Leapfrog Group Webinar, July, 2016

Diagnostic Error: The New Frontier for Patient Safety

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DISCLOSURES

1. Grant support
   - NIH U01 DC013778-01A1 (NIDCD), 5U01NS080824, (NINDS), U24TR001609-01 (NCATS), AHRQ (pending)
   - Siemens/SIDM, Brainscope, Kaiser Permanente
2. Research VOG devices loaned by
   - GN Otometrics
   - Autronics-Interacoustics
3. Founding Board Member SIDM (unpaid)
4. 'Diagnosis' career focus (academic COI)

Investigational Use – Device

DIAGNOSTIC ERRORS

'BASE CASE': STROKE IN ACUTE VERTIGO

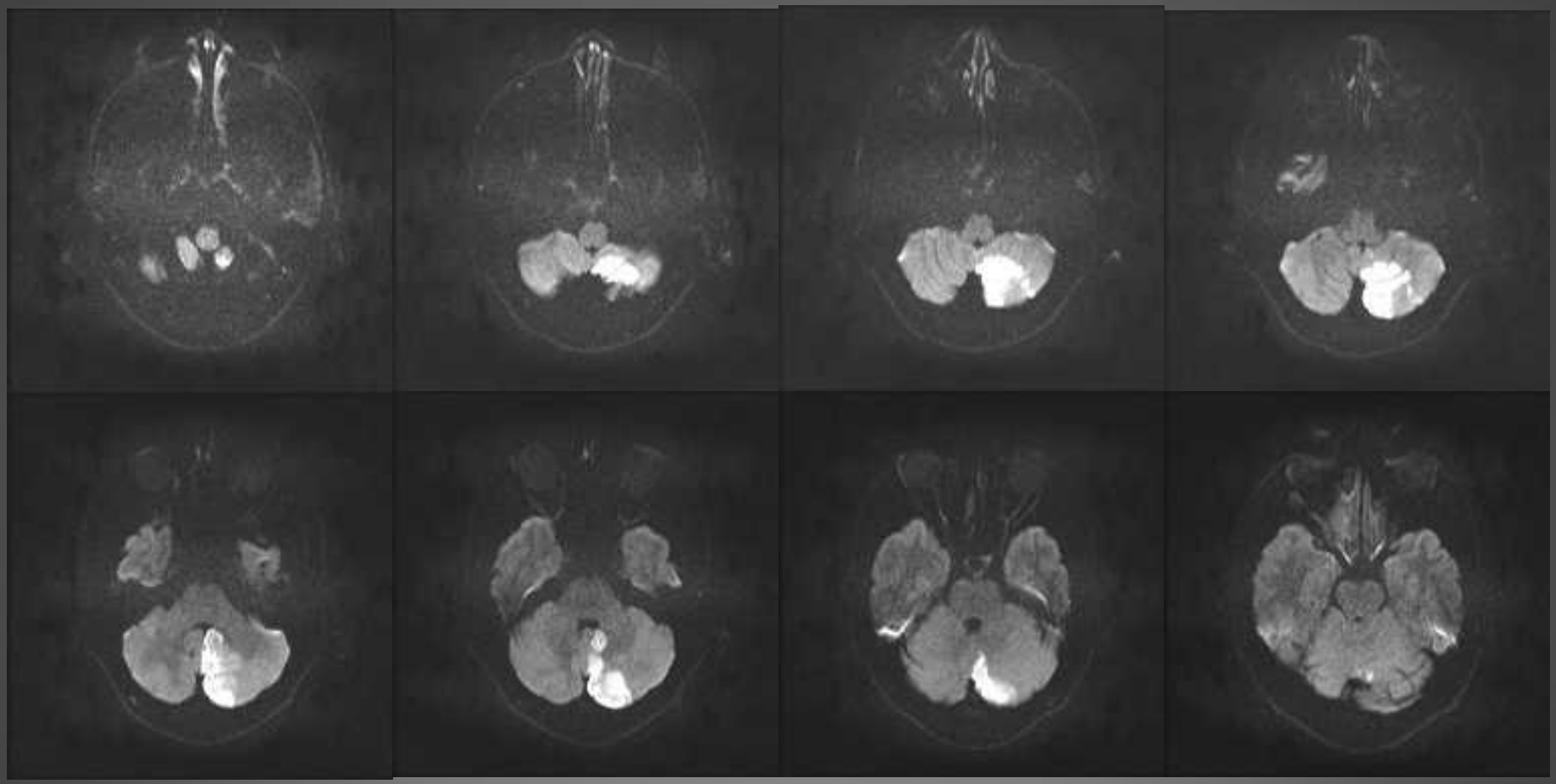
A 30 year-old woman presents with new vertigo and vomiting to the ED. Woke with symptoms this morning and still has them 12 hours later. Associated with nausea, vomiting, head motion intolerance, mild gait unsteadiness. No other neurologic symptoms.

Does the patient have a stroke?

ED physician orders a CT scan of the brain. When it returns with a normal result, the patient is discharged with medication (meclizine) for "labyrinthitis" and told to follow up with their primary care provider.

The patient returns 48 hours later herniating from a large posterior fossa stroke, and ends up disabled in a nursing home.

LARGE CEREBELLAR INFARCTION



medial PICA-territory stroke, dimensions 3.0 x 5.0 x 4.4 cm

LEARNING OBJECTIVES

1) Summarize the public health burden and financial impact of diagnostic error and misdiagnosis-related harms.

2) List common causes and prioritize targets for error reduction and quality-improvement initiatives.

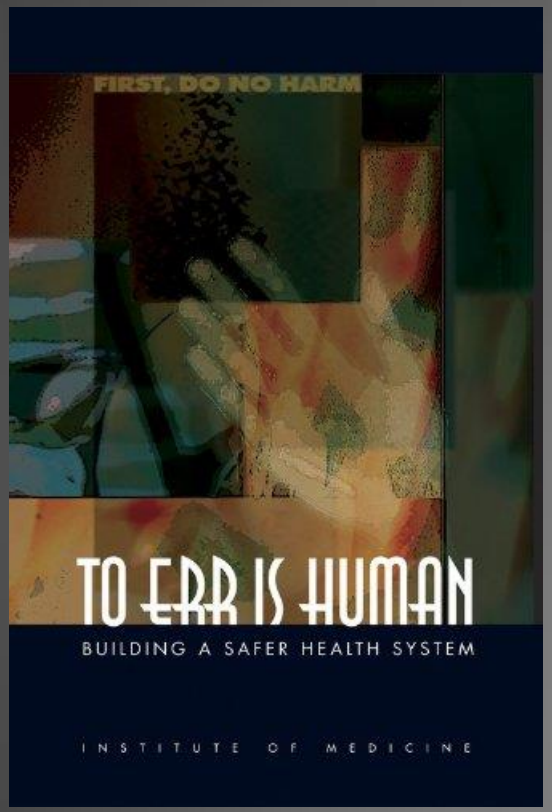
OUTLINE

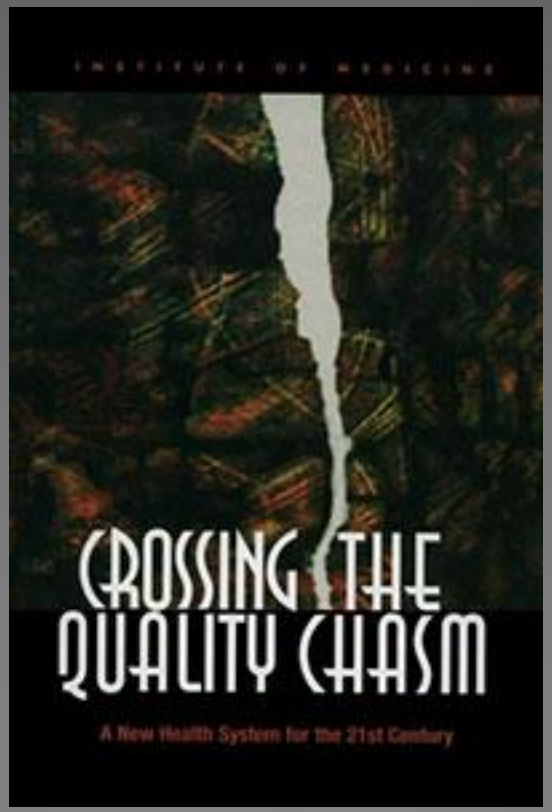
1. The Problem (Newman-Toker)
   - Burden & Impact
   - Definition
   - Classes & Causes
   - Goals & Priorities
   - Conclusions
2. Solutions (Mark Graber)
3. Questions & Discussion

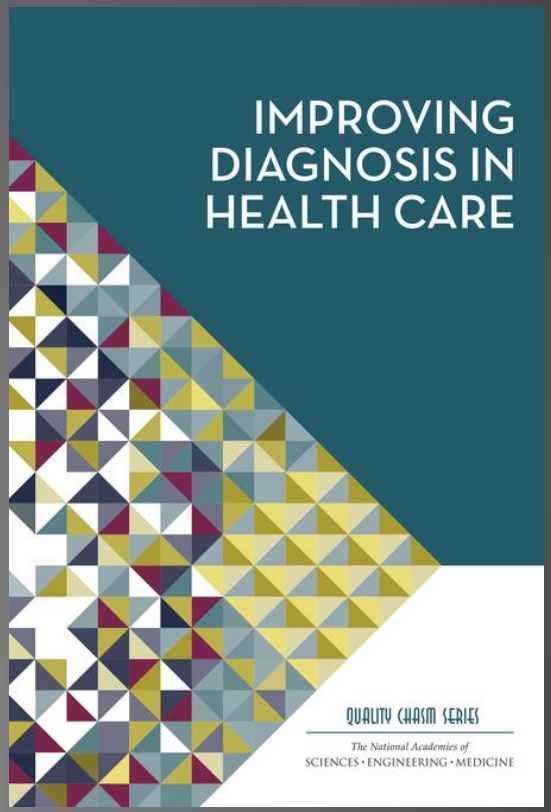
Diagnostic Errors

Burden & Impact

IOM TRILOGY – VOL. 3 DX ERRORS (2015)







Newman-Toker

IOM Report, September 22, 2015

"The delivery of healthcare has proceeded for decades with a blind spot: Diagnostic Errors"

"…most people will experience at least one diagnostic error in their lifetime, sometimes with devastating consequences."

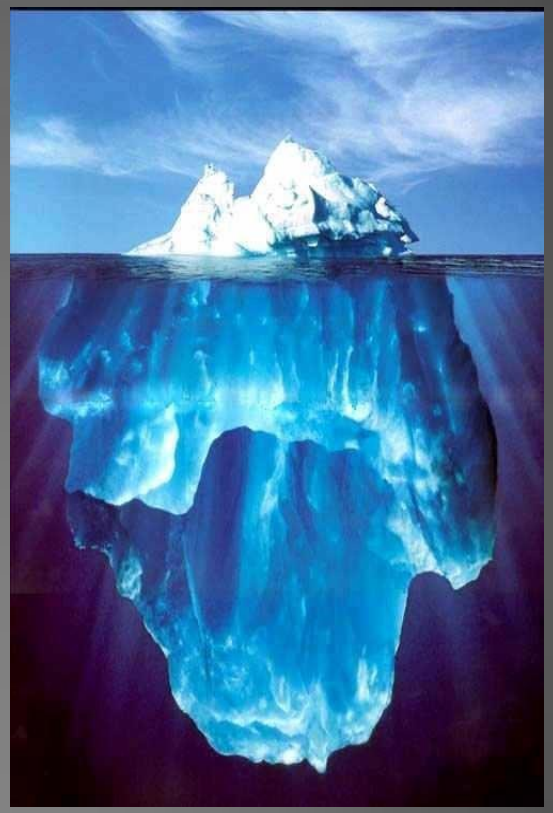
"Improving the diagnostic process is not only possible, but it also represents a moral, professional, and public health imperative"

DIAGNOSTIC ERRORS

MAJOR PUBLIC HEALTH PROBLEM

Most Common
Most Catastrophic
Most Costly

All Other Errors Combined



Diagnostic Errors
Harmed > 4 Million
Cost > $100 Billion

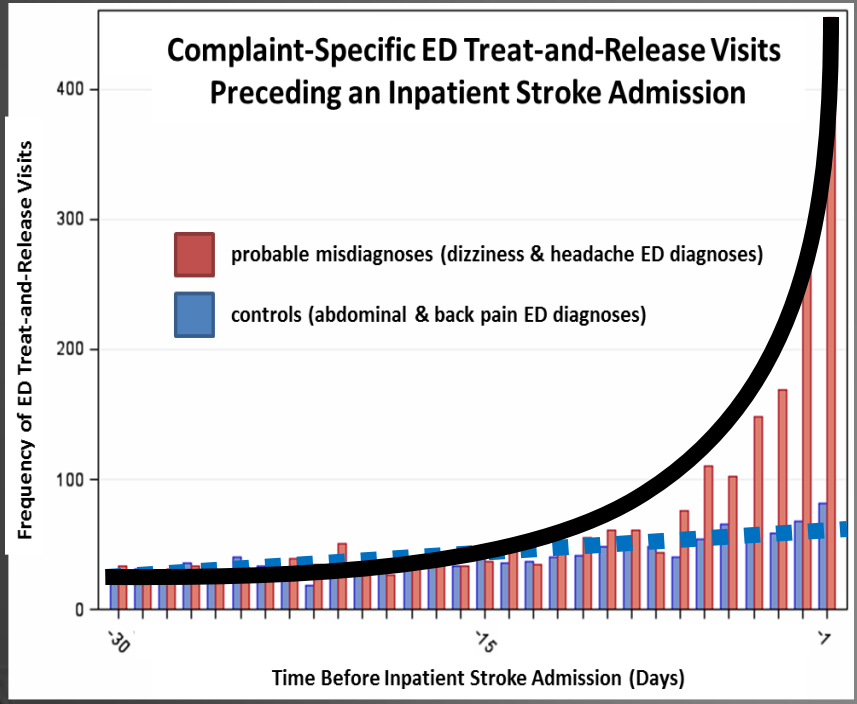
Newman-Toker

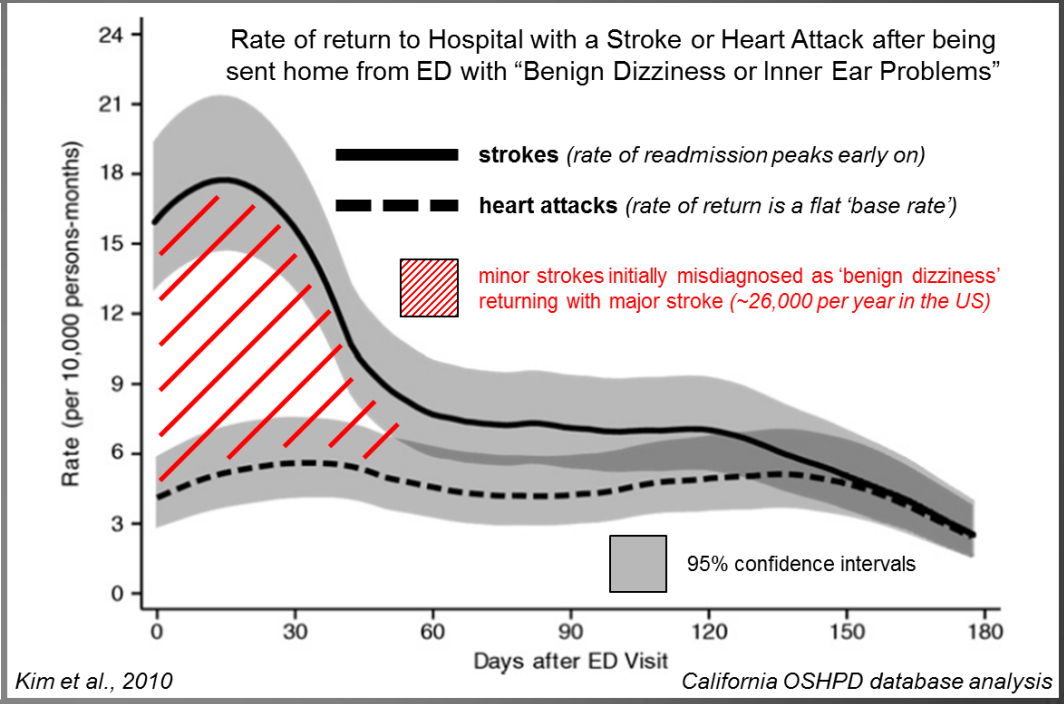
BASE CASE UPDATE – DIZZINESS & STROKE

MISSED STROKE IN "BENIGN" DIZZINESS

***Look Back Approach*:**
Stroke patients more likely to have been discharged from ED with "benign" dizziness prior ~14 days (N = ~180,000 strokes)

***Look Forward Approach*:**
'Benign' dizziness sent home from ED more likely to return with a stroke within ~30 days, but not heart attack (N = ~30,000 ED dizzy discharges)





Kim et al., 2010

California OSHPD database analysis

BASE CASE UPDATE – DIZZINESS & STROKE

WASTEFUL DIAGNOSTIC PRACTICES

Table 1. Cost savings of implementing VOG approach nationally using variable projections of effects on physician behavior

For All ED Dizziness	Current (2013 US National[1,4])	Conservative Projection	Intermediate Projection	Optimistic Projection
ED CT Reduction from Current Baseline	0%	50%	75%	90%
All ED Dizziness CT Rate	41.2%	20.6%	10.3%	4.1%
ED MRI Increase from Current Baseline	0%	50%	25%	0%
All ED Dizziness MRI Rate	2.4%	3.6%	3.0%	2.4%
Anticipated Admit Rate Reduction for Ear Disorders	0%	25%	50%	75%
All ED Dizziness Admission Rate	18.8%	18.0%	17.2%	16.4%
Total ED/Hospital Workup Costs	**$9,242,624,941**	**$8,703,997,576**	**$8,198,729,820**	**$7,735,623,708**
Total Annual US Healthcare Cost Savings	**$0**	**$538,627,365**	**$1,043,895,121**	**$1,507,001,233**
Public (Federal/State) Insurance Cost Savings	**$0**	**$186,903,696**	**$362,231,607**	**$522,929,428**

Estimated $1B wasted in US EDs (~10% of the $9B spent on ED dizziness workups each year)

Source: Newman-Toker et al., BMJQS, 2013

Diagnostic Errors

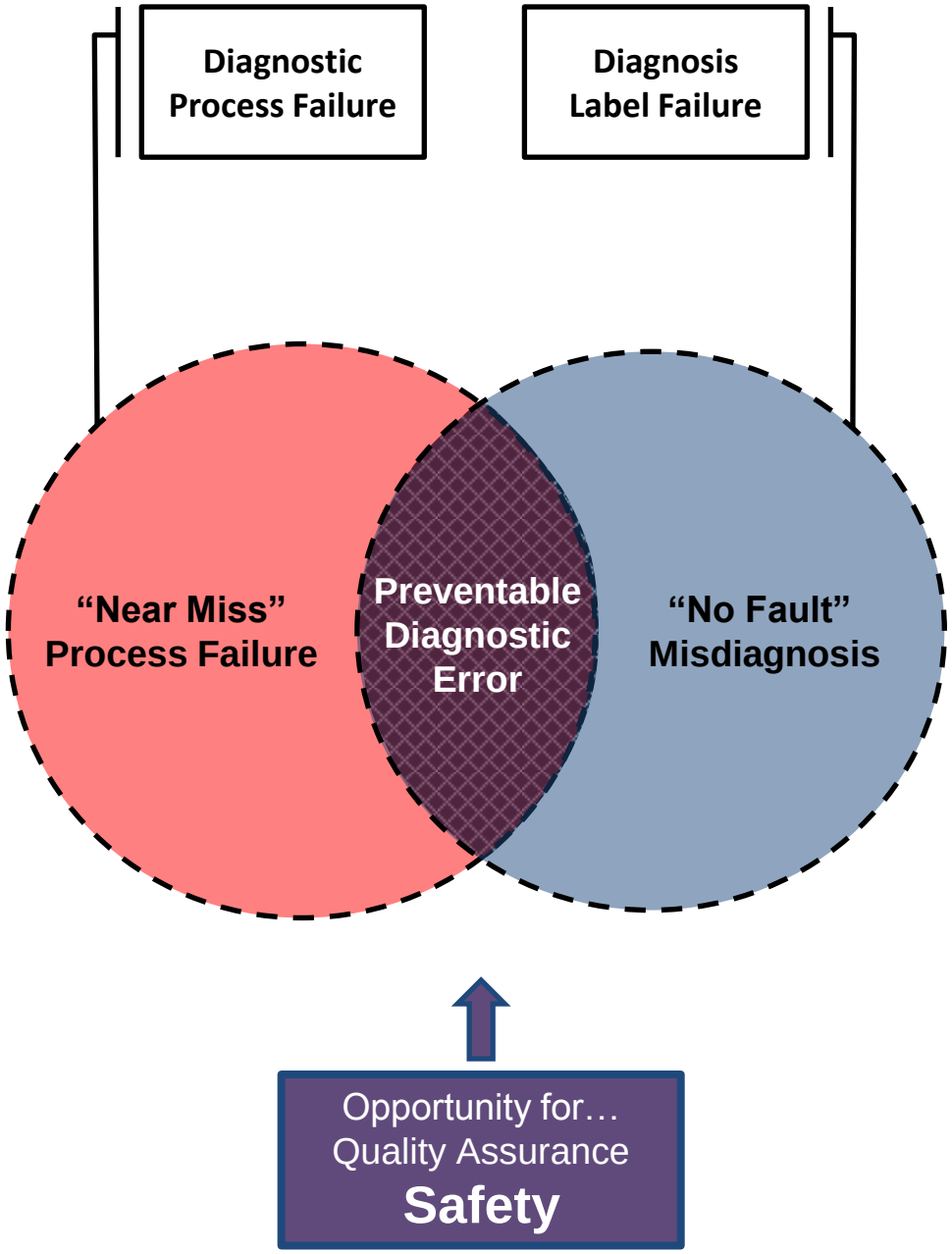
Definition

IOM Definition of Diagnostic Error

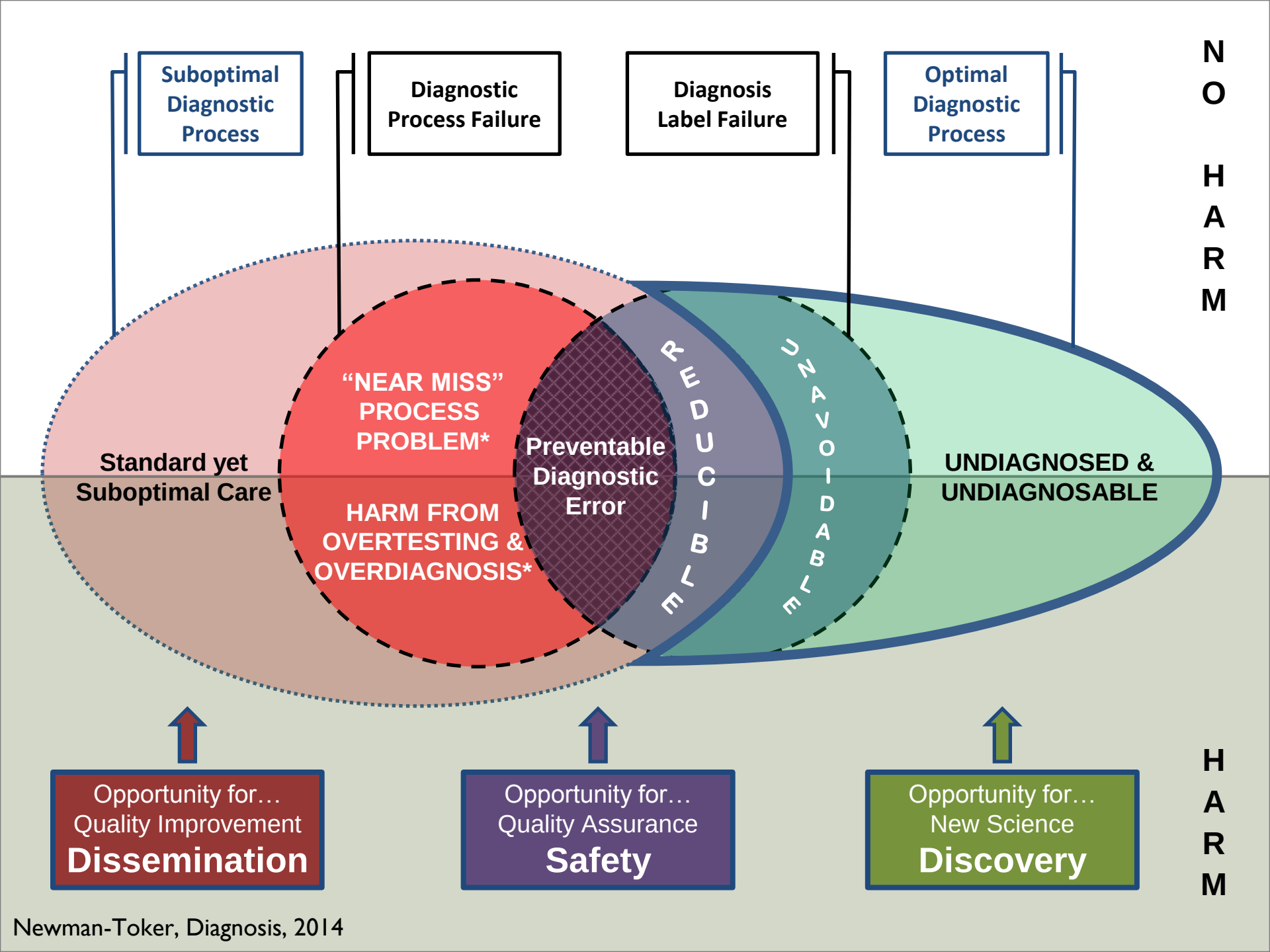
DIAGNOSTIC ERROR is the failure to…

(a) establish an accurate and timely explanation of the patient's health problem(s) or

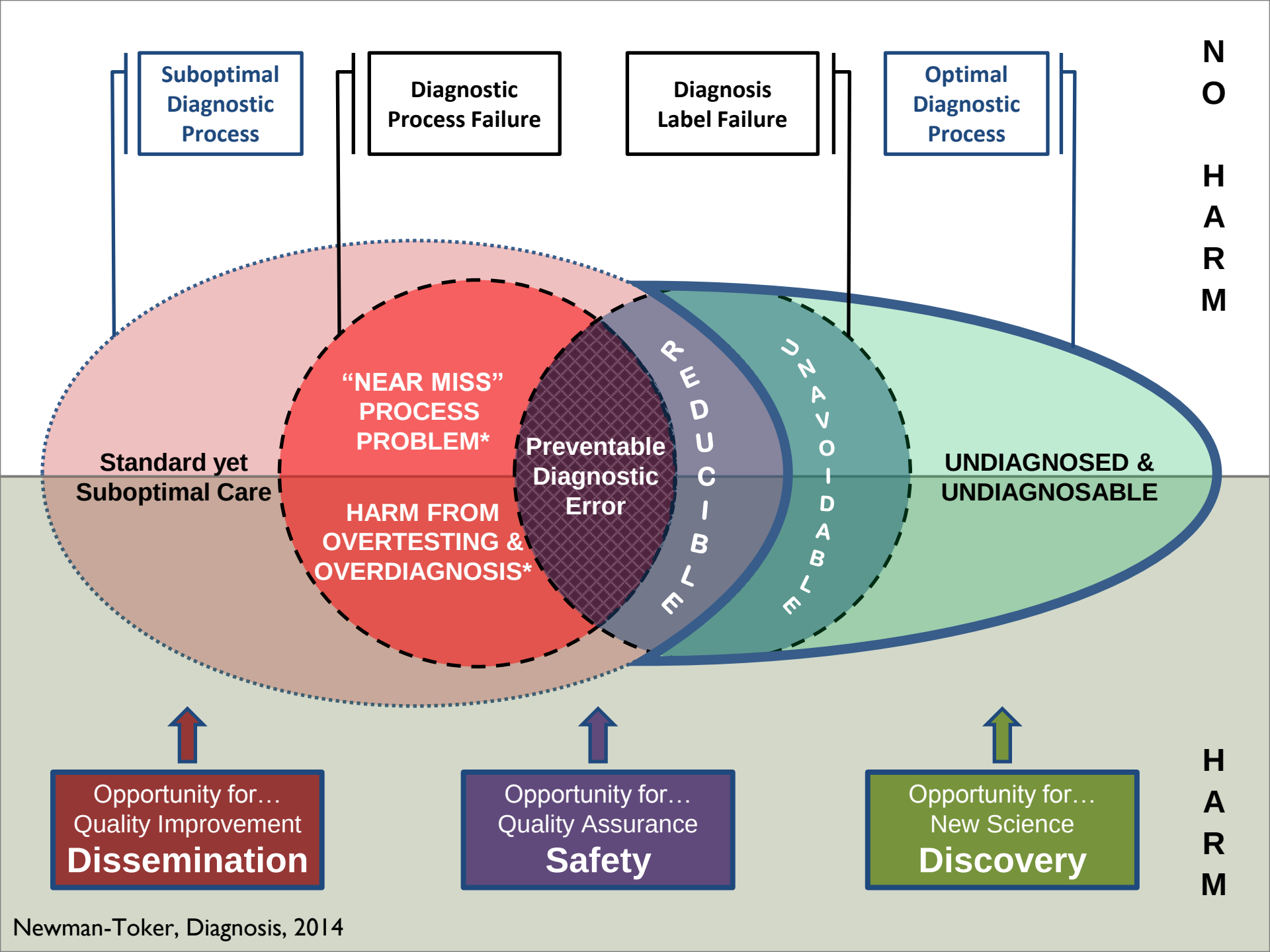
(b) communicate that explanation to the patient



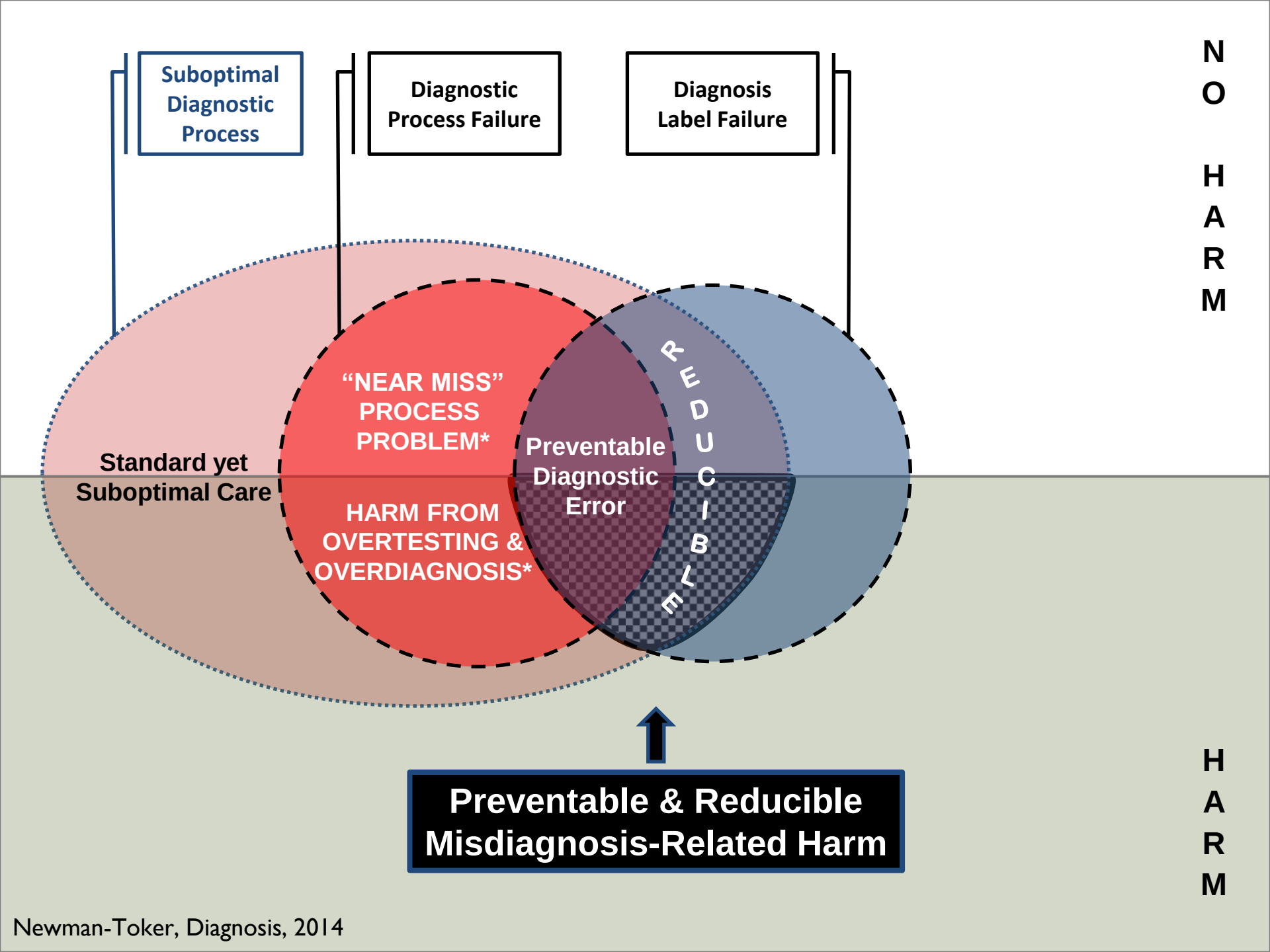
Newman-Toker, Diagnosis, 2014



Newman-Toker, Diagnosis, 2014



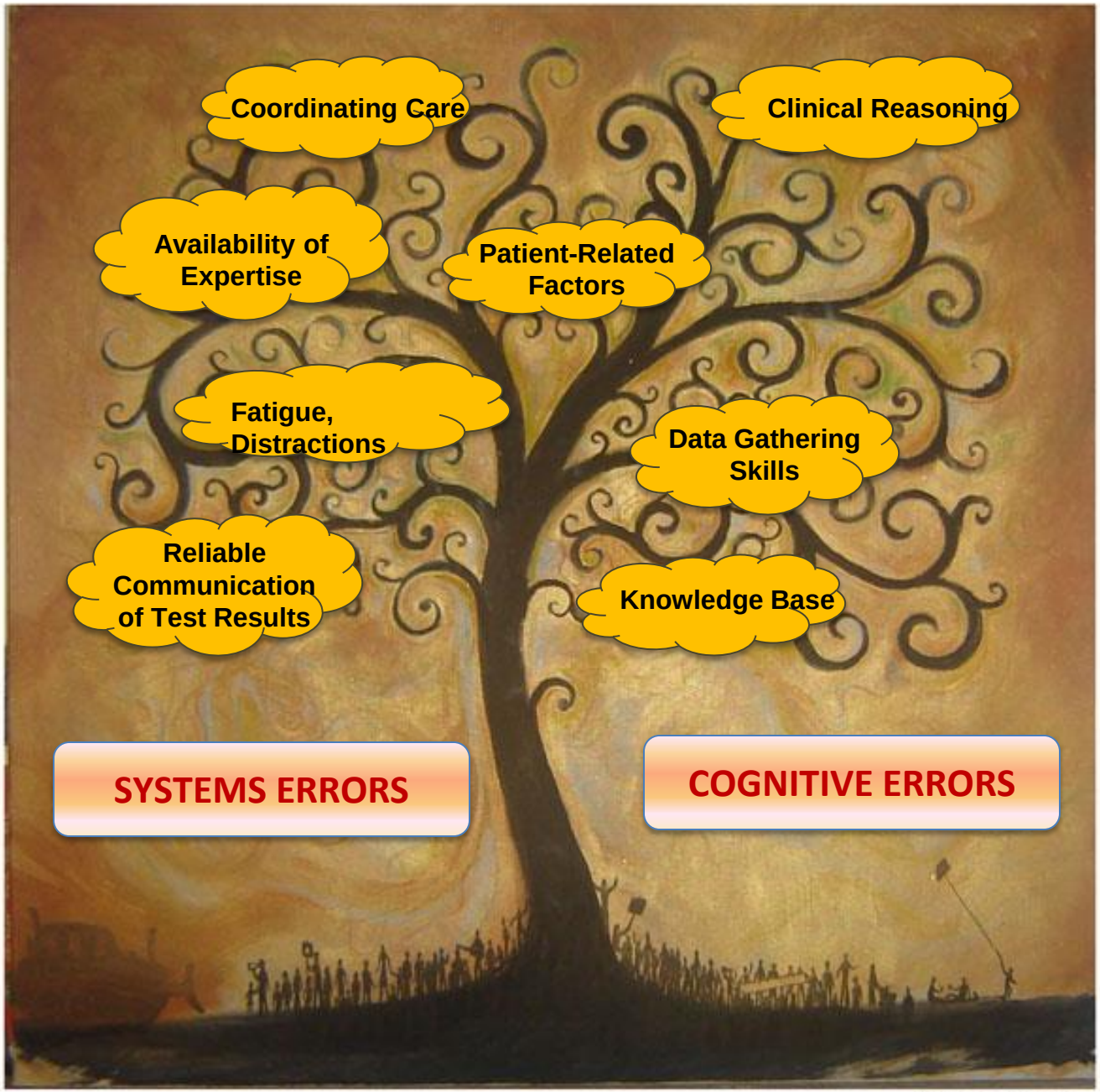
Newman-Toker, Diagnosis, 2014



Newman-Toker, Diagnosis, 2014

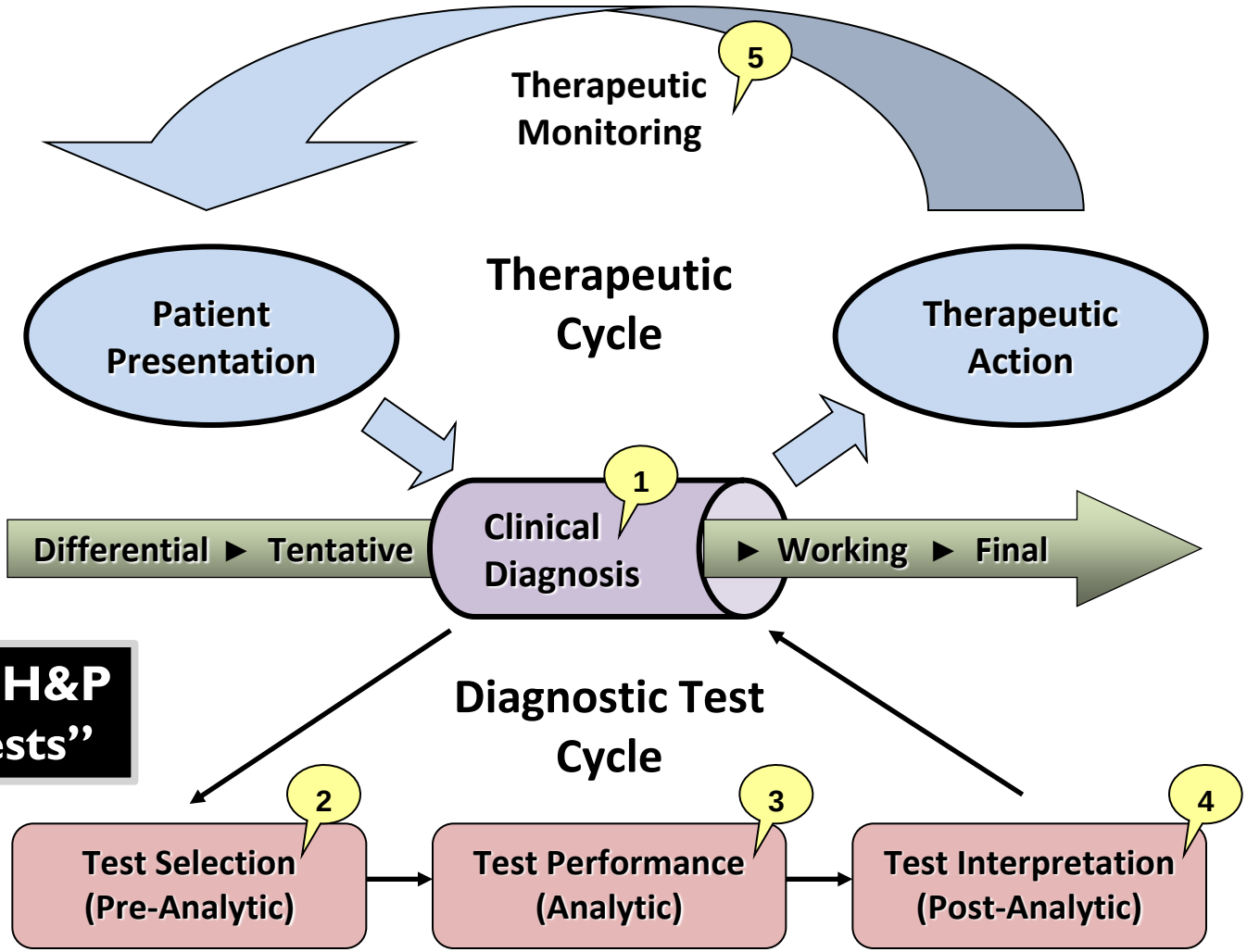
Diagnostic Errors

Classes & Causes


Coordinating Care
Clinical Reasoning
Availability of Expertise
Patient-Related Factors
Fatigue, Distractions
Data Gathering Skills
Reliable Communication of Test Results
Knowledge Base
SYSTEMS ERRORS
COGNITIVE ERRORS
"Tree of Life"
Tim Parish 2008

Graber, 2011

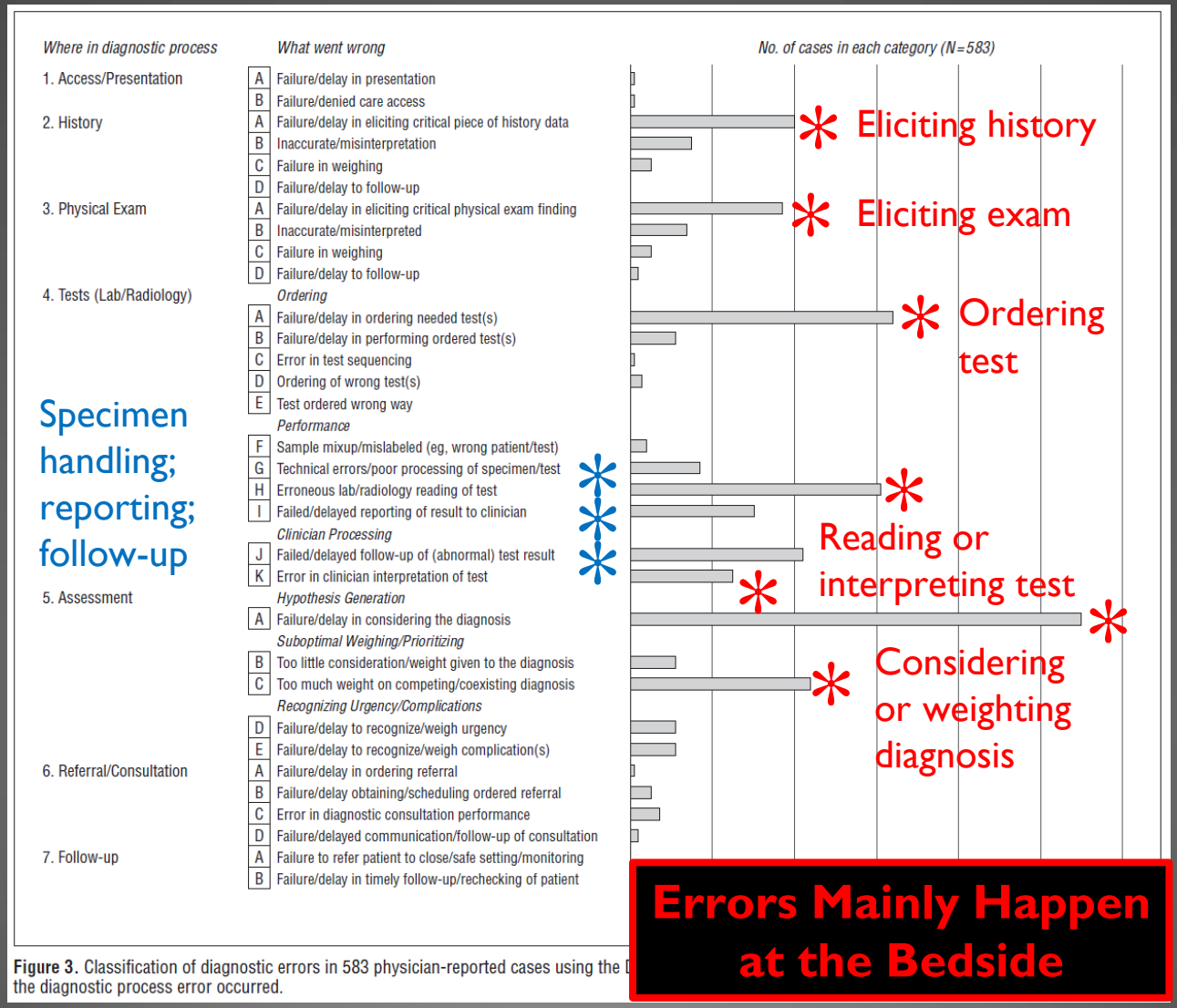
When Can Diagnostic Errors Occur?



Bedside H&P are "Tests"

Newman-Toker DEM 2012

DIAGNOSTIC PROCESS ERRORS

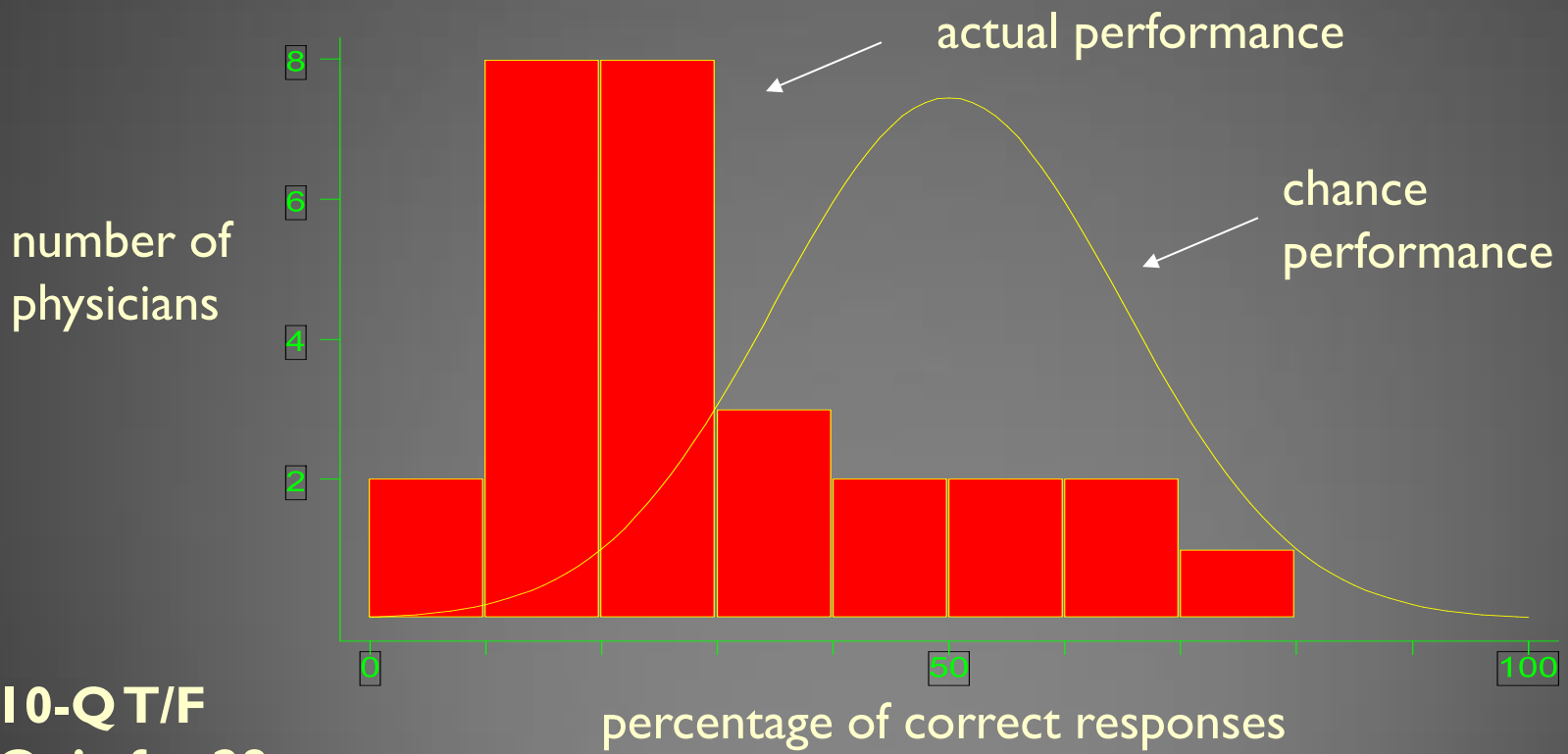


Schiff et al., 2009

BASE CASE UPDATE – DIZZINESS & STROKE

FREQUENT MISCONCEPTIONS ABOUT DX

MISCONCEPTIONS ← CHANCE → UNDERSTANDING



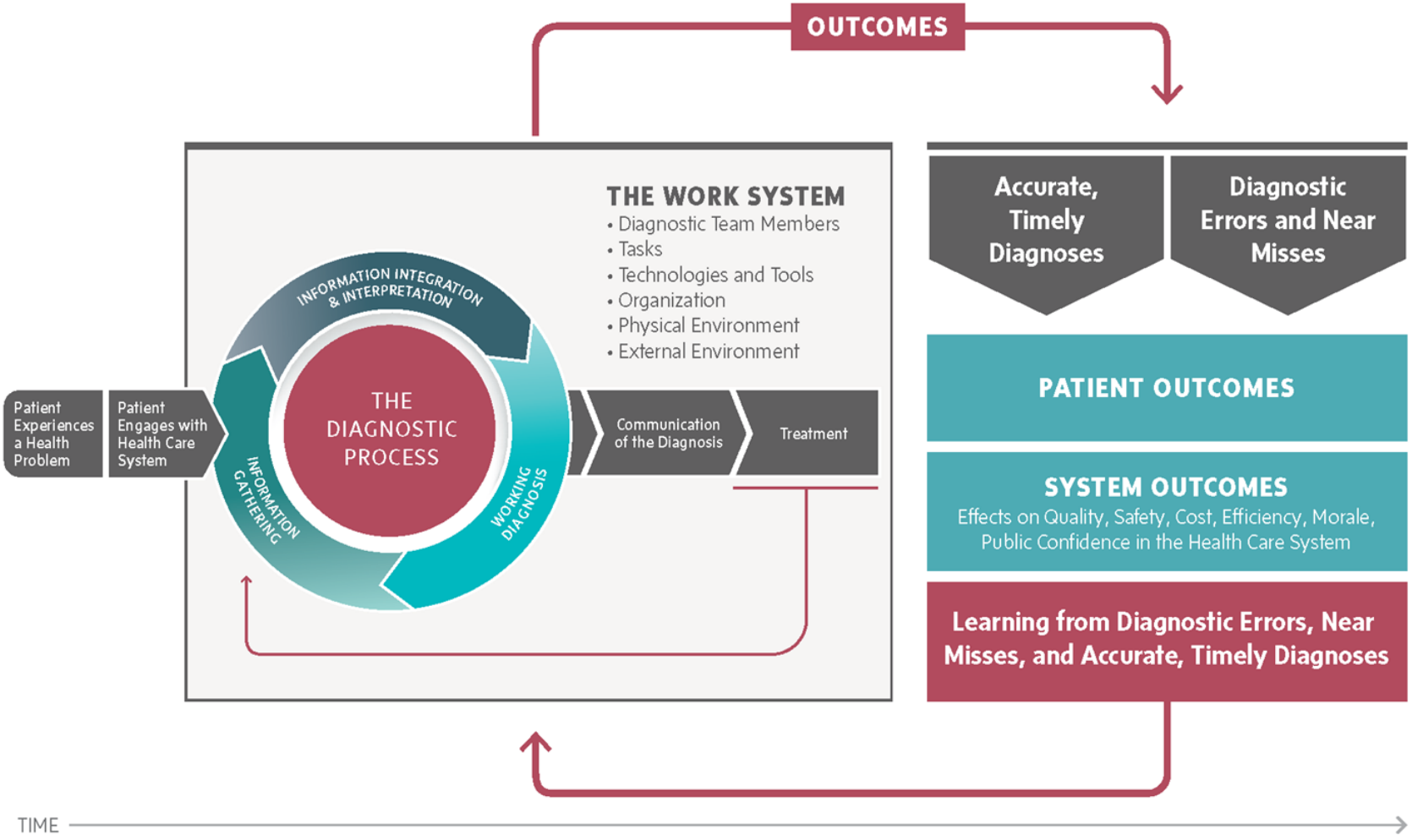
10-Q T/F Quiz for 28 ED/PCPs

Newman-Toker et al, Acta Otolaryngol 2008

Diagnostic Errors

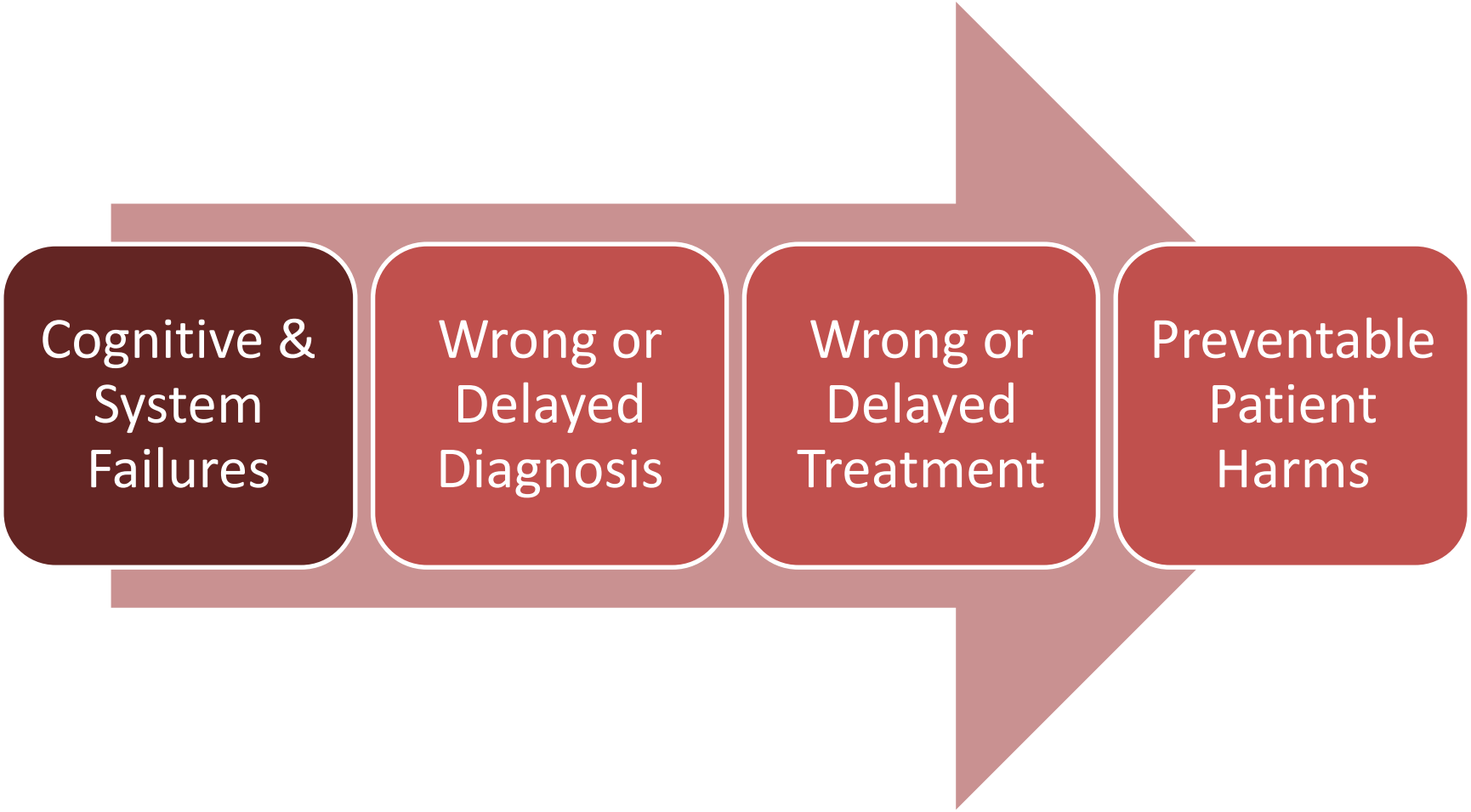
Goals & Priorities

IOM Diagnostic Process & Outcomes



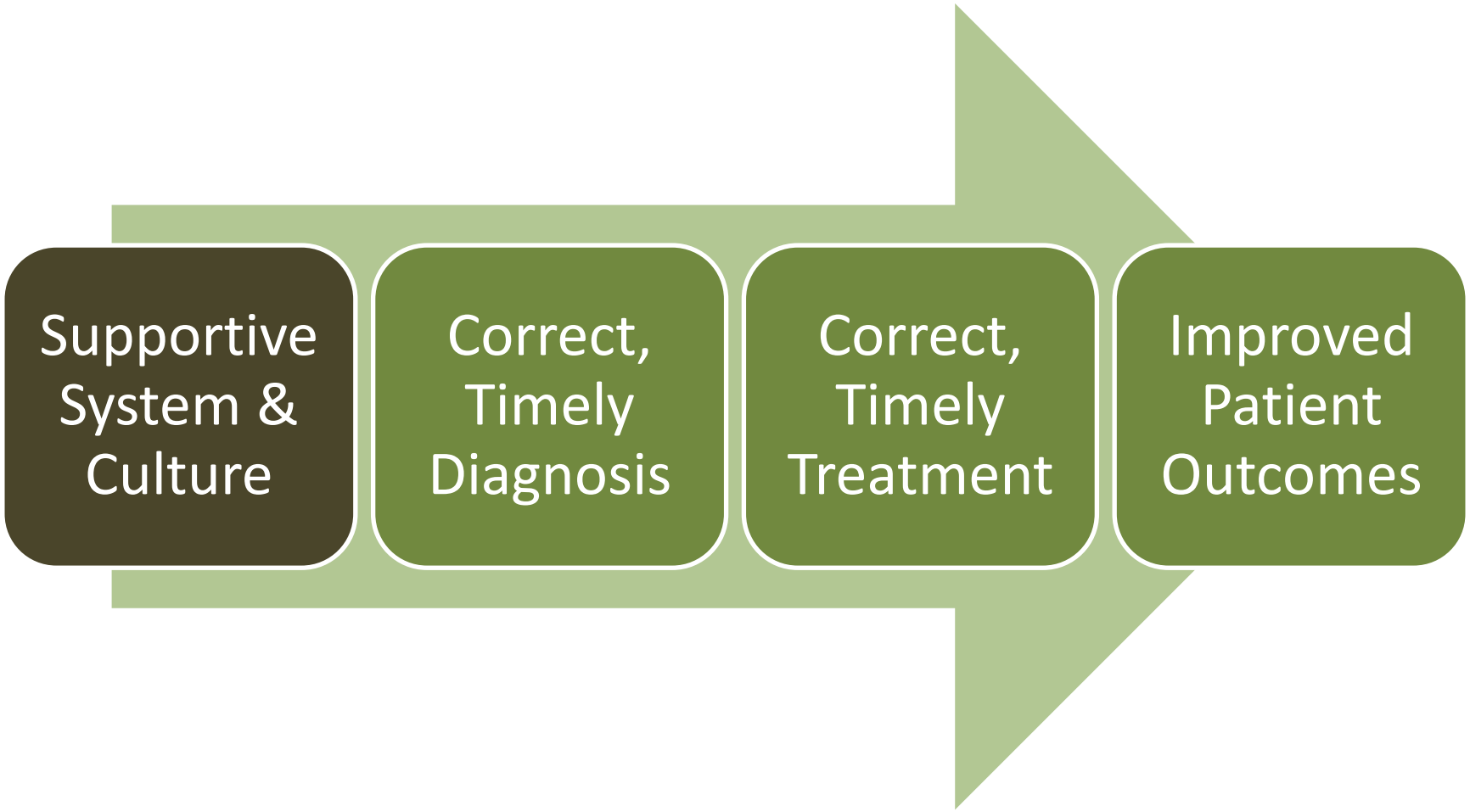
IOM, Improving Diagnosis in Healthcare, 2015

Failed Diagnostic Process & Outcomes



Newman-Toker

Optimal Diagnostic Process & Outcomes



Newman-Toker

DIAGNOSTIC ERRORS

THE 'BIG THREE' CAUSES OF HARM

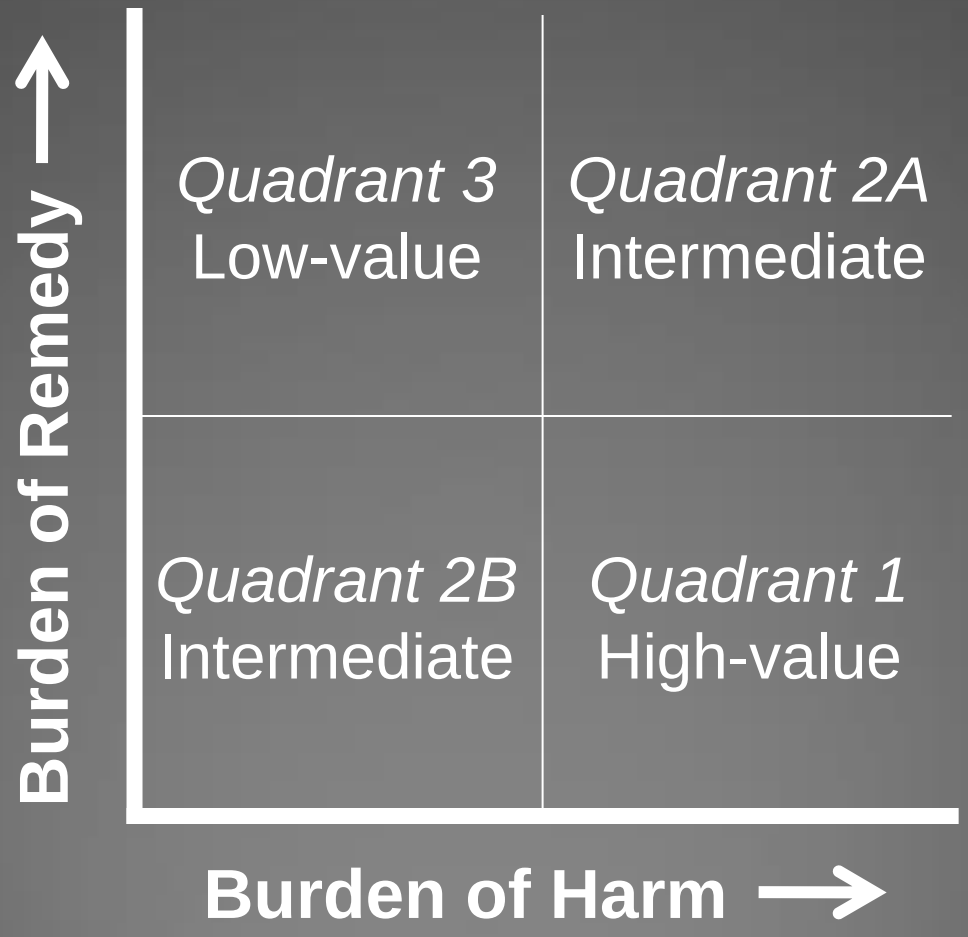
IOM REPORT—"Early efforts could focus on identifying the most common diagnostic errors, "don't miss" health conditions that may result in patient harm, or diagnostic errors that are relatively easy to address."

Cancer

Infections

Vascular Events

PUBLIC HEALTH PERSPECTIVE



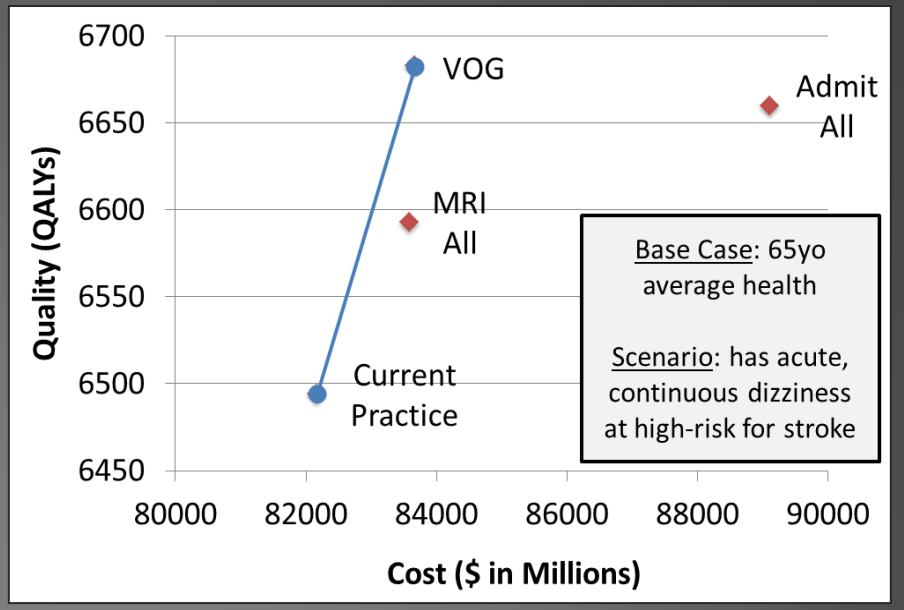
Newman-Toker DEM 2010

BASE CASE UPDATE – DIZZINESS & STROKE

SAVE LIVES AND REDUCE COSTS OF CARE

New diagnosis of acute dizziness could cut costs by $1B and eliminate 45,000-75,000 missed strokes each year

(Newman-Toker, 2016)



High-risk groups (underuse) – save lives

Low-risk groups (overuse) – save money

(Newman-Toker et al, BMJQS 2013)

Diagnostic Errors

Conclusions

TAKE HOME MESSAGES

1) Diagnostic errors are common, catastrophic, & costly to society and individual patients.

2) The 'big 3' causes of harm from diagnostic error are cancer, infections, & vascular events.

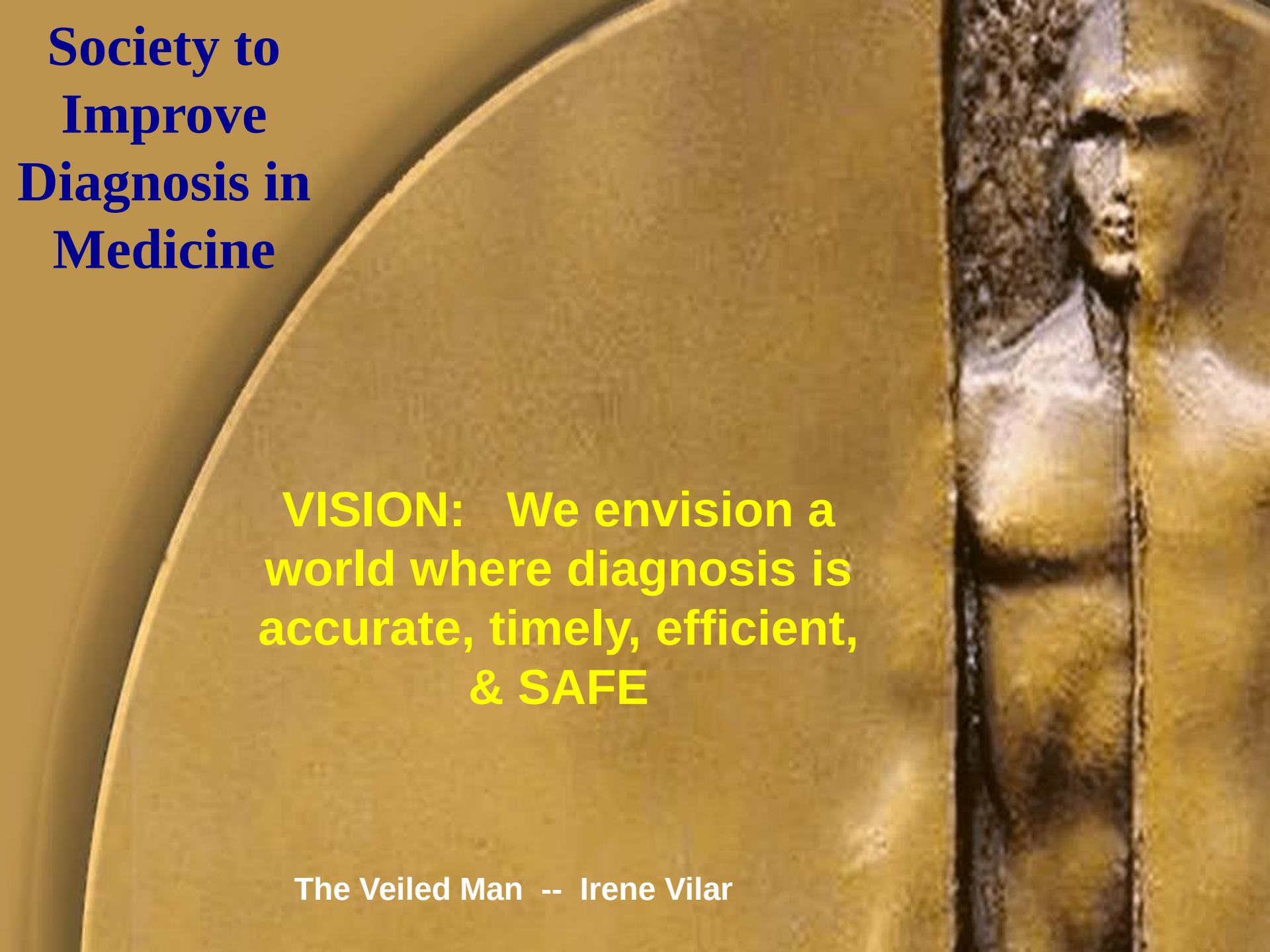
3) We should prioritize based on public health burden of problem vs. remedy. Stroke in acute dizziness presentations is one such problem.

ADDRESSING DIAGNOSTIC ERROR

Mark L Graber, MD FACP

President, SIDM
Senior Fellow, RTI International

Society to Improve Diagnosis in Medicine



VISION: We envision a world where diagnosis is accurate, timely, efficient, & SAFE

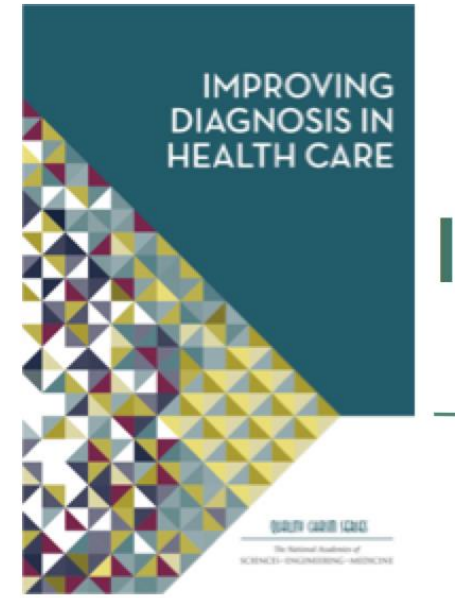
The Veiled Man -- Irene Vilar

9th Diagnostic Error in Medicine Conference
Los Angeles, CA

SOCIETY to IMPROVE DIAGNOSIS in MEDICINE

Better Outcomes Through Better Diagnosis

KNOWING IS NOT ENOUGH, WE MUST APPLY
WILLING IS NOT ENOUGH, WE MUST DO



YOU

Recommendations

Practice Improvement

THE STAGES OF CHANGE

Admitting you have a problem

Starting to think about doing something

Discussing change and making plans

DOING SOMETHING !!

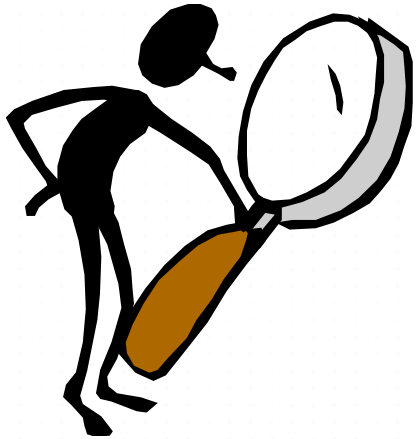
Hospitals: Its not OUR problem !

Docs: Its not MY problem !

Oversight Organizations: Its not OUR problem !

Who owns the diagnostic error problem?

HEALTHCARE SYSTEMS
WHAT CAN I DO?



FIND CASES OF DX ERROR

AND LEARN FROM THEM

Step #1 - Find and learn from diagnostic error

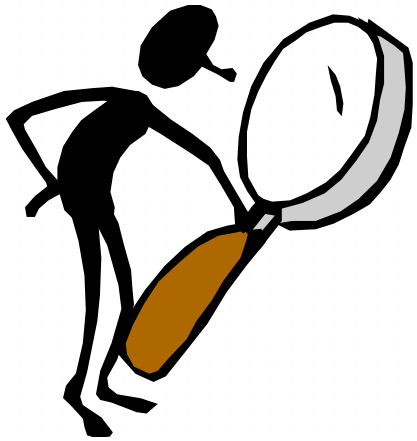
Your existing tools won't work: Global trigger tool yield: 0

Promising new approaches:

- **Standardized patients**
- **Asking physicians**
- **Asking patients**
- **Using focused trigger tools**

- *Finding errors: Graber et al Jt Comm Jl Qual Safety 2014 40:102*
- *Triggers: Singh et al. BMJ-Qual Safety 2011; JAMA 2013*
- *MD reporting: Trowbridge: Focus on Patient*
- *Pt reporting: Weingart: AHRQ Web M&M 2013*

HEALTHCARE SYSTEMS - WHAT CAN I DO?



The “new” TEAM for diagnosis

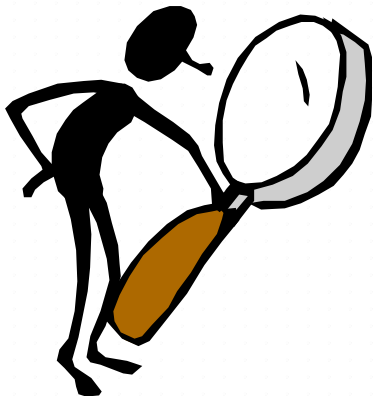
THE PATIENT !!

NURSES !!

MD’S – NP’S – PA’S – APN’S

PATHOLOGY & RADIOLOGY

HEALTHCARE SYSTEMS - WHAT CAN I DO?



Designate a CZAR for diagnostic safety

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

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 (and nurses) your partner

PATIENTS - WHAT CAN I DO?

Be a good historian

Take advantage of cancer screening

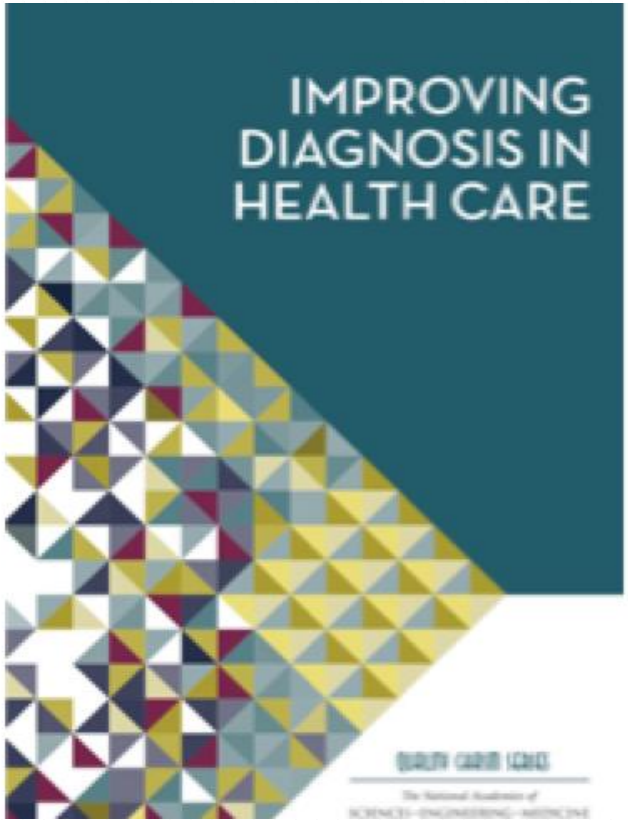
Keep accurate records of your tests

SPEAK UP ! What else could this be ?

Ask what to expect & how to follow-up

Give feedback about diagnostic errors

EVIDENCE OF PROGRESS



IOM Report

Downloaded 15,000 times

http://nas.edu/improvingdiagnosis

EVIDENCE OF PROGRESS

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
And a dozen more ……
Advisory: AHRQ, CDC

Collective action
Individual action

COALITION TO IMPROVE DIAGNOSIS

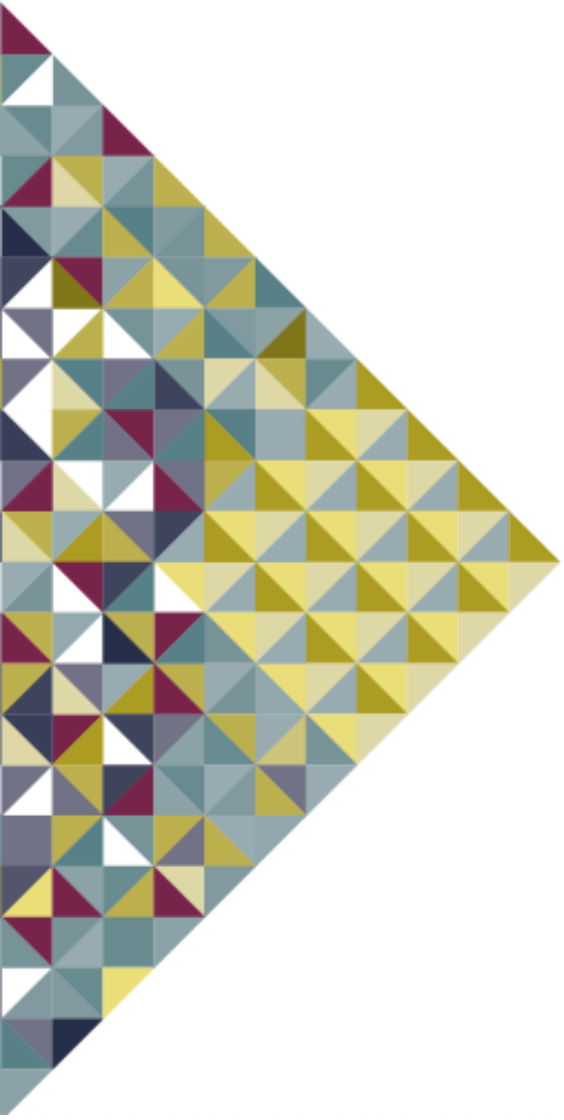
EVIDENCE OF PROGRESS

Healthcare Organizations Getting Started

Intermountain
Maine Medical Center
KP Southern Cal.

Atrius Health
U. Pittsburgh
Advocate

Insurers: LAMMICO, MMIC, MCIC



"Improving the diagnostic process is not only possible, but it also represents a moral, professional, and public health imperative."

GRABER.MARK@GMAIL.COM

A SURVEY:

DIAGNOSTIC SAFETY