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PSLL MONTHLY NEWSLETTER

Patient Safety Learning Lab

Division of General Internal Medicine | Brigham and Women's Hospital



About Diagnostic Errors

Diagnostic errors are often attributed to cognitive and systems factors. Therefore, recognizing these factors may be a profound step in preventing errors from happening.

Additionally, while there may be errors in the diagnostic process, not all diagnostic errors lead to adverse events for patients.

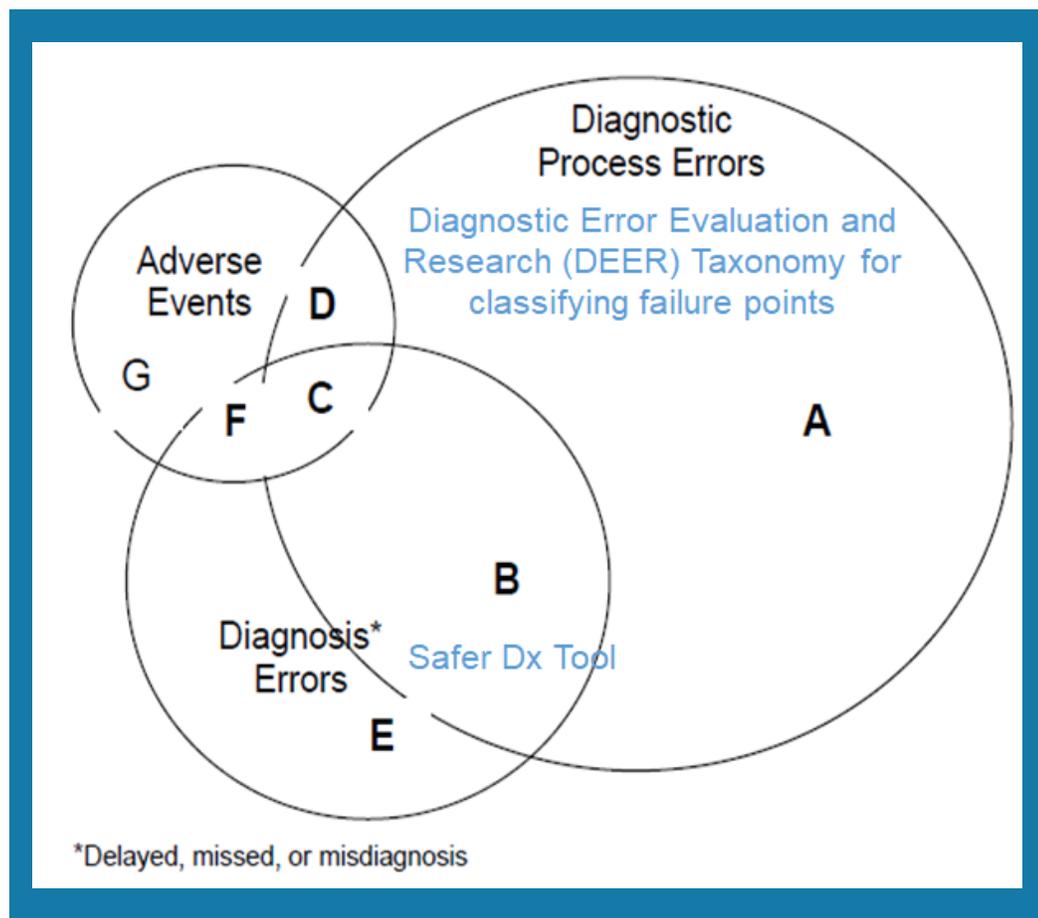
Our December newsletter outlines the Patient Safety Learning Lab's efforts in defining and identifying these failures in the diagnostic process.

OVERVIEW

- About Diagnostic Errors
- Diagnostic Errors in the COVID-19 Era
- Important Definitions
- Case of the Month
- Ways to Prevent Diagnostic Error

The **DEER (Diagnostic Error Evaluation and Research) Taxonomy** helps to classify failure points in the diagnostic process related to access/presentation, physical examination, lab testing, hypothesis generation, referral/consultation, and monitoring/follow-up.

The **Safer Dx Tool** is a framework for measurement and reduction of diagnostic errors. Use of the framework accounts for the complexity of diagnostic error and will lead to addressing the sociotechnical context while understanding and preventing error, as it includes both technological, non-technological, and external factor dimensions.



Prior to COVID-19, we conducted a preliminary analysis of diagnostic error rates at BWH.

We sampled 51 of the 365 patients that expired (2016-18) on general medicine services to undergo a 2-person chart review and adjudication process. **Data from this cohort showed a 62% prevalence of diagnostic error.**

Main causes of these errors were attributed to:

- Failure or delay in considering correct dx: 28 (75.7%)
- Suboptimal weighing or prioritizing of dx: 28 (75.7%)
- Too much weight to lower probability/priority dx: 5 (13.5%)

And 30 (81%) of these errors led to harm, 29 (96.7%) of which were preventable.

During the COVID-19 pandemic, there may be other types of diagnostic errors that occur, that are important to recognize...

Nomenclature	Description	Additional Context
Anchor	Missed or delayed non-COVID diagnosis because it was assumed to be COVID-19	Patients are being told they are "presumed COVID-19 positive" which may or may not be true. Several conditions, including bacterial pneumonia, bronchitis, and sinusitis could be missed in absence of full evaluation including reliable and accurate testing.
Acute Collateral	Delayed diagnosis of acute non-COVID-19 diagnoses because patients are not coming in for evaluation due to infection risk	Recent concerns have been raised regarding reductions in admission for AMI and stroke because people may be staying home from fears of possible infection risk related to a trip to the hospital.
Strain	Missed or delayed non-COVID-19 diagnosis in non-COVID-19 patient because of heightened state of attention to other COVID-19 patients in an overwhelmed health system	While hospitals are surging with COVID-19 patients, patients without COVID-19 may not get the same quality or timeliness of evaluation. Overcrowding and "hallway evaluation" is a known risk factor for disrupting the patient-clinician interaction and is associated with delays in care and failure to diagnose. Non-COVID-19 patients may get care from clinicians who are filling in for others and are possibly less experienced in the relevant domain of care.

Gandhi TK, Singh H. Reducing the Risk of Diagnostic Error in the COVID-19 Era. J Hosp Med. 2020 Jun;15(6):363-366. doi: 10.12788/jhm.3461. PMID: 32490798; PMCID: PMC7289509.

Important Definitions in the Diagnostic Process

- **Primary diagnosis:** the most serious and/or resource-intensive during the hospitalization
- **Hospital principal problem:** condition which occasioned the admission to the hospital
- **Secondary diagnosis:** conditions that coexist at the time of admission, or develop subsequently, and that affect patient care during the current episode



Typically, the primary diagnosis and hospital principal problem are the same diagnosis, but not always!

Case of the Month

Case summary

A 64-year-old Spanish-speaking male with recently diagnosed A-fib presented to his PCP for 1 week of fevers, chills, cough and dyspnea. His symptoms started 1 day after hospitalization for A-fib with RVR during which he was on warfarin and amiodarone for rhythm control. A diagnosis of RLL PNA was made based on imaging and physical exam findings in the PCP's office and he was sent to the BWH ED for further management.

At the ED, physical exam was notable for crackles at the R lung base. Labs were significant for a normal WBC (7.3), mild transaminitis (ALT/AST 51/61; ALP 139). The procalcitonin was 0.11. ECG was notable for NSR with a slightly long QT but no ischemic changes. Blood cultures were drawn and ultimately yielded no growth. He was started on cefepime and doxycycline and admitted to general medicine. He received one dose of IV vancomycin in setting of fever (101.2), but stable BP and O2.

In the A&P of the H&P, the admitting team communicated a primary working diagnosis of RLL pneumonia. The team initially thought this was health care-associated pneumonia (HCAP). However, because the patient was not intubated or in the ICU during the prior admission and was currently doing well, they thought this was less likely. The transaminitis was suspected to be secondary to a viral infection or possibly amiodarone.

On HD #1 his labs were significant for worsening transaminitis (ALT/AST 104/136; ALP 173) and stable WBC (6.35). Physical exam with notable for persistent basilar crackles and stable vitals. Viral respiratory panel, strep / legionella urinary antigens were negative. The patient reported feeling better and requested discharge. The team noted a CURB-65 of zero and discharged the patient on a 4-day course of oral Augmentin and Doxycycline, with close follow-up.

He did not improve following discharge, presented to the ED again, and was admitted to the MICU for hypoxemic respiratory failure. He received pulse steroids and amiodarone was eventually discontinued. He improved significantly. The discharge diagnosis was described as "hypoxemic respiratory failure secondary to amiodarone toxicity."



Description of diagnostic error

- Failure to consider non-infectious etiologies of pneumonia at the time of admission (aspiration, acute amiodarone toxicity) in light of risk factors (prior strokes), underwhelming procalcitonin (was 0.11; suggested threshold of >0.25 to consider antibiotics for bacterial pneumonia, though antibiotic use may also be started if high clinical suspicion), afebrile and no leukocytosis
- Interestingly the patient also had transaminitis which the team attributed to a viral etiology, though this was likely related to amiodarone toxicity.

Outcome

- The patient was hospitalized three times within narrow time frame.
- Less than 24 hours after the second hospitalization, the patient was discharged on a 4-day course of antibiotics for suspected bacterial pneumonia but did not improve.
- After discontinuing amiodarone during the third hospitalization, his respiratory status improved.

Most significant failures in the diagnostic process

- Anchoring bias &/or premature closure – The team anchored on bacterial pneumonia based on the available diagnosis from the PCP upon admission; however, the WBC was normal and procalcitonin was underwhelming.
- Suboptimal weighing of piece of history data – The team did not heavily consider the new medication (amiodarone) upon admission presentation
- Consult services not utilized – A pulmonary consult may have been useful.

Harm

- Unnecessary use of broad-spectrum antibiotics
- Subsequent hospitalization requiring ICU 8 days later for hypoxemic respiratory failure

Risk factors for diagnostic error

- Response to treatment is not as expected for the primary working diagnosis of bacterial pneumonia
- Spanish-speaking, requiring interpreter
- Re-admission within 7 days

Lessons learned

- Pay attention to medication changes / additions in the history leading to admission.
- Keep non-infectious etiologies on the differential whenever for patients admitted with a primary working diagnosis of pneumonia
- Consider a diagnostic time-out for patients who do not respond to treatment of the primary working diagnosis for the hospital principal problem.
- “Potential risk factors for amiodarone-induced pulmonary toxicity include high daily doses (greater than 400 mg/day), high cumulative doses (treatment duration greater than two months), male gender, age over 60 years, and pre-existing lung disease.”

How can YOU prevent diagnostic errors at BWH?

- View the **Quality and Safety Dashboard** before rounds or before hand-offs, while running the list with residents/interns, or while writing H&Ps and progress notes. The Dashboard is an Epic-integrated tool that enables you to proactively identify quality & safety risks for your patients in real-time.
- Participate in **Diagnostic Time-Outs** to address diagnostic uncertainty in patient care.

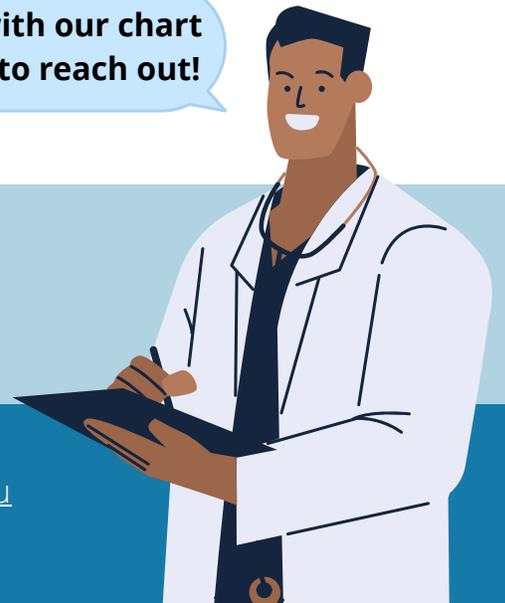
Download our Diagnostic Time-Out here:



Attend our Diagnostic Safety Workshops to learn more!

Interested in getting involved with our chart adjudication process? Feel free to reach out!

Contact Us!



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