Strengthening Health Systems Research Methods and Measures

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Evaluation of complex health interventions

- **Complex**: Interventions that contain several interacting components (UK MRC)

- Complexity is characterized by:
  - Number and type of interactions between components
  - Number and difficulty of behaviors required to deliver / receive intervention
  - Number of groups or organizational levels targeted by intervention
  - Number and variability of outcomes
  - Degree of flexibility to ‘customize’ an intervention to setting and/or population
  - Scale and diversity of implementation context
  - Diffuse causal pathways
Health systems: complex, dynamic and adaptive systems are at play

• Complexity of the problem

• Complexity of the intervention/delivery itself

• Complexity of the implementation (adoption) context

• Complexity of the health system itself

• Complexity of the broad context
Framework for analysing adoption and diffusion of health innovations/interventions
Evaluation of complex interventions: recent examples

**Broader scope** (interventions with multiple domains and conditions)

- The Global Fund 5 Year Evaluation
- GAVI Alliance – Health Systems Strengthening Support

**Narrower scope** (comparatively narrower domain or conditions)

- IMCI Evaluation
- Avahan – The India AIDS Initiative
Observations from recent evaluations

• Diversity of type

• Scale

• Design (mostly observational or quasi experimental, mostly purposeful sampling, *use of case studies*)

• Methods (mix of methods – qualitative and quantitative)

• Evaluations mostly undertaken by independently commissioned teams
Key Issues

What scientifically rigorous methods are suitable when:

a. Complex interventions are often introduced rapidly at scale for ethical, moral, policy and political reasons

b. Randomized controlled experimental evaluation designs are often not feasible or may not be acceptable.

c. Implementation contexts vary greatly

d. The question that needs answering relates to not just what work but why, how
Case Study Driven Multi-methods Research
Case Study Approach

• Exploratory
• Descriptive
• Explanatory

• Analytic Teaching cases
Process

1. Agree theoretical framework/lens
2. Generate propositions
3. Analytical tools approach & d/base
4. Pilot cases
5. Refine tools
6. Case studies
   - Literal replication
   - Explanatory theory & Evidence
7. Case studies
   - Theoretical replication

Construct validity
- Internal validity
- Reliability

Propositions
- Rival propositions

Internal validity
- External validity

Validity:
- Construct validity
- Internal validity
- Reliability
- External validity
Rigour - Research question

• A priori specification of constructs
• Clearly defined
• Reasons articulated
• A priori constructs and theoretical framework
Theoretical framework and propositions are key

• State the conditions under which particular phenomena are likely to be found
  – Allows *literal replication*

• State the conditions when particular phenomena are not likely to be found (for predictable reasons)
  – Allows *theoretical replication*
Research protocol

• Clearly presented
• Replicable
Study design

• Define (population) boundaries
  – Reduce extraneous variation
  – Define limits to generalization
• Theoretical sampling
  – Good outcome, poor outcome or both
• Literal (multiple similar cases) and theoretical replication (diverse cases)
• Polar cases
• Extreme cases
# Design

Design logic critical

<table>
<thead>
<tr>
<th></th>
<th>Single</th>
<th>Multiple</th>
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<tbody>
<tr>
<td>Holistic</td>
<td>Russia TB</td>
<td>Baltic PHC</td>
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<td></td>
<td>Estonia PHC</td>
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<td>Embedded</td>
<td>Russia HIV</td>
<td>Global Fund country cases</td>
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Analytic vs. Statistical Generalisation

- Cases are not sampling units but each akin to an individual ‘experiment’ to test (generate) propositions
- Analytic generalisation using theory developed a priori

Replication logic

- Literal replication
  - Each predict similar results (n=4)
- Theoretical replication
  - Predict contrasting results --- but for predictable reasons (n=4)
- Different from sampling logic that allows statistical generalisation
Multimethods

- Qualitative
  - Documentary analysis
  - Interviews
  - Focus groups
  - Non-participant observations

- Quantitative
  - Analysis of routine data
  - Surveys
  - Modelling
Instrument development

- Iterative development and validation of instruments
- Multiple methods
- Piloting by multiple investigators
  - Triangulation
- Adapt to context
Data collection

• Multiple investigators (pairs)
• Data collection and analysis combined
• Inductive
• Team meetings to compare / triangulate
• Field notes important
Data analysis

• Deductive and inductive -- analytic induction
• Within case analysis
• Cross case analysis
• Within group similarities
• Inter group differences
• Pairing of cases - compare and contrast
Emergent Theory

- Parsimony
- Logical coherence
- Causal logic / chain