

Avoidable Imaging Wave II

M&M and Overtesting:

How to Discuss Diagnostic Error Without Causing Unnecessary Imaging

Presenter



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M&M and Overtesting: How to Discuss Diagnostic Error Without Causing Unnecessary Imaging

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Funding & Disclosures

Outside Work

- CRICO/Risk Management Foundation: Associate Medical Director for Emergency Medicine

Investigator-Initiated Research Funding Sources

- CMS ACEP SAN
- CRICO/Risk Management Foundation

Objectives

- Review role of diagnostic error in EM & contributing factors to diagnostic error
- Review role of morbidity and mortality (M&M) conference in overtesting
- Discuss strategies to review cases of diagnostic error while encouraging appropriate testing

Case

- You come back from a weekend away to find an email from your medical director titled “peer review – confidential”
- Enclosed is an email chain... that starts with the admitting hospitalist -> PCP -> chief of medicine -> ED director -> to you ... asking you to reply to the PCP on your failure to diagnose a PE
- On your way to the ED, you run into a colleague who says – I saw a patient you discharged last week with COPD and she came back...and had a PE

Case

- 48 year old woman with COPD and rheumatoid arthritis who presented to the ED with dry cough and shortness of breath for several days. Despite using her inhalers she was worsening. She also reported some chest pain that day.
- In the ED she was breathing rapidly (RR 22), with wheezing, but was stable. Her chest X-ray showed a viral pattern. Her HR was 90
- You treated her with nebulizers, steroids and oral antibiotics; she had improvement, and could walk without difficulty after several hours. Her resting RR was 14 and HR 90 after treatment
- You considered other causes of the chest pain:
 - you got an ECG and sent a troponin which were negative.
 - You considered PE, but as she did not have risk factors for DVT, and you thought her chest pain was from coughing you did not test for PE
- You discharged her to follow up with her PCP

Case

- Four days later the patient had gone to her PCP. Her respiratory status was slowly improving. She had continued to have cough, and chest pain. The PCP ordered a d-dimer and repeat CXR. The d-dimer resulted as 900 (<500 normal)
- She was sent to the ED for a CT scan
- Your colleague ordered a CT scan of her chest with contrast that showed several subsegmental PEs
- She was admitted for PE, started on a LMWH, transitioned to DOAC.

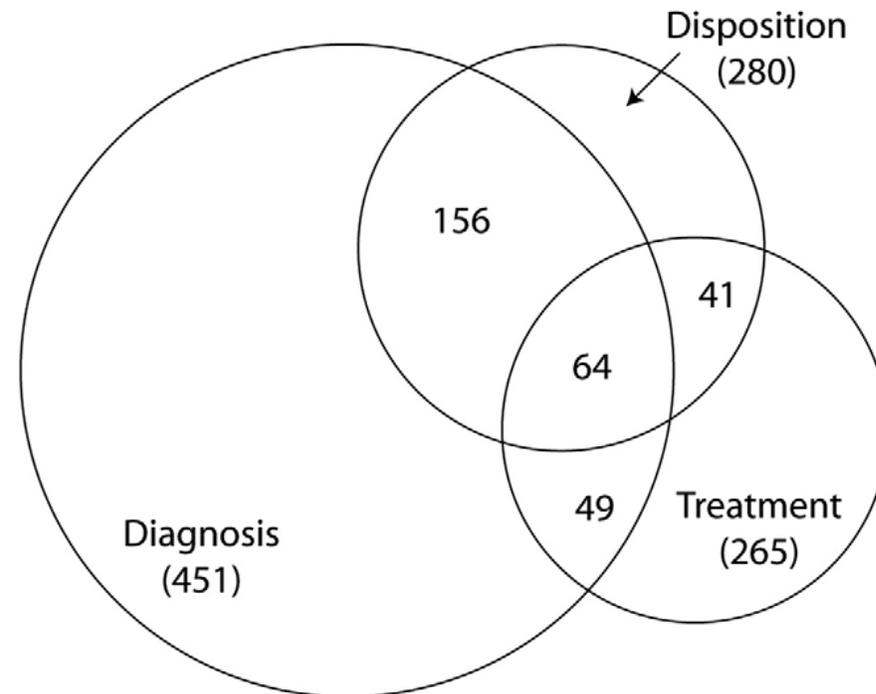
What gets reviewed shapes our culture

- At your institution do you review:
 - Adverse outcomes regardless of cause
 - Missed diagnoses
 - Complaints from outside providers
 - Near misses
 - Unnecessary / Avoidable tests

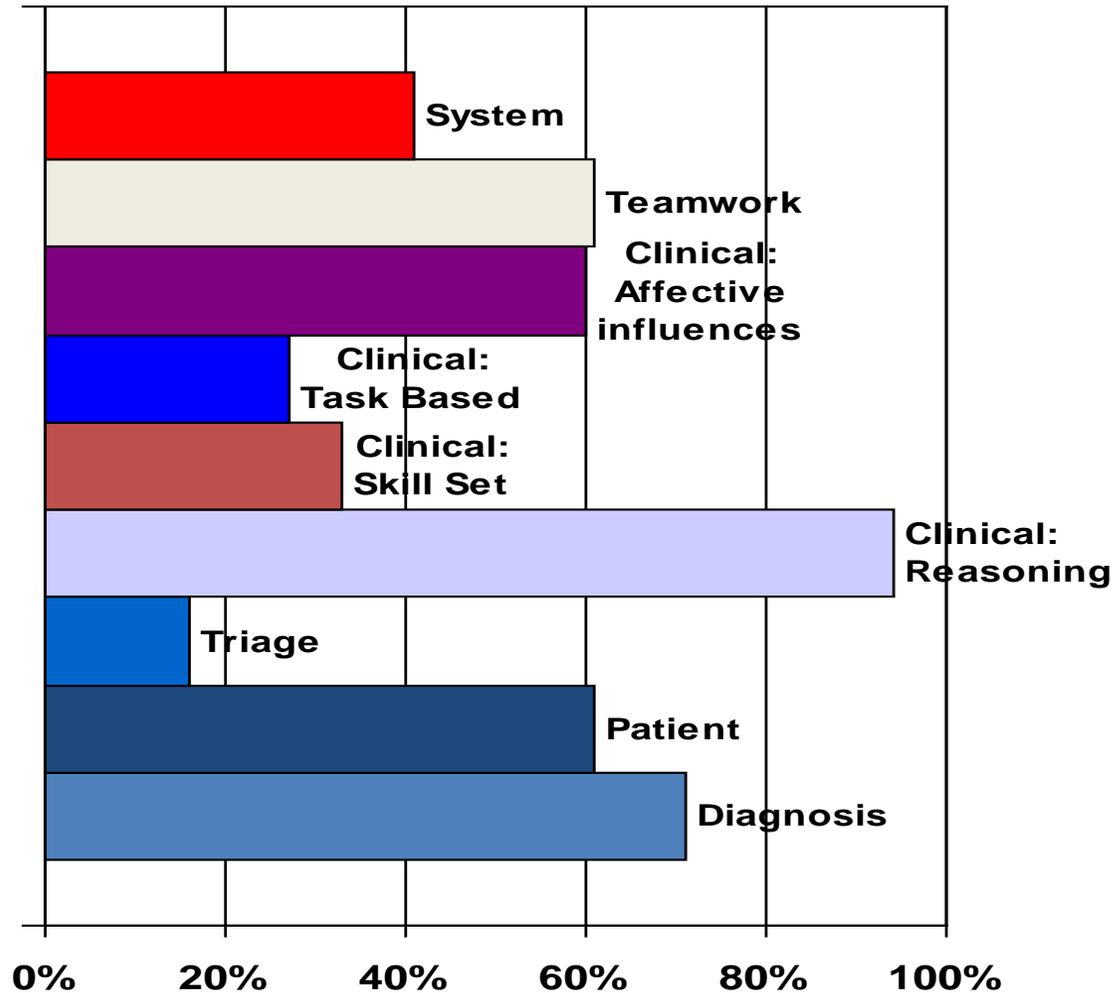
Diagnostic Error

Error Analysis: 15 year at one ED

- Cook County ED
- Retrospective review of 636 cases
- Two physicians independently reviewed:
 - 4 categories phase of work (diagnosis, treatment, disposition, and public health)
 - contributing factors that likely affected outcome (patient factors, triage, clinical tasks, teamwork, and system).



Error Analysis: 15 year at one ED



Missed and Delayed Diagnoses in the Emergency Department: A Study of Closed Malpractice Claims From 4 Liability Insurers

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- 122 closed malpractice claims from 4 liability insurers in which patients had alleged a missed or delayed diagnosis in the ED.
- 48% of these missed diagnoses were associated with serious harm
- 39% resulted in death.

Missed and Delayed Diagnoses in the Emergency Department: A Study of Closed Malpractice Claims From 4 Liability Insurers

The leading breakdowns in the diagnostic process were:

- Failure to order an appropriate diagnostic test (58% of errors),
- Failure to perform an adequate medical history or physical examination (42%),
- Incorrect interpretation of a diagnostic test (37%),
- Failure to order an appropriate consultation (33%).

Table 2. Diagnostic steps and frequency of breakdowns at each step.

Step	No.	%*
Patient notes problem and seeks care	3	4
Provider performs medical history and physical examination	33	42
Provider orders appropriate tests	46	58
Ordered tests performed in a timely manner	3	4
Ordered tests performed correctly	1	1
Test results transmitted to and received by the provider	13	16
Test results transmitted to and received by the patient	6	8
Interpretation of test results	29	37
Provider orders consultation (or referral) [†]	26	33
Requested consultation (or referral) occurs [†]	1	1
Creation of proper follow-up plan	21	27
Patient adherence with plan	6	8

*Calculated as a percentage of 79 claims with identified errors.

[†]A failure to order a consultation in the ED includes the failure to order an immediate consultation in the ED, the failure to order an appropriate outpatient subspecialty referral, and the failure of trainees to consult with more senior physicians.

Missed and Delayed Diagnoses in the Emergency Department: A Study of Closed Malpractice Claims From 4 Liability Insurers

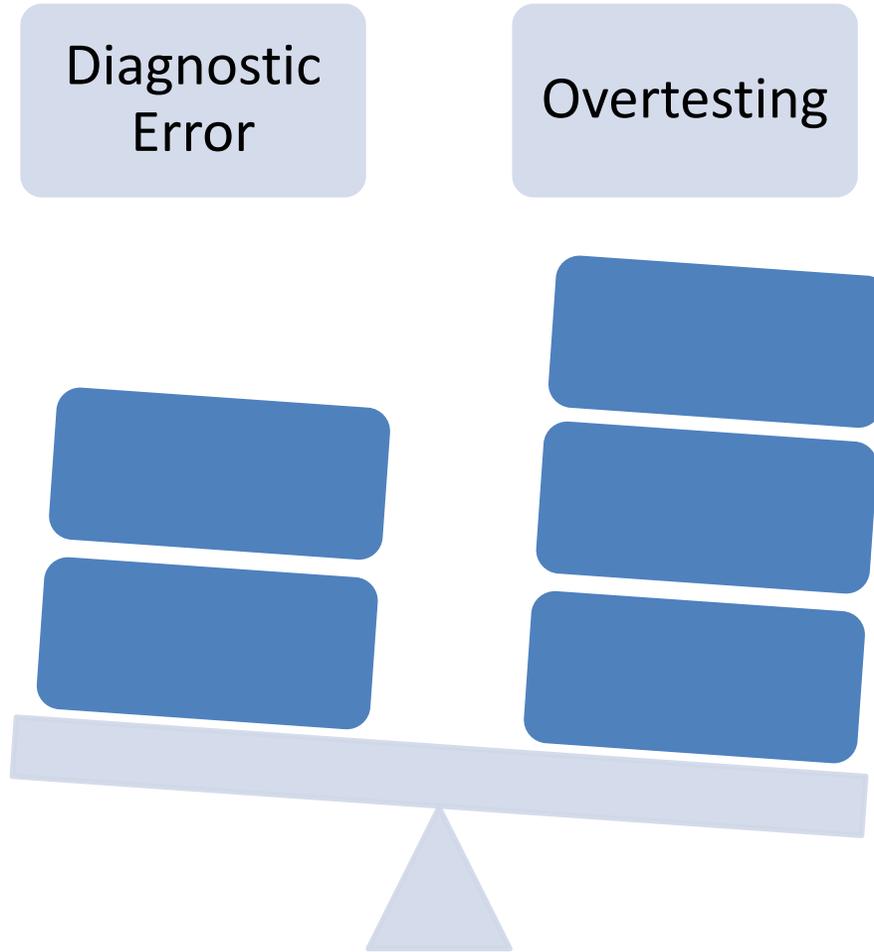
- The leading contributing factors to the missed diagnoses were:
- cognitive factors (96%),
 - patient-related factors (34%),
 - lack of appropriate supervision (30%),
 - inadequate handoffs (24%),
 - excessive workload (23%).

Table 4. Factors contributing to diagnostic errors.

Factor	No.	%*
Cognitive factors	76	96
Judgment	69	87
Knowledge	46	58
Vigilance or memory	32	41
Communication factors	28	35
Handoffs	19	24
Establishment of clear lines of responsibility	5	6
Conflict	2	3
Other communication factor	7	9
Systems factors	29	37
Supervision	24	30
Workload	18	23
Interruptions	4	5
Fatigue	3	4
Technology	0	0
Ergonomics	0	0
Patient-related factors	27	34
Patient nonadherence	8	10
Atypical presentation	6	8
Complicated medical history	6	8
Substance abuse	6	8
Poor historian	4	5
Psychiatric issue	3	4
Obesity	2	3
Language barrier	1	1

*Calculates as a percentage of 79 claims with identified errors.

How Do We Balance



Morbidity and Mortality (M&M) Conference

Background

- Ernest Amory Codman
 - “End Result Card”
 - "End Result Hospital" in Boston, Massachusetts, 1911–1917
- M&M Conferences today
 - Forum to discuss adverse outcomes
 - Identify and avoid repeatable individual errors
 - Foster a climate of openness around errors
 - Patient Safety forum for the E.D.
 - Identify systems problems



M&M in Practice: Culture of Blame & Shame

Historical - punitive

- Cases chosen based on bad outcome
- Question: how could this outcome have been avoided
- Focus on individual
- Lesson: do more in this patient, ergo do more in similar patients

Modern: non-punitive

- Chosen based on error potential: bad outcome or “near-miss”
- Question: how did this event happen, what can we change to decrease likelihood in future
- Focus on role of individual & system
- Lesson: practice changes; modify system

M&M in Practice: Culture of Blame & Shame

- Fear of missing a diagnosis leads to overtesting
- What do we fear
 - Patient harm
 - Medicolegal risk
 - Humiliation, ostracization by peers
 - Shame, personal inadequacy

Emergency Medicine Morbidity and Mortality Conference and Culture of Safety: The Resident Perspective

Kathleen Wittels, MD, Emily Aaronson, MD, Richard Dwyer, MD, Eric Nadel, MD, Fiona Gallahue, MD, Christopher Fee, MD, Robert Tubbs, MD, Jeremiah Schuur, MD, MHS, for the EM M&M Culture of Safety Research Team

ABSTRACT

Objective: Morbidity and mortality conference (M&M) is common in emergency medicine (EM) and an Accreditation Council for Graduate Medical Education (ACGME) requirement. We aimed to characterize the prevalence of elements of EM M&M conferences that foster a strong culture of safety.

Methods: Emergency medicine residents at 33 programs across the United States were surveyed using questions adapted from a previously tested survey of EM program directors and the Agency for Healthcare Research and Quality (AHRQ) Culture of Safety Survey.

Results: The survey response rate was 80.3% (1,002/1,248). A total of 60.3% (601/997) of residents had not submitted a case of theirs to M&M in the past year. A total of 7.6% (73/954) reported that issues raised at M&M always led to change while 88.3% (842/954) reported that they sometimes did and 4.1% (39/954) reported that they never did. A total of 56.2% (536/954) responded that changes made due to M&M were reported back to the residents. Of residents who had cases presented at M&M, 24.2% (130/538) responded that there was regular debriefing, 65.2% (351/538) responded that there was not, and 10.6% (57/578) were unsure. A total of 10.2% (101/988) of respondents agreed that M&M was punitive, 17.4% were neutral (172/988), and 72.4% (715/988) disagreed. A total of 18.0% (178/987) of residents agreed that they felt pressure to order unnecessary tests because of M&M, 22.3% (220/987) were neutral, and 59.6% (589/987) disagreed. A total of 87.4% (862/986) felt that M&M was a valuable educational didactic session, and 78.3% (766/978) believed that M&M contributes to a culture of safety in their institution.

Emergency Medicine Morbidity and Mortality Conference and Culture of Safety: The Resident Perspective

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Table 3
Residents' Perceptions of M&M

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Comfort submitting cases I was not involved in	21.9 (217)	21.0 (208)	27.5 (272)	20.8 (206)	8.8 (87)
Comfort submitting cases I was involved in	32.9 (326)	35.2 (349)	21.4 (212)	7.8 (72)	3.1 (31)
M&M feels punitive	2.6 (26)	7.6 (75)	17.4 (172)	29.2 (289)	43.1 (426)
Case discussion is focused on cognitive errors	14.7 (146)	44.4 (440)	27.1 (269)	11.4 (114)	2.3 (23)
Case discussion is focused on systems errors	23.9 (237)	52.4 (520)	17.2 (171)	5.2 (52)	1.2 (12)
Mistakes have led to positive changes	21.2 (209)	46.4 (458)	27.5 (271)	3.8 (38)	1.0 (10)
Feel pressure to order unnecessary tests because of M&M	3.3 (33)	14.7 (145)	22.3 (220)	41.1 (406)	18.5 (183)
M&M is a valuable educational didactic session	53.1 (524)	34.3 (338)	9.6 (95)	1.5 (15)	1.4 (14)
M&M contributes to culture of safety at my institution	36.7 (359)	41.6 (407)	18.5 (181)	2.0 (20)	1.1 (11)
Issues raised at M&M lead to change	Always 7.6 (73)		Sometimes 88.3 (842)		Never 4.1 (39)
Changes are reported back to residents	Yes 56.2 (536)		No 43.8 (418)		
Debriefing for residents	Yes 17.5 (168)		No 42.8 (410)		Don't know 39.7 (380)

Data are reported as % (n).

M&M = morbidity and mortality conference.

Agreement was measured on a five point Likert scale: 5 = strongly agree, 4 = agree, 3 = neutral, 2 = disagree, 1 = strongly disagree.

Strategies to Review Diagnostic Error without
Sending Message that the answer is always more
testing...

Strategies

1. Create a “just culture” that focuses on decisions rather than outcomes, and acknowledges human error
2. Modify the structure of your case conference (M&M) to encourage generalized decision-making, system improvements, and avoid blame
3. Add reviews of overtesting to balance the culture of diagnostic error that more is always better

Just Culture

Poll

- At my institution we have a just culture for managing errors and preventable events?
 - TRUE
 - FALSE

How do we create a culture of safety?

- New ways of thinking about error and risk
 - fair and just approach
 - Don't judge quality of decision based on outcome, but by understanding how systems and values impact decisions
- Just Culture training
 - Skills-based
 - Tools to understand how systems and behaviors create or reduce risk, and give framework for thinking about how systems and behavior impact risk
- Manage risk and have fair and consistent response

What is a just culture?

- Traditional health care model:
 - Individuals accountable for all errors to patients under their care, Worse outcome = more attention
- A just culture:
 - Focuses on decisions not outcomes
 - Recognizes that individuals should not be held accountable for system failings
 - Recognizes many errors represent predictable interactions between human operators and the systems in which they work
 - Recognizes that competent professionals make mistakes
 - Acknowledges that even competent professionals will develop unhealthy norms
 - Has zero tolerance for reckless behavior

The Outcome Bias

- We tend to focus on the outcome instead of the choice made by the individual
 - We punish for mistakes where there is harm
- We want to focus on the “why”
- A Learning Organization remains curious about what drives behavior
- We cannot judge the *quality* of a person’s choice by the outcome, good or bad

What we know

- To err is human
 - We are human, and therefore fallible. We will occasionally make mistakes.
- To drift is human
 - “Drifting” is normal human behavior.
- We work within systems that have fallibilities. They were designed with limited resources and by humans.

Values, Expectations, Incentives

- Values compete
 - In ED: Length of stay vs. patient education
- There are nearly always incentives for people's behavioral choices
 - What are they?
 - Is it important?

The Behaviors we Expect

Human Error <i>Product of Our Current System Design and Behavioral Choices</i>	At-Risk Behavior <i>A Choice: Risk Believed Insignificant or Justified</i>	Reckless Behavior <i>Conscious Disregard of Substantial and Unjustifiable Risk</i>
<p>Manage through changes in:</p> <ul style="list-style-type: none">• Choices• Processes• Procedures• Training• Design• Environment	<p>Manage through:</p> <ul style="list-style-type: none">• Removing incentives for at-risk behaviors• Creating incentives for healthy behaviors• Increasing situational awareness	<p>Manage through:</p> <ul style="list-style-type: none">• Corrective Action Plans• Progressive Action
Console Remediate	Coach Culture Change	Corrective Action

Human Error

- Human Error is not a “Cause” – it is a consequence associated with other factors:
 - Did the person make an **at-risk choice** that increased the risk an error might occur?
 - Did the **system** contribute to the error?
 - Were there **personal performance factors**, like fatigue, distraction, or environment that contributed?
- Manage: Console & Remediate Systems

Just Culture, Diagnostic Error & Testing

- What was the root cause of the diagnostic error
 - Failure to gather information
 - Failure to consider
 - Wrong application of knowledge (e.g. decision rule)
- Was the decision to not order the test reasonable based on available information
 - e.g. low risk by ACEP policy
- Make sure the result of review is clear statement about the likely cause and what can be done to avoid in the future

Cognitive Errors and Tips to Avoid

Poll: Which neck would you image

3 patients w/ neck pain (all neurologically intact)

- 70 yo woman tripped and fell at home
 - Delayed onset neck pain
 - No midline tenderness
- 45 yo M crashed car on local street (25 mph)
 - Passenger died in accident
 - Immediate neck pain
 - Ambulatory at scene
- 45yo M bicycle messenger hit front of car over hood
 - Wearing helmet
 - Walking at accident

THINKING,
FAST AND SLOW



DANIEL
KAHNEMAN

WINNER OF THE NOBEL PRIZE IN ECONOMICS

System 1 and System 2 Thinking

System 1 "Fast"

DEFINING CHARACTERISTICS

Unconscious
Effortless
Automatic

WITHOUT Self-Awareness or Control

"What You See Is All There Is"

ROLE

Assess the Situation
Deliver Updates

System 2 "Slow"

DEFINING CHARACTERISTICS

Deliberate and Conscious
Effortful
Controlled Mental Process

WITH Self-Awareness or Control

Logical and Skeptical

ROLE

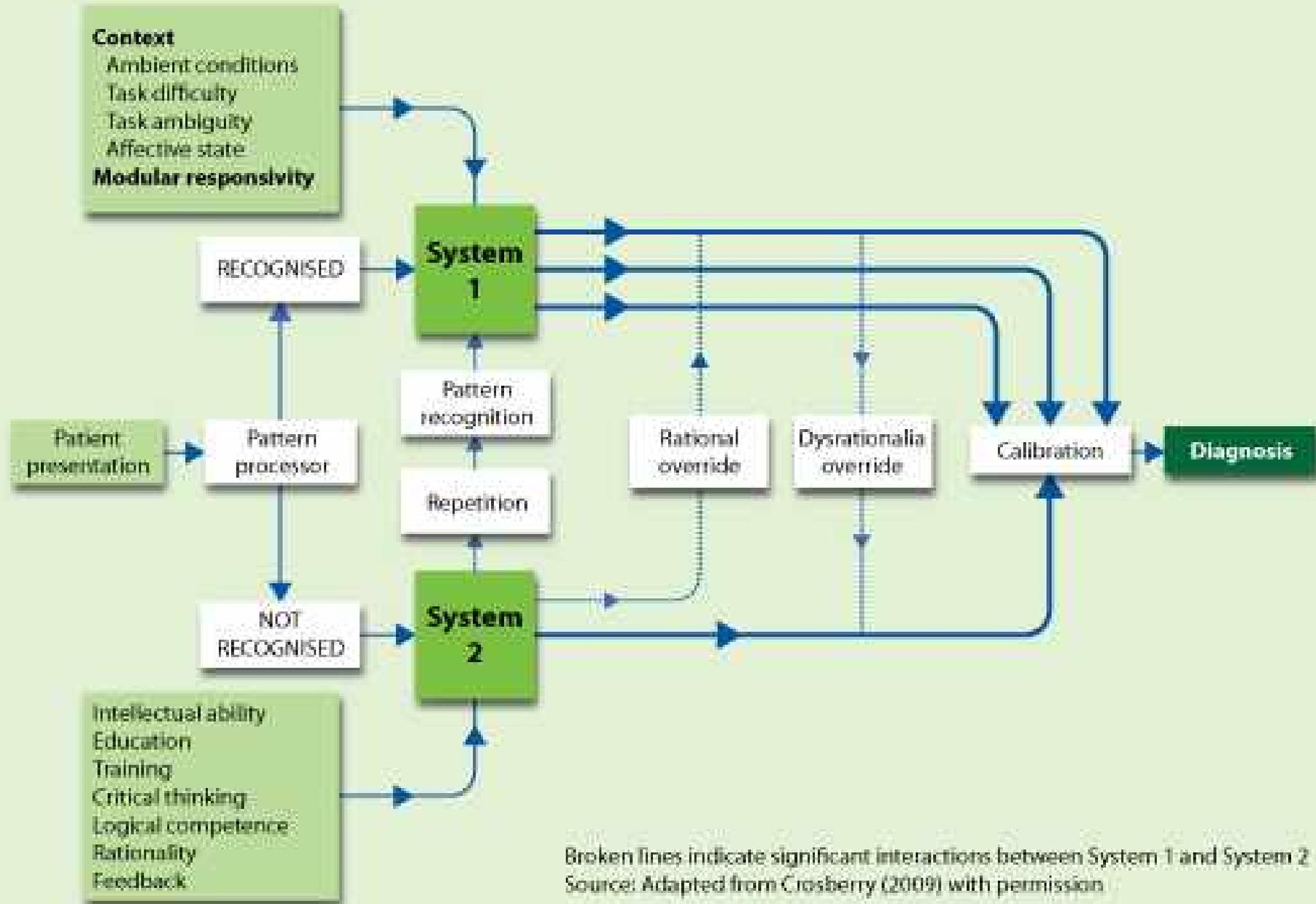
Seeks New/Missing Information
Makes Decisions

Table 1

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

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

* Adapted from: Croskerry P, Norman GR. Overconfidence in clinical decision making. *Am J Med.* 2007;121:S24–S29. Used with permission.⁴⁵



Addressing Cognitive Biases:

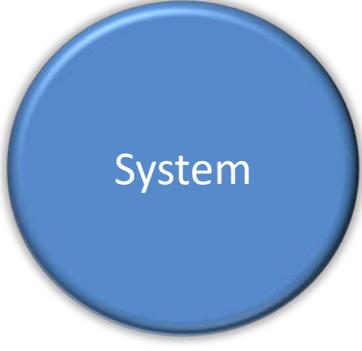
Forcing functions and other tools

Types of Diagnostic Errors



No-Fault

- Unusual presentation of disease
- Patient refusal to be tested
- Limitations in medical knowledge



System

- Technical failures
- Organizational failures
 - Testing not available
 - Inadequate supervision
 - Poor coordination of care



Cognitive

- Knowledge
- Judgment
- Memory/Vigilance

Reducing Cognitive Errors

- Cognitive awareness
- Cognitive debiasing strategies
- Cognitive training

Cognitive awareness

- Providing descriptions of cognitive biases and examples of their adverse impact on decision-making
- Metacognition: thinking about thinking. Reflection on the decision making process itself.

Cognitive Awareness

Recognizing High Risk Situations

- Patients
- Situations
- Diagnoses

Cognitive Awareness

Recognizing High Risk Situations

- High risk patients
 - “The young, the old, and the crazy”
 - The hostile, abusive, and intoxicated

**Unreliable history, atypical presentations,
negative visceral response**

Recognizing High Risk Situations

- The Return Visit
 - Diagnosis Momentum
 - Visceral Bias

Recognizing High Risk Situations

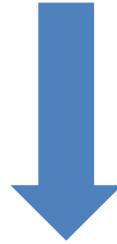
- High risk times
 - Patient sign-out
 - Loss of information
 - Misinterpretation of new incoming data
 - High acuity or volume
 - End -of-shift (personal fatigue)

Recognizing High Risk Situations

- High Risk Diagnoses
 - CP: MI, PE, TAD
 - Headache: SAH, meningitis, SDH
 - Abd pain: appendicitis, ectopic , torsion
 - Ortho: tendon & nerve injuries, foreign bodies

Cognitive Debiasing Strategies

Heuristics or mental strategies to avoid bias

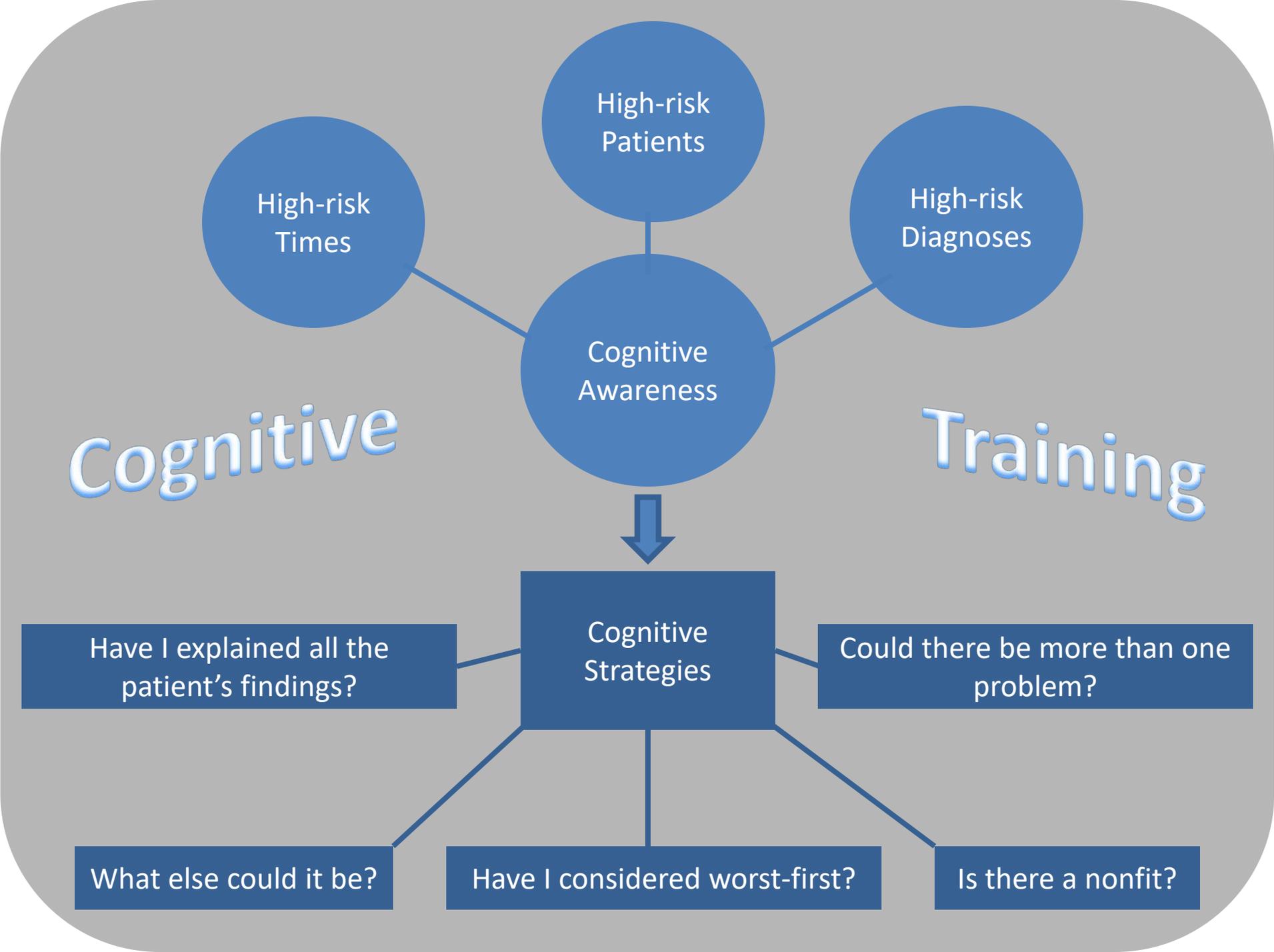


Forced Thinking

What else could it be?

Is there anything that doesn't fit?

Is it possible that I have more than one problem?



High-risk Times

High-risk Patients

High-risk Diagnoses

Cognitive Awareness

Cognitive

Training

Cognitive Strategies

Have I explained all the patient's findings?

Could there be more than one problem?

What else could it be?

Have I considered worst-first?

Is there a nonfit?

Cognitive Training

- Simulation – create clinical scenarios that are high risk for cognitive errors
- Observation- training videos that contrast biased vs. unbiased approaches
- Feedback
 - Immediate
 - M&M

Case Reviews & Cognitive Issues

- Identify cognitive biases that lead to diagnostic error
 - E.g. hassle bias – patient in hallway, did not undress
- Review underlying causes for biases, and specific strategies to address
 - Nursing policy to undress all patients

Case Review Tips

- Do not label case an error at outset
- Get provider's story in addition to medical record
- Understand root causes of decisions
 - Knowledge gap vs. cognitive error?
 - Reckless vs. At-risk
- Close review with clear guidance on criteria for testing that can be applied in future
 - Clinical decision rule, guideline, consultant
- Acknowledge and address fear & shame of providers

Making M&M a Systems Conference

- Case choice
 - Potential errors and system failures NOT bad outcomes that cannot be explained
- Preparation
 - Root cause analysis beforehand
 - Get providers perspective beforehand

Making M&M a Systems Conference

- Presentation
 - Do not reveal outcome until the end
 - Present chronologically, as information was available to team
 - Present data, not interpretations
 - Ask audience to interpret and suggest action at typical decision points
 - Patient arrival, after H&P, after initial tests, etc.
 - Open discussion focusing on why and how to prevent
 - Formal recommendations with specific action plans
 - Provider recommendations – e.g. guideline
 - System recommendations

Overtesting Conference

- Identify cases where tests were done unnecessarily
- Discuss costs and value and connect overuse to patient harm by labeling it a medical error and performing root-cause analyses.
- Goal is to create a safe environment for open discussion, in the hopes of preventing patient harm from overuse from happening again.
- Identifying these cases can be challenging; we weren't trained to look for them in the past.
 - E.g. tracing a case of clostridium difficile back to treatment for presumed bacterial bronchitis is difficult.
 - Look at high cost and radiation imaging and review; e.g. CTPA in pregnancy

Countering Medicine's Culture of More. Hyung J. Cho, MD <http://journalofethics.ama-assn.org/2015/11/mnar1-1511.html>

Summary

- Providers never want to miss a diagnosis; fear of inadequacy leads to over testing
 - Formally acknowledge and manage for both provider of case & audience at conference
- Use case reviews to understand how decision-making happened so recommendations can guide future cases
 - Individual cognitive issues
 - Systems issues
- Consider reviewing cases of overtesting

Thank you!



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E•QUAL

EMERGENCY
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Questions? Contact the E-QUAL team at equal@acep.org