Intersection of Quality Improvement (QI) and Research

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Intersection of QI and Research: Accelerating and Strengthening Learning and Change

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What is the problem?

• Research tells us what is possible and guidelines tell us what to do
  – Effective PMTCT prevents mother-to-child transmission rates of HIV
  – Vaccination for measles works
  – Washing hands reduces the risk of infections
What is the problem?

• Research tells us what is possible and guidelines tell us what to do
  – Effective PMTCT prevents mother-to-child transmission rates of HIV
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• BUT
What is the problem?

• Research tells us what is possible and guidelines tell us what to do
  – Effective PMTCT prevents mother-to-child transmission rates of HIV
  – Vaccination for measles works
  – Washing hands reduces the risk of infections

• BUT
  – We still see HIV, measles and hospital-associated infections
How big is the problem?

United States
1999: To Err is Human-
estimated tens of
thousands of patients
die each year due to
mistakes
The HIV Care Cascade

From "Illinois HIV Care Continuum Update" Illinois Department of Public Health, December 2014
Why do we have this problem?
Academic pathway:
More than just the article or the guidelines......
What are the challenges?

• Know-do gap
  – More than just efficacy and knowledge
• When translating research findings into practice and keeping them there
  – How we spread
  – Effectiveness when spread
• Once in practice, what is the quality
  – Getting it to the Right people
  – Doing it the Right way
• Understanding if it can be sustained?
What are the challenges?

• **Know-do gap**
  – More than just efficacy and knowledge
• **When translating research findings into practice and**
  If we want more evidenced-based practice, perhaps we need more an better practice-based evidence
  – Getting it to the Right people
  – Doing it the Right way
• **Understanding if it can be sustained?**
What is quality?

- Quality is a priority for everyone
- How we define it can be different
- How we measure it also differs

IOM 6 domains of quality
What about QI?

- Goal is to get care to match the standards we and our patients have defined and expect
- Multiple methods in use
  - Facility and individual level
    - PDSA cycles, behavioral change (coaching), data feedback/benchmarking
    - System design
    - Collaboratives
  - Policy levels
    - Financial incentives, public reporting
  - Community engagement
    - Accountability, empowerment

From mfi.jpg
Audience Poll #1

How would you describe your role in QI?

1. I have never done it
2. I have been on a team
3. I have led a team
4. I have published papers in QI
Quality Improvement vs. Research
Old school thoughts

**Quality Improvement**

Aim: Improve practice of health care

Methods:
- Test observable
- Stable bias
- Just enough data
- Adaptation based on data
- Many sequential tests
- **Assess by degree of belief in measured change**

**Clinical Research**

Aim: Create New clinical knowledge

Methods:
- Test often blinded
- Eliminate bias (e.g. case mix, randomize)
- Just in case data (more)
- Fixed prior hypotheses
- **One fixed test/intervention**
- Assess by statistical significance

Slide from 2003
Where do QI and research intersect?

- Both have specific aims
- Both include measurement and analysis
- Both create knowledge
  - Local knowledge from QI
  - Generalizability is the goal of research
- Not all QI can or should be studied, but more should be studied than we do
Why?

- QI creates local knowledge which is often lost
- Research is done which does not result in broader and sustainable improvement in quality
- We need innovations in delivery as well as delivery of innovations

Getting **new** evidence into practice
Getting evidence on how to get existing EBIs to be delivered
Example of lost knowledge

• You notice that people are not washing their hands before seeing patients
• You recognize that there are multiple barriers
  – Opportunity
  – Motivation
• You address these and hand washing goes up
• How many other places adopt this?
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Audience Poll #2

What does implementation science mean to you?

1. I have never heard of it
2. I have heard of it but do not know what it means
3. It is the study of how you do science
4. It is the study of how you can better implement interventions into practice
Even when we combine QI and research—we sometimes do not get it right.
Even when we combine QI and research-we sometimes do not get it right
Even when we combine QI and research—we sometimes do not get it right

Introduction of Surgical Safety Checklists in Ontario, Canada

David R. Urbach, M.D., Anand Govindarajan, M.D., Refik Saksin, M.Sc., Andrew S. Wilton, M.Sc., and Nancy N. Baxter, M.D., Ph.D.

Most of what we do are complex interventions

• “health service interventions that are not drugs or surgical procedures, but have many potential “active ingredients.”

• combines different components in a whole that is more than the sum of its parts.

• How we study this is different than a drug trial
  – Whether introducing new evidence-based interventions OR addressing why existing ones are not being done
“Traditional statistical and research methods assume linear and repeatable patterns. However, complex systems like health care delivery sites do not act in that way. A different type of inquiry is required.”

- Michael Parchman, MD, MPH

We also need perhaps less delivery of innovation and more innovation of delivery
What do we need to do this?

- Different study type
- Expanded group of researchers
- Different evidence
- Different ways in which we do this research
- Better research integrated IN QI interventions
- Better research OF QI methods
- Different ways in which we disseminate new knowledge
- Building capacity for embedded research
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Can Implementation science help us?

• The study of methods to promote the integration of research findings and evidence into healthcare policy and practice (NIH Fogarty Center)

• ..the scientific inquiry into questions concerning implementation-the act of carrying an intention into effect...” Peters et al 2013

• Seeks to understand and work within rather than control for real world conditions
What about Improvement Science?

- Discipline producing generalizable learning through combining rigor of research with a “willingness to adapt improvement activities”\(^1\)

- Field of research to identify *which improvement strategies* work *WHILE* efforts continue to make patient care safe and effective\(^2\)

2. [www.improvementscienceresearch.net/about/improvement_science.asp](http://www.improvementscienceresearch.net/about/improvement_science.asp)  
What are some challenges where implementation and improvement science can help

• Understanding **where** change is needed
  – What is the problem creating the quality of care gap
• Determining **which intervention** is needed and how it should be **adapted and implemented**
  – How to bridge the gap
• If it works, how and why (and if not, why not)
• Meeting local needs and creating generalizable knowledge
When can we use Implementation and Improvement Science

• For a specific activity, inform the:
  – Design or Adaptation
  – Implementation
  – Evaluation
  – Spread
  – Dissemination
• Measure effectiveness, implementation, potential for sustainability and scale
• Create generalizable knowledge and local change/learning
Audience Poll #3

Have you used frameworks in your work or research?

1. Yes
2. No
3. What is a framework?
What about Frameworks and Models?

• There are many!
• Chosen well, can help you define what you did and heat and how you will measure and study beyond effectiveness
• Explain what should happen or did happen
  – Ex. HIV care cascade
• Explain what you think will happen
  – Ex. If I put up posters and provide alcohol rub dispensers, hand washing will increase and stay that way
## Simplified Logic model of this lecture

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Activities and outputs</th>
<th>Outcomes</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Qualified Speakers</td>
<td>• Lecture given</td>
<td>• Increased knowledge and skills</td>
<td>More effective study design</td>
</tr>
<tr>
<td>• Effective materials</td>
<td>• People attend and stay awake</td>
<td>• Knowledge is applied</td>
<td>More generalizable knowledge</td>
</tr>
<tr>
<td>• Space (adequate and set-up)</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
Ex. RE-AIM

- **Reach:**
  - What % of your targeted population did you reach
- **Effectiveness**
  - Did you see the benefit you wanted?
- **Adoption**
  - Did providers do what you wanted them to do?
- **Implementation**
  - How well was it implemented? Where were adaptation needed and done
- **Maintenance**
  - How has it been incorporated into “usual practice”? How will it (or has it been) sustained
Ex. RE-AIM of HCV testing QI initiative

• **Reach:**
  – What % of patients were offered and received HCV testing?
  – Who did not?

• **Effectiveness**
  – How many people were newly diagnosed and screened for treatment?

• **Adoption**
  – What % of providers routinely offered HCV screening? What were there resistance?

• **Implementation**
  – Was the intervention (training, education, availability of testing and treatment referrals) done as planned? Did something not work and was adaptation done? What was it?

• **Maintenance**
  – Was it incorporated into “usual practice” in the clinic? Are there barriers for sustaining (financial, resources etc.)?
What else to plan to measure? Context matters

Consolidated Framework for Implementation: Figure from Sustainability of healthcare innovations (SUSHI): Long term effects of two implemented surgical care programmes
What about the type of evidence is needed to create generalizable knowledge?
What are data?
What are data?
What are data?

15

28%
What are data?

The person at the desk treated me with respect
What are data?

15  28%

On a scale of very short to very long, the wait time was long.

The person at the desk treated me with respect.
What are data?

On a scale of 1 to 28%, please rate how long you'd like me to stay with respect.
Measuring beyond Interventions and quality: what did you plan and what did you do?

Powell BJ, 2014
Measuring beyond Interventions and quality: what did you plan and what did you do?

Powell BJ, 2014
Study/Evaluation design for more or less rigor

- Randomized control trials
  - Rigid
  - Adaptive
  - Pragmatic
- Quasi experimental
  - Stepped wedge
  - Interrupted time series
  - Statistical Process Control
  - Pre/post
    - With or without controls
  - Only end line
- Mixed methods
- Qualitative
Study methods

• Why not just do a randomized control trial?
• Sometimes we do need them
• Sometimes we should not
  – Equipoise
• Sometimes we can not....
The Story of Research of QI for Central Line infections

- Bundle of 4 evidence-based interventions known to decrease risk of central line infections
- Prospective study of implementation of this bundle in hospitals in Michigan
- Reduced infections from 2.7 infections per 1000 catheter-days to median of 0 by 3 months
  - Sustained for 18 months
Balancing demands of local need and priorities versus generalizable knowledge

The Story of MESH
Balancing demands of local need and priorities versus generalizable knowledge

The Story of MESH

**FIGURE 4. CORE ACTIVITIES OF MENTORS AT THE HEALTH CENTER**

- **Assess Quality of Care**
  - Visit each health center every 4–6 weeks and observe patient consultations in the mentor’s clinical sphere. Use observation checklists to assess quality of patient consultation.

- **Build Mentees’ Skills**
  - Offer in-the-moment mentorship, particularly for urgent issues.
  - Post-consultation discussions of strengths, weaknesses, and plans for skill building.

- **Improve HC Staff Knowledge**
  - Conduct on-site learning sessions to address knowledge and training gaps of health center nurses.

- **Improve Systems**
  - Complete Mentor Activity Log, including facility assessment, to identify system gaps that could be addressed through quality improvement projects.

**MESH-QI: MENTORSHIP AND ENHANCED SUPERVISION FOR HEALTH CARE AND QUALITY IMPROVEMENT IN RWANDA**
Challenges

• Timeline of the national government and partners

• Ethics of observing poor quality
• Equipoise on the value of mentoring
• Resources available for evaluation
Compromise
Nurse mentorship to improve the quality of health care delivery in rural Rwanda

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Mentoring and quality improvement strengthen integrated management of childhood illness implementation in rural Rwanda

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ABSTRACT
Objective. Integrated Management of Childhood Illness (IMCI) is the leading clinical protocol designed to decrease under-five mortality globally. However, impact is threatened by gaps in IMCI quality of care (QOC). In 2010, Partners In Health and the Rwanda Ministry of decreased under-five mortality and health cost savings.3–5 However, many countries have experienced significant barriers to widespread implementation, including poor training coverage, inadequate equipment and infrastructure, and political and financial constraints. Even in areas where
Clinical mentorship to improve pediatric quality of care at the health centers in rural Rwanda: a qualitative study of perceptions and acceptability of health care workers

Anatole Manzi1,2*, Hema Magge2,3,4, Bethany L Hedt-Gauthier1,2,5, Annie P Michaelis2, Felix R Cyamatare2, Laetitia Nyirazinyo1, Lisa R Hirschhorn2,4,5 and Joseph Ntagirira1

Abstract

Background: Despite evidence supporting Integrated Management of Childhood Illness (IMCI) as a strategy to improve pediatric care in countries with high child mortality, its implementation faces challenges related to lack of
Compromise

**FIGURE 7. NONCOMMUNICABLE DISEASES (NCDS): APPROPRIATE MANAGEMENT OF ASTHMA, DIABETES, AND HYPERTENSION**

- Jul - Sep '13: 31%
- Oct - Dec '13: 36%
- Jan - Mar '14: 46%
- Apr - Jun '14: 50%
- Jul - Sep '14: 60%
- Oct - Dec '14: 56%

**Background:** Despite evidence supporting Integrated Management of Childhood Illness (IMCI) as a strategy to improve pediatric care in countries with high child mortality, its implementation faces challenges related to lack of...
Methods of analysis: run charts and statistical Process Control charts

Savarino et al 2016
Published in BMJ Improvement reports

Healthy control chart.
What about IRB and informed consent?

• Required IRB overall but low risk
• **None** of the interventions were experimental.
  – all safe, evidence-based, standard (though not always implemented) procedures.
• No additional risks beyond those involved in standard clinical care.
• Using a protocol to ensure implementation of these interventions could not have increased the risks of hospital-acquired infection.
• Participating hospitals could have introduced this QI protocol without research
• Only component of the project that constituted **pure research** — the systematic measurement of the rate of catheter-related infections — did not carry any risks to the subjects. Thus, the research posed no risks.
• AND-this created generalizable knowledge which has saved countless lives

Adapted in part from From Miller and Emmanuel, NEJM 2008
Embedded research as a pathway: research “with” not “on”

Models

• Researchers “embedded” in an organization and with academic affiliation who collaborate with care teams to identify, design, conduct, and disseminate findings to those who work inside host organizations while also maintaining academic affiliation

• Similar models but no affiliation with academic institutions

• Explicit building capacity of providers and managers to consume, design, and implement research
  – Mentorship from researchers
  – Co-develop with academic partners

• Core is collaborative relationship

Vindrola Pardos. The role of embedded research in QI. BMJQS, 2016
Publishing your work

• SQUIRE (Standards for Quality Improvement Reporting Excellence) 2.0
  – http://squire-statement.org/
• Simple guidelines for how to write up your QI work
• Lesson learned: read before you start the project.......
Audience Poll #4

What is your interest in combining QI and research in the next 3-6 months?

1. I have none
2. I am already doing it and can help others
3. I am already doing it but need some help
4. I would like to start
Many thanks and questions

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