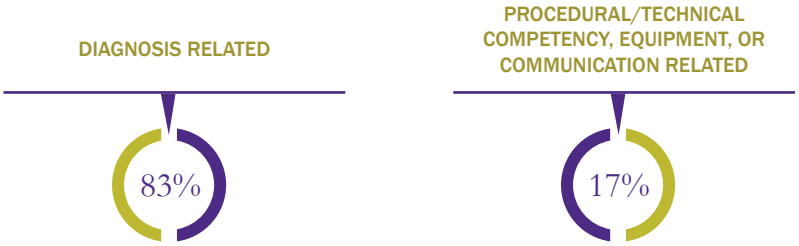
LEVERAGING DATA:

A Focused Review of Radiology Closed Claims

Radiologists make up approximately 3.6% of the U.S. physician population. However, a review of national closed claims data reveals that radiologists rank 6th among all specialties as the most frequently named defendant in medical malpractice claims.[1] In "The Causes of Medical Malpractice Suits against Radiologist in the United States", Whang et al., concluded that errors in diagnosis is the most common general cause of malpractice claims against radiologists.[2] The most frequently missed diagnosis was breast cancer, followed by non-vertebral fractures and spinal fractures. Communication failures and failure to recommend additional testing were the most frequent contributing factors for filing a lawsuit.

In this review, the analysis of the Cooperative of American Physicians, Inc. (CAP) Radiology Closed Claims data, 2006-2015, will provide a snapshot of factors contributing to diagnostic errors and offer suggestions on how to improve the practice of radiology with an eye toward improving patient outcomes and avoiding malpractice claims.

Summary of Findings (Radiology Claims):



CAP CLOSED CLAIMS DATA			
TOTAL CLAIMS REVIEWED 68	INDEMNITY LOSS	TOTAL EXPENSES	TOTAL INCURRED
DIAGNOSIS RELATED	$17.5M (97%)	$3.1M	$20.6M
PROCEDURAL/TECHNICAL COMPETENCY, EQUIPMENT, OR COMMUNICATION RELATED	$585K	$462K	$1.047M
CAP AVERAGE			
TOTAL AVERAGE FOR ALL RADIOLOGY	$220,275	$43,404	N/A

In This Data Study...

This study delves into the analytics of claims against CAP radiologists (radiology includes diagnostic radiology, nuclear medicine, and interventional radiology).

The analysis looks at closed radiology cases which resulted in an indemnity payment, between 2006 and 2015. This range is parallel to the national Medical Professional Liability (MPL) Association (formerly PIAA) data[3] for the same period, allowing for a comparison of CAP's experience to national averages.[4]

Over the selected period there are 68 radiology cases in which an indemnity payment was made, in contrast to MPL Association, with 1,826 events. Hence, our data represents 4.4% of the national dataset for radiology closed claims in the MPL Association's database (2006-2015).

This review notes a number of hidden variables that might influence the origin of the claim that cannot be accounted for. Such individualized elements are workload, staffing, provider specific conditions (i.e., exhaustion/stress/divorce), institutional metrics and directives driving costs, and funding of new and current technologies and diagnostic software and upgrades, to name a few. We address those in our proposed risk reduction strategies.

According to the MPL Association data study 2006 – 2015, radiology data study:

AVERAGE INDEMNITY FOR RADIOLOGY CLAIMS	$389,687 *(higher than CAP's average)*
AVERAGE INDEMNITY HAS DROPPED	↓ 9%
CAP'S AVERAGE INDEMNITY HAS DROPPED	↓ 8%

Diagnostic Error is the Primary Allegation against Radiologists

Diagnostic error is a recurring theme in a majority of claims against radiologists—both nationally and within the Cooperative of American Physicians, Inc. (CAP). CAP's analysis found that allegations of missed or delayed diagnoses accounted for 83% of the cases analyzed. This figure is significantly higher than the national average of 54%. (We are unable to offer an explanation of why CAP's experience significantly differs from the national experience.)

Neither the national nor CAP data point to a single causative factor leading to diagnostic errors. It is not surprising, as multiple factors would logically impact quality and accuracy of an interpretive diagnosis, including the ordering physician requesting the wrong study, reliance on poor quality images, and the radiologist's technical or judgment errors. What the analysis demonstrates is that a diagnostic error can have devastating consequences for the patient and medical providers involved in the care. Consider this example:

CASE STUDY

Less Than Adequate Study

A 26-year-old female arrived in an ER tremulous, with blurred vision and a heart rate over 160. Motor and sensory function was normal. Fearing a possible stroke, the ER physician ordered an MRI of the brain. The image, interpreted by the radiologist, was limited "due to motion artifact." The report noted no acute infarct and no obvious hemorrhage or mass. The patient was admitted to the floor and then to the ICU as she deteriorated. She was seen by hospital intensivists and neurology but no one considered stroke since it had been ruled out previously. A follow up study the following morning identified an infarct in the pons that upon review was present in the initial study.

In this case, the initial radiologist provided a report based on a less than adequate study, and all subsequent treating physicians relied on that read, to their and the patient's detriment. The patient was diagnosed with Locked-in syndrome (LIS) and the case resulted in a settlement in excess of $30 million! This case is an example of an unfortunate reality related to radiology claims: many of them involve high severity injuries and thus result in significant liability payments.

CAP DATA
Types of Diagnosis Related Cases

25% Involved cancer

11% Alleged missed or delayed diagnosis of breast cancer

12% Alleged missed or delayed diagnosis of lung cancer

7% Alleged missed fracture

THE CAP RADIOLOGY DATA DIVE FINDINGS REVEAL that high severity injury cases account for 38% of all radiology claims with an indemnity payment, and account for 52% of all paid radiology claims.

CAP DATA

HIGH SEVERITY INJURIES 38%	TOTAL INDEMNITY $91M	DIAGNOSTIC ERRORS
High severity injuries accounted for 38% of total radiology claims • Death • Stroke • Paraplegia • Hemiplegia	Total indemnity paid in high severity cases • 52% of the total indemnity paid in radiology claims	Diagnostic errors with high severity injuries • Female breast neoplasm • Pulmonary/ thoracic neoplasm • Evolving stroke/ brain infarcts

The Role of Communication Failures

In several of the cases we reviewed, communication failures played a pivotal role. Communication failures can occur at either end of the radiology spectrum. We see cases in which the interpreting radiologist's interpretation is detrimentally impacted by a lack of available information. Often, the radiologist is not provided meaningful clinical history or earlier studies for comparison purposes, which can result in a failure to interpret findings in the context of the clinical presentation, or a too-narrow focus and interpretation that isn't adjusted for the clinical presentation. This omission can lead to an improper interpretation and an eventual mismanagement of the patient's clinical course. In the following case, the radiologist was not provided with the patient's full clinical history and reason for the ER visit, but instead was provided only with an order and secondary symptom. A chief complaint or review of the medical record may have changed the final interpretation in this case.

CASE STUDY

Lack of Meaningful Clinical History

Patient comes to the ER after he awoke from a nap with fever, malaise, head, neck, shoulder and back pain. A lumbar puncture performed was negative. A chest X-ray, one view, was ordered, listing the reason for the film as "cough". The film was read as negative. Patient was feeling slightly better and was discharged. Subsequent to discharge, patient presented to the PCP four months later with continued back and arm pain. He had diminished range of motion and a new X-ray revealed bilateral shoulder dislocation and a fracture of the humeral head. The patient alleged failure to appreciate bilateral shoulder dislocations and a fracture of the right greater tuberosity when interpreting a chest X-ray. There was no question that the bilateral dislocations were apparent on the original X-ray, and patient received a settlement of $500,000.

At the other end of the communication spectrum we see cases where the radiologist properly interprets the images presented, but fails to ensure that the report reached the appropriate physician or patient.

CASE STUDY

Failure to Communicate Findings

Patient falls off a ladder and complains of ankle and back pain in the ER. CT of ankle is read by ER doctor as showing no fracture. Patient is discharged with diagnosis of sprain. Subsequent to discharge, film is reviewed by radiology and an acute fracture of the calcaneus is noted. Facility policy requires direct notification to patient if radiology review differs from ER review. Neither the ER physician nor the patient is notified of the discrepancy. Weeks pass before another film is eventually ordered and the diagnosis is made. Patient sued for delay in diagnosis and received a settlement.

Other communication issues noted in the cases reviewed include: failure to recognize "incidental findings" (IUD and ET placement errors) and failure to report "STAT" studies physician-to-physician.

Communication failures were found in at least ¼ of all cases reviewed, including those with diagnostic errors. The communication breakdowns included communication among providers regarding the patient's condition, communication between provider and patient/family, and inadequate informed consent for invasive procedures. Some cases often had multiple communication factors identified.

INTERVENTIONAL RADIOLOGY

CAP's closed claim analysis identified 14 cases involving interventional radiology. Nine of those cases (64%) involved interventional technique with unrecognized complications. Examples include perforations and inadvertent arterial cannulizations.

Workload, continued skill development and collaboration with peers, adequate rest, Continuous Quality Improvement (CQI) reviews, cognitive bias, and a state of situational awareness are ever-present issues across the healthcare spectrum. Building strong systems which identify diagnostic failures begins with ensuring a CQI process, open communication, and a culture of safety.

Primary Contributing Factors to Radiology Claims

Through claims analysis, we can identify areas to improve the medical diagnostic process. Interpretation errors and provider communication failures are two of the largest areas of claims involving radiologists. By analyzing Medical Professional Liability (MPL) claims, we have learned the specific trends and patterns which contribute to diagnostic failures and communication issues.

Communication Failures

The MPL claims and risk management experts have identified radiology as a specialty with an inherent risk of communication gaps and failures as the origin of injury and claims. Often, a radiologist is asked to interpret an image in the absence of known but unavailable prior studies, and without adequate patient history and basis for the radiographic service. Both of these elements need to be addressed to produce a meaningful reduction in patient harm associated with an information vacuum.

Communication issues may be addressed from a process and systems design perspective in both the pre- and post-study environments.

A Pre-imaging communication:

Require key clinical information from the ordering physician with pertinent medical history and co-morbidities. In simple terms **no data = no study**.

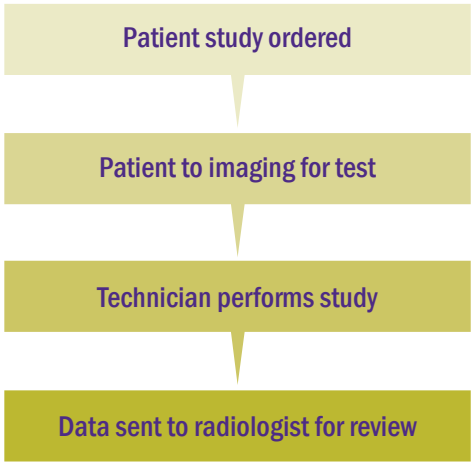
B Post-imaging communication:

Establish a process for communicating significant, high-risk, and critical test results. Develop a process to capture and document turnaround time for results; specific method of communication for all studies with a triage hierarchy prioritizing urgent and critical results to the relevant parties in the communication pathway: providers, patients, and/or nursing units.

Many institutions are moving in this direction with EHR systems, delivering clinical data to radiology departments as part of the ordering process. Digital availability of prior studies is improving access to comparative analytics. Most of these changes are institutionally driven (i.e., Kaiser/hospital systems) vs. part of the mainstream culture within radiology and non-institutional healthcare settings. It is not yet an integral element of required clinical data in every institution or with freestanding imaging centers performing, for example, mammograms under contract with an IPA. We recommend radiologists working in facilities without these protocols seek to have them implemented.

Workflow Challenges

Some of the process in diagnostic radiology workflow presents risk in its operations as it places the radiologist at the end of the line:



In this workflow structure the radiologist is at the end of the process, after the patient is gone from the imaging arena. This is a classic pattern in “teleradiology” and “nighthawk” services.

By placing the radiologist at the front of the process armed with relevant clinical information, the ability to assess the best diagnostic tool for the intended purpose is enhanced. We suggest this may be achieved through process and systems design. For example, the patient with a screening mammogram order with positive genetic markers for breast neoplasm and a family history of breast cancer goes to MRI. The intake order process does not allow mammography as an option. Such designs envision and require clinician participation in development.

System Failures

We know that radiologists have little control over the healthcare system but opportunities exist to address the diagnostic challenges by using a systems approach. In other industries, it has been found that simple task errors occur at a rate of 1:1000. It has also been determined that if someone else inspects the task performed, the error rate in technical areas of human performance jumps to 1:1M[5]. Using this information, we could theorize that a double review standard for certain radiologic tests would reduce the diagnostic error rate significantly. Hence, high risk categories prone to produce significant injury, such

as missed diagnosis of neoplasms, could benefit from what is commonly referred to as "blind double reads."

Technology

Radiology is a technological specialty using both sophisticated hardware and software designed to enhance identification of neoplasms and conditions. Equipment upgrades and software variants can be costly but required. Institutions generally have the financial power to fund hardware and software upgrades, while small facilities and freestanding imaging centers do not.

As technologies evolve, the ones that prove to be superior performers towards the greatest chance at diagnostic success ought to evolve to being the standard vs. lesser expensive but more error-prone options typically preferred by payers such as the health insuring HMO/PPO realm.

Technical & Skill Deficiencies

Challenges in this category are difficult to address, as by definition it involves clinical competency. Still, proctorship and mentorship in skill development are likely the preferred strategies of an experienced radiologic skillset to any given procedural need. Evidence-based guidelines are evolving across the specialties, including interventional radiology. Use of navigational tools such as fluoroscopy or ultrasound may reduce the frequency or delays in complication recognition.

Risk Interventions/Recommendations

Strong patient safety and risk management strategies are an important part of a radiologist's practice. Risk management implementation should focus on:

1. Establishing a robust Continuous Quality Improvement (CQI) review and learning from outcomes of diagnostic, skill related, and communication breakdowns that result in diagnosis failure or delay, and/or weakness in clinical judgment. It is important to measure performance, and:
   a. Identify articles, presentations and/or radiologic case studies which pose the greatest learning opportunities.
   b. Recognize cases studies with diagnostic challenges.
   c. Review case studies with:
      - Failures to perceive (narrow diagnostic focus) and misinterpretation
      - Lack of communication with referring provider.
2. Focus risk management and patient safety opportunities on:
   a. Development of standard processes for communication between referring provider and radiologists.
   b. Provide expectations for information needed prior to imaging.
   c. Increase focus on Narrow Diagnostic Focus/Cognitive Bias.
   d. Create a clear process for communicating findings.

[1]PIAA MPL Specialty Specific Series Radiology, 2006-2015
[2]Whang et al. The Causes of Medical Malpractice Suits Against Radiologists in the United States. Radiology, 2013; 266 (2): 548-554.
[3]PIAA Radiology Specialty Specific Series; 2016 Ed
[4]PIAA data does not adjust for venue specific tort reforms insofar as reported indemnity or expenses.
[5]Smith, J. David. Reliability, Maintainability and Risk. 7th Edition, Elsevier, 2005. (Extracts from Appendix 6).

Tools and Resources:

Cooperative of American Physicians
www.capphysicians.com

American College of Radiology
www.acr.org

Medical Board of CA
www.mbc.ca.gov

Society to Improve Diagnosis in Medicine
www.improvediagnosis.org

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