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## Research Brief

# Comparison of the time-to-indexing in PubMed between biomedical journals according to impact factor, discipline, and focus



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Abstracting and indexing as a topic  
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Information storage and retrieval  
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## A B S T R A C T

**Background:** Practicing evidence-based medicine requires health care professionals to efficiently retrieve relevant and current literature.

**Objective:** The purpose of this study was to compare the time interval between PubMed entry and indexing with Medical Subject Headings (MeSH) between biomedical journals with varying impact factors, focus areas, and health care discipline representation.

**Methods:** This was a cross-sectional study of articles entered into PubMed database between January 1 and December 31, 2012. The primary endpoint was the number of days between PubMed entry and indexing with MeSH terms.

**Results:** A total of 7906 articles were reviewed across 18 journals. In the first comparison, the time-to-indexing was  $177 \pm 100$  days,  $111 \pm 69$  days, and  $23 \pm 40$  days for articles published in journals with impact factors of 2.0–2.5, 4.5–6.5, and  $>25$ , respectively ( $P \leq 0.001$ ). In the second comparison, the time-to-indexing was  $111 \pm 69$  days for general medicine versus  $170 \pm 74$  days for specialty journals ( $P \leq 0.001$ ). In the third comparison, the overall time-to-indexing was  $177 \pm 100$  days,  $234 \pm 107$  days, and  $163 \pm 58$  days for medicine, nursing, and pharmacy journals, respectively ( $P \leq 0.001$ ).

**Conclusions:** Study results identified a significant delay between entry of articles into the PubMed database and time-to-indexing with MeSH terms across journals of varying impact factor, discipline, and focus. Results suggest that there may be factors that influence the priority by which articles are indexed with MeSH terms. Future research should focus on determining those journal characteristics and any impact of this delay on clinical practice.

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The Joint Commission of Pharmacy Practitioners has recently developed a consistent approach to patient care across the profession.<sup>1–3</sup> The Pharmacists' Patient Care Process is a method by which pharmacists, using evidence-based practice, provide patient-centered care through the steps collect, assess, plan, implement, and follow-up.<sup>2,3</sup> The integration of evidence-based practice, also called evidence-based medicine (EBM), into each step is an example of how EBM has become a cornerstone in contemporary health care. It integrates the health care professional's clinical expertise, patient's values and expectations, and best external evidence to make decisions.<sup>4,5</sup> It emphasizes the use

of high-quality evidence, and thus, practicing EBM requires that health care professionals be able to efficiently identify relevant and current biomedical literature.<sup>4,5</sup>

PubMed is one of the most widely used search engines by health care professionals, researchers, and the public to identify and retrieve biomedical literature. It is a free resource developed and maintained by the National Center for Biotechnology Information (NCBI) at the U.S. National Library of Medicine (NLM) and includes more than 25 million citations.<sup>6</sup> To facilitate retrieval of information and account for variations in terminology, the NLM has developed Medical Subject Headings (MeSH) to serve as a controlled vocabulary.<sup>7</sup> These MeSH words and phrases are assigned to citations by human indexers to describe content and other characteristics which then form the hierarchical structure by which citations can be retrieved from MEDLINE (indexed database) via PubMed (a search engine which searches MEDLINE and other citation records).<sup>6,7</sup>

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Using MeSH vocabulary improves the specificity and efficiency of PubMed searches<sup>8,9</sup> and the ability to use MeSH has been identified as one of PubMed's major advantages over other search engines (e.g., Google Scholar).<sup>10–12</sup> As a result, searching with MeSH terms either by themselves or in combination with keywords is often taught as the preferred PubMed search strategy in the education of many health care professionals.<sup>13–15</sup>

The time interval between when an article is entered in PubMed and indexed with MeSH terms is estimated to be upwards of 4 months for some pharmacy journals which may present an obstacle for health care professionals using PubMed to make evidence-based decisions.<sup>16,17</sup> There is limited information on factors that might contribute to this delay. As a result, the objective of this article was to compare the time-to-indexing between journals reflecting different subject areas, health care disciplines, or impact factor.

## Methods

### Study design

This was a cross-sectional study of articles entered into the PubMed database between January 1 and December 31, 2012. Three comparisons were performed (Table 1). In the first comparison, 3 general medicine journals were identified across varying impact factors: 2.0–2.5 (*American Journal of Managed Care*, *Current Medical Research and Opinion*, and *International Journal of Clinical Practice*), 4.5–6.5 (*American Journal of Medicine*, *Journal of Internal Medicine*, and *Mayo Clinical Proceedings*), and >25 (*New England Journal of Medicine*, *Journal of the American Medical Association*, and *The Lancet*). Ranges were selected through visual review of the impact factor as reported by ISI Web of Knowledge Journal Citation Reports for the category “medicine, general & internal” for a natural division in impact factor (e.g., 6.5 to > 25) and/or to facilitate matching necessary for subsequent comparisons.

In the second comparison, 3 journals classified as general medicine as outlined above were matched by impact factor ( $\pm 0.5$ ) to journals representing the specialty areas of cardiology (*American*

*Heart Journal*), infectious disease (*Journal of Antimicrobial Chemotherapy*), and hematology (*Thrombosis and Haemostasis*). In the third comparison, 3 journals representing medicine (*American Journal of Managed Care*, *Current Medical Research and Opinion*, and *International Journal of Clinical Practice*) were matched by impact factor ( $\pm 0.5$ ) to those representing nursing (*International Journal of Nursing Studies*, *Oncology Nursing Forum*, and *Research in Nursing & Health*) and pharmacy (*American Journal of Health-System Pharmacy*, *Annals of Pharmacotherapy*, and *Pharmacotherapy*).

Journal category and impact factor were taken from the ISI Web of Knowledge Journal Citation Reports as reported for 2012.<sup>18</sup> Journal website were reviewed to ensure a clinical focus. All journals needed to be published in the English language and available electronically through the Oregon State University and/or Oregon Health & Science University library systems. This study was determined to be exempt from review by the Oregon State University Institutional Review Board.

### Data sources

Data were abstracted from the PubMed searches using the Medline display format and entered into a data collection file. Data collected for each article included the PubMed entry date, MeSH indexing date, and publication type(s) through procedures described previously.<sup>16</sup> In the Medline display format, the PubMed entry date is defined as the Entrez Date (EDAT) (i.e., date the citation was added to the PubMed database) and the MeSH indexing date as the MeSH Date (MHDA) (i.e., date the citation was indexed with MeSH terms).<sup>6</sup> The NLM specifies that the MHDA remain the same as EDAT until MeSH terms are added; therefore, citations with this characteristic and no MeSH terms assigned were categorized as unindexed.<sup>6,16</sup>

Publication type(s) was determined by the NLM and reported as part of the Medline display format. Any publication type that represented less than 1% of articles within a set of journals across all 3 sets was classified as “other.” Data were collected for all entered articles entered with the exception of those with an impact factor >25 where every fifth article was reviewed due to high volume.

**Table 1**  
Journals included with impact factor and number of articles

Journal name	Impact factor	Number of articles reviewed
General medicine journals		
American Journal of Managed Care	2.117	230
Current Medical Research & Opinion	2.263	224
International Journal of Clinical Practice	2.427	209
American Journal of Medicine	4.768	378
Mayo Clinic Proceedings	5.790	221
Journal of Internal Medicine	6.455	158
Journal of the American Medical Association <sup>a</sup>	29.978	214
The Lancet <sup>a</sup>	39.060	322
New England Journal of Medicine <sup>a</sup>	51.658	266
Specialty medicine journals		
American Heart Journal	4.497	321
Journal of Antimicrobial Chemotherapy	5.338	679
Thrombosis and Haemostasis	6.094	374
Nursing journals		
International Journal of Nursing Studies	2.075	274
Research in Nursing & Health	2.181	70
Oncology Nursing Forum	2.393	114
Pharmacy journals		
American Journal of Health-System Pharmacists	1.984	347
Pharmacotherapy	2.311	152
Annals of Pharmacotherapy	2.567	273
Total		4826

<sup>a</sup> Due to the high number of articles published, only every fifth entry was reviewed. The original MEDLINE download contained 1330 articles for the *New England Journal of Medicine*, 1609 articles for *The Lancet*, and 1067 articles for the *Journal of the American Medical Association*.

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