Lost in translation: Review of identification bias, translation bias and research waste in dentistry

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ABSTRACT

Objective. To review how articles are retrieved from bibliographic databases, what article identification and translation problems have affected research, and how these problems can contribute to research waste and affect clinical practice.

Methods. This literature review sought and appraised articles regarding identification- and translation-bias in the medical and dental literature, which limit the ability of users to find research articles and to use these in practice.

Results. Articles can be retrieved from bibliographic databases by performing a word or index-term (for example, MeSH for MEDLINE) search. Identification of articles is challenging when it is not clear which words are most relevant, and which terms have been allocated to indexing fields. Poor reporting quality of abstracts and articles has been reported across the medical literature at large. Specifically in dentistry, research regarding time-to-event survival analyses found the allocation of MeSH terms to be inconsistent and inaccurate, important words were omitted from abstracts by authors, and the quality of reporting in the body of articles was generally poor. These shortcomings mean that articles will be difficult to identify, and difficult to understand if found. Use of specialized electronic search strategies can decrease identification bias, and use of tailored reporting guidelines can decrease translation bias. Research that cannot be found, or cannot be used results in research waste, and undermines clinical practice.

Significance. Identification- and translation-bias have been shown to affect time-to-event dental articles, are likely affect other fields of research, and are largely unrecognized by authors and evidence seekers alike. By understanding that the problems exist, solutions can be sought to improve identification and translation of our research.

Abbreviations: MeSH, Medical Subject Headings; NNR, number needed to read.
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1.   Introduction

Evidence is used by different people, for different reasons. They could be seeking background information to assist in new research, be completing an assignment for university, writing a lecture for colleagues, seeking information to support clinical decisions or be involved in an in-depth analysis of published data. The evidence is only helpful to the users if it can be both identified, and then understood.

Identification bias occurs when relevant articles cannot be found, and translation bias occurs when those articles that are found cannot be understood. Together, these problems contribute to research waste: when research is ignored, cannot be found, cannot be used, or is unintentionally repeated [1–7].

Researchers write articles, and seek to find evidence from articles that others have written. There is the feeling that in this age of electronic libraries and search engines, the process of cataloging the research means that all those who seek it can retrieve it, easily. Unfortunately, and possibly surprisingly, this is not actually the case.

Identification and translation bias results in avoidable research waste. A commentary in 2009 estimated that approximately 85% of research was affected by avoidable waste, and likened this to financial waste running into billions of dollars [3]. Increasing concern regarding research waste initiated a series of articles in the *Lancet* in early 2014 [1,2,4–7] exploring the problems underpinning research waste, options available to improve the situation, and recommendations to consider for the future. In addition to fiscal disadvantages, other authors [7] reported that many initially promising research results did not seem to be impacting health care research or clinical practice. For example, over 95% of articles in 2005 regarding cancer prognostic markers had reported at least one significant prognostic variable, but these potentially useful findings did not appear to be either known or impacting future research.

This article aims to review:

- How articles are retrieved from bibliographic databases.
- What article identification and translation problems have affected medical research.
- What article identification and translation problems have affected a specific area of dental research, namely time-to-event survival analyses.
- How identification-bias and translation-bias can contribute to research waste and affect clinical practice.

2.   Methods

This literature review discusses articles regarding identification- and translation-bias in the medical literature at large, and articles reporting time-to-event dental literature specifically. A systematic method was not employed.

3.   Results

3.1.   *Indexing and identification: retrieval of articles from bibliographic databases*

When writing abstracts, and when searching for evidence, it is important to understand how the databases will catalog the information, and how this can then be retrieved.

Specifically, finding data about dental outcomes is not necessarily straightforward. The articles are indexed in many databases, such as MEDLINE, Embase, ClNAHL, PsycLit and the Cochrane Library. The databases contain the 'data' from the articles, and are separate entities to the search platforms that are used to retrieve these data. Common search platforms come from providers such as OVID, PubMed and SilverPlatter. Some databases, such as MEDLINE, can be searched via multiple search platforms, including OVID and PubMed. To conduct an effective search, the seeker needs to know both what they want, and how to find it [8].

Articles can be sought by a free text word or index-term search. In the bibliographic databases of MEDLINE, a word search searches for the given word or phrase that was used by the authors, but in the title or abstract only. The search does not access the full text of the article and, so, although a word search sounds like it would be effective, if the original authors did not describe their research adequately in their title and abstract, searchers will not necessarily find the evidence they seek.

A supplementary search method uses indexing terms. These terms are allocated to the articles by indexers who have read the entire article. Different databases use different indexing terms, such as Medical Subject Headings (MeSH). These terms are selected from a controlled vocabulary by indexers at the US National Library of Medicine and allocated to all articles in the MEDLINE database [9]. These terms have also been adopted by other databases such as the Cochrane Library [10], CINAHL [11] and PsycLit [12] as a source of thesaurus terms, enabling index searches. Indexing terms means that similar types of articles should be allocated similar indexing terms. It also means that indexers working on articles that were not described completely in the abstract can combat this by allocating an appropriate indexing term after reading the full article. This means that some research that would be missed by a word search can be identified by an index-term search, helping to overcome identification bias.

Articles can also be identified by electronic full-text searches [13]. Many documents on the internet can be searched across the full text by Google, by full text searching of the output of individual publishers, and by full text in some databases such as the Cochrane Library and PubMed Central. Full text searching is becoming increasingly available, but it is not yet common.

3.2.   *Identification- and translation-bias in the medical literature*

Early researchers using Medlars (a precursor to today's MEDLINE) encountered problems identifying relevant dental