Charting the Course to Improved Medical Diagnosis

Mark L Graber, MD FACP
President, SIDM
Senior Fellow, RTI International
Disclosures: None

• **Goals:** Discuss ..... 

• The main findings of the IOM report: “Improving Diagnosis in Health Care”

• Why, where, and often diagnostic errors occur

• How to address diagnostic error – the role of physicians, patients and healthcare organizations
Survey

Think of yourself and your immediate family.

Have you experienced one of these 3 things?

- Someone was given a diagnosis that was wrong
- Someone was given the right diagnosis, but it should have been made much earlier
- Someone has a medical condition that STILL has not been diagnosed?
Why Should I Care About Dx Error?

Dollars and cents
- Each malpractice case = $300,000
- A third of healthcare dollars are wasted – a large fraction could be diagnostic errors

Your organization’s reputation

The next case could be YOU or your FAMILY
WHO WE ARE: Non-profit physician-led organization. Members: MD’s, Patients, safety experts, educators, researchers, insurers, payers, regulators

VISION: We envision a world where diagnosis is timely, accurate, reliable, efficient, & SAFE. We are the ONLY safety organization focused on this problem.

ACTIVITIES: Annual Conference: Diagnostic Error in Medicine; Newsletter; Listserv; IOM report
DIAGNOSTIC ERROR IN MEDICINE
10th International Conference

October 8-10, 2017
Boston Marriott Newton
DEMCconference.org

IMPROVING DIAGNOSIS: IT TAKES A TEAM
http://nas.edu/improvingdiagnosis
Knowing is not enough, we must apply.
Willing is not enough, we must do.

Recommendations  Practice Improvement
The Bad News and the Good

Bad
Your plate is already full
There are a LOT of diagnostic errors out there

Good
You won’t be seeing any new performance measures on these any time soon
You know how to do this – process improvement
Conclusion

Diagnostic errors are a significant but underappreciated challenge to health care quality

• Getting the right diagnosis is a key aspect of health care: it provides an explanation of a patient’s health problem and informs subsequent health care decisions

• Diagnostic errors persist through all settings of care and harm an unacceptable number of patients
Definition of Diagnostic Error

The failure to:

(a) establish an **accurate** and **timely** explanation of the **patient’s** health problem(s)

or

(b) **communicate** that explanation to the **patient**

The single biggest problem in communication is the illusion that it has taken place.  
*George Bernard Shaw*
Low Hanging Fruit: Test Result Communication

52% Primary care providers have NO system to track tests ordered. 

8% Critical lab abnormalities never followed up

62% Tests results that return after discharge that PC provides are unaware of
What is the number ??

1 in 10 diagnoses are wrong (secret shoppers)

40,000 – 80,000 deaths (autopsy data)

1 in 3 people surveyed have experienced a dx error (survey)

Most common cause for a malpractice claim (CRICO, VA, KP)

1 in 20 patients will experience a dx error every year (chart review)
The Toll of Dx Error

US

Each Hospital

40,000 – 80,000 deaths/yr

10 deaths every year

1 in 20 primary care visits involves a preventable dx error; half are potentially harmful

10 patients harmed every day in your clinics or ER

Error-related Harm

Diagnostic Error

Leape et al.  JAMA  288:2405, 2002
“It is likely that most of us will experience at least one diagnostic error in our lifetime, sometimes with devastating consequences.”
Where do they happen?

CRICO - Analysis of 4519 claims related to diagnostic error

Ambulatory care clinics  Its NOT just rare conditions. Dx errors are COMMON in patients with anemia, asthma, COPD
Error in the Diagnostic Process

- Silent disease
- Too early; atypical
- Patient misleads us
- Patient doesn’t f/u

“No Fault” Causes

DIAGNOSTIC ERROR (Wrong, missed & delayed diagnosis)

Inconsequential

HARM
Diagnosis is HARD!

**PATIENT VARIABLES**
- Stage of disease
- How it manifests
- How it is perceived
- How it is described
- When help is sought

**SYSTEM COMPLEXITY**
- Disjointed care
- Communication barriers
- Production pressure
- Tight coupling
- Access to care & expertise

**PHYSICIAN VARIABLES**
- Knowledge and experience
- Access to patient data, tests, consults
- Skill in clinical reasoning
- Stress, distractions, mood, time to think

**Healthcare System Statistics**
- 10,000 Diseases
- 5,000 Lab Tests
Why do they happen?

100 cases – 535 root causes
Graber et al. Arch Int Med 165:1493-9, 2005

SYSTEM

BLUNT end

SHARP end

Communication, coordination, training, policies, procedures

Patient’s Clinical Course

Me

Cognitive
In 100 cases of dx error, the most common system errors (n = 215) were:

<table>
<thead>
<tr>
<th>TYPE</th>
<th>EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>Critical lab abnormality lost</td>
</tr>
<tr>
<td>Coordination of care</td>
<td>Medical records aren’t available</td>
</tr>
<tr>
<td>Expertise available</td>
<td>No Radiologist on nights</td>
</tr>
<tr>
<td>Culture of safety</td>
<td>No system to find dx errors</td>
</tr>
<tr>
<td>Supervising trainees</td>
<td>Trainee errors on weekends</td>
</tr>
<tr>
<td>Workload, stress, distractions</td>
<td>Short exam: missed a key finding</td>
</tr>
<tr>
<td>Reliability of lab, X-rays</td>
<td>Small lung nodule missed on X-ray</td>
</tr>
<tr>
<td>Staff – training, dedication, competency, compatibility</td>
<td>Residents mis-read chest X-ray on PACS system</td>
</tr>
</tbody>
</table>

Normalization of deviance
The Case: Rory Staunton

Wednesday:
12 year old boy
3 days earlier: Scrapped knee
Wakes from sleep:
Feels sick, chills, vomiting,
pain at the abrasion site
Thursday, 6 PM – Pediatrician

Feels worse; Family calls Pediatrician

- **CC:** vomiting, fever, weak, leg pain
- **PE:** T102; HR 140; RR36; BP 100/60
  - Skin: mottled; Abd benign
- **ASSESSMENT:** Gastroenteritis; Call made to ER
Thursday, 9 PM – Emergency Dept

- PE: T 100; HR 143; RR 20; BP 94/46
  - Abd benign; No skin exam documented
- ASSESSMENT: Gastroenteritis
- LABS: (Return after discharge): WBC 14.7 with 53% bands
- ASSESSMENT: Gastroenteritis
- PLAN: Zofran, NS IV 1 L, home
Friday:
  – Sx: fever, feels sick, skin sensitive to touch, turning splotchy and blue with red spots
  – Family calls Pediatrician multiple times: Advised Tylenol

Saturday:
  – Returns to ER, admitted to ICU;
  – Dx = Strep sepsis.

Sunday: Dies in the ICU
How Do Doctors Think?
How Do Doctors Think?
System 1: Automatic, subconscious processing
EXPERT | HEURISTIC
System 2: Deliberate, conscious thought

Diagnosis
Recognized?
Repetition
This past weekend the patient was clearing brush from his back yard, wearing shorts. He now has a very itchy rash: vesicles, linear, just where his skin was exposed.

1. Morphea
2. Chicken pox
3. Poison Ivy
4. Pemphigoid
Think about the letter “R”. Which is more common?

A. R as the FIRST letter of a word?

B. R as the THIRD letter of a word?
High Stakes Testing
Blink or Think?

The gestation period of the Asian elephant is .....
What advice did you receive to get the best score on multiple choice tests?

A. Trust your intuition
B. At the end of the test, go back and reconsider the questions you weren’t sure about
Wrong to Wrong

Right to Wrong

Wrong to Right
<table>
<thead>
<tr>
<th>AUTHOR</th>
<th>YEAR</th>
<th>SETTING</th>
<th># Students</th>
<th>Total Questions</th>
<th>% Changed</th>
<th>Wrong to Wrong</th>
<th>Right to Wrong</th>
<th>Wrong to Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>Davis</td>
<td>1929</td>
<td>College Education Courses</td>
<td>28</td>
<td>MC</td>
<td>22000</td>
<td>2.50%</td>
<td>26%</td>
<td>21%</td>
</tr>
<tr>
<td>Shahabudin</td>
<td>1929</td>
<td>Not stated</td>
<td>&gt; 262</td>
<td>T\F</td>
<td>21903</td>
<td>2.90%</td>
<td>34%</td>
<td>66%</td>
</tr>
<tr>
<td>Bath</td>
<td>1967</td>
<td>College Psychology Courses</td>
<td>77</td>
<td>MC</td>
<td>7700</td>
<td>4.30%</td>
<td>20%</td>
<td>20%</td>
</tr>
<tr>
<td>Mathews</td>
<td>1975</td>
<td>1st &amp; 2nd Year Medicine Courses</td>
<td>188</td>
<td>MC</td>
<td>11630</td>
<td>5.40%</td>
<td>22%</td>
<td>20%</td>
</tr>
<tr>
<td>Lowe and Crawford</td>
<td>1983</td>
<td>2nd Year Med Students: Physiology</td>
<td>353</td>
<td>MC</td>
<td>39380</td>
<td>4.60%</td>
<td>32%</td>
<td>22%</td>
</tr>
<tr>
<td>Fabry and Case</td>
<td>1985</td>
<td>National boards: Ob\Gyn</td>
<td>692</td>
<td>Mix</td>
<td>123,175</td>
<td>3.80%</td>
<td>29%</td>
<td>23%</td>
</tr>
<tr>
<td>ABIM</td>
<td>2012</td>
<td>National boards: Internal Med</td>
<td>500</td>
<td>MC</td>
<td>40,000</td>
<td>12.00%</td>
<td>28%</td>
<td>23%</td>
</tr>
</tbody>
</table>
The RIGHT FOOT test .....
The RIGHT FOOT test ..... 

Lessons:

The intuitive, subconscious system that we trust so much is error prone and we know very little about it.

We should NOT trust it for diagnosis
Delayed Diagnosis of Sepsis

Cognitive Errors

• Knowledge: OK?
• Data collection: Incomplete
• Synthesis: Faulty
  Wrong context; Premature closure

System Errors

• Lab results not available fast enough
• Inadequate plan for follow-up
• No system to learn from errors
COGNITIVE ERRORS (n = 320)

Most common:

- Premature closure  (39)
- Faulty context generation  (26)

And many many others ....
“Say ... What’s a mountain goat doing way up here in a cloud bank?”
ABC
1234
Premature closure = Satisficing

= Falling in love with the first puppy ...

(Herbert Simon)
Diagnostic Errors

• Are common and cause enormous harm

• Errors happen wherever diagnoses are made: clinics, ER, inpatient settings

• Errors reflect the many shortcomings in our healthcare systems, and the limitations and of human cognition

• Are generally NOT being addressed
<table>
<thead>
<tr>
<th>High Reliability</th>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Someone owns the process</td>
<td>No one owns the process</td>
</tr>
<tr>
<td>The pieces are integrated</td>
<td>Independent systems</td>
</tr>
<tr>
<td>Top priority is safety</td>
<td>Top priority is fiscal responsibility</td>
</tr>
<tr>
<td>Equivalent actors</td>
<td>Independent actors</td>
</tr>
<tr>
<td>Performance is predictable</td>
<td>Performance is variable</td>
</tr>
<tr>
<td>Measurement is king</td>
<td>Measurement doesn’t exist</td>
</tr>
<tr>
<td>Culture: Resilient, safety oriented</td>
<td>Culture: Financial health is goal #1</td>
</tr>
</tbody>
</table>

**Results:** Six Sigma

**Results:** One or Two Sigma
So where are we?
Hospitals: Its not OUR problem!

Docs: Its not MY problem!

Oversight Organizations: Its not OUR problem!

Who owns the diagnostic error problem?
PHYSICIANS - What can I do?

Be thoughtful and reflective
Learn why dx errors occur and how to avoid
Always construct a differential diagnosis
Take advantage of second opinions
Use decision support resources
Make the patient your partner
IMPACT OF ISABEL

Studied pediatric ICU admissions who did NOT have a diagnosis on admission (n = 206). Correct diagnosis rates:

• Residents on their own: 89.4%

• Residents + Isabel: 92.5%

• Residents + Isabel + Attending 95%

PATIENTS - What can I do?

Be a good historian

Take advantage of cancer screening

Keep accurate records of your tests

SPEAK UP! What else could this be?

Ask what to expect & how to follow-up

Give feedback about diagnostic errors
# 8 Goals to Improve Diagnosis and Reduce Diagnostic Errors

<table>
<thead>
<tr>
<th></th>
<th>Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Facilitate more effective teamwork in the diagnostic process among health care professionals, patients, and their families</td>
</tr>
<tr>
<td>2</td>
<td>Enhance health care professional education and training in the diagnostic process</td>
</tr>
<tr>
<td>3</td>
<td>Ensure that health information technologies support patients and health care professionals in the diagnostic process</td>
</tr>
<tr>
<td>4</td>
<td>Develop and deploy approaches to identify, learn from, and reduce diagnostic errors and near misses in clinical practice</td>
</tr>
<tr>
<td>5</td>
<td>Establish a work system and culture that supports the diagnostic process and improvements in diagnostic performance</td>
</tr>
<tr>
<td>6</td>
<td>Develop a reporting environment and medical liability system that facilitates improved diagnosis through learning from diagnostic errors and near misses</td>
</tr>
<tr>
<td>7</td>
<td>Design a payment and care delivery environment that supports the diagnostic process</td>
</tr>
<tr>
<td>8</td>
<td>Provide dedicated funding for research on the diagnostic process and diagnostic errors</td>
</tr>
</tbody>
</table>
Diagnostic Error

The Next Organizational Challenge: Finding and Addressing Diagnostic Error

Minimizing Diagnostic Error: 10 Things You Could Do Tomorrow
Healthcare Systems - What can I Do?

Find and discuss diagnostic errors

Address the common system flaws that contribute to diagnostic error: Lost test results; failure to follow-up; expertise not available;

Provide decision support resources

Develop pathways for feedback

Facilitate second opinions

Follow up on patients seen in the ED
Healthcare Systems - What can I Do?

The “new” TEAM for diagnosis

THE PATIENT !!
NURSES !!
MD’S – NP’S – PA’S – APN’S
PATHOLOGY & RADIOLOGY
Healthcare Systems - What can I Do?

FIND CASES OF DX ERROR AND LEARN FROM THEM
Step #1  -  Find and learn from diagnostic error

Your existing tools won’t work:  Global trigger tool yield:  0

• **Ambulatory Care:** None of the existing quality assessment tools captures diagnostic errors in ambulatory patients
  Tsang et al Fam Pract 29: 8-15, 2012

• **Inpatient Care:** 785 Medicare inpatients: Found 13% rate of adverse events using 5 different QA approaches, but not a single episode of diagnostic error
  Levinson (OIG) Nov 2010

Promising new approaches:
  – Standardized patients
  – Asking physicians and asking patients
  – Focused trigger tools
Facilitated Physician Reporting

Robert Trowbridge – Maine Medical Center
Established a desktop icon for MD reporting; Personally championed:

- Identified 36 dx errors over 6 months
- 73% involved moderate or serious harm

*Addressing diagnostic error – an institutional approach.*
*Focus on Patient Safety 2010. 13(3): 1-5*
Facilitated Patient Follow-Up

- Saul Weingart et al:
  - 228 discharged patients – 20 adverse events and 13 near misses, none detected by the hospital
  - Similar reports from the US, Japan, Sweden, Canada

AHRQ Web M&M 2013
Trigger Tools

- **Singh et al**
  - Trigger = PC visit + unplanned admission within 2 weeks:

- **Found:**
  - 21% dx error rate vs 2% unselected patients
  - 1 in every 20 ambulatory patients experiences a diagnostic error every year
  - Many\most errors involve common problems

*BMJ-Qual Safety 2011; JAMA 2013*
If you aren’t addressing diagnostic error, are you really what you say?

A passion for putting patients first.
A Transforming, Healing Presence.
Advanced Healthcare Made Personal.
Advanced Medicine, Trusted Care.
Because Your Life Matters.
Best of Care, Close to Home.
Exceptional Care. Exceptional People.
First. Best. Always.
Growing to Meet Your Needs
Healing Hands. Caring Hearts.
Medicine that touches the world.
Minds Advancing Medicine
Our Best, Every Day
Our specialty is you.
Partnerships for Health
Remarkable People. Remarkable Medicine.
The heart of your healthcare.

The Hospital of the Future, Today.
The hospital you trust to care for those you love.
Uncompromising Excellence. Commitment to Care.
We’re here for life.
We’re in this together.
We’re Right Where You Need Us.
Where care comes first.
Where caring is our calling.
Where Compassion and Healing Come Together.
World class healthcare where you live.
You’ll Love the Way We Care for You.
Your Hospital for Life.
Your Most Trusted Health Partner for Life
The Coalition to Improve Diagnosis

American Board of Internal Medicine and the ABIM Foundation
American Board of Medical Specialties
American College of Emergency Physicians
American College of Physicians
American Society of Healthcare Risk Managers
Consumers Advancing Patient Safety
Leapfrog Group
National Patient Safety Foundation
National Partnership of Women and Families
National Association of Pediatric Nurse Practitioners
Society to Improve Diagnosis in Medicine
Department of Veterans Affairs – Veterans Healthcare Agency

Advisory: AHRQ, CDC
“Improving the diagnostic process is not only possible, but it also represents a moral, professional, and public health imperative.”

GRABER.MARK@GMAIL.COM