

Evaluating the Effectiveness of Search Strategies for Systematic Reviews in Zoonotic Public Health

Vi Nguyen¹, Lisa Waddell^{1,2}, Janet Harris¹, and Andrijana Rajic^{1,2}

¹Laboratory for Foodborne Zoonoses, Guelph, PHAC

²Department of Population Medicine, University of Guelph

Summary

The study objective was to compare the effectiveness of modified search strategies with the original SR searches that were utilised in three previously completed systematic reviews (SRs) addressing specific zoonotic public health topics. Reducing the number of major databases included in the electronic search to at least three, in combination with comprehensive search terms, yielded high sensitivity in capturing relevant citations for two out of three SRs. The effect of reducing both the number of databases and search terms resulted in decreased sensitivity. Results reveal that in order to achieve efficient and effective searching, a balance between comprehensive and brief searches is required.

Rational

Sensitive and efficient search strategies are important part of a SR process. In ZPH, these strategies are often time and manpower demanding. Recent application of this method in agri-food public health have lead us to evaluate the opportunities for improving search strategy efficiency for SRs in this area.

Objectives and Approach

Objective: Compare the effectiveness of modified search strategies ('brief searches') with the original comprehensive SR searches utilised by this team and their collaborators in three previously completed SRs.

Three SRs were:

1. The zoonotic potential of *Mycobacterium avium* ssp. *paratuberculosis* (MAP SR) (Waddell et al., CJPH, 2008).
2. Pre-harvest interventions for the reduction of *E. coli* O157 in domestic weaned ruminants (*E. coli* SR) (Sargeant et al., ZPH, 2007).
3. Zoonotic and potentially zoonotic bacteria in organically produced food animals and foods of animal origin (Organics SR) (Wilhelm et al., 2008, on-going).

Study approach is shown in Figure 1.

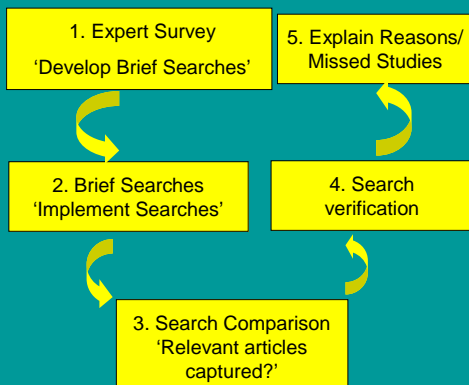


Figure 1: Study Approach

Table 1: Description of brief searches

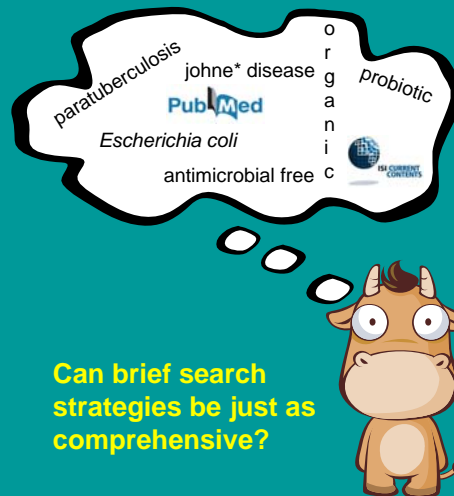
Brief Search Strategy 1 (BSS 1)	Brief Search Strategy 2 (BSS 2)
<ul style="list-style-type: none"> • Top 3 ranked databases • Original search algorithms from each SR 	<ul style="list-style-type: none"> • Top 3 ranked databases • Top ranked search terms for brief search algorithms

Table 2: Databases searched for each SR

MAP SR	<i>E. coli</i> SR	Organics SR
<ul style="list-style-type: none"> • PubMed • Agricola • Current Contents 	<ul style="list-style-type: none"> • PubMed • Agricola • CAB (Commonwealth Agricultural Bureaux) 	<ul style="list-style-type: none"> • PubMed • Agricola • CAB

Relevant articles captured?

Both brief searches (Table 1 & 2) were restrained to the original comprehensive search dates. Citations were managed by Procite® (Version 5.0.3) and compared with the relevant papers included in the three original SRs (Fig 2).



Can brief search strategies be just as comprehensive?

Search verification

Citations that were missed by either of the BSSs were investigated using original verification procedures to see if they could be captured through the search verification process (Table 3).

Table 3: Search verification strategies

MAP SR	<ul style="list-style-type: none"> • 5 most recent literature reviews • 5 most cited literature reviews
<i>E. coli</i> SR	<ul style="list-style-type: none"> • All relevant probiotic papers
Organics SR	<ul style="list-style-type: none"> • 10 randomly selected primary articles

Reasons for missed studies

Missed citations were examined to find possible explanations for not retrieving them (Table 4).

- Is the publication indexed within database?
- Are the search terms in title, abstract, or keywords?

Results

Figure 2: Comparison of brief search strategies for three SRs

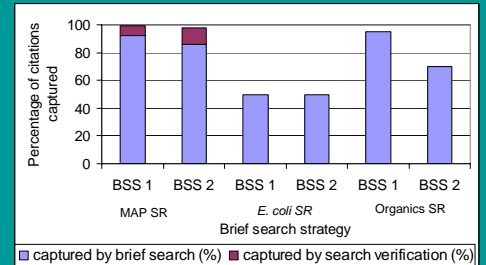


Table 4: Reasons for missing relevant citations

Reasons	# articles / each SR		
	MAP	<i>E. coli</i>	Organics
Citation lacks a keyword	4	0	0
Search strategy missing search term	4	0	2
Citation missing component of research question	0	4	0
Journal/publication source not indexed in databases	0	2	0
Reason for missing article unknown	2	0	16
Total # missed articles	10	6	18
# articles included in SR	74	12	61
# articles captured by BSS 1/BSS 2	68/64	6/6	58/43

Discussion Highlights

The major reasons for missing studies were an insufficient number of search terms.

The missing papers from the *E. coli* SR were originally obtained in an additional search with new search terms (risk factor or management) and (cattle) and (col^{*}).

For the Organics SR, the reasons for missing a majority of the articles is unknown because the citations contained search terms from each component of the research question.

Conclusions

While search terms should be comprehensive, the number of databases can be reduced to at least three.

PubMed has a human/medial focus and is not as comprehensive for research questions with an animal/agricultural focus.

Current Contents, Agricola, and CAB each identified unique citations that would have otherwise been missed.

The use of reference lists of literature reviews was most useful for identifying missed citations than of primary articles.