

# Diagnostic Errors: Nurses and Nurse Practitioner Partnerships for Diagnostic Excellence

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## Disclosures

- I receive grant funding from the Gordon and Betty Moore Foundation, the Macy Foundation, and CRICO to study improving diagnosis.
- And I make errors.
- And I still have more questions than answers.



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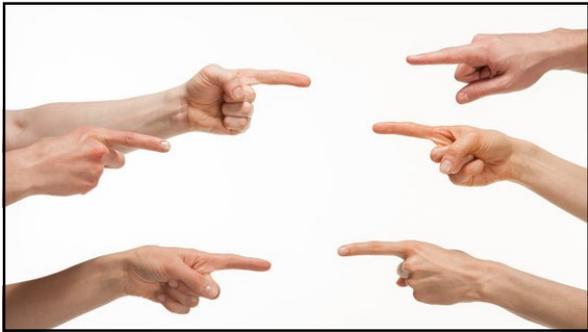
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*I think about baseball when I wake up in the morning.  
I think about it all day and I dream about it at night.  
The only time I don't think about is when I'm playing it.*

*-Bob Feller*

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## What Is Diagnostic Error?

- The failure to establish an accurate and timely explanation of a patient's health problem(s) or communicate that to the patient.
- A diagnosis that is:
  - Wrong
  - Missed
  - Delayed
- A missed opportunity to make a diagnosis
- Overdiagnosis

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

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Vol. 324 No. 6 ADVERSE EVENTS

**THE NATURE OF ADVERSE EVENTS**

**Results of the**

LUCIAN L. LEAPE, M.D., TROYEN  
ANN G. LAWTHERS, SC.D., A. RUSS  
LIESI HEBERT, SC.D., JOSEPH P. NEWHOUSE

Leape et al. NEJM. 1991; 324:377-384

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Table 2. Clinical vs Autopsy

**Major error in 31.7% of patients**

**Correct diagnosis would have changed management and possibly resulted in cure or prolonged survival in 10%**

Diagnosis	Prospective case series
Cancer	1492 ICU patients with 315 deaths
Myocardial infarction	24 (1%)
Stroke	
Spleen infarction	167 (53%) autopsied
Renal infarction	
Mesenteric infarction	138 clinical diagnoses from 167 patients

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**OPEN ACCESS**

**The frequency of outpatient three-lar**

Singh et al. BMJ Qual Saf 2014; 23:727-31

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## Diagnostic Error in Outpatients

- Three data sources:
  - Primary Care Study:
    - Unusual patterns of return visits
      - Unplanned hospitalization within 2 weeks of visit
      - Unscheduled visit(s) within 2 weeks of visit
  - Colon Cancer
    - No followup within 60 days of documented hematochezia, positive FOBT, or iron deficiency anemia
  - Lung Cancer
    - No followup within 7 days of documented "red flag" symptoms such as an abnormal CXR



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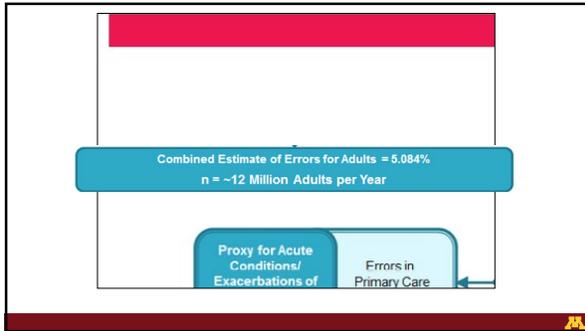
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## Errors in Patients Admitted to the PICU

- Analysis of 4 cohorts of patients
  - Cohort 1: Autopsied patients
  - Cohort 2: Patients seen as outpatients within 2 weeks of admission to PICU
  - Cohort 3: Patients transferred to the ICU after a rapid response who required intubation or pressors
  - Cohort 4: Patients transferred to the ICU after a rapid response who did not decompensate
- Cases screened for errors using the SaferDx tool



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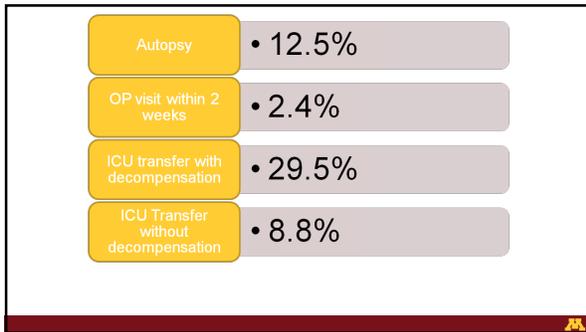
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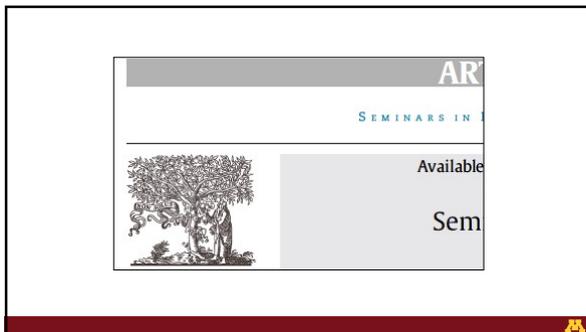
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**Table 1 – Examples of prototypical errors in neonatology**

Case (n = 10)	Initial Presentation	Misdiagnosis
1	Premature delivery at 31 weeks	HSV
2	Term delivery	Imp
3	Multiple congenital anomalies	Coa

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### CLINICAL RESEARCH STUDY



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### Diagnosis of Spinal Epidural Abscess

55.5% of patients experienced a diagnostic error

Median time from red flag to diagnosis:

- 4 days (no error) vs 12 days (error)

Patients with a diagnostic error had **MORE** red flags

- 4.9 red flags vs 4.3 red flags



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WHY?



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Sometimes your best isn't good enough.  
— My mother



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## Diagnostic Error in

Mark L. Graber, MD; Nancy Franklin, PhD

**Background:** The goal of this study was to determine the relative contribution of system-related and individual components to diagnostic error and to

Graber et al. Arch Int Med. 2005; 165:1493-9



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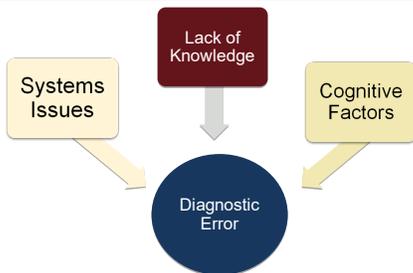
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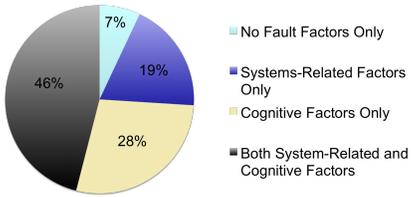
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**Categories of factors contributing to diagnostic error in 100 patients**



Graber et al. Arch Int Med. 2005; 165:1493-9



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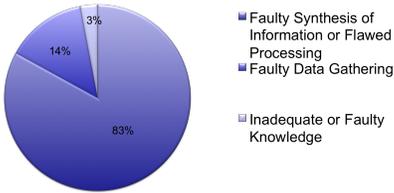
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**Cognitive Contributions to Error**



Graber et al. Arch Int Med. 2005; 165:1493-9



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What you learned in high school economics was probably wrong.



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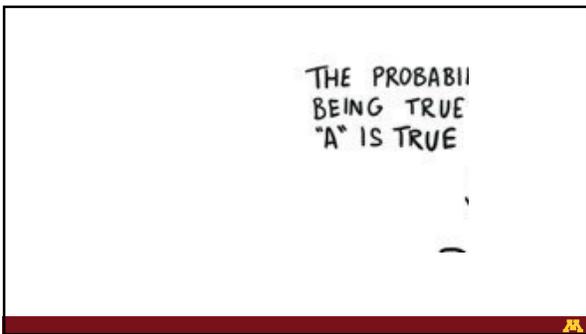
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**DE GRUYTER**

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Andrew Olson, Joseph Rencic, Karen Cos  
Brenda Zierler, Gene Harkless, Michael

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# The Di

Patient Patient

INFORMATION & INTERPRETATION

Has sufficient information

Clinical History and Laboratory

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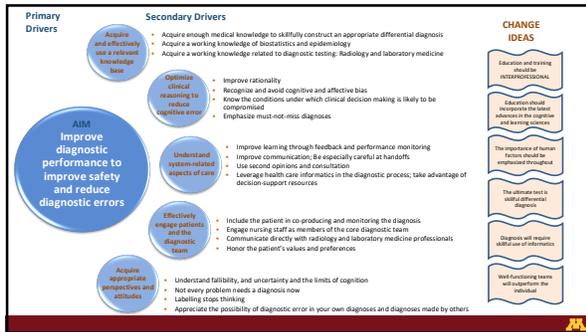
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**Individual competencies for diagnosis (I-competencies)**

**I. Demonstrate clinical reasoning to arrive at a justifiable diagnosis (an explanation for a health-related condition)**

I-1. Accurately and efficiently collect key clinical findings needed to inform diagnostic hypotheses. Use these tools appropriately and efficiently in the diagnostic process. Effective interpersonal communication skills, history-taking, the physical examination, and record review, diagnostic testing, and the electronic health record and health IT resources.

I-2. Formulate, or contribute to, an accurate problem representation expressed in a concise summary statement that includes essential epidemiological, clinical, and psychosocial information.

I-3. Produce, or contribute to, a correctly prioritized, relevant differential diagnosis, including can't miss diagnoses.

I-4. Explain and justify the prioritization of the differential diagnosis by comparing and contrasting the patient's findings and test results with accurate knowledge about prototypical or characteristic disease manifestations and atypical presentations, and considering pathophysiology, disease likelihood, and clinical experience.

I-5. Use decision support tools, including point-of-care resources, checklists, consultation, and second opinions to improve diagnostic accuracy and timeliness.

I-6. Use reflection, surveillance, and critical thinking to improve diagnostic performance and mitigate detrimental cognitive bias throughout the clinical encounter. Discuss and reflect on the strengths and weaknesses of cognition, the impact of contextual factors on diagnosis, and the challenges of uncertainty. Demonstrate awareness of atypical presentations, information that is missing, and key findings that don't fit.

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**Team-based competencies for diagnosis (T-competencies)**

**T. Partner effectively as part of an interprofessional diagnostic team. Communicate effectively and solicit information from all members of the team (including the patient and family) to create a shared mental model of a patient's illness and the plan for diagnostic evaluation.**

T-1. Engage and collaborate with patients and families, in accordance with their values and preferences when making a plan for diagnostic evaluation. Listen actively, encourage questions, and be alert to new or changing information. Explain the diagnostic process, including the patient's and family's role in helping to identify the most likely diagnosis. Share appropriately when diagnostic uncertainty exists.

T-2. Collaborate with other healthcare professionals (including nurses, physicians, physician assistants, radiologists, laboratory professionals, pharmacists, social workers, physical therapists, medical librarians, and others) and communicate effectively throughout the diagnostic process. Acknowledge and challenge authority gradients, especially between clinicians and patients/families, constructively.

T-3. Apply effective strategies at transitions of care to facilitate accurate and sufficient information transfer about the diagnosis, including any pending workup and areas of uncertainty. Close the loop on test result communication and clarify expectations with the team for test result follow-up.

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System-related competencies for diagnosis (5-competencies)

**5. Identify and understand the systems factors that facilitate and contribute to timely, accurate diagnoses and error avoidance.**

**S-1.** Discuss how human factors contribute to diagnostic safety and error by identifying how the work environment influences human performance. Take steps to mitigate common systems factors that detract from diagnostic quality and safety.

Use local resources (including people, teams and technology, especially the electronic health record) effectively and efficiently to optimize patients' access to care, diagnostic testing services, and appropriate experts for consultation.

**S-2.** Advance a culture of diagnostic safety that encourages open dialogue and continuous learning from analysis and discussion of excellent diagnostic performance, near misses and errors. Give and receive feedback at an individual and team level to improve subsequent diagnostic performance.

**S-3.** Disclose diagnostic errors and missed opportunities transparently and in a timely manner to patients, families, team members, supervisors, and appropriate quality and risk management staff.



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More of the same will yield more of the same

Practicing and learning in teams – real teams

Developing comprehensive programs of feedback

Sharing and embracing uncertainty

Embracing – not blaming– the system to improve diagnosis.



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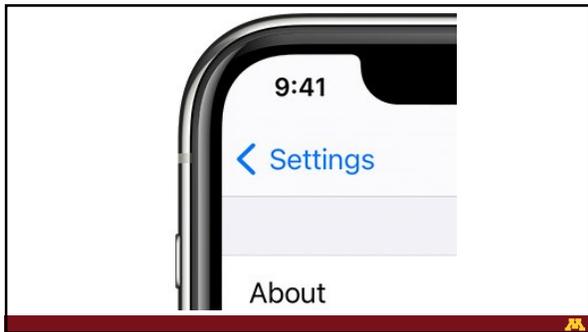
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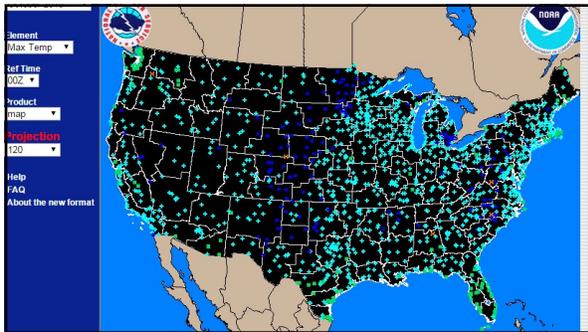
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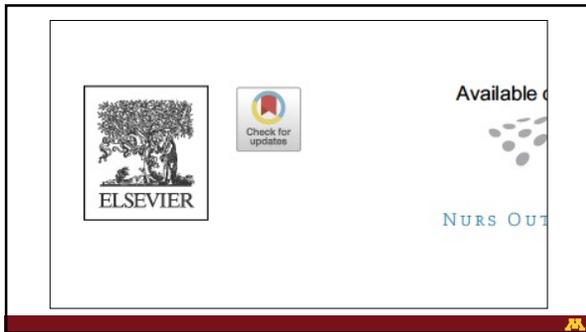
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To better serve our  
must improve. Nurse  
central role in achiev  
role in assessing, eva  
not be underestimated

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As we move toward an era of electronic medical records and device integration, it is important to note that machines monitor, but nurses survive.

Nurses are responsible for the accurate measurement, recording and interpretation of the clinical data that underlie all subsequent care.

Is an intervention required such as sitting the patient up or commencing oxygen therapy?

Is escalation of care needed and how urgently?

Can the patient's problem be managed by the home team or is a rapid response system activation required?

Importantly, nurses are also charged with keeping patients safe, particularly in hospitals; prevention of complications and adverse events is nursing core business.

Considine, Diagnosis 2017, 4(4): 197-99

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**Table 1 – Hypothetical Scenario: The Differences Between Who is Not Prepared for the Role in Diagnosis**

**Nurse Not Prepared for Role in Diagnosis**

Nurse reassures patient that she is in good hands with the nurse and the team. Nurse gives patient wet washcloth for lightheadedness. About an hour later, the patient's technician takes the patient's vital signs every 4

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In the Moment

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There is so much known data. And yet with all of this communication, miscommunication

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Research

Original Investigation

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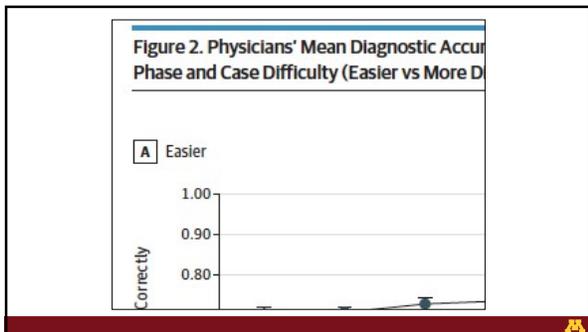
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ONLINE FIRST

Improving Resident Feedback

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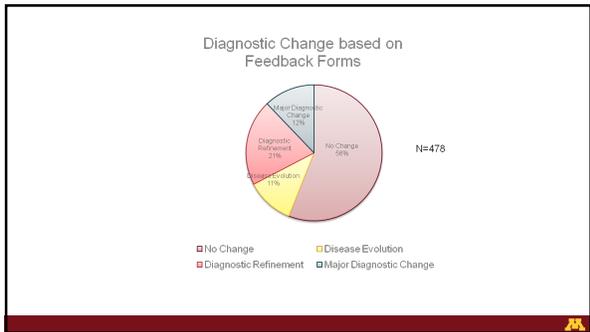
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### Myths About Knowing

If I just study enough, I'll know enough.

Experts are experts mostly because they have more knowledge.

I don't know because I'm a student. And I'm the only one.

Saying "I don't know" makes me look incompetent.

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### Diagnostic Timeout

- What else could this diagnosis be?
- Have we considered the worst case scenario?
- Are we influenced by any common heuristics and biases?
- Is there anything about the way we feel today or the way we feel toward this patient that may be impairing my judgment?
- Is there anyone else we need to involve?

Trowbridge RL. Med Teach. 2008 Jun;30(5):496-500.  
Ely JW, Graber ML, Croskerry P. Acad Med. 2011 Mar;86(3):307-13.

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## Expand the Diagnostic Team



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### Diagnostic Team Members



The National Academy of  
SCIENCES • ENGINEERING • MEDICINE  
SOURCE: National Academies of Sciences, Engineering, and Medicine, 2019.  
Improving Diagnosis in Health Care. Washington, DC: The National Academies Press.



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### Expanding the Diagnostic Team

- What doesn't fit in this explanation for you?
- Given your experience with this, what do you think about our current approach?
- What have you read about your condition?
- What is confusing?



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Calibration should be our goal

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Quadrant 1: Accurate and certain: "Slam dunk"	Quadrant 2: Accurate and uncertain: "Cautiously optimistic"	Diagnostic certainty
Quadrant 3: Inaccurate and uncertain: "Diagnostic mystery"	Quadrant 4: Inaccurate and certain: "Diagnostic hubris"	

Diagnostic accuracy

Santhosh, Lekshmi et al. *Diagnosis*, vol. 6, no. 2, 2019, pp. 121-126

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Thank you!  
apjolson@umn.edu  
@andrewolsonMD

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The University of Minnesota is an equal opportunity educator and employer.

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