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Mapping the Types of Knowledge Syntheses / LRs

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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.”

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.”

Knowledge Synthesis - Canada

“...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 QL 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...”

Knowledge Synthesis - Netherlands

“...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”

Bos, V., & van Kammen, J. (2007). Knowledge synthesis: A guide. ZonMw (the Netherlands Organization for Health Research and Development) and NIGZ (the Netherlands Institute for Health Promotion and Disease Prevention). ISBN: 9789069282466

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)

Chalmers, I., Hedges, L. V. & Cooper, H. (2002). A brief history of research synthesis. *Evaluation and the Health Professions*, **25**, 12–37.

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**

Ioannidis, J.P. (2005). Contradicted and initially stronger effects in highly cited clinical research. JAMA, 294(2):218-28.

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

Chalmers, I. (2003). Trying to do more good than harm in policy and practice: The role of rigorous, transparent, up-to-date evaluations. *The Annals of the American Academy of Political and Social Science*, 589, 22-40.

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)

Whittemore, R. (2005). Combining evidence in nursing research: Methods and implications. *Nursing Research*, 54(1), 56-62.

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

Grant, M. J., & Booth, A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information & Libraries Journal*, 26, 91-108.
doi: 10.1111/j.1471-1842.2009.00848.x

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

Canadian Institutes of Health Research (CIHR). A knowledge synthesis chapter (**2010**). Available from: URL: <http://www.cihr-irsc.gc.ca/e/41382.html>

Approaches & Designs

- *Typology*: vocabulary/terminology used (literary warrant)
- *Time* (& resources) needed to complete a review
- *Tangible processes* required (SALSA)
 - SALSA framework: **S**earch, **A**ppraisal, **S**ynthesis, **A**nalysis

Librarianship: role of librarian in KS

Grant, M. J., & Booth, A. (2009). A typology of reviews: An analysis of 14 review types and associated methodologies. *Health Information & Libraries Journal*, 26, 91-108.
doi: 10.1111/j.1471-1842.2009.00848.x

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
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- 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

KS/LR-type	Search	Appraisal	Synthesis	Analysis
Integrative / Critical / Comprehensive	Identify most significant concepts	Evaluation based on contribution	Narrative	Identify conceptual contribution
Rapid Review	Complete	Time-limited formal QA	Narrative & Tabular	Mapping QL & QN of lit; Identify direction of effect
Scoping Review	Complete	Informal QA	Tabular & Narrative (commentary)	Mapping QL & QN of lit; Identify research gaps

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!

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