Reducing Diagnostic Error: A Practical Workshop

Bob Trowbridge
Harry Hoar
Doug Salvador

Session M11
These presenters have nothing to disclose

December 6, 2015
8:30AM – 4:00 PM

#IHI27FORUM

Faculty

- Bob Trowbridge, MD
  Co-Director, Intro to Clinical Reasoning, TUSM
  Director, Faculty Development and General Internal Medicine
  Maine Medical Center

- Harry Hoar III, MD
  Division Chief, Pediatric Hospital Medicine
  Director, Pediatric Simulation
  Baystate Medical Center

- Doug Salvador, MD MPH
  Vice President, Medical Affairs
  Baystate Medical Center
INTRODUCTIONS

WHAT DO YOU WANT TO MAKE SURE WE COVER TODAY?
Session Objectives

- Discuss the epidemiology of diagnostic error
- Describe how cognitive biases contribute to diagnostic error
- Apply a specific tool to analyze diagnostic errors
- Identify methods to minimize errors in diagnosis in the clinical setting

Agenda

- Definition and Impact of Diagnostic Error
- Causes of Diagnostic Error
- Cognitive Errors/How Doctors Think
- Solutions
What is a diagnostic error?

**Graber Definition**

- A diagnosis that, on the basis of the eventual appreciation of more definitive information, was
  - Unintentionally delayed, or
  - Wrong, or
  - Missed altogether

*American Journal of Medicine 165 (13) 2005*
Singh Definition

The occurrence of a **missed opportunity** to make the **correct** diagnosis in a **more timely** manner

---

IOM Definition

The failure to

- Establish an accurate and timely explanation of the patient's health problem(s) or
- Communicate that explanation to the patient
A couple of cases

- Split into small groups
- Determine
  - Was this a diagnostic error?

Was this a diagnostic error?

- Seems straightforward, but
  - Requires clinical (diagnostic) expertise
  - Subjective
  - Recreating the context is impossible
    - Limited cognitive insight
  - Hindsight bias
How important is diagnostic error?

- Prevalence
- Impact

How Common is Diagnostic Error?

- Overall, likely rate of diagnostic error is about 10-15%
- Error rate varies by specialty and study
  - Anatomic pathology 2-5%
  - ED up to 12%
  - Medical admitting diagnosis ~6%
Ambulatory Medicine

- Examined frequency of diagnostic error via triggers
- 5% of all outpatient visits associated with a diagnostic error
  - 50% of these with potential to cause serious harm
- 12 million Americans affected annually

JAMA Internal Medicine 173 (6): 2013

Pediatrics and Diagnostic Error

- 45% of pediatricians report making a harmful diagnostic error at least once or twice a year
- 5% of pediatric admissions subject to diagnostic error

Pediatrics 126 (1) 2010
Ir J Qual Health Care, July 2014
What does the IOM say?

“It is likely that most of us will experience at least one diagnostic error in our lifetime, sometimes with devastating consequences.”

How important is diagnostic error?

- Prevalence
- Impact
Do these errors matter?

- Account for up to 17% of adverse events
- 40,000-80,000 US hospital deaths per year attributable to diagnostic error
- 5% of all autopsies show a lethal diagnosis that could have been treated ante-mortem

What do these errors look like?

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Missed on initial evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
<td>9%</td>
</tr>
<tr>
<td>Sub-arachnoid hemorrhage</td>
<td>5%</td>
</tr>
<tr>
<td>Pulmonary Tb</td>
<td>45%</td>
</tr>
<tr>
<td>Acute Coronary Syndrome</td>
<td>2-3%</td>
</tr>
<tr>
<td>Appendicitis</td>
<td>19%</td>
</tr>
</tbody>
</table>
Do these errors matter?

- Account for up to 17% of adverse events
- 40,000-80,000 US hospital deaths per year attributable to diagnostic error
- 5% of all autopsies show a lethal diagnosis that could have been treated ante-mortem
- Tort claims data

<table>
<thead>
<tr>
<th>Type of Error</th>
<th>Number of Claims</th>
<th>Amount Paid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery-related</td>
<td>2625</td>
<td>$77,000,000</td>
</tr>
<tr>
<td>Medication-related</td>
<td>1309</td>
<td>$27,000,000</td>
</tr>
<tr>
<td>Diagnostic</td>
<td>2477</td>
<td>$93,000,000</td>
</tr>
</tbody>
</table>

J Law Med Ethics 2001; 29:335-345
Closed Claims Review

<table>
<thead>
<tr>
<th>Type of Error</th>
<th>Total Claims</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery</td>
<td>29%</td>
</tr>
<tr>
<td>Obstetrics</td>
<td>24%</td>
</tr>
<tr>
<td>Diagnosis</td>
<td>29%</td>
</tr>
<tr>
<td>Medication</td>
<td>18%</td>
</tr>
</tbody>
</table>

NEJM 2006; 354:2024-33

NPDB Review

- Reviewed 25 years of claims
- 350,000 total claims
  - Diagnostic error
    - Leading cause of claims (29%)
    - Highest proportion of pay-outs (35%)
    - More often resulted in death (40%)
    - 25 year sum cost of $38 billion
    - Median cost per claim of $213,000

BMJ Quality and Safety 22: 2013
Costs related to
- inappropriate/unnecessary testing
- delayed evaluation
- patient dissatisfaction

How important is diagnostic error?

- Prevalence
- Impact
Causes of Diagnostic Error

Clinical Data Gathering:
- History and Physical
  - Failure to look
  - Failure to ask

Medical Records
- Failure to obtain pertinent records
- Lack of record accessibility
- Prior medical records without key data

Communication
- Failure in hand-off communication
- Follow up mechanism in place but not utilized
- Delay in or omission of communication of test result
- Failure of communication with staff
- Failure in communication to consultant

Specific Diagnosis/Presentation
- Is the particular diagnosis difficult to diagnose (e.g., atrial fibrillation)

Organizational Issues:
- Physical Context of Care
  - Inadequate space to evaluate patient (quiet, private)
  - Inadequate bed availability on specific units
  - Diagnostic equipment unavailable

Context of Care
- Post-operative patient with multiple consultants
- Patient with rare symptoms
- Complex hospitalized patient
- " Routine" ambulatory patient

Cognitive Process:
- Faulty Reasoning
  - Patient behaviorally difficult
  - Patient irritable
  - Physician fatigued/inoverworked

Affective Factors
- Physician overwhelmed/inadequate backup
- Lack of clinical decision support
- Inadequate follow-up mechanisms in place
- Test performed incorrectly
- Faulty reading of lab test
- Faulty reading or imaging study
- Lack of test availability
- Lack of consultant availability
- Barriers to accessing proper setting for patient

Organizational Issues:
- Clinician Support
A CASE

Causes of Diagnostic Error

- Three general categories of diagnostic error
  - “No Fault”
    - Very unusual presentations, patient-related error
  - Systems-related
    - Technical failure, organizational issues
  - Cognitive errors
    - Faults in knowledge, data gathering, information processing or affective issues
Systems-related Errors

- Technical Failures
  - Faulty test or data

- Organizational Failures
  - Poor coordination of care
  - Inadequate supervision of trainees
  - Poor communication
  - External interference

Causes of Diagnostic Error

- Three general categories of diagnostic error
  - “No Fault”
    - Very unusual presentations, patient-related error
  - Systems-related
    - Technical failure, organizational issues
  - Cognitive errors
    - Faults in knowledge, data gathering, information processing or affective issues
Basis of Cognitive Errors

Cognitive Errors
- Faulty knowledge
- Faulty data gathering
- Faulty synthesis
- Affective error
Basis of Cognitive Errors

- Cognitive Errors
  - Faulty knowledge
  - Faulty data gathering
    - Failure to ask or look
    - EMRs
  - Faulty synthesis
  - Affective error

Basis of Cognitive Errors

- Cognitive Errors
  - Faulty knowledge
  - Faulty data gathering
  - Faulty synthesis
    - Premature closure
    - Misjudging the importance of a finding
    - Faulty context generation
  - Affective error
Basis of Cognitive Errors

- Cognitive Errors
  - Faulty knowledge
  - Faulty data gathering
  - Faulty synthesis
  - Affective error
    - Metacognitive failure

Causes of Diagnostic Error

- Three general categories of diagnostic error
  - “No Fault” (7%)
    - Very unusual presentations, patient-related error
  - Systems-related (19%)
    - Technical failure, organizational issues
  - Cognitive errors (28%)
    - Faults in knowledge, data gathering, information processing or affective issues

46%
Cognitive Errors/How Doctors Think
The Diagnostic Process

The National Academies of Sciences, Engineering, and Medicine

Where Failures in the Diagnostic Process Occur

THE WORK SYSTEM
- Diagnostic Team Members
- Tools
- Technologies and Tools
- Organization
- Physical Environment
- External Environment

THE NATIONAL ACADEMIES OF SCIENCES • ENGINEERING • MEDICINE

12/6/2015
Failure in Information Gathering
Failure in Information Integration
Failure in Information Interpretation

THE DIAGNOSTIC PROCESS

INFORMATION INTEGRATION & INTERPRETATION
INFORMATION GATHERING
WORKING DIAGNOSIS

How Doctors Think
Jerome Groopman, M.D.
We think in 2 ways: Fast and Slow

Chicken-sexing: Type 1 reasoning

What are these people feeling?

Features of ‘System 1’

- Fast
- Effortless
- Largely below the level of consciousness
- Usually accurate but prone to systematic biases
- Does not understand statistics or logic
- Unable to be turned off
Vulcan logic: Type 2 reasoning

17 x 24 = ?
Features of ‘System 2’

- Slow
- Effortful
- Accurate

Avoided by the 'cognitive miser'

Makes you feel like this:

Muscles tense, HR increases, BP increases, pupils dilate

Diagnosis: Chicken-sexing or vulcan logic?
We are all chicken-sexers (with Vulcan potential).

The interaction of system 1 and system 2

(a)

(b)
Unconscious activation of the correct diagnosis based on prior experience.

Effortless, quick
Heuristics

- Shortcuts or “rules of thumb” that are learned “on the job”
- Quick, practical, and usually adequate
- > 60 different heuristics have been described in medicine
- Classic example - representativeness heuristic: If it looks like a duck, quacks like a duck...


It’s usually a duck..., but not always.
Illness Scripts

- Stored mental model for a particular diagnosis
- 'Script' is composed of the predisposing conditions, pathophysiologic cause, and clinical manifestations of the disorder
- Diagnosis involves mentally scanning for the illness script that most closely resembles the clinical presentation


Illness script for epidural abscess

Risk Factors:
- Immunodeficiency
- IV drug use
- Spinal surgery
- Diabetes

Pathophysiology:
- Hematogenous vs. local spread
- Compression of cord
- Staph aureus most common

Clinical manifestations:
- Back pain
- Fever
- Malaise
- Radiculopathy
- Bowel/bladder dysfunction
- Paraplegia/paresis
- Sepsis

Chao & Nanda. Am Fam Physician 2002
We are all chicken-sexers with Vulcan potential.

A Quiz

(Eight seconds per question; write down your answers)
A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball.

How much does the ball cost?

If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?
In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half the lake?
A bat and a ball cost $1.10 in total. The bat costs $1.00 more than the ball.

How much does the ball cost?

If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets?
In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half the lake?

Correct answers:
- 5 cents
- 5 days
- 47 days
### System 1 Failures - Cognitive and Affective Biases

**Table 1**

**CRT Scores, by Location**

<table>
<thead>
<tr>
<th>Locations at which data were collected</th>
<th>Mean CRT score</th>
<th>&quot;Low&quot;</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>N =</th>
</tr>
</thead>
<tbody>
<tr>
<td>Massachusetts Institute of Technology</td>
<td>2.18</td>
<td>7%</td>
<td>15%</td>
<td>30%</td>
<td>48%</td>
<td>61</td>
</tr>
<tr>
<td>Princeton University</td>
<td>1.63</td>
<td>18%</td>
<td>27%</td>
<td>28%</td>
<td>25%</td>
<td>121</td>
</tr>
<tr>
<td>Boston fireworks display*</td>
<td>1.53</td>
<td>24%</td>
<td>24%</td>
<td>26%</td>
<td>26%</td>
<td>195</td>
</tr>
<tr>
<td>Carnegie Mellon University</td>
<td>1.51</td>
<td>22%</td>
<td>25%</td>
<td>25%</td>
<td>25%</td>
<td>746</td>
</tr>
<tr>
<td>Harvard University*</td>
<td>1.43</td>
<td>20%</td>
<td>37%</td>
<td>24%</td>
<td>20%</td>
<td>51</td>
</tr>
<tr>
<td>University of Michigan: Ann Arbor</td>
<td>1.18</td>
<td>31%</td>
<td>33%</td>
<td>23%</td>
<td>14%</td>
<td>1267</td>
</tr>
<tr>
<td>Web-based students*</td>
<td>1.10</td>
<td>38%</td>
<td>25%</td>
<td>22%</td>
<td>15%</td>
<td>525</td>
</tr>
<tr>
<td>Bowling Green University</td>
<td>0.87</td>
<td>50%</td>
<td>25%</td>
<td>13%</td>
<td>12%</td>
<td>52</td>
</tr>
<tr>
<td>University of Michigan: Dearborn</td>
<td>0.83</td>
<td>51%</td>
<td>22%</td>
<td>21%</td>
<td>6%</td>
<td>154</td>
</tr>
<tr>
<td>Michigan State University</td>
<td>0.79</td>
<td>49%</td>
<td>29%</td>
<td>16%</td>
<td>6%</td>
<td>118</td>
</tr>
<tr>
<td>University of Toledo</td>
<td>0.57</td>
<td>64%</td>
<td>21%</td>
<td>10%</td>
<td>5%</td>
<td>138</td>
</tr>
<tr>
<td>Overall</td>
<td>1.24</td>
<td>39%</td>
<td>28%</td>
<td>23%</td>
<td>17%</td>
<td>3428</td>
</tr>
</tbody>
</table>

*Croskerry P, A Universal Model of Diagnostic Reasoning. Academic Medicine, Vol. 84, No. 8 / August 2009*
How fast were the cars going when they *bumped* into each other?

How fast were the cars going when they *smashed* into each other?
Framing effects (framing bias)

The manner in which a case is presented (framed) influences subsequent thinking about the case.

Write down the last 2 digits of your SSN.
How much would you pay for this bottle of wine?

Crisp and vibrant, gaining lift to the structure from acidity and fine tannins, with dark berry and coffee flavors. Lingers pleasantly. Rating: 87 - Wine Spectator

Anchoring

- Relying too heavily on initial impressions and failing to adequately adjust in light of new information
- “You never get a second chance to make a first impression”
Confirmation bias

The tendency to look for evidence that confirms our suspicions and ignore or misinterpret data that does not
More fun with wine…

$13  $90

Think, pair, share…

- Refer back to the case
- Think about any examples of framing, anchoring, and confirmation bias that occurred in this case
- Turn to someone next to you and discuss
- Share as a group
Diagnosis Momentum

- Tendency for a particular diagnosis to become established without adequate evidence.
- The farther along it gets, the more momentum it has and the less likely anyone is to question the diagnosis.

Croskerry. Acad Emerg Med. 2002
Premature closure

- Concluding that a patient has a particular diagnosis before there is actually enough evidence to make that diagnosis
- Premature closure tends to stop any further thinking about the diagnosis
Think, pair, share…

- Refer back to the case
- Think about how the provider’s affect/emotional state(s) may have influenced their decisions
- Turn to someone next to you and discuss
- Share as a group
Croskerry P, A Universal Model of Diagnostic Reasoning. Academic Medicine, Vol. 84, No. 8 / August 2009

Context
Ambient conditions
Task difficulty
Task ambiguity
Affective state
Modular responsivity

Patient Presentation

Type

Diagnosis

Intellectual ability
Education
Training
Critical thinking
Logical competence
Rationality
Feedback

### Principal Characteristics of Type 1 and Type 2 Decision-Making Processes

<table>
<thead>
<tr>
<th>Cognitive style</th>
<th>Type 1, Heuristic, intuitive</th>
<th>Type 2, Systematic, analytical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computational principle</td>
<td>Associative</td>
<td>Rule based</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>Passive</td>
<td>Active</td>
</tr>
<tr>
<td>Capacity</td>
<td>High</td>
<td>Limited</td>
</tr>
<tr>
<td>Cognitive awareness/control</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Automaticity</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Rate</td>
<td>Fast</td>
<td>Slow</td>
</tr>
<tr>
<td>Reliability</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Errors</td>
<td>Relatively common</td>
<td>Rare</td>
</tr>
<tr>
<td>Effort</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Emotional attachment</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td>Scientific rigor</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

System 2 failures are caused by:

- Inattentiveness
- Distractions
- Fatigue
- Time pressure
- Incomplete information
- Cognitive “miserliness”

“System 2 approaches can be employed by well-rested, well-slept decision makers under conditions in which there are no distractions or untoward intrusion of affect and all the required data are available.”
Creating better diagnosticians

- Teach trainees about the diagnostic process
- Make system 1 more accurate
- Activate system 2 more frequently

Teach trainees about the diagnostic process
Metacognition
Cognitive debiasing

Make system 1 more accurate
- Experience matters
- Progressive problem solving
- Feedback on diagnostic decisions

Activate system 2 more frequently
- Cognitive forcing strategies
- Checklists
- Expertise development
"There are some things they don't teach you in medical school. I think you've got one of those things."

SOLUTIONS
What are you doing at your institution to improve diagnosis?

National Academies Report Goals

- Facilitate more effective teamwork in the diagnostic process – HC professionals, patient, families
- Enhance HC professional education and training in the diagnostic process
- Ensure health information technologies support the diagnostic process
- Develop and deploy approaches to identify, learn from, and reduce diagnostic errors in clinical practice
- Establish a work system and culture that supports the diagnostic process and improvements in diagnostic performance
- Medical liability, payment system, research funding
National Academies Goals

- Teamwork
- Education and Training  ✓
- Health Information Technology
- Learn from Diagnostic Errors  ✓
- System and Culture

**FIGURE 3-2** Places in the diagnostic process where failures can occur that contribute to diagnostic errors.
National Academies Goals

- Teamwork
- Education and Training
- Health Information Technology
- Learn from Diagnostic Errors
- System and Culture

Patients are Members of the Team!
Velma Payne, DEM conference 2014

- Recruited 35 patients and family members

- Patient Stereotyping
  - Labelling
  - Assumed Mental Health Issue

- Lack of Respect
  - Not Listening to Patients
  - Dismissive of Patient Views

- Resident Supervision

Sir William Osler

- "Listen to your patient, he is telling you the diagnosis"
What about the role of nurses?

Christine Goeschel, AVP Quality
MedStar Health

Improving the Diagnostic Process:
Steps EVERY nurse could take NOW

1. Know the major diagnoses of your patients
2. Be the voice of your patients and their advocate in navigating their health care
3. Be the eyes of the diagnostic team in detecting, reporting and documenting changes in your patients symptoms, signs, complaints, or conditions
4. Be the monitor of the diagnostic team. Is your patient responding to treatment as expected?
Christine Goeschel, AVP Quality
MedStar Health

Improving the Diagnostic Process:
Steps EVERY nurse could take NOW

5. Help optimize communication between your patient and the care team
6. Be the watchdog for appropriate care coordination
7. Educate patients about the diagnostic process
8. Learn about how diagnostic errors arise and how they can be avoided

Support interprofessional and intra-professional teamwork in the diagnostic process
Diagnostic Management Teams
Vanderbilt – Michael Laposata

Coagulation Rounds

JULY 1, 2010  VANDERBILT UNIVERSITY

This patient has an elevated PTT, with a normal PT/INR and normal thrombin time.

A PTT mixing study failed to correct into the normal range. These results were consistent with the presence of an inhibitor (such as a lupus anticoagulant) in the sample.

The Dilute Russell Viper Venom time (dRVVT) is used for detection of Lupus Anticoagulant, and the test was positive, indicating the presence of Lupus Anticoagulant.

Taken together, this is a patient with a prolonged PTT based upon the presence of a lupus anticoagulant.
National Academies Goals

- Teamwork
- Education and Training
- Health Information Technology
- Learn from Diagnostic Errors
- System and Culture

KP Safety Nets, since 2009

Kaiser Permanente Creatinine Safety Program: A Mechanism to Ensure Widespread Detection and Care for Chronic Kidney Disease

John J. Sim, MD,*, Mark P. Rukowski, MD,† David C. Selman, BS,‡ Michael Batech, BPharm,§ Royceen Trimillos, RN,§
Jeff M. Slezak, MD,*, Steven J. Jacobson, MD, PhD,*, Michael R. Kester, MD,‡
*Division of Nephrology and Hypertension, Kaiser Permanente Los Angeles Medical Center, Los Angeles, Calif; †Regional Quality and Clinical Analysis, Southern California Permanente Medical Group, Kaiser Permanente Southern California, Pasadena; ‡Department of Research and Evaluation, Kaiser Permanente Southern California, Pasadena.

ABSTRACT

BACKGROUND: Chronic kidney disease is highly prevalent but is challenging to diagnose because of the need to establish chronicity. Within the current healthcare environment, a single abnormal creatinine measurement may go without a follow-up, which may lead to missed diagnoses on diagnostic errors. The Kaiser Permanente Southern California creatinine safety program (the Creatinine SafetyNet) was created to help ensure that all single abnormal creatinine results had a follow-up evaluation.

METHODS: In the period February 1, 2010, to March 1, 2011, the electronic health records were used to identify individuals with single abnormal creatinine values that were >1.50 mg/dL without a repeat measurement. A coordinated effort among a dedicated regional nurse and provider was used to communicate with patients and order a repeat creatinine measurement.

RESULTS: A total of 22,996 individuals were identified (64% ambulatory care encounters). A total of 1,680 individuals (52%) followed up with a repeat measurement. Female patients, non-Hispanic whites, and older individuals were more likely to obtain a repeat measurement. Subsequently, 160 individuals had chronic kidney disease identified. Within 6 months, 16% patients had chronic documentation of their chronic kidney disease and 36% patients had a hypertensive classification.

Larry Weed

“…minds are constrained in two ways that no training can overcome: limited capacities for information retrieval and processing, plus heuristics and biases built into human cognition…. It is pointless for diagnosticians to try to recognize and overcome their cognitive limits and vulnerabilities. The point is not to overcome these human constraints but to bypass them altogether....”

Weed LL and Weed L, Diagnosis 2014; 1(1):13-17
The Potential of Technology

- Clinical Decision Support
- Automated Handoff Tools
- Integrated Health Record

National Academies Goals

- Teamwork
- Education and Training
- Health Information Technology
- Learn from Diagnostic Errors
- System and Culture
**Modified Graber Checklist**

- Obtain a complete history
- Perform a complete but focused exam
- Use a systematic approach to obtain diagnostic possibilities to be considered
- Take time to pause and reflect (SAFER)
- Be a skeptic

Ely JW, *Diagnosis* 2014;1(1):131-34

---

**Diagnostic Checklist in Action**
Diagnostic Checklist

-SAFER
- Serious diagnoses
- Alternative diagnoses
- Feelings affecting thinking
- Extraneous data…is it really extraneous?
- Reasons why this happened

Diagnostic Pause Exercise

- Please form groups of 2 or 3 people
- Read the exercise handout
- One person take the role of attending and lead the group through the SAFER checklist
CULTURE

Psychological Safety
The Impact of Rudeness on Medical Team Performance: A Randomized Trial

BACKGROUND AND OBJECTIVES: Latrogenesis often results from performance deficiencies among medical team members. Team-targeted rudeness may underlie such performance deficiencies, with individuals exposed to rude behavior being less helpful and cooperative. Our objective was to explore the impact of rudeness on the performance of medical teams.

METHOD: Twenty-four NICU teams participated in a training simulation involving a preterm infant whose condition acutely deteriorated due to necrotizing enterocolitis. Participants were informed that a foreign expert on team reflexivity in medicine would observe them. Teams were randomly assigned to either exposure to rudeness (in which the expert's comments included mildly rude statements completely unrelated to the teams' performance) or control.

Diagnostic Performance

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control Group</th>
<th>Rudeness Group</th>
<th>T Test</th>
<th>P (One-Tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Diagnosed respiratory distress</td>
<td>3.59</td>
<td>1.07</td>
<td>3.20</td>
<td>1.00</td>
</tr>
<tr>
<td>Diagnosed shock</td>
<td>2.88</td>
<td>1.32</td>
<td>2.68</td>
<td>1.08</td>
</tr>
<tr>
<td>Suspected infection</td>
<td>3.13</td>
<td>1.01</td>
<td>3.06</td>
<td>1.13</td>
</tr>
<tr>
<td>Diagnosed NEC</td>
<td>2.06</td>
<td>1.23</td>
<td>2.62</td>
<td>0.95</td>
</tr>
<tr>
<td>Good stage 1 diagnostic skills</td>
<td>3.22</td>
<td>0.99</td>
<td>2.91</td>
<td>0.75</td>
</tr>
<tr>
<td>Diagnosed deterioration</td>
<td>4.06</td>
<td>0.75</td>
<td>3.54</td>
<td>0.89</td>
</tr>
<tr>
<td>Suspected perforation of bowel</td>
<td>2.60</td>
<td>1.47</td>
<td>1.84</td>
<td>0.86</td>
</tr>
<tr>
<td>Diagnosed cardiac tamponade</td>
<td>3.18</td>
<td>1.30</td>
<td>2.15</td>
<td>1.40</td>
</tr>
<tr>
<td>Good stage 2 diagnostic skills</td>
<td>3.13</td>
<td>1.21</td>
<td>2.55</td>
<td>1.07</td>
</tr>
<tr>
<td>Overall diagnostic</td>
<td>3.18</td>
<td>0.82</td>
<td>2.65</td>
<td>0.69</td>
</tr>
</tbody>
</table>

*P < .05, **P < .01.
Procedural Performance

**TABLE 3. Comparison of Mean Procedural Performance Variables (N = 72)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Control Group (n = 33)</th>
<th>Rudeness Group (n = 33)</th>
<th>t Test</th>
<th>P (One Tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Performed reposition well</td>
<td>3.06</td>
<td>.84</td>
<td>2.49</td>
<td>.73</td>
</tr>
<tr>
<td>Ventilated well</td>
<td>3.44</td>
<td>.94</td>
<td>3.01</td>
<td>.81</td>
</tr>
<tr>
<td>Verified place of tube wall</td>
<td>3.46</td>
<td>.80</td>
<td>2.85</td>
<td>.62</td>
</tr>
<tr>
<td>Asked for right radiographs</td>
<td>3.29</td>
<td>.23</td>
<td>2.96</td>
<td>.50</td>
</tr>
<tr>
<td>Asked for right laboratory tests</td>
<td>3.78</td>
<td>.88</td>
<td>3.24</td>
<td>.84</td>
</tr>
<tr>
<td>Gave right resuscitation medica</td>
<td>3.55</td>
<td>.81</td>
<td>3.17</td>
<td>.88</td>
</tr>
<tr>
<td>Stopped percutaneous central line on time</td>
<td>2.98</td>
<td>.90</td>
<td>2.64</td>
<td>.66</td>
</tr>
<tr>
<td>Prepared and performed pericardiocentesis</td>
<td>2.71</td>
<td>.55</td>
<td>2.11</td>
<td>.39</td>
</tr>
<tr>
<td>Good general technical skills</td>
<td>3.17</td>
<td>.86</td>
<td>2.61</td>
<td>.73</td>
</tr>
<tr>
<td>Overall procedural</td>
<td>3.20</td>
<td>.92</td>
<td>2.77</td>
<td>.67</td>
</tr>
</tbody>
</table>

*P < .05, **P < .01.

**FIGURE 1.** Path model of the effect of rudeness on performance, mediated by information sharing and help-seeking. Numbers denote standardized coefficients for the mediation path shown by the arrow. The relationship between information sharing and help-seeking was .27. The relationships between information sharing and procedural performance and between help-seeking and diagnostic performance were not significant. *P < .05, **P < .01.
Solutions

- Teamwork
- Education and Training
- Health Information Technology
- Learn from Diagnostic Errors
- System and Culture
  - Diagnostic Environment

Wrap Up

- Review Goals of the day
- Questions
- Follow-up

Doug.SalvadorMD@baystatehealth.org

Harry.HoarIIIMD@baystatehealth.org

TROWBR@mmc.org
First Year Medical Student

https://www.youtube.com/watch?v=V8l8_G_ce_Q

Diagnosis Celebration

https://www.youtube.com/watch?v=rRBq-6lVxzU&feature=related