Rethinking the Idea of Evidence in Evidence-based Policy & Practice (EBP)
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- Why this topic is important & timely
- What is evidence-based policy & practice?
- Ideas about evidence
  - Cross-disciplinary & multi-disciplinary perspectives
- Implications
  - Reformulation of EBP
  - Implications for researchers, reviewers, & guideline developers
  - Issues & challenges

Chambers’ Informed Clinical Decision-Making Model

Chambers’ Informed Decision-making Model (proposed by David Chambers, Chief, Dissemination Research Program, NIMH, April 17, 2007; reproduced with permission from Institute for the Advancement of Social Work Research, 2007)
Transdisciplinary EBP Model


[Diagram of evidence hierarchy]

Systematic Reviews

Critically-Appraised Topics

Articles

Randomized Controlled Trials (RCTs)

Cohort Studies

Case-Controlled Studies Case Series / Reports

Background Information / Expert Opinion
Cross-disciplinary Ideas about Evidence

- *Evidence, inference and enquiry: Towards an integrated science of evidence* - University College London
- “Notwithstanding differences --- all of our projects involve, as part of the enterprise, drawing inferences from evidence to test hypotheses and justify conclusions and that the logic of this kind of inquiry is governed by the same principles.” (Twining, 2012)
- Substance blind science of evidence which has at its core a scheme for classifying evidence in terms of inferential properties. (Schum, 2012)
  - Relevance
  - Credibility
  - Recurrent combinations
    - data: “… only become evidence when their relevance to hypotheses being considered is established by defensible arguments or chains of reasoning.”

Evidence in Anglo-American Common Law

- ‘Evidence’ is a word of relation used in the context of argumentation. --- information has a potential role as relevant evidence if it tends to support or tends to negate, directly or indirectly, a hypothesis ---. One draws inferences from evidence in order to prove or disprove a hypothesis ---. The framework is argument, the process is proof, and the engine is inferential reasoning from information. (Twining, 2003)
- Principles in a rationalist tradition:
  - Nothing is to be received which is not logically probative of some matter requiring to be proved [relevance]
  - Everything which is thus probative should come in, unless a clear ground of policy of law excludes it. (Thayer, 1898)
Evidence in Philosophy

• Little attention has been given to underlying sociological, epistemological & philosophical questions underpinning logic of scientific methods in EBM & health technology assessment, yet whole business gives rise to interesting & important issues.  
  (Kelly & Moore, 2012)

• Obviously medicine should be evidence-based. The issues lie in the details: what exactly counts as evidence? Do certain kinds of evidence carry more weight than others? (And if so why?) How exactly should medicine be based on evidence? When it comes to these details, EBM has got itself into a mess ---. In order to start to resolve this mess, we need to go ‘back to basics’; & that means turning to philosophy of science.  
  (Worrall, 2010)

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Theories of Evidential Relationship Providing Necessary & Sufficient Conditions for Truth Claims

- **High Objective Probability & High Relevance** – Explanatory relationship    
  e.g., Achinstein

- **Error-statistical**    
  Severe Test Attempting to Rule-Out H    
  e.g., Mayo (Popperian); sensitivity/specificity tests

- **E & H Deductive Relationship**    
  • Hypothetico-Deductivism    
  • Instantial    
  E as Positive Instance of H; Satisfaction Theory    
  (e.g., Hempel)    
  • Bootstrapping Multiple Hs & Multiple Observations (e.g., Glymour)    
  • A Priori Theory of Confirmation    
  Carnap

- **Positive-relevance/increase-in-probability**    
  \( P(H|E) > P(H) \)    
  e.g., Baysian
Philosophy: Nancy Cartwright & Jeremy Hardie

- Questions policy makers need to address for policies to be warranted & evidence-based:
  - Did policy work there (somewhere with some specific setting, population, time - efficacy)?
  - Will policy work here (effectiveness)?
  - Is there a causal relationship between policy & outcomes (theory, logic model, program theory)?
  - What support factors must be in place for policy to work here?
  - Are all above assumptions warranted (evidence-based)?
  - Can answers be quantified into probabilities or at least into qualitative categories?
Evidence-based justified argument that X is likely to work "here"

Findings from review of efficacy & effectiveness studies showing X worked somewhere

Findings from horizontal search showing enabling/support variables "there" are present "here"

Findings from vertical search showing causal principles "there" are present "here"

Evidence-based justified decision to try X "here"

The 5 Steps of Evidence-Based Practice

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EBP Process Modified with Argument as 4th & 7th Step

Information Sources for Justified Argument

- Assess:

  - Client System Preferences & Values & Characteristics
  - Practitioner System Resources & Preferences & Values & Characteristics
  - Environmental & Organizational Context & Resources
  - Best Available Research Evidence
  - Specifying Intervention Effectiveness & Causal Roles & Support Factors

Form Justified Argument
Comparative Effectiveness Research (CER) Options

**Experimental Study Type**
- Pragmatic Trial (PCT)
- Cluster RCT
- Crossover
- Delayed Start
- N=1 RCT

**Observational Study Type**
- Case-control
- Cohort
- Qualitative

**Methods**
- Adaptive Designs & Bayesian Methods
- New User Design
- Restriction
- Subgroup Analysis
- Instrumental Variable Methods
- Propensity Scores
- Sensitivity Analysis
- External Information
- Qualitative Analytic Methods


**Figure 1:** The blank “wheel” of the pragmatic–explanatory continuum indicator summary (PRECIS) tool. “E” represents the “explanatory” end of the pragmatic–explanatory continuum.
Issues and Challenges

1. How to break loose from rigid hierarchical views of evidence & move toward more nuanced views?

2. How to replace such hierarchical views with broader, more inclusive views which retain adherence to evidentiary principles of relevance, credibility, & strength of evidence, placing test of relevance as prior to test of evidence quality?

3. How to move away from a view of evidence which treats isolated findings from outcome studies as “evidence” even though these findings have not been embedded into evidential arguments?

4. How to develop science & art of forming evidentiary arguments?

5. How to gather information about causal variables as well as support variables needed to form evidentiary arguments & to facilitate implementation of what works “there” to what might work “here?”

6. How to move from an exclusive focus on RCTs to CER strategies, designs, & methods?