

• A DOSE OF INSIGHT®

# HIDDEN IN PLAIN SIGHT

Exposing the Drivers of Diagnostic Error

A Three-Part Series:

**Part One:** The Emergency Department

SEPTEMBER | 2024



**COVERYS**



**Q:** In the past year, has your emergency department experienced diagnostic errors related to:

- |   |  |
|---|--|
| <input type="checkbox"/> Infection/Sepsis                       | <input type="checkbox"/> Communication Failure |
| <input type="checkbox"/> CVA                                    | <input type="checkbox"/> Bias                  |
| <input type="checkbox"/> Fracture & Other Orthopedic Conditions | <input type="checkbox"/> Test Interpretation   |

If so, you're not alone. These are some of the most common diagnoses and points of diagnostic failure in emergency departments (EDs).

**This white paper is the first of a three-part series exploring diagnostic challenges in emergency, ambulatory, and hospital settings.**

**In this paper, we investigate:**

- How often diagnostic errors are occurring, and in which settings, based on data from closed malpractice claims.\*
- Why EDs are particularly vulnerable to diagnostic error.
- Where errors typically occur, and which diagnoses are most likely to be missed.
- Details about how diagnostic errors occur in infection, vascular, and orthopedic cases – the top three categories revealed by Coverys data.
- Recommendations to help reduce diagnostic errors in your ED.
- A self-assessment to help identify systems and educational opportunities.

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**AUTHORS**

**Dana Siegal**, RN, CPHRM, CPPS  
Vice President, Risk Management & Analytics

**Maryann Small**, MBA  
Senior Director, Risk Management & Analytics

**Susan L. Montminy**, EdD, MPA, BSN, RN,  
FASHRM, CPHRM, CPPS  
Director, Risk Management

**Marlene Icenhower**, BSN, JD, CPHRM  
Senior Risk Specialist

**Michelle Bondurant**, RN, CP  
Clinical Data Manager, Risk Management & Analytics

\*Coverys evaluated 6,050 events that closed between January 1, 2019, and December 31, 2023, and identified 436 specific events where a diagnostic error in the ED was alleged. Unless otherwise indicated, statistics and information in this publication were derived from this proprietary data.

## DIAGNOSTIC ERROR



# PAST INITIATIVES & PRESENT STATE

To err is human. This is not just an accepted truth – it’s also part of the title of the groundbreaking 1999 report<sup>1</sup> from the Institute of Medicine. The report found that roughly 98,000 people died every year due to medical errors in hospitals. Widespread media attention followed, sensationalizing the topic by focusing on who was to blame.

While the 1999 report put a spotlight on the topic of medical error, diagnostic error did not receive specific attention until the same organization released their 2015 report<sup>2</sup>, “Improving Diagnosis in Healthcare.” This report revealed that most patients experienced at least one diagnostic error in their lifetime, with sometimes serious consequences. Prior to this report, diagnostic error was largely unappreciated as a major cause of medical error.

Over time, as we’ve expanded our understanding of medical error, the focus has shifted from who to blame to deciphering why it occurs and promoting widespread acceptance that systems and interactions between systems and humans are key drivers of circumstances that can result in diagnostic error.

Many organizations have published guidance to help reduce errors related to diagnosis. For example, The Leapfrog Group<sup>3</sup> introduced a national initiative to identify best practices, create a roadmap for health systems, and survey hospitals’ progress. Others, such as Agency for Healthcare Research and Quality (AHRQ), expanded the TeamSTEPPS<sup>4</sup> principles to include a module on diagnosis, and research published by The Joint Commission<sup>5</sup> led to a checklist of 10 practices for diagnostic error reduction.

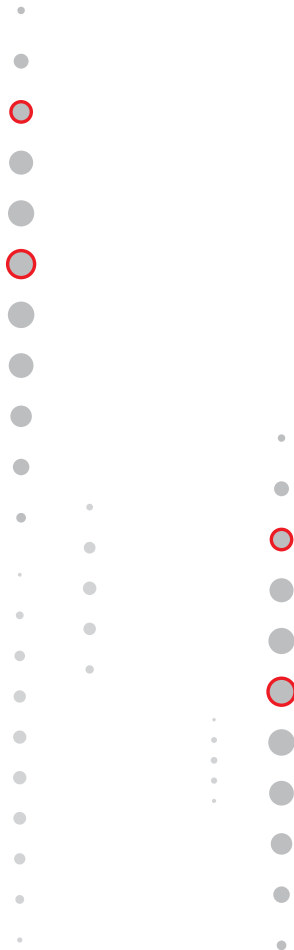
Despite these ongoing efforts, the challenge of diagnostic error persists. A 2019 study<sup>6</sup> reported that 795,000 Americans die or become permanently disabled due to misdiagnosis each year.

While the high-level clinical trends in malpractice events have remained unchanged, we now have a better understanding of contributing risk factors and mitigation strategies to reduce the incidence of diagnostic error.

### What is diagnostic error?

Diagnostic error is the failure to either establish an accurate and timely explanation of the patient’s health problem(s) or communicate that explanation to the patient.

-National Academy of Medicine



DIAGNOSTIC ERROR



# WHAT MALPRACTICE DATA REVEALS

Diagnosis represents a pivotal moment in a patient's journey. It is the decision that often determines the patient's course of treatment, the available interventions, and the possibility for a positive outcome.

Below are key facts related to diagnostic error across all settings, based on Coverys clinical claims data. It is important to note that our data is consistent with national data.

### How big is the problem?

Over a five-year period, diagnostic error contributed to 26% of Coverys medical malpractice claims yet accounted for 41% of indemnity paid.

### What are the consequences?

The consequences of diagnostic error are devastating. Patients, their families, and clinical care teams are physically, emotionally, and/or professionally harmed – in many cases, suffering heartbreaking losses. The financial impact creates significant burden for providers and the healthcare system at large. The five-year average indemnity paid for diagnosis-related events is \$627,000 – 50% higher than all other types of events.

### Where do diagnostic errors most often occur?

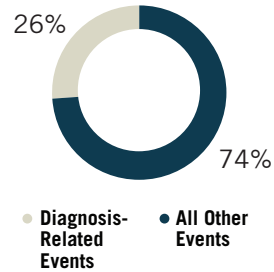
The highest percentage of diagnostic-related malpractice claims occur in ambulatory care settings. Emergency departments and urgent care clinics are the second-most frequent source of diagnostic-related claims.

### Does the clinical setting matter?

Yes, the diagnostic journey varies greatly depending on each setting's unique characteristics and dynamics. Risk mitigation strategies may vary based on the setting.

The subsequent pages of this report examine diagnostic error in the ED – the second-most frequent location for diagnostic error allegations, and quite possibly, the most complex setting for reaching an accurate diagnosis.

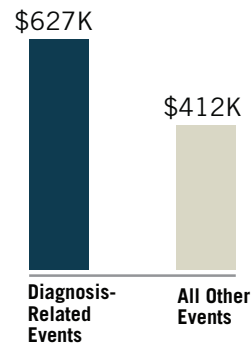
#### 26% OF MALPRACTICE EVENTS INVOLVED DIAGNOSTIC ERROR



N=6,050 events closed 2019-2023.

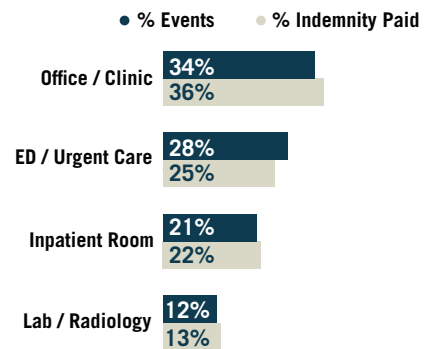
Top "Other Events" includes: Surgical, Medical, Medication Patient Safety, Obstetrics

#### AVERAGE INDEMNITY PAID



N=6,050 events closed 2019-2023.

#### TOP LOCATIONS FOR DIAGNOSTIC-RELATED EVENTS



N=1,610 diagnostic-related events closed 2019-2023.



# INSIGHTS FROM CLOSED ED CASES

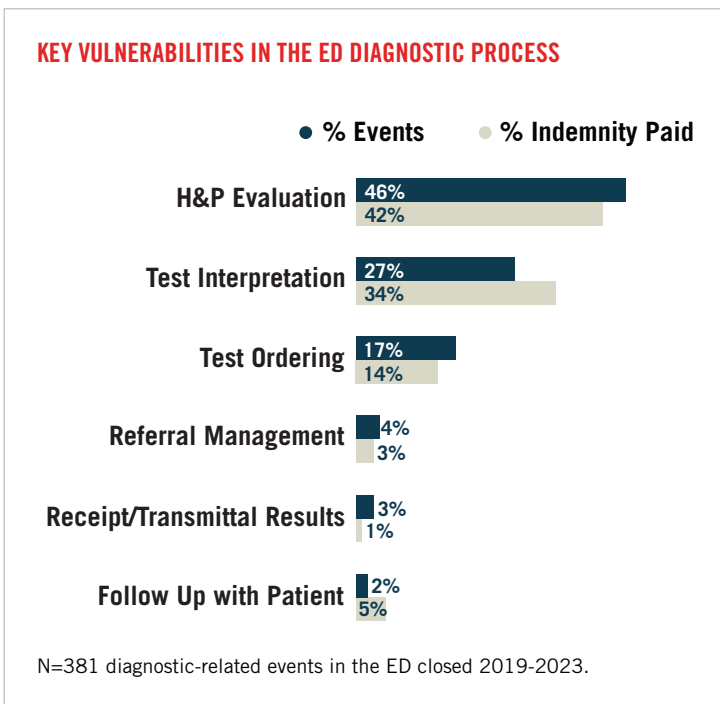
The diagnostic process of care involves a series of steps from evaluation of the initial patient presentation to the development of a working—and eventually final—diagnosis. Each step builds on the insights of the previous, a process that can be particularly challenging in the fast-paced and rapidly evolving environment of the ED. Coverys data from closed malpractice events reveals that the top two categories in the process of care that are most vulnerable to error involve patient assessment and test interpretation.

## Key vulnerabilities in the diagnostic process in the ED

Failure to obtain an adequate history and physical (H&P) is the most frequent contributor to diagnostic error in the ED, which is a critical prerequisite for establishing a complete differential diagnosis and ordering the correct tests.

## The devastating consequences of diagnostic error

Diagnostic error in the ED can have devastating consequences. Our data shows that that 52% of diagnosis-related events in the ED resulted in death (36%) or a high-severity injury (16%). Events involving death accounted for 51% of the indemnity paid.



52%

of diagnosis-related events in the ED resulted in death or high-severity injury.

### Injury severity definitions:

**High:** Major and permanent injuries that result in loss of function.

**Medium:** Injuries that can be resolved with a subsequent surgical procedure or medical treatment.

**Low:** Injuries that are minor and may require additional treatment but have no complications or long-term physical effects.

### Common myth:

There's a general belief that only the most severe events lead to claims. Our data reveals that 48% of malpractice events arise from low- and medium-severity cases.

A CLOSER LOOK

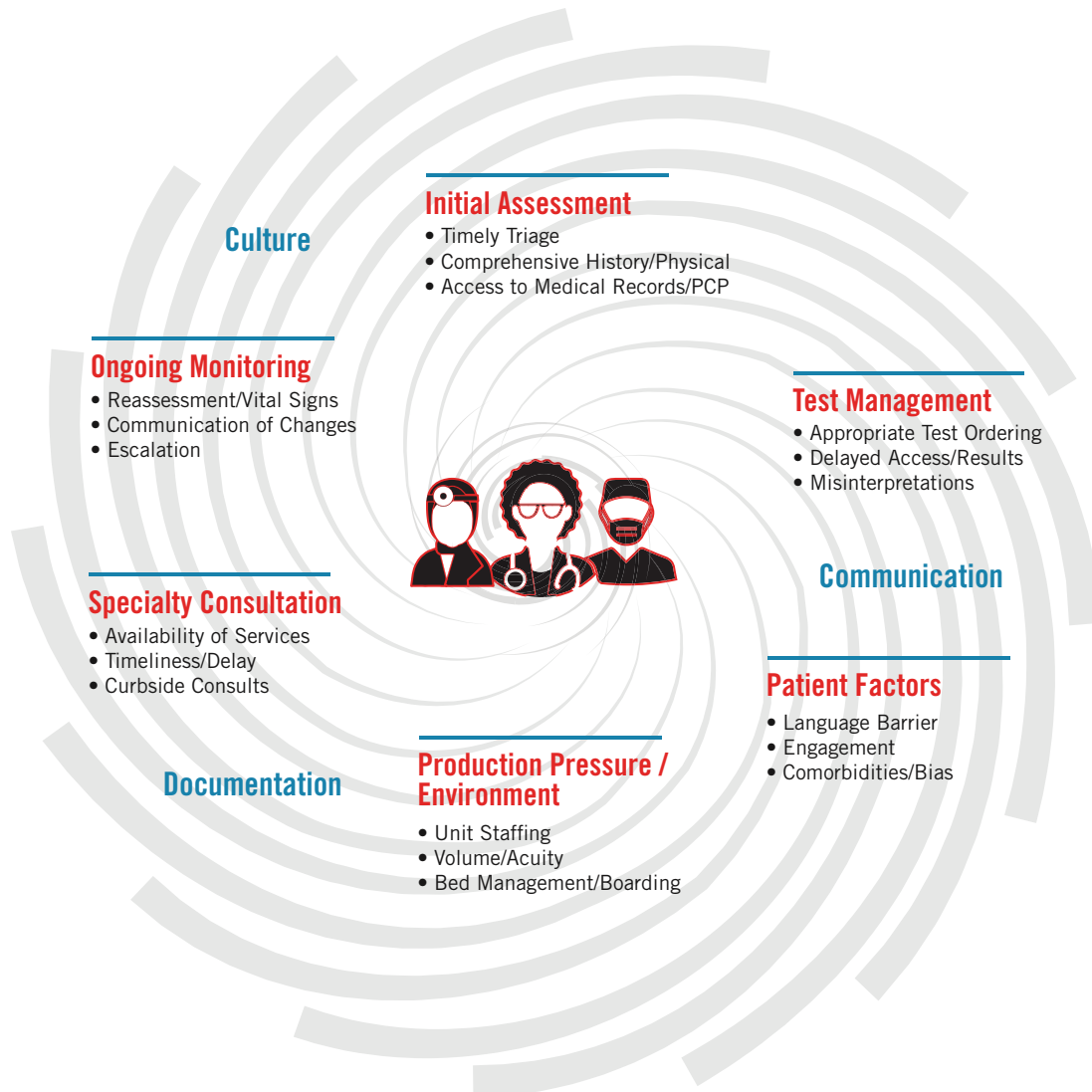


# WHY EDs ARE VULNERABLE

The diagnostic process is complex. Providers must gather, integrate, and interpret data and apply clinical judgment. ED care teams need to coordinate and communicate input from testing, ongoing assessment, and consultations. The diagnostic process can break down even in optimal settings, and ED environments are often far from optimal. Systems issues, combined with fast-paced, high-acuity environments, make EDs particularly vulnerable to error.

Chaos can contribute to diagnostic error, particularly when many medical encounters involve an incomplete medical history and disrupt collaborative processes and feedback loops.

Furthermore, some patients are discharged before test results are back, leaving voids in completing the diagnostic process. Additionally, some patients do not return when symptoms persist or worsen, so the feedback loop is never closed. **The chart below illustrates the many complexities facing ED care teams.**





## TOP ED VULNERABILITY



# CLINICAL DECISION-MAKING

Coverys malpractice data reveals that 67% of diagnostic-related events in the ED involved one or more elements of clinical decision-making.

Clinical decision-making is the very foundation of the diagnostic process, requiring the gathering and synthesis of information from numerous sources to determine all the possible causes of the patient's clinical presentation. While it is no surprise to find that 67% of diagnostic-related events in the ED involved clinical decision-making, uncovering the specific vulnerabilities within that process provides the insights needed to improve diagnoses.

### Coverys malpractice data reveals the following voids and failures in the decision-making process:

- Incomplete information gathering, such as lack of patient/family history.
- Insufficient consideration of differential diagnoses.
- Incomplete or delayed testing or results.
- Inaccurate test interpretation.
- Delayed consults or specialty care.

Clinical systems and communication are also key contributors to diagnostic failure – resulting in missing clinical data and test results, premature discharge, and delayed patient transfers.



67%

of events involve **clinical decision-making**.

19%

of events involve **clinical systems and communication**.



### Did you know?

Cognitive bias is recognized as a potential contributor to incomplete differentials and clinical decision-making. One study<sup>7</sup> found that 32% of 3,544 ED cases had elements of bias, e.g., anchoring or confirmation.

#### Key definitions:

- **Anchoring bias:** The tendency to perceptually lock on to salient features of the patient's initial presentation too early in the diagnostic process.
- **Confirmation bias:** Looking for confirming evidence to support a diagnosis rather than disconfirming evidence to refute it.

MISSED DIAGNOSES



# TOP CATEGORIES

Historically, myocardial infarctions (MIs) have been a key focus of misdiagnosis in the ED. However, recent Coverys data reveals that infection, vascular conditions, and orthopedic injuries are the top categories driving malpractice claims, and account for the largest portion of indemnity payments.

This finding may be the result of increased focus on ED cardiac management in recent years and suggests that similar improvements might be possible through focus on infection, vascular, and orthopedic conditions.

**These top two categories account for more than 40% of ED diagnostic error events:**

- ① Infection, sepsis, abscess.
- ② Cerebral vascular accident (CVA), pulmonary embolism (PE), and deep vein thrombosis (DVT).

While the clinical presentation of these two categories may be quite different, the potential for rapid decline makes them equally vulnerable to the same risks within the diagnostic process.

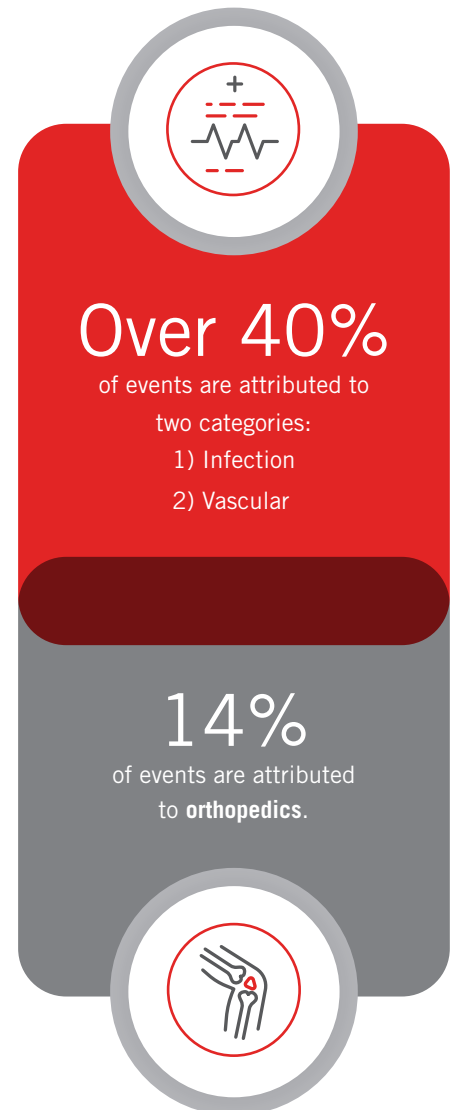
With both infections and vascular conditions, data must be consistently monitored for minor indications of potential decompensation. Warning signals may emerge anytime during triage, initial medical assessment, lab wait time, vital sign monitoring, or discharge.

Common points of error include communication breakdown between healthcare providers and delays in patient testing and transfer.

**The third-highest category for missed diagnoses is orthopedic cases, accounting for 14% of ED diagnostic error events.**

The dynamics for orthopedic cases may differ from the first two categories in that the patient's presentation is more often stable, though serious issues such as spinal fractures and compression injuries present the same risk of rapid decline. Diagnosis of orthopedic injuries requires careful assessment of the presenting injury, the mechanism of injury, and radiology findings, as well as clinical judgment.

Common points of error include misinterpretations resulting in missed fractures, delays in testing, overlooking secondary symptoms or findings, communication breakdown, and failure to communicate changes in the final read. On the following pages, we will explore these diagnostic categories in greater depth.





### TOP MISSED DIAGNOSTIC CATEGORIES IN THE ED

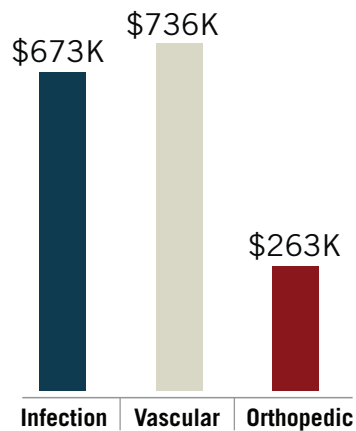
Infection	24%	Infection / Sepsis / Abscess
Vascular	18%	CVA* / PE* / DVT*
Orthopedic	14%	Fracture / Compartment Syndrome
Cardiac	12%	MI / Aortic Dissection
Cancer	9%	Lung / Brain / Kidney (Incidental Findings)

N=404 missed diagnoses in ED events closed 2019-2023.

An event can have more than one final diagnosis.

\*Cerebral Vascular Accident (CVA), Pulmonary Edema (PE), Deep Vein Thrombosis (DVT)

### AVERAGE INDEMNITY PAID FOR TOP 3 DIAGNOSTIC CATEGORIES



N=89 missed diagnosis events in the ED closed 2019-2023 with an indemnity payment.

OFTEN DISGUISED



# INFECTIONS & VASCULAR CONDITIONS

In situations involving infections and vascular conditions, every second counts, particularly during patient assessment. Inadequate data collection paired with cognitive bias or intuitive reasoning may lead to a narrow diagnostic focus, which, in turn, may lead to a cascade of missteps, such as ordering inadequate tests or errors in interpretation. Without close monitoring, a patient’s condition may deteriorate rapidly.

Patient presentation of infection is varied, which can complicate diagnosis. For example, pneumonia may cause different symptoms, appear differently on chest X-rays, and respond differently to antibiotics. Elderly patients and those with comorbidities can be particularly difficult to diagnose.

Although misdiagnosis of infections and vascular conditions is common, systems and safeguards can help.

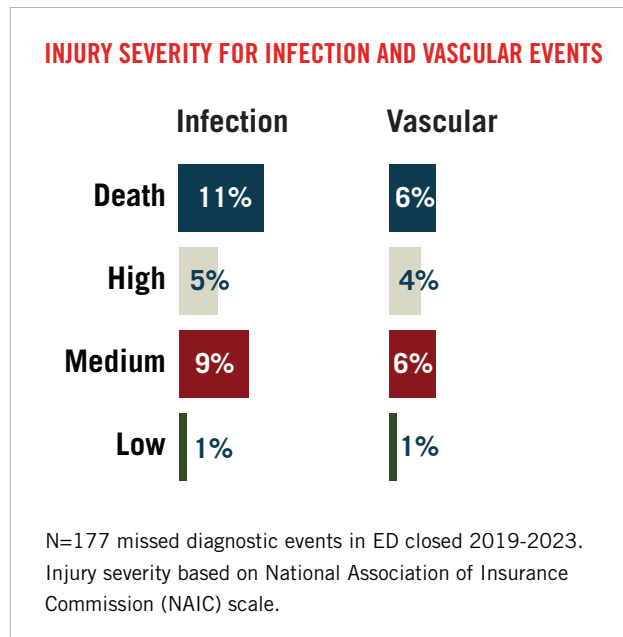
### Providers can also reduce the potential for misdiagnosis by:

- Taking a complete and accurate history that includes comorbidities.
- Staying alert for diagnostic bias.
- Ensuring continuous, concurrent monitoring.
- Communicating as a patient’s condition evolves.
- Escalating exploration as indicated by monitoring.
- Taking discharge vital signs to check for evolving symptoms.



### Key questions to consider:

- Could the condition be more serious than it seems?
- Has the condition changed in response to treatment?
- What other conditions may be causing the symptoms?





## CASE STUDY #1: Infection Case Gone Wrong

Delayed sepsis diagnosis and multiple handoffs result in teenager's death.

A teenage patient presented to the ED for complaints of abdominal pain and fever. Lab work was ordered, and IV fluids were administered. The abdominal CT scan was normal. An additional three liters of IV fluids were given. The blood pressure remained low, but the patient was discharged with an antibiotic for a possible UTI.

The patient returned to the ED that same day with worsening symptoms. A chest X-ray revealed pneumonia. To assist with the differential diagnosis, which included sepsis, the physician wanted a gallbladder ultrasound that was unavailable at the hospital.

The patient was instructed to proceed to another hospital for the ultrasound. The patient presented to the receiving hospital with tachycardia, hypotension, and a low O2 sat. The gallbladder ultrasound was normal. A chest CT revealed multifocal pneumonia.

The patient remained hypotensive and was admitted to the ICU with a diagnosis of septic shock pneumonia. The patient died a few days later. The blood culture results and autopsy revealed a rare *Fusobacterium* infection.

STUBBORNLY ELUSIVE

 **ORTHOPEDIC CASES**

As the third-largest category of diagnostic error, orthopedic cases typically involve a partnership between the ED and radiology teams.

In fact, Coverys data reveals that 16% of the diagnostic errors related to orthopedic cases in the ED involved radiology. Of those cases, 88% involved misinterpretation of the diagnostic study.

Additional issues involve failed assessment and/or communication of the test results including follow-up post-discharge if the final read is different than the initial interpretation, e.g., confirms a fracture.

A key vulnerability involves aligning symptomatology and patient assessment findings with test results. If it looks like a fracture and feels like a fracture, it's a best practice to treat the injury as a fracture until proven otherwise.

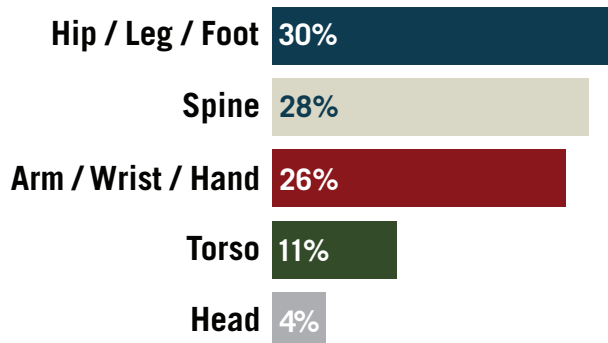
In the fast-paced environment of the ED, cognitive bias can surface and influence clinical decisions, creating additional vulnerabilities.



**Key questions to consider:**

- Could the condition be more serious than it seems?
- Has the condition changed in response to treatment?
- What other conditions may be causing the symptoms?

**DISTRIBUTION OF ORTHOPEDIC INJURIES**



N=53 orthopedic injuries for diagnostic ED events closed 2019-2023.



**16%**  
of orthopedic events

**AND**

**21%**  
of indemnity payments  
involved a radiology issue.





## CASE STUDY #2: Orthopedic Case Gone Wrong

Compartment syndrome leads to permanent disability.  
Could anchoring bias be involved?

A patient had surgery to repair a fractured tibia/fibula and was discharged home the next day. The patient returned to the ED on post-op day three with severe pain, fever, and numbness throughout the foot and leg.

A PA examined the patient and immediately suspected compartment syndrome. The consulting orthopedic surgeon, who did not physically examine the patient, concluded via text message communication that the patient had cellulitis.

The same orthopedic surgeon arrived four hours later to examine the patient and still concluded that the patient had cellulitis. Later that night, the patient developed increasing pain and numbness and was taken to surgery. A fasciotomy was performed revealing dusky muscle from compartment syndrome and peroneal nerve palsy.

This young patient suffered necrosis of the entire anterior compartment of his lower leg requiring multiple surgeries and permanent disability.

SELF-ASSESSMENT TOOL



# IDENTIFYING YOUR VULNERABILITIES

Our in-depth review of ED malpractice cases uncovered key vulnerabilities in the care process that contribute to diagnostic error and harm. The following self-assessment identifies crucial best practices that address the contributing factors identified in our data. How consistently does your ED follow the data-driven recommendations in each of these areas?

**History & Physical (H&P) and Test Ordering:** Complete and timely information for full assessment.

Always   Sometimes   Unsure

- |                          |                          |                          |  |
|--------------------------|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Our <b>H&amp;P process</b> requires gathering and documenting relevant clinical information from the patient, family, other providers, and medical records when indicated. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Our team communicates <b>sufficient clinical data to radiologists</b> so they can achieve the best imaging and accurate interpretation of the findings.                    |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | We have a process for monitoring <b>timeliness of test results</b> , including standard practice for reporting critical and emergent results.                              |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | We have a clear process for communicating <b>incidental findings</b> to ensure providers and patients are properly notified.   |

**Diagnostic Processing and Differential:** Robust differential diagnosis, free from cognitive bias.

- |                          |                          |                          |  |
|--------------------------|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | We have established specific <b>clinical pathways for high-risk presentations</b> , such as infection, stroke, and MI, and review them regularly to ensure adherence.                                  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | We have access to and have optimized the use of <b>decision support tools</b> to assist with the differential diagnostic process and documentation.  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Our team has a process, such as a <b>diagnostic timeout</b> , to ensure all data/input is reviewed and all possibilities/team perspectives have been considered before a final diagnosis or discharge. |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Our team recognizes the potential for <b>cognitive bias</b> to limit the differential diagnosis and is comfortable raising concerns about such pitfalls as anchoring or confirmation bias.             |

**Ongoing Monitoring:** Consistent reassessment and escalation for change/decline in status.

- |                          |                          |                          |  |
|--------------------------|--------------------------|--------------------------|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | We have a standard process for <b>monitoring and communicating</b> repeat vital signs and other clinical data.   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | We have a defined practice for <b>communicating and escalating</b> changes in patient status and/or decompensation.  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | We have a robust <b>culture of teamwork</b> and communication in which team members feel comfortable speaking up, identifying diagnostic red flags, and escalating lack of treatment response. |

**Discharge and Follow-Up:** Clearly expressed plan for follow-up communication/next steps.

- |                          |                          |                          |   |
|--------------------------|--------------------------|--------------------------|---|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Our policies and procedures require <b>reassessment and recording of vital signs</b> prior to discharge.  |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Our <b>discharge instructions</b> are written in plain language and include findings and specific instructions for follow-up and return instructions for unresolved and worsening symptoms.   |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | We follow a standard process for <b>communicating findings</b> when results are received (or updated) after patient discharge, including establishing specific contact information for patients who lack a fixed address, phone number, or email address. |

## LEADING CHANGE



# ELIMINATING THE HIDDEN DRIVERS

Using insights revealed by this self-assessment tool, your team can expose and begin to eliminate the hidden drivers of diagnostic error in your ED.

Leading this change will involve identifying your ED's unique vulnerabilities and implementing new protocols. It will require the commitment of the entire care team working together to implement solutions with consistent monitoring, continual adjustments, and ongoing vigilance.

While this effort won't be easy, it will be worthwhile. When you eliminate the drivers of diagnostic error, you will help reduce the harm experienced by patients, their loved ones, and their care teams. You will also help stem the tide of exorbitant medical practice liability costs and nuclear verdicts – and their impact on the ever-increasing cost of healthcare.

## Five Key Steps

1

### RAISE AWARENESS

Share this report to educate your team on the prevalence of diagnostic error, its causes, and how it can be prevented.

2

### KNOW YOUR DATA

Become a data sleuth. Ask for a review of your adverse event, patient experience, and culture safety data. Set measurable goals for improvement.

3

### ENLIST AND ENGAGE

Develop champions to vigilantly lead change, continually improving your most vulnerable areas.

4

### EVALUATE AND MONITOR

Stay on track, monitoring and sustaining best practices and holding teams accountable.

5

### CONTINUOUSLY ADAPT

Continuously adapt your practices to address emerging exposures. Monitor metrics to avoid complacency.

Case studies and other patient examples shared in this publication are derived from actual malpractice claims with identifying details removed or altered to protect the anonymity of patients, families, healthcare providers, and healthcare organizations. The information in this report is intended to provide general guidelines for risk management. It is not intended as, nor should it be construed as, legal or medical advice.

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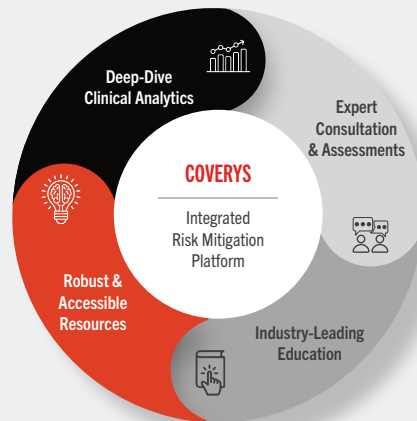
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*Insurance products provided by Medical Professional Mutual Insurance Company and its subsidiaries.*

1. Institute of Medicine, “To Err is Human: Building a Safer Health System” <https://pubmed.ncbi.nlm.nih.gov/25077248/>
2. Committee on Diagnostic Error in Health Care; Board on Health Care Services; Institute of Medicine; The National Academies of Sciences, Engineering, and Medicine. “Improving Diagnosis in Health Care” <https://www.ncbi.nlm.nih.gov/books/NBK338596/>
3. The Leapfrog Group, “Recognizing Excellence in Diagnosis” <https://www.leapfroggroup.org/news-events/patient-safety-watchdog-leapfrog-group-funded-national-initiative-preventing-harm>
4. Agency for Healthcare Research and Quality, “TeamSTEPS for Diagnosis Improvement” <https://psnet.ahrq.gov/issue/teamsteps-diagnosis-improvement?>
5. The Joint Commission, “Safety Recommendations to Address Diagnostic Errors” <https://www.jointcommission.org/resources/news-and-multimedia/news/2022/10/safety-recommendations-to-address-diagnostic-errors/>
6. BMJ Journals, “Burden of Serious Harms from Diagnostic Error in the USA” <https://qualitysafety.bmj.com/content/33/2/109>
7. Candello, “Diagnostic Error: The Big Three – Vascular Events, Infections, and Cancer” <https://www.candello.com/Solutions/Convening/Webinars/Dx-Error-Big-Three-Webinar>