



# **Background Information/Problem**

Errors related to missed or delayed diagnoses are a frequent cause of patient injury and an underlying cause of patient safety related events. Additionally, diagnostic errors are frequently the leading or second leading cause of malpractice claims in the United States, accounting for twice as many alleged and settled claims as medication errors. Studies have shown that cognitive errors and system design flaws—especially communication issues—all contribute to diagnostic error.

#### Method

The Pennsylvania Patient Safety Authority reviewed exactly 100 events related to diagnostic error reported between June 2004 and November 2009 in an effort to identify both cognitive and system-level risk reduction/risk mitigation strategies to reduce diagnostic error in Pennsylvania. Potential outcome and process measures were also developed to assist facilities in the identification and tracking of diagnostic error.

## **Characteristics of Pennsylvania Diagnostic** Error Events (N = 100)



#### **EVENT REPORT**

Patient is an infant seen in the ED [emergency department] during high flu season after an episode of vomiting and period of apnea observed by family. Was discharged, but returned later. Family reported that the patient had another episode of apnea. Patient was evaluated and transferred to another facility for clinical impression of apnea and reflux.

Patient seen in the ED on day one and day two for complaints of shortness of breath and chest pain. Diagnosed with an upper respiratory infection and sent home each time. Subsequently later admitted and died. Coroner preliminary report indicated PE [pulmonary embolus] as cause of death.

# **POTENTIAL FAILURE(S)**

Authority report stated missed diagnosis of apnea and reflux. Admitted during high flu season; potentially attributed symptoms to common flu, due to availability. A more thorough physical examination may have led to the discovery of other symptoms indicative of reflux.

# PENNSYLVANIA DIAGNOSTIC ERROR IN ACUTE CARE Pennsylvania Patient Safety Authority Cynthia Lacker, RN, MS, LNCC, CPHRM

## **Common Causes of Cognitive Errors**

Some of the common heuristics employed during the diagnostic process include the following:

- The **representative heuristic**, which uses "mental matching" to diagnose conditions with characteristic presentations, can predispose diagnosing physicians to a lack of differential diagnoses.
- The availability heuristic, which is the tendency to accept a diagnosis due to ease in recalling a past similar event or case, rather than accepting it based upon statistical prevalence or probability.

Biases and limitations related to cognitive processing errors include the following:

• **Anchoring**, which is the tendency to stay with an original diagnosis despite evidence to the contrary.

## Select Risk Reduction Strategies

Healthcare facilities may consider the following three global strategies to reduce diagnostic error:

- Provide a mechanism to collect diagnostic error reports within the facility. Collection and aggregation of diagnostic error data allows for tracking, trending, uncovering patterns, learning across cases, and measuring improvement.
- Continuously improve the culture of safety so that identification and analysis of diagnostic error is acceptable and anticipated. Include diagnostic error as a key part of the quality assurance plan.
- Identify any diagnostic-related adverse events and incidents that appear repeatedly as possible "normalization of deviance" and intervene as needed. Conduct analysis of events that result in misdiagnosis-related patient harm.

To combat cognitive errors consider the following:

- Provide information about and encourage the general study of clinical and pathological discrepancies to learn about all types of diagnostic error.
- Provide resources for clinical decision support systems that provide accurate estimates of disease probability.
- Provide resources and encourage the use of clinical guidelines and clinical algorithms. When well designed, these resources remedy the deficiencies in human judgment by incorporating statistics, epidemiology, and decision theory in a clinically useful format.
- Consider diagnostic checklists to prevent reliance on memory for error-prone processes.

# Sample Event Reports with Associated Individual and System Error Mitigation Strategies

Authority report stated missed diagnosis of PE. Anchored on diagnosis "upper respiratory infection." Once a physician anchors on a diagnosis, it is very difficult to introduce new differential diagnoses. May not have considered alternate diagnoses on subsequent visits.

# POTENTIAL COGNITIVE PROCESSING ERROR

Availability heuristic. The tendency to accept a diagnosis based upon recent or vividly recalled cases or events rather than on prevalence or probability.

Anchoring heuristic. The tendency to fixate on first impressions or initial symptoms without considering causes that appear later or those that do not support the initial hypothesis or diagnosis.

- **Premature closure**, which is narrowing the choice of diagnostic possibilities (i.e., hypotheses) too early in the diagnostic process, such that the correct diagnosis is never considered.
- **Satisficing**, which is the acceptance of less than the ideal or the seeking of a merely satisfactory solution that is not necessarily the optimal one.
- **Confirmation bias**, which is the tendency to seek out data to confirm one's original idea rather than to seek out or validate disconfirming data.
- **Context errors**, which occur when the diagnosing physician is biased by patient history, previous diagnosis, or other factors and the case is formulated in the wrong context.

• Enhance feedback to clinicians regarding diagnoses and errors to improve calibration and reduce overconfidence regarding their own diagnostic error rate. Improving feedback to clinical practitioners may be the most effective debiasing procedure available.

To combat systems errors consider the following:

- Migrate toward electronic medical records to ensure that patient information is available to all care providers in real time, in all settings.
- Ensure an efficient and effective system of communicating abnormal and critical test results directly to the ordering physician and the patient.
- Ensure that specialty expertise is available when needed, at all times and on all days.
- Consider mandatory second opinions on key error-prone diagnoses and second readings of key diagnostic tests.
- Ensure that there is a standardized process for handoff procedures between physicians and across care units.
- Provide close oversight of trainees' diagnostic evaluations especially in cases of high workload or with complex patients or with patients with atypical presentation. Provide a mechanism for supervisory oversight of diagnostic decision-making strategies.
- Ensure a strong mechanism for follow-up of discharged patients, especially for high-risk diagnoses or symptoms for which a diagnosis has not yet been assigned.

#### INDIVIDUAL STRATEGY

Use checklists for physical examination components. Use decision support resources, if available. Confer with colleagues, and seek out second opinions.

Think beyond the most obvious diagnosis. Perform comprehensive and systematic physical examinations. Use a diagnostic time-out and reflective thinking about the patient and symptoms in a calm environment. Consider worst-case scenarios. Ask, "What do I not want to miss?"

# Select Outcome Measures to Identify Diagnostic Error

(designed to assess how well the organization is performing core processes associated with preventing diagnostic error)

- Number of times an autopsy reveals a different definitive diagnosis / total number autopsies performed
- Number of times a postmortem magnetic resonance imaging (MRI) scan reveals a different definitive diagnosis / total number postmortem MRIs performed
- Number of patients with different admitting and discharge diagnoses / total number of patient discharges

# **Select Process Measures to Identify Diagnostic Error**

(designed to identify adverse events and measure the overall level of patient harm associated with diagnostic error)

#### **Cognitive Processing**

- Number of referrals with different or added diagnoses / total number of referrals in a specific patient population
- Number of patients returned to the ED within 48 hours who are assigned a new or different diagnosis / total number of patient returns to the ED within 48 hours

#### **Systems**

- Number of pathology over-reads / total number pathology specimens processed
- Number of laboratory tests credited / total number of laboratory tests ordered
- Number of radiology over-reads / total number of radiology tests ordered
- Number of delays (specify timely consult) in obtaining consultations or referrals / total number of referrals/consults ordered within a specific patient population

### Outcome

The Pennsylvania Patient Safety Authority encourages each healthcare facility to begin monitoring diagnostic error rates. Once facilities begin collecting data regarding diagnostic error, the Authority invites use of the sample "DEER Taxonomy Chart Audit Tool" to trend diagnostic error reports, to identify when in the diagnostic process errors occur, to analyze aggregate results, and to develop and implement both physician- and system-level strategies to reduce diagnostic error occurrence.

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This poster was adapted from the following:

Diagnostic error in acute care. Pa Patient Saf Advis [online] 2010 Sep [cited 2010 Sep 23]. Available from Internet: http://patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2010/Sep7(3)/Pages/76.aspx.

#### SYSTEM STRATEGY



Provide decision support systems to diagnosing physicians. Provide point-of-care clinical resources such as electronic medical records. Internet access, and access to electronic medical journals and prescribing data. Encourage the use of diagnostic checklists to improve systematic examinations and to decrease reliance on memory.

Implement a system to automatically screen patients returning to the ED within 48 hours. Provide decision-support information in the form of clinical algorithms based upon evidence-based medicine. Ensure the availability of specialty consultations7 days per week, 24 hours per day. Encourage physicians to seek out second opinions on high-risk populations (e.g., return to the ED within 48 hours).