Evidence meets Implementation:

How do we implement evidence to advance healthcare?

Denise Campbell-Scherer, MD, PhD, CCFP, FCFP
Associate Dean, Lifelong Learning & Physician Learning Program
Professor, Dept. of Family Medicine & Alberta Diabetes Institute,
University of Alberta

Twitter: DCScherer
Why?

• The application of what we know already will have a bigger impact on health and disease than any drug or technology likely to be introduced in the next decade.

• Sir Muir Gray, UK Chief Knowledge Officer
The focus has shifted from the patients and the diseases that make them suffer, to the diseases themselves and their measurement within the patient.

D. Mangin
Objectives

- Reflect on the intent and fundamental questions related to implementation.
- Sense-making on how we implement different kinds of evidence.
- Consider how the use of theory can improve interventions and evaluation.
Outline

- Introduction to our problem
- Epistemological reflections
- Where have we been?
- Where are we going?
- How can we get there?
A few definitions....

• Knowledge

• Individual – facts gained through experience, learning; translated into action via human will and agency

• Collective – socially shared, collectively co-created, embedded in systems

A few definitions....

• Knowledge Transfer
  (Canadian Institutes for Health Research)

• “dynamic, interactive process that includes the synthesis, dissemination, exchange, and culturally sound application of knowledge to improve health, provide more effective health services and products, and strengthen the healthcare system.”

Strauss S. et al. (2009) CMAJ 181 (3-4) 165-68.
Are we ready to implement?

- Do we understand the problem and outcome we wish to achieve?
- Do we have the evidence it matters? Is it meaningful?
- Do we understand the context? Opportunity cost? Perspective of frontline staff and people with lived experience? Have they helped co-create the intervention?
- Do we have the physical, material, and personnel resources to implement and sustain the change?
- If the answer is YES --- carry on....
- What kind of intervention is being addressed? Is it more of a technical or adaptive problem?
Standing on the shoulders of giants
A clockwork Universe?

By Andrew Shiva / Wikipedia, CC BY-SA 4.0,
https://commons.wikimedia.org/w/index.php?curid=28608413
Reductionism

• “The most natural thing in the world to grasp. It’s simply the belief that “a whole can be understood completely if you understand its parts, and the nature of the ‘sum’. Now one in her left brain could reject reductionism.”

D. Hofstadter, Gödel, Escher, Bach: an Eternal Golden Braid
As cited in M. Mitchell Complexity A guided Tour
Science is Darwinian

Kuhn, The structure of scientific revolutions
Papiloswallowtail butterflies, Dr Kunte Biodiversity lab, Tata Institute of Fundamental Research
Sometimes, even if I stand in the middle of the room, no one acknowledges me.
We do NOT live in a clockwork universe.... we live in interconnected complex adaptive systems

Complex Adaptive Systems:

Collection of individual agents who have freedom to act in unpredictable ways and whose actions are interconnected

Difference between complicated (aircraft) and complex (human)
3 Fundamental Implementation Questions

(1) How do we make sense of our problem?

(2) How do we approach the design of the knowledge transfer strategy/strategies for sustained change?

(3) How do we pick the most appropriate intervention theory?
(1) How do we make sense of our problem?
“While technical problems may be very complex and critically important, they have known solutions that can be implemented by current know-how. They can be resolved through the application of authoritative expertise and through the organization’s current structures, procedures and ways of doing things.

Adaptive challenges can only be addressed through changes in people’s priorities, beliefs, habits and loyalties. Making progress requires going beyond any authoritative expertise to mobilize discovery, shedding certain entrenched ways, tolerating losses and generating the new capacity to thrive anew.”

Cynefin Framework

- Emergent patterns, perceived not predicted
- Need multiple perspectives on the nature of the system
- Narrative methods

Unordered

- Domain of disorder

Ordered

- Entrained patterns most dangerous

From: Kurtz CF, Snowden DJ (2003)
The new dynamics of strategy: sense-making in a complex and complicated world.
IBM Systems Journal 42(3):462-483
Knowledge Management

• First generation
  – information for decision support

• Second generation
  – focus on movement of knowledge between tacit – explicit states
  • SECI (Socialization, Externalization, Combination, Internalization, Ba “shared space for emerging relationships”) Nonaka and Takeuchi 1995

• Third generation
  – focus on complicated, complex and chaotic

We do NOT live in a clockwork universe…. we live in interconnected complex adaptive systems

Implications:

1) All parts are interconnected. You can not do a controlled experiment in a closed system and expect the results to apply in an open system in an unproblematic way. The concept of transferrable effect size is problematic.

2) We are not Pavlov and people are not dogs. We need to move beyond theories of operant conditioning to behavioural theories.

3) Interventions/ innovations are NOT static.

4) Principles scale, programs don’t.

5) Solutions may be emergent, and naturalistic methods are required to elucidate them.

6) There will always be unintended consequences! You must look for them.
Interventions are not static
They adapt to culture and context...
We do NOT live in a clockwork universe.... we live in interconnected complex adaptive systems

Implications:

“ruthless standardization; top-down centralized implementation with rigid milestones; dashboards of aggregated process metrics DOES NOT WORK”

Eg IT program spectacular failure

Greenhalgh, 2017
Focus on understanding the questions

Is the most valuable perspective the one you don’t have?

Navigate the Transformative Age with the better-connected consultants.

ey.com/consulting

The better the question. The better the answer. The better the world works.

Navigate the Transformative Age with the better-connected consultants.
ey.com/consulting
People with lived experience

My implementation science butterflies
(2) How do we approach the design of the knowledge transfer strategy/strategies for sustained change?
A word about theory … what you don’t know can kill your good idea

Using theory to:

(1) unpack the problem,

(2) design the intervention co-creation,

(3) design and monitor the implementation strategy ~

will help you to understand why and how the intervention did or did not work.

(4) use empiric data to refine the theory
Theory, Model, Framework?

- Theories... explain cause and effect relationships... ~ grand, mid-range, lower level
- Models... simplified representations of phenomena. In contrast to theories, models are descriptive and have a narrowly defined scope
- Frameworks ... list descriptive concepts or variables that account for phenomena into a structure that can serve to measure or evaluate
Theories are important in social & natural sciences

• Robust explanations of previously or currently observed phenomena, and are points of departure for forecasts of future phenomena

• Useful theories for understanding implementation problems

May C, 2009
Categories of Theories, Models & Frameworks used in implementation science

1. Process models – steps in process of translating research to practice including implementation. Action model has practical guidance. i.e. Knowledge to Action Model

2. Determinant frameworks- specify determinant barriers and facilitators i.e. Theoretical domains framework, Consolidated framework for implementation research

3. Classic theories – from sociology, psychology, org sci that can provide understanding and/or explanation of aspects of implementation i.e. Normalization Process Theory

4. Evaluation frameworks – specify elements of implementation that could be evaluated for implementation success ie. RE-AIM, CIFR

Nilsen, 2015
Normalization process theory

Describes how practices become routinely embedded in social contexts. Can orient design of improvement interventions toward what is likely important, relevant and feasible in making efforts successful.
(3) How do we co-create interventions & pick the most appropriate intervention theory?
Interventions

• Example for interventions aiming to change behaviours:

• Theoretical domains framework ~ derived from 33 behaviour change theories, 128 constructs sorted into 14 domains
Theoretical Domains Framework for Behaviour Change

A word about tools
Finding an implementation framework for your work

• Construct flexibility
• Socioecologic framework level: system, community, organization, individual
• Implementation and/or dissemination?
<table>
<thead>
<tr>
<th>Model</th>
<th>Dissemination and/or Implementation</th>
<th>Construct Flexibility: Broad to Operational</th>
<th>System</th>
<th>Community</th>
<th>Organization</th>
<th>Individual</th>
<th>Policy</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diffusion of Innovation</td>
<td>D-only</td>
<td>1</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>21</td>
</tr>
<tr>
<td>RAND Model of Persuasive Communication and Diffusion of Medical Innovation</td>
<td>D-only</td>
<td>1</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td>22</td>
</tr>
<tr>
<td>Effective Dissemination Strategies</td>
<td>D-only</td>
<td>2</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>23</td>
</tr>
<tr>
<td>Model for Locally Based Research Transfer Development</td>
<td>D-only</td>
<td>2</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>24</td>
</tr>
<tr>
<td>Streams of Policy Process</td>
<td>D-only</td>
<td>2</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>25, 26</td>
</tr>
<tr>
<td>A Conceptual Model of Knowledge Utilization</td>
<td>D-only</td>
<td>3</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
<td>27</td>
</tr>
<tr>
<td>Conceptual Framework for Research Knowledge Transfer and Utilization</td>
<td>D-only</td>
<td>3</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>28</td>
</tr>
<tr>
<td>Conceptualizing Dissemination Research and Activity: Canadian Heart Health Initiative</td>
<td>D-only</td>
<td>3</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>29, 30</td>
</tr>
<tr>
<td>Policy Framework for Increasing Diffusion of Evidence-based Physical Activity Interventions</td>
<td>D-only</td>
<td>3</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>31</td>
</tr>
<tr>
<td>Blueprint for Dissemination</td>
<td>D-only</td>
<td>4</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>32</td>
</tr>
<tr>
<td>Framework for Knowledge Translation</td>
<td>D-only</td>
<td>5</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>33</td>
</tr>
<tr>
<td>A Framework For Analyzing Adoption of Complex Health Innovations</td>
<td>D &gt; I</td>
<td>2</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>34, 35</td>
</tr>
<tr>
<td>A Framework for Spread</td>
<td>D &gt; I</td>
<td>2</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td>36, 37</td>
</tr>
<tr>
<td>Collaborative Model for Knowledge Translation Between Research and Practice Settings</td>
<td>D &gt; I</td>
<td>2</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td>38</td>
</tr>
<tr>
<td>Coordinated Implementation Model</td>
<td>D &gt; I</td>
<td>2</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
<td>39</td>
</tr>
<tr>
<td>Model for Improving the Dissemination of Nursing Research</td>
<td>D &gt; I</td>
<td>2</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td>40</td>
</tr>
</tbody>
</table>

A brief word about evaluation

- 3 key questions for convergent mixed-methods analysis and multi-methods in RCTs in the real world

1. What are the contextual factors that impact the primary outcome measure?
2. How did the process of implementation work and what actually happened in the intervention?
3. What were the impacts of the intervention (positive and negative beyond the primary outcome measure?)
4. Do the qualitative findings predict individual quantitative results?
Take home points

• We live in interconnected complex adaptive systems. Technical solutions may be appropriate for some implementation challenges, but not for adaptive problems.

• Cynefin can be a useful sense making structure

• Theory and rigorous qualitative evaluation are crucial to improve interventions and evaluation.

• You can not create and implement a successful intervention without co-creation with people with tacit knowledge

• To succeed we need a lot of butterflies.
Useful references


Useful references


Graham ID et al. Lost in knowledge translation: Time for a map? J Cont Educ Health Prof. 2006;26:13-24

5AsT Team

- Principal Investigators
  Denise Campbell-Scherer
  Arya Sharma
  Sheri Fielding

- Co-Investigators
  Jeff Johnson
  Andrew Cave
  Donna Manca
  Guillermina Nöel
  Robin Anderson

- Patient Champions
  Penny Giacomoni, Rosemary Anderson, Jessie Clarke, Pat Parkinson, Laura Rogers, Michael Beaulieu

- Research Assistants
  Michelle Borowitz, Jacqueline Torti
  Nisreen ChelimiJaskaran Singh, Breanne Aylward

- Post-Doctoral Fellows
  Jodie Asselin
  Ayodele Ogunleye
  Christian Rueda-Clausen
  Thea Luig

- Study Coordinators
  Adedayo Osunlana
  Melanie Heatherington

- Students
  Eniola Salami, Albert Vu Carlos Lara
  Emily King

- Co-Investigators – 5AsT MD
  Sonja Wicklam
  Rena Lafrance
  Doug Klein
  Karen Moniz