Intersection of Quality Improvement (QI) and Research

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

Lisa Hirschhorn, MD MPH

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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?

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  - Effective PMTCT prevents mother-to-child transmission rates of HIV
  - Vaccination for measles works
  - Washing hands reduces the risk of infections
- BUT

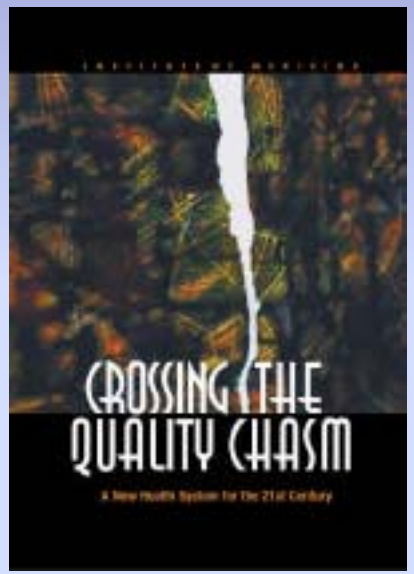
What is the problem?

- 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

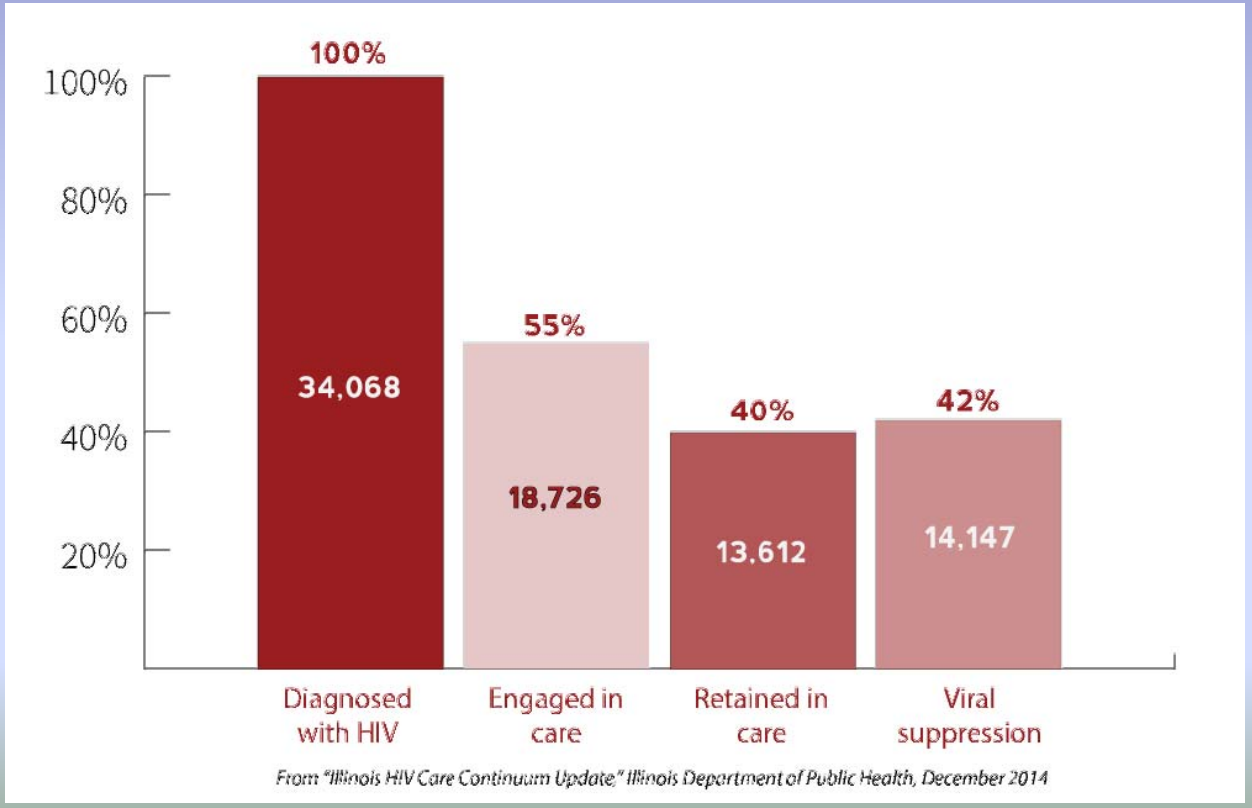
How big is the problem?

United States

1999: To Err is Human- estimated tens of thousands of patients die each year due to mistakes



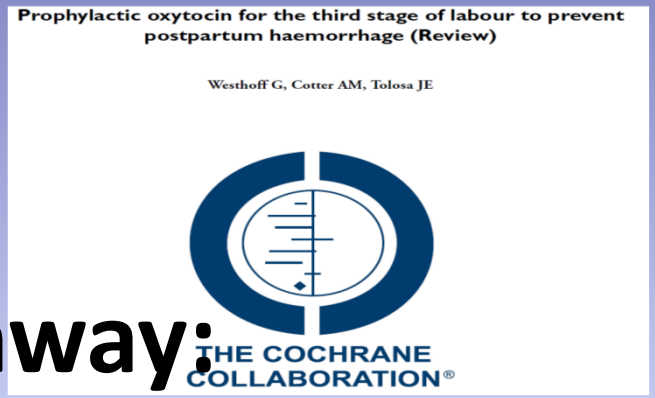
The HIV Care Cascade



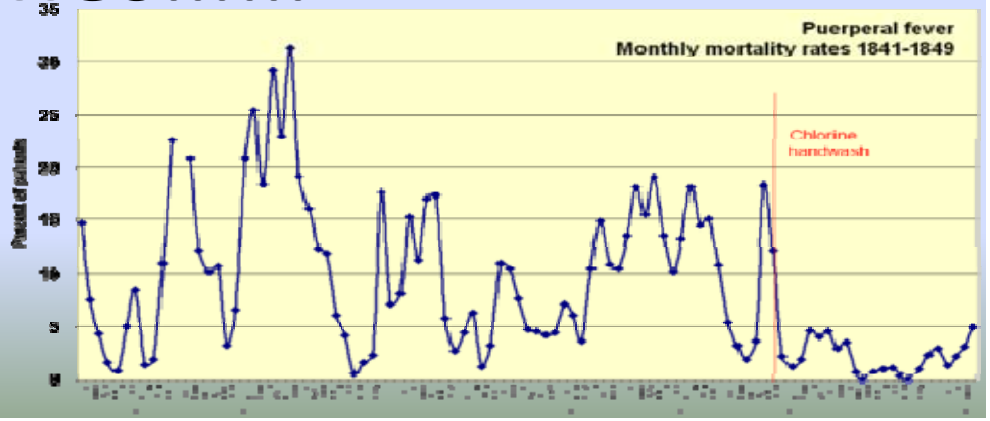
From "Illinois HIV Care Continuum Update," Illinois Department of Public Health, December 2014

AFC

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**
  - Getting it to the Right people
  - Doing it the Right way
- **Understanding if it can be sustained?**

If we want more evidenced-based practice, perhaps we need more an better practice-based evidence

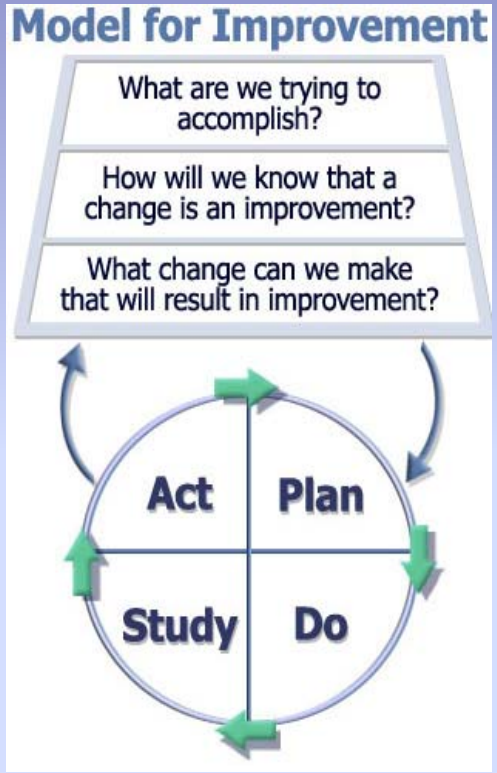
What is quality?

- 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

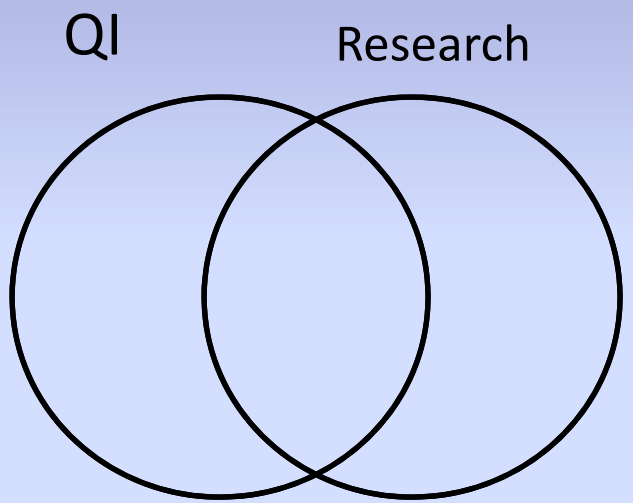
Methods:

- 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

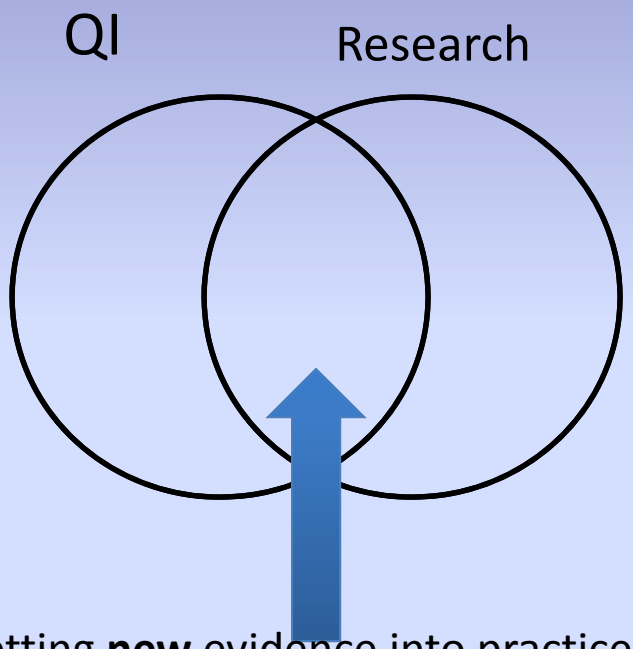
Where do QI and research intersect?

- 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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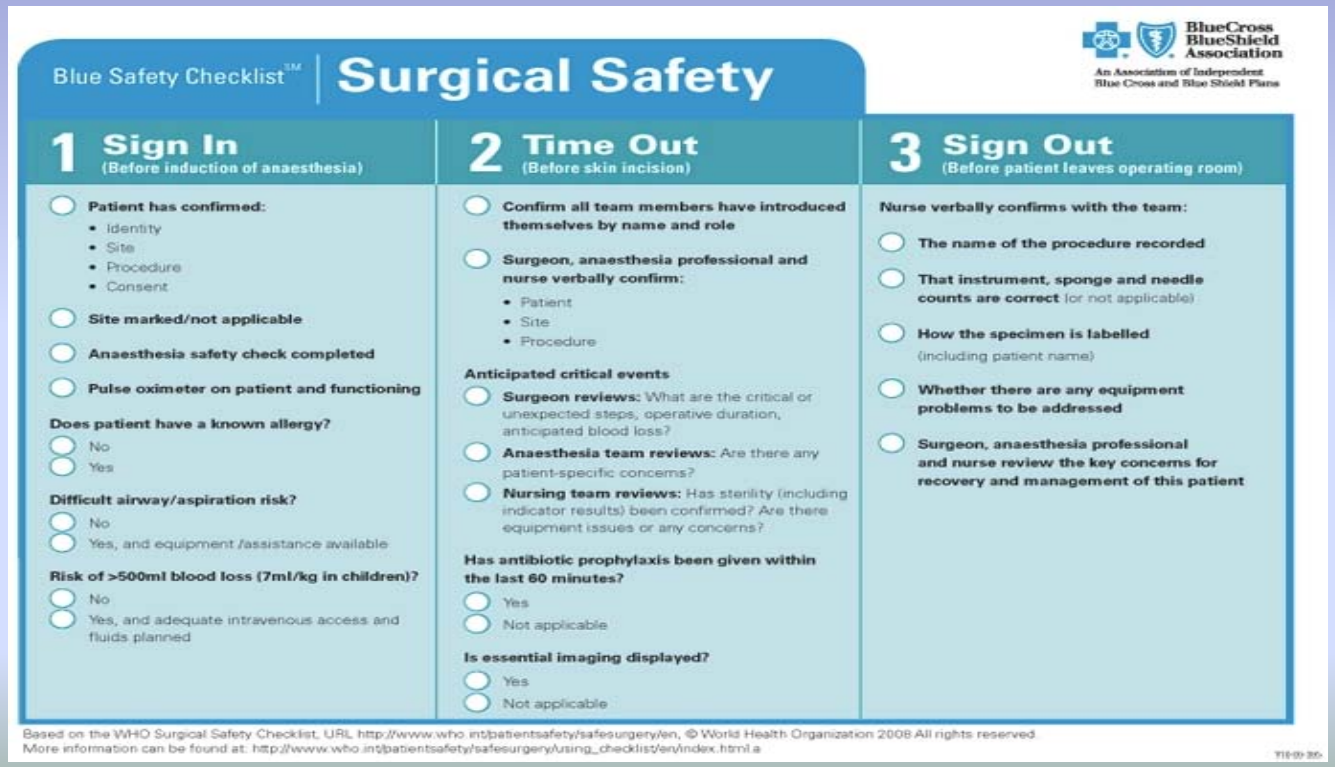
Audience Poll #2

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



Blue Safety Checklist℠ | Surgical Safety

BlueCross BlueShield Association
An Association of Independent Blue Cross and Blue Shield Plans

1 Sign In
(Before induction of anaesthesia)

- ◯ **Patient has confirmed:**
  - Identity
  - Site
  - Procedure
  - Consent
- ◯ **Site marked/not applicable**
- ◯ **Anaesthesia safety check completed**
- ◯ **Pulse oximeter on patient and functioning**

Does patient have a known allergy?
- ◯ No
- ◯ Yes

Difficult airway/aspiration risk?
- ◯ No
- ◯ Yes, and equipment /assistance available

Risk of >500ml blood loss (7ml/kg in children)?
- ◯ No
- ◯ Yes, and adequate intravenous access and fluids planned

2 Time Out
(Before skin incision)

- ◯ **Confirm all team members have introduced themselves by name and role**
- ◯ **Surgeon, anaesthesia professional and nurse verbally confirm:**
  - Patient
  - Site
  - Procedure

Anticipated critical events
- ◯ **Surgeon reviews:** What are the critical or unexpected steps, operative duration, anticipated blood loss?
- ◯ **Anaesthesia team reviews:** Are there any patient-specific concerns?
- ◯ **Nursing team reviews:** Has sterility (including indicator results) been confirmed? Are there equipment issues or any concerns?

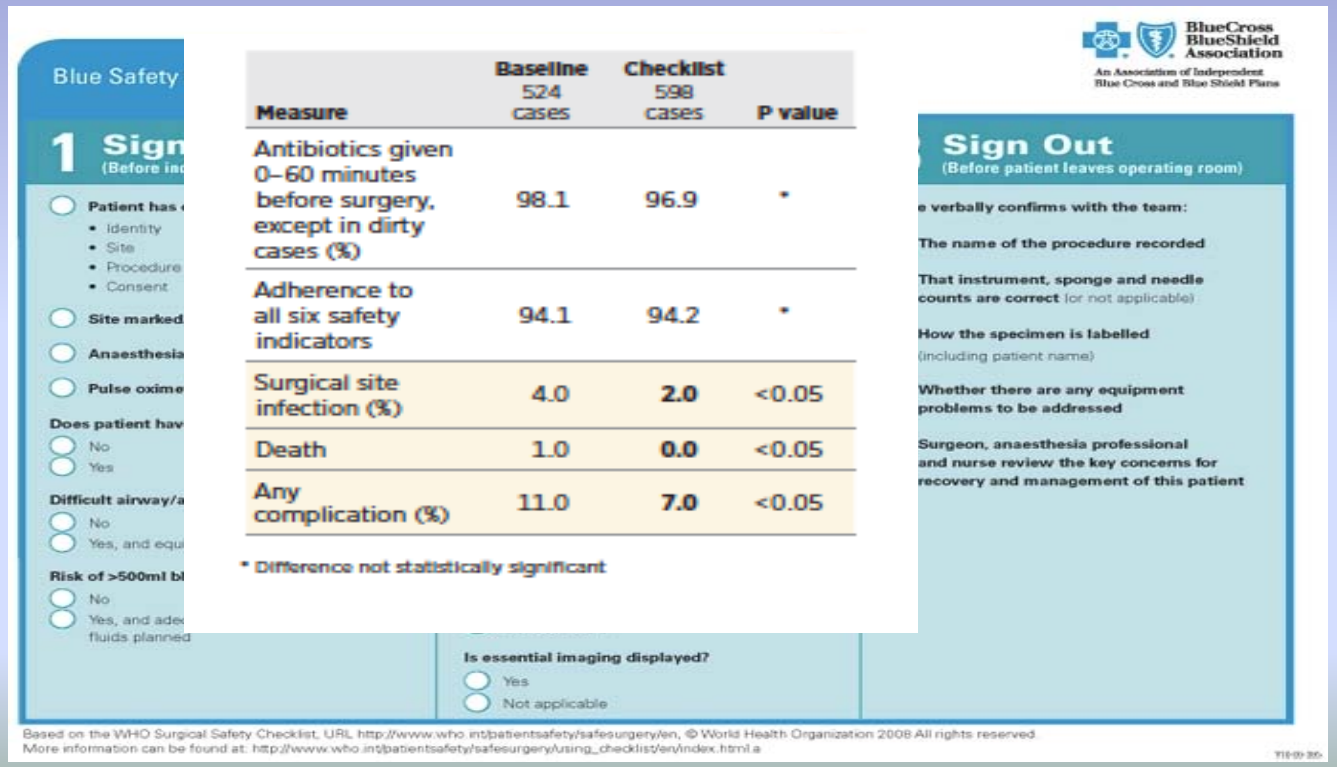
Has antibiotic prophylaxis been given within the last 60 minutes?
- ◯ Yes
- ◯ Not applicable

Is essential imaging displayed?
- ◯ Yes
- ◯ Not applicable

3 Sign Out
(Before patient leaves operating room)

Nurse verbally confirms with the team:
- ◯ **The name of the procedure recorded**
- ◯ **That instrument, sponge and needle counts are correct** (or not applicable)
- ◯ **How the specimen is labelled** (including patient name)
- ◯ **Whether there are any equipment problems to be addressed**
- ◯ **Surgeon, anaesthesia professional and nurse review the key concerns for recovery and management of this patient**

Even when we combine QI and research-we sometimes do not get it right



Blue Safety

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(Before ind

Patient has
- Identity
- Site
- Procedure
- Consent

Site marked

Anaesthesia

Pulse oxime

Does patient hav
No
Yes

Difficult airway/a
No
Yes, and equi

Risk of >500ml bl
No
Yes, and ade
fluids planned

Measure	Baseline 524 cases	Checklist 598 cases	P value
Antibiotics given 0–60 minutes before surgery, except in dirty cases (%)	98.1	96.9	*
Adherence to all six safety indicators	94.1	94.2	*
Surgical site infection (%)	4.0	**2.0**	<0.05
Death	1.0	**0.0**	<0.05
Any complication (%)	11.0	**7.0**	<0.05

* Difference not statistically significant

Is essential imaging displayed?
Yes
Not applicable

BlueCross BlueShield Association
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Based on the WHO Surgical Safety Checklist, URL http://www.who.int/patientsafety/safesurgery/en, © World Health Organization 2008 All rights reserved
More information can be found at: http://www.who.int/patientsafety/safesurgery/using_checklist/en/index.html a

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Blue Safety

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(Before ind

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Antibiotics given 0–60 minutes			

BlueCross BlueShield Association
An Association of Independent Blue Cross and Blue Shield Plans

Sign Out
(Before patient leaves operating room)

SPECIAL ARTICLE

Introduction of Surgical Safety Checklists in Ontario, Canada

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

N Engl J Med 2014; 370:1029-1038 | March 13, 2014 | DOI: 10.1056/NEJMsa1308261

Infection (%)			
Death	1.0	**0.0**	<0.05
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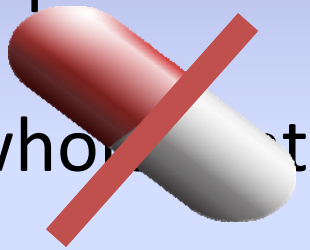
problems to be addressed

Surgeon, anaesthesia professional and nurse review the key concerns for recovery and management of this patient

Is essential imaging displayed?
Yes
Not applicable

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]

1. Marshall et al Lancet 2013 2. www.improvementscienceresearch.net/about/improvement_science.asp
3. The HealthFoundation, Report: Improvement Science Research scan January 2011

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

Inputs	Activities and outputs	Outcomes	Impact
• Qualified Speakers • Effective materials • Space (adequate and set-up)	• Lecture given • People attend and stay awake	• Increased knowledge and skills • Knowledge is applied	More effective study design More generalizable knowledge

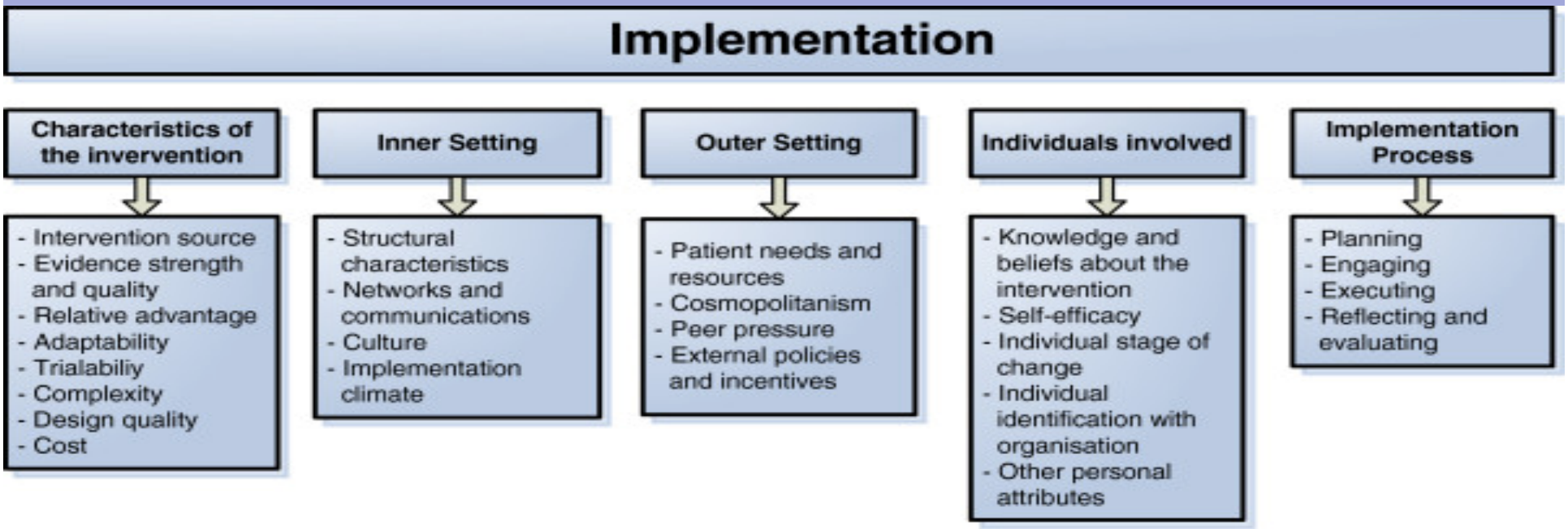
Ex. RE-AIM

- **R**each:
  - What % of your targeted population did you reach
- **E**ffectiveness
  - Did you see the benefit you wanted?
- **A**doption
  - Did providers do what you wanted them to do?
- **I**mplementation
  - How well was it implemented? Where were adaptation needed and done
- **M**aintenance
  - How has it been incorporated into “usual practice”? How will it (or has it been) sustained

Ex. RE-AIM of HCV testing QI initiative

- **R**each:
  - What % of patients were offered and received HCV testing?
  - Who did not?
- **E**ffectiveness
  - How many people were newly diagnosed and screened for treatment?
- **A**doption
  - What % of providers routinely offered HCV screening? What were there resistance?
- **I**mplementation
  - 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?
- **M**aintenance
  - 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?

15

What are data?

28%

15

What are data?

28%

15

The person at the desk treated me with respect

What are data?

What are data?

15

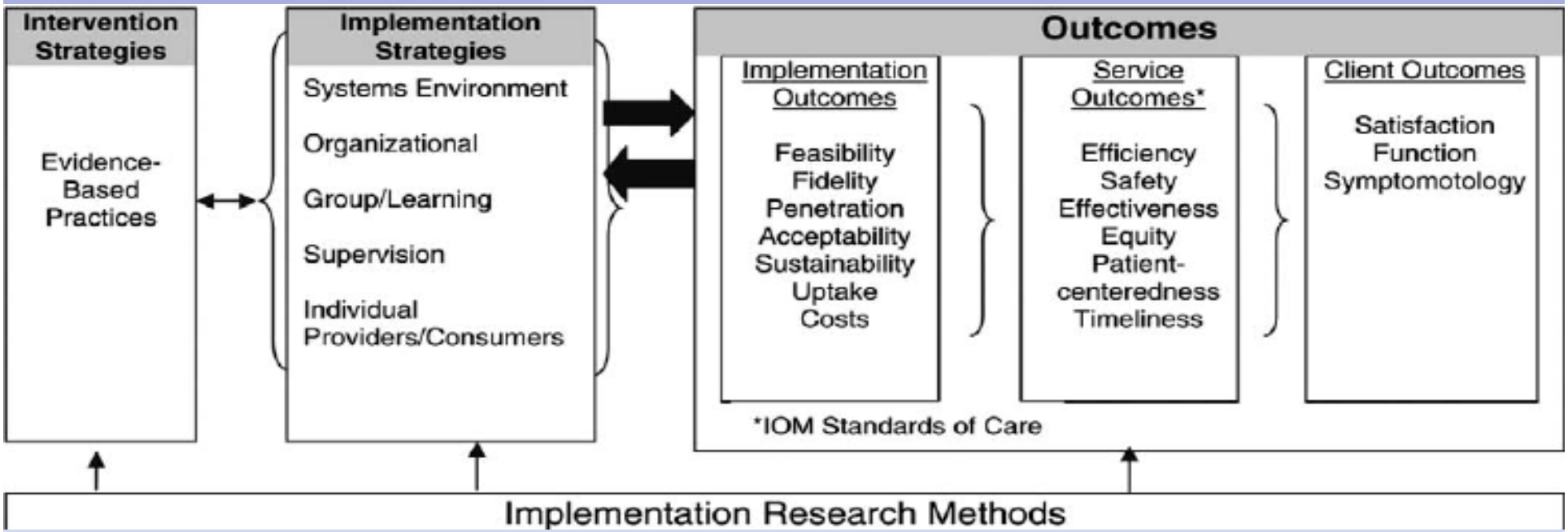
On a scale of

as long

%

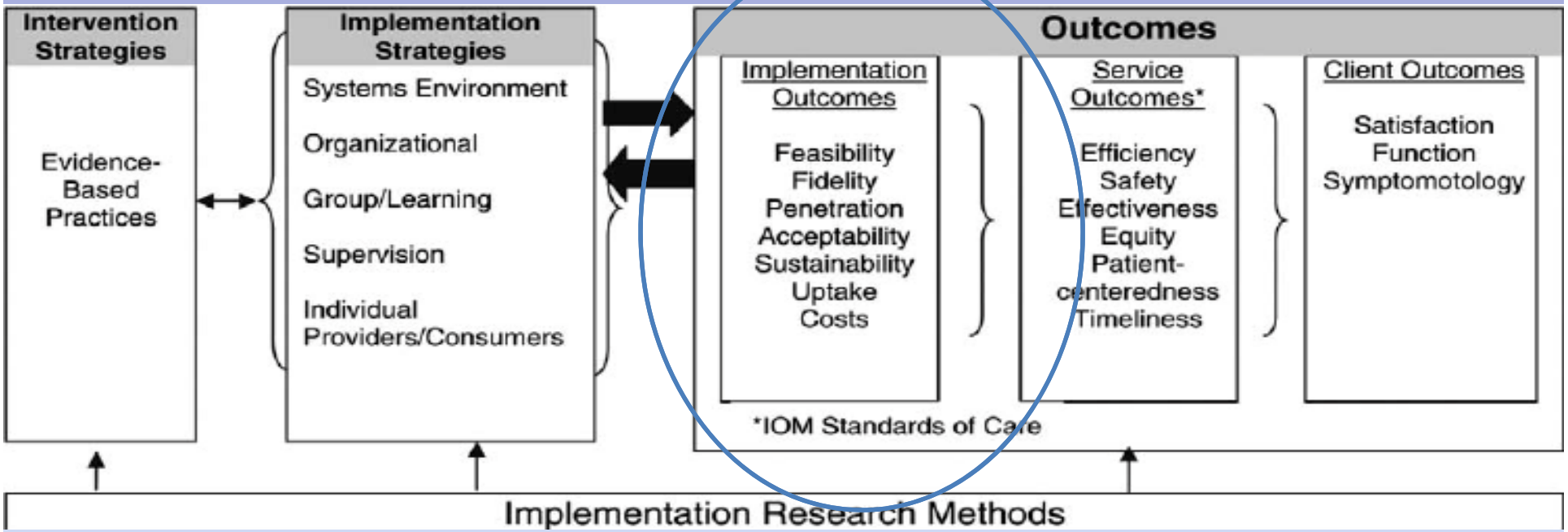
ed me with respect

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

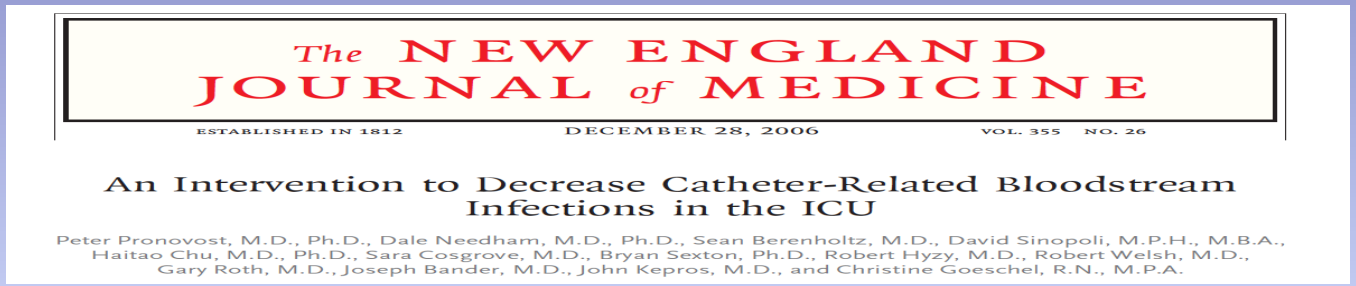
Study/Evaluation design for more or less rigor

- 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



The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 DECEMBER 28, 2006 VOL. 355 NO. 26

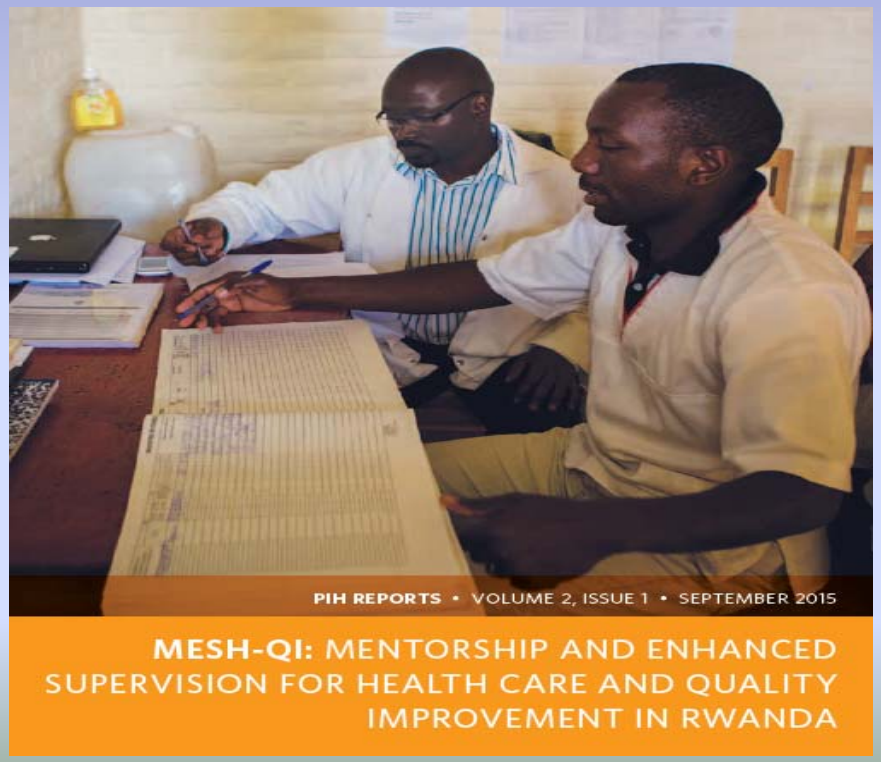
An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU

Peter Pronovost, M.D., Ph.D., Dale Needham, M.D., Ph.D., Sean Berenholtz, M.D., David Sinopoli, M.P.H., M.B.A., Haitao Chu, M.D., Ph.D., Sara Cosgrove, M.D., Bryan Sexton, Ph.D., Robert Hyzy, M.D., Robert Welsh, M.D., Gary Roth, M.D., Joseph Bander, M.D., John Kepros, M.D., and Christine Goeschel, R.N., M.P.A.

- 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

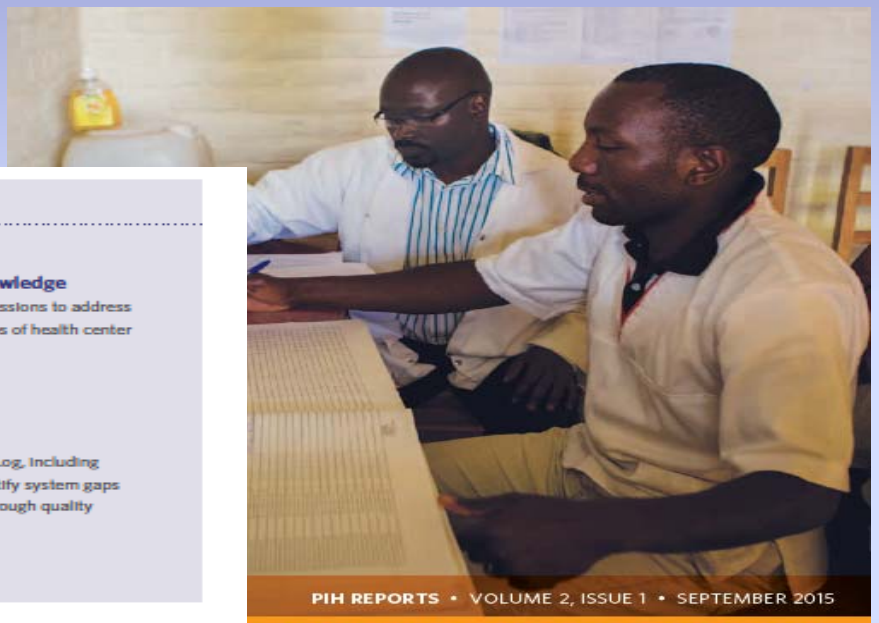
Assess Quality of Care
Visit each health center every 4–6 weeks and observe patient consultations in the mentor's clinical sphere. Use observation checklists to assess quality of patient consultation.

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

Build Mentees' Skills
Offer in-the-moment mentorship, particularly for urgent issues.

Post-consultation discussions of strengths, weaknesses, and plans for skill building.

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



PIH REPORTS • VOLUME 2, ISSUE 1 • SEPTEMBER 2015

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

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Available online at www.sciencedirect.com
ScienceDirect
NURS OUTLOOK 61 (2013) 137–144
NURSING OUTLOOK
www.nursingoutlook.org

Nurse mentorship to improve the quality of health care delivery in rural Rwanda

Manzi Anatole, MPH[a,b,], Hema Magge, MD[a,c,d], Vanessa Redditt, MD[e], Adolphe Karamaga, MD[f], Saleh Niyonzima, MD[f,b], Peter Drobac, MD[a,d,g], Joia S. Mukherjee, MD[d,g,h], Joseph Ntaganira, MD, PhD[b], Laetitia Nyirazinyoye, PhD[b], Lisa R. Hirschhorn, MD[d,g,h,i]*

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[b] *School of Public Health, National University of Rwanda, Kigali, Rwanda*
[c] *Division of General Pediatrics, Children's Hospital Boston, Boston, MA*
[d] *Division of Global Health Equity, Brigham and Women's Hospital, Boston, MA*
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Compromise

ADC Online First, published on May 12, 2014 as 10.1136/archdischild-2013-305863

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

Hema Magge,[1–5] Manzi Anatole,[4–6] Felix Rwabukwisi Cyamatare,[4,5] Catherine Mezzacappa,[1,4,5] Fulgence Nkikabahizi,[7] Saleh Niyonzima,[7] Peter C Drobac,[1,3,4,5] Fidele Ngabo,[7] Lisa R Hirschhorn[1,3,5]

▶ Additional material is published online only. To view please visit the journal online (http://dx.doi.org/10.1136/archdischild-2013-305863).

[1]Division of Global Health Equity, Brigham and Women's

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

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ADC Online First, published on May 12, 2014 as 10.1136/archdischild-2013-305863

Manzi *et al. BMC Health Services Research* 2014, **14**:275
http://www.biomedcentral.com/1472-6963/14/275

BMC Health Services Research

RESEARCH ARTICLE Open Access

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

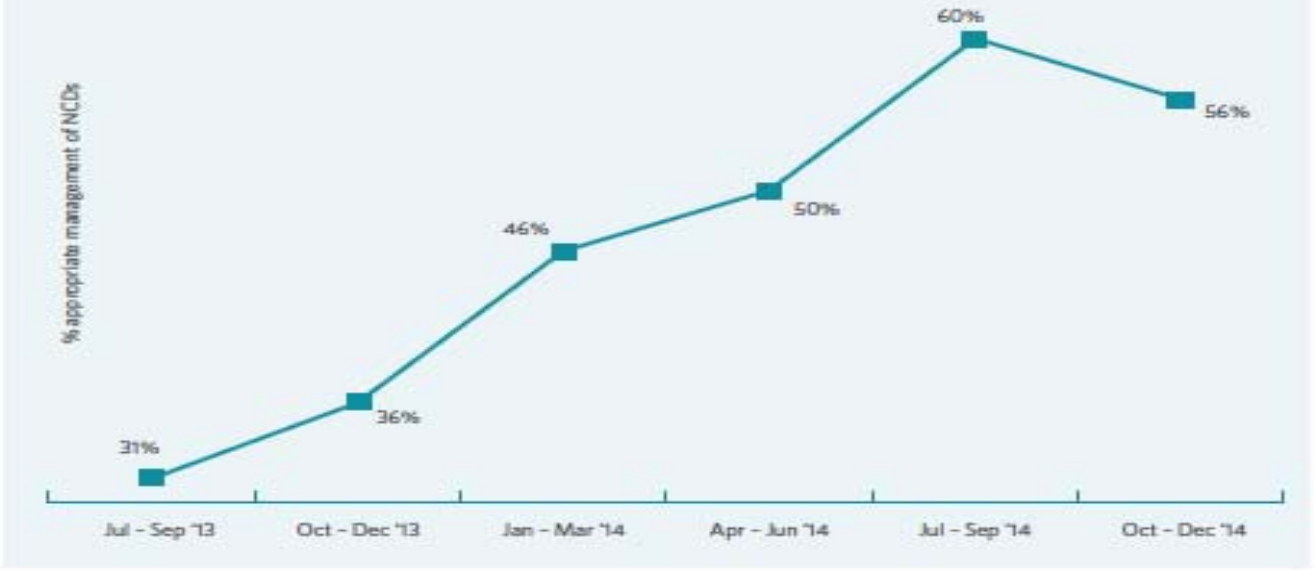
Anatole Manzi[1,2*], Hema Magge[2,3,4], Bethany L Hedt-Gauthier[1,2,5], Annie P Michaelis[2], Felix R Cyamatare[2], Laetitia Nyirazinyoye[1], Lisa R Hirschhorn[2,4,5] and Joseph Ntaganira[1]

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

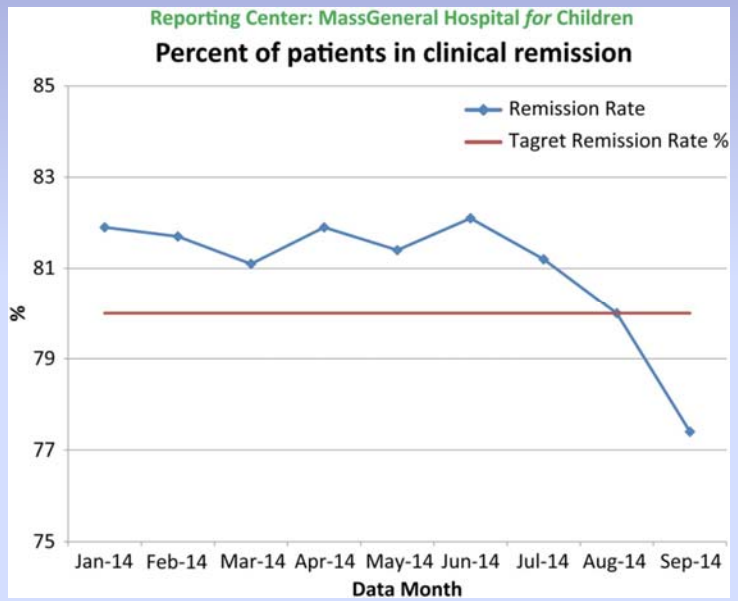
Compromise

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

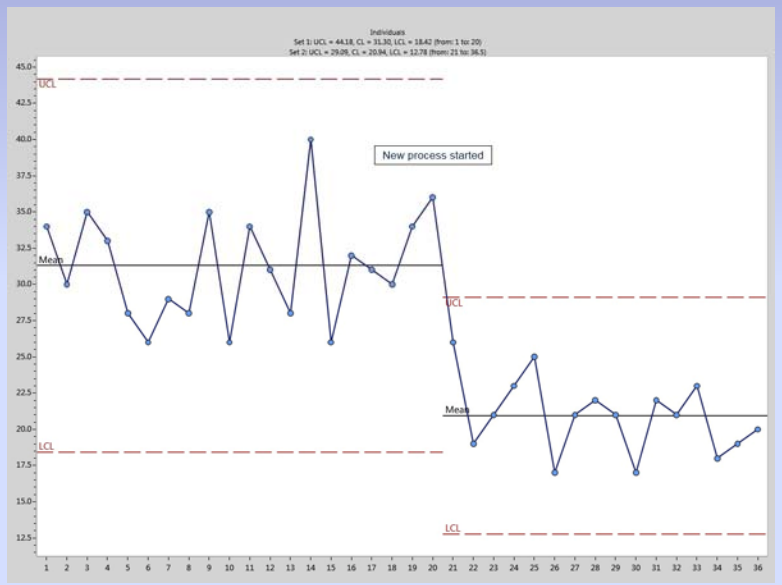


Background: Despite evidence supporting Integrated Management of Childhood Illness (IMCI) as a strategy to improve pediatric care in countries with high child mortality, its implementation faces challenges related to lack of

Methods of analysis: run charts and statistical Process Control charts



Savarino et al 2016
Published in BMJ Improvement reports



Healthy control chart.
http://www.pqsystems.com/quality-solutions/statistical-process-control/SQCpack/resource-articles/what-to-look-for-in-your-charting-software.php

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 Padros. 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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