RECAP OF PREVIOUS DAY OR SESSION
SESSION 4 OBJECTIVES

At the end of this session participants will:

▪ Identify characteristics of basic research designs and methods
▪ Describe the types of evidence generated from different designs
▪ Describe how characteristics of critical thinking apply to assessing quality of evidence
▪ Know characteristics and questions to use for appraising the strength of a research paper/article – and a body of evidence.
▪ Demonstrate assessing levels and measures of strength of evidence for their policy issue.
DEFINITIONS: AT LIGHTENING SPEED

Research is...
- Process to discover new knowledge
- A systematic investigation
- Designed to produce generalizable knowledge

Systematic is...
- Done or acting according to a fixed plan or system; methodical

Generalizable is...
- Applied to other populations
- Published and disseminated
THE SCIENTIFIC METHOD
EXAMPLE: SCIENTIFIC METHOD AND SMOKING

Observation
- A lot of the people dying of lung cancer were smokers

Hypothesis
- People who smoke are more likely to get lung cancer than people who don’t smoke

Experiment
- Follow group of smokers to see how many get lung cancer.
- Follow group of non-smokers to see how many get lung cancer.
- Compare lung cancer rates between smokers and non-smokers.
- Did the results support the hypothesis?
WHY DO RESEARCH?

- To find the truth (or get closer); expand knowledge

- ...and to get at the truth, the research has to be designed in a certain way

- The research design is part of the protocol

- The protocol is the set of rules/activities to be followed
RESEARCH DESIGNS

What are they and why important?

Source: http://www.barstane.com/wp-content/uploads/2012/05/Square-hole-rounded-peg-web-l.png
MAJOR RESEARCH DESIGNS

1. Action Research Design
2. Case Study Design
3. Causal Design
4. Cohort Design
5. Cross-Sectional Design
6. Descriptive Design
7. Experimental Design
8. Exploratory Design
9. Historical Design
10. Longitudinal Design
11. Meta-Analysis Design
12. Observational Design

Detail in pre-reading and Participant Guide
GROUP ACTIVITY

GALLERY WALK
TYPES OF EVIDENCE

Primary research studies empirically observe a phenomenon first hand. Typically:

- Experimental
- Quasi-experimental
- Observational

Secondary review studies re-examine primary studies. Typically:

- Systematic reviews
- Non-systematic reviews

Theoretical or conceptual studies focus almost exclusively on the construction of new theories versus generating or synthesizing evidence.
QUALITATIVE RESEARCH

Qualitative research:
• Gathers understanding of human behavior & reasons for such behavior
• Investigates the ‘why & how’ of decision-making, not just ‘what, when & where’
• Highly useful in policy & evaluation studies

Qualitative data:
• Text-based
• Derived from in-depth interviews, observations, analysis of written documents, FGDs, or open-ended questionnaires

Quantitative research:
- Systematic scientific investigation of quantitative properties, phenomena & their relationships
- Objective is to develop & employ statistical models, theories and/or hypotheses pertaining to phenomena & relationships

Quantitative data:
- Numerical data that can be manipulated using mathematical procedures to produce statistics

The process of measurement is central to quantitative research because it provides the fundamental connection between empirical observation & statistical expression of quantitative relationships

GROUP DISCUSSION
CRITICAL THINKING

What is it?

Characteristics of critical thinkers?

How does it relate to my work? To appraising evidence?
Evidence-informed policy is not just about getting research used, but getting ‘good’ research used

Scenario: You have an article/report from a new study in front of you. What is your thought process for deciding whether to read it and take it seriously? What questions do you ask yourself to make a determination?
10 QUESTIONS FOR CRITICALLY APPRAISING RESEARCH ARTICLE

1. Is the study question relevant?
2. Does the study add anything new?
3. What type of research question is being asked?
4. Was the study design appropriate for the research question?
5. Did the study methods address the most important potential sources of bias?
6. Was the study performed according to the original protocol?
7. Does the study test a stated hypothesis?
8. Were the statistical analysis performed correctly?
9. Do the data justify the conclusions?
10. Are there any conflicts of interest?

### CHECKLIST OF PRINCIPLES OF RESEARCH QUALITY – SINGLE STUDY

<table>
<thead>
<tr>
<th>Principle of quality</th>
<th>Associated question</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conceptual clarity</td>
<td>Does the study acknowledge assumptions?</td>
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<tr>
<td></td>
<td>Does the study present a conceptual framework?</td>
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<tr>
<td></td>
<td>Does the study state the research question or outline a hypothesis?</td>
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<tr>
<td>Transparency</td>
<td>Does the study present or link to the raw data analysis?</td>
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<tr>
<td></td>
<td>What is the underlying context in which the study was conducted?</td>
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<td></td>
<td>How the study describes sources of evidence/bias?</td>
</tr>
<tr>
<td>Aggregation</td>
<td>Does the study identify a research design?</td>
</tr>
<tr>
<td></td>
<td>How the study identifies a research design?</td>
</tr>
<tr>
<td></td>
<td>How the study determines why the initial design and analysis are linked to the research question?</td>
</tr>
<tr>
<td>Cultural sensitivity</td>
<td>Does the study explicitly consider any context-specific concerns that may bias the analysis/finding?</td>
</tr>
<tr>
<td>Validity</td>
<td>To what extent does the study demonstrate measurement validity?</td>
</tr>
<tr>
<td></td>
<td>To what extent does the study measure construct validity?</td>
</tr>
<tr>
<td></td>
<td>To what extent does the study measure discriminant validity?</td>
</tr>
<tr>
<td>Reliability</td>
<td>To what extent are the measurements across the study similar?</td>
</tr>
<tr>
<td></td>
<td>To what extent does the study measure construct reliability?</td>
</tr>
<tr>
<td></td>
<td>To what extent do the findings/study to be essentially depend on the analysis/technical valid?</td>
</tr>
<tr>
<td>Credibility</td>
<td>Does the study support the methodology?</td>
</tr>
<tr>
<td></td>
<td>Does the study support the methodology?</td>
</tr>
<tr>
<td></td>
<td>Are the conclusions clearly based on the study’s results?</td>
</tr>
</tbody>
</table>

ASSESSING STRENGTH OF EVIDENCE

Weigh the rigor of the evidence you found.

Ask:

- What makes the study important?
- Do the findings make sense?
- Who conducted the research and wrote the report?
- Who published the report?
- Did the researcher select an appropriate group for study?

ASSESSING STRENGTH OF EVIDENCE (CONT.)

- If comparison groups are used, how similar are they?
- What has changed since information was collected?
- Are the methods appropriate to the research purpose?
- Does the study establish causation?
- Is the time frame long enough to identify an impact?
- Could data be biased due to poor research design?
- Are the results statistically significant?

ASSESSING CONTENT QUALITY -- IN ADDITION TO STRENGTH OF EVIDENCE

Consider:

- Completeness – missing anything?
- Uniqueness – original?
- Timeliness – up-to-date?
- Coverage – depth?
Take care: if studies in a systematic review are weak, then the review evidence will not be strong.
MEASURES OF STRENGTH

Internal validity
- The intervention is actually causing the desired outcome. Are the changes observed due to the intervention or due to other possible factors?
- How confident we are that the observed changes are due to the intervention
- Ability to rule-out competing explanations for observed changes

External validity
- The program is replicable, producing similar results in different settings

Program fidelity
- How well a program is implemented according to established standards. Research on implementation of evidence-based programs shows that fidelity to core program elements is critical to success.
A p-value tells you if the relationship is strong enough to pay attention to.

P-values represent how likely the result would occur by chance.

Used to determine whether observed differences between experiment and control groups are due to systematic effects of treatments or simply to chance factors.

Look for p-values lower than .05, or 5%, when reading journal papers.

APPRAISING QUALITY OF NON-SCIENTIFIC INFORMATION

This type is still important – even though it is not gathered through a scientific process with conceptual and analytical framework, research design, methods, etc.

Examples: newspaper articles, blogs, reports of commissions, government policy documents, or guidelines.

How do you go about appraising quality for this type of information?

See Session 4 Handout – Appraising Quality of Non-Scientific Information
GROUP ACTIVITY

EVALUATING STRENGTH OF BODY OF EVIDENCE

1. Very Strong
2. Strong
3. Medium
4. Limited
5. No evidence

1. Summarize **technical quality** of body of evidence
   - Builds directly upon prior assessment of the quality of single research studies conducted individually or as part of a secondary study (e.g., a systematic review)

2. Assess the **overall strength** of a body of evidence
   - Directly linked to the quality, size, consistency and context of the collection

- **If time or expertise are not available to assess all individual studies in a body of evidence...:**
  - Seek to use evidence synthesis products which assess the quality of individual studies
  - Make a judgement about a body of evidence based on the criteria for strength of a body of evidence (e.g., quality, size, consistency, strength)
Systematic reviews may be preferred in EIPM, as opposed to using single studies.

Systematic reviews sum up the best available research on a question by synthesizing results of several studies.

Ideally, combine with newer or perhaps ‘out-of-the box’ single studies which may not have been included in a systematic review.
PRACTICAL APPLICATION

EXERCISE 3

Part 1

1. Assess the strength of at least one of the research documents you found for answering your policy question

2. Provide a brief, but critical summary of its strength and/or weaknesses, and indicate your decision on whether you will use the research document in your work or not [40 min]

Part 2

1. Individual feedback from facilitators [40 min]

Use Session 4 Worksheet – Appraising Evidence
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SESSION REFLECTION AND EVALUATION

EXTRA SLIDES
REFLECTION

What did you learn that you can use in your work place?

What would you share in a debrief at your work place?

Are there sub-topics from the session you want to explore more?

What ideas did this session generate for you?

Are there tasks or “to-do’s” you want to follow up on later?

Are there topics or areas you want to clarify with the facilitator or group?