Reach, Effectiveness, Adoption, Implementation, and Maintenance (RE-AIM)

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OVERVIEW

• Background on RE-AIM and Measurement
• External validity and RE-AIM elements for knowledge synthesis
• Applications of RE-AIM
• Types of Evidence Needed for KT
• Q and A
Research to Practice Pipeline

The 17-year odyssey

Priorities for research funding

Peer review of grants

Publication priorities and peer review

Research synthesis

Guidelines for evidence-based practice

Evidence-based medicine movement

Funding; population needs, demands; local practice circumstances; professional discretion; credibility and fit of the evidence.

Academic appointments, promotion, and tenure criteria

“Lack of consideration of **external validity** is the most frequent criticism by clinicians of RCTs, systematic reviews, and guidelines.”

• **P. Rothwell**


“The significant problems we face cannot be solved by the same level of thinking that created them.”

• **A. Einstein**
What evidence is needed to support translation of an evidence-based rehabilitation intervention to practice?

“The law of halves” … a story about context
## TRANSLATION OF MAGIC REHAB INTERVENTION (50% CURE RATE EFFICACY)

<table>
<thead>
<tr>
<th>Dissemination or KT Step</th>
<th>Concept</th>
<th>% Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>50% of Clinics Use</td>
<td>Adoption</td>
<td>50.0%</td>
</tr>
<tr>
<td>50% of Clinicians Take Part</td>
<td>Adoption</td>
<td>25.0%</td>
</tr>
<tr>
<td>50% of Patients Accept</td>
<td>Reach</td>
<td>12.5%</td>
</tr>
<tr>
<td>50% Follow Regimen Correctly</td>
<td>Implementation</td>
<td>6.2%</td>
</tr>
<tr>
<td>50% of Those Implementing Correctly Are Cured</td>
<td>Effectiveness</td>
<td>3.2%</td>
</tr>
<tr>
<td>50% Continue to Benefit After 6 Months</td>
<td>Maintenance</td>
<td>1.6%</td>
</tr>
</tbody>
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Moral of the Story?

“Focus on the Denominator”
(not just the numerator)

Each step of the dissemination sequence, or each “RE-AIM” dimension, is important.
In theory, there is no difference between theory and practice. But, in practice, there is.
~Jan L.A. van de Snepscheut

A PROBLEM BY DESIGN??
RE-AIM TO HELP PLAN, EVALUATE, AND REPORT STUDIES

- **R** (Reach) Increase
- **E** (Effectiveness) Increase
- **A** (Adoption) Increase
- **I** (Implementation) Increase
- **M** (Maintenance) Increase

# RE-AIM Dimensions and Definitions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Definitions</th>
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</thead>
<tbody>
<tr>
<td><strong>REACH</strong></td>
<td>1. Participation rate among eligible individuals</td>
</tr>
<tr>
<td></td>
<td>2. Representativeness of participants</td>
</tr>
<tr>
<td><strong>EFFICACY/EFFECTIVENESS</strong></td>
<td>1. Effects on primary outcome of interest</td>
</tr>
<tr>
<td></td>
<td>2. Impact on quality of life, negative outcomes</td>
</tr>
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www.re-aim.org
### RE-AIM (cont.)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Definitions</th>
</tr>
</thead>
</table>
| **ADOPTION** | 1. Participation rate among possible settings  
2. Representativeness of settings participating |
| **IMPLEMENTATION** | 1. Extent to which intervention was delivered as intended and adaptations made  
2. Time & costs of intervention |
| **MAINTENANCE** | 1. *(Individual)* Longer-term effects of intervention ≥ 6 months  
2. *(Individual)* Impact of attrition on outcomes  
3. *(Setting)* Sustained delivery & modification of intervention |

www.re-aim.org
RE-AIM Focus on Context

- Broaden the criteria used to evaluate programs to include external validity

- Evaluate issues relevant to program adoption, implementation, and sustainability

- To help close the gap between research studies and practice by:
  - Suggesting standard reporting criteria
  - Informing design and evaluation of interventions
  - To focus on contextual factors that may impact results
Designed for Translation (aka a ‘Realist’ or Precision Medicine Approach)

Determine if potential program/policy will:

- Reach large numbers of people, especially those who can most benefit
- Be widely adopted by different settings using available “channels” of delivery
- Be consistently implemented by settings and staff members reflective of local community
- Produce relevant, replicable, long-lasting effects (with minimal negative impacts) at reasonable cost
Reporting Evidence

CONSORT Reporting Criteria a good START.....

...but not Sufficient- also need:

- Info on Settings and Staff who were invited and participated vs. did not (*Before* CONSORT flow diagram)

- Longer-term maintenance and sustainability information- at both the individual and the program/setting levels (*After* CONSORT flow diagram)

http://re-aim.org/resources_and_tools/figures_and_tables/consort.pdf
CURRENT RE-AIM USES

• Popularized by Glanz, Rimer book \textsuperscript{1} & Larry Green(s)
• Used by public health, CDC, HRSA, RWJF, VA & QUERI projects
• Used in over 200 publications and many grant proposals
• Development of “Calculators,” “Quizzes,”
  Self-test- available at www.re-aim.org
• Moved website to KP Colorado (2006), NCI (2010), VT (2012)
• Used in NIH, RWJF, AoA, CDC grant, Peers for Progress applications
• eLearning Trainings: \url{http://www.centertrt.org/index.cfm?fa=webtraining.reaim}
CRITICISMS AND CHALLENGES IN THE APPLICATION OF RE-AIM

• Calculating the denominator and evaluating REACH and ADOPTION can be challenging

• Summary score(s) and….. Is one component of the model more important than the others?

• CONTEXT – where does it fit in?

• Points to WHAT to focus on, but not directly HOW to improve (RE-AIM is a framework, not a theory)
Our Evidence Bases Consistently Lack External Validity Elements


- Review of 5 topics on cancer care continuum did not include designs or measures to support dissemination (Ellis et al., Health Psych 2005)

- Childhood obesity prevention review poor reporting of EV elements; All studies failed to report full EV elements; Median reporting all elements was 34.5%; mode was 0% (Klesges, et al. AJPM, 2008)
…Applying RE-AIM to Planning Interventions
Planning and Evaluability

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

Perspectives and World Views

• **Researchers**
  Focus is fidelity, effect size (internal validity)

• **Local Practitioners**
  To determine if a program or study is relevant to their particular setting (patients, resources, staff, measures, etc.)

• **Decision and Policy Makers**
  To determine the range of conditions and settings across which a given program/policy/product will apply (generalizability) Patients; Citizens; Recipients

Does this apply to me? Fit my situation?
Types of D & I Methods and Evidence Needed: 2R’s and “RCT”

- Relevant
- Rigorous and
- Rapid
- Cost informative
- Transparent

http://cancercontrol.cancer.gov/IS/
Cost Evidence

• Replication costs and scalability costs are arguably most needed
• Perspective—patient and adopting setting
• Costs should be comprehensive, standard and transparent
• “One persons costs are another’s profits”
• Cost-effectiveness analyses need not be overwhelming*—cost per incremental unit change
• Should be harmonized and include costs frequently not counted that need to be—e.g., recruitment, overhead, training, preparation and supervision

Transparent Evidence on...

- Information needed to replicate or implement
- Resources required—costs for patients and delivery setting perspectives
- How were settings, clinicians, and patients selected—(who was excluded and why)
- Adaptation—changes made to protocol, to intervention, to recruitment, etc.
- Differences across settings
WE NEED EVIDENCE THAT...

<table>
<thead>
<tr>
<th>IS MORE...</th>
<th>IS LESS...</th>
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<tbody>
<tr>
<td>Contextual</td>
<td>Isolated, de-contextualized</td>
</tr>
<tr>
<td>Practical, efficient</td>
<td>Abstract, intensive</td>
</tr>
<tr>
<td>Robust, generalizable</td>
<td>Singular (Setting, staff, population)</td>
</tr>
<tr>
<td>Comparative</td>
<td>Academic</td>
</tr>
<tr>
<td>Comprehensive</td>
<td>Single outcome</td>
</tr>
<tr>
<td>Representative</td>
<td>From ideal settings</td>
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From ideal settings
THE FUTURE OF RE-AIM?

• Application to Comparative Effectiveness Research (CER-T)
• Application to aging and disability?
• Transparency focus
• What it means to “Use RE-AIM”*

Possible Directions:
• Merge with PRECIS model**?
• Your IDEAS WELCOMED!

**Thorpe KE, et al. A pragmatic–explanatory continuum indicator summary (PRECIS)...CMAJ; MAY 12, 2009;180(10)
All Models (and Methods)- including RE-AIM are WRONG

….Some are useful

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

H. L. Mencken
Cartoon available from the Cartoon Bank:

Sam Gross / The New Yorker Collection / http://www.cartoonbank.com

Image ID: 17656
Comments, Questions, etc.

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