



An Economic  
Overview of the Value  
of AI in Radiology

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## AN ECONOMIC OVERVIEW OF THE VALUE OF AI IN RADIOLOGY

Within every healthcare system, two challenges continuously shape our efforts to improve medical outcomes: cost containment strategies and the explosive growth of healthcare data. The healthcare ecosystem is amassing data at an unprecedented rate, with IBM estimating the overall volume of global healthcare data doubling every few years. At the same time, recent data demonstrates that health spending per person in the U.S. was \$10,224, which was 28% higher than Switzerland, the next highest per capita spender. The juxtaposition of increasing healthcare costs with the continuous growth of healthcare data begs the question: can artificial intelligence help alleviate some of this tension? What is the value can AI deliver to radiology and the healthcare system as a whole?

How to best leverage the power of AI to decrease medical costs and improve outcomes is now a primary agenda for healthcare decision makers, governments, investors and innovators. Physicians and clinical leaders are building strategic partnerships with computer scientists and data engineers to learn how to separate signal from noise in a cost-effective and clinically relevant manner. Within the field of radiology, the power of artificial intelligence on the economics of healthcare is on full display. With healthcare budgets under pressure globally, AI-based radiology companies must articulate a succinct ROI for healthcare providers to justify their role in the larger architecture of administering quality care.

How does AI show value in radiology?

Below, we explore seven ways in which deploying AI within radiology can not only improve healthcare outcomes, but also offer a return on investment for hospitals and private practice groups.

### Incidental Findings

A truly exciting development within diagnostic imaging is a potential shift from active primary diagnostics due to a patient presenting clinical symptoms to a framework of proactive detection of medical illnesses. Trained algorithms may have the keen capability of assisting radiologists in the detection of pathologies that are outside the primary reason a patient presents to the clinic or emergency room. Through empowering radiologists to detect additional conditions that were previously undiagnosed (or unknown to the patient), AI may improve health outcomes and provide an opportunity for early intervention. Whether it be a vertebral compression or suspicious lung nodule, assisting medical doctors in honing in on clinically significant incidental findings offers healthcare systems the opportunity to offer the right treatment to the right patient at the right time.



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## Prioritization

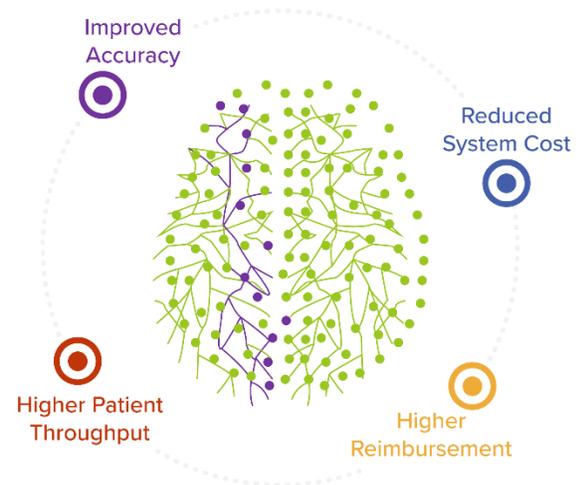
Imagine scenario 1: Dr. Roberts is a resident physician on night call, and it happens to be a busy evening in the emergency department. Inundated with scans, Dr. Roberts makes his way through his workflow, keenly detecting pathologies and advising his colleagues accordingly. A few hours into his shift, Dr. Roberts begins analyzing a scan with a potential abnormality from patient John Doe.

Now imagine scenario 2: Patient John Doe presents to the emergency department with a headache and blurry vision. An always-on AI-enabled software detects a potential ischemic artery, thereby immediately prioritizing this case in Dr. Roberts' workflow. Within 40 minutes, Dr. Roberts informs the ED attending that John Doe requires additional workup for a suspected ischemic stroke. Further imaging is conducted, a stroke team is dispatched, and John Doe is well on his way to receiving life-saving treatments.

There is a clear advantage to prioritizing scans containing potentially positive pathologies. Whether it be guiding resident physicians on night call, or helping alert attendings with complex caseloads, an AI empowered radiologist offers improved patient outcomes through delivering the right care to each patient in need.

## Reimbursement: A Word on NTAP

CMS offering reimbursement for AI-driven imaging is an obvious game changer for the entire industry. Whether it be for stroke detection or other important diagnostic pathologies, the importance of NTAP for the entire field of imaging has been outlined keenly by Aidoc CEO, Elad Walach. This would be a good time to keep in mind that beyond the downstream revenue streams through prioritization and interventions, the AI tool itself can generate a return on investment for hospitals and private practices alike.



## Length of Stay

A reduction in length of stay is a policy aim for many hospitals, as it indicates efficiency of care throughout the integrated structure of a healthcare system.<sup>1</sup> Significant research suggests that the longer a patient remains in the hospital, the higher their risk for hospital acquired infections, medical errors, falls, and unnecessary costly tests.<sup>2</sup> With hospital administrators and clinical staff compelled to confer higher quality care with less resources, forward thinking institutions have turned to technological advancements to alleviate their overcrowded emergency departments and unnecessary long lengths of stay.



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Inculcating artificial intelligence within the workflow of the radiologist positively influences downstream workflow pathways in a manner that leads to a reduction in hospital length of stay. Whether it be through reducing turnaround time or streamlining communication between physicians, AI-based imaging techniques have proven to reduce length of stay in triaged patients.

With a national average of \$2500 per day per hospital bed, a minimal reduction in length of stay for all patients analyzed with an AI-enabled imaging tool may have significant economic benefits on an annualized basis.

### Improved Workflow and Reading Time

Radiologists work against the clock to deliver accurate diagnostic assessments in a timely manner. At the core of a patient's workflow and clinical management pathway rests the radiologist's ability to not only offer a precise diagnosis, but to do so in a timely and efficient manner. The economics of improving workflow and reading time with AI-enhanced algorithms could potentially offer both private practices and hospitals with a lucrative return on investment.

Granted, improving throughput with AI-based imaging algorithms is in its infancy, but the ability to augment a radiologist's daily output by even 5% would offer significant financial gains.

### Revolutionizing Hub and Spoke Models of Healthcare

In a typical hub and spoke model, the efficacy of treatment is significantly dependent upon time to treatment.<sup>3</sup> A significant portion of time is spent on patient transfer time, travel time, and the varying clinical specialties involved in developing an accurate diagnosis and action plan. Particularly, patients admitted to a spoke center with presenting symptoms indicative of an LVO may face delays that could ultimately determine the treatment pathway they undergo. In hospitals lacking a proper stroke team, significant time delays may result in the patient missing out on mechanical thrombectomy.<sup>4</sup> With recent evidence suggesting superior outcomes in patients undergoing mechanical thrombectomy for large vessel occlusions, it is imperative to coordinate transfer teams, neuroradiologists, and interventionalists such that the patient has the best opportunity to meet the time-frame requirements to undergo mechanical thrombectomy.

With an AI-based detection and communication center, hub and spoke centers are enabled to automatically detect suspected LVOs through CT angiogram and immediately alert the on-call stroke teams. By immediately alerting neuroradiologists to suspected LVOs, in addition to providing a structural processing framework to communicate directly with the interventionalist, AI may decrease overall door-to-needle time thereby improving health outcomes. Furthermore, a decrease in time-processing delays may enable health systems to treat more patients in need.



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### Honorable Mention: Medico-Legal

Our community is a long ways away from *relying* on AI to diagnose any condition. Nevertheless, it is important to keep in mind that a second pair of eyes behind any scan coming through your workflow may inevitably help a radiologist-in-training detect a pathology she may have overlooked. 67% of lawsuits brought forth against a radiologist are due to a failure to diagnose a pathological condition.

Where AI will take our community in terms of sensitivity and specificity increases is a story yet told, but one thing is for certain: our abilities to enhance our detective cognition may only be augmented by leveraging AI in the reading room.

### Looking ahead: artificial intelligence in radiology

The economics of any new medical device is complex and intricate. Perhaps the most exciting and nuanced of them all is artificial intelligence within the field of radiology. Cost, quality and safety are tied together in an inextricable way, and radiology happens to impact all three of them. As we embark on revolutionizing healthcare through AI in radiology, understanding the regulatory and payment policies surrounding imaging will be vital in catalyzing widespread adoption. Aided by AI, our field will continue to strive for better health outcomes, while providing hospitals and private practices with a realistic return on investment on an emerging health technology.

### Is it time to start exploring AI in your practice?

Reach out to us for a complimentary consultation with an AI expert user.

[www.canopy-partners.com](http://www.canopy-partners.com)

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