Optimizing the Identification of Grey Literature:
A Rapid Review

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Table of Contents

Key Messages

Effective grey literature searching includes planning, executing, and managing the search.

1. Search plans define search boundaries and limits.

2. Search execution requires consideration of appropriate search sources and search techniques.

   a. Search sources include: grey literature databases, targeted websites, customized Google search engines, expert/key informant consults, and conference abstracts and proceedings. Comprehensive searches use multiple and overlapping search sources.

   b. Search techniques include the use of: hand-searching, data saturation, search permutations, and the appropriate use of English language filters.

3. Search management uses spreadsheets to capture the necessary elements of the search for transparency and efficiency.

Executive Summary

Research Question

Which methods, tools, or processes optimize the identification of grey literature for public health decision-making?

Issue and Purpose

Peel Public Health (PPH) often uses grey literature for evidence-informed decision making. Currently grey literature searches across Peel Public Health lack a consistent and structured approach. A comprehensive, systematic process for effective and efficient grey literature searching is required to ensure all relevant information is identified. The purpose of this rapid review is to identify optimal methods for grey literature searching.

Methods

A search of published and unpublished literature yielded 229 results. After removal of duplicates and primary relevancy assessment, full-text analysis was conducted for 17 articles. Three qualified for critical appraisal based on inclusion/exclusion criteria. The articles include two case studies and a methods guide. Each article was rated strong in quality.

Synthesis of Findings

There are three components of effective grey literature searching: planning, executing, and managing the search. The search plan is created prior to conducting the search to

ensure efficient organization and comprehensiveness. The elements in a search plan include: potential search sources, search terms, and limits.

Executing grey literature searches involves searching the following sources, as appropriate: grey literature databases, targeted websites, customized Google search engines, experts/key informants, and conference abstracts and proceedings. Targeted websites are the most effective means of identifying relevant publications. Customized Google searches are more efficient than scanning lists of published websites.

Search techniques for locating grey literature include: hand-searching, search permutations, data saturation, and English language filters when appropriate.

Proper management of the search results will ensure the search is efficient and transparent. Reporting standards for systematic reviews should be used to document the elements of the search. Microsoft Excel and Chrome's Bookmark Manager are recommended tools.

Recommendations

1. Peel Public Health's Library Services should develop a systematic and comprehensive process and tool for grey literature searching for staff that includes guidance on:

   a) creating a search plan that provides structure and defines the parameters of a search;

   b) using multiple permutations and variations of search strings when conducting a search;

   c) using multiple and overlapping search sources such as: grey literature databases, targeted websites, customized Google search engines, expert/key informant consults, and conference abstracts and proceedings;

   d) executing appropriate search techniques such as: hand-searching, data saturation, and search permutation. English language filters should be used when appropriate; and

   e) managing data throughout the search process with tools such as Microsoft Excel and Chrome's Bookmark Manager.

2. Clarify role expectations between Librarians and other staff in relation to grey literature searching.

3. Peel Public Health's Library Services should develop a knowledge translation and training plan to roll out the process and tool across divisions.

Glossary of Terms and Concepts

Conference Abstracts and Proceedings are collections of papers published at conferences. Researchers may present papers on their current research projects and solicit feedback from audience. The list of papers presented may be published either before or after the conference, or may never be published.

Customized Google Search Engines are filtered topic-specific search platforms within Google Chrome. An example of such a search engine was developed by Ontario Public Health Libraries Association and captures websites of Canada's federal and provincial health departments, public health agencies, and collaborating centres.

Data Saturation is reached when all relevant articles have been obtained. This arises when no new articles are displayed in the results. This concept also applies to the soliciting of expert consults/key informants.

Expert Consults and Key Informants are defined as individuals that are well-versed in the topic of consideration and likely to be aware of relevant documents.

Grey Literature Databases catalogue grey literature documents, provide indexing and may provide peer review for both print and online resources (e.g. New York Academy of Medicine: Grey Literature Report).

Hand-Searching is a search technique that involves manually scanning table of contents and websites' publications.

Search Sources, also called Search Methods are defined as broad methodological approaches to locating items. They include targeted websites and expert consultations, conference abstracts and proceedings, grey literature databases, and customized Google search engines.

Search Techniques are defined as approaches within the broader category of search sources (search methods) that aid in the retrieval of information. Examples include keywords and search strings.

Targeted Websites are relevant websites of health organizations and agencies. These can be identified by consulting with content experts and reviewing online lists of relevant organizations. A Google search may also be conducted to identify additional websites and organizations.

1   Issue

Evidence-informed decision making at Peel Public Health often includes unpublished, or grey, literature. The field of public health is interdisciplinary and non-clinical; hence there is a need to use grey literature.

Peel Public Health staff express uncertainty about where to find relevant grey literature resources, how to search them, and when to stop searching. This leads to incomplete or inconsistent searches across the department. Currently, Peel Public Health Library Services recommend staff use the "Grey Literature Checklist" when conducting grey literature searches. This checklist has proven too narrow and prescriptive, which may restrict the scope of resources identified.

The aim of this paper is to identify methods to optimize grey literature searching.

2   Context

The Third International Conference on Grey Literature defines grey literature as that which is "produced on all levels of government, academics, business and industry in print and electronic formats, but which is not controlled by commercial publishers".(1) Examples of grey literature include theses, governmental reports, conference proceedings, and guidelines.

Searching grey literature can be resource and time-intensive.(2) There is no gold standard for conducting grey literature searches.(3) Various organizations have formulated their own methods and guidance (e.g., The National Institute for Health and Care Excellence, Cochrane Collaboration, Collaborative Research and Development).

It is difficult to search for grey literature systematically and comprehensively. Reasons for this are:

- The lack of grey literature cataloguing and records management across organizations, making it difficult to locate relevant items;

- The "filter bubble", which is a term used to describe the potential bias associated with the limited display of results from search engines based on searcher location and search history;

- The limited number of "search engine results pages" (SERPs) displayed after entering a query into a search engine;

- The lack of metadata or controlled terminology such as those used to tag published literature (e.g. Medical Subject Headings);

- The changing nature of website domains and URLs;

- The ambiguity of grey literature documents (e.g. inaccurate titles) and lack of reporting standards; and

- The potential for organizations to lose knowledge as a result of grey literature being lost or forgotten.

Grey literature is important to PPH in making decisions. For example, half of the research reviews conducted in one division incorporated grey literature resources. In addition, the inclusion of grey literature minimizes publication bias (4) and increases the comprehensiveness of the search. Therefore, PPH would benefit from effective grey literature searching methods and tools.

3 Literature Review Question

This review answers the research question "Which methods, tools, or processes optimize the identification of grey literature in a public health setting?"

4 Literature Search

A Library Specialist conducted a search of the published literature on March 1, 2017. The search included MEDLINE, MEDLINE In-Process, Healthstar, Global Health, and Cochrane Database of Systematic Reviews. No limits were applied to the search strategy. No synthesized filter was incorporated.

A search of the unpublished literature was conducted between February 24th and March 10th, 2017. The following resources were searched: Agency for Healthcare Research and Quality, Turning Research Into Practice (TRIP) database, and The National Collaborating Centre for Methods and Tools. Google searches were also conducted.

Reference lists of relevant articles were further reviewed and experts in grey literature searching were consulted to identify additional material.

See Appendix A and B for the complete search strategies of the published and unpublished literature.

5 Relevance Assessment

Two reviewers screened all titles and abstracts for relevance. A third reviewer was consulted to reach consensus on ambiguous items.

Relevance assessment was conducted based on the following criteria:

Inclusion Criteria:

1. Focuses on grey literature
2. Describes optimal methods and/or tools and/or processes
3. Relates to public health or healthcare disciplines

Exclusion Criteria:

1. Non-English language
2. Publication date exceeds 10 years

6   Results of the Search

The search yielded 229 articles, 87 of which were duplicates. Based on primary relevance assessment using titles and abstracts, 125 articles were deemed non-relevant and 17 articles remained for full-text review. After review, three articles were determined to be appropriate for critical appraisal: one methods guide and two single studies (see Appendix C).

7   Critical Appraisal

Three reviewers critically appraised all three articles. The two single studies were appraised using the Critical Appraisal of a Case Study[1] tool, developed by the Center for Evidence-Based Management. The Authority, Accuracy, Coverage, Objectivity, Date and Significance[2] (AACODS) assessment tool was applied to the methods guide. Reviewers met to discuss their independent scoring and any inconsistencies were resolved through discussion. All three papers were rated strong in quality.

8   Description of Included Studies

The three high quality papers are described below.

1.   **Godin et al. (2015): Applying systematic review search methods to the grey literature: a case study examining guidelines for school-based breakfast programs in Canada.(5)**

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[1] Center for Evidence Based Management (July, 2014), Critical Appraisal Checklist for a Case-Control Study. Retrieved (08,13, 2017) from https://www.cebma.org
[2] Tyndall, J. AACODS Checklist. Flinders University, 2010. Retrieved (08,15, 2017) from http://dspace.flinders.edu.au/dspace/

The objective of this case study was to describe search methods previously established for systematic reviews and apply them to school-based breakfast programs in Canada. Authors formulated a search plan based on the reporting standards known as the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).[3] Elements included resources, search terms, websites, and limits. Each search method was discussed and their results were compared with one another. Examples of resources for each method were documented. Finally, the authors discussed how the systematic approach could be adapted to a wide range of research questions and recommended tools to aid in record management.

2.   **Adams et al. (2016): Searching and synthesising 'grey literature' and 'grey information' in public health: critical reflections on three case studies.(2)**

The objective of this case study was to critically reflect on three occasions where the various authors "attempted to systematically search for and synthesize public health grey literature and information".(2) Critical reflection was defined as a "post hoc examination of experiences in an attempt to improve future practice".(2) Each author described their experience searching a case study and provided their insights in order to contribute to the development of grey literature searching methodology for future researchers. Searches were based on the methods advanced by Godin et al.

3.   **Balshem et al. (2013): Methods Guide for Comparative Effectiveness Reviews: Finding Grey Literature Evidence and Assessing for Outcomes and**

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[3] Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

Analysis Reporting Biases When Comparing Medical Interventions: ARHQ and the Effective Health Care Program.(6)

The intent of this methods guide was to "describe the major data sources that should be considered when searching for unpublished studies".(6) It also attempted to answer the question of when particular methods were most likely to provide useful information. The methods guide was developed by 14 investigators (including a research librarian) from the Agency for Healthcare Research and Quality and seven Evidence-based Practice Centers (EPCs). These investigators established timelines, coordinated and scheduled conference calls, participated in subgroups, and edited the overall guidance.

The workgroup of 14 investigators were split into two subgroups. The first subgroup focused on determining the difficulties of locating relevant published and unpublished literature as well as unpublished data from published studies. The second subgroup focused on the methods of identifying and assessing potential biases that arise from selective outcome and selective analysis reporting. A research librarian conducted literature searches on the topic of reporting bias and any other requests from the workgroup. The guidance was based on empirical evidence. If evidence was ambiguous or unavailable, the authors resorted to experience and consensus. The combined draft of both subgroups was reviewed by all members of the workgroup and revisions were made. Directors of all EPCs provided comments and the revised draft was sent out for external peer review and public comment. Final edits were incorporated into this version of the methods guide. Authors intend to revise and update the guide as new evidence emerges.

9 Synthesis of Findings

The findings are organized into three main components: planning the search, executing the search, and managing the search. Management is conducted at all stages of the search. Refer to Figure 1.0 for a graphical representation of the key components of a grey literature search.

Figure 1.0

Key Components of a Search

Planning the Search	Executing the Search	
Search Plan	Search Sources	Search Techniques
Include: • Resources to search • Search terms to use • Limits to set	Include: • Grey literature databases • Targeted websites • Customized Google search engine • Expert consult/key informants • Conference abstracts & proceedings	Include: • Hand-searching • English language filters when appropriate (see p.19 for criteria) • Search permutations • Data saturation
Managing the Search		
• Export keyword fields in all relevant databases into spreadsheets • Record websites' name/organization, year, and URL • Record PRISMA elements • Remove duplicates then screen and extract relevant results and search terms		

Planning the Search

Before conducting a search, develop a search plan to provide guidance, structure, and transparency.

The elements in a search plan include: potential search sources, search terms, and limits. Authors need to adapt their search plan to incorporate technological advances in social media and other information-sharing systems, specifically when reaching out to experts/key informants.

Providing predefined boundaries and limits for searching, such as setting the number of pages to be screened when searching websites, helps with time management. Narrowing the focus of the question and the search is warranted if a comprehensive search is not feasible due to limited resources.

Executing the Search

Search execution is comprised of search sources and search techniques. Sources include: grey literature databases, targeted websites, customized Google search engines, expert/key informant consults, and conference abstracts and proceedings.

Each of the search sources above are considered as useful as traditional peer-reviewed literature. Sources can be searched in any order. Whenever possible, use multiple overlapping search sources to reach data saturation. Search sources can yield a wide array of websites that range in type, size, and geographic area. However, their effectiveness differs according to the particular question at hand.

Search techniques are strategies to locate information within a source. Techniques include: hand-searching, search permutations, data saturation, and English language filters when appropriate.

I. Search Sources

Grey Literature Databases

These databases catalogue grey literature documents, provide indexing, and may provide peer review for print and online resources. Examples include Canadian Research Index, Canadian Public Policy Collection, and the New York Academy of Medicine: Grey Literature Report. Because search functionality differs among databases, adapt search terms to fit the database being searched. Incorporate several search strings containing multiple combinations of terms for each database searched.

Targeted Websites

Relevant websites are typically identified in the following ways:

1) Conducting a Google search.

2) Soliciting recommendations from content experts and reviewing lists of relevant publishing organizations.

3) Browsing websites of known relevant publishing organizations and agencies.

Search each relevant website for documents using a combination of keywords applied to the website's own database or built-in search bar tool. If neither of these functions exists, then use hand-searching techniques (see Hand-Searching p. 19).

Customized Google Search Engine

Customized Google search engines are specially tailored to execute refined searches based on pre-defined filters. An example is the Ontario Public Health Library Association's Canadian government publications; this engine searches Canadian public health agencies, collaborating centres, and federal and provincial health departments. Execute the same search terms in customized Google search engines as those previously utilized to identify targeted websites in Google.

Expert Consults/Key Informants

a)   Identify individuals

Experts in a particular topic area are likely to be aware of relevant grey literature documents. Interdisciplinary topic areas require consultation with multiple experts. Experts or key informants should be contacted before searching grey literature sources in order to determine its relevance; this is particularly important when searching conference abstracts and proceedings.

b)   Make a request

In order to most effectively use experts and key informants staff must ensure:

- number of experts contacted is dependent on the scope of the review and project timeline;
- requests are clear and concise;

- experts in the field are contacted by e-mail to elicit the greatest response rate, with the least number of attempts, and the shortest response time[4];

- no more than 3 attempts to contact authors are made and separate each request attempt or reminder e-mail by a week; and

b)   Document the request

Reviewers should report the number of experts they attempted to contact, the number actually contacted, the percentage of experts who responded positively to the information request, and the number of non-respondents. The reviewer should also track the identified documents and record the data.

Conference Abstracts and Proceedings

Conference abstracts and proceedings are collections of papers published at conferences. The papers may be published either before or after the conference—or not at all. If deemed appropriate by content experts, search conference websites specifically, with the purpose of identifying unpublished studies. Since most conference proceedings are found in journal supplements, and not bibliographic databases, hand-searching may be warranted.

II. Search Techniques

Hand-Searching

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[4] Note that requests sent out via Twitter and social media increased the pool of potential viewers, and significantly reduced the time dedicated to this task.

Hand-searching is a technique that involves manually reviewing tables of contents and organizations' online publications. Reviewers should first decide whether hand-searching is reasonable.

As a general rule, hand-searching in targeted websites is appropriate if:

- The website does not possess a search bar.

- The website does not possess a database.

English Language Filters

English-language filters should be used with discretion when minimizing bias. Searchers should look for translated abstracts of articles not originally written in English, if appropriate. If including only English-language articles may bias the findings, then consider expanding the search to also include non-English language articles. Databases that specifically contain non-English articles include LILACS (Latin American and Caribbean of Health Sciences Information System) and Global Index Medicus.

Inclusion of Non-English language studies is warranted when:

a) There are systematic differences between studies reported in English language journals and those reported in non-English journals.

b) Most of the relevant studies have been reported in language other than English.

c) Most of the studies have been conducted in non-English language regions.

Search Permutations

Search strategies, or search strings, can be composed of either controlled terminology or keywords, but are often found together in line-by-line commands that search a database. It is important to execute several search strategies containing multiple combinations of keywords for each source searched. Searching multiple permutations of terms in various combinations may yield more relevant hits.

Data Saturation

Data saturation is defined as the point when the execution of additional searches would not yield any new information. This provides the searcher with confidence that they are nearing the end of their search. Using spreadsheets in Microsoft Excel and Google Chrome's Bookmark Manager are effective tools in visually recognizing the recurrence of themes, articles and information. These are some of the signs of data saturation.

Managing the Search

Properly managing search data makes searching more transparent.

I. **Record search elements using PRISMA**

PRISMA elements are systematic review reporting standards that help to plan and document the search process. The reporting standards for grey literature searching are as follows:

- Record databases searched along with their full search strategy (including search terms and combinations).

- Describe all information sources searched (e.g. Centers for Disease Control and Prevention).

- Record the name of the grey literature searcher.

- Record the date search performed.

Searchers may contact the publishing organization directly, browse their websites or locate other related publications to find PRISMA element information missing from the original document.

II. Spreadsheets for Tracking

Spreadsheets or other tools can be used to track where and how information is identified. Microsoft Excel and Chrome's Bookmark Manager are suitable tools for record management practices.

An example search management process is the following:

1) Export keyword fields in all relevant databases into Excel.
2) Record websites' name/organization, year, and the URL.
3) Remove duplicates and conduct the first round of title screening.

10 Applicability and Transferability

On October 12, 2017, a facilitated meeting was held to discuss the findings of this rapid review and apply it to the Peel Public Health context. The meeting was attended by the authors of the rapid review, representatives from across all five health services divisions, Education and Research team management and the Associate Medical Officer of Health. The main points of the meeting are summarized below.

Applicability

Political Acceptability or Leverage

Incorporating optimized grey literature search methods into current PPH search processes was endorsed. The group agreed that implementing consistent, clear, and rigorous processes and documentation practices would increase search transparency and accountability. It would also reduce searcher uncertainty, while enhancing the organization's credibility and reputation.

Social Acceptability

Developing a process and tool was welcomed by the group. They concluded that the newly structured, organized approach may increase the efficiency of the search, and thus save the searcher time in the long term. However, resistance to change and perceived additional time costs of implementing these processes into a search were marked as barriers to social acceptability. It was recommended that the processes be made flexible to accommodate particularly constrained search timelines. The new processes will be more acceptable if they are easy to use and if adequate supports from librarians and knowledge brokers exist.

Available Essential Resources

A recurring theme in the discussion was training librarians, knowledge brokers, and staff on all components of the search process, including technical aspects of documentation (e.g., Chrome's Bookmark Manager and advanced Microsoft Excel skills). Library resources would be essential for the development of the process and tool along with

their maintenance, knowledge translation, training, and support. Specific actions would include revising the health information literacy courses and developing just-in-time mentoring.

Potential difficulties that may arise with respect to resources include: the requirement that teams be knowledgeable about new or unfamiliar relevant sources, costs of mentoring staff, capacity issues surrounding documentation, determining optimal staff time devoted to searching, and advanced technical literacy in data management. Finally, the group discussed the importance of determining what form the products or deliverables of this rapid review will take (i.e., briefing note, process map).

Organizational Expertise and Capacity

A new process and tool for grey literature searching would align with PPH's 10-year Strategic Plan and would contribute to workforce development and End-to-End Public Health Practice. Key stakeholders in the roll-out of a new process include knowledge brokers and trainees, and librarians to institute these changes departmentally. The group identified training needs for using technology for documentation. Discussion also emphasized the importance of managers and supervisors determining "acceptable" criteria for a search plan. The group discussed the importance of distinguishing the roles of librarians and clients with regard to the execution of the search.

Transferability

Implementing this new process would positively improve the effectiveness of grey literature searching. Specialists, knowledge brokers, and frontline staff would need to be

adequately trained, along with managers and supervisors. Managers and supervisors would need to dedicate time to guiding and mentoring their teams.

11   Recommendations

Peel Public Health's Library Services should develop a systematic and comprehensive process and tool for grey literature searching for staff that includes guidance on:

a) creating a search plan that provides structure and defines the parameters of a search;

b) using multiple permutations and variations of search strings when conducting a search;

c) using multiple and overlapping search sources such as: grey literature databases, targeted websites, customized Google search engines, expert/key informant consults, and conference abstracts and proceedings;

d) executing appropriate search techniques such as: hand-searching, data saturation, and search permutation. English language filters should be used when appropriate; and

e) managing data throughout the search process with tools such as Microsoft Excel and Chrome's Bookmark Manager.

2. Clarify role expectations between Librarians and other staff in relation to grey literature searching.

3. Peel Public Health's Library Services should develop a knowledge translation and training plan to roll out the process and tool across divisions.

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Appendices

Appendix A: Search Strategy

Appendix B: Grey Literature Searches

Appendix C: Literature Search Flowchart

Appendix D: Data Extraction Tables

Appendix E: Applicability & Transferability Worksheet

Appendix A: Search Strategy

Database: EBM Reviews - Cochrane Database of Systematic Reviews <2005 to March 1, 2017>, Global Health <1973 to 2017 Week 08>, Ovid Healthstar <1966 to January 2017>, Ovid MEDLINE(R) <1946 to February Week 4 2017>, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations <March 07, 2017>
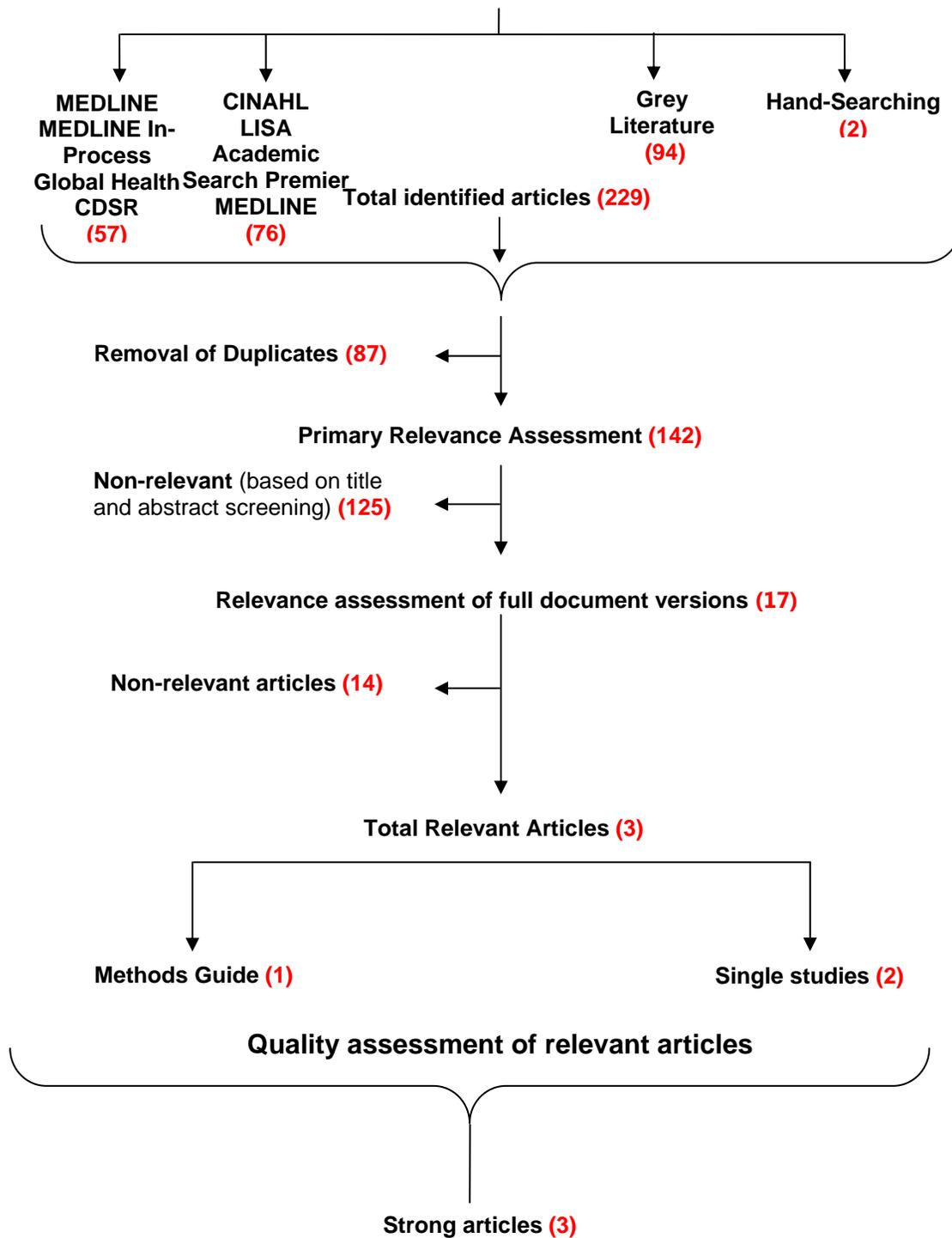
Search Strategy:

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1   ("grey lit*" or "gray lit*" or "unpublish* lit*").ti. (102)

2   ("method*" or "strateg*" or "framework*" or "approach*" or "tool*" or "process*" or "step*" or "guidance*" or "guideline*" or "technique*" or "procedure*").ti,ab. (14578128)

3   ("identif*" or "find*" or "discover*" or "procure*" or "gather*" or "obtain*").ti,ab. (8937166)

4   1 and 2 and 3 (57)

5   remove duplicates from 4 (32)

Appendix B: Grey Literature Searches

Sources	Search Terms	Results Reviewed
Google	("grey literature" OR "gray literature" OR "unpublished literature") AND ("step*" OR "method*" OR "tool*" OR "process*")	40
Agency for Healthcare Research and Quality	"grey literature"	20
TRIP Database	(title: grey literature) from: 2007 to:2017	19
Subject Specialists	n/a	13
Secondary Searching (Reference Lists)	n/a	2

Appendix C: Literature Search Flowchart

MEDLINE
MEDLINE In-Process
Global Health
CDSR
(57)

CINAHL
LISA
Academic
Search Premier
MEDLINE
(76)

Grey Literature (94)

Hand-Searching (2)

Total identified articles (229)

Removal of Duplicates (87)

Primary Relevance Assessment (142)

Non-relevant (based on title and abstract screening) **(125)**

Relevance assessment of full document versions (17)

Non-relevant articles (14)

Total Relevant Articles (3)

Methods Guide (1)

Single studies (2)

Quality assessment of relevant articles

Strong articles (3)

Appendix D: Data Extraction Tables

Appendix D: Data Extraction Tables

Title	Applying systematic review search methods to the grey literature: a case study examining guidelines for school-based breakfast programs in Canada
General Information & Quality Rating	
Author(s)	Godin K, Stapleton, S, Kirkpatrick, SI, Hanning, RM, Leatherdale, ST
Date	October 2015
Country	Canada
Quality rating	Strong using Critical Appraisal of a Case Study (CEBMa)
Objective(s) of review	Describe systematic review search methods to search grey literature relevant to school-based guideline breakfast programs in Canada.
Details on methodology	
	Study Design & Search Methods

- Case study design reported by authors.

- Authors formulated search plan comprised of PRISMA's elements including: resources, search terms, websites, limits. Mapped onto study flow diagram.

Grey Literature Databases

- The following databases were searched: Canadian Research Index, Canadian Public Policy Collection, and Canadian Health Research Collection.

- Keyword searches conducted containing (1) school (2) breakfast (e.g. meal, nutrition, breakfast, snack, milk, feeding, lunch) and (3) guidelines (e.g. guidelines, standards, frameworks, recommendations, best practices).

- Each keyword field is utilized in all databases and records exported to Excel. Duplicates are removed. Title screening conducted and relevant articles highlighted for further screening.

Customized Google Search Engine

- Utilized customized search engines that looked at Canadian public health information and government documents. Google websites to be searched after deciding how many webpages to view.

- Ten different search strategies applied to each search engine.

- First ten pages reviewed (100 results per search) using title and short text that is found beneath. Potentially relevant records "bookmarked" in Google Chrome and later entered into Excel. Main folder named after search engine used. Subfolder named after specific search strategy and bookmarked homepage filed within. This prevents same record from being identified twice.

- Titles deemed potentially relevant retained for further screening. Search terms and number of results

	screened/retrieved were recorded.
	Targeted Websites
	• Google searched to identify organizations and websites publishing relevant material.
	• Each website then 'hand-searched' for relevant documents and the name of the website along with the date searched is recorded.
	• Content experts on research team also utilized as source of targeted websites. Finally, lists of relevant organizations utilized (e.g. Grey Matters tool).
	• Same 10 unique search strategies from previous search method were utilized (100 results) and screened for relevancy using title and accompanying text.
	• Website's name/organization and URL entered into Excel.
	• Each website searched using search bar and its own databases using a combination of keywords. If website was without either of these functionalities, then it was hand-searched.
	• Name, year, and URL of individual records recorded in Excel spreadsheet within same row as its main website homepage.
	• Potentially relevant records obtained via targeted websites screened for next phase.
	Expert Consultations
	• Expert contacts consulted via e-mail.
	• Experts reflected diversity of topic.

	• Attempt to reach saturation, such that addition of new expert would not yield different or new documents. • Experts included breakfast program coordinators, dietitians, government representatives, school food caterers, nutrition researchers, and program funders (n=35). • Reminder e-mail sent to experts if after 7-days no response. • Recorded which experts had responded, which documents they had identified, and need for reminder messages to be sent to those who had yet to reply.
Setting	Canada
	Inclusion/Exclusion Criteria • Published within Canada. • Published by government or NGO at federal or provincial/territorial level. • Most current version of document. • Intended for school administrators/meal program coordinators at Canadian elementary or secondary schools. • Available in English.
Results	

	Summary of Results • 4 search methods resulted in identifying 15 items that met all eligibility criteria (primarily took form of reports and websites). • Search methods found to be "manageable, comprehensive, and intuitive" (consultation with experts, targeted websites, grey literature databases, and customized Google search engine). • Search methods yielded wide range of organizations (i.e. geographical area, type and size). • 8/15 (53.3%) of publications were non-governmental of which 2 were at national level. 7/15 (46.7%) were provincial government. • 11/15 (73.3%) articles found in duplicate after 4 search methods completed (considered by authors to be moderate level of overlap). • Reliance on one source would not have been comprehensive since 4/15 items were identified through a single search method. • 29/35 (82.9%) of experts contacted and/or referred by a colleague responded to e-mail inquiry for additional items. • Content experts identified 9/15 included publications. Grey literature remained central to locating remainder. • Targeted web searches are most comprehensive means of identifying relevant publications. • Google searches may require creating several search strategies containing multiple combinations of search terms. • Set number of pages to be screened in advance for effective time management.

- In relevance screening, use whatever elements available in assessing grey literature (e.g. abstracts, executive summaries, tables of contents).

- Utilize numeric screening code for both stages of relevancy assessment.

- Excel was a suitable tool for record management:

    Advantages: allowed for exporting of records directly into spreadsheet, ability to duplicate individual sheets for screening purposes, remove duplicates functionality, ability to insert extra column in Excel to input screening decisions, and 'sort' function.

    Disadvantages: inability to directly export from Google, time spent navigating between browser and spreadsheet.

- Develop detailed grey literature search plan including following items: resources, search terms, websites.

- Document each stage of search for transparency and comprehensiveness in order to record all assumptions, decisions, and challenges using PRISMA elements:

    1. full search strategy of at least 1 database

    2. description of all information sources in search

    3. name of searcher

    4. date search performed.

- Systematic review search methods can be used as template for grey literature searching, or at very least used as a starting point for refining search methods.

- Search methods to locate grey literature can be adapted to disciplines other than School

Breakfast Programs.

- Missing details of grey literature (e.g. date of publication) can be identified by contacting organization directly or searching their websites and other publications that may reference item.

- Grey literature search methods should be held to the same rigour as traditional search methods for academic, peer-reviewed literature.

- Challenge to apply systematic search methods to grey literature due to lack of standards and resources. Examples include the following:

    1. Search engine's "filter bubble" which favours certain geographical or topic areas and limited display of results pages.

    2. Inability to export records into bibliographic software from Google due, in part, to lack of metadata and controlled terminology.

    3. Changing nature of website domains/URLs, website addresses (reproducibility).

    4. Ambiguity of grey literature documents and lack of reporting standards (e.g. misleading titles, missing dates of publication).

    5. Standard strength of evidence criteria may not be applicable to certain reviews that contain grey literature.

Results Specific to Search Method

Grey Literature Databases

- Adapt search terms to fit specific databases due to variability in functionality.

- Google searches may require several search strategies containing multiple combinations of terms.

- Grey literature databases yielded only one relevant publication versus other search methods (the

rest were position papers, program evaluation reports, and primary studies).

Customized Google Search Engine

- Create several search strategies with multiple combinations of search terms

- Customized Google search engine method provides a refined and targeted search due to its tailored nature.

- Use Bookmark Manager to see which websites come from which search engine and which search terms. Also prevents same record from being identified repeatedly. Record each strategy's terms and number of results retrieved and/or screened.

Targeted Websites

- Google search deemed to be more efficient than published list of websites, which can change or expire quickly.

- If website does not possess a search bar conduct a hand-search and record the date accessed.

- Use the same search strategies utilized in the customized search engine method when conducting searches of targeted websites.

- Record websites' name/organization and URL in Excel.

Expert Consultations

- Identify experts based on those who are well-versed in topic and likely to be aware of relevant documents and who also reflect the diversity of the discipline under investigation.

- Number of experts contacted should depend upon scope of review and project timeline.

- Reach 'data saturation' such that addition of more experts unlikely to uncover additional relevant

	publications. • Use Excel to record respondents, identify documents, and express need for reminder messages to those who had not yet replied.
	Limitations of Case Study • Only one reviewer determining article eligibility. • Time periods for execution were approximated following completion of case study.

Title	Searching and synthesising 'grey literature' and 'grey information' in public health: critical reflections on three case studies
General Information & Quality Rating	
Author(s) Date	Adams J, Hillier-Brown F.C., Moore HJ, Lake AA, Araujo-Soares V, White M, Summerbell C. September 2016 United Kingdom

Country	
Quality rating	Strong using Critical Appraisal of a Case Study (CEBMa)
Objective(s) of review	Critical reflections on three case studies in order to provide insights on searching for and synthesizing grey literature and grey information.

Details on methodology	
	Study design and search methods • 3 case study designs reported by authors. • Authors included 3 research reviews they had been working on that involved searching the grey literature. • Authors provided post hoc examination of their experiences searching the 3 case studies and they critically reflected on elements of these. • Searched public health grey literature and information by searching: 1. peer-reviewed databases and grey literature databases 2. relevant websites 3. search engines

4.   relevant experts.

Case Study 1

- Searched databases of peer-reviewed and grey literature relevant journals.

- Utilized an internet search engine (Google)

- Searched relevant funder and third sector websites

- Searched reference lists and citations of included studies

- Searched publications of authors of included studies

- Targeted requests sent via e-mail to those with publications in field.

- General requests for information sent to relevant e-mail distribution lists posted on online bulletin boards and published in 'trade press'.

Case Study 2

- Utilized internet search engine.

- Searched relevant funder and third sector websites

- Targeted requests sent via e-mail to:

o   All Primary Care Trusts in England

o   All local authorities in England

o   All regional obesity leads in England

o   Regional voluntary sector network organizations.

Case Study 3

- Searched databases of peer-reviewed and grey literature research and trial databases

- Internet search engine

- Searched relevant funder and third sector websites.

- Searched media databases

- Targeted requests sent via e-mail to:

    o   All local authorities in England

    o   Those with publications in the field.

General requests:

    o   Sent to relevant professional organizations via Twitter

    o   Sent to relevant e-mail distribution lists

    o   Posted to online bulletin boards

    o   Published in 'trade press'

<u>Similarities Across Case Studies</u>

- In case study 1 and 3, requests for information were sent to content experts in relevant fields via e-mail lists, posted on online bulletins, and published in 'professional press' (e.g. newsletters of professional organizations); deemed to be useful, although increased time taken to conduct search.

- Case study 2 and 3, authors attempted to contact relevant individuals working in all local public health departments in England by identifying individuals and contact e-mail addresses for those

	with relevant roles using internet searches and telephone calls.
Inclusion/Exclusion Criteria	Authors identified 3 cases that included searches for grey literature and grey information.

Results

Summary of Results

- Searching grey literature can be systematic and the methods can be replicated but results are not replicable.

- No gold standard exists for searching grey literature and information, therefore difficult to be certain all relevant info has been captured.

- Searching for less formally archived information is by nature time-consuming and inefficient.

- Methods dependent on nature of question: "one size rarely fits all", since different methods for locating information differentially effective across three reviews. Therefore important to use many overlapping searching approaches.

- Efficiency of different search methods, partly dependent on quality of search strategy used.

- Technological advances in social media and information systems may call for need to adapt search methods to reflect these local and international trends and researchers should be flexible to these changes.

- As time passes grey literature becomes lost or forgotten and therefore potential respondents' ability provide usable information declines.

- Incorporating social media into search strategy (Case Study 3) and the use of Twitter decreased time spent obtaining pool of potential viewers.

- Twitter requests were valuable in that they were widely retweeted and increased the pool of potential viewers. Additionally, it proved to be a quicker process than cascading of e-mail requests and

	requests in professional (trade) press.
	• Clear data management and recording systems using spreadsheets were useful to track where and how information was identified.
	• If unable to conduct comprehensive search due to limited resources, focus question and search until data saturation is reached.
	Comments/limitations
	• Critical reflections on case studies were conducted on post hoc basis.
	• Searching across 3 case studies sacrificed specificity for sensitivity.
	• Risk of bias is dependent on question it is being used to answer.
	Case Study 1
	• Conducted in 2005 when social media less established.
	• Majority of studies methodologically weak and high risk of bias.
	Case Study 2
	• Resources were limited therefore had to focus search by identifying intervention types.
	Case Study 3
	• Majority of studies methodologically weak and high risk of bias.
	• Computer programs (e.g. NVivo) could not capture how many people retweeted a particular tweet. Also, could not capture when requests for info circulated using alternate methods to e-mail.

Title	Methods Guide for Comparative Effectiveness Reviews: Finding Grey Literature Evidence and Assessing for Outcome and Analysis Reporting Biases When Comparing Medical Interventions: ARHQ and the Effective Health Care Program
General Information & Quality Rating	
Author(s) Date Country	Balshem H, Stevens A, Ansari M, Norris S, Kansagara D, Shamliyan T, Chou R, Chung M, Moher D, Dickersin K. 2013 USA
Quality rating	Strong using AACODS tool
Objective(s) of review	Provide guidance on steps that authors of systematic reviews can take in order to reduce reporting biases on interventions.
Details on methodology	
Study design and search methods	• Guidance document. • Guidance was based on empiric evidence where available and on experience and consensus where evidence was ambiguous or unavailable.
Recommendations	
	1.0 Searching Conference Abstracts and Proceedings 1.1 Reviewers should conduct a search of conference abstracts and proceedings to identify unpublished or unidentified studies. 1.2 Searching conference abstracts and proceedings should be performed routinely but not without first

consulting key informants or technical expert panel who may identify relevant conferences to search.

1.3 Search conference websites specifically and search abstracts of any meeting identified by reading the reference of key articles.

2.0 Contacting Authors

2.1 Contact authors when review team requires clarification regarding study eligibility, study design, or other aspects of study conduct that may affect conclusions.

2.2 Contact authors in order to obtain missing or unreported outcomes, clarifying potential errors or unclear results.

2.3 Contact authors by e-mail to ensure greatest response rate with fewest number of attempts and taking the shortest response time.

2.4 Make no more than 3 attempts to contact authors and separate each attempt by a week.

2.5 Be clear and concise when making request from author and, when possible, provide a table identifying specific data being requested

2.6 Reviewers to report number of authors they attempted to contact, number of authors actually contacted, and percentage of authors who responded positively to information request.

2.7 Requests to authors for clarification about study methods most likely to be successful.

3.0 Hand-searching

3.1 Hand-searching definition does not include reference lists or reviews of citation tracking.

3.2 If reviewers decide hand-searching is warranted, determine appropriate journals from content experts and ask librarian how well those journals are indexed in electronic databases and the lag time to indexing.

3.3 If hand-searching yields no relevant studies, a more comprehensive search using this method may be unnecessary.

	3.4 Hand-searching may be valuable for identifying studies only published as conference abstracts (since not included in electronic databases but journal supplements). **4.0 Searching Non-English Language Literature** 4.1 Reviewers should avoid using English-language only filters. 4.2 Discuss with key informants whether exclusion of non-English language articles may bias findings. If yes, then include non-English language literature from LILACS and Global Index Medicus. Following list of criteria can be used to determine whether there should be incorporation of non-English language literature: 4.21 IF there are systematic differences between studies reported in English language journals and those reported in non-English journals. 4.22 IF most of the relevant studies have been reported in language other than English. 4.23 IF most of the studies have been conducted in non-English language regions. 4.3 Reviewers should always read English language abstracts of non-English articles in order to determine whether expansion of search into special regional databases is appropriate.
	Comments/limitations - Focus of guidance document is on reducing all forms of reporting biases that may affect the 'effect of an intervention'. The key difference for public health staff is that on occasion, grey literature may be the sole source of information for a given intervention. - Guidance aimed at researchers conducting systematic reviews in a clinical context. - Authors contacted may not have access to full data and may be contractually obligated to nondisclosure.

Appendix E: Applicability and Transferability Worksheet

eidm evidence-informed decision making

Starting/Modifying a Program
Applicability and Transferability Worksheet

Factors	Questions	Notes
Applicability (feasibility)		
Political acceptability or leverage	• Will the intervention be allowed or supported in current political climate? • What will the public relations impact be for local government? • Will this program enhance the stature of the organization? ○ *For example, are there reasons to do the program that relate to increasing the profile and/or creative a positive image of public health?* • Will the public and target groups accept and support the intervention in its current format?	

Social acceptability	• Will the target population find the intervention socially acceptable? Is it ethical?
	   ○ *Consider how the program would be perceived by the population.*
	   ○ *Consider the language and tone of the key messages.*
	   ○ *Consider any assumptions you might have made about the population. Are they supported by the literature?*
	   ○ *Consider the impact of your program and key messages on non-target groups.*	

| Available essential resources (personnel and financial) | • Who/what is available/essential for the local implementation?
• Are they adequately trained? If not, is training available and affordable?
• What is needed to tailor the intervention locally?
• What are the full costs?
  ○ *Consider: in-kind staffing, supplies, systems, space requirements for staff, training, and technology/administrative supports.*

• Are the incremental health benefits worth the costs of the intervention?
  ○ *Consider any available cost-benefit analyses that could help gauge the health benefits of the intervention.*
  ○ *Consider the cost of the program relative to the number of people that benefit/receive the intervention.* | |
| Organizational expertise and capacity | • Is the intervention to be offered in line with Peel Public Health's 10-Year Strategic Plan (i.e., 2009-2019, 'Staying Ahead of the Curve')?
• Does the intervention conform to existing legislation or regulations (either local or provincial)?
• Does the intervention overlap with existing programs or is it symbiotic (i.e., both internally and externally)?
• Does the intervention lend itself to cross-departmental/divisional collaboration?
• Any organizational barriers/structural issues or approval processes to be addressed?
• Is the organization motivated (learning organization)?
  ○ *Consider organizational capacity/readiness and internal supports for staff learning.* | |

Transferability (generalizability)

Magnitude of health issue in local setting	- What is the baseline prevalence of the health issue locally? - What is the difference in prevalence of the health issue (risk status) between study and local settings? *Consider the Comprehensive Health Status Report, and related epidemiological reports.*	
Magnitude of the "reach" and cost effectiveness of the intervention above	- Will the intervention appropriately reach the priority population(s)? - What will be the coverage of the priority population(s)?	
Target population characteristics	- Are they comparable to the study population? - Will any difference in characteristics (e.g., ethnicity, socio-demographic variables, number of persons affected) impact intervention effectiveness locally? *Consider if there are any important differences between the studies and the population in Peel (i.e., consider demographic, behavioural and other contextual factors).*	

Proposed Direction (after considering the above factors):

Form Completed by: _____