Mapping the Types of Knowledge Syntheses / LRs

Anastasia Mallidou, RN, PhD
Assistant Professor
School of Nursing University of Victoria

07 April 2014
Outline

- What is evidence (i.e., EBP), knowledge translation (KT), knowledge synthesis (KS)
- Brief history of KS, Purpose, Stages, Quality criteria for reviews
- Approaches & Designs
- SALSA framework
- Main types of KS (Integrative/Critical/Comprehensive, Scoping, Realist, Rapid, Systematic, Meta-analysis, Overview of reviews)
Evidence in Healthcare

... source of evidence for health care is the results of well-designed research, but such results are by no means the only data used in everyday practice.

“...the patient and her or his relevant others, the practitioner’s own experiences, and the nature, norms of setting/context & culture within which healthcare is being delivered are all rich sources of evidence upon which to draw in making clinical decisions.”

Alan Pearson, 2007
Knowledge Translation

“...a dynamic and iterative process that includes synthesis, dissemination, exchange and ethically-sound application of knowledge to improve the health of Canadians, provide more effective health services and products and strengthen the healthcare system.”

“...the contextualization and integration of research findings of individual research studies within the larger body of knowledge on the topic. A synthesis must be reproducible and transparent in its methods, using QN and/or QL methods... by synthesizing QN or QN results. It could a) take the form of a systematic review; b) follow the methods developed by Cochrane Collaboration or Joanna Briggs Institute (JBI); c) result from a consensus conference or expert panel...”
“...a strategy for combining information from research with information from policy-makers and practitioners in a systematic and transparent way in order to promote the use of knowledge by disease prevention workers, health care providers and their professional associations, patients and patient groups, managers of health care, disease prevention institutions, health insurers and policy-makers”

History of Research/K Synthesis

• James Lind (1747): 1st RCT
• Gathering research findings; getting rid of rubbish
• Ian Chalmers et al. (2002): full description of research synthesis discipline; methodological development, relevance, rigour & trade-off
• Growing range of designs & methods for various types of evidence; all follow similar approach (variation of rigour & process)

Why knowledge synthesis?

- Science is a **cumulative process**
- Independent studies may be **misleading**; validity, reliability, interpretation of results raise concerns (Ioannidis et al., 2005). Some reviews may be biased
- Few studies **persuasive to change** practice/policy
- KS: **efficient, scientific** approach to identify & summarize evidence for **generalizability** and **consistency** of research & key messages
- KS are the cornerstone of **KT**

Purpose of KS

• For “knowledge” support: to summarize the evidence on a specific question/issue; not additional tasks to support a decision

• For “decision” support: includes steps of engagement with DMs for developing research question & synthesis protocol, interpreting and contextualizing KS results, developing (context) recommendations

Stages of KS (= research)

All components of scientific investigation

- Purpose & objectives
- Inclusion & exclusion criteria
- Identify potential studies
- Apply pre-determined criteria
- Data extraction
- Appraisal of studies’ quality
- Analysis of data
- Structured report

Quality Criteria in LRs

1. Well-defined *problem / research question* (purpose & objectives)
2. Explicit identification of review *method* (inclusion & exclusion criteria, etc.) by investigators with *expertise* in content and method
3. Clear specification of review process and *protocol*
4. Comprehensive & explicit *literature search* (identify potential studies, apply pre-determined criteria)
5. Explicit, unbiased, reproducible *data extraction* for content and quality (data extraction)

Quality Criteria in LRs (cont’d)

6. Primary study **quality** considered in analysis (appraisal of studies’ quality)

7. Data **analysis** is systematic and variability of findings addressed (analysis of data); evidence identified from primary studies

8. **Conclusions** based on evidence and capture complexity of clinical problem

9. Methodological **limitations** identified

KS Methods - USA

...of Nursing reviews

• Integrative review (methodological, theoretical, empirical)
• Systematic review, Meta-analysis (QN)
• Meta-summary / Meta-synthesis / Formal grounded theory / Meta-study (QL data)

Typology of reviews - UK

- Critical review, Literature review, Mapping review / systematic map
- Meta-analysis, Mixed studies / mixed methods review, Overview
- Qualitative systematic / evidence review / qualitative synthesis, Rapid review, Scoping review, State-of-the-art review
- Systematized review, Umbrella review

KS Methods - Canada

...from primary studies
• Systematic reviews of QN evidence
• Syntheses of QL evidence
• Mixed methods syntheses

...from broad & diverse studies
• Scoping reviews
• Multiple treatments meta-analysis/Network
• Meta-narrative synthesis

Approaches & Designs

• **Typology**: vocabulary/terminology used (literary warrant)

• **Time** (& resources) needed to complete a review

• **Tangible processes** required (SALSA)
  – SALSA framework: Search, Appraisal, Synthesis, Analysis

*Librarianship: role of librarian in KS*

Search

• Identify significant items (criteria?)

• **Comprehensive**: max # of primary sources; combination of at least 2-3 strategies in searching the literature *(Whittemore & Knafl, 2005)*
  – *Complete*: with constraints in time, scope
  – *Purposive or selective*: sampling primary studies; **but** justified, explicit, well documented

• **Extensive**: more than 3 strategies

• **Exhaustive**: all known sources & strategies

• **Systematic**: comprehensive & exhaustive
Appraisal

- Evaluation based on contribution (?)
- Critical quality assessment (QA)
- Typical QA (without using an instrument)
- **Formal** QA (use of generic instrument)
- QA including sensitivity analyses
- Time-limited formal QA (sampling)
Synthesis

Summary: summary of data without new insight
Synthesis: combine data in a way to best answer a pre-defined question

- Typical narrative (conceptual/chronological)
- Graphical & tabular
- Narrative commentary
- Minimal narrative & tabular supplement
Analysis

• Identify conceptual contribution
• Chronological
• Numerical: analysis of measures of effect
• Thematic/Conceptual: may incl. conceptual models
• Association of QL & QN studies
• Mapping quantity & quality of literature; identify research gaps
• Explanatory: What works for whom, in circumstances, in what respects & how – Combination of theoretical views, empirical evidence, context, mechanisms & outcomes
• Recommendations for practice, policy, research
Main Types of KS
Integrative, Comprehensive, Critical review or Overview*

- **Search:** identify most significant concepts
  - **Appraisal:** evaluation based on contribution
- **Synthesis:** narrative (chronological or conceptual)
- **Analysis:** identify conceptual contribution (significant component) or new theory
- **Weakness:** Open to biases

*Undergraduate studies (assignment or project)
Rapid Review
(quick but not dirty)

• Search: Complete
• Appraisal: Time-limited formal QA
• Synthesis: Narrative & tabular
• Analysis: Mapping quantity & quality of the literature; identify direction of effect

• Weakness: Risk of bias

*Graduate studies (assignment or project)
Scoping Review

- Search: Complete
- Appraisal: Informal QA
- Synthesis: Tabular & narrative commentary
- Analysis: Mapping quantity & quality of the literature; identify research gaps

- Weakness: Not a final product/output

*Graduate studies (assignment or project)
Systematic Review*

- Search: Comprehensive & exhaustive
- Appraisal: Formal QA
- Synthesis: Narrative with tabular supplement
- Analysis: Recommendations for practice, policy, research

- Systematized review (? Search & QA)
- Systematic search & review (not QA)
- Weakness: Answers to simple & well defined research questions (not for complex situations)

*Doctoral studies (assignment or project)
Realist Synthesis*

A logic of enquiry designed to explain complex social interventions or programs (based on the “realist” approach) for policy-makers.

- Search: Complete/exploratory, purposive sampling
- Appraisal: Formal QA using judgement
- Synthesis: Narrative
- Analysis: Explanatory; recommendations (tentative)

- Weakness: Not a protocol-driven approach; explicit & reflexive QA; not generalizable effects

*Doctoral studies (assignment or project
Meta-Analysis (MA)

A transparent, objective, replicable *statistical method* to synthesize & compare effect sizes from relevant, independent, primary, quantitative & “combinable” studies and to report a precise summary effect.

- **Search:** Systematic
- **Appraisal:** Formal QA & sensitivity analyses
- **Synthesis:** Graphical & tabular with narrative commentary
- **Analysis:** Numerical analysis of effect
- **Debate:** Inappropriate use (“apples & oranges”)
Overview of reviews (Umbrella)

“...compiling evidence from multiple SRs into one accessible & usable document...”

- Search: Systematic for SRs
- Appraisal: Formal QA of SRs
- Synthesis: Graphical & tabular with narrative commentary
- Analysis: Recommendations for practice, policy, research

- Weakness: Currently not feasible due to the lack of SRs on all topics.
# Comparing types of KS

<table>
<thead>
<tr>
<th>KS/LR-type</th>
<th>Search</th>
<th>Appraisal</th>
<th>Synthesis</th>
<th>Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Integrative / Critical / Comprehensive</strong></td>
<td>Identify most significant concepts</td>
<td>Evaluation based on contribution</td>
<td>Narrative</td>
<td>Identify conceptual contribution</td>
</tr>
<tr>
<td><strong>Rapid Review</strong></td>
<td>Complete</td>
<td>Time-limited formal QA</td>
<td>Narrative &amp; Tabular</td>
<td>Mapping QL &amp; QN of lit; Identify direction of effect</td>
</tr>
<tr>
<td><strong>Scoping Review</strong></td>
<td>Complete</td>
<td>Informal QA</td>
<td>Tabular &amp; Narrative (commentary)</td>
<td>Mapping QL &amp; QN of lit; Identify research gaps</td>
</tr>
</tbody>
</table>
Next Steps

International agreement of
• Discrete & mutually exclusive typology
• Types of reviews (criteria)
  – Rigour
  – Quality of KS
  – Resources needed
• Know-how to perform & appraise KS for impact & influence

EBP (P: practice and policy)
Thank you!
mallidou@uvic.ca