How to Do a Root Cause Analysis of Diagnostic Error

James B. Reilly, MD MS FACP
Associate Director, Internal Medicine Residency, Allegheny General Hospital West Penn Hospital Educational Consortium
Assistant Professor of Medicine, Temple University School of Medicine

Mark L. Graber, MD FACP
Senior Fellow, RTI International
Professor Emeritus, SUNY Stony Brook School of Medicine
Founder and President, Society to Improve Diagnosis in Medicine (SIDM)

Robert L. Trowbridge, MD FACP
Division Director, General Internal Medicine, Maine Medical Center
Assistant Professor of Medicine Tufts University School of Medicine

PATIENT SAFETY AWARENESS WEEK
DIAGNOSTIC ERROR WEBCAST SERIES

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Disclosure

Faculty Disclosure

Mark L. Graber, James B. Reilly and Robert L. Trowbridge have disclosed no relevant, real or apparent personal or professional financial relationships.

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Learning Objectives

- Use 3 new approaches to find diagnostic errors in their organizations

- Apply standard definitions to decide if a diagnostic error was involved

- Identify the correct staff to involve in conducting the RCA

- Explain how to modify the usual RCA approach so that it incorporates cognitive and affective root causes, and issues relating to knowledge management

- Use the outcomes of the RCA to improve the diagnostic process and to educate medical trainees

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Introduction to Dx Error RCA's Finding Diagnostic Errors

Mark L. Graber, MD FACP
Senior Fellow, RTI International
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Why RCA's of Diagnostic Error are Important

Importance to your organization

- Every healthcare organization has the obligation to continuously improve the quality of medical care provided
- Root cause analysis has become the standard approach used by healthcare organizations to learn from adverse events that have occurred, and is now a routine tool of most risk management practices
- Learning from adverse safety events is an expectation of accrediting agencies

Importance to your patients

- Injured patients want to know that you are doing everything possible to prevent a similar event from injuring another patients

Importance to your staff

- Staff want to work in ideal environments and see continual improvement towards that goal.
- Staff will benefit from and typically value participating in these reviews

Finding Diagnostic Cases of Diagnostic Error

- Some will find you – Tort claims

- The classic approaches to finding adverse events won't work

- Use 3 new approaches:
  – Ask the patients – Follow-up with patients recently discharged or recently seen in the ER
  – Ask the physicians – Identify a physician champion to receive reports
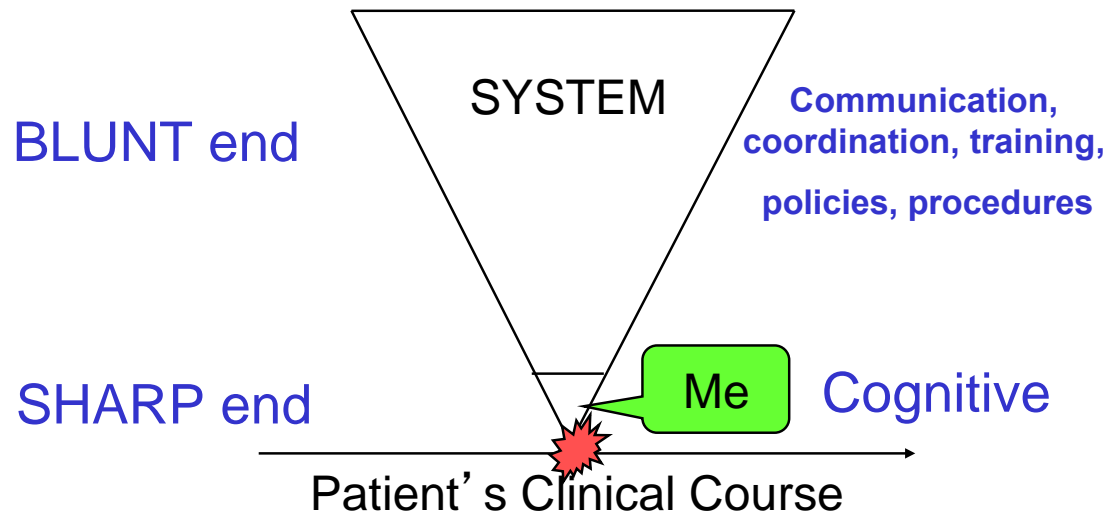 – Use 'trigger tools' to identify cases at high risk for error from the electronic medical records

**Diagnostic errors happen every day in every healthcare organization,
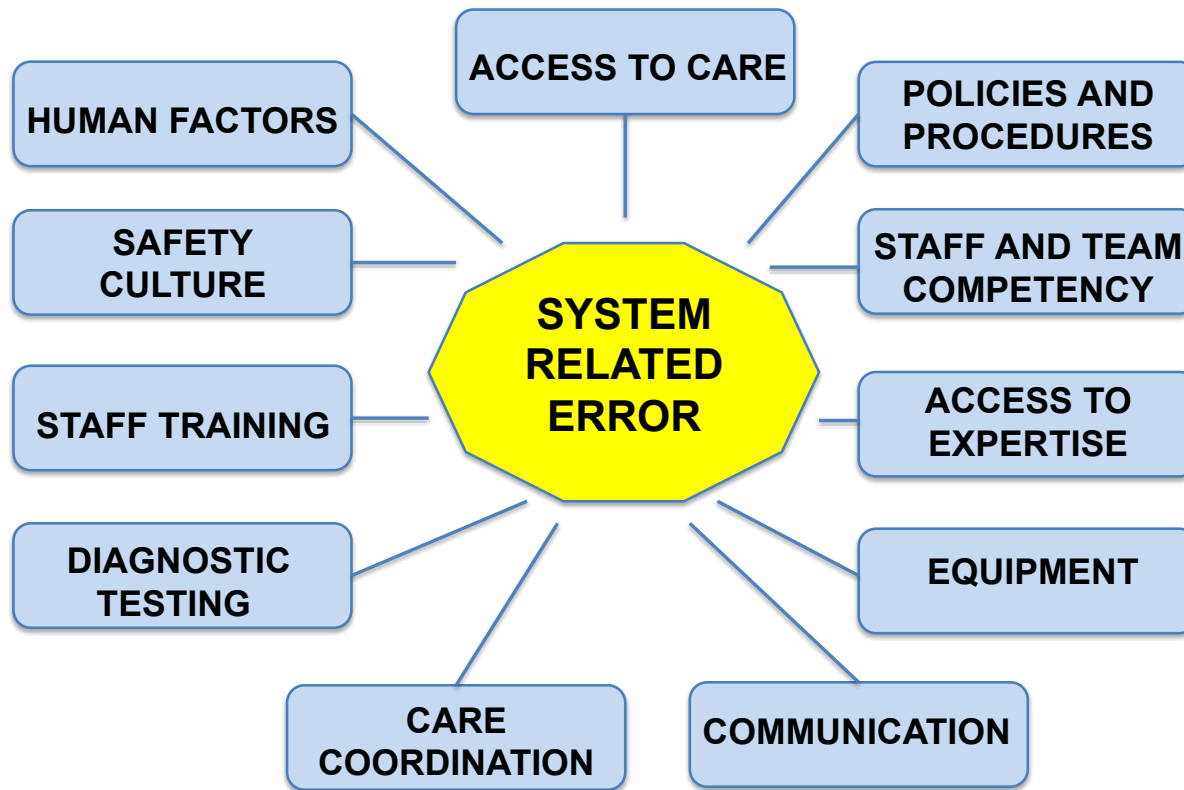and will result in 10 deaths per year**

RCA of Diagnostic Error

Conceptual approach: Whenever a patient is harmed in relation to the diagnostic process, consider two broad categories of causal factors:
The "Blunt End" -- All the system-related elements that contribute to diagnosis
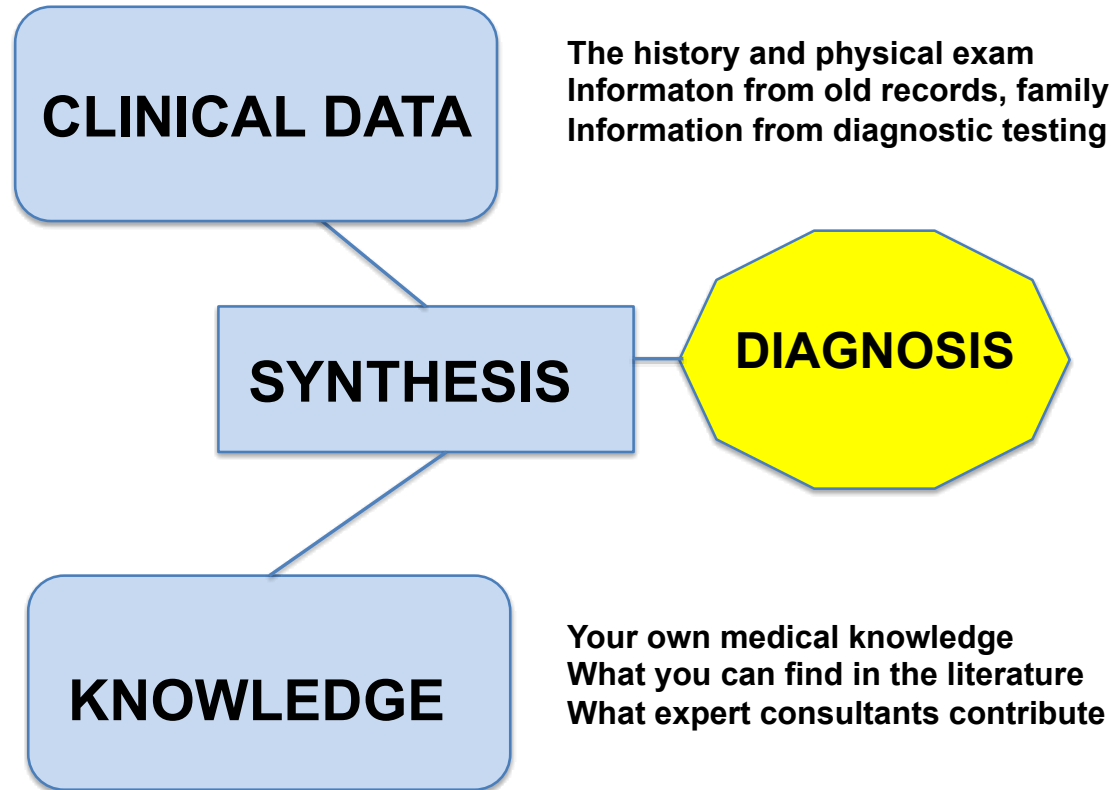The "Sharp End" - All the cognitive factors

Diagnostic Error - System-Related Factors

ACCESS TO CARE

POLICIES AND PROCEDURES

HUMAN FACTORS

STAFF AND TEAM COMPETENCY

SAFETY CULTURE

SYSTEM RELATED ERROR

STAFF TRAINING

ACCESS TO EXPERTISE

DIAGNOSTIC TESTING

EQUIPMENT

CARE COORDINATION

COMMUNICATION

Diagnostic Error - Cognitive Factors

CLINICAL DATA

The history and physical exam
Informaton from old records, family
Information from diagnostic testing

SYNTHESIS

DIAGNOSIS

KNOWLEDGE

Your own medical knowledge
What you can find in the literature
What expert consultants contribute

Identification of Diagnostic Errors

- **Definition of Diagnostic Error**

- Was it an error?

- Was it avoidable?

What is a Diagnostic Error?

- Graber/Australian Patient Safety Foundation
  - A diagnosis that, on the basis of the eventual appreciation of more definitive information, was
    - Unintentionally delayed, or
    - Wrong, or
    - Missed altogether

- Singh Definition
  - There was a missed opportunity to make the diagnosis

- Schiff Definition
  - There was a breakdown in the process of making a diagnosis

Identification of Diagnostic Errors

- Definition of Diagnostic Error

- **Was it an error?**

- **Was it avoidable?**

Was it an error? Was it avoidable?

- Determining whether an error occurred:
  - Should be done by clinicians
  - Is a subjective process
  - Is highly subject to hindsight bias

- It can be very difficult to re-create the clinical context

- May need to settle for "it could have been an error"

- There will be disagreement!

Identification of Diagnostic Errors

- Definition of Diagnostic Error

- Was it an error?

- Was it avoidable?

- If yes, then on to a root cause analysis…….

Root Cause Analysis of Diagnostic Error

- **How it differs from a "usual" RCA**

- Logistics

- Who should be there

- When should it occur

Root Cause Analysis

	Traditional RCA	**Dx Error RCA**
Fishbone diagram	Yes	Yes
Systems analysis	Critical	Critical
Cognitive analysis	No	Critical
Clinician involvement	Variable	Mandatory
Clear action steps	Often	Sometimes
Proven effective	No	No
Recommendations implemented	70%	?

Root Cause Analysis of Diagnostic Error

- How it differs from a "usual" RCA

- **Logistics**

- When should it occur

- Who should be there

Root Cause Analysis of Diagnostic Error

- How it differs from a "usual" RCA

- Logistics

- **When should it occur**
  - As soon as possible!!

- Who should be there

Root Cause Analysis of Diagnostic Error

- How it differs from a "usual" RCA

- Logistics

- When should it occur
  - As soon as possible!!

- **Who should be there**
  - The involved clinicians
  - Nurses
  - Expert RCA facilitators
  - Cognitive specialists
  - Error experts
  - Librarians

Analysis of a Diagnostic Error Using a Fishbone Diagram

James B. Reilly, MD MS FACP
Associate Residency Director, Internal Medicine
Allegheny General Hospital -
West Penn Hospital Educational Consortium
Assistant Professor of Medicine, Temple University School of Medicine

Fishbone Diagram

- Commonly used tool to facilitate Root Cause Analysis of Adverse Events
  - Traditionally focused on identifying systems problems
  - Utility is in providing systematic framework for analyzing highly complex events
  - Great potential exists to incorporate cognitive factors into analysis of a diagnostic error, as etiologies are usually multifactorial and from both cognitive and system domains

Case

- 47 yo man with Type I DM presents to Emergency Department with several days fatigue, abdominal pain, and vomiting
  - Unable to tolerate oral intake for 3 days
    - Held insulin for 2 days to avoid "going low"

- PMH: Type I Diabetes Mellitus, diagnosed in childhood
  - History of inconsistent control of sugars

- Medications: Basal Glargine Insulin and Prandial Aspart Insulin

Case

- Physical Exam

  – Alert, thin, very uncomfortable

  – Afebrile, Pulse 70, BP 96/58, normal oxygen sat

  – Cardiorespiratory Exam is normal

  – Abdominal exam: Soft, diffusely mildy tender, without rebound tenderness of guarding

  – Remainder of exam documented as normal

Case

- Laboratory Studies:
  – Mildly elevated WBC count with normal differential
  – Glucose 197
  – Creatinine 1.2 (from normal baseline 0.8)
  – Potassium 5.8
  – Bicarb 16
  – Elevated Anion Gap (=22)

- Infectious and cardiac testing unrevealing

- Abdominal CT performed showing no pathology

Hospital Course

- Admitted to Medicine service with diagnosis of Diabetic Ketoacidosis triggered by viral gastroenteritis and insulin non-adherence

- No beds available so treatment initiated in ED
  - Insulin drip and IV fluids started

- Repeat lab studies showed improvement in most lab parameters, so re-admitted to floor team
  - Potassium still elevated but improved

- Signed out to Medicine night float resident

Hospital Course

- Admitting night float resident performs chart review:
  - Patient has four previous admissions in past year for similar complaints
  - Noticed previously diagnosed "gastroparesis" by nuclear gastric emptying study in past records
  - Plan adjusted to begin metoclopromide (promotility) and limit opioid pain meds as they could exacerbate gastroparesis and related pain

- Due to busy call night, this was not communicated to patient

Hospital Course

- Night float hands off to morning team
  - Patient still awaiting bed in ED

- Morning rounds truncated due to other sick patients – team cannot round in ED.

- Multiple requests from nurse for pain medicine are declined by intern over phone

- Patient becomes frustrated, signs out AMA

Follow-Up

- Three days later the patient returns to the ED with dizziness and persistent fatigue

- Afebrile, Pulse 70, BP 92/60, normal oxygen

- Examination normal

- Potassium back up at 5.9, other parameters are normal.

- Patient readmitted to medicine for "presyncope" and "failure to thrive"

Follow-Up

- Upon questioning, patient emphasizes that most concerning symptom has been fatigue
  - Contributed to poor job performance leading to termination (and loss of health insurance)

- Lack of insurance prevented him from following up with endocrinologist "for that other test"

- Review of past records showed baseline high potassium and an equivocal baseline morning cortisol

- Inpatient adrenal stimulation test confirmed diagnosis of primary adrenal insufficiency

Anchoring Bias

- Also called "premature closure"

- Failure to continue considering reasonable alternatives after a primary diagnosis is reached

- "*When the diagnosis is made, the thinking stops*"

Availability Heuristic

Humans judge things as being more likely if they readily come to mind
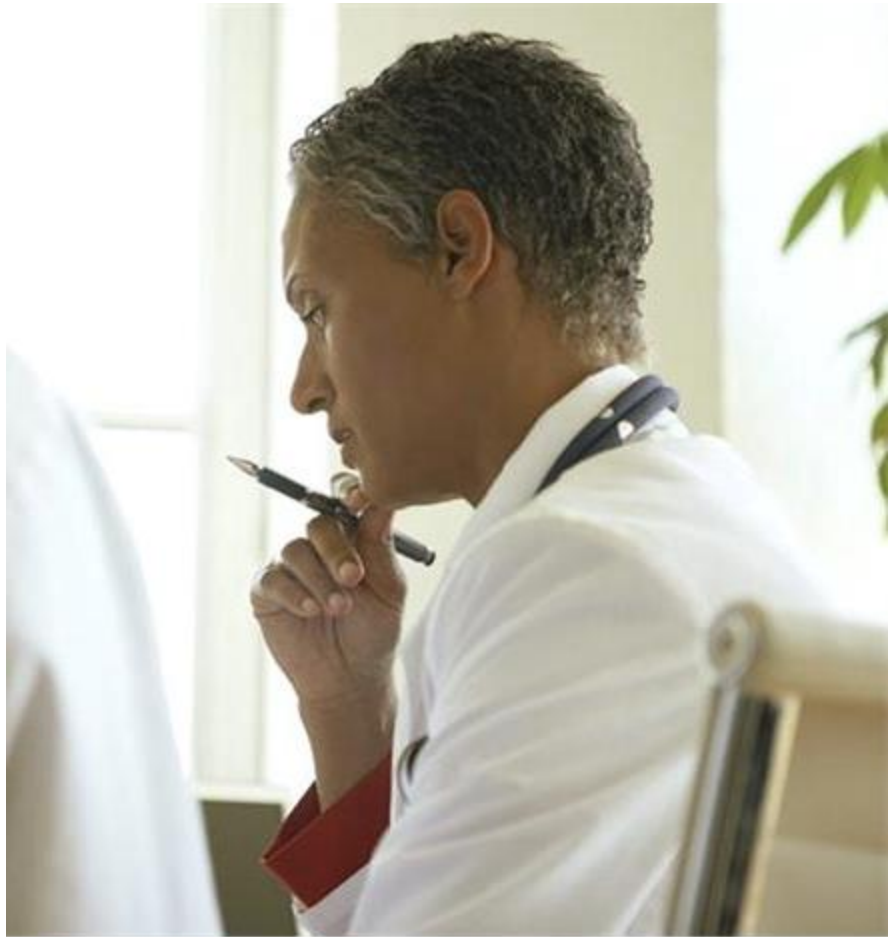
Confirmation Bias

Tendency to look for confirming evidence to support a diagnosis rather than look for discomfirming evidence to refute it (despite the latter often being more persuasive and definitive)

Absolutely!

Diagnosis Momentum

- "Chart Lore"

    e.g. from "cut and paste" medical record systems

- Once diagnostic labels are attached to patients, they become <u>sticky</u>

Framing Effect
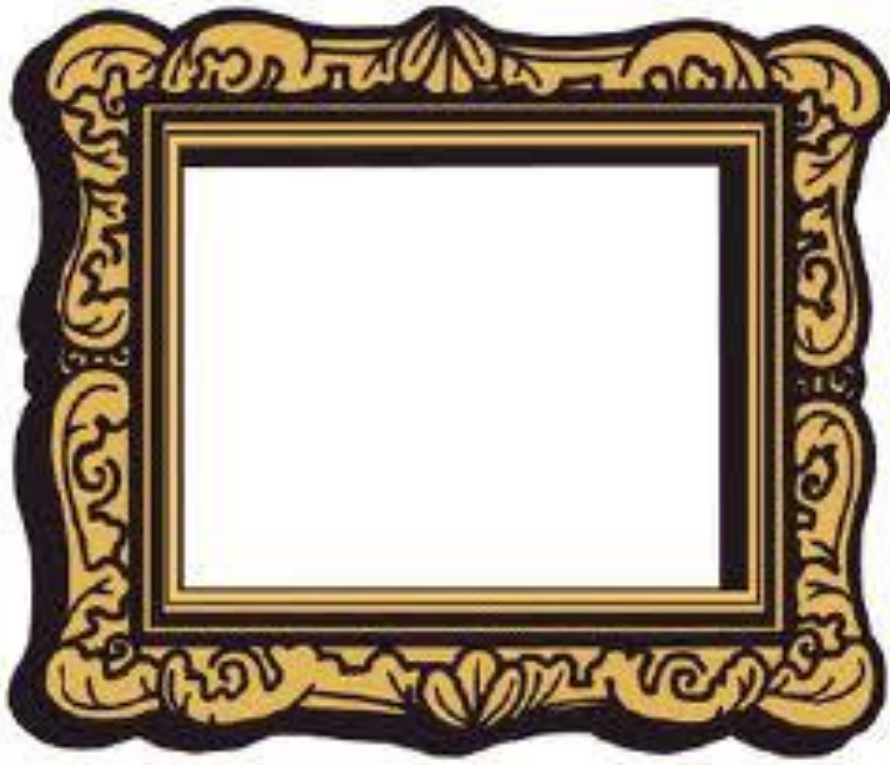
How we see things is strongly influenced by the way a problem is described and the environment where it takes place

Visceral Bias

- Counter-transference

- Negative (or positive) feelings towards a patient may result in diagnoses being missed

- Common Types
  - Non-compliant patients
  - Homeless patients
  - Patients with chronic pain
  - Obese patients
  - VIPs

Availability Bias
- DKA common
- "Viral Illness" invoked

Diagnosis Momentum
- "Chart Lore" of Gastroparesis

Confirmation and Anchoring
- Fatigue discounted
- Hyperkalemia and hypotension ignored despite persistence
- First cortisol not acknowledged?

Visceral Bias
- "Pain-med seeking"

Cognitive Factors

Systems Factors

Communication/Team Factors
- Multiple Handoffs

Process or Task Factors
- No follow up for cortisol arranged
- No endocrinology Appointment made

Patient Factors
- Cannot navigate system
- Uninsured

Physical Environment
- Bed Shortage means Admitted patient in ED
- Patient location remote to MD team

Delay in Diagnosis of Adrenal Insufficiency

NPSF — National Patient Safety Foundation®
CAUTIOUS PATIENT FOUNDATION — a division of Patient Always First, a 501(c)(3)
SOCIETY to IMPROVE DIAGNOSIS in MEDICINE — Better Outcomes Through Better Diagnosis

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Case Comments

After the RCA

- Disclosure

- Support for "second victim"
  – Thinking errors seem far more personal
  – Culture more accepting of systems errors

- Action Plans
  – Disseminate
  – Educate
  – Facilitate Better Thinking

What Can We Do?

- Learn to Find Diagnostic Errors?
  - Acknowledge prevalence and ubiquity even among well-trained, competent care teams
  - Report them as you would pure system error
    - De-stigmatize

- Once We Find Them, How Do We Talk About Them?
  - Analyze faulty thought process in the same way you analyze a faulty delivery system

- Can We Change Diagnostic Habits?

Cognitive Psychology of Diagnostic Reasoning

Reflexive vs. Reflective
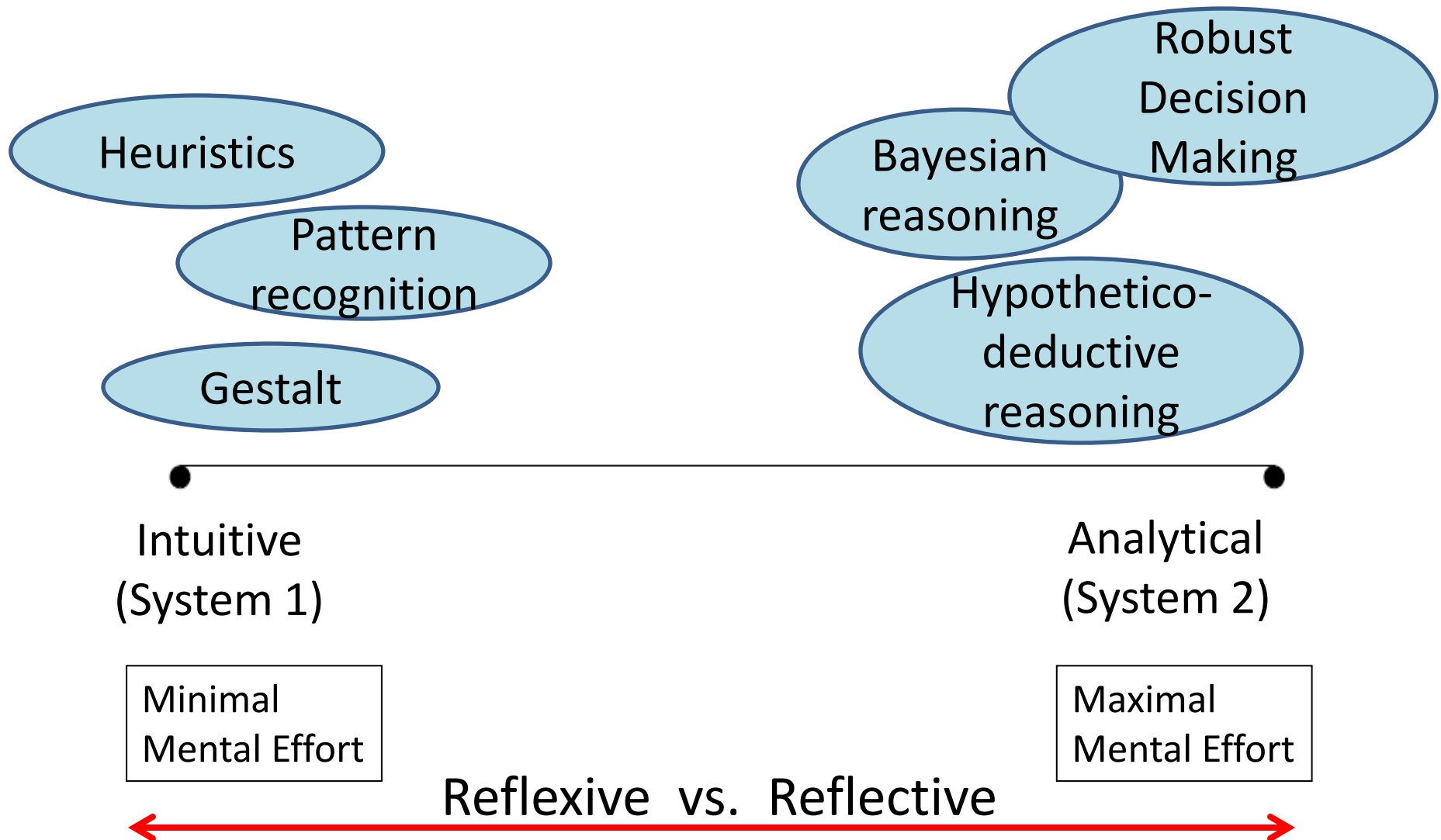
Croskerry. Adv in Health Sci Ed 2009; 14:27-35
Croskerry, P. Academic Medicine. 2003; 78(8): 775-80

Properties of the Dual Processes

	System I (Intuitive)	System II (Analytical)
Cognitive Style	Heuristic	Systematic
Cognitive Awareness	Low	High
Automaticity	High	Low
Rate	Fast	Slow
Effort	Low	High
Emotional Component	High	Low
Scientific Rigor	Low	High
Errors	More	Less

Croskerry. Adv in Health Sci Ed 2009; 14:27-35

Education: Systems Awareness

- Knowledge of the System
  - Understand the effect systems have on individual's thinking
  - Recognize High-Risk situations

- System-Based Skills
  - Diagnostic Process "Maps"
  - Root Cause Analysis
  - Morbidity and Mortality Conference

- System-Based Attitudes
  - Personal open-ness to discussing error
  - Creating a safe environment to identify and analyze error and propose change
    - "Culture of safety" – Goal is ultimately error PREVENTION!

Trowbridge, et al. BMJ Qual Saf 2013.

Within The System

- Become an "expert"

- Refer Diagnostic Errors for Review
  - Event Reporting System
  - Morbidity and Mortality Conference

- Participate in Reviews

- Enlist Interprofessional Help

- TEACH!
  - Physician Learners
  - Colleagues
  - All members of the care team

Education: Think Better to "De-Bias"

- Metacognition (Thinking about Your Thinking)
  - Understanding Strengths and Limitations of dual processing
    - Promote decreased reliance on memory
    - Willingness to adopt systematic approaches to common problems
  - Reflect on one's own biases and consider cognitive "forcing" strategies
    - Trust your gut but know when it can fail you

- Developing Intuition
  - Perfect Practice Makes Perfect
    - Develop a better Personal System I
  - Progressive Problem Solving
    - Thinking one step ahead: Chess, not checkers
  - Feedback
    - Ask your colleagues about outcomes after you are off duty
  - Simulation
    - High fidelity clinical simulation and team training has potential

Trowbridge, et al. BMJ Qual Saf 2013

Potential of Health IT

- Better Data Gathering and Organization
  - Less energy used while creating the database leaves more for critical thinking
  - Ability to re-present data in multiple formats may assist in differential diagnosis generation

- Differential Diagnosis Generators
  - ISABEL
  - Dxplain

- Clinical Decision Support and Order Sets
  - More efficient, reliable sources for medical knowledge
  - Directly incorporate learning into the workflow

- Tools that Facilitate Followup and Feedback

- Watson Technology May Help Accomplish All of the Above!

El-Kareh, et al. BMJ Qual Saf 2013.

Leadership's Role In Reducing Diagnostic Errors

- Acknowledge the Magnitude of the Problem

- Culture Change
  - Safety culture is an environment where it is not just safe to report and discuss as a first step; it's the norm
  - Model sound diagnostic practices for others

- Appreciate the role of systems improvements in directly reducing errors AND promoting better thinking
  - Streamline reporting systems
  - Optimize the clinical environment

Knowledge Management

Information from diagnostic tests & consults

Information on processes, policies, procedure

CLINICAL DECISIONS

Information from the patient & medical record

Evidence from medical literature

Clinical knowledge and skills
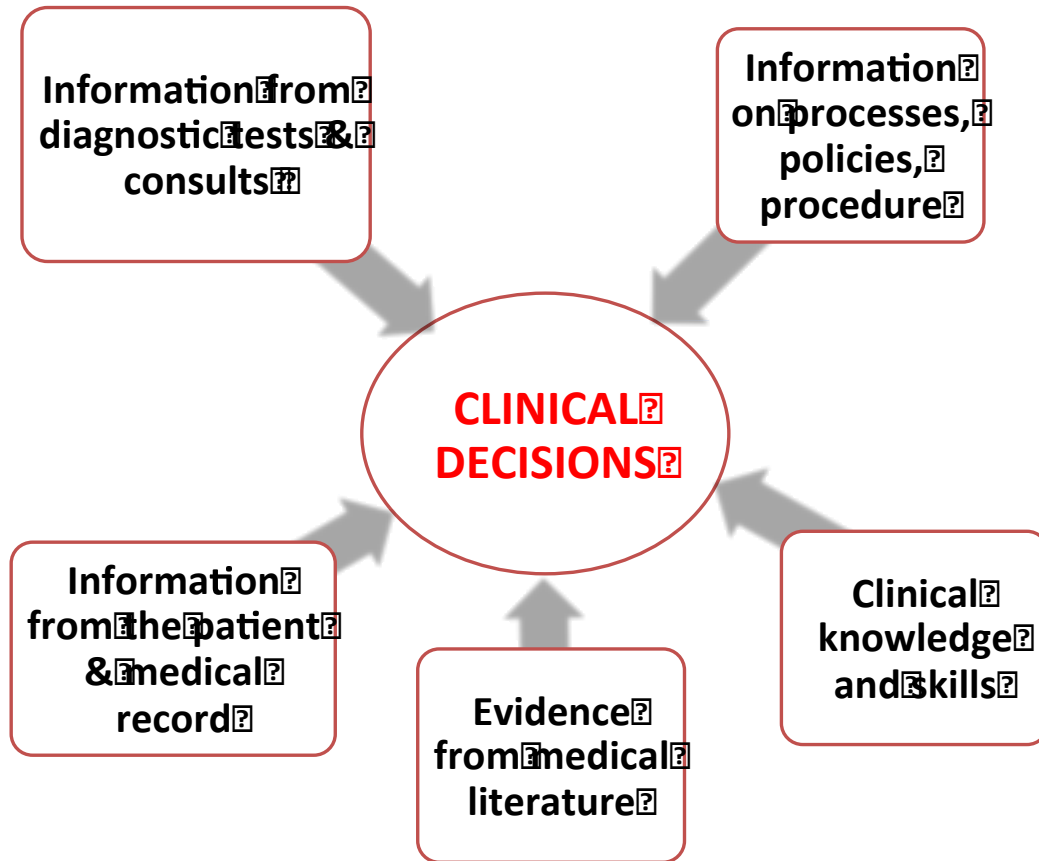
RCA's of Diagnostic Error - Realities

The reality is that there **IS NO SUCH THING** as the cause of an incident or The Root Cause; Cause is something you construct, not find. Your goal is to understand why what people did at the time made sense to them and learn from this analysis.

The RCA process is not reproducible – Don't worry about getting it perfect

The Next Organizational Challenge: Finding and Addressing Diagnostic Error. ML Graber, R Trowbridge, JS Myers, CA Umsheid, W Strull, MH Kanter. Joint Commission Journal on Quality and Safety. March, 2014; 40(3): 102-110

Helping Organizations with Defining Diagnostic Errors as Missed Opportunities in Diagnosis. Hardeep Singh. Joint Commission Journal on Quality and Safety. March, 2104; 40(3) 99-101.
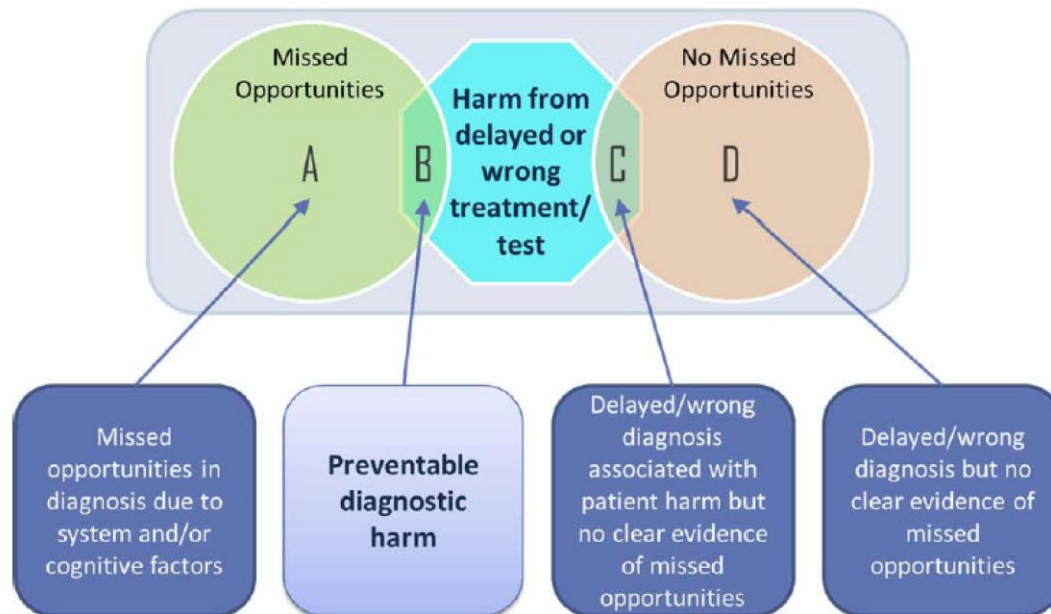
Summary

- Performing RCA's of diagnostic error should be a routine part of your quality management program

- The process is just like any other RCA, but with consideration of the cognitive factors relevant to the case

- Remember to involve clinicians, librarians, nursing staff, trainees, and include expertise on human factors

- Focus on finding things to fix; Avoid assigning blame

- Share widely the RCA analysis, what was learned, and what can be done to improve the quality of care going forward

Questions?

Free Diagnostic Error Tools Available

Visit www.npsf.org/psaw to download free tools and resources for:

- Patients and Families

- Health Care Clinicians and Professionals

- Health Care Organizations

Webcast Replays Available!

Patient and Family Engagement to Prevent Diagnostic Error

Diagnostic Safety in an EHR-enabled Health Care System

How to Do a Root Cause Analysis of Diagnostic Error

Available at www.npsf.org/psaw

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