Primary Health Care Search Filter: Bringing the evidence to shore
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Abstract

Surfing the internet for primary health care (PHC) literature produces waves of information that can lead a researcher to feel as though they are drowning in papers. Sifting through material to find the oysters containing pearls can be a complex task. With the PHC literature and evidence base rapidly increasing, Flinders Filters and the Primary Health Care Research & Information Service collaborated on a project to develop a search filter designed to facilitate easier access to this ocean of PHC resources, by enabling efficient and effective retrieval of relevant literature.

The PHC Search Filter was developed in the Ovid Medline platform with a rigorous methodology comprising five phases including: constructing a gold standard set of PHC-specific articles; identifying relevant index terms and textwords; testing combinations of search terms; assessing the search strategy which performed most effectively; and translating the filter for use in PubMed to enable 'one click searching'. The first section of this paper will describe the development of the PHC Search Filter.

Second, the paper will report on a mixed-methods study used to evaluate the PHC Search Filter, four months after its launch. This evaluation involved extensive advertising of an online survey, with individuals invited to participate regardless of whether they had used the PHC Search Filter or not. With 90 respondents, the survey provided details about the overarching benefits and positive response to the tool, and directions for further refinement of the PHC Search Filter. The key findings from the evaluation noted that the PHC Search Filter reduces the burden associated with literature searching, increases the value of the results that are received, and provides a useful resource to improve the likelihood of incorporating relevant evidence into policy and practice.

Primary Health Care

Primary health care (PHC) is traditionally viewed as the first level of contact individuals and families have with the health system (Alma-Ata, 1978), and recent trends in international health reform have seen a shift away from focusing on the health system's acute sector towards emphasis on this role of PHC. This is in response to the growth, ageing and changing composition of the population; increasing rates of chronic conditions; workforce challenges; advances in technology; and high costs of acute care compared with PHC (Brown, Oliver-Baxter, & Bywood, 2013). Changing the focus to PHC is proposed to alleviate the pressure on the acute care system and address health care problems before they escalate to an acute phase (Standing Council on Health, 2013).
Where general practice has for decades been the ‘primary’ health care service in the Australian community, attending to the general health concerns of most of the population, over time the form and function of PHC has extended to a more holistic, biopsychosocial model of health and wellbeing. This model of care is delivered by a wider range of providers, services and functions (Oliver-Baxter, Brown, & Bywood, 2013). In Australia, PHC currently incorporates a number of health services including general practice, nursing, allied health, community health and Aboriginal community controlled health services (Powell Davies, Perkins, McDonald, & Williams, 2009), in addition to researchers, policy makers and administrators. The result of such a broad field of research and practice is a wide and deep ocean of literature related to issues in PHC.

Evidence-Based Policy and Practice

It is widely accepted that policy and practice should be based on evidence (Nutley, Davies, & Walter, 2002). As noted by Haynes and Haines (1998), “clinicians and healthcare planners who want to improve the quality and efficiency of healthcare services will find help in research evidence” (p. 273). Such evidence can inform care, guide decisions and assess value in policy and practice.

According to Bowen and Zhi (2005), the ‘evidence-informed policy and practice pathway’ involves three stages, namely sourcing, using and implementing the evidence. This paper focuses on the first of these stages, as researchers, policy makers and health professionals require access to up-to-date, relevant studies to inform their activities. Further, knowledge exchange, or the “process that aims to get research knowledge into action” (Australian Primary Health Care Research Institute [APHCRI], 2011), is required to ensure that the evidence offered is relevant to end users. Among a workforce acknowledged to be time poor, streamlining the search process to improve access to resources is of great importance.

There are currently over 23 million citations held in the PubMed electronic database, which increases by approximately 500,000 citations per year (US National Library of Medicine National Institutes of Health, n.d.). With growing numbers of journals, citations and grey literature, searchers can be overwhelmed by the wealth of literature available to them. Given the time pressures faced by health professionals and policy makers, strategies have been developed which make it easier to search for specific topics and identify key studies to inform policy and practice.

It has been suggested that “computer-aided literature searching is one of the core skills required for the practice of evidence-based medicine” (Doig & Simpson, 2003, p. 2120). This has been reinforced by research citing the benefits of search filters such as the Clinical Queries option added to the PubMed database (Doig & Simpson, 2003). Search filters are evidence-based literature search strategies which offer a standardised, systematic, subject-based search with a known level of performance (Flinders Centre for Clinical Change and Health Care Research, 2013). Filters are able to save time, increase the likelihood of quality retrievals of citations, reduce search burden and embed technical expertise.

Stage 1: Filter Development

With the PHC literature and evidence base rapidly increasing, Flinders Filters, the Primary Health Care Research & Information Service (PHCRIS), and an Expert Advisory Group collaborated on a project to develop a search filter. Flinders Filters specialises in information retrieval and the development of real world solutions, including filters and search tools. PHCRIS is a knowledge exchange organisation that helps people to find information, share knowledge, build capacity and exchange ideas about PHC. This collaborative project aimed...
to develop a search system for automated harvesting of the literature (Damarell, Tieman, & Lawrence, 2012); thus the ‘PHC Search Filter’ was born. It is well understood in research that optimal search construction is an iterative, time consuming process that often presents challenges to both novice and experienced searchers. The PHC Search Filter was designed explicitly to facilitate easier access to PHC resources for all searchers, by enabling efficient, effective and validated retrieval of relevant literature in peer-reviewed journals.

A precise search is a balance between retrieving relevant citations and keeping out irrelevant citations. Thus the first phase of development for the PHC Search Filter included scoping of the concepts and constructing a gold standard set of PHC-specific articles. Initially scoping of the PHC literature explored relevant concepts, terminology and indexing sources. An existing set of citations (the PHCRIS National Primary Health Care Strategy Submissions dataset) was used as the basis for this exercise, in conjunction with discussions with the Expert Advisory Group to clarify the nature of the area. From five options presented to the Expert Advisory Group, the APHCRI systematic reviews were selected as the ‘gold standard’.

The next step involved creating a ‘gold standard’ set of articles using OvidSP Medline, based on the included references of ten APHCRI systematic reviews (Damarell et al., 2012). This gold standard was randomly split into three. The first set was used to conduct a frequency analysis of index and textword terms related to PHC, where index terms refer to the National Library of Medicine’s Medical Subject Headings (MeSH) terms, and textwords are used to retrieve references not yet indexed with MeSH terms. Terms were included if they were perceived by the developers to be central to the PHC concept, and retrieved unique citations from the gold standard. Terms which were applicable to other health care contexts or retrieved too many irrelevant results (e.g., General Practitioners) were not included.

The resulting search terms were then tested in a number of different combinations in the second set of gold standard articles to determine which combination retrieved the maximum number of articles. The search strategy which performed most effectively was subsequently selected and validated with the third gold standard set. The final combination comprised eight MeSH terms and three textwords. Finally, in a post hoc relevance test, the Expert Advisory Group reviewed the resulting set of 500 journal articles retrieved by the preliminary search filter and reported a retrieval effectiveness of 78.3 per cent.

While developed in OvidSP Medline, the filter was translated for use with PubMed, an open access bibliographic database. PubMed offers several advantages over OvidSP Medline. For example, PubMed is freely available/readily accessible without requiring a paid subscription; searches can be converted into hyperlinks for real time investigation of the database; and PubMed provides access to a greater range of content (Primary Health Care Research and Information Service, 2013b). Though the two databases have different search syntax, it was possible to translate the filter to enable ‘one click searching’ in PubMed. Therefore, the OvidSP Medline version of the filter, suitable for the indexed citations, was converted to PubMed’s database rules.

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This validated PubMed translation was then tested and found to have an equivalent level of performance to the original OvidSP Medline preliminary search filter. In addition, a specific textword version of the filter was developed to ensure that the not-yet-indexed citations in PubMed could also be searched. These two models were combined to form the final PHC Search Filter, which searches PubMed’s indexed (i.e., Medline citations indexed with MeSH terms), unindexed (i.e., not selected for MeSH indexing) and not-yet-indexed (i.e., in the process of being indexed with MeSH terms) citations.

After testing and validation, the next stage involved embedding the PHC Search Filter into a URL for PubMed; that is, ensuring that clicking on the PHC Search Filter initiates a search on
the PubMed database via a hyperlink containing the relevant search terms, as seen in Figure 1. The final step was to host the PHC Search Filter on the PHCRIS website (http://www.phcris.org.au/phcsearchfilter). This enables anyone with an interest in PHC to find and use the PHC Search Filter and improve their search strategies. By making the search filter available as a hyperlink in the website, it facilitates access to the underlying evidence base, supporting the potential use of evidence in policy and practice.


Figure 1. Search URL

In addition to the core of the filter, the PHC Search Filter offers two search options - a selection of 'one-click' search topics and the opportunity for a ‘build-your-own’ search. The one-click search means that searchers can choose from 12 topics appropriate to their area of interest in PHC (Table 1). The searcher simply makes ‘one click’ to select their topic of choice and the PHC Search Filter will retrieve all PHC-related literature relevant to that topic from PubMed. These topics reflect key constructs in PHC and behind each of them is a collection of search terms selected by the Expert Advisory Group.

<table>
<thead>
<tr>
<th>Table 1. One-Click Search Topics</th>
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<td>Chronic disease management</td>
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<td>Continuity of patient care</td>
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<td>Coronary heart disease</td>
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<td>Diabetes</td>
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<td>General practitioners</td>
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<td>Health services accessibility</td>
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Build-your-own searches allow individuals to create customised topic searches (Figure 2). There are also options to refine searches, including a limit to Australian content, the option to select only high quality research in the form of randomised controlled trials and/or systematic reviews, opportunity to designate a time frame, and a limit to ensure only free, full text articles are retrieved.
Stage 2: Evaluation

Four months after the launch of the PHC Search Filter in July 2012, PHCRIS conducted an evaluation to assess users' experiences with the PHC Search Filter to date. The aim of the evaluation survey was to obtain user feedback as an interim summary of how the PHC Search Filter had been received; to assess whether any additional topic searches were required; and to identify user-recommended improvements for the PHC Search Filter to inform updates.

The evaluation took a mixed-methods approach combining three components: quantitative data in the form of web statistics collected through Google Analytics around frequency of use of the PHC Search Filter; quantitative findings from a 12-item online survey, designed to address reasons for using/not using the PHC Search Filter and perceived outcomes; and qualitative responses to open-ended questions about perceptions of the PHC Search Filter, posed as part of the online survey. The survey was actively distributed to almost 5,000 members of PHCRIS subscriber groups (including the PHC Search Filter mailing list) in addition to promotion via social media.

The PHC Search Filter can be used by any user who requires PHC literature search assistance. To support this, PHCRIS maintains a database of subscribers, including both individuals and organisations, who wish to keep up-to-date with the PHC Search Filter and its developments. At the time of writing there were over 650 subscribers to the PHC Search Filter mailing list, including researchers (23%), policy makers (13%), Medicare Locals (12%), allied health organisations (12%), and others (20%). A further 20 per cent consists of smaller proportions of subscriber categories such as overseas health organisations, Indigenous
health groups, professional societies, the former Divisions of General Practice, general practitioners, private consultants, consumers, and aged care facilities.

Since its launch in July, the PHC Search Filter has continually increased in web activity. Page views or ‘hits’ give an indication of the amount of web activity and PHC Search Filter access or traffic. To date, there have been over 3,800 general page views, 78 per cent of which were unique page views (i.e., new viewers to the webpage). Web usage comes mostly from Australian IP addresses, with a small proportion (approximately 7%) from overseas.

With regard to the evaluation survey, analysis illustrated that researchers, practitioners and policy makers, as the obvious parties likely to benefit from using the PHC Search Filter, make the most use of this tool for their type of work. Sixty per cent of the 90 survey respondents identified themselves as researchers (28%), practitioners (20%), or policy makers (12%). Of these respondents, their principal organisation was a university (26%), service delivery organisation (12%), state government (11%) or PHC support organisation (10%).

Fifty per cent of survey respondents had not used the PHC Search Filter, citing reasons such as lack of awareness that the tool was available (56%), perceptions that the Filter was not relevant to their work (16%) or insufficient time to explore the Filter's capabilities (11%). Of the fifty per cent of respondents who had used the PHC Search Filter, most users frequently employed both of the search options (42%) with similar rates of preference for using only the one-click search (29%) or the build-your-own method (27%). The majority of respondents had experimented with the PHC Search Filter (91%) or used it to keep up with the latest PHC literature (67%). In general, almost all survey respondents found the PHC Search Filter had some degree of usefulness (Figure 3), with the consensus that it is a useful/very useful tool (42% and 40% respectively). When asked about ease of use, an overwhelming majority (96%) found the PHC Search Filter easy to navigate. Eighty-two per cent of respondents indicated that they would recommend the PHC Search Filter to others.

![Figure 3. Perceived Usefulness of the Filter ‘In General’](image)

Survey respondents were also asked to suggest any additional topic searches they would like to see included. Twenty three suggestions for new keyword topics were received, with child/maternal/pregnancy topics and lifestyle/risk factors/prevention-related topics suggested most frequently. Two current PHC Search Filter topic searches (i.e., Aboriginal and Torres Strait Islander health, and rural and remote health) were mentioned in keyword suggestions, despite already being part of the PHC Search Filter’s one-click function.
Qualitative feedback was frequently in support of the PHC Search Filter. Comments described increasing awareness, with individuals who had been unaware of the tool beginning to use it after receiving information through their PHCRIS subscriptions, and encouraging additional advertising/publicity activities to further promote the benefits of the PHC Search Filter.

“This tool would be great for a basic search in the primary care context, as it can simplify the search process for people who are unaccustomed to other ways of searching, or who do not have access to alternatives such as university library databases… it certainly won’t hurt to add the PHC RIS option to my Favourites for future searches” [Researcher, University]

“I played with the tool, looking for information on a health topic of personal interest – was impressed with the information returned” [Policy maker, Federal Government]

“You are one of my best resources – thanks so much for your service!” [Policy maker, Service Delivery Organisation]

“The search filter is a very useful tool and has the potential to save a lot of time when researching topics” [Practitioner, Service Delivery Organisation]

“I love it – and while being a ‘work in progress’ for you, I’ve already gained a lot” [Consumer, Consumer Advocacy Group]

Discussion

The PHC Search Filter was developed to facilitate easier access to literature for anyone with an interest in PHC. Designing the PHC Search Filter followed an established method with a process that ensures the tool sits in the right space, retrieves literature of valuable quality and quantity, and offers a validated search strategy. The number of subscribers to the PHC Search Filter mailing list reflects great interest in both the Filter and in accessing the PHC literature more broadly, and illustrates the breadth of stakeholders engaged in PHC. Results from the evaluation study suggest that the PHC Search Filter is a useful tool, with high numbers of individuals exploring the capability of the PHC Search Filter. Consistent feedback was provided that the PHC Search Filter is easy to navigate and useful both to individuals working in PHC-related areas, and in general, with support for the notion that users would recommend it to others.

In terms of knowledge exchange, the PHC Search Filter employs elements of different models. The topic searches in the one-click option may be perceived as a form of ‘push’ model, presenting key PHC concepts; while the build-your-own option offers an approach in which searches ‘pull’ in information relevant to their work. Asking survey respondents to suggest additional topic searches also presented a chance to encourage ‘exchange’ efforts with feedback from searchers (Lavis, Lomas, Hamid, & Sewankambo, 2006). From the evaluation data it seems that using both search options was popular. When considering the one-click option, there was great interest in exploring topics around chronic disease.
management and mental illness, both key considerations in Australian’s current reform. Use of these methods provides the opportunity to present the latest trends in PHC through the topic searches, but also ensures that searchers are able to access the literature and evidence that best suits their needs, be it to inform research, policy or practice.

While the PHC Search Filter enables quick and easy access to literature using real-time searches, it is not designed to be comprehensive in what it retrieves; instead the emphasis is on retrieving results with a high level of specificity. This is to ensure that the search results are not overwhelming, but may inadvertently mean that some key papers are missed, depending upon the manner in which they have been coded in the database. In this light, the PHC Search Filter is dependent upon the quality of titles, abstracts, keywords and MeSH included in PubMed, and is restricted to English language citations. Further, it must be acknowledged that despite the wealth of literature included in PubMed, it does not index the entire world’s literature. However, while some combinations of search options may produce few results, this may change over time as PubMed is regularly updated with new literature (Primary Health Care Research and Information Service, 2013a).

The evaluation study was able to provide a snapshot of perceptions of the value of the PHC Search Filter soon after its launch. However, generalisability of the findings was restricted by the small sample size and the likelihood that many respondents were attendees of the launch, hence potentially bringing bias to the results. Similarly, due to the small sample, it was not possible to compare perceptions across different professional groups. Future evaluations will look to recruit individuals from a range of workplace environments and roles to understand the benefits/concerns regarding the PHC Search Filter for specific groups.

The PHC Search Filter will continue to be updated in the future, in terms of the addition of topic searches based on both users’ feedback and records of keywords used in build-your-own searches. It is also possible that scoping of similar tools for use in different databases may be considered. Additionally, The PHC Search Filter must be constantly monitored and evaluated in order to inform updates, ensure the product addresses the needs of consumers and promote sustainability. The most common reason for not using the PHC Search Filter was a lack of awareness of its availability, hence marketing strategies to promote the PHC Search Filter must be considered in future. Further, future evaluations may explore use across different groups and review methods for ensuring that students, policy makers, practitioners and researchers are aware of, and able to readily engage with, the PHC Search Filter.

**Conclusion**

The PHC Search Filter is able to facilitate easy access to the PHC literature, potentially reducing the burden associated with searching and increasing the value of the literature being retrieved. The ability of the PHC Search Filter to search the latest, not-yet-indexed citations means that searchers get up-to-date information - a great benefit for policy makers and practitioners requiring timely information. Based on established methods of development and validation, the PHC Search Filter is a valuable tool for not only improving search abilities but for promoting knowledge exchange. With evidence of great interest and perceived benefit, the PHC Search Filter enables efficient and effective access to the PHC literature; it is a platform for finding the right information in a vast ocean and bringing it to shore. With regular monitoring and updates, it is hoped that the PHC Search Filter will continue to be a reliable tool to facilitate access to relevant literature and increase the likelihood of incorporating evidence into both policy and practice.
References


