Certificate Program in Practice-Based Research Methods

Utilizing Quality Improvement for PBRN Research

Session 7 - January 12, 2017

Chester H. Fox MD, FAAFP, FNKF
Professor of Family Medicine
Jacobs School of Medicine and Biomedical Sciences
University at Buffalo, The State University of New York

Mary A. Dolansky, RN, PhD, FAAN
Associate Professor
Frances Payne Bolton School of Nursing
Case Western Reserve University
Utilizing QI for PBRN Research:

Chet Fox MD
Mary Dolansky RN, PhD
THE CHRONIC CARE MODEL
PRINCIPLES OF PRAGMATIC CLINICAL TRIALS
IMPROVING CARE IN THE REAL WORLD

- CLINICALLY RELEVANT ALTERNATIVES
- DIVERSE STUDY POPULATION
- HETEROGENEOUS PRACTICE SETTINGS
- DATA COLLECTED ON A BROAD RANGE OF OUTCOMES

Why This Kind of Study Is needed?

- People get only 50% of evidence-based preventive and chronic disease care
- It takes 7.9 hours/patient/year to complete preventive screenings
- It takes 3.6 hours/day for stable patients and 10.6 hours/day for complex patients to do chronic disease management
- It takes 17 years from evidence in the literature to become routine care

PRINCIPLES OF QUALITY IMPROVEMENT
The Model for Improvement

Unless changes are integrated into "daily work", changes will not stick. E.g. job descriptions and job training following current best known methods, link to supervision, etc.
METHODS THAT WORK

- Practice Facilitation
- Academic Detailing / Mentoring
- Audit and Feedback
- Collaborative Learning
PRACTICE FACILITATION

- Develops long-term relationship with practice
- Works integrally with practice to set up efficient systems for QI and population management
- Works with and trains staff in effective team meetings
- Helps set up efficient work flows to integrate into routine care
- Helps prepare necessary data and reports so people can know how they are doing
- Cross pollinate ideas that work
Academic Detailing/Mentoring

- **Academic Detailing**
  - Experienced MD Champions educate practice champions
- **Academic mentoring**
  - On-going relationship and support of practice champions
- **Purpose: Clinician buy-in**
  - To support efficiency instead of the dreaded “One More Thing”
Audit and Feedback

- Two Forms
  - Pre-post change over time

- Benchmarking compared to other practice sites or clinicians
Collaborative Learning

- Video
- In-person
- Webinar
- Small group
- Large group
- Mixed; Practice managers, staff and clinicians
- Specialized: just staff; just clinicians etc
Key Elements of Success

- Goals:
  - Clear, easily measurable and feasible
  - Not too many
- Resources:
  - Time and personnel to do the project
  - Data at the point of care and population reports
  - Clinician Champions
  - Site coordinator for local accountability
  - Shared learning abilities
Develop the One page value proposition using the 5R approach
PCORI grant as example

- Requirements
- Resources
- Roles
- Responsibilities
- Respect

- Practices must have ½ time behavioral health specialist who can see Medicare and fill out integration forms
- $150,000 per practice site over 5 years
- PCP, BH specialist, facilitator
- Complete web based training and give all necessary research data
- This is attitudinal and underlies the project
Decision support plan
Point of Care Decision Support example
Overview of a Pragmatic Clinical Trial

Comparative Effectiveness Trial
Computer Decision Support alone vs. Computer Decision Support + Virtual Facilitation
**Translate CKD Study**

**Point of Care Decision Support**

---

**CINA Sample Clinic**

**Patient Recommendation Report**

**Identification:**
- **Name:** SAMPLE, CINA Female
- **Age:** 75 years
- **Gender:** Female
- **AM:** 9:00

**Diagnosis:**
- **Active Diagnoses:**
  - **Diabetes Mellitus**
  - **Hypertension**
  - **Chronic Kidney Disease**
  - **Hypertension**
  - **Anemia**
  - **Proteinuria**

**Risk Factors:**
- **CHD 10Y Risk:** 20%
- **DM Risk:** High
- **Hypertension:** High
- **Creatinine:** 1.5 mg/dL

**Smoker:**
- **Goal not met:** Yes
- **Goal met:** No
- **Goal value:** BMI > 20

**Vaccine:**
- **Tetanus:** Protraneous

**Action Items:**
- **Document Advanced Directive status**
- **Document last Mammogram:** 1/2020
- **Document last Pap smear:** N/A
- **Order HbA1c:** 1/2020
- **Order Lipid Panel:** N/A

**Labs:**
- **Cholesterol:** 160 mg/dL
- **LDL:** 45 mg/dL
- **Triglycerides:** 157 mg/dL

**Measurements:**
- **Weight:** 60 kg
- **Height:** 160 cm

**Diagnostic Testing:**
- **Last Test:** 01/2020
- **Frequency:** 2022

**Next Appt Date:**
- **Date:** 01/2022

**Metabolic Syndrome Criteria:**
- **BP > 130/85**
- **OR**
- **DM**
- **OR**
- **Estimated Glomerular Filtration Rate (eGFR) < 60 mL/min/1.73 m^2**

---

**Additional Notes:**
- **Clinical Notes:**
  - **Order HbA1c:** 1/2020
  - **Order Lipid Panel:** N/A
  - **Order Alpha Glucosidase:** N/A
  - **Order Fasting Lipid Panel:** N/A

---

**Conclusion:**
- **Recommendation:** Continue monitoring for Metabolic Syndrome.
Versus Facilitated Decision Support

- Target
- Reminder
- Administrative Buy-In
- Network Information System
- Site Coordinator
- Local Clinician Champion
- Audit and Feedback
- Team Approach
- Education
## Study Outcome Measures

<table>
<thead>
<tr>
<th>Treatment Recommendation</th>
<th>Goal</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control blood pressure</td>
<td>130</td>
<td>Means of last three systolic BP; will be based on last one or two if fewer than three available</td>
</tr>
<tr>
<td>Control HbA1c</td>
<td>&lt;7.0</td>
<td>Last HbA1c</td>
</tr>
<tr>
<td>Control LDL</td>
<td>&lt;100</td>
<td>Mean of last two LDL; last LDL if only one is available</td>
</tr>
<tr>
<td>Use ACE/ARB</td>
<td></td>
<td>Documentation in EHR/pharmacy of prescription; yes/no for each time period</td>
</tr>
<tr>
<td>Refer to Nephrologist (GFR &lt; 30)</td>
<td></td>
<td>Referral documented, if applicable</td>
</tr>
<tr>
<td>Eliminate smoking</td>
<td></td>
<td>Yes/no for each time period</td>
</tr>
<tr>
<td>Eliminate NSAID/Cox-2 use</td>
<td></td>
<td>Yes/no for each time period</td>
</tr>
</tbody>
</table>
Preliminary Results

- 35 Practices
- 10 States
- 21,105 patients
- Data available for 3 years

- Pre-post in intervention practices improves:
  - Dx of CKD: 34%-44%
  - Use of ACE/ARB: 46%-51%
  - Referral to Nephrology for CKD stage 4: 29%-34%
Dissemination of Results

- 6 peer reviewed publications
- 20 national presentations
- TRANSLATE scoring framework used as a model of practice transformation for CMS 685 million dollar transforming clinical practice initiative
Qualitative Methods

- Surveys (conducted at baseline)
- Physician Interviews
- Analysis of all communications between facilitators and practice (emails, phone calls, meeting notes, etc.)
- TRANSLATE rubric scoring
- Site visits**

**Planned in original design, but not conducted
## Baseline Physician Interview Themes

<table>
<thead>
<tr>
<th>Major Theme</th>
<th>Sub-Themes/ Details</th>
</tr>
</thead>
</table>
| **Limited awareness of evidence-based CKD guidelines** | Inconsistent awareness of guidelines  
* Aware of diagnosis and recognition aspects only  
* Inconsistent implementation  
* Using some but not all KDOQI guidelines  
* Adapts diabetes recommendations for screening  
* Varies by provider  
* Not aware of guidelines |
| **Inconsistency in CKD screening and diagnostic process** | No set criteria  
* Not established or standardized  
* Gut feeling; #’s don’t look good  
* Broad spectrum of tests used to diagnose CKD  
* Variety in which patients regularly screened for CKD |
| **Use of health information management systems for other diseases to monitor care of CKD patients** | Use of guidelines for diabetes and cardiovascular disease  
* Use of CINA/EMR tools for other conditions  
* POC tools/registry  
* Guidelines assimilated in protocol engine  
* Flow sheets follow exercise established as national guidelines |
| **Difficulty explaining CKD to patients** | Provider discomfort  
* Wants other house physician is not ready/ equipped to respond  
* Doesn’t want to frighten the patient  
* Limited patient education materials  
* Physician knowledge of CKD limited  
* Explaining the diagnosis  
* Impaired kidney function  
* Risk management  
* Part of the natural aging process  
* Providing reassurance  
* Steps can be taken to prevent progression/analysis  
* Manageable, if patient modifies risks and adheres to medical advice |
| **Challenges caring for CKD and other chronic disease patients** | Provider level  
* Competing demands; time, increased patient volume, complex patients  
* Need for provider education  
* Patient level  
* Motivation/engagement/compliance  
* Multi-morbidities  
* Social determinants of health issues  
* Practice level  
* Competing demands  
* Insufficient support staff  
* Primary focus on other diseases  
* Lack of communication with specialists |
Quality Improvement
Operations & Research

Mary A. Dolansky, PhD, RN, FAAN
Associate Professor
VA Quality Scholar Senior Fellow
Director of the QSEN Institute
Director of Interprofessional Integration VA Center of Excellence in Primary Care
Mary.dolansky@case.edu
Objective:

Differentiate between Quality Improvement and Improvement Science
What is Quality?
IOM’s Six Aims for Improvement
Quality
IOM’s Six Aims for Improvement

1. **Safe**: Care in healthcare facilities should be as safe as at home
   *3rd leading cause of death*

2. **Effective**: Care should be science based and evidence based

3. **Efficient**: Care and service should be cost effective
IOM’s Six Aims for Improvement (cont.)

4. **Timely**: No waits or delays should occur in receiving care

5. **Patient centered**: System of care revolves around patient-appropriate

6. **Equitable**: Disparities in care should be eradicated- Geographic
What is QI?

- The combined and unceasing efforts of everyone - health care professionals, patients and their families, researchers, payers, planners, educators - to make changes that will lead to better patient outcomes, better system performance and better professional development.

- Batalden & Davidoff 2007
History

1. Origins in manufacturing 1980’s
   - Deeming, Shewhart, Donabedian
2. 1993 HMO Group conference on Total Quality Management
3. Emphasis on links between improvement, change & learning
4. 1st projects: breast cancer & asthma

Mammography Quality Standard, 1992
Breast Cancer Surveillance Consortium
Luce, J., Bindman, A., Lee, P. (1994). Brief history of quality improvement in the US.
What is QI

- Systematic - data guided activity
- Dynamic intervention
- Designed to bring immediate improvement to a local context
The Model for Improvement

- Identifying an area for improvement
- Proposing specific changes
- Testing the changes
- Evaluating the success of the changes
- Multiple pilot studies

Other models:
Six Sigma
Lean
Juran

Nolan and Nolan, 2000
QI Dimensions

- Philosophy - Culture - Learning Organization

- Practical problem solving (tool) - An evidenced -based management style (local level)

- An application of a theory-driven science of system change (science - Implementation science)

QI Dimensions

- Philosophy - Culture - Learning Organization

- Practical problem solving (tool) - An evidenced-based management style (local level)

- An application of a theory-driven science of system change (science)

QI Philosophy

- Personal level
- Organizational level
  - Culture
  - Learning Organization
QI Dimensions

- Philosophy- Culture- Learning Organization

- Practical problem solving (tool)- An evidenced -based management style (local level)

- An application of a theory-driven science of system change (science)

QI: Theory of Profound Knowledge

1) Knowledge of a system

2) Knowledge of variation

3) Knowledge of psychology
   Change management

4) Theory of knowledge ---PDSA

Knowledge of a system

Source: Own Illustration
Knowledge of Variation

Multidisciplinary rounds
Hand hygiene protocol
Vent bundles
ICU Medical Director
UTI bundles
Central line bundles

Number of events

Psychology of Change
Change Innovation

- Education
- Reminder - Cue to action
- Champion model
- Audit and feedback
- Collaborative
Theory of Knowledge

Model for Improvement

- What are we trying to accomplish?
- How will we know if a change is an improvement?
- What changes can we make that will result in improvement?

ACT

PLAN

STUDY

DO
Using Sequential PDSA Cycles to Build Knowledge
Revised conceptual model of rapid cycle change.

Challenges

Complexity

Time

Opportunities

P = Plan
D = Do
Barrier
S = Study
A = Act
Lingering background impact
D = Direct flow of impact
Different sizes of letters and cycles and bold letters = denotes differences in importance/impact

Product: Story Board

Is Osteoporosis In Men Under screened?
Semta Jain MD, Bilori Bilori MD, Pete Spanos BA, Mary Dolansky RN PhD, Mamta Singh MD MS.

Introduction & Background
- Mortality rate in men is the year is around 0.5% which is higher than women.
- Fractures due to osteoporosis are more common than osteoarthritis, which is 1 in 5 men age 50 or above age 50.
- Fractures occur in men before the age of 50 years which is uncommon.
- Femoral neck fractures are not commonly recommended by the International Osteoporosis Foundation or other bone assessments due to a lack of evidence.
- Fractures or spine fractures of more than 10 years old and men aged 60-69 with risk factors with osteoporosis.
- History of fracture and for men 80-80 years of age without previous fracture, screening delayed by 10 years is reasonable.
- Men aged 65 years of age or older should be considered for a baseline screening.

Aim
To increase the screening rate of osteoporosis in high-risk males over the age of 50 at the MU/NP resident clinic by 50% by the end of Aug 2013.

Methods
We extracted baseline data for patients enrolled with a center of excellence. We and RP patients at Wexler Park VA in 2012 were done from 2008 to 2012 for various indications. Several of these indications include high-risk osteoporosis monitored below:
- Morbid obesity (body mass index 45 kg/m²)
- Hyperparathyroidism (ratio of calcium × PTH/PTH)
- Hypogonadism (testosterone ≤ 250 ng/dl)
- Rheumatoid arthritis and breast cancer.

Process Map

Determining Factors

Conclusions
- Osteoporosis in men is under-screened as reflected through our baseline data.
- The barriers to screening in men and nurses were identified mainly to be low on priority to discuss with patients, unclear knowledge of osteoporosis prevention, medication management, medical record system renewal and direct support from the local VA.
- No clear screening guidelines exist but data suggests that fractures lead to stable mortality and morbidity, increased number of hospitalization, and increased cost. Some data suggests that significant knowledge gap has resulted in poor screening rates. We attempted to narrow this gap by creating awareness amongst residents and nurses.

Results
- Reducing the rate of our project, we identified reduced mortality and morbidity, reduced cost, reduced hospitalization, and improved awareness amongst residents and nurses.
- It is shown that men are more likely to have osteoporosis than women.

Discussion
Our data analysis suggests osteoporosis screening rates in men are low at our VA medical center. It would be interesting to determine the rate of osteoporosis in men. We found that there is a significant gap in VA medical center in this area.

References:
What is SQUIRE?

HOW CAN THIS WEBSITE HELP?

The SQUIRE Guidelines help authors write excellent, usable articles about quality improvement in healthcare so that findings may be easily discovered and widely disseminated. The SQUIRE website supports high quality writing about improvement through listing available resources and discussions about the writing process.

More about SQUIRE

SQUIRE Sponsors

The Dartmouth Institute For Health Policy & Clinical Practice

The Robert Wood Johnson Foundation

Quality and Safety in Healthcare

Institute for Healthcare Improvement

Journals Connected with SQUIRE

A listing of journals (with links) that have published articles about the development of SQUIRE, refer to the

SQUIRE Guidelines

The guidelines are available in several formats.

- SQUIRE Guidelines is an online resource for authors, reviewers, and editors that provides an overview of the items in the SQUIRE checklist.

- SQUIRE Guidelines checklist in PDF is available for downloading.

- SQUIRE Explanation and Elaboration (E&E) is a series of web pages for authors, editors, and reviewers that provides one or more example(s) for each of the items in the SQUIRE checklist. Each example from existing literature is accompanied by a detailed explanation of how that item may be addressed in a manuscript.

- Explanation and Elaboration (E&E) in PDF is available for downloading from Quality and Safety in Healthcare.

Get Involved

Have you implemented a quality improvement in healthcare that you'd like to write about? Have you already published an article? Do you know of a journal or organization that has adopted the SQUIRE guidelines?

Please contact us and let us know about it.

How to cite SQUIRE

Translations

- Japanese (PDF)
- Norwegian (PDF)
- Spanish (PDF)

SQUIRE Screencasts

Why and how SQUIRE was developed, and how it might help you

SQUIRE at IHI National Forum 2013

15 Nov, 2013

The SQUIRE faculty will be teaching a learning lab at the IHI National Forum in Orlando, FL, on December 8, 2013. This session advances participants' writing skills with the goal of moving their healthcare improvement efforts to scholarly publication. Participants will bring their own improvement work—at any stage of development—for use in hands-on writing exercises. Faculty will employ a new draft version of the SQUIRE publication guidelines for reporting healthcare improvement to help participants prepare their work for
Reducing Blood Culture Contamination in Community Hospital Emergency Departments: Multicenter Evaluation of a Quality Improvement Intervention

Wesley H. Self, MD, MPH\textsuperscript{a}, Joyce Mickanin, MSN, RN\textsuperscript{b}, Carlos G. Grijalva, MD, MPH\textsuperscript{c,d}, Freda H. Grant, BS, MT, ASCP\textsuperscript{e}, Michelle C. Henderson, MSN, RN\textsuperscript{f}, Glenda Corley, BS, MT, ASCP\textsuperscript{f}, D. Glen Blaschke II, MD\textsuperscript{g}, Candace D. McNaughton, MD, MPH\textsuperscript{a}, Tyler W. Barrett, MD, MSCI\textsuperscript{a}, Thomas R. Talbot, MD, MPH\textsuperscript{c,h}, and Barbara R. Paul, MD\textsuperscript{b}

\textsuperscript{a}Department of Emergency Medicine, Vanderbilt University School of Medicine, Nashville, Tennessee

\textsuperscript{b}Community Health Systems Professional Services Corporation, Franklin, Tennessee

\textsuperscript{c}Department of Preventive Medicine, Vanderbilt University School of Medicine, Nashville,
QI Dimensions

- Philosophy- Culture- Learning Organization
- Practical problem solving (tool)- An evidenced-based management style (local level)
- An application of a theory-driven science of system change (science)

2010
Improvement Science

A field of research focused on healthcare improvement. The primary goal of this scientific field is to determine which improvement strategies work as we strive to assure effective and safe patient care.
Improvement Knowledge

1) Knowledge of a system

2) Knowledge of variation

3) Knowledge of psychology
   Change management

4) Theory of knowledge PDSA
Knowledge of a System
Theoretical Domains Framework

Internal Factors:
- Knowledge, Skills,
- Social/Professional Role & Identity, Goals,
- Behavioral Regulation,
- Emotion, Beliefs about Capabilities, Beliefs on Consequences, Optimism,
- Intentions, Memory, Attention, & Decision Making

External Factors:
- Social Influences, Reinforcement,
- Environmental Context and Resources

Implementation of Guidelines

Cane, O’Connor, & Michie (2012)
Systems Thinking Scale
http://fpb.case.edu/systemsthinking/index.shtm
Knowledge of Variation
Knowledge of Psychology/Change Management

Implementation Interventions

- Education
- Reminder- Cue to action
- Champion model
- Audit and feedback
- Collaborative
Effectiveness of Knowledge of Psychology/Change management Interventions
(Bero et al., 1998, Grimshaw et al., 2001)

Little or no effect
- Educational materials
- Didactic educational meetings
Sometimes Effective

- Audit and feedback
- Local opinion leaders
- Local consensus processes
- Patient mediated interventions
Generally Effective

- Educational outreach visits
- Reminders
- Interactive educational meetings
- Multifaceted interventions including two or more of:
  - Audit and feedback
  - Reminders
  - Local consensus processes
  - Social marketing
Why Use a SMART Design to Build an Adaptive Intervention?

Adaptive Interventions

Adaptive interventions have four critical components.

1. **Sequence of decisions regarding patient care** - Most interventions require decisions such as, “If the patient is unresponsive to the initial treatment, what treatment should we provide next?” or “Once the patient has stabilized, what treatment is needed to prevent relapse?”

2. **The set of treatment options at each decision point** - For example, if a patient is unresponsive to a drug, should the dosage be increased, should the drug be discontinued, or should counseling be increased? All of these are treatment options.

3. **Tailoring variables** - These are the factors used to trigger a change in the treatment. These can be things like early signs of nonresponse, manifestation of side effects, or environmental or social characteristics. The idea is to identify the variables that best indicate when the appropriate treatment has changed.
Other Uses in Science

PROTOCOL

Testing a post-discharge nurse-led transitional home visit in acute care pediatrics: the Hospital-To-Home Outcomes (H2O) study protocol

Heather L. Tubbs-Cooley, Rita H. Pickler, Jeffrey M. Simmons, Katherine A. Auger, Andrew F. Beck, Hadley S. Sauers-Ford, Heidi Sucharew, Lauren G. Solan, Christine M. White, Susan N. Sherman, Angela M. Statile & Samir S. Shah On behalf of the H2O Study Group*

Accepted for publication 6 November 2015

Co-correspondence to H.L. Tubbs-Cooley:
E-mail: heather.tubbs_cooley@cchmc.org

Time for Change
The Science of Improvement

Donald M. Berwick, MD, MPP, FRCP

In the early 1890s, Dr. William Halsted developed radical mastectomy for breast cancer. Surgeons performed the Halsted procedure for more than 80 years even though there was little systematic evidence for its success. Then a new breed of scholars subjected the procedure to formal methods of evaluation unknown to Halsted. The methods—randomized controlled trials (RCTs)—principal among them—led to a surprise: radical mastectomy had no advantage over simpler forms of treatment.

This is but 1 example of the hard-won victory of evidence over belief in medicine. The pioneers of the formal evaluation of medical practices raised questions that traditional practitioners did not welcome. But in time, formal evaluation prevailed. The pioneers developed a hierarchy of evidentiary rigor relating the design of a study to the confidence that could be placed in the findings, from the lowest, nearly valueless anecdote to the royalty of evidence, the RCT.

Concurrently, a similar story of hard-won learning unfolded in the so-called quality movement. Scholars illuminated the scale and types of defects in the processes of care and the outcomes, including high rates of unscientific care, inappropriate care, geographic variations in practice, latent disagreements among specialists, and often unrecognized medical injury to patients. Like the pioneers of evidence-based medicine, students of medical quality were at first largely ignored, but no longer. In 1990 and 2001, the Institute of Medicine published 2 landmark reports on the evidence for quality failures and called urgently for redesign of care systems to achieve improvements.

The story could end here bountifully with 2 great streams of strained, progress may be the victim. For example, the RCT is a powerful, perhaps unequalled, research design to explore the efficacy of conceptually neat components of clinical practice—tests, drugs, and procedures. For other crucially important learning purposes, however, it serves less well.

Recent controversies about the evaluation of rapid response teams provide a case in point. These controversies show the importance of adjusting research methods to fit research questions. Although only 10% to 12% of inpatient resuscitations outside intensive care units survive to hospital discharge, early warning signs are present in a large percentage of patients who ultimately experience cardiac arrest. Rapid response team systems bring expert clinicians to the bedside of deteriorating patients before arrest occurs. In the mid 1990s, based largely on reports from Australian investigators, the Institute for Healthcare Improvement and others began introducing the concept to willing hospitals. Local experience strongly suggested that these systems often, although not always, were associated with improved outcomes, including reduced anxiety among nursing staff, increased interdiscplinary teamwork, decreased cardiac arrests outside of intensive care units; and, in some cases, declines in mortality.

The evidence base took a turn in June 2005 with the publication of the Medical Early Response Intervention and Therapy (MERIT) Study, a cluster randomized prospective trial that claimed to find no beneficial effect of these teams on several primary outcomes. Controversy has continued since then regarding the scientific evidence for rapid response systems.

In fact, the MERIT trial was not negative; it was inconclusive. The study team encountered an array of serious problems in execution common in social science. For example-
FEATURE ARTICLE

An Instrument to Differentiate between Clinical Research and Quality Improvement

by Greg Ogrinc, William A. Nelson, Susan M. Adams, and Ann E. O’Hara

There is increasing recognition of the importance of clinical research and quality improvement, development, testing and evaluation,
Figure 1.
Depiction of the continuum of clinical research, quality improvement, and patient care activities. Examples are provided relating to care, improvement, and research for acute myocardial infarction (AMI).

- Prospective study to discover the factors associated with efficient cardiac catheterization at several medical centers
- A medical center systematically makes and studies changes to improve the efficiency of cardiac catheterization for AMI
- Randomized controlled trial of cardiac catheterization versus a new medication for AMI
- Multi-institution study of a checklist to improve the system of cardiac catheterization
- Mc Johnson receives cardiac catheterization less than 90 minutes after arriving at the ED with symptoms of his AMI

Direct Patient Care

Quality Improvement Research
Topic for Discussion

Science in Our Field

Improvement Science (A)
Implementation Science (B)
organizations

IHI.org
organizations
Summary

- What is Quality
- What is QI
- Philosophy, Local application, Science
Questions
The End