

# Teaching Information Literacy Skills to Public Health Staff

A Rapid Review

**Region of Peel – Public Health**

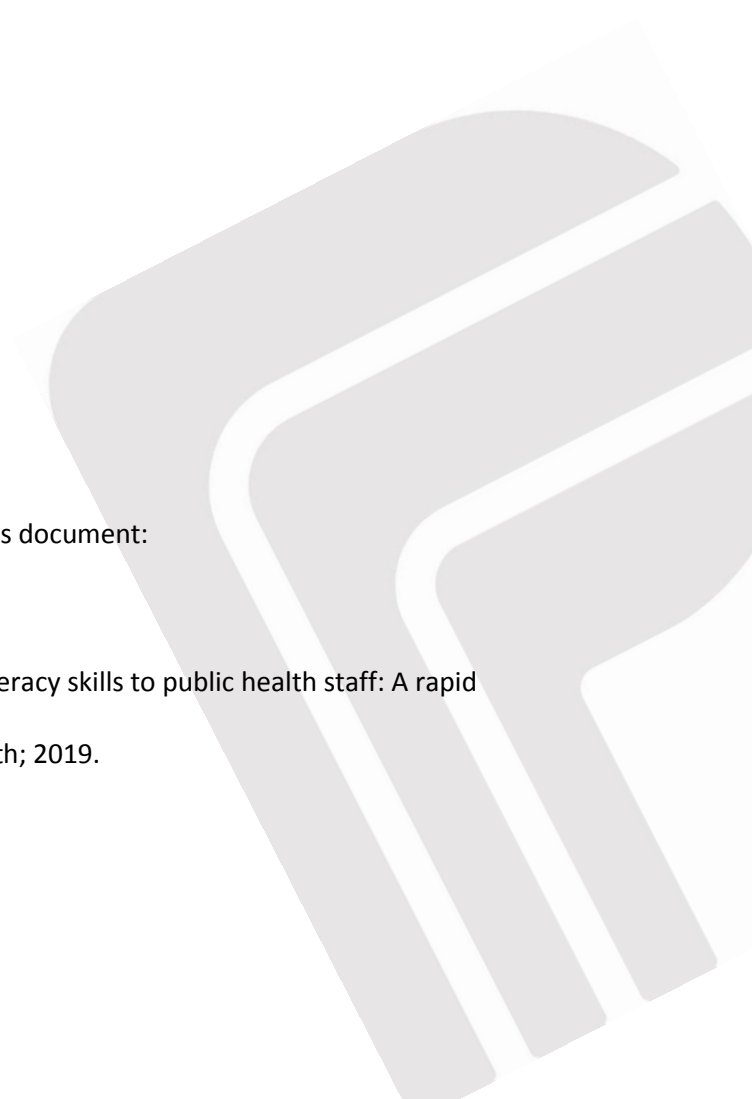
**Office of the Medical Officer of Health**

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## *Key Messages*

1. Both face-to-face and online teaching strategies formats equally increase information literacy (IL) skills.
2. Blended formats do not increase IL skills more than single formats.
3. Students did not express a clear preference for one teaching format.
4. Teaching formats for IL can be adapted to organizational need and context.

## *Executive Summary*

### **Question**

What are effective strategies for teaching information seeking skills to public health staff?

### **Issue and Context**

Evidence-informed decision making (EIDM) has been part of the strategic plan at Region of Peel – Public Health (ROP-PH) for the past ten years. EIDM requires that staff can search for and use the best available research evidence to inform their work.

At ROP-PH, the two librarians perform all complex searches of the published literature, including those related to research reviews. This is due to the expert level of search-skill required. At the team level, staff may be expected to complete searches independently. Therefore, staff need a base level of information seeking skills to fulfill their everyday search needs.

The librarians currently use several face-to-face methods to teach information seeking skills. Significant human resources are invested in face-to-face teaching. The effectiveness of these teaching approaches is unclear.

### **Methods**

Published and grey literature were searched to identify synthesized evidence and yielded 270 results. After assessing for relevance and quality, one systematic review was included.

## **Findings**

Face-to-face teaching formats increased information literacy, as did online formats. Face-to-face and online formats were relatively equal in terms of improving skill levels. A blended format (with face-to-face and online components) did not demonstrate a consistent improvement in IL skills compared to single formats. Students did not express a preference for one format over another, but rather cited differences in delivery formats and advantages/disadvantages of each format. Results showed that the IL teaching format can change to suit the demands of the student population and organizational context. Overall, these findings must be considered in light of the methodological limitations of the included studies.

## **Recommendations**

ROP-PH librarians should:

1. Map out how information seeking skill development fits into the larger capacity building strategies/framework for the organization (e.g., numeracy, End-to-End Public Health Practice ).
2. Create a teaching plan that includes face-to-face and online teaching formats to build and enhance information seeking skills of staff. This plan will require:
  - a. Engaging with staff to understand their information seeking skill needs and perspective on training needs.
  - b. Identifying the appropriate skills/knowledge to be developed within specific staff roles.

## **1 Issue**

Evidence to inform public health practice is core to the organizational culture at Region of Peel – Public Health (ROP-PH). Evidence-informed decision making (EIDM) has been part of ROP-PH’s strategic plan for the past ten years. EIDM requires that staff can search for and use the best available research evidence to inform their work.

Two librarians support staff to find evidence at ROP-PH. The librarian role includes conducting literature searches and teaching public health staff to conduct searches independently. The librarians currently use several face-to-face methods to teach information seeking skills to all levels of staff. The skills taught include: search question development, sources and levels of public health evidence, and search techniques for various databases including grey literature. The librarians teach staff these skills using both large group sessions and individual or small group mentoring. The effectiveness of these teaching approaches is unclear.

## **2 Context**

At ROP-PH, the librarians perform all complex searches of the published literature, including those related to research reviews. This is due to the expert level of search-skill required. At the team level, staff may be expected to complete searches independently including: published literature searches for projects outside of research reviews; and grey literature (unpublished) searches.

Although they may consult with a librarian, staff would need to:

- determine the appropriate databases to be searched;
- identify potential sources of related grey literature;

- develop an appropriate search strategy including search terms;
- apply the search strategy; and
- document the results.

Staff need a base level of information seeking skills to fulfill their everyday search needs. The complexity and frequency of these everyday searches differs based on an individual's role in the organization. However, staff have varied skill-levels based on their education and experience. It is a workforce development priority for staff to maintain skills and competencies to be optimally effective in their positions. Capacity building efforts give staff a sense of empowerment within their roles.

The Ontario Public Health Standards (2018) state that "The board of health shall ensure all programs and services are informed by evidence."<sup>1</sup> The Public Health Agency of Canada's Core Competencies require that all public health practitioners can find, assess and apply evidence in their work.<sup>2</sup> To achieve these two expectations of local public health, ROP-PH invested heavily in EIDM infrastructure and resources over the past ten years. This included building the Health Services Library resources, developing the Knowledge Broker role and implementing strategies to build staff capacity. Several strategies are already in place to build capacity for EIDM across the organization (e.g. ONCORE, EIDM workshop, E2EPHP training sessions).

The current library training includes four face-to-face, large group sessions (1.5 hours each) which are led by the librarians on a bi-monthly schedule (total of 24 sessions per year).

Approximately 80 staff attend these sessions each year. Significant human resources are invested in face-to-face teaching however, librarian capacity meets organizational demand at this time. In addition, there is one e-learning module available for staff related to copyright.



In the library field, information literacy is a term commonly used to describe the knowledge and skills that people need to find information. A background reading paper was completed in July 2018 to define information literacy and identify a framework to help organize and inform capacity-building activities within the Health Services Library. Two frameworks were identified although neither was directly related to the public health context.<sup>3-4</sup> Information literacy was defined as the skills needed to find, appraise and use information in practice.<sup>3</sup> These frameworks describe common elements of information literacy which include: defining a question, searching for evidence, appraising quality, and synthesizing information. Given the overlap between information literacy and EIDM, the focus of this review is the searching component, which encompasses the information seeking skills of public health staff.

### **3 Literature Review Question**

What are effective strategies for teaching information seeking skills to public health staff?

<b>Population</b>	Public health staff
<b>Intervention</b>	Teaching strategies (any modality: in person or online, etc.)
<b>Comparison</b>	None
<b>Outcome</b>	Information seeking skills

## **4 Literature Search**

The librarian conducted an iterative search of the published literature. The final search was conducted on November 21 and 22, 2018. The databases searched were: Cumulative Index to Nursing and Allied Health Literature (CINAHL Plus); Library and Information Science Abstracts (LISA); MEDLINE; MEDLINE in-process; Cochrane Database of Systematic Reviews; Global Health; and Healthstar. Since information seeking is a component of information literacy, both terms were included. The only limit applied was a filter for synthesized literature (Appendix A). Due to the large number of irrelevant items retrieved, the decision was made to search for the terms “information literacy” or “information seeking” in the title field only.

A search of the unpublished literature was conducted between November 22, 2018 and November 26, 2018. Two sources were searched: Turning Research into Practice (TRIP) database and Google (Appendix A).

Reference lists of relevant articles were reviewed and a librarian expert was consulted to identify additional material.

## **5 Relevance Assessment**

After initial screening of the search results, no articles were identified that focused on public health. The review team broadened the relevance criterion for population to include any health professionals or college/university students since these may be generalizable to public health staff.

Two reviewers independently screened all titles and abstracts for relevance. Discrepancies were discussed and consensus was reached. Potentially relevant full-text articles were retrieved and screened by both reviewers.

Relevance assessment was conducted based on the following:

- **Inclusion Criteria:** synthesized literature (e.g. systematic reviews); intervention involves training, teaching, instruction and/or educational strategy; population is health professionals or students at the college or university level; outcome is information seeking or information literacy skills.
- **Exclusion Criteria:** describes information seeking behaviours in relation to consumer health or health literacy; focuses on how to assess, measure or evaluate information seeking or literacy knowledge or skills; publication date exceeds 10 years; non-English language.

## **6** *Results of the Search*

The searches yielded 270 articles, 18 of which were duplicates. Based on primary relevance assessment using titles and abstracts, 240 articles were deemed non-relevant and 12 articles remained for full-text review. After full-text review, four articles were deemed to be appropriate for critical appraisal: three systematic reviews and one literature review (Appendix B).

## 7 *Critical Appraisal*

Two reviewers critically appraised all four articles using the Health Evidence™ Quality Assessment Tool for review articles.<sup>5</sup> Reviewers met to discuss their independent scoring and any discrepancies were resolved through discussion. Three papers were rated weak and were excluded. One paper was rated strong and included in this review.

## 8 *Description of Included Papers*

**Weightman et al. (2017): A Systematic Review of Information Literacy Programs in Higher Education: Effects of Face-to Face, Online, and Blended Formats on Student Skills and Views.**<sup>6</sup>

The objectives of this strong quality systematic review were: to examine the relative effectiveness of face-to-face and online formats to teach information literacy (IL) skills; to compare blended versus single format delivery; and to explore views of higher education students in relation to these formats. The paper included 11 randomized and 21 non-randomized controlled studies. Twenty-one studies included data on student views. The majority of the studies were conducted in the United States. The population of interest was undergraduates and postgraduates enrolled in higher education coursework programs, mostly in a university setting. Included studies were critically appraised but quality scores were not reported.

The intervention formats included face-to-face (large group, small group, one-on-one), online and blended (with face-to-face and online teaching) instruction. Intervention details varied substantially between the studies:

- Librarians delivered the intervention in 30 of 33 studies.
- Teaching duration varied ranging from 15 minutes to 3.3 hours.
- Frequency of instruction varied (e.g. an online intervention over 10 weeks, 14 one-hour sessions).
- Period between intervention and skills assessment varied.

The outcomes of interest were a change in IL skills and student views on the educational formats. IL skills were assessed in two ways: test and assignment scores. It was noted that test scores indicate factual knowledge whereas assignment scores indicate behavior skills needed to complete an IL task.

Seventeen studies were included in the meta-analysis, but results were reported separately for test and assignment scores. Results were reported as standardized mean differences (SMDs). A random-effects meta-analysis was conducted due to high heterogeneity between included studies. The authors conducted a sensitivity analysis to determine the effect of heterogeneity and noted that this did not significantly change the overall results.

Student views were themed based on the qualitative information provided. The perspective of the provider (e.g., librarian) was not included.

## 9 Findings

### **Both face-to-face and online teaching formats equally increase information literacy (IL) skills**

When comparing pre-test scores to post-test scores, face-to-face teaching formats increased information literacy (SMD 1.02; 95%CI 0.75 to 1.29,  $I^2=75.8%$ , 12 studies), as did online formats (SMD 0.92; 95%CI 0.57 to 1.26,  $I^2=90.0%$ , 11 studies). Face-to-face and online formats were relatively equal in terms of improving skill levels (SMD -0.01; 95%CI -0.28 to 0.26,  $I^2=83.1%$ , 13 studies). These findings were consistent with the studies that were not included in the meta-analysis.

The results were generally consistent when test scores (shown above) or assignment scores were examined. It is not known if this knowledge or skill is sustained over time.

### **Blended formats do not increase IL skills more than single formats**

A blended format (with face-to-face and online components) did not demonstrate a consistent improvement in IL skills compared to single formats. Based on test scores, there was no difference between online and blended formats (SMD 0.15; 95%CI -0.03 to 0.34,  $I^2=0.0%$ , 4 studies) or between face-to-face and blended formats (SMD 0.36; 95%CI -0.03 to 0.75,  $I^2=11.2%$ , 3 studies). When assignment scores were considered, online or face-to-face formats significantly improved IL skills compared to a blended format (SMD -1.28; 95%CI -1.90 to -0.65, 1 study and SMD -0.70; 95%CI -1.02 to -0.36,  $I^2=0.0%$ , 2 studies respectively).

### **Students did not express a clear preference for one teaching format**

Student did not express a preference for one format over another, but rather cited differences in delivery formats and advantages/disadvantages of each format. The online format was favoured in terms of perceived benefits, attitudes, and comfort with research or ability to choose databases. The face-to-face format was favoured in terms of perceived effectiveness, responsiveness of instructor and clarity of presentation.

### **Teaching formats for IL can be adapted to organizational need and context**

Results showed that the IL teaching format can change to suit the demands of the student population and organizational context. The authors indicate confidence in moving towards use of more online teaching, especially for routine IL teaching such as orientation for new students and for “point of need” educational opportunities.

Librarians delivered the intervention in 30 of 33 studies. One study compared IL skills among three groups: those who received online instruction and those who received face-to-face instruction by a librarian or tutor. IL skills increased significantly in the online and librarian-led groups but not in the group led by a tutor.

Overall, these findings must be considered in light of the methodological limitations of the included studies. The available evidence was heterogeneous and methodological limitations included a lack of:

- randomization

- validation of skill testing
- long term follow-up

## ***10 Applicability and Transferability***

On June 24, 2019, staff from the Education and Research team and Organizational Development and Learning met to discuss the findings of this review and apply them to the public health context in Peel. An Applicability and Transferability (A & T) worksheet was used to consider the findings and recommendations in our local context (Appendix D).

### Political Acceptability

**The recommendations would likely be politically acceptable.**

- The culture at Peel supports professional development and EIDM, which is expected to continue as part of workforce development.
- Despite current public health sector changes, the need to build information seeking skills will continue. Training developed by Peel would likely be considered useful within the new regional public health entities.

### Social Acceptability

**The recommendations would likely be socially acceptable.**

- Based on ROP-PH's experience with ONCORE, staff value both face-to-face and online instruction. Face-to-face training allows for relationship building with librarians and tailored instruction, whereas online training allows for self-paced learning.



- Human Resources has implemented online modules for some core staff training which has been acceptable to staff.

#### Available Resources

**The implementation of the recommendations could lead to more efficient use of resources.**

- There are time and budget considerations in the creation of online modules. Library staff need time to develop a teaching plan, identify a framework and engage with staff.
- Sustained leadership support would be necessary to create and implement the new training plan.

#### Organizational Expertise and Capacity

**The recommendations align with organizational priorities but will require a capacity building strategy and implementation plan.**

- The Education and Research team would require partnerships to develop content and build interactive modules.
- Human Resources has a platform for online learning which could be leveraged, as well as vendors that could be used to create online modules. Instructional design/interactivity issues need to be considered and this is not a skill set available within the team.

#### Transferability

- Evidence from this review may be generalizable to Peel staff, however staff may have a different motivation to learn and/or comfort level with online learning than a student population.

- The learning needs of staff may be different within the new regional public health entities, however, the foundational skills required to do public health work will be the same.
- Prior to revising existing training, librarians need to define the desired outcomes, target audience, purpose, expected behaviour change and required skill.

## ***11 Recommendations***

ROP-PH librarians should:

1. Map out how information seeking skill development fits into the larger capacity building strategies/framework for the organization (e.g., numeracy, E2EPHP).
2. Create a teaching plan that includes face-to-face and online teaching formats to build and enhance information seeking skills of staff. This plan will require:
  - a. Engaging with staff to understand their information seeking skill needs and perspective on training needs.
  - b. Identifying the appropriate skills/knowledge to be developed within specific staff roles.

## 12 *Acknowledgements*

### **Authors**

Rebecca Strange; Librarian Specialist

Nancy Ramuscak; Program Manager

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Jackie Muresan; Advisor, Public Health Knowledge Brokering

## References

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## *Appendices*

**Appendix A: Search Strategy**

**Appendix B: Literature Search Flowchart**

**Appendix C: Data Extraction Table**

**Appendix D: Applicability and Transferability Worksheet**

## *Appendix A: Search Strategy*

### **OVID**

Database: EBM Reviews - Cochrane Database of Systematic Reviews <2005 to November 8, 2018>, Global Health <1973 to 2018 Week 44>, Ovid Healthstar <1966 to October 2018>, Ovid MEDLINE(R) <1946 to October Week 5 2018>, Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations <November 09, 2018>

Search Strategy:

- 
- 1 "information seek\*".ti. (1562)
  - 2 "information literacy".ti. (289)
  - 3 1 or 2 (1847)
  - 4 review\*.ti,pt. (4772850)
  - 5 meta analys\*.ti,pt. (230344)
  - 6 synthes\*.ti,pt. (365355)
  - 7 guideline\*.ti,pt. (150599)
  - 8 overview\*.ti,pt. (66800)
  - 9 4 or 5 or 6 or 7 or 8 (5372000)
  - 10 3 and 9 (101)
  - 11 remove duplicates from 10 (55)

## CINAHL Plus with Full Text and LISA

[Print Search History](#) [Retrieve Searches](#) [Retrieve Alerts](#) [Save Searches / Alerts](#)

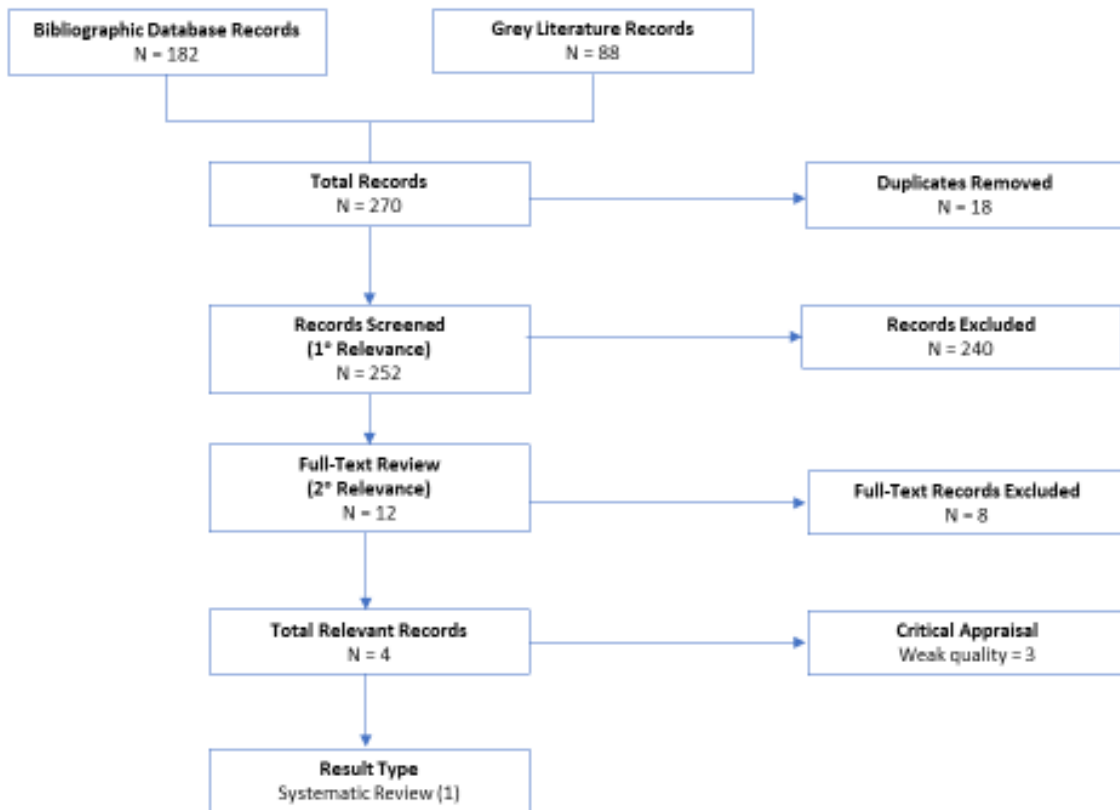
<input type="checkbox"/> Select / deselect all <input type="button" value="Search with AND"/> <input type="button" value="Search with OR"/> <input type="button" value="Delete Searches"/> <input type="button" value="Refresh Search Results"/>			
Search ID#	Search Terms	Search Options	Actions
<input type="checkbox"/> S3	S1 AND S2	Search modes - Boolean/Phrase	<a href="#">View Results (178)</a>   <a href="#">View Details</a>   <a href="#">Edit</a>
<input type="checkbox"/> S2	TI review* OR TI meta analys* OR TI synthes* OR TI guideline* OR TI overview*	Search modes - Boolean/Phrase	<a href="#">View Results (418,841)</a>   <a href="#">View Details</a>   <a href="#">Edit</a>
<input type="checkbox"/> S1	TI "information literacy" OR TI "information seek"	Search modes - Boolean/Phrase	<a href="#">View Results (6,023)</a>   <a href="#">View Details</a>   <a href="#">Edit</a>

Note: Set 3 of 178 records was further reduced to 127 records after removal of duplicates.

## Grey Literature

Sources	Search Terms	Results Reviewed
Google	("information literacy" OR "information seek*") AND educat*	50
TRIP Database	(title: "information literacy" OR "information seek*") AND educat*	38

## Appendix B: Literature Search Flowchart



Adapted from: 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(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit <http://prisma-statement.org/PRISMAStatement/FlowDiagram>



## Appendix C: Data Extraction Table

<p><b>Systematic Review</b>            Weightman et al, 2017            A Systematic Review of Information Literacy Programs in Higher Education: Effects of Face-to-Face, Online, and Blended Formats on Student Skills and Views.  <a href="https://journals.library.ualberta.ca/eblip/index.php/EBLIP/article/view/29088/21442">https://journals.library.ualberta.ca/eblip/index.php/EBLIP/article/view/29088/21442</a></p>	
<p><b>General Information and Quality Rating</b></p>	
Author Countries	United Kingdom and Australia
Health Evidence Quality Assessment Tool	<p>Rated as strong (9/10) by two independent reviewers (RS and NR).</p> <ul style="list-style-type: none"> <li>Quality assessment of included studies was performed but results were not reported for each included study.</li> </ul>
<p><b>Review Details</b></p>	
Objective	<ol style="list-style-type: none"> <li>To examine the relative effectiveness of face-to-face (traditional) and online (web or computer based) formats to teach information literacy (IL) skills</li> <li>To compare blended versus single format delivery to teach IL skills</li> <li>To explore views of higher education students on these different formats</li> </ol>
Search period	1995-October 2016
Number of databases searched	British Education Index; ERIC; Proquest Dissertations and Theses (Index to Theses); Librarians' Information Literacy Annual Conference (LILAC) Abstracts; Library, Information Science & Technology Abstracts (LISTA); LOEX Conference Abstracts; Open Grey; Scopus.
Inclusion/exclusion criteria	<p><b>Inclusion criteria:</b></p> <ul style="list-style-type: none"> <li>Included controlled study designs only.</li> <li>The teaching had to be described as information literacy or library skills, with a statement that equivalent content was covered within each format.</li> </ul> <p><b>Exclusion criteria:</b></p> <ul style="list-style-type: none"> <li>Sessions for research postgraduates, unless part of a formal "taught" program.</li> <li>Sessions for professional trainees.</li> <li>Comparisons involving differing face-to-face formats only or differing online formats only.</li> <li>Different curricula for each learning format.</li> <li>Students not from the same cohort (ie: different year groups for different formats).</li> </ul>
Number and types of studies included	<ul style="list-style-type: none"> <li>33 included studies               <ul style="list-style-type: none"> <li>11 randomized controlled trials and 22 non-randomized controlled before and after studies</li> <li>21 of the studies contained comparative data on student views</li> </ul> </li> </ul>

Countries	26 United States, 3 United Kingdom, 2 Australia, 1 Czech Republic, 1 Canada
Quality of included studies	<ul style="list-style-type: none"> <li>• Studies were critically appraised using the Glasgow checklist for educational interventions</li> <li>• The checklist was adapted to include the questions from the ReLIANT checklist for library based educational interventions.</li> <li>• Two authors independently appraised each study.</li> <li>• Quality assessment of each study was not reported</li> </ul>
Synthesis	<ul style="list-style-type: none"> <li>• Meta-analysis of studies that provided mean IL test scores with standard deviations (17 studies) <ul style="list-style-type: none"> <li>○ Studies were heterogeneous, therefore a random-effects meta-analysis was employed.</li> </ul> </li> <li>• Narrative synthesis of findings from studies that could not be meta-analyzed (16 studies)</li> <li>• Thematic analysis of student views</li> </ul>
<b>Characteristics of the studies included in review</b>	
Study population(s)	<ul style="list-style-type: none"> <li>• Undergraduates and postgraduates enrolled in higher education coursework programs</li> </ul>
Study settings	<ul style="list-style-type: none"> <li>• University setting (31 studies)</li> <li>• College setting (2 studies)</li> </ul>
Description of interventions	<ul style="list-style-type: none"> <li>• No information provided about the content of the intervention sessions.</li> <li>• Interventions varied considerably in their format, duration and frequency.</li> <li>• The majority of the interventions were delivered by librarians (30), graduate students (1) or teaching assistants (2).</li> </ul> <p><b><u>Face-to-face instruction:</u></b></p> <ul style="list-style-type: none"> <li>• Of the 21 studies providing information on face-to-face contact time, the typical duration was 50-60 minutes (range 14 one-hour sessions to 0.5 hours)</li> </ul> <p><b><u>Online instruction:</u></b></p> <ul style="list-style-type: none"> <li>• Of the 31 studies providing information on online instruction, duration ranged from 15-80 minute</li> <li>• Longest contact time was 9 hours.</li> <li>• One of the online interventions took place over 10 weeks.</li> <li>• Methods included online or web-based tutorials/modules, which were either interactive or self paced.</li> </ul> <p><b><u>Blended instruction (with face-to-face and online components):</u></b></p> <ul style="list-style-type: none"> <li>• Of the 10 studies providing information on blended instruction, longest duration was 3.3 hours.</li> </ul>
Outcome measures	<p><b><u>Change in information literacy skills:</u></b></p> <ul style="list-style-type: none"> <li>• IL skills were measured in two ways: via test scores (pre and post) or through assignment scores (course work, worksheets).</li> <li>• When studies provided means, sample sizes and standard deviations, study findings for skills outcomes were combined by meta-analysis, but reported separately for test scores and assignment scores.</li> </ul>

	<ul style="list-style-type: none"> <li>• A standardized mean difference (SMD) was used</li> <li>• Follow up periods varied significantly between the studies, ranging from immediately after instruction up to one year afterwards.</li> </ul> <p><b><u>Student views on the educational format:</u></b></p> <ul style="list-style-type: none"> <li>• Types of outcomes measures for student’s views included satisfaction, self-efficacy, perceived benefits and effectiveness.</li> </ul>
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**Results of the Review**

Main results	<p><b><u>Face-to-face instruction:</u></b></p> <p><u>Test Scores:</u></p> <ul style="list-style-type: none"> <li>• Among students who received face-to-face instruction, there is a significant increase in skills comparing pre to post test scores <ul style="list-style-type: none"> <li>○ Standardized mean difference (SMD) 1.02 (95% CI; 0.75, 1.29; I<sup>2</sup>=75.8%) (12 studies)</li> </ul> </li> </ul> <p><u>Assignment Scores:</u></p> <ul style="list-style-type: none"> <li>• Among students who received face-to-face instruction, there is a significant increase in skills comparing pre to post assignment scores <ul style="list-style-type: none"> <li>○ SMD 3.51 (95% CI; 2.84, 4.17) (1 study)</li> </ul> </li> </ul> <p><b><u>Online instruction:</u></b></p> <p><u>Test Scores:</u></p> <ul style="list-style-type: none"> <li>• Among students who received online instruction, there is a significant increase in skills comparing pre to post test scores <ul style="list-style-type: none"> <li>○ SMD 0.92 (95% CI; 0.57, 1.26; I<sup>2</sup>=90.0%) (11 studies)</li> </ul> </li> </ul> <p><u>Assignment Scores:</u></p> <ul style="list-style-type: none"> <li>• Among students who received online instruction, there is a significant increase in skills comparing pre to post assignment scores <ul style="list-style-type: none"> <li>○ SMD 4.83 (95% CI; 3.98, 5.68) (1 study)</li> </ul> </li> </ul> <p>Overall:</p> <ul style="list-style-type: none"> <li>• Of the 25 studies that included a pre-test, all noted an increase in skills from pre-test to post-test across delivery formats.</li> </ul> <p><b><u>Face-to-face vs. online instruction:</u></b></p> <p><u>Test Scores:</u></p> <ul style="list-style-type: none"> <li>• There was no difference in student’s test scores when comparing face-to-face and online instruction. <ul style="list-style-type: none"> <li>○ SMD -0.01 (95 % CI; -0.28, 0.26; I<sup>2</sup>=83.1%) (13 studies)</li> </ul> </li> </ul> <p><u>Assignment Scores:</u></p> <ul style="list-style-type: none"> <li>• Students who received online instruction had higher assignment scores compared to those who had face-to-face instruction <ul style="list-style-type: none"> <li>○ SMD 0.58 (95 % CI; 0.15, 1.01) (1 study)</li> </ul> </li> </ul> <p>Overall:</p> <ul style="list-style-type: none"> <li>• 27 of the 33 studies reported that there was no statistically significant difference between skills learned via face-to-face and</li> </ul>
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online formats.

- Results of the remaining six studies were:
  - Unclear due to weaknesses in the data analyses (1 study)
  - Favoured online delivery (2 studies)
  - Favoured face-to-face delivery (2 studies)
  - Favoured a blended delivery of online and face-to-face (1 study)

**Online or face-to-face vs. blended instruction:**

**Test Scores:**

- Among students who received online versus blended formats, there was no significant change in IL skills
- SMD) comparing online versus blended format were 0.15 (95% CI, -0.03, 0.34;  $I^2=0.0\%$ ) (4 studies)
- Among students who received face-to-face versus blended format, there was no significant difference in IL skills (3 studies)
- Standardized mean difference comparing face-to-face versus blended format were 0.36 (-0.03, 0.75;  $I^2=11.2\%$ ) (Figure 5).

**Assignment Scores:**

- Among students who received online versus blended formats, there was a significant increase in IL skills for those who received online format (1 study)
- Standardized mean difference (SMD) comparing online to blended formats was -1.28 (95% CI, -1.90, -0.65)
- Among students who received face-to-face versus blended formats, there was a significant increase in IL skills for those who received face-to-face format (2 studies)
- Standardized mean difference (SMD) comparing face-to-face to blended formats were -0.70 (-1.02, -0.38;  $I^2=0.0\%$ ) (Figure 5).

**Overall:**

- 10 of the 33 studies included blended delivery and results were mixed.
- 7 of these 10 studies found no statistically significant difference between blended and other formats in terms of test or assignment outcomes.
- Of the 3 that showed statistically significant different results:
  - The blended method provided better skill development than face-to-face, but not significant compared to online (1 study)
  - There were higher post-test scores for students receiving a face-to-face vs blended format (1 study)
  - There was greater pre-post improvement in the blended learning compared to the online learning group (1 study)

**Student views on the educational format:**

- 19 studies gathered views on both types of format.
- Students perceived advantages and disadvantages for each format.
  - Thematic analysis of student views found no preference in

	<p>relation to format on a range of measures (14 studies).</p> <ul style="list-style-type: none"> <li>○ Online course was favoured in terms of perceived benefits, attitudes to the course, and comfort in carrying out research or increased self-efficacy in choosing databases to search (5 studies).</li> <li>○ Face-to-face was favoured in terms of perceived effectiveness and responsiveness of instructor and clarity of presentation (3 studies).</li> </ul> <p><b><u>Study design features</u></b></p> <p><b><u>Librarian vs tutor:</u></b></p> <ul style="list-style-type: none"> <li>● Interventions in 30 of the 33 studies were delivered by librarians.</li> <li>● Face-to-face teaching was delivered by graduate student or teaching assistant tutors (2 studies).</li> <li>● Skills increased significantly in the librarian and online groups, but not in the tutor group, in a direct comparison between face-to-face groups, one trained by librarians and one by course tutors (1 study).</li> </ul> <p><b><u>Follow up time:</u></b></p> <ul style="list-style-type: none"> <li>● Only 14 studies provided information on follow-up period between teaching and the skills test (range was immediately after teaching to 12 months) <ul style="list-style-type: none"> <li>○ Of those, 13 studies showed no significant difference between the two formats in terms of skills retained.</li> </ul> </li> </ul> <p><b>In summary</b>, the authors noted that:</p> <ul style="list-style-type: none"> <li>● Face-to-face and online instruction increases IL skills</li> <li>● The increase in skills is comparable for face-to-face and online methods</li> <li>● Students do not express a clear preference for one format over another, although they perceive advantages and disadvantages of each.</li> <li>● Depending on the educational situation, the teaching format can change to suit the demands of the student population.</li> <li>● The authors are confident in moving towards the greater use of online options, especially for routine information literacy (IL) teaching such as library orientations and for access at “point of need”.</li> </ul>
<p>Limitations</p>	<ul style="list-style-type: none"> <li>● Quality of the included studies is moderate at best.</li> <li>● Of 33 studies, 25 did not pilot or validate the test instrument. <ul style="list-style-type: none"> <li>○ Only 2 studies carried out formal validity testing.</li> <li>○ Only 7 studies piloted or validated the test instrument</li> </ul> </li> <li>● Heterogeneity was high across studies so meta-analysis results should be interpreted with caution.</li> </ul>

## Appendix D: Applicability and Transferability Worksheet

Factors	Questions	Notes
<b>Applicability (feasibility)</b>		
Political acceptability or leverage	<ul style="list-style-type: none"> <li>• Will the intervention be allowed or supported in current political climate?</li> <li>• What will the public relations impact be for local government?</li> <li>• Will this program enhance the stature of the organization?               <ul style="list-style-type: none"> <li>○ <i>For example, are there reasons to do the program that relate to increasing the profile and/or create a positive image of public health?</i></li> </ul> </li> <li>• Will the public and target groups accept and support the intervention in its current format?</li> </ul>	<ul style="list-style-type: none"> <li>• The culture at Peel supports professional development, a culture of inquiry, and EIDM - this is expected to continue as part of workforce development</li> <li>• Despite current public health changes at the regional level, there will continue to be information-seeking-skill needs for public health staff.</li> <li>• Information seeking training developed by Peel would likely be considered useful within the regional public health entities.</li> <li>• Given focus at Peel on EIDM, staff within other PHUs may have different skill needs</li> <li>• Need to consider the value of creating online modules within the regional software given upcoming governance changes.</li> </ul>
Social acceptability	<ul style="list-style-type: none"> <li>• Will the target population find the intervention socially acceptable? Is it ethical?               <ul style="list-style-type: none"> <li>○ <i>Consider how the program would be perceived by the population.</i></li> <li>○ <i>Consider the language and tone of the key messages.</i></li> <li>○ <i>Consider any assumptions you might have made about the population. Are they supported by the literature?</i></li> </ul> </li> <li>• <i>Consider the impact of your program and key messages on non-target groups.</i></li> </ul>	<ul style="list-style-type: none"> <li>• Staff value both the face-to-face and online instruction for different reasons. Face-to-face training allows for relationship-building with librarians and more tailored learning. Online training allows for self-paced learning. Expected acceptance for balance between online and face-to-face</li> <li>• Organizational Learning and Development (OD) has moved to online modules for some core training (e.g., health and safety) which has been acceptable to staff</li> <li>• Staff will still need an opportunity to meet the librarians               <ul style="list-style-type: none"> <li>○ build rapport and relationships through onboarding sessions</li> <li>○ tutorial or office hours concept helps people answer specific questions.</li> </ul> </li> </ul>

		<ul style="list-style-type: none"> <li>• Online format works well for ONCORE - people value the facilitated case studies and human interaction as well.</li> </ul>
Available essential resources (personnel and financial)	<ul style="list-style-type: none"> <li>• Who/what is available/essential for the local implementation?</li> <li>• Are they adequately trained? If not, is training available and affordable?</li> <li>• What is needed to tailor the intervention locally?</li> <li>• What are the full costs? <ul style="list-style-type: none"> <li>○ <i>Consider: in-kind staffing, supplies, systems, space requirements for staff, training, and technology/administrative supports.</i></li> </ul> </li> <li>• Are the incremental health benefits worth the costs of the intervention? <ul style="list-style-type: none"> <li>○ <i>Consider any available cost-benefit analyses that could help gauge the health benefits of the intervention.</i></li> <li>○ <i>Consider the cost of the program relative to the number of people that benefit/receive the intervention.</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• A variable approach between online and face-to-face instruction could make more effective use of library resources.</li> <li>• There are time and budget considerations in creation of online modules.</li> <li>• Need to consider how instruction methods are supported by mentoring and consultations by librarians and Knowledge Brokers</li> <li>• Staff time needed to develop teaching plan, identify framework and engage with staff - librarians need six months to build the plan.</li> <li>• Need sustained leadership support to create and implement new training plan</li> <li>• Need to get KB input into the planning of training and collaborate as needed.</li> </ul>
Organizational expertise and capacity	<ul style="list-style-type: none"> <li>• 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')?</li> <li>• Does the intervention conform to existing legislation or regulations (either local or provincial)?</li> <li>• Does the intervention overlap with existing programs or is it symbiotic (i.e., both internally and externally)?</li> </ul>	<ul style="list-style-type: none"> <li>• Regional OD team has access to platform and vendors that could be used to create online modules</li> <li>• Need to consider instructional design/ interactivity issues to optimize online training - this is not a skill set available within the team</li> <li>• Need to consider partnership (e.g., similar to ONCORE partnership with Waterloo) to develop content and build interactive modules</li> <li>• NCCMT and PHO are possible partners - would need to understand how we partner with them in relation to</li> </ul>

	<ul style="list-style-type: none"> <li>• Does the intervention lend itself to cross-departmental/divisional collaboration?</li> <li>• Any organizational barriers/structural issues or approval processes to be addressed?</li> <li>• Is the organization motivated (learning organization)? <ul style="list-style-type: none"> <li>○ <i>Consider organizational capacity/readiness and internal supports for staff learning.</i></li> </ul> </li> </ul>	<p>information seeking capacity building.</p> <ul style="list-style-type: none"> <li>• Regional Learning Council is developing organizational learning strategy <ul style="list-style-type: none"> <li>○ Need to consider how our plans fit into this strategy</li> </ul> </li> </ul>
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<b>Transferability (generalizability)</b>		
Magnitude of health issue in local setting	<ul style="list-style-type: none"> <li>• What is the baseline prevalence of the health issue locally?</li> <li>• What is the difference in prevalence of the health issue (risk status) between study and local settings? <ul style="list-style-type: none"> <li>○ <i>Consider the Comprehensive Health Status Report, and related epidemiological reports.</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Expectations for information seeking skills should be delineated by role</li> </ul>
Magnitude of the “reach” and cost effectiveness of the intervention above	<ul style="list-style-type: none"> <li>• Will the intervention appropriately reach the priority population(s)? <ul style="list-style-type: none"> <li>○ What will be the coverage of the priority population(s)?</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Current face-to-face training has reached those staff who self-select</li> <li>• Online training would also reach the appropriate staff if incorporated into broader staff capacity building strategies</li> </ul>



Target population characteristics	<ul style="list-style-type: none"> <li>• Are they comparable to the study population?</li> <li>• Will any difference in characteristics (e.g., ethnicity, socio-demographic variables, number of persons affected) impact intervention effectiveness locally? <ul style="list-style-type: none"> <li>○ <i>Consider if there are any important differences between the studies and the population in Peel (i.e., consider demographic, behavioural and other contextual factors).</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• The needs of staff now may be different than the needs of staff within the new entities; however, the foundational skills will be the same.</li> <li>• Prior to creating revised training, librarians need to define the desired outcomes, target audience, purpose, expected behaviour change, required skill</li> <li>• There may be barriers with respect to technological resistance and comfort level in relation to online tutorials.</li> <li>• The studies focused on undergraduate and graduate students. <ul style="list-style-type: none"> <li>○ Peel staff may have different motivation to learn than student population</li> <li>○ Difference in baseline skill and online vs face-to-face preferences may differ in workforce</li> </ul> </li> </ul>
Proposed Direction (after considering the above factors):		

Form Completed by: \_\_\_\_\_

**Worksheet adapted from:** Buffet C., Ciliska D., and Thomas H. National Collaborating Centre for Methods and Tools. November 2007. *Can I Use this Evidence in my Program Decision? - Assessing Applicability and Transferability of Evidence.*