Outline

• Need for Implementation Research

• What Do We Know About Dissemination & Implementation (D&I) Science?

• How to Make Sense out of this Complexity?
  – The Evidence Integration Triangle (EIT)

• How to Learn More- and GET FUNDED?

• Future Directions and Opportunities to Get Involved
Translation Continuum

- Bench
- Bedside
- Clinic
- Community
- Population & Policy
Bench to Bookshelf
Current Situation in United States¹

• Underperforming health care system²

• Balkanized and silo approaches

• Expensive, unsustainable cost, increasing

• Inequitable: Health disparities

• CRISIS and OPPORTUNITY

¹Institute of Medicine. Unequal treatment...Washington D.C., National Academies Press, 2003
“The significant problems we face cannot be solved by the same level of thinking that created them.”

A. Einstein
Integrated Dynamic, Multilevel Research-Practice Partnerships Systems Approach

Adapted from Estabrooks et. al. APJM, 2005, 31: S45
Implementation and Dissemination Research Characteristics (Russ’ view)

- Contextual
- Complex
- Multi-component programs and policies
- Non-linear
- Transdisciplinary
- Multi-level

Rapid Learning Approaches

Data Collected:

- With real (and complex) patients
- By real-world staff
- Under real-world conditions and settings
- And evaluated through real-time data (often with Electronic Health Records)

Recommended Purpose of Research (ala RE-AIM)

Collect evidence to document interventions that can:

- **Reach** large numbers of people, especially those who can most benefit
- Be widely **adopted** by different settings
- Be consistently **implemented** by staff members with moderate levels of training and expertise
- Produce **replicable** and **long-lasting** effects (and minimal negative impacts) at reasonable **cost**
## Ultimate Impact of an Insurance-sponsored Weight Management Program in West Virginia

<table>
<thead>
<tr>
<th>Dissemination Step</th>
<th>Concept</th>
<th>% Impacted</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.8% of Weight Management sites participated</td>
<td>Adoption</td>
<td>8.80%</td>
</tr>
<tr>
<td>5.9% of members participated</td>
<td>Reach</td>
<td>0.52%</td>
</tr>
<tr>
<td>91.4% program components implemented</td>
<td>Implementation</td>
<td>0.47%</td>
</tr>
<tr>
<td><strong>43.8% of participants showed weight loss</strong></td>
<td>Effectiveness</td>
<td><strong>0.21%</strong></td>
</tr>
<tr>
<td>21.2% individuals maintained benefit (individual)</td>
<td>Maintenance</td>
<td>0.04%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STEP</th>
<th>TRANSLATION ISSUES INVOLVED</th>
<th>LENGTH OF TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Research</td>
<td>Choice of measures; generalizability.</td>
<td>1-5 years</td>
</tr>
<tr>
<td>Replication Research</td>
<td>Degree measures harmonized, samples similar study(ies).</td>
<td>1-3 years</td>
</tr>
<tr>
<td>Synthesis Reviews</td>
<td>Criteria used for: inclusion, quality, outcomes, realist review?</td>
<td>1-2 years?</td>
</tr>
<tr>
<td>Guideline Created</td>
<td>Implementation guides? Adaptation guides, feasibility.</td>
<td>1-3 years?</td>
</tr>
<tr>
<td>Other Guidelines?</td>
<td>Consistency with original, costs and ease of implementation.</td>
<td>1-2 years?</td>
</tr>
<tr>
<td>Adoption of Guidelines</td>
<td>Politics, costs, adaptation.</td>
<td>6 months?</td>
</tr>
<tr>
<td>Implementation of Guidelines</td>
<td>Readiness, capacity, incentives, tracking, guidelines.</td>
<td>3-12 months</td>
</tr>
<tr>
<td>Patient “Adherence”</td>
<td>Competing demands, cost, meaning.</td>
<td>1 – X months</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Evolution over time, “drift.”</td>
<td>2 - ? years</td>
</tr>
<tr>
<td>Complete Cascade</td>
<td>Partnership, relevance, adaptation are cross-cutting issues.</td>
<td>8-17+ years</td>
</tr>
</tbody>
</table>
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

Academic appointments, promotion, and tenure criteria

Practice

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

The Need

D&I: What we know

EIT

Funding

Future Directions/D&I Opportunities

**Intervention Program/Policy**
*Prevention or Treatment*
(e.g. design; key components; principles; external validity)

**Evidence**

**Stakeholders**

**Multi-Level Context**

- IntrAPERsonal/Biological
- InterPErsonal
- Organizational
- Policy
- Community/Economic
- Social/Environment
The Need

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- Community/Economic
- Social/Environment

**Practical Measures**
(e.g. actionable & longitudinal measures)

**Evidence**

**Stakeholders**
The Need

D&I: What we know

EIT

Funding

Future Directions/D&I Opportunities

Implementation Process
(e.g., stakeholder engagement team-based science; CBPR; patient centered care)

Intervention Program/Policy
(Prevention or Treatment)
(e.g., design; key components; principles; external validity)

Evidence

Stakeholders

Practical Measures
(e.g., practical, actionable & longitudinal measures)

Multi-Level Context

- Intrapersonal/Biological
- Interpersonal
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Intervention Program/Policy – The “What”

• Identify key components or theoretical principles

• Need for detailed implementation guides, lessons learned manuals

• Need to focus and report on both internal and external validity (need to add relevance to rigor)

• Most focus on treatment; less on prevention; least on policy

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

Practical Measures – the “So What”

Measures need to be:
• Brief and practical

• Collected longitudinally to assess progress

• Reliable and valid

• Sensitive to change

• Have national norms, easily understood and ACTIONABLE

• Culturally appropriate across groups

• Reflect multiple stakeholder perspectives

Implementation Process – The “How”

• Partnership and Community Based Participatory Research (CBPR) approaches

• Patient-centered Care Approach

• Team science in action

• Iterative, self-correcting

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1 Guidelines and Categories for Classifying Participatory Research Projects in Health: [http://lgreen.net/guidelines.html](http://lgreen.net/guidelines.html)


Implementation Process
(e.g., stakeholder engagement; team-based science; CBPR; patient centered care)

Practical Measures
(e.g., actionable & longitudinal measures)

Intervention Program/Policy
(Prevention or Treatment)
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Multi-Level Context
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Current Research Focus
of Evidence-based Practice

Current Need
D&I: What we know
EIT
Funding
Future Directions/D&I Opportunities

National Cancer Institute
Multi-Level Context

- Intrapersonal/Biological
- Interpersonal
- Organizational
- Policy
- Community/Economic
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Implementation Process
(e.g., stakeholder engagement; team-based science; CBPR; patient centered care)

Evidence
Stakeholders

Intervention Program/Policy
(Prevention or Treatment)
(e.g., design; key components; principles; external validity)

Practical Measures
(e.g., actionable & longitudinal measures)

Feedback

National Cancer Institute
Practical (Pragmatic) Trials: Key Contextual Characteristics

- Multiple, heterogeneous settings
- Representative populations
- Comparison conditions are real-world alternatives
- Multiple outcomes important to decision and policy makers

Thorpe KE et al., Can Med Assoc J, 2009, 180: E47-57
Tunis SR et al. Practical clinical trials...JAMA 2003;290:1624-1632
Glasgow RE et al. Practical clinical trials...Med Care2005;43(6):551-557
“For every complex problem there is a simple solution ... and it is wrong.”

H.L. Mencken
Bridging the Gap: A Synergistic Model
Getting Evidence-based Cancer Control Interventions into Practice

**GOAL:** To increase the adoption, reach and impact of evidence-based cancer control

- **Science Push**
  Documenting, improving, and communicating the intervention for wide population use

- **Delivery Capacity**
  Building the capacity of relevant systems to deliver the intervention

- **Market Pull/Demand**
  Building a market and demand for the intervention

Increase the number of systems providing evidence-based cancer control
Increase the number of practitioners providing evidence-based cancer control
Increase the number of individuals receiving evidence-based cancer control

**ULTIMATE GOAL:**
Improve population health and well-being

Tracy Orleans (RWJF) – Designing for Dissemination Conference Presentation, 9/02
“By God, gentlemen, I believe we’ve found it—the Fountain of Funding!”
The Major Cross-NIH D&I Funding Announcement

- R01 - PAR 10-038 ($500k per annum up to five years)
- R03 - PAR 10-039 ($50K per annum up to two years)
- R21 - PAR 10-040 ($275K up to two years)

- Participating Institutes: NIMH, NCI, NIDA, NIAAA, NIAID*, NHLBI, NINR, NIDDK*, NINDS*, NIDCD, NIDCR, & Office of Behavioral & Social Sciences Research

- Starting October 2010, new standing review commit Dissemination and Implementation Health Research

- Three submission dates per year: **February, June, October**
Key Features

• “To identify, ... and refine effective and efficient methods....

• .......... and strategies to disseminate and implement research-tested ...

• .... interventions and .... prevention... and Quality of Life improvement services........

• in public health and clinical practice settings”

http://dccps.cancer.gov/d4d/research_portfolio.html
Other D &I Mechanisms

• CTSA funding at many medical schools

• Partnerships with Prevention Research Centers

• Some CDC Mechanisms

• AHRQ Funding- especially via PBRNs and EHR Related

• Other NIH and private funding (ACS, etc.)
Key Content Issues Funded

• Implementation of evidence-based interventions in healthcare and community settings

• Workplace health promotion

• Survey of state (provincial) tobacco plans and implementation research to reach and assist underserved populations
Key Questions Asked By Reviewers

• Is this program or policy ready for dissemination?

• Is team really transdisciplinary?

• Will this advance the field; how is it innovative?

• Is there a good plan for sustainability or broader dissemination of the project?
Content Issues Seldom Addressed (Research Opportunities)

- Comparative Effectiveness Research
- Dissemination to large number of settings
- Proposals addressing complex patients, complex and multilevel problems
- Health policy issues
- Dissemination & implementation of systematic review evidence
Annual D&I Meetings

• “State of the D&I Science” Venue
• Three meetings held since 2007
  – Participation increased from 350 registrants in 2007 to over 900 in 2010
  – Past themes have included: “Building Capacity” and “Methods and Measures”

Next meeting: Bethesda, MD March 21-22, 2011
Theme: Policy and International Contributions

PREDICTING THE FUTURE...

“You Don’t Need a Weatherman To Know Which Way the Wind Blows”
-Bob Dylan
Evolving Issues

- Simulations, MODELING, system dynamic models
- Time-lagged REPLICATIONS
- Natural experiments
- Well-documented quality improvement studies
- RAPID LEARNING and electronic medical records (EHR) databases\(^1\)
- Practical and pragmatic trials\(^2\)

\(^1\)Etheredge LM, Health Affairs, 2007, Web Exclusive Collection: w107-118
\(^2\)Thorpe KE et al., Can Med Assoc J, 2009, 180: E47-57
Challenges and Conclusions

• The future is **multiple** (conditions, behaviors, interactive modalities)

• The future is **complex** (and we ignore complexity at our peril)

• **“All models (and designs) are wrong”** – and greater tolerance, respect, and creativity is needed

• We need to **UN-learn** much of what we have been taught to answer the tough questions

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1Glasgow RE, Emmons KM. *Annual Review of Public Health* Dec 6,2006 epub ahead of print

2StermanJD. *Syst Dynam Rev* 2002;18:501-531
## Evidence that...

<table>
<thead>
<tr>
<th>IS MORE</th>
<th>IS LESS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contextual</strong></td>
<td><strong>Isolated</strong></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>
</tr>
</tbody>
</table>

National Cancer Institute
Russell E. Glasgow

Email: glasgowre@mail.nih.gov (preferred)

Phone: 303-435-4912

NCI Implementation Science Website: http://cancercontrol.cancer.gov/d4d/
Evidence Integration Triangle
Translation Across the Continuum

**Intervention Program/Policy**
*(Prevention or Treatment)*
(e.g., design; key components; principles; external validity)

**Implementation Process**
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**Practical Measures**
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- Community/Economic
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Feedback

Evidence

Stakeholders
### Key Pragmatic and Translation Content Issues in Need of Study by Research Design, Intervention and Evaluation Issues

<table>
<thead>
<tr>
<th>Research Issue</th>
<th>Practical and Feasible Interventions</th>
<th>Key Contextual Factors</th>
<th>Transparent Reporting</th>
<th>Design Fits Question</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Experimental Design</strong></td>
<td>• Addresses issues relevant to decision makers&lt;br&gt;• Representative settings and participants&lt;br&gt;• Includes complex patients and realistic comparison treatment(s)</td>
<td>• Heterogeneous or typical settings&lt;br&gt;• Study of moderating factors&lt;br&gt;• Includes qualitative features</td>
<td>• Reports&lt;br&gt;• Modification and adaptation to recruitment and design&lt;br&gt;• across sites&lt;br&gt;• local customization.</td>
<td>• Fits specific question&lt;br&gt;○ Dynamic&lt;br&gt;○ Adaptive&lt;br&gt;○ Rapid and efficient&lt;br&gt;• Information for scale-up and robustness analyses&lt;br&gt;• Simulations</td>
</tr>
<tr>
<td><strong>Intervention Characteristics</strong></td>
<td>• Designed for broad adoption and implementation&lt;br&gt;• Efficient&lt;br&gt;• MINC*&lt;br&gt;• Stepped care&lt;br&gt;• Scalable</td>
<td>• Flexible&lt;br&gt;• Provides guidelines for fidelity and customization&lt;br&gt;• Deliverable by variety of staff in typical settings</td>
<td>• Reports on:&lt;br&gt;• Adoption&lt;br&gt;• Implementation&lt;br&gt;• Modifications&lt;br&gt;• Subgroup effects&lt;br&gt;“CONSORT Plus”** information</td>
<td>• Designed for healthcare settings of future&lt;br&gt;• QI blends that get smarter over time&lt;br&gt;• Sustainable with typical resources.</td>
</tr>
<tr>
<td><strong>Evaluation Measures and Analyses</strong></td>
<td>• Analyses of modifier and subgroup effects&lt;br&gt;• Effects of Tx intensity and staff expertise&lt;br&gt;• Cost, cost-effectiveness, and sensitivity analysis</td>
<td>• Report policy, economic, and political context&lt;br&gt;• Assess impact on&lt;br&gt;○ Disparities&lt;br&gt;○ high-risk subgroups&lt;br&gt;○ variation across settings&lt;br&gt;○ staff and time&lt;br&gt;• Generalization analyses</td>
<td>• Reach by&lt;br&gt;○ Condition&lt;br&gt;○ Unintended&lt;br&gt;○ Quality-of-life impacts&lt;br&gt;• Implementation by condition and over time&lt;br&gt;• Maintenance at setting and individual levels.</td>
<td>• Evaluate systems impacts and unintended consequences&lt;br&gt;• Understand multi-level effects and mediators&lt;br&gt;• “Post-mortem” interviews&lt;br&gt;• long-term sustainability and program evaluation</td>
</tr>
</tbody>
</table>
WHY? (Targets for Change?)

- Much research not relevant to patients, practitioners, policy makers
- Vested interests (FDA model)
- Way we were trained – “unlearning”
- Complex, “wicked issues”
- Insufficient funding (98.5% NIH budget for basic)