



Conducting a Literature Search & Semi-Systematic Review: the NCCEH Approach

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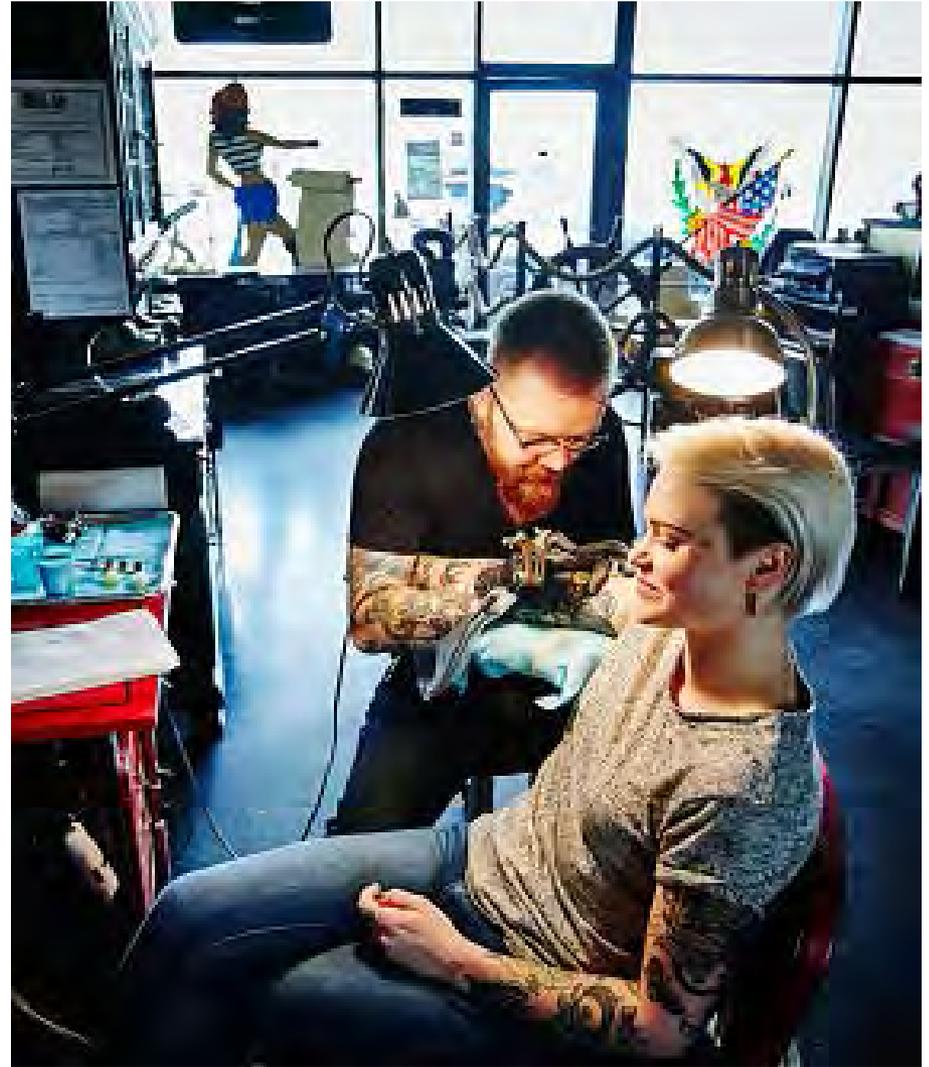
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Outline

1. Role of NCCEH
2. What is Evidence-informed decision making (EIDM)?
3. Overview of Literature Reviews
4. Literature Search
5. Critical Appraisal
6. Synthesis



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Established by the Public Health Agency of Canada in 2005 to promote the use of knowledge and evidence by public health practitioners and policy-makers in Canada.

ROLE OF NCCEH

NCCEH's Mandate

Synthesize, translate, & exchange knowledge

- Incorporate evidence from research and experience to improve or develop policy & practice

Identify gaps in knowledge

- Catalyze new research or application of research

Build capacity

- Provide tools, establish networks, foster partnerships

- **Target Audience:**

- Public Health Inspectors (PHIs), Medical Health Officers (MHOs), other environmental public health practitioners and policy-makers

Getting started: Why did we create this document?

- There are a number of barriers to accessing and using evidence effectively
 - Lack of a protocol; can be time-consuming; documents behind the “pay wall”; difficulty appraising quality.
- NCCEH’s **objective** in developing this document is to clarify the **process** and **tools** used to conduct a literature review.
- **This document is for those who...**
 - Wish to carry out their own literature reviews in a rigorous (but stream-lined) manner.
 - Want to better understand how NCCEH conducts its reviews.

Evidence-informed decision-making (EIDM)

- EIDM is “the intentional and **systematic** processes of bringing the **best available scientific evidence** on specific questions together with **other relevant information** to help weigh options and **inform decisions** that will affect priorities, policies, programs and practices” (Pierson et al. 2012).
- How to have EIDM in public health?
 - effective **knowledge translation, synthesis, exchange (KTSE)**

Knowledge translation has been described as....

- Activities that foster dissemination, adoption, appropriation of most up-to-date knowledge possible to allow for its use in professional practice (INSPQ, 2013)
- Systematic review, assessment, identification, aggregation, and practical application of research by key stakeholders (NCDDR, 2005)
- Exchange, synthesis, and ethically-sound application of knowledge within a complex system of interactions among researchers and users – to accelerate the capture of the benefits of research (CIHR, 2016)
- Primarily translation of research-based/scientific knowledge

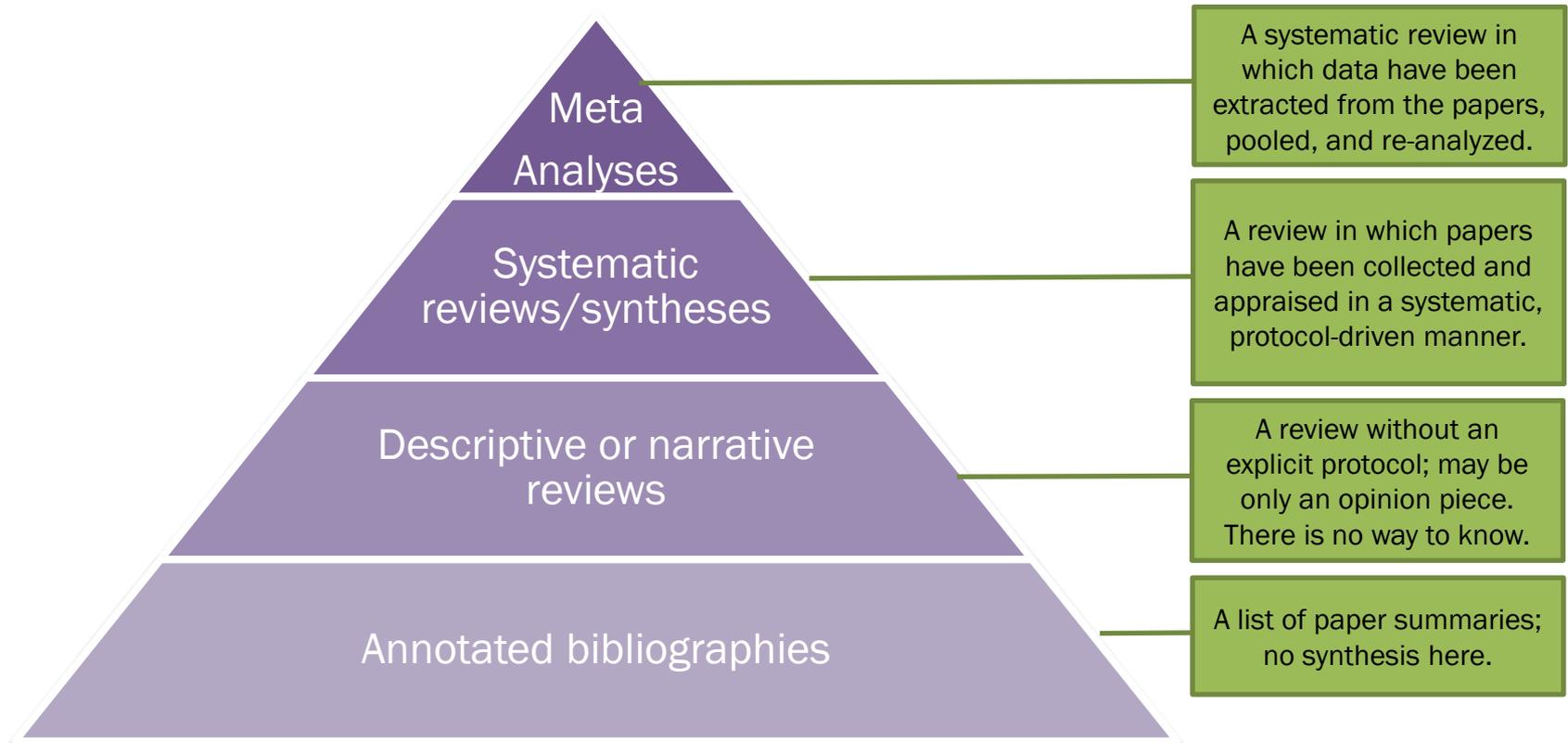
What kind of knowledge does KTSE capture?

- Public Health Knowledge (INSPQ, 2013)
 - Research-based
 - Fundamental/experimental, clinical, or applied
 - Products include: reports, articles, lit reviews, systematic reviews, meta-analyses
 - Tacit knowledge
 - Know-how of practitioners, researchers, etc. who accumulated knowledge about theoretical knowledge and practical experience
 - **KEY:** How to ‘export’ this knowledge? Needs interaction with holder of knowledge and conveyance of the knowledge in concrete manner.
 - Knowledge from data analysis
 - Collected, organized, analyzed and transmitted to stakeholders

KTSE may also be known as:

- Knowledge Transfer (commonly used outside of healthcare)
 - Systematic approach to capture, collect, and share tacit knowledge in order for it to become explicit knowledge
 - Process of getting knowledge used by stakeholders
 - All forms of ‘knowing’ including research, tacit/experiential knowledge
- Knowledge Exchange
- Research utilization
- Implementation
- Many more... often used interchangeably, but can mean different things (Graham et al. 2006)

Many types of lit review for different purposes



- Knowledge synthesis happens in upper 3 levels.

What is a systematic lit review?



- Occurs via an established **protocol** that helps to ensure:
 - You found all (or almost all) the relevant info.
 - Each study is assessed for quality and reliability.
 - That your **biases** as a writer have not affected the information you accessed or included
- This process is **documented, repeatable, and creates new knowledge.**

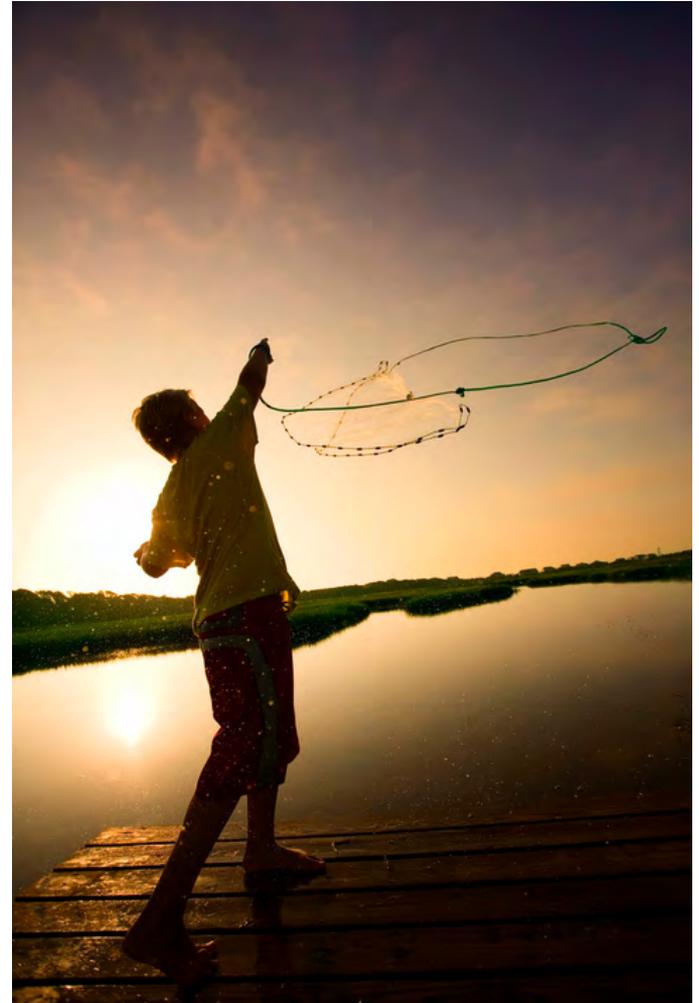
Systematic reviews in practice

- True systematic reviews typically require:
 - Multiple reviewers/scientists (labour intensive)
 - Extended time frame (months to years)
 - Access to specialized software for quantitative analysis
 - See the Cochrane Methods page: <http://methods.cochrane.org/>
 - May not always be feasible for pressing public health decisions
- However, the principles of systematic review—particularly the use of a **documented, protocol-driven approach**—can be used to improve KTSE.
 - May be referred to as a semi-systematic, a modified systematic, or a rapid review/scoping review/response.

I. THE LITERATURE SEARCH

An analogy...

- Your search query is your “net.”
- You throw it out, sort the “catch,” and then discuss all relevant items captured.
- The objective: unbiased appraisal of the body of evidence.



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LITERATURE SEARCH



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Steps to Conducting a Literature Search

1. Develop a research question
2. Identify your key words
3. Identify your databases
4. Construct your search query
5. Document your search results
6. Identify the relevant papers
7. Repeat your searches



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An inquiry....

An EHO visiting a body art convention noticed that tattoo artists were using meat-packing pads as dressings for new tattoos. The pads are food safe and bacteriostatic, but not sterile. They don't seem to be causing infections. Is it acceptable to let this practice continue?



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BE CAREFUL!

- Before beginning, take a moment to identify any previously held assumptions regarding the topic.
 - **Bias** in how you shape your question, where you look for information, or what papers you include can invalidate your work.
- Using pre-specified (“*a priori*”) **inclusion and exclusion criteria** adds transparency and rigour to selection of information sources.

Bias in a literature search

- **Publication bias:**
 - Studies with “positive” results more likely to get published.
 - Helpful to question what types of information might **not** be represented in the literature.
- **Database bias:**
 - Relying on a single database can systematically limit what you find for certain topic areas.
- **Source selection bias:**
 - Not just relying on databases, but also grey literature, theses, etc.
- **Paper selection bias:**
 - Stick to inclusion/exclusion criteria; have more than one reviewer, if possible.



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Step 1: Develop A Research Question

- Purpose of this is to focus your thinking and your lit search.
- ***Is there a medical consensus on clean vs. sterile dressings for new tattoos?***
 - A specific question, easy to pick out key words.
 - Helps to develop inclusion/exclusion criteria.



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Step 2: Identify Your Key Words

- Brainstorm a list of keywords → *Bandages, dressings, sterile, non-sterile, clean, tattoos.*
- Think of your “**lens**” → keywords from other disciplines, countries, languages, etc.
 - Also called permanent ink; includes permanent makeup.
 - Conventional tattooing vs. traditional tattooing.
 - In nursing, sometimes people use non-sterile dressings like diapers for wound care.



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Step 2: Identify Your Key Words

- More advanced: selecting MeSH terms.
- Set your selection criteria. In this example:
 - i. Papers about tattoo wounds or similar wounds.
 - ii. Papers in which sterile or non-sterile dressings were used intentionally (not accidental contamination).
 - iii. English language only.
 - iv. Peer-reviewed, but also grey literature.
 - v. Nothing related to traditional tattooing (different technology).

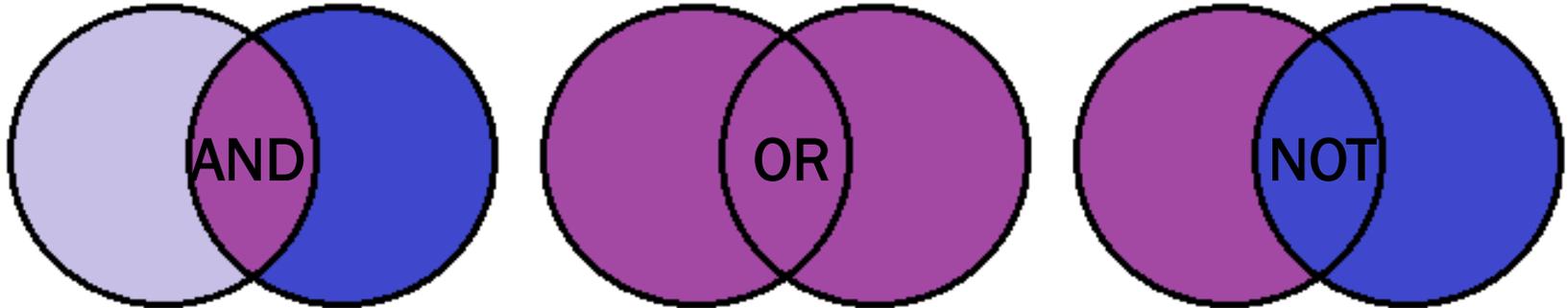


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Step 3: Identifying Your Databases

- Most go to Google Scholar and PubMed, but there are many other great field-specific resources out there!
 - Relying on one database can be a source of bias.
 - Libraries provide access to other databases (EBSCOhost, etc).
- Learn tricks for searching websites:
 - “non-sterile tattoo dressings”
 - Tattoo dressings site:cdc.gov
 - Tattoo dressings filetype: pdf

Step 4: Construct Your Search Query



- Boolean operators: AND, OR, NOT, used with (), “”
- Variants:
 - Truncation (*): will add any ending to the root of the word
 - metabol* → metabolizing, metabolism, metabolic, metabolite.
 - Wildcard (?): will return different spellings of the word with zero or 1 characters.
 - isch?emic → ischemic, ischaemic
- Limiters: time, language, peer-reviewed, paper types, etc.

Step 5: Document Your Search Results

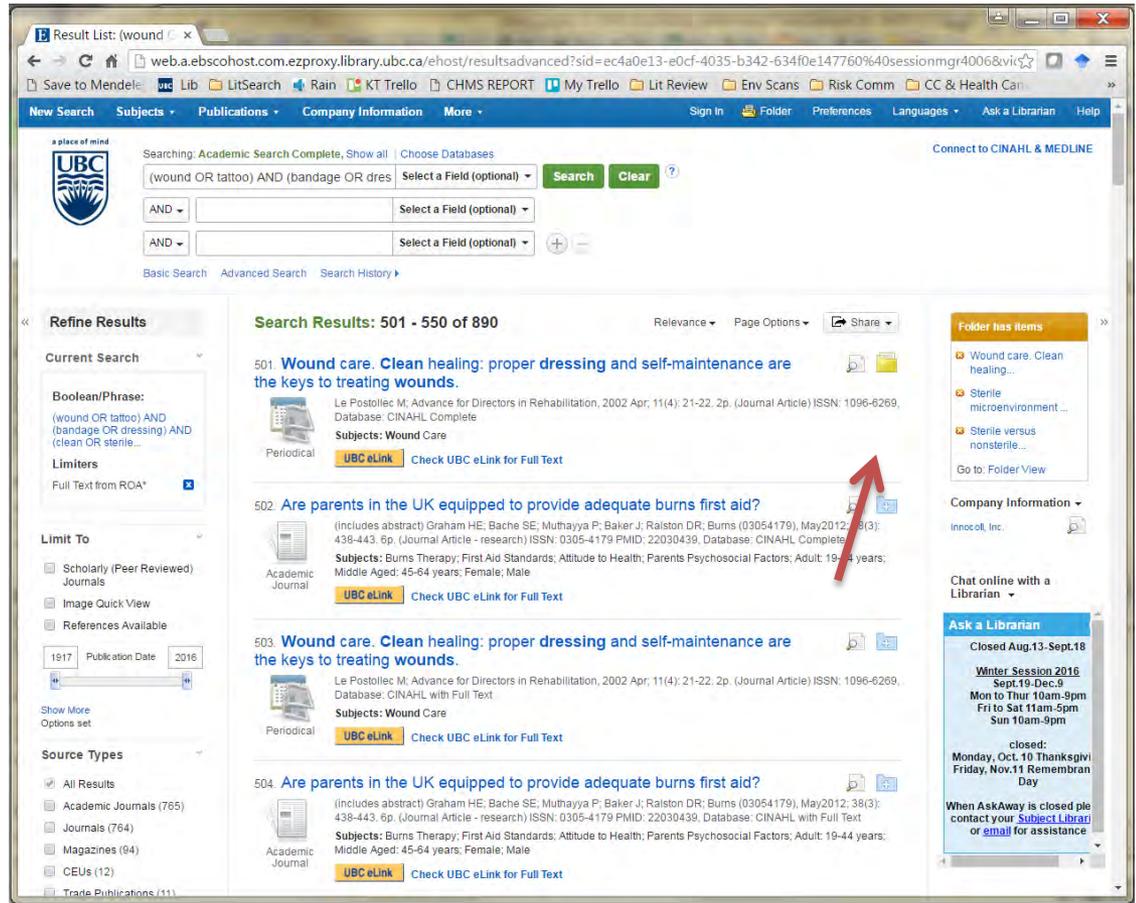
- Keep track of what, where and when you searched:

Date	Database	Key words	Hits
8/22/2016	EbscoHost #1	("post-surgical care" OR "home care") AND (wound OR incision) AND ("sanitary napkins" OR "sanitary pads" OR "maxi-pad" OR "diaper")	0 hits
8/22/2016	EbscoHost #2	(wound OR tattoo) AND (bandage OR dressing) AND (clean OR sterile OR non?sterile)	34 hits
8/23/2016	EbscoHost#3	"tattoos" AND "skin infection"	6,000 hits (Too many hits to review, revise search terms.)
9/1/2016	Google Scholar #1	("post-surgical care" OR "home care") AND (wound OR incision) AND ("sanitary napkins" OR "sanitary pads" OR "maxi-pad" OR "diaper")	1 hit
9/1/2016	Google Scholar #2	(wound OR tattoo) AND (bandage OR dressing) AND (clean OR sterile OR non?sterile)	5 hits
9/1/2016	CINAHL#1	("post-surgical care" OR "home care") AND (wound OR incision) AND ("sanitary napkins" OR "sanitary pads" OR "maxi-pad" OR "diaper")	0 hits

- Very helpful when you need to repeat searches

Step 5: Document Your Search Results

- As you run your searches, you need to keep track of the citations of all relevant papers.
- If the title and/abstract looks promising, export the citation to **reference management software**.
- Many database search tools have a selection feature that will allow you to collect and export a batch of papers.



The screenshot shows a library search results page. The search query is "(wound OR tattoo) AND (bandage OR dres)". The results list shows four items, with the first one highlighted. A red arrow points to the "Check UBC eLink for Full Text" button for the first result. The page includes a search bar, a sidebar with filters, and a right-hand panel with library information and a chat window.

Result List: (wound OR tattoo) AND (bandage OR dres)

Search Results: 501 - 550 of 890

501. **Wound care. Clean healing: proper dressing and self-maintenance are the keys to treating wounds.**
Le Postollec M. Advance for Directors in Rehabilitation, 2002 Apr; 11(4): 21-22. 2p. (Journal Article) ISSN: 1096-6269, Database: CINAHL Complete
Subjects: Wound Care
UBC eLink Check UBC eLink for Full Text

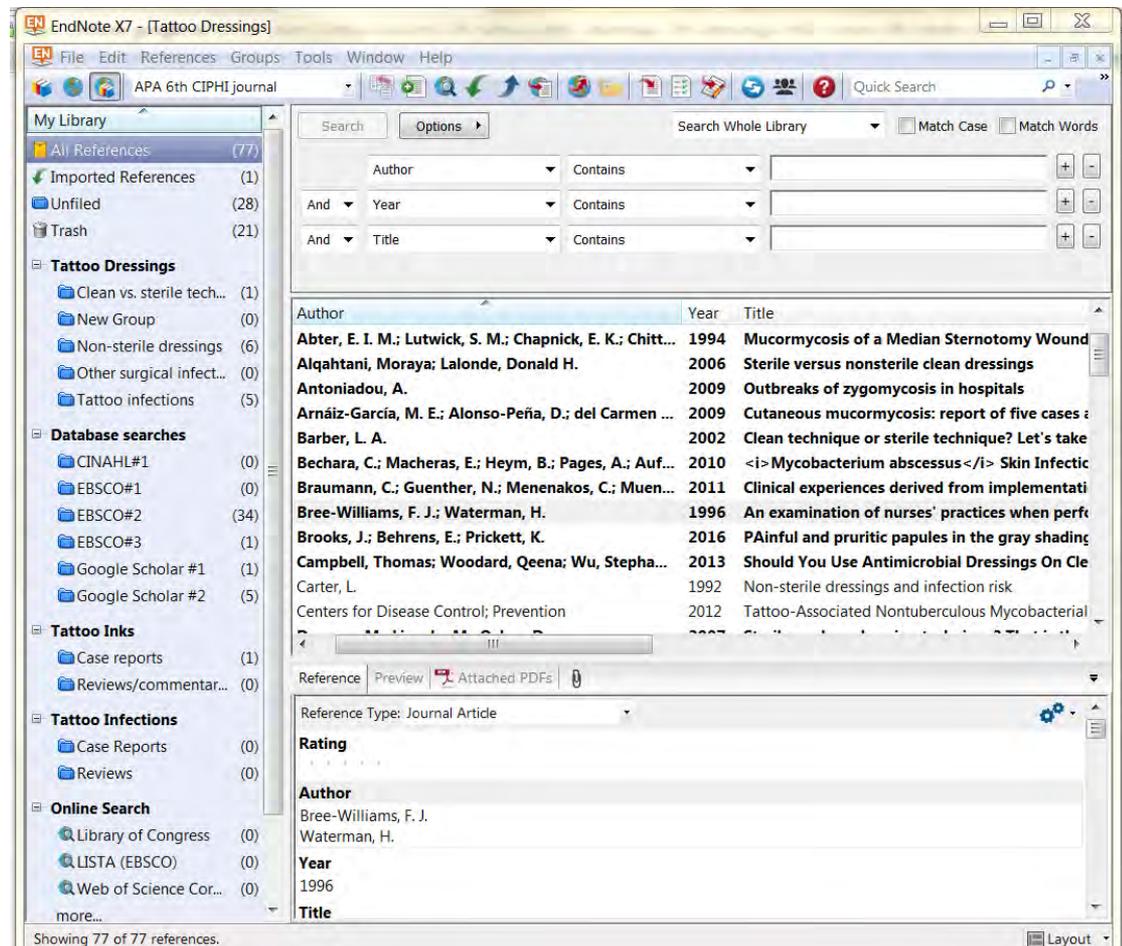
502. **Are parents in the UK equipped to provide adequate burns first aid?**
(Includes abstract) Graham HE; Bache SE; Muthayya P; Baker J; Ralston DR; Burns (03054179), May2012; 38(3): 438-443. 6p. (Journal Article - research) ISSN: 0305-4179 PMID: 22030439, Database: CINAHL Complete
Subjects: Burns Therapy; First Aid Standards; Attitude to Health; Parents Psychosocial Factors; Adult: 19-64 years; Middle Aged: 45-64 years; Female; Male
UBC eLink Check UBC eLink for Full Text

503. **Wound care. Clean healing: proper dressing and self-maintenance are the keys to treating wounds.**
Le Postollec M. Advance for Directors in Rehabilitation, 2002 Apr; 11(4): 21-22. 2p. (Journal Article) ISSN: 1096-6269, Database: CINAHL with Full Text
Subjects: Wound Care
UBC eLink Check UBC eLink for Full Text

504. **Are parents in the UK equipped to provide adequate burns first aid?**
(Includes abstract) Graham HE; Bache SE; Muthayya P; Baker J; Ralston DR; Burns (03054179), May2012; 38(3): 438-443. 6p. (Journal Article - research) ISSN: 0305-4179 PMID: 22030439, Database: CINAHL with Full Text
Subjects: Burns Therapy; First Aid Standards; Attitude to Health; Parents Psychosocial Factors; Adult: 19-64 years; Middle Aged: 45-64 years; Female; Male
UBC eLink Check UBC eLink for Full Text

Step 5: Document Your Search Results

- Reference management software is an **essential tool**.
- Records meta-data for all your papers.
- Use **folders** to:
 - archive your search results.
 - organize papers by topic.
- Makes writing easier:
 - Cite as you write.
 - Quick bibliography.
 - Quick re-formatting.



Step 5: Document Your Search Results

- Many **FREE** reference management tools available:

Ref Management Software	Features
Zotero www.zotero.org	<ul style="list-style-type: none">• Allows you to import/save citations off Google Scholar and most scientific publication platforms.
Mendeley www.mendeley.com	<ul style="list-style-type: none">• Great for organizing, tagging, and making notes on papers.• Has desktop and web-based library.• Facilitates info sharing with other users.
Google Scholar Library https://scholar.google.ca/	<ul style="list-style-type: none">• Simplest tool; easy to use, but very limited functionality for a complex search/research question.• Saves references directly out of a Google Scholar Search (just click the “Save” button)• Can export to other programs, if necessary.• Allows tagging, but can’t sort into folders.

Step 6: Identify the Relevant Papers

- Your search may return 100s of documents – which ones are useful?
- Typically takes two rounds of review:
 - **First Round**: Select papers and import to reference manager based on **title** and then **abstracts** of relevant titles.
 - **Second Round**: Read the selected papers and eliminate those which do not fit your **selection criteria**.
- As you read, watch out for **additional citations** that may not have appeared in your search.

Step 7: Repeat Your Searches

- During and after review, run your searches again periodically until submission for publication.
 - Newest publications may have relevant info.
 - Note the date range your search encompasses.
- Can also use email alerts using your best keywords.
 - Google Alerts → good for non-academic content
 - Google Scholar → keyword alerts for academic content
 - Web of Knowledge → Citations Alerts
 - Many of the publishers have alerts

Common Lit Search Problems

My search returned too many papers to review.

- You may be asking too large of a question.
- Refine or limit your research question.

Nothing relates directly to my research question.

- Can anything useful be learned from related fields? Try expanding your search.
- Is there any grey literature from public health agencies or other reputable entities?

I can't access the paper online.

- Those with library access may be able to order the article through an interlibrary loan.
- No library access? Find partners with access.
- Be very careful of relying on Abstracts alone.

The problem is more complex than expected.

- Reach out to the EH community, including other EH practitioners, government agencies, academics, and the NCCEH (contact@ncceh.ca)

II. CRITICAL APPRAISAL

- Academics and practitioners alike are often asked to appraise evidence for subjects in which they are *not* experts.
- This can be challenging (and intimidating), but remember...
 - The process is **iterative**: the more you read, the more you understand, and your understanding of earlier papers in the review will improve.
 - There are a set of **basic questions** you should ask when reading any (and every paper).

STEPS TO CRITICAL APPRAISAL

1. Start at the top
2. Ask the Basic Questions (critical appraisal)
3. Compare studies using a literature review matrix

Step 1: Start at the top

- Rather than going directly to primary studies, start with other systematic or semi-systematic reviews
- These resources should have already been appraised, so they are (more) trustworthy
- At the very least, you know if yet another review is warranted.

Step 2: Ask the Basic Questions

- For each *individual* study, you should glean the following:
 - What questions does the paper address?
 - What are the main conclusions of the paper?
 - What evidence supports those conclusions?
 - Are the methods appropriate for answering the question?
 - Do the data actually support the conclusions?
 - What is the quality of the evidence?
 - Why are the conclusions important?

Modified from: Little and Parker 2010.

Step 3: Set up your lit review matrix

- The literature review matrix is a highly useful research tool:
 - Each paper gets a row
 - Each column is an important point of comparison amongst all the papers
 - When the matrix is complete, writing the paper and successfully synthesizing are much easier
- Benefits: organization, accountability, easy to find the gaps, focused RQs; facilitates group work.
- During review, scan the references and add any additional relevant papers to the matrix
- For more info: see Klopper 2007, Garrard 2007.

Example of a Literature Review Matrix

Study	Setting	Type of wound	Dressings Used	Outcomes
Lawson et al.	Hospital	Contaminated surgical incision	Sterile and non-sterile dressing changes 3 times a day.	No difference in infection rates.
Stott et al.	Hospital	Contaminated surgical incision	Sterile and non-sterile dressing changes 3 times a day.	No difference in wound healing
Karch & Karch	Homecare	Clean surgical incision	Sanitary pads, w/instruction on clean technique	Serious infection

- Other important points of comparison (columns) may be:
 - Study type, # participants (n), population characteristics, quality rating, comments/criticisms, or any other category important to your research question

How do I know if it's a “good” paper?

- Appraising the quality of a paper:
 - Apply inclusion/exclusion criteria.
 - Many approaches to assessing evidence (e.g., CASP).
 - Consider study design, possible bias, assumptions, plausibility, etc.
- Online resources:
 - NCCEH and NCCMT documents on critical appraisal.
 - “How to Read a Paper” series by Trish Greenhalgh.
 - Talk about what you mean by “quality” research with your research group or mentor.
 - Look for obvious conflicts of interest.

III. SYNTHESIS

- Synthesis means the generation or creation of **new knowledge**.
- Summarizing is not synthesizing.
- Your lit review matrix is a **powerful tool** for synthesis.



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How do I know that “synthesis” has occurred?

- What do you know from reading all of these papers that you couldn't have known from reading one of these papers?
 - You have identified and drawn on **relationships** between studies.
 - You have identified **themes** that stand out from the body of literature.
 - You have understood the **state of knowledge** within the context of **strengths and limitations**.
 - You have identified **gaps** in the body of literature.
 - You have connected your work to **current issues**.
 - You can suggest further **research** or **policy** action.

Example: What increases student motivation?

One possible answer: meaningful work

Analysis=One part or way of increasing student motivation is through meaningful work.
What did individual authors have to say about meaningful work?

Author's Names	meaningful work
Knowles (1978)	Builds upon learners life experiences, and links new knowledge with previous life experiences
Seifert (2004)	Contributes to confidence
Rogers (2002)	Tasks meet an immediate need
Bandura (1997)	Leads to task persistence
Craft (2005)	Reflective journals can be meaningful to the student
What does the student author think?	I also find that I am more motivated to do "real life" nursing tasks that are meaningful to my future career

From: Taylor, C. What is "synthesis". n.d. Available from:

https://umanitoba.ca/faculties/nursing/students/What_is_synthesis.pdf

Examples: Summary/reporting

“Knowles (1978) wrote that meaningful work builds upon life experiences and links new knowledge with previous experiences. Meaningful work contributes to a student’s [persistence] (Bandura, 1997). Meaningful work meets an immediate need (Rogers, 2000). Seifert (2004) claimed that meaningful work contributes to a student’s confidence. Finally, Craft (2005) stated that reflective journals can be meaningful tasks for the student.”

Modified from: Taylor, C. What is “synthesis”. n.d. Available from:
https://umanitoba.ca/faculties/nursing/students/What_is_synthesis.pdf

Examples: Synthesis

“Much of the literature claims that student motivation increases when the tasks are meaningful (Bandura, 1997; Craft, 2005; Knowles, 1978; Rogers, 2000; Seifert, 2004). While satisfying the professor’s expectations can be satisfying for the student, meaningful work contributes to a student’s confidence (Seifert, 2004) and persistence of a task (Bandura, 1997). For work to be meaningful to students, tasks should build upon their life experiences and link new knowledge with their previous life experiences (Knowles, 1978) or immediate needs (Rogers, 2002). One means of achieving a meaningful connection is through reflective journaling tasks (Craft, 2005).”

From: Taylor, C. What is “synthesis”. n.d. Available from:

https://umanitoba.ca/faculties/nursing/students/What_is_synthesis.pdf

Key Messages

- Literature reviews are just one tool within KTSE.
- A good synthesis can only come from a good lit search.
- The quality of the lit review is partly dependent on how well you can avoid bias during all stages of the process.
- Using a literature review matrix (or synthesis matrix) can help clarify appraisal and facilitate synthesis
- True synthesis has occurred when new knowledge or insight on a topic/question has been generated.
- A comprehensive synthesis will include public health knowledge from multiple lines of evidence, including scientific literature.

Questions?



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BC Centre for Disease Control
An agency of the Provincial Health Services Authority



National Collaborating Centre
for Environmental Health

Centre de collaboration nationale
en santé environnementale

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Some Useful Websites:

- Canadian Institutes of Health Research. A Guide to Knowledge Synthesis. Available at:
 - <http://www.cihr-irsc.gc.ca/e/41382.html>
- Harvard Graduate School of Education. The Literature Review: a Research Journey. Available at:
 - <http://guides.library.harvard.edu/c.php?g=310271&p=2071512>
- National Collaborating Centre for Methods and Tools: <http://www.nccmt.ca/>
- Virginia Commonwealth University. Write a Literature Review. Available at:
 - <http://guides.library.vcu.edu/lit-review>