Pragmatic Dissemination and Implementation Research: RE-AIM and Health Equity

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*Adaptation, Fidelity and Tailoring Interest Group*

Dissemination and Implementation Science Program of Adult and Child

Consortium for Outcomes Research and Delivery Science
Acknowledgments and Conflicts of Interest

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• University of Wisconsin Short course planning committee

FINANCIAL DISCLOSURE
• National Institutes of Health (NIH), Agency for Healthcare Research and Quality (AHRQ), and Robert Wood Johnson Foundation (RWJF) funding on various projects

UNLABELED/UNAPPROVED USES DISCLOSURE
• None
How are pragmatic D&I research and designs different from ‘research as usual’?

- Examples:
  - Pragmatic methods - especially PRECIS-2
  - Pragmatic models - especially RE-AIM
  - Pragmatic measures - especially brief PROs

- Health Equity challenges and example of pragmatic research
- Future directions and opportunities for D&I research
- Discussion; resources; Q & A
Need for Pragmatic Research

Usual Research is Slow

• Traditional RCTs are slow and expensive

• Most common reason for non-adoption…research not seen as relevant

• Rarely produce findings that are easily put into practice

It takes an average of 17 years before 14% of research findings lead to widespread changes in care.
Need for Pragmatic Research

- Traditional RCTs study the effectiveness of treatments delivered to carefully selected populations under ideal conditions.

- Even when we do implement a tested intervention into everyday clinical practice, we often see a “voltage drop”... a dramatic decrease in effectiveness.


“If we want more evidence-based practice, we need more practice-based evidence.”

Green LW *Am J Pub Health* 2006
A Different Approach: Pragmatic Research for Population Health

**Explanatory (efficacy) trial**: Specialized experiment in a specialized population

**Pragmatic trial**: Real-world test in a real-world population

**Pragmatic designs emphasize**:
- participation or reach
- adoption by diverse settings
- ease of Implementation
- maintenance

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### Key Differences Between Traditional Efficacy RCTs and Pragmatic Controlled Trials (PCTs)

<table>
<thead>
<tr>
<th></th>
<th>A traditional RCT tests a hypothesis under ideal conditions</th>
<th>A PCT compares treatments under everyday clinical conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GOALS</strong></td>
<td>To <strong>determine causes and effects of treatment</strong></td>
<td>To improve practice and inform clinical and policy decisions</td>
</tr>
<tr>
<td><strong>DESIGN</strong></td>
<td>Tests the intervention against placebo, using rigid study protocols and minimal variation</td>
<td>Tests two or more real-world using flexible protocols &amp; local customization</td>
</tr>
</tbody>
</table>
### Key Differences Between Traditional Efficacy RCTs and Pragmatic Controlled Trials (PCTs) - cont’d

<table>
<thead>
<tr>
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<th>A traditional RCT tests a hypothesis under ideal conditions</th>
<th>A PCT compares treatments under everyday clinical conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PARTICIPANTS</strong></td>
<td>Highly defined and carefully selected</td>
<td>More representative because eligibility criteria are less strict</td>
</tr>
<tr>
<td><strong>MEASURES</strong></td>
<td>Require data collection outside routine clinical care</td>
<td>Brief and designed so data can be easily collected in clinical settings</td>
</tr>
<tr>
<td><strong>RESULTS</strong></td>
<td>Rarely relevant to everyday practice</td>
<td>Useful in everyday practice, especially clinical decision-making</td>
</tr>
</tbody>
</table>
PCTs: Fewer Exclusions Allow for a Broader Subset of Settings, Staff, and Participants

Traditional RCT
- Eligible population
- Exclusions, non-response, etc.
- Efficacy, among a defined subset

PCT
- Eligible population
- Exclusions, non-response, etc.
- Effectiveness, in a broad subset

Figure provided by Gloria Coronado, PhD, Kaiser Permanente Center for Health Research
The Pragmatic-Explanatory Continuum Indicator Summary (PRECIS) Planning Tool

- How pragmatic is your study?
- Not all or none (no completely pragmatic study)
- Tool to help in planning and reporting (see next slide)


The PRECIS-2 Domains

**Eligibility** – to what extent are the participants in the trial similar to those who would receive this intervention if it was part of usual care? Score 5 for criteria essentially identical to those in usual care; score 1 for an approach with lots of exclusions.

**Recruitment** - how much extra effort is made to recruit participants over and above what that would be used in the usual care setting? Score 5 for recruitment through usual appointments or clinic; score 1 for an approach with targeted invitation letters, advertising in newspapers.

**Setting** – how different is the setting of the trial and the usual care setting? Score 5 using identical settings to usual care; score 1, for only a single center, or only specialized trial or academic centers.
Example Studies on PRECIS-2 Wheel

Green = pragmatic study  
Dashed Blue = efficacy or explanatory study
Average Scores for e-Health Studies Literature Review by PRECIS Domain

<table>
<thead>
<tr>
<th>Level of Effectiveness</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td></td>
<td>Pragmatic</td>
</tr>
<tr>
<td>High</td>
<td>Traditional Effective</td>
<td>Traditional Effective</td>
<td>Pragmatic and Effective</td>
</tr>
</tbody>
</table>

Luoma K et al. (2017). *Translational Behav Med, 7*: 751
Pragmatic Measures

1. Required Criteria
   • Important to stakeholders
   • Burden is low to moderate
   • Broadly applicable, has norms to interpret
   • Sensitive to change

2. Additional Criteria
   • Actionable
   • Low probability of harm
   • Addresses public health goal(s)
   • Related to theory or model
   • “Maps” to “gold standard” metric or measure

<table>
<thead>
<tr>
<th>Domain</th>
<th>Final Measure (Source)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Overall Health Status</td>
<td>1 item: BRFSS Questionnaire</td>
</tr>
<tr>
<td>6. Sleep</td>
<td>2 items: a. Adapted from BRFSS</td>
</tr>
<tr>
<td></td>
<td>b. Neuro-QOL [Item PQSLP04]</td>
</tr>
<tr>
<td>7. Smoking/Tobacco Use</td>
<td>2 items: Tobacco Use Screener [Adapted from YRBSS Questionnaire]</td>
</tr>
<tr>
<td>10. Demographics</td>
<td>9 items: Sex, date of birth, race, ethnicity, English fluency, occupation, household income, marital status, education, address, insurance status, veteran’s status. Multiple sources including: Census Bureau, IOM, and National Health Interview Survey (NHIS)</td>
</tr>
</tbody>
</table>
IF AN INTERVENTION WORKS

AND NOBODY CAN USE IT.....

DOES IT STILL MAKE AN IMPACT?
Pragmatic Models- RE-AIM
Other Models

Over 91 D&I Frameworks: [http://dissemination-implementation.org/index.aspx](http://dissemination-implementation.org/index.aspx)

Most Commonly used models in NIH grants: RE-AIM and DOI (now also CFIR)

Many commonalities across models and theories
Purpose and History of RE-AIM Framework

- Intended to facilitate translation of research to practice
- Internal and external validity, and emphasizes representativeness
- Individual and organizational factors - experimental and observational
- Public health impact depends on all elements (reach x effectiveness, etc.)

www.re-aim.org
<table>
<thead>
<tr>
<th>RE-AIM Dimension</th>
<th>Key Pragmatic Priorities to Consider and Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reach</td>
<td>WHO is (was) intended to benefit and who actually participates or is exposed to the intervention?</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>WHAT is (was) the most important benefit you are trying to achieve and what is (was) the likelihood of negative outcomes?</td>
</tr>
<tr>
<td>Adoption</td>
<td>WHERE is (was) the program or policy applied and WHO applied it?</td>
</tr>
<tr>
<td>Implementation</td>
<td>HOW consistently is (was) the program or policy delivered, HOW will (was) it be adapted, HOW much will (did) it cost, and WHY will (did) the results come about?</td>
</tr>
<tr>
<td>Maintenance</td>
<td>WHEN will (was) the initiative become operational; how long will (was) it be sustained (setting level); and how long are the results sustained (individual level)?</td>
</tr>
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### RE-AIM—Health Equity Implications

<table>
<thead>
<tr>
<th>RE-AIM Issue</th>
<th>Disparity</th>
<th>Overall Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reach</td>
<td>30%</td>
<td>70% of benefit</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>0 (equal)</td>
<td>70% of benefit</td>
</tr>
<tr>
<td>Adoption</td>
<td>30%</td>
<td>49% of benefit</td>
</tr>
<tr>
<td>Implementation</td>
<td>30%</td>
<td>34% of benefit</td>
</tr>
<tr>
<td>Maintenance</td>
<td>30%</td>
<td>24% of benefit</td>
</tr>
</tbody>
</table>
RE-AIM Summary Points

• RE-AIM is not a theory but it tells you where to look; where things often break down

• RE-AIM is an outcomes framework that can be used for planning and evaluation

• Each dimension is an opportunity for intervention

• All dimensions can be addressed within a given study (though likely not all intervened upon)

• RE-AIM can be used for observational, efficacy, effectiveness, and implementation science projects
…Applying RE-AIM to Planning Interventions
Planning and ‘Evaluability’*

• Do initial ESTIMATES of RE-AIM dimensions where do not have data (evaluability)* -with stakeholders
• Often helpful to compare two or more program or policy options (create RE-AIM ‘profiles’)
• Expect different programs or interventions to do well on different RE–AIM dimensions
• Include multiple perspectives on ongoing basis

http://www.re-aim.org/resources-and-tools/self-rating-quiz/

What Implementation Costs are Important in D&I Research?

- Intervention Costs? (Primarily time, burden, and opportunity costs)
- Cost-effectiveness? (on outcomes important to citizens)
- Quality Adjusted Life Years?
- Replication Costs? (Costs to implement in different settings)
Reporting Resources Required

• Understand *from perspective of stakeholders*, including patients and decision makers

• Simple is fine – sophisticated economic analyses are not needed for most D&I purposes
  • Report costs of conducting or *replicating interventions*
  • Beyond money, costs can include clinician and staff time, training, infrastructure, startup costs, opportunity costs

Crosscutting issues
- Proportion who benefit
- Representatives of the who benefit
- Reasons: how and why they benefit
- Adaptations made
- Costs incurred

FIT among:
- Intervention
- Implementation strategy
- Context
- You can’t have it all-interactions

Changing Outer Context
PRISM External Environment (e.g., policy, guidelines, incentives)

Changing Internal Context
PRISM factors of
- Organizational & Patient Characteristics
- Organizational & Patient Perspectives (values)
- Implementation & Sustainability Infrastructure

Evidence-based intervention (components)
Implementation strategies
Maintenance, Reach, Effectiveness, Adoption
Evolution of RE-AIM

- Applicability to many different content areas - over 420 articles
- Used for both planning and evaluation
- Underreporting of key components
- Setting level factors reported much less often (e.g., adoption)
- Increasing use of qualitative measures*

Practical, Robust Implementation and Sustainability Model

Addresses Contextual Factors Impacting RE-AIM Outcomes

Pragmatic RE-AIM “Precision Implementation” and Health Questions

Determine:

• What percentage and what types of patients are Reached;

• For whom is the intervention Effective in improving what outcomes (including health equity) with what unanticipated consequences;

• In what percentage and in what types of settings and staff is this approach Adopted;

• How consistently are different parts of it Implemented at what cost to different parties;

• And how well are the intervention components and their effects Maintained?
THE FUTURE OF RE-AIM?

Application to Comparative Effectiveness Research (CER-T)

Transparency focus ('Expanded CONSORT figure*)

What it means to “Use RE-AIM”

Possible Directions:

Merge with PRECIS-2 model*?

Your IDEAS WELCOMED!

Kessler RS, et al. What Does It Mean to "Employ" the RE-AIM Model? Eval Health Prof., 2012 Mar;36, 44-46
All models (and methods) are wrong… Some are useful

“To every complex question, there is a simple answer… and it is wrong.”

~H. L. Mencken
Be Fit Be Well: 24-month randomized weight loss and hypertension self-management intervention trial among low-income urban clinics.

- RE-AIM used to plan for and assess reduction in disparities, as well as report outcomes

Bennett et al. Obesity Treatment for Socioeconomically Disadvantaged Patients in Primary Care Practice. *Arch Intern Med.* 2012;172(7):565-574
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Usual Care (n=185)</th>
<th>Intervention (n=180)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>122 (66%)</td>
<td>128 (71%)</td>
</tr>
<tr>
<td>Non-Hispanic Black/African-American</td>
<td>131 (71%)</td>
<td>129 (71%)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>23 (12%)</td>
<td>25 (14%)</td>
</tr>
<tr>
<td>Language n(%) Spanish</td>
<td>22 (12%)</td>
<td>23 (13%)</td>
</tr>
<tr>
<td>&lt; High School Education</td>
<td>73 (40%)</td>
<td>47 (26%)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>87 (47%)</td>
<td>86 (47%)</td>
</tr>
<tr>
<td>Medicare or Medicaid</td>
<td>99 (54%)</td>
<td>99 (55%)</td>
</tr>
</tbody>
</table>

Baseline characteristics of Be Fit Be Well participants
One in-person visit with follow-up phone calls

Self-monitoring and feedback via CHOICE of Web, IVR and Print
Results

• **REACH**: 60% of eligible population was invited to participate (604), of those 365 (60%) completed baseline and were randomized. Those that participated vs. not were younger and had a higher mean BMI. No other differences on demographics

• **EFFECTIVENESS**: *  
  
  • At 24 months, intervention participants had greater weight losses compared with those receiving usual care (difference, −1.03 kg; 95% CI, −2.03 to −0.03 kg)  
  
  • Mean systolic blood pressure was significantly lower in the Ix arm compared with the usual care arm.

*No differential patterns in outcomes observed for minority vs. nonminority or disparity related sub-groups.*
Results (cont.)

• **ADOPTION:**
  - All three centers invited participated, 4 centers were excluded for lack of EHR system.
  - For staff, 19 of 20 primary care physicians (95%) referred their patients to the program.

• **IMPLEMENTATION:**
  - 71% completion rate of counseling calls and 63% of participants completing more than 70% of their calls.
  - English speakers were more likely to have goals, barriers and strategies documented (P<0.0001), as were participants making more than $10,000 (P<0.001).

• **MAINTENANCE:** Strong individual-level maintenance with *no sub-group differences*, but at the setting-level none of the centers maintained the program components.

“What program/policy components are most effective for producing what outcomes for which populations/recipients when implemented by what type of persons using what strategies under what conditions, with how many resources and how/why do these results come about?”

NOT possible to address all these issues in any one study.... BUT should consider each or them pragmatically and transparently; then select and report those most relevant.
Future Needs: Pragmatic D&I Research and Opportunities

• Understanding **context**: Mixed measures; multi-level; team functioning; international collaborations

• Integration of **health policy**, **public health**, and **biomedicine**; clinical and community; opportunities provided by policy changes

• Focus on **social determinants** of health, health equity, generalizability of results to low resource settings, individuals and low and middle income countries (and vice versa)

• Focus on **costs**, resources, **de-implementation**, **value** and comparative effectiveness research

• **Precision health**, big data, AI and learning health systems
Questions?

‘I am all ears!’
Evidence-Based Program and RE-AIM Resources


Program Focus: Awareness building, Behavior Modification and Self-efficacy

http://re-aim.org/resources_and_tools/index.html

http://rtips.cancer.gov/rtips/index.do
Rethinking Clinical Trials: A Living Textbook of Pragmatic Clinical Trials

Welcome to the Living Textbook of pragmatic clinical trials, a collection of knowledge from the NIH Health Care Systems Research Collaboratory. Pragmatic clinical trials are performed in real-world clinical settings with highly generalizable populations to generate actionable clinical evidence at a fraction of the typical cost and time needed to conduct a traditional clinical trial. They present an opportunity to efficiently address critical knowledge gaps and generate high-quality evidence to inform medical decision-making. However, these trials pose different challenges.

GET STARTED

What is a PRAGMATIC CLINICAL TRIAL?

ENGAGING STAKEHOLDERS and building partnerships to ensure a successful trial

http://www.rethinkingclinicaltrials.org/
Where do I find pragmatic measures?
Sample sites to visit.

PROMIS website
http://www.healthmeasures.net/explore-measurement-systems/promis

National Institute of Nursing Research
https://cde.nlm.nih.gov/form/search?selectedOrg=NINR

GEM- NCI website

My own health report (MOHR) project.
http://myownhealthreport.org/
Ratings on RE-AIM Dimensions

- Hospital-based Group Counseling
- System-wide Health Policies

RE-AIM Dimensional Rating:
- Hi
- Med
- Low

Dimensions:
- Reach
- Efficacy
- Adoption
- Implementation
- Maintenance
Evidence-Based...on what?
External Validity/Pragmatic Criteria (often Ignored)

- Participant **representativeness**
- **Setting** representativeness
- **Context** and setting
- **Adaptation**/change
- Sustainability
- **Costs/feasibility** of treatment
- Comparison conditions
The 5 Rs to Enhance Pragmatism, D&I Science and Likelihood of Translation

Research that is:

- Relevant
- Rapid and recursive
- Redefines rigor
- Reports resources required
- Replicable


<table>
<thead>
<tr>
<th>CHARACTERISTIC OF MEASURE AND OUTCOME</th>
<th>D&amp;I OUTCOMES AND MEASURES</th>
<th>HSR AND CLINICAL EFFECTIVENESS OUTCOMES AND MEASURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>FOCUS</td>
<td>Delivery and implementation issues (aka process: feasibility, fidelity, adoption, reach)</td>
<td>Clinical outcome or measure of control</td>
</tr>
<tr>
<td>BREADTH</td>
<td>Multiple levels, broad focus, systems perspective</td>
<td>Narrower focus; often a single primary outcome</td>
</tr>
<tr>
<td>PREFERRED MODALITY</td>
<td>Multiple observation, interview, tracking forms</td>
<td>Biological (e.g., BP, A1c); more recently data in the EHR</td>
</tr>
<tr>
<td>EXPENSE AND INTENSIVENESS OF ASSESSMENT</td>
<td>Brief, low burden, pragmatic</td>
<td>Often expensive, requires expert assessment; emphasis on blinding when possible</td>
</tr>
<tr>
<td>LEVEL and WHO IS ASSESSED</td>
<td>Setting, staff and end users</td>
<td>Usually patients</td>
</tr>
</tbody>
</table>
Types of Outcomes in Implementation Research

**Implementation Outcomes**
- Acceptability
- Adoption
- Appropriateness
- Costs
- Feasibility
- Sustainability

**Service Outcomes**
- Efficiency safety
- Effectiveness
- Equity
- Patient-centeredness
- Timeliness

**Client Outcomes**
- Satisfaction
- Function
- Symptoms