covera health

WHITEPAPER

Misguided from the start—
The critical impact of radiology misdiagnosis on healthcare's highest-spend categories

Table of Contents

Misdiagnosis—a problem with life-changing consequences

"I literally wept with relief at finally having a diagnosis, an intelligent physician and a drug to manage my symptoms."

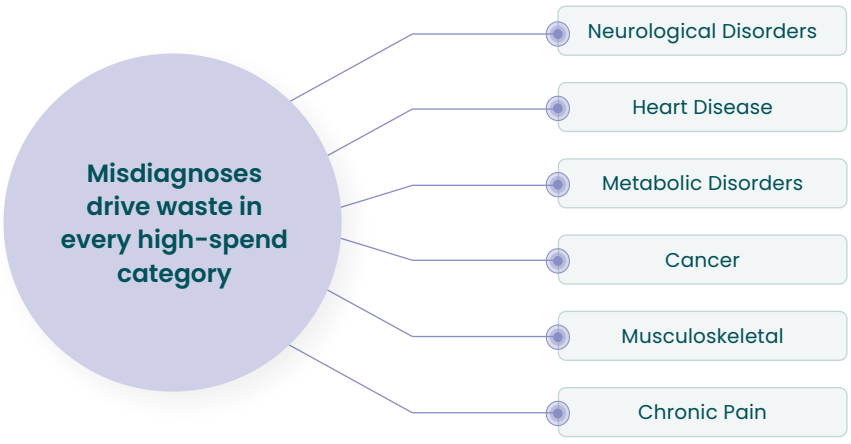
-Lorri Devlin

All her life, Lorri Devlin thought she was just "nervous," suffering from intermittent bouts of extreme anxiety. Often she'd wake up having bitten her lip in her sleep; other times she felt waves of terror rush over her, thinking she might be about to die. These episodes, recounted in the Washington Post, started in early childhood and were initially diagnosed as panic attacks. But seeing a therapist and taking medication for anxiety only helped so much.

For most of her 60 years of life, Lorri thought her condition would never improve. Then, in April 2017, something happened that would change everything. On a flight home from a vacation, she "fainted" inflight. Shortly thereafter, an expert at Boston's Beth Israel Deaconess Medical Center, identified her symptoms as consistent with temporal lobe epilepsy. She began taking medication for the condition, and immediately improved.

"I literally wept with relief at finally having a diagnosis, an intelligent physician and a drug to manage my symptoms," she told the Washington Post. But she also harbored anger over being misdiagnosed for more than 50 years.

Clinically-significant radiology misdiagnoses increase downstream costs up to 250%[2]



While most stories aren't as dramatic as Devlin's, misdiagnosis is surprisingly common—and often very costly, leading to unnecessary tests and expenses, suboptimal or wrong treatments, and, in the worst cases, morbidity and mortality.

A surprisingly common problem

According to a 2015 report by the National Academy of Medicine, nearly everyone will experience a clinically significant diagnostic error in his or her lifetime.[3]

Overall, the rate of missed, incorrect, or delayed diagnoses is estimated to be as high as 10 to 15%.[4] Postmortem examinations show that diagnostic errors contribute to approximately 10% of all patient deaths, and 6 to 17% of adverse events in hospitals.[3]

That helps to explain why misdiagnoses are estimated to account for 40,000 to 80,000 deaths each year in US hospitals alone, and likely just as many cases of nonlethal disability.[5-7]

Perhaps unsurprisingly, many patients are aware of the risk of misdiagnosis and actively worry about the consequences.

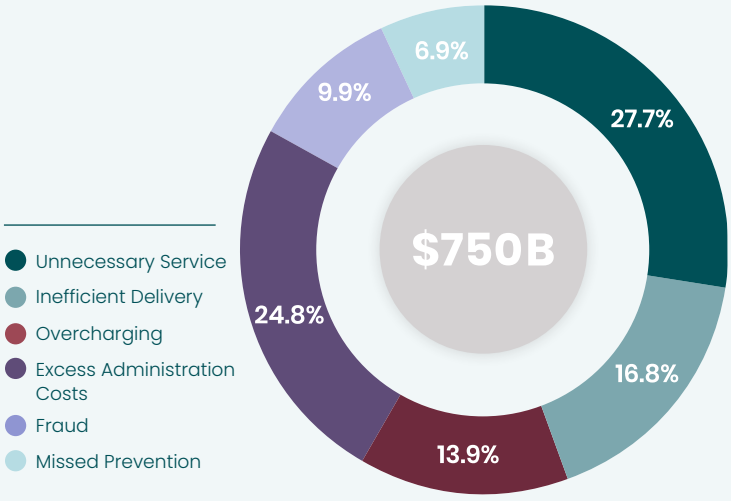
In one survey of more than 2,000 patients, 55% reported that the possibility of a diagnostic error was their chief concern in seeing a doctor in an outpatient setting.[8]

And medical misdiagnoses contribute significantly to $750 billion in wasted US healthcare spending each year.[3] About one-half is attributable to inefficient delivery of care—or delivery of the wrong care—to patients. Patients like Lorri Devlin.

Overall, the rate of missed, incorrect, or delayed diagnoses is estimated to be as high as 10 to 15%[3]

Driving wasted healthcare spending

An estimated one-third of healthcare dollars are wasted. Much of that is attributed to inefficient delivery of care or delivery of unnecessary care to patients—both possible consequences of misdiagnosis.[3]



$750 Billion of annual healthcare spending is wasted.[3]

National Academy of Medicine 2015. Improving Diagnosis in Health Care. Washington, DC: The National Academies Press. https://doi.org/10.17226/21794.

Addressing the complexity of misdiagnoses

Challenges of studying the issue

Given their prevalence and impact on downstream care, understanding how misdiagnoses arise and how to reduce them is critical.

Regardless of their source, misdiagnoses can distort all treatment decisions that follow.

Identifying the Source of Errors

Errors happen across a wide variety of settings, from hospitals, and nursing homes, to labs, imaging centers and various other outpatient locations, complicating data collection. The diagnostic process can involve many different touchpoints and personnel, which can be difficult to parse for the source of a medical misdiagnosis.

Overcoming Disparate Data

It is also challenging to aggregate and compare data that come from very different modes of inquiry (e.g., post-mortem examinations, patient interviews, medical records).

Coordinating Ongoing Research

Without intentional, retrospective analysis, errors often go unnoticed.[1] "Not surprisingly, available research estimates were not adequate to extrapolate a specific estimate or range of the incidence of diagnostic errors in clinical practice today," the National Academy of Medicine noted. "Even less information is available to assess the severity of harm caused by diagnostic errors." Unfortunately, the situation will not improve without a concerted effort, the report concluded.

> "Without a dedicated focus on improving diagnosis, these errors will likely worsen as healthcare delivery and the diagnostic process continue to increase in complexity."
>
> *-National Academy of Medicine*

Diagnostic errors in radiology

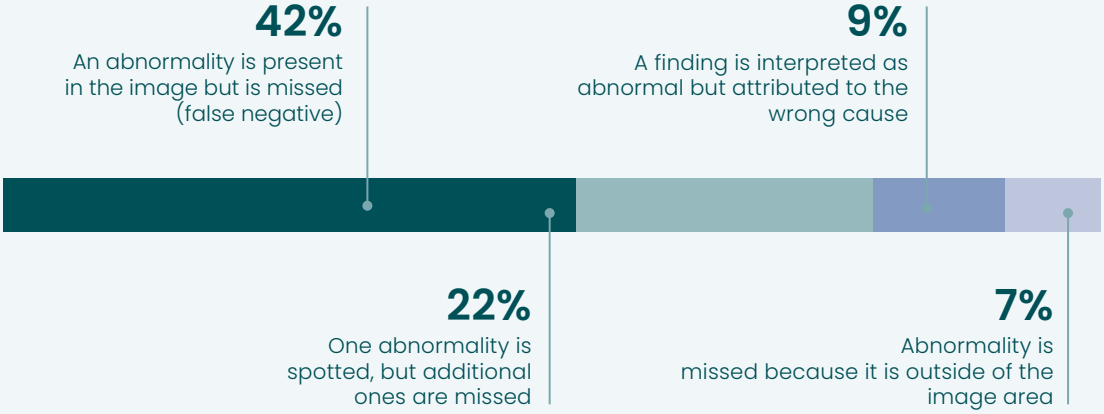
Radiology determines the effectiveness of all downstream specialties.

Utilization of medical imaging grew >70% from 2000 to 2009, surpassing all other medical categories and accounting for over $100 billion in direct spending per year.[10-11] Due to the foundational nature of imaging in modern medicine, a delayed, missed, or incomplete radiology diagnosis can distort the entire patient journey.

Though radiologists have an average operational error rate of only 3% to 5%, retrospective studies of more avanced imaging technologies such as MRIs and CT scans have found error rates of 30% or more for complex diagnoses.[12] Similarly high error rates have been seen in many other techniques in radiologic practice as well, including: sonography, angiography, thallium radionuclide heart scans, and radiologic studies involving trauma.[13] In screening mammography for breast cancer, false positive rates of up to 61% have been reported—a significant concern, considering that there were more than 30 million such mammograms performed in the US in 2012.[14]

In some cases, a lack of subspecialization or experience on the part of the reading radiologist may be the issue, contributing to the types of interpretative errors outlined below.

Types of radiological errors[15]



Variation between imaging centers

In a novel, 2017 study published in The Spine Journal, researchers sent one patient with back pain to 10 different centers for the same low-back MRI. Not a single finding was reported unanimously across all 10 reports.[16]

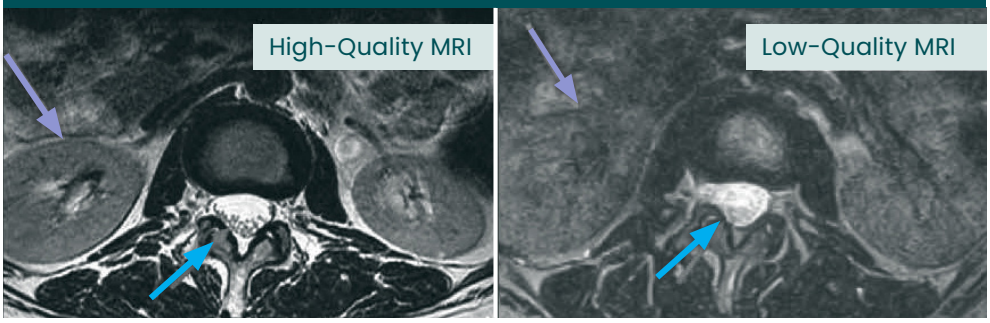
Comparison of the results to a consensus diagnosis by the study authors revealed high variability among centers, with a 44% average interpretive error rate across reports.[16] Such high rates of variation suggest that 2 patients with the same underlying issue could be steered to vastly different treatment plans, based solely on their choice of imaging center.

The study belies the common but mistaken view of radiology as a commodity with no meaningful differences in quality, a misconception that has led many patients and payers to select imaging centers based primarily on price, convenience and network status.

Drivers of diagnostic errors

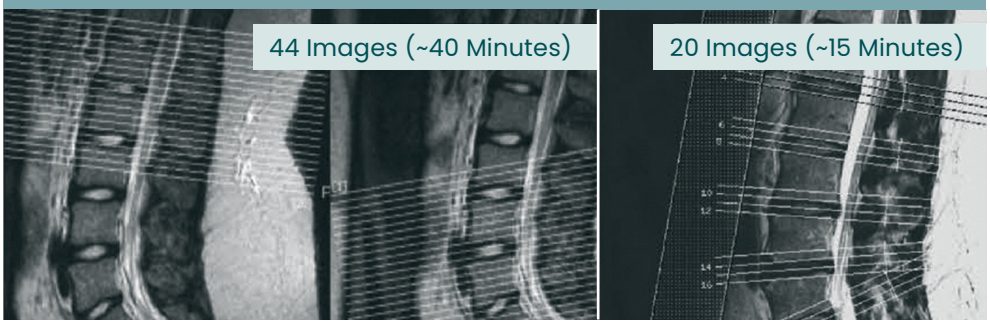
The causes of radiology errors are heterogeneous, ranging from technical causes to interpretive errors on the part of the reading radiologist.

1. Imaging devices vary widely in strength and resolution



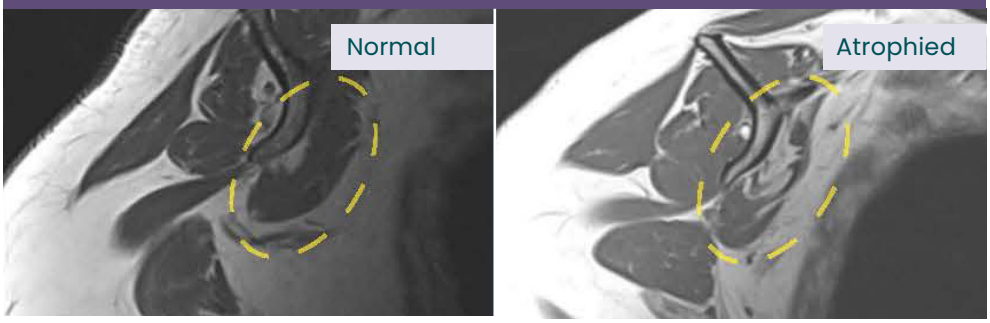
The lower quality image on the right makes it difficult to see individual nerve roots (blue arrow) and evaluate organ tissue (purple arrow).

2. Imaging protocols often prioritize speed over coverage



Imaging center protocols may prioritize speed at the expense of seamless anatomical coverage. When MRI images sections are widely spaced, reading is more difficult, and radiologists may miss clinically important information.

3. Interpretive errors may send patients down the wrong path



The image at right shows a torn and severely atrophied rotator cuff. In failing to describe the atrophy in the report, the radiologist missed a chance to alert the referring physician that this patient would be a poor surgical candidate and unlikely to recover well.

The emerging science of quality

New efforts are underway to better define, measure, and deliver quality in radiology—a fundamental step to reduce misdiagnosis and ensure appropriate downstream care.

Walmart Charts New Course by Steering Workers to High-Quality Imaging Centers

– Kaiser Health News

When employee benefit leaders at Walmart discovered that over half their employees directed to designated centers of excellence for spine surgery were being told (based in part on new or reinterpreted radiology scans) that they could avoid surgery altogether, they knew they had to act.

"The goal is to give associates the best chance to get better, and that starts with the right diagnosis," said Lisa Woods, Walmart's Senior Director of US Healthcare, in an interview in Kaiser Health News.

So Walmart turned to Covera Health, the New York-based clinical analytics company that identifies local imaging centers most likely to provide an accurate radiology diagnosis.

Selection of top radiologists for their Radiology Centers of Excellence program is based on detailed assessment of 10 years of medical records and radiology scans involving millions of data points.

Through a unique data-sharing arrangement with radiology providers, (which grants direct access to records to a quality-review panel comprised of experienced, subspecialized radiologists), together with its proprietary artificial intelligence algorithms, Covera Health has been able to identify more than 1,000 top performing imaging centers to date, nationwide. In return, participating radiologists gain access to actionable insights to improve their practices.

In an evaluation of nearly eighty-thousand patients, those routed through Covera Health's network demonstrated improved outcomes, and returned to work faster, versus those who were not. At the same time, radiologists were able to demonstrate the value of their expertise.[2]

According to Ron Vianu, CEO of Covera Health. "Radiologists, from our perspective, are intellectually curious, incredibly caring and genuinely interested in trying to solve this problem."

The company believes that a partnership system where everyone shares in the benefits of improved diagnostic quality is essential to reducing misdiagnoses and their distorting impact on healthcare at large.

About Covera Health

Building Superior Radiology Programs

By using advanced data science to connect employees with local radiologists proven to deliver the most accurate diagnoses, Covera Health is improving patient outcomes and reducing healthcare costs.

To learn more, visit: www.coverahealth.com

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