four divisions of KT articles: all KT content (general KT, KT instruments, KT applications, and KT theory); all KT content without instruments; KT applications; and KT theory.

In addition to the database of articles, we built an extensive list of search terms that had potential to retrieve KT articles. The sensitivity, specificity, precision, and accuracy with which each of these search terms retrieved the target articles (KT articles) in the database were calculated. Sensitivity measures the proportion of target articles retrieved, whereas specificity represents the proportion of nontarget articles that were not retrieved. Precision measures the proportion of retrieved articles that were on target, and accuracy measures the proportion of articles that were retrieved correctly.

Our required sample size of on-target articles (KT articles) was between 110 and 150 based on theoretical work by Yao et al. [28]. Their research also showed that the database of articles for filter development should include articles from journals that have a high proportion of on-target articles and some journals that include only a few on-target articles as well as a range of types or domains of journals. These formal stipulations lead to a database with a representative sample of the literature [28]. Specific journal titles are selected and then all the articles in them are included in the database. The full method of journal selection is reported elsewhere, but we include some details here [11].

We first produced two lists of journals that published at least some KT material. The first list included journals with