Integrating Quality Improvement and Patient Safety into medical education

Prathibha Varkey, MBBS, MPH, MHPE, MBA
Associate Chair, Department of Medicine
Professor of Medicine and Professor of Preventive Medicine
Mayo Clinic, Rochester, MN
• No Financial Disclosures
My primary teaching affiliation is with:

1. Allied health undergraduate program
2. Allied health graduate program
3. Undergraduate medical education (medical school)
4. Graduate medical education (Residency/fellowship)
5. Continuing professional development
6. QI/safety officer or staff
7. Other
Carnegie Foundation:
2010 report on medical education

• Observations on medical education included:
  “do not support the development of capacities we desire and society needs in our physicians”

• Recommendations for action included:
  “focus on population health, QI, and patient safety…should participate authentically in inquiry, innovation & improvement in care”

Guiding principles

- Integration
- Cognitive learning theory

Activation of prior knowledge

Active learning will be incorporated in the context of meaningful work

- Adult learning theory
Evidence-based Improvement

Choosing best plan

Generalizable Scientific Knowledge

- control for context
- generalize across contexts
- experimental design
- statistics

Particular Context

- understand system “particularities”
- learn structures, processes, patterns
- culture and context of changes

Executing locally

Measured Performance Improvement

- balanced measures
- clinical
- functional
- satisfaction
- costs

Batalden, 2003
Conceptual framework for patient safety

## Dreyfus Model of Skills Acquisition

<table>
<thead>
<tr>
<th>Level</th>
<th>Skill Description</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novice</td>
<td>Rules</td>
<td>Early medical student</td>
</tr>
<tr>
<td>Advanced Beginner</td>
<td>Rules + Situation</td>
<td>Senior medical student</td>
</tr>
<tr>
<td>Competent</td>
<td>Rules + Selected Contexts + Accountable</td>
<td>Resident/Fellow</td>
</tr>
<tr>
<td>Proficient</td>
<td>Accountable + Intuitive</td>
<td>Faculty</td>
</tr>
<tr>
<td>Expert</td>
<td>Immediately sees what</td>
<td></td>
</tr>
<tr>
<td>Master</td>
<td>Develops style</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loves surprise</td>
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</table>
Recommendations for UME

1. Ability to critically evaluate knowledge base supporting good patient care

2. Understanding of the gap between prevailing practices and best practices and the steps necessary to close the gap

3. Participating in closing the gap between prevailing and best practices
UConn

- 2nd year students work on DM CQI projects in community-based primary care clinics

- Clinics involved improved:
  - documented rates of foot and eye exams (51.3% to 70.2% for foot exams)
  - HgbA1Cs dropped from 7.71% to 7.22%

- Students more confident in QI skills

- Students did not like chart audit, were not satisfied overall

Slide from K.Baum, UMN
CLARION Case competition

- Team-based case competition
  - Interprofessionally-written case of sentinel event
  - Interprofessional student teams
  - Given up to 6 weeks to develop RCA and presentations
  - Then present to a panel of judges

- Local and national versions

Slide from K.Baum, UMN
Mayo Medical School - QI/Safety curriculum in evolution

• 2003- 1st student QI/safety elective
• 2004- integrated longitudinal curriculum across 4 years (13 courses)
• 2006 - Curriculum reform
• 2011 - Announcement of new medical school in Arizona focused on healthcare delivery
IHI Open School

• Online courses developed by the Institute for Healthcare Improvement
• Free for students and faculty
• [http://www.ihi.org/IHI/Programs/IHIOpenSchool/](http://www.ihi.org/IHI/Programs/IHIOpenSchool/)

• Certificate program available
  • Chapter organization

• Courses include:
  • Patient safety
  • Quality improvement
  • Leadership
  • Patient and family-centered care
Summary

• Integrate into clinical experiences
• Interprofessional settings are powerful
• Attend to hidden curriculum
• Follow the lessons of adult learning
  • Students need to care
  • Avoid sense of busy-work
  • Avoid “add-ons”
  • Active learning
Residents and Medical Errors

- 640 Resident Survey, 2005
  - 17.8% cared for a patient with at least one adverse event
  - 37% at least partially responsible for the medical error

- 200 Resident Survey, 2008
  - 15% did not report an error they had caused or participated in

PBLI- The Mirror analogy

• Identify the improvement that is needed
• Engage in learning- lit search, measurement, comparison to norms/standards (EBM)
• Apply what was learned
• Assess improvement
SBP- “It takes a village”

- Multidisciplinary healthcare team
- Types of medical practices and delivery systems
- Cost effective care
- Patient safety
- Patient advocacy
## Teaching Practice Based Learning and Improvement

<table>
<thead>
<tr>
<th>Content</th>
<th>Methodology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality or Practice Improvement</td>
<td>Exercise + Self reflect on practice and determine improvement</td>
</tr>
<tr>
<td></td>
<td>Lectures/Seminars/Conferences</td>
</tr>
<tr>
<td></td>
<td>Small groups/case discussion</td>
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<tr>
<td></td>
<td>Quality Improvement Project</td>
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<td></td>
<td>OSCE/Simulation</td>
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</tbody>
</table>
## Teaching Practice Based Learning and Improvement

### Content
- Evidence Based Medicine
- Teaching Skills

### Setting
- Clinical Teaching
- Lectures/Seminars/Conferences
- Journal Club
- Research/QI Project
- Clinical Teaching
- Interactive Workshop
Teaching Systems Based Practice

Content

Health care system

- Different types of medical practice and delivery systems
- System resources
- System issues and the reduction of errors
- Conducting a root cause analysis
- Team Collaboration

Setting

- Clinical teaching
- Patient Safety projects
- Systems based M & M
- Lectures/Seminars/Conferences
- Interdisciplinary Teams
Teaching Systems Based Practice

Cost Effective Practice

Content

• Tools and techniques for controlling costs and allocating resources
• Understanding of financing/insurance structures
• Understand cost of commonly prescribed medications/ordered tests

Setting

• Clinical Teaching
• Intelligent EMR
• Practice management curricula or projects
Many Possible Delivery Formats

1. Centralized approach
2. Elective
3. Required rotation
4. Intensive workshop
5. Longitudinal experience
Centralized approach:  
*Mayo School of GME*

- Learning and improving patient outcomes
- Flexible approach
- 1-1 PD meetings
- Linking QI experts to educators
- Web resources
- Faculty development workshops

Mayo-Macy Project: Web-based modules

Curriculum

- QI
  - Basic
  - Advanced

- Measurement
  - Basic
  - Advanced

- EBM
  - Basic
  - Advanced

- Patient Safety
  - Basic
  - Advanced

- Leadership
  - Negotiation
  - Change mx

Assessment

- OSCE
  +8 stations

- External QI
- Health policy

http://qiresources.mayo.edu/
This introductory module on patient safety provides incoming Mayo residents and fellows an introduction to epidemiology, classification, communication, and prevention of medical errors.

You can navigate through the module using the arrows located in the upper-right hand side of the screen, or by clicking the table of contents located to the left.

The module does not need to be completed in one sitting. You can always return to the section you left off; or if you prefer, you can set a bookmark on your current page by clicking the icon above.

Please review this module in its entirety as you must achieve a 100% score on the post-test before the module will be considered complete.

**What do You Know?**

What percentage of patients admitted to acute care hospitals experience a serious medication error?

- 1. 0.05-2.5%
- 2. 2-14%
- 3. 30-45%
- 4. 50-70%

**Correct Answer!**

Close to 1 in 10 patients admitted to the hospital experience a serious medication error. This means to your practice!

**Adverse Events in the ICU**

Let's travel next to the ICU where our sickest patients are admitted.

- 1.7 errors occur per day per patient
- Autopsy studies reveal that 35-40% of missed diagnoses result in deaths
- Likelihood of error increases 6% for each extra hospital day
- Length of stay is 8.8 days vs. 23.8 days if adverse events occur

Lancet 1997

Another way to look at some of these statistics is to see what proportion of our patients in the ICU experience an adverse event: 20.2% or one-in-five patients experience an adverse event. Of these, close to half (45%) are preventable.

Source: Critical Care Medicine, August 2005
Collaborative Series

- Multiple residencies working on common QI themes
  Atlantic Health systems, NJ (2007)
- Medication reconciliation across 8 residencies
  - Over a 10-month period, 3 half-day collaborative learning sessions
  - Increased from 20% to 82% in IM clinic
  - 100% in pediatric clinic, surgery, OR dental clinics

UCSF Housestaff Incentive Scorecard

PATIENT SATISFACTION:
For the period of June 2010-July 2011, on the patient satisfaction survey likelihood of recommending question, maintain an annual average mean score of 90.5.

PATIENT SAFETY AND QUALITY:
For the period of July 2010-June 2011, achieve 85% hand hygiene compliance for at least six of twelve months.

LAB UTILIZATION:
By June 2011 residents will decrease by 5% the aggregated utilization of common laboratory tests (defined as tests/inpatient day). Common tests will include, CBC, CBC with differential, electrolytes (Na, K, Cl, CO2, HCO3, Mg, Ca, Phos), BUN, Cr, AST, ALT, total bilirubin, alkaline phosphatase and albumin.
Program specific incentives

- Anatomic Pathology (Achieved)
  - Goal: Decrease incorrectly submitted specimens
- Anesthesia (Achieved)
  - Goal: ICU transfer note
- Dermatology (Achieved)
  - Goal: Appropriate Medication monitoring
- Emergency Medicine (Achieved)
  - Goal: Smoking cessation in Emergency Department
Dartmouth Preventive Medicine + Leadership Residency

- Two year preventive medicine program; must combine with another DHMC residency or fellowship
- Focus on improving care for a defined population of patients – developing capabilities related to systems, measurement, populations, leadership, reflection
STAY OUT OF PENS

11/29/2003
Choosing a QI project

• Relevance to your specialty
• Significance to patients
• Significance to learners
• Significance to institution/clinic
• Scope for improvement
• Feasibility for completion

Steps necessary to conduct a QI project

Nolan’s Model

Goal/Aim
What are we trying to accomplish?

Measurement
How will you know a change is an improvement?

Improvement Ideas
What changes can you make that will result in an improvement?

1. Identify target of opportunity
2. Synthesize information about optimal practice
3. Synthesize information about current practice
4. Develop a strategy for practice improvement
5. Implement strategy
6. Assess cost-effectiveness of the solution
7. Determine whether solution should be disseminated

PDSA Cycle

Act
Determine what changes are to be made

Plan
State objectives
Make predictions
Develop plan to carry out cycle

Study
Summarize what was learned

Do
Carry out the test and document problems and unexpected observations

Email Reminders to reduce no-show rates

Collaborative Care Team Project - Family Medicine

- Required 12-month Senior class group project
- Chronic disease or Clinical issue
- Principles of EBM applied
- Protocol developed incorporating best evidence and addressing cost effectiveness
Standardization of Polypectomy Methods-Gastroenterology

• Problem: Selection of methods of colonoscopic polypectomy among gastroenterologists
Impact on medication reconciliation


(N = 70x2; Data collected 3/05)
SPECIAL INVESTIGATION
WHY YOUR DRUGS COST SO MUCH
WHO'S TO BLAME
WHAT WE CAN DO ABOUT IT
By Donald L. Barlett and James B. Steele
Intervention: Order Set

Standard medicine order sheet

Antiemetic:

- Prochlorperazine (Compazine) 10 mg IV every 6 hours PRN. If no effect within 30 minutes after the 1st dose, give single dose of Ondansetron (Zofran) 4 mg IV.
Outcomes

Anticipated savings $15000 per quarter
Assessment

- Specific pre and post-tests
- End of rotation Likert
- QIKAT
- QI projects
- OSCE
- Quality Improvement Proposal Assessment Tool – 7 (QIPAT-7)

OSCE as an assessment tool

MUSIQ: Model for Understanding Success in Quality

Success factors in QI education

- Faculty/learner buy-in
- QI expert faculty
- Addressing competing demands
- Choice of project
- Access to data
- Leadership buy-in
- Institutional alignment

Mayo Quality Academy: TEAM’s Training

- Face to face
- 10 days
- Teams with a project
- “Best of” Lean, Six Sigma, Change Management, Human Factors, Project Management

D.Wood, M.McClees, Jeff Leland
Quality Academy TEAM’s Training - Rochester

- Specimen Management
- Falls Prevention
- Diabetes Care
- Appointment No Shows
- Central Lines
- Universal Protocol
- Urology Appointment process
- Transplant Outcomes
- Inpatient Warfarin Mgmt
- Hospital Discharge process

19 Cohorts completed
114 teams
726 staff
# Mayo Quality Fellow Certifications

## Mayo Quality Fellows Certifications

<table>
<thead>
<tr>
<th>Level</th>
<th>AZ</th>
<th>FL</th>
<th>MCHS</th>
<th>MN</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bronze</td>
<td>1914</td>
<td>1416</td>
<td>1888</td>
<td>13,673</td>
<td>18,891</td>
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<tr>
<td>Silver</td>
<td>116</td>
<td>87</td>
<td>61</td>
<td>833</td>
<td>1,097</td>
</tr>
<tr>
<td>Gold</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>35</td>
<td>42</td>
</tr>
</tbody>
</table>

Last Updated 10/11/2011

![Diagram showing percentage of employees bronze certified by site](image)
Online Resources

• Mayo Clinic Quality Academy Educational Resources: http://qiresources.mayo.edu/
• IHI: http://www.ihi.org/IHI/Topics/HealthProfessionsEducation/
• ACMQ: http://www.acmq.org/
• Quality and Safety Education for Nurses: http://www.qsen.org/
• MedEd Portal: http://services.aamc.org/30/mededportal/servlet/segment/mededportal/information/
• Web M&M: http://www.webmm.ahrq.gov/
• Agency for Healthcare Research & Quality: http://www.ahrq.gov/qual/
• National Patient Safety Foundation: http://www.npsf.org/
• SQUIRE Guidelines: http://www.squire-statement.org/
Where do we go from here?
Reflections on a possible framework for QI education

• Active, experience-based learning
• Interdisciplinary teams, collaboration
• Learning in context of meaningful work
• Faculty development
• Leadership buy-in
• The 70% rule in innovation
“I am convinced that nothing we do is more important than developing people. At the end of the day you bet on people, not on strategies”

Larry Bossidy