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Systematic reviews examining implementation of research into practice and impact on population health are needed.

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Abstract

Objective: To examine the research translation phase focus (T1-T4) of systematic reviews published in the Cochrane Database of Systematic Reviews (CDSR) and Database of Abstracts of Reviews of Effects (DARE). Briefly, T1 includes reviews of basic-science experiments; T2 includes reviews of human trials leading to guideline development; T3 includes reviews examining how to move guidelines into policy and practice; and T4 includes reviews describing the impact of changing health practices on population outcomes.

Study design and setting: A cross-sectional audit of randomly selected reviews from CDSR ($n=500$) and DARE ($n=500$) was undertaken. The research translation phase of reviews, overall and by communicable disease, non-communicable disease and injury subgroups, were coded by two researchers.

Results: 898 reviews examined a communicable, non-communicable or injury related condition. Of those, 98% of reviews within CDSR focused on T2, and the remaining 1.6% focused on T3. In DARE, 88% focused on T2, 8.7% focused on T1, 2.5% focused on T3, and 1.3% focused on T4. Almost all reviews examining communicable (100% CDSR, 93% DARE), non-communicable (98% CDSR, 87% DARE) and injury (95% CDSR, 88% DARE) were also T2 focused.

Conclusion: Few reviews exist to guide practitioners and policy makers with implementing evidence-based treatments or programs.

Keywords: knowledge translation; systematic review; databases, bibliographic, translational research; policy

Running head: Reviews examining how to move evidence into practice and its impact are needed

What is new?

Key findings

- Almost all systematic reviews published in the CDSR (98%) and DARE (88%), and within communicable diseases, non-communicable diseases and injury-related conditions were focused on T2 phase research (T2: research involving human trials to generate evidence-based guidelines).

What this adds to what is known?

- Few T3 (research examining how to move evidence-based guidelines into practice) and T4 (research examining the impact of implementation of evidence-based guidelines on population health) focused systematic reviews are available in CDSR and DARE.
- Practitioners and policy makers may have little evidence to guide practice and policy decisions.

What should change now?

- Efforts to increase the production of T3 and T4 systematic reviews including issuing targeted calls for such reviews, establishing funding schemes, and creating more specialist journals for dissemination are needed.

Background

To maximise the benefits of investments in health research, basic science discoveries need to be tested via clinical trials to determine their efficacy, effectiveness and cost-effectiveness. Those interventions found to be effective and cost-effective must then be adopted as part of clinical or public health practice in order for community benefit to be achieved (1, 2). The process of moving research into practice is known as translational research and encompasses four distinct but related phases (3). Phase 1 (T1) research involves moving basic science discoveries, such as understanding disease mechanisms, into research involving human patients. Phase 2 (T2) research aims to facilitate movement from human patient-oriented research into evidence-based guidelines. Phase 3 (T3) research involves examining how to move evidence-based guidelines into health practice in organisations and communities and Phase 4 (T4) research examines the impact of changing health practices on population health outcomes(3).

Despite the importance of each phase of research translation, analysis of research funding and activity suggests that most research output has focused on the first two phases of translation (innovation development and testing in humans), with little attention given to improving methods of dissemination or uptake of evidence-based practice (4). Although systematic reviews are key to facilitating research translation (5), to date there has been no examination of the proportion of systematic reviews that report findings from trials within each different research translation phase (T1-T4). Therefore, this study aimed to describe the translation phase focus (T1-T4) of systematic reviews published in two databases of high quality – the Cochrane Database of Systematic Reviews (CDSR) and the Database of Abstracts of Reviews of Effects (DARE). A secondary aim of the study was to describe post-hoc the

proportion of T1-T4 reviews examining communicable diseases, non-communicable diseases and injury related conditions within these databases.

Methods

Titles and abstracts of a randomly selected subsample of systematic reviews published in the CDSR ($n=500$) and DARE ($n=500$) between January 2012 and August 2013 were extracted.

These databases were selected as they are widely accessed, international databases that publish high quality reviews of healthcare interventions. The translation stage focus was coded independently by two researchers based on the following definitions used by the National Institute of Health (3): a) T1 - reviews of lab-based or basic-science experiments that lead to studies conducted in humans; b) T2 – reviews of human trials that lead to the development of evidence-based guidelines, recommendations or policy; c) T3 – reviews of studies which examine ways of moving evidence-based guidelines into policy and practice; and d) T4 – reviews of research that describe the impact of changing health practices on health outcomes in the population. Based on the classifications used to define the major causes of mortality and morbidity in the Global Burden of Disease (GBD) study, systematic reviews were also coded using the following subgroups: 1) communicable disease (e.g. HIV/AIDs, tuberculosis, diarrhoea, lower respiratory infections, meningitis); 2) non-communicable disease (e.g. cancer, cardiovascular disease); 3) injury (transport injuries) and; 4) other (e.g. non-specific conditions, or not included in the GBD taxonomy (7)). Reviews examining a condition not included in the GBD taxonomy were excluded from subsequent analysis. Frequencies, proportions and Wald-based 95% confidence intervals were generated using STATA 11.0 for each research translation phase and by communicable disease, non-communicable disease and injury.

Results

Of the 1000 reviews, 102 (10%) did not examine a condition included in the GBD taxonomy leaving 898 reviews included in the analyses. Almost all (98%) [95% CI (97%, 100%)] reviews in the CDSR focused on T2 phase research. Only 2% [95% CI (0.4%, 2.7%)] focused on T3 phase research, with no reviews conducted for T1 or T4 (see Table 1). This result was similar within the disease subgroups for CDSR with 100% of communicable disease reviews, 98% [95% CI (97%, 100%)] of non-communicable disease reviews, and 95% [95% CI (85, 100)] of injury-related reviews focusing on T2 phase research.

<Insert Table 1 here>

For DARE, 8% of reviews [95% CI (6.1%, 11%)] focused on T1 phase research, 88% [95% CI (84%, 91%)] on T2 phase research, 3% [95% CI (1.8%, 5.3%)] on T3 phase research, and 2% [95% CI (0.4%, 2.7%)] on T4 phase research. While the majority of reviews within the communicable diseases (93% [95% CI (86%, 100%)]), non-communicable diseases (87% [95% CI (84%, 90%)])) and injury (88% [95% CI (84%, 91%)] reported in DARE were also focused on T2 phase research, 9.8% [95% CI (6.8%, 13%)] of reviews within the non-communicable disease subgroup focused on T1 phase research.

<Insert Table 2 here>

Discussion

This study highlights that an overwhelming proportion of systematic reviews published in the two databases (98% in CDSR and 88% in DARE) focused on research trials from translation phase 2:T2. The findings were consistent across the primary causes of death and disability,

where almost all research within communicable diseases (98% CDSR, 87% DARE), non-communicable diseases (98% CDSR, 87% DARE), and injury (CDSR 95%; 88% DARE) subgroups also focused on T2 phase research.

An absence of reviews examining T1 research within the CDSR was expected given that the aim of the database to publish reviews primarily to inform public health policy and practice, rather than basic science. However, the lack of systematic reviews targeting other translation stages is surprising given the importance of T3 and T4 research in ensuring that evidence based interventions reach and benefit patients and populations for which they are intended. Furthermore, it has been suggested that as much as 31% of original public health research focuses on dissemination research, providing a considerable body of research for inclusion in systematic reviews (7). These findings suggest that strategies to increase the prioritisation and publication of T3 and T4 focused systematic reviews are urgently required. The issuing of targeted calls for such reviews, establishment of funding schemes for translation research, and the creation of more specialist journals for implementation and dissemination research may improve the demand for these types of reviews, resources for their conduct, and avenues for publication (8, 9). The effectiveness of such strategies in increasing the number and production of T3 and T4 focused systematic reviews warrants further investigation.

The primary limitation of the study was the inclusion of only reviews published in the CDSR and DARE. Therefore, the findings of the study may not generalise to reviews which are published in other peer reviewed journals but do not satisfy the quality criteria for the CDSR or DARE, or other grey literature such as government reports or dissertations. As such, the results of this study may not provide a comprehensive assessment of all available evidence to inform practice. Nonetheless, the findings demonstrate that a limited number of T3 and T4

reviews exist to support policy makers and practitioners with ensuring evidence based initiatives reach and benefit patients and the community for whom they are intended.

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Table 1. Translation research phase of reviews published in CDSR for the total database, and by communicable disease, non-communicable disease and injury.

Translation level	n (%) [95% CI]			Total Total CDSR n=449
	Communicable n=88	Non-communicable n=341	Injury n=20	
T1	0 (0) [N/A] [†]	0 (0) [N/A] [†]	0 (0) [N/A] [†]	0 (0) [N/A] [†]
T2	88 (100) [N/A]	335 (98) [97, 100]	19 (95) [85, 100]*	442 (98) [97, 100]
T3	0 (0) [N/A] [†]	6 (1.8) [0.4, 3.2]	1 (5.0) [0, 15]*	7 (1.6) [0.4, 2.7]
T4	0 (0) [N/A] [†]	0 (0) [N/A] [†]	0 (0) [N/A] [†]	0 (0) [N/A] [†]

*Results truncated due to impossible estimates.

[†]Cell size is zero, therefore no estimates for confidence intervals provided.

Table 2. Translation research phase of reviews published in DARE for the total database, and by communicable disease, non-communicable disease and injury.

Translation level	n (%) [95% CI]			Total
	Communicable n=54	Non-communicable n=378	Injury n=17	Total DARE n=449
T1	2 (3.7) [0, 8.7]*	37 (9.8) [6.8, 13]	0 (0) [N/A] †	39 (8.7) [6.1, 11]
T2	50 (93) [86, 100]	328 (87) [84, 90]	15 (88) [73, 100]*	393 (88) [84, 91]
T3	2 (3.7) [0, 8.7]*	7 (1.9) [0.5, 3.2]	2 (12) [0, 27]*	11 (2.5) [1.0, 3.9]
T4	0 (0) [N/A] †	6 (1.6) [0.3, 2.8]	0 (0) [N/A] †	6 (1.3) [0.3, 2.4]

*Results truncated due to impossible estimates.

†Cell size is zero, therefore no estimates for confidence intervals provided.