## Title Slide: Research to Reality: Implementation Science

National Cancer Institute
U.S. Department of Health and Human Services
National Institute of Health

Research to Reality:
The Evidence Integration Triangle

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## Slide 2: Outline

- Current Gap Between Research and Practice: Why is Implementation Needed?
- What Do We know About Dissemination and Implementation (D&I) Science? How is it Different?
- New Models and Conceptualizations - Thinking Differently
- Future Directions/Disseminations and Implementation Opportunities

## Slide 3: Translation Continuum

Bi-directional arrow running across five boxes. Boxes going left to right: (1) bench; (2) bedside; (3) clinic; (4) community; and (5) population and policy.

## Slide 4: Bench to Bookshelf

[image]
clinician looking at vial and writing notes with arrow pointing to books covered in cobwebs
[end image]

## Slide 5: Current Situation in United States1

[The Need]

- Underperforming health care system[2]
- Balkanized and silo approaches
- Expensive, unsustainable cost, increasing

- Inequitable: Health disparities
- CRISIS and OPPORTUNITY

[1]Institute of Medicine. Unequal treatment…Washington D.C., National Academies Press, 2003
[2]McGlynn EA et al. The quality of health care…*N Eng J Med* 2003;348(26):2635-2645

## Slide 6: Research to Practice Pipeline

[image]
A cone with the wide portion on the left hand side and the narrow part on the right hand side. Inside the cone there are 4 steps. At the opening of the cone (left side) is "Priorities for research funding". The first step is "Peer review of grants". The second step is "Publication priorities and peer review. The third step is "Research synthesis". The fourth step is "Guidelines for evidence-based practice". Coming out of the cone is "Practice: Funding; population needs, demands; local practice circumstances; professional discretion; credibility and fit of the evidence." Below the steps are two influences that need to be taken into consideration. The first is "Academic appointment, promotion, and tenure criteria" which affects steps 1 and 2. The second is "Evidence based medicine movement" which affects, with the exception of "Priorities for research funding", all the steps and the outcome "Practice".
[end image]

Green, LW et al. 2009.
Annual Rev. Public Health. 30: 151-174

## Slide 7: No Title

***"The significant problems we face cannot be solved by the same level of thinking that created them."***
***A. Einstein***

## Slide 8: Implementation and Dissemination Research Characteristics

[D&I: What we know]

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

Glasgow R & Steiner J. (2011). In Dissemination and Implementation Research. Brownson, R, Colditz, G, and Proctor, E (Eds.). Oxford.

## Slide 9: Integrated Dynamic, Multilevel Research-Practice Partnerships Systems Approach

[D&I: What we know]
[image]
3 circles connected by 3 sectional bars: "Fit", "Partnership" and "Design Appropriate for Question."
First circle has 3 inner circles: Evidence tested program (outer circle), Program as tested (middle circle) and Critical elements (inner circle) is connected to the second circle by the bi-directional sectional bar "Fit". The second circle has 3 inner circles. Health care systems (outer circle), Clinic(s) and Delivery site(s) (middle circle) and Program delivery staff (inner circle). The third circle is Research design team and adaptive design. The third circle is connected to the first circle by the bi-directional bar "Design Appropriate for Question" and to the second circle by the bi-directional bar "partnership".
[end image]

Adapted from Estabrooks et. al. *APJM, 2005, 31: S45*

## Slide 10: Recommended Purpose of Research (ala RE-AIM)

[D&I: What we know]
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

http://cancercontrol.cancer.gov/IS/reaim/index.html

## Slide 11: Ultimate Impact of an Insurance-sponsored Weight Management Program in West Virginia[1]

[D&I: What we know]

| Dissemination Step | Concept | % Impacted |
|---|---|---|
| 8.8% of Weight Management sites participated | Adoption | 8.80% |
| 5.9% of members participated | Reach | 0.52% |
| 91.4% program components implemented | Implementation | 0.47% |
| 43.8% of participants showed weight loss | Effectiveness | 0.21% |
| 21.2% individuals maintained benefit (individual) | Maintenance | 0.04% |

[1]Abildso CG, Zizzi SJ, Reger-Nash B. Evaluating an Insurance-Sponsored Weight Management Program With the RE-AIM Model, West Virginia, 2004-2008. Preventing Chronic Disease Public Health Research, Practice, and Policy. 2010. 7(3).

## Slide 12: Evidence Integration Triangle: Intervention Program/Policy (Prevention or Treatment)

[New Models]
(e.g. design; key components; principles; external validity)

Multi-Level Context

- Intrapersonal/Biological
- Interpersonal
- Organizational
- Policy
- Community/Economic
- Social/Environment

Ongoing Partnership & Stakeholder Engagement
[Animation]
It is all about context. And context is multi-level and all these levels need to be considered when thinking about a problem and developing or implementing an intervention.
(After first click): Next, we have to consider the stakeholders and stakeholder engagement. The stakeholders could be a community group, clinicians, political leaders, community members, program staff, etc. With this group, the goal(s) and objectives are defined and consider the evidence.
(After click 2): The first component of the evidence-based triangle we need to consider is the program or policy intervention. There are a number of reviews that exist (Cochrane, Community Guide, AHRQ guidelines, etc) that outline the evidence of intervention design, key components and principles. What has been lacking, in the past, is a focus on external validity. There is still work to be done so that intervention designs include factors that make research both "rigorous and relevant" and thus far we have ignored the relevance.
[end Animation]

## Slide 13: Evidence Integration Triangle: Practical Measures

[ New Models]
(e.g. design; key components; principles; external validity) has a bi-directional connection to "Practical Measures (e.g. actionable & longitudinal measures)"
Multi-Level Context

- Intrapersonal/Biological
- Interpersonal
- Organizational
- Policy
- Community/Economic
- Social/Environment

Ongoing Partnership & Stakeholder Engagement

[Notes]
Leg two is the practical measures. This is how we know how well we are doing and measurement needs to be done iteratively throughout development and implementation. To do so, these measures must be practical so they can, like an intervention, be appropriate and relevant to the setting in which they are used.
[end Notes]

## Slide 14: Evidence Integration Triangle: Implementation Process

[New Models]

(e.g. design; key components; principles; external validity) has a bi-directional connection to "Practical Measures (e.g. actionable & longitudinal measures)". "Practical Measures" has bi-directional connection to "Implementation Process" (e.g. team-based science; CBPR; patient centered care). "Implementation Process" has a bi-directional connection to "Intervention (Program/Policy)". This completes the circular connection from "Intervention (Program/Policy)" to "Practical Measures" to "Implementation Process" back to "Intervention (Program/Policy)". "Ongoing Partnership & Stakeholder Engagement" is in the middle of the circle.

Multi-Level Context

- Intrapersonal/Biological
- Interpersonal
- Organizational
- Policy
- Community/Economic
- Social Environment

[Notes]
The third leg of the triangle is the implementation process. This is really how one implements the intervention and the evidence around this implementation process. This has for the most part be excluded from the evidence-based focus thus far.
[end Notes]

## Slide 15: No title

*"For every complex problem there is a simple solution ...*
*and it is wrong."*
*H.L. Mencken*

## Slide 16: Bridging the Gap: A Synergistic Model. Getting Evidence-based Cancer Control Interventions into Practice

[New Models]
[Image]
GOAL: To increase the adoption, reach and impact of evidence-based cancer control

"Market Pull/Demand": Building a market and demand for the intervention.

"Science Push": Documenting, improving, and communicating the intervention for wide population use, goes to "Delivery Capacity": Building the capacity of relevant systems to deliver the intervention. Then goes to a section containing:

- 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

Finally to "ULTIMATE GOAL": Improve population health and well-being

Tracy Orleans (RWJF) – Designing for Dissemination Conference Presentation, 9/02
[End Image]

## Slide 17: Evolving Issues

[Future Directions/D&I Opportunities]

- 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

## Slide 18: Rapid Learning Approaches

[Future Directions/D&I Opportunities]
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)

A Rapid Learning Health System. *Health Affairs* (supplement). 2007

## Slide 19: Practical (Pragmatic) Trials: Key Contextual Characteristics

[Future Directions/D&I Opportunities ]

- 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 Care*2005;43(6):551-557

## Slide 20: Example Cancer Screening Implementation Study

[Future Directions/D&I Opportunities ]

- Large scale (n = 5,905) RCT of efficient automated phone call patient reminder system for Colorectal Cancer Screening (CRC)
- Used PRISM framework and partnership with H M O operations to design feasible, sustainable program
- Intervention patients 1,3 times more likely to receive CRC screening than controls - this REPLICATES parallel findings for mammography, which increased screening rates by 1.5 times
- System found to be cost-effective , and continued by the H M O

Mosen DM, Feldstein AC, et,al, Med Care, 2010 48: 604-610

## Slide 21: Evidence that…

[Future Directions/D&I Opportunities]

[image]
Scales to with weight holder on each side
[end image]

| IS MORE | IS LESS |
|---|---|
| Contextual | Isolated |
| Practical, efficient | Abstract, intensive |
| Robust, generalizable | Singular (setting, staff, population) |
| Comparative | Academic |
| Comprehensive | Single outcome |
| Representative | From ideal settings |

Rigorous, Relevant, and Practical

## Slide 22: Challenges and Conclusions

[Future Directions/D&I Opportunities]

- The future is multiple (conditions, behaviors, interactive modalities)
- The future is complex (and we ignore complexity at our peril)[1]
- "All models (and designs) are wrong" [2]– 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

[1]Glasgow RE, Emmons KM. *Annual Review of Public Health* Dec 6,2006 epub ahead of print
[2]StermanJD. *Syst Dynam Rev* 2002;18:501-531

## Slide 23:The Trans-NIH D&I Funding Announcement

[Future Directions/D&I Opportunities]

- 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, NCCAM* & Office of Behavioral & Social Sciences Research
- Starting October 2010, new standing review committee, Dissemination and Implementation Health Research
- Three submission dates per year: February, June, October

* New Participating Institutes

## Slide 24: Annual D&I Meetings

[funding]

- Annual meeting held since 2007 - "State of the D&I Science" Venue
  - Participation increased from 350 registrants in 2007 to over 1200 in 2011
  - Past themes have included: "Building Capacity" and "Methods and Measures". This year it is "Crossroads".
  - Next meeting: Bethesda, MD March 19-20, 2012
    - Registration: http://conferences.thehillgroup.com/obssr/DI2012/index.html
- Week long TRAINING in D & I Research - each summer
  - Information and Slides available: http://conferences.thehillgroup.com/OBSSRinstitutes/TIDIRH2011/index.htm

## Slide 25: N C I web page

[image]
Web page of Implementation Science site.
http://cancercontrol.cancer.gov/IS/
[end image]

## Slide 26: Research to reality (R2R): A Virtual Community of Practice

[Future Directions/D&I Opportunities]

A dialogue between practitioners and researchers on how to move evidenced-based programs into practice

[image]
Research to Reality web site
https://ResearchtoReality.cancer.gov
[end image]

- Launched February, 2011 ( N C I )
  - linked to Cancer Control P.L.A.N.E.T. Step 2
- Site Features
- Monthly cyber-seminars
  - Discussion forums
  - An events calendar
  - Featured partners
  - Community profiles

## Slide 27: QUESTIONS? COMMENTS?

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