PATIENT SAFETY AND ERROR PREVENTION - WE CAN TEACH IT!

Robyn Blair, MD
Susan Guralnick, MD
APPD Annual Meeting March 30, 2012
*Adapted from the work of John Bingham and Doris Quinn
We have nothing to disclose
Diagnostic Error
Resident Workshop on Diagnostic Error
Diagnostic Error Overview

- Residents provided with articles on Diagnostic Error prior to the workshop session
- Small group discussion of articles
Diagnostic Error Articles

- Mamede S, Schmidt HG, Penaforte JC, **Effects of Reflective Practice on the Accuracy of Medical Diagnoses**, Medical Education 2008;42:468-475.


- Graber M, **Diagnostic Errors in Medicine: What Do Doctors and Umpires Have in Common?**
Types of Diagnostic Error

- No Fault Errors
- System Errors
  - Technical
  - Organizational
- Cognitive Errors
Cognitive Diagnostic Error

Heuristics - shortcuts in reasoning

– **Availability** – judging by ease of *recalling past cases*

– **Anchoring** – relying on *initial impressions*
Cognitive Diagnostic Error

Framing Effect
Being swayed by subtle wording
Cognitive Diagnostic Error

Blind Obedience
Showing undue deference to authority or technology
Cognitive Diagnostic Error

Premature Closure
Espousing narrow-minded belief in a single idea
Activity
Part 1

• Read the Case
• Write down the first diagnosis that comes to mind
Activity
Part 2

• Read the Case again
• Write down ALL Diagnoses that come to mind

(diagnosis discussion)
Implementation

• What do you currently do in your program to decrease diagnostic error
• What can you implement in your program to decrease diagnostic error
Linking Outcomes of Care and the ACGME Core Competencies: A Matrix Solution

John W. Bingham, MHA
VP, Performance Improvement & Chief Quality Officer
University of Texas M. D. Anderson Cancer Center
1515 Holcombe Blvd
Houston, Texas 77030

Doris Quinn, PhD
Director, Process Management and Improvement Education
University of Texas M. D. Anderson Cancer Center
1515 Holcombe Blvd
Houston, Texas 77030
Inspired by the IOM report, *Crossing the Quality Chasm*

- Pointed to a chasm between:
  - the healthcare that healthcare providers *now provide*
  - the healthcare that they are *capable of providing*.

- IOM Aims for Improvement are linked with the ACGME Core Competencies

- Provides a way for users to examine patient care using the Aims and Competencies to identify improvement opportunities.
unsafe care is often attributed to individuals but is more often a result of the interaction of people and systems

This tool:
- makes these interdependencies explicit
- forces the users to identify what was learned and what might be improved
Public Reporting of Quality

- CMS Quality Measures (“CMS Compare’’)
- Accrediting Bodies (JCAHO)
- Statewide Organizations (QIOs)
- Business Coalitions (Leapfrog)
- Employers (Annual enrollment process)
- Commercial Health Care Scorecards
  (www.healthgrades.com)
Patient Care should be:

- Safe
- Timely
- Effective
- Efficient
- Equitable
- Patient-Centered
  
  (STEEEEP)
“Avoiding injuries to patients from the care that is intended to help them”
Reducing waits and sometimes harmful delays for both those who receive and those who give care
“Providing services based on scientific knowledge to all who could benefit and refraining from providing services to those not likely to benefit”
Patient Care that is EFFICIENT

“Avoiding waste, including waste of equipment, supplies, ideas, and energy”
Patient Care that is **EQUITABLE**

“Providing care that does not vary in quality because of personal characteristics such as gender, ethnicity, geographic location, and socio-economic status”
“Providing care that is respectful of and responsive to individual patient preferences, needs and values and ensuring that patient values guide all clinical decisions.”
The ACGME Competencies

- Patient Care
- Medical Knowledge
- Interpersonal and Communication Skills
- Professionalism
- Practice-Based Learning and Improvement
- Systems-Based Practice
Preparation for Matrix

History
Physical Exam
Labs
Tests
Consults
Etc.

⇒ Diagnosis ⇒ Patient Care
Matrices can be relatively simple…
## Healthcare Matrix: Care of Patient(s) with Constrictive Pericarditis

### Department of Internal Medicine

#### ACGME Competencies

<table>
<thead>
<tr>
<th>SAFE</th>
<th>TIMELY</th>
<th>EFFECTIVE</th>
<th>EFFICIENT</th>
<th>EQUITABLE</th>
<th>PATIENT-CENTERED</th>
</tr>
</thead>
</table>

#### Assessment of Care

**Patient Care**  
(Overall Assessment)  
Yes/No

- Yes
- No
- Yes
- No
- Yes
- Yes

**Medical Knowledge & Skills**  
(What must we know?)

- Disagreement over evaluation of constrictive pericarditis.

**Interpersonal & Communication Skills**  
(What must we say?)

- Decision re: surgery was not properly communicated to patient or primary team because of poor communication between surgery and primary service.
- Only LH cath was performed despite request for RH cath and LH cath.

**Professionalism**  
(How must we behave?)

**System-Based Practice**  
(What is the process?  
On whom do we depend?  
Who depends on us?)

- Records from outside hospital were not readily available. Primary team did not review outside data thoroughly.

#### Improvement

**Practice-Based Learning & Improvement**  
(What have we learned?  
What will we improve?)

- Have direct contact with referring physician from outside hospital.
  - If outside records arrive, primary team should be paged or information should be flagged in the chart.
  - Direct communication between teams if questions re: proposed procedure.
Or Complex...
## Assessment of Care

### Patient Care
**Overall Assessment**
- Yes/No

**Medial Knowledge & Skills**
- Red rubber catheters too flexible and can bend easily – may be hard to remove or suction hardened secretions (unknown frequency of suctioning and use of saline to loosen secretions)
- Patient with poor lung reserve, time wasted during oral attempts at intubation – patient unable to tolerate prolonged apnea

**Interpersonal & Communication Skills**
- Better way to communicate likelihood of obstruction and difficult airway
- Poor communication about steps required to secure airway

**Professionalism**
- PICU/Anesthesia ignore otolaryngology advice about securing airway
- PICU responsive to code initially

**System-Based Practice**
- Knowledge of where bronchoscopes are located for each ICU
- Determine role of nurses, respiratory therapists, and physician in managing tracheotomy patients

### Improvement
- Need variety of suction catheters available.
- Need clear steps to be taken for airway emergency in patients with tracheostomy with poor pulmonary reserve and difficult anatomic airway.
- Method to succinctly communicate whether patient can be orally intubated to minimize unsuccessful attempts at securing airway.

- Create order set to specify supplies necessary, as well as initial steps if airway lost.
- Have standard order set available for all ICU’s and floors.
- Make order set easy to use so many different services may implement.

© 2004 Bingham, Quinn
Complex Matrices

- often the result of an M&M conference
- the result of much thought and collaboration
- often result in department wide or even system-wide improvements
Benefits of Matrix Application

- *When care is suboptimal* there are many lessons to learn

- *When care is optimal*, the Matrix allows the team to see what went well and find ways to make that part of the system.
The Matrix encourages users to **analyze** and identify gaps in care, as well as plan improvements.
A child with multiple comorbidities presented to the ER with trouble swallowing, shortness of breath, and fever for two days.

An exam was performed and several oral problems were identified, including an oral infection that resulted in severe respiratory distress and inability to intubate.

She underwent a tracheotomy.

She was transferred to the PICU where treatment for sepsis was begun. She slowly improved over the following seven days and by day ten she was breathing on her own.

After a scheduled trache tube change, the patient went into respiratory arrest. Mask ventilation was unsuccessful. A code was called,

The airway was suctioned and a blockage was detected.

Although the PICU and anesthesia teams were aware that she was a difficult intubation and that the tracheotomy site had a distal obstruction, they both attempted to intubate orally and proved unsuccessful.

Despite undergoing a bronchoscopy which identified and broke up a hard mucous crust, the patient could not be revived.
# Healthcare Matrix: Care of Patient(s) with...

<table>
<thead>
<tr>
<th>IOM Aims</th>
<th>SAFE</th>
<th>TIMELY</th>
<th>EFFECTIVE</th>
<th>EFFICIENT</th>
<th>EQUITABLE</th>
<th>PATIENT-CENTERED</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGME Competencies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assessment of Care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient Care</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Overall Assessment)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes/No</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical Knowledge &amp; Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(What must we know?)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interpersonal &amp; Communication Skills</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(What must we say?)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professionalism</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(How must we behave?)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System-Based Practice</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(What is the process? On whom do we depend? Who depends on us?)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improvement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice-Based Learning &amp; Improvement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(What have we learned? What will we improve?)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

© 2004 Bingham, Quinn
## Care of Patients with respiratory distress
### Otolaryngology: Head and Neck Surgery

### Aims

<table>
<thead>
<tr>
<th>Competencies</th>
<th>Safe</th>
<th>Timely</th>
<th>Effective</th>
<th>Efficient</th>
<th>Equitable</th>
<th>Patient-Centered</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Care</strong>&lt;br&gt;(Overall Assessment)&lt;br&gt;Yes/No</td>
<td>No</td>
<td></td>
<td>No</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Medical Knowledge &amp; Skills</strong>&lt;br&gt;(What must we know?)</td>
<td></td>
<td>Red rubber catheters too flexible and can bend easily – may be hard to remove or suction hardened secretions</td>
<td></td>
<td>Time delay due to oral intubation attempts that predictably would not be successful in restoring airway</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Interpersonal &amp; Communication Skills</strong>&lt;br&gt;(What must we say?)</td>
<td></td>
<td>Better way to communicate likelihood of obstruction and difficult airway</td>
<td></td>
<td>Inefficient attempts at oral intubation = time lost for patient</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Professionalism</strong>&lt;br&gt;(How must we behave?)</td>
<td></td>
<td>PICU/Anesthesia ignore otolaryngology advice about securing airway.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>System-Based Practice</strong>&lt;br&gt;(On whom do we depend and who depends on us?)</td>
<td></td>
<td>PICU/Anesthesia ignore otolaryngology advice about securing airway.</td>
<td></td>
<td>Inefficient system for tracheotomy care (i.e. supplies, specified nursing instructions)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Improvement

| Practice-Based Learning & Improvement<br>(What have we learned? What will we improve?) | Need variety of suction catheters available. Determine the essential equipment for tracheotomy care. Improve ENT communication with other departments. | Create order set to specify supplies necessary, as well as initial steps if airway lost. | | | | |

© 2004 Bingham, Quinn.
Completing the Matrix

• Each of the IOM Aims are reviewed in order.
  – If the answer is “yes” then there may not be a need to complete the column

• Timely and Efficiency are often confused
  – Timely involves a clock!
    • Were meds given on time, were antibiotics given 1 hour before surgery?
  – Efficiency is resource utilization
    • Patient stayed in ICU because of a problem, return to surgery after a missed sponge, etc.
• What should be in the practice based learning and improvement box?
  – Examine all the boxes above
  – What has been learned from the analysis?
  – What needs to be improved?
  – Identify these problems and propose solutions.
Case Follow-Up

- After collaborating to create the complex Matrix described above, the ENT resident was prompted to ask if there were standardized trache orders already in place throughout the hospital.

- There were, but the orders were out of date and few staff were aware they existed.

- It was also determined that the red rubber catheters used for suction are too flexible and thus insufficient for the task.

- He found major problems with communication, supplies, and protocol.
Closing the Patient Care Loop

1. Identify Issues of care related to Aims and Competencies via the Matrix
2. Identify Lessons learned and improvement needed
3. Complete Action Plan for improvements with accountabilities and timeline
4. Use Quality Improvement tools and methods to improve care
What are we trying to accomplish? (The Aim)

How will we know that a change is an improvement?  
- Data Over Time –

What changes can we make that will result in an improvement?  
- Process Analysis –

PDSA Model

Plan –> Do –> Study –> Act –> Plan
New ENT Trache Orders

Treatment
1. Ambu bag and identical replacement trache tube or #6 endotracheal tube to be at hob at all times.
2. Have suction kits with #14 French suction catheters, yankauer, and red rubber catheters at bedside.
3. Do not change trache tape or trache holders, even if soiled.
4. Suction trache tube with/ns instillation every 2 hours and prn for 48 hours, then every 4 hours and prn.
5. Stoma care every 8 hours post-op with hydrogen peroxide and bacitracin ointment.
6. Remove and clean inner cannula with brushes every 2 to 4 hours for 24 hours and then every 4 to 8.
7. If trache falls out, call a code and doctor, and replace tube if possible; if not possible, bag per mask and intubate (if patient is intubatable).
8. If trache falls out call a code and a doctor, replace tube if possible or place #6 ET tube through trache site (if patient is not intubatable).
9. Notify house officer if problem passing suction catheter, cuff deflating, bleeding, sob. or low sats.

Patient/Family Teaching by nursing
10. Instruct patient how to communicate as directed.
11. Nursing: Prior to discharge patient must demonstrate adequate trache suction with and without saline flush, remove inner cannula and clean or replace with new inner cannula, communicate verbally or written as directed.
12. Print out and review home trache instructions with patient/significant other prior to discharge.
13. Patient must have suction machine and humidifier at home or delivery scheduled for discharge day.
14. Return to previous list
Merging Data

• Data from Matrices can be aggregated in a database and sorted by:
  – ACGME Competency
  – IOM Aim
  – Diagnosis
  – Positive or Negative Outcome

• Problems can be recognized in areas of
  – Patient Care
  – Education
  – Teamwork
  – Handoffs
  – Diagnoses
  – Hospital processes
The Stroke Report

• Vanderbilt medical students observed neurology patients

• Data revealed that the process for caring for stroke patients seemed better than other diagnoses
28 matrices were analyzed for Neurology
- Both positive and negative trends were noted

High number of positive trends in the care of Stroke patients (n=6)
- very few Communication or Professionalism issues
- Effective and Efficient
- Comments about Systems-Based Practice were often positive.

Explored the reasons for these positive outcomes
- “stroke team” with clear protocols and guidelines
- when care crossed departments and there were not “teams”, the care was significantly more problematic.
<table>
<thead>
<tr>
<th>ID</th>
<th>Aim</th>
<th>Competency</th>
<th>Content</th>
<th>Dx</th>
<th>Primary Code</th>
<th>Secondary Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Safe</td>
<td>Professionalism</td>
<td>Decisions were made based on accepted algorithms and consensus within the team</td>
<td>Stroke</td>
<td>Positive</td>
<td>EBM</td>
</tr>
<tr>
<td>2</td>
<td>Timely</td>
<td>Interpersonal and Communication Skills</td>
<td>Delays in communication increased the time it took to get an initial head CT and begin tx</td>
<td>Pregnancy and Intracerebral Hemorrhage</td>
<td>Negative</td>
<td>Teamwork</td>
</tr>
<tr>
<td>3</td>
<td>Effective</td>
<td>Practice-Based Learning and Improvement</td>
<td>We could have taken the time to do a better initial H&amp;P to better discern what patient’s condition was like at initial presentation to compete to d/c condition</td>
<td>Stroke</td>
<td>Improvement</td>
<td>Care Plan</td>
</tr>
<tr>
<td>4</td>
<td>Efficient</td>
<td>Systems-Based Practice</td>
<td>Repeated imaging an brain bx were unnecessary. Reduce switching primary neurologists to avoid repeat testing</td>
<td>Celiac Sprue</td>
<td>Negative</td>
<td>EBM</td>
</tr>
<tr>
<td>5</td>
<td>Equitable</td>
<td>Interpersonal and Communication Skills</td>
<td>Pt spoke Spanish. Skilled interpreters were not available. Medicals students and family were used as interpreters, which was not ideal</td>
<td>Hydrocephalus</td>
<td>Negative</td>
<td>Translators</td>
</tr>
<tr>
<td>6</td>
<td>Patient Centered</td>
<td>Medical Knowledge</td>
<td>Team took the time to know the pt and her desire for tx</td>
<td>Lung Ca with brain metastases</td>
<td>Positive</td>
<td>Pt/Physician communication</td>
</tr>
</tbody>
</table>
The Healthcare Matrix

- Provides a broader view of quality patient care and safety
- Clarifies opportunities for improvement.
- Helps analyze gaps in resident competency education
- Facilitates improvements in education.
- Can be used to study any facet of care: aim, competency, diagnosis, service, etc.
- Useful as a means of teaching quality improvement.
- In conjunction with quality improvement methods, the Matrix is a powerful analysis and improvement tool.
Phases of Implementation

• **Phase 1 – Workshop with Pediatric residents**
  – Didactic session: Introduction of the Healthcare Matrix
  – Small group session: Application of the Matrix to a patient care case
  – Large group session: Discussion about the completed matrices

• **Phase 2 – Leadership Buy-In**
  – Individual meetings with:
    • Department Chair
    • Quality Assurance Chair
    • Designated Institutional Official
Phases of Implementation

• **Phase 3 – Faculty Education**
  – Introduction of the Healthcare Matrix
  – Explanation of how residents will be using the Matrix

• **Phase 4 – Introduction to Fellows**
  – Formal workshop with didactics, small and large group sessions
  – Guest speaker
    • Representative from the Department of Continuous Quality Improvement
Phases of Implementation

• Phase 5 – Implementation in monthly Departmental Quality Assurance Meetings
  – Residents prepare a patient care case using the Matrix
  – Presentation of Matrix results and action plan

• Phase 6 - Post evaluation survey
  – Resident surveys immediately after the workshop then 3 and 6 months post – workshop

• Phase 7 - Reinforcement
  – High impact Grand Rounds lecture by the co-creator of the Matrix, Dr. Doris Quinn
  – Interactive resident session with Dr. Quinn
Barriers to Implementation

- **Resident Workshop**
  - Meeting the needs of each post graduate year
  - Time
  - Lack of knowledge regarding hospital systems/resources

- **Faculty Education**
  - Resistance to change
  - Novelty of Matrix

- **Need for Reinforcement**
  - Residents need increased exposure throughout training
Q & A

THEN

SMALL GROUP ACTIVITY

LARGE GROUP DISCUSSION

WRAP-UP
Resources

- Diagnostic Error articles
- Link to Matrix
- IHI.org “open school” patient safety modules