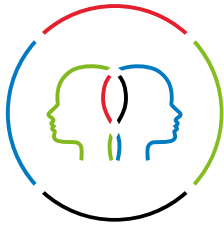




The rise of artificial intelligence in medical imaging

Artificial intelligence (AI) is already supporting specific tasks in medical imaging, including cancer detection, image interpretation, workflow optimization, and clinical decision support. Between 1995 and 2025, radiology accounts for 76.5% of the 1,430 AI/machine learning (ML)-enabled devices authorized by the U.S. Food and Drug Administration (FDA).¹



AI in medical imaging, by the numbers



**Radiology accounts for 76.5% of FDA-cleared
AI-enabled devices.**



AI/ML-enabled devices authorized is 1,430.



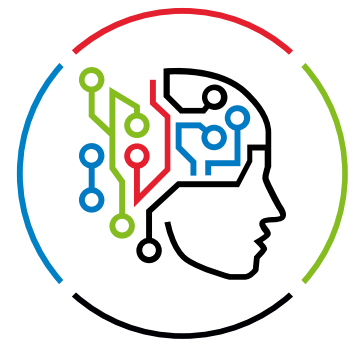
**The global imaging AI market is projected
to reach \$19.78 billion by 2033.**

However, FDA authorization does not show how widely a device is used in clinical practice or whether it improves patient care. Institutions evaluating AI in medical imaging need evidence about performance, clinical fit, limitations, and risks — before and after deployment.

This whitepaper examines where AI is being used in medical imaging, what current research shows, which challenges institutions need to address, and what the next phase of AI research may require.

Where does AI in radiology stand today?

AI development in medical imaging has moved beyond research into clinical use, while research and regulatory activity continue to expand at different rates.



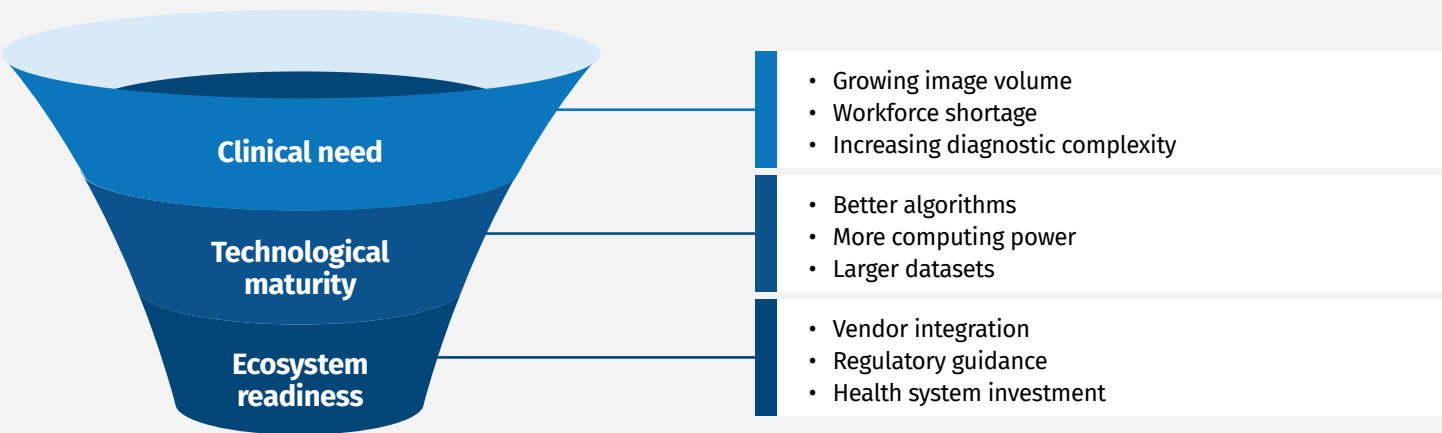
The next challenge for AI: From adoption to trust

A 2024 survey of American College of Radiology members, published by Clinical Imaging, found that 68% of 211 respondents reported using AI in practice, while only 46% said AI's overall accuracy met their expectations.² This gap between use and confidence highlights that adoption does not equal trust. Radiologists are experimenting with AI tools, but widespread confidence in their reliability is still developing.

This experience is shaping where institutions expect AI to contribute. A 2025 survey of 43 American radiology department chairs identified postprocessing and interpretation workflow among the top areas targeted for AI implementation.³ Instead of adopting AI for its own sake, radiology leaders are focusing on tangible ways it can address clinical and operational needs.

The commercial market is scaling alongside that interest. Grand View Research valued the global AI in medical imaging market at approximately \$1.36 billion in 2024, projecting growth to \$19.78 billion by 2033.⁴ While these numbers indicate investment and growth, they don't necessarily reflect how widely or effectively AI is adopted in clinical practice.

Several developments drive continued interest:



AI at work: Diagnostics, workflows, and decisions

AI's clinical value in radiology is found in three core aspects:

**Detect:** Finding abnormalities

**Optimize:** Improving workflow efficiency

**Support:** Enabling better clinical decisions



How AI supports detection and diagnosis

AI can assist radiologists with detection and interpretation, including identifying abnormalities and supporting the review of findings that might otherwise be overlooked, leading to faster diagnoses, less stressed clinicians, and smoother clinical workflows.

A randomized Mammography Screening with Artificial Intelligence (MASAI) trial of 105,934 women shows what that looks like at scale. The study found that AI-supported screening increased cancer detection rate by 29%, compared to standard double reading, without a significant increase in false-positive rates.⁵

Cancer detection is one specific AI application, but the underlying pattern — AI catching what a human reader might miss — shows up more broadly in how the technology gets used across a radiology department. A 2025 *Cureus* scoping review of 12 studies examined how AI has been applied across different stages of the radiology workflow, including:⁶

- Detecting abnormalities
- Flagging overlooked findings
- Reducing reported errors in interpretation and reporting

Together, these studies demonstrate that AI can support specific diagnostic tasks, from cancer detection to identifying overlooked findings. However, the degree of clinical benefit depends on the specific application and outcome measures.



Where AI can optimize the imaging workflow

AI can reduce the number of images radiologists need to review or shorten interpretation time. How it changes the workflow depends on what it does and where it sits in the process.

The same MASAI trial with improved detection rate also showed a reduced screen-reading workload by 44.2%, by determining which mammograms needed single reads versus full double reads.⁵ This demonstrates how AI can have multiple, complementary impacts within the same workflow.

A 2022 prospective randomized study of chest CT interpretation measured interpretation time instead. AI assistance reduced mean interpretation time from 421 to 328 seconds across three cardiothoracic radiologists — a 22.1% reduction.⁷

Outcome	Results
Cancer detection	+29%
Reading workload	-44.2%
Mean CT interpretation time	-22.1%



The two studies measure different workflow outcomes: one reduced the number of readings required, while the other reduced interpretation time. Neither establishes a universal productivity gain, but both show that AI can help radiologists spend less time per case — potentially allowing more focus on complex or ambiguous cases.

How AI can support clinical decisions

Detection and productivity gains only matter if the decisions built on top of them stay sound. AI can support the decision-making process, but clinical judgment and oversight are essential to ensure patient safety and appropriate care.

Current AI applications can help radiologists:



Organize information and prioritize cases.



Assess whether an imaging request meets established criteria.



Surface clinical inputs and outputs for review.

Large language models (LLMs) extend this capability to text-heavy work, processing and generating clinical text in ways that open up applications in reporting, summarization, and information retrieval.

As AI contributes more information to the decision process, the question of who evaluates and acts on that information becomes more important.

In a 2024 survey of European Society of Radiology members, 48% believed patients would not accept AI-only radiology reports without physician supervision and approval.⁸ The finding points to an expectation that human oversight isn't optional in AI-assisted patient care. AI-generated output still requires assessment for accuracy and clinical relevance before applying to patients.

Challenges of AI in medical imaging

An AI model that performs well in testing can still fail in deployment. Institutions have to account for how AI behaves once it encounters real patients, established clinical processes, and requirements beyond the conditions in which it was tested.

Governing AI across its lifecycle

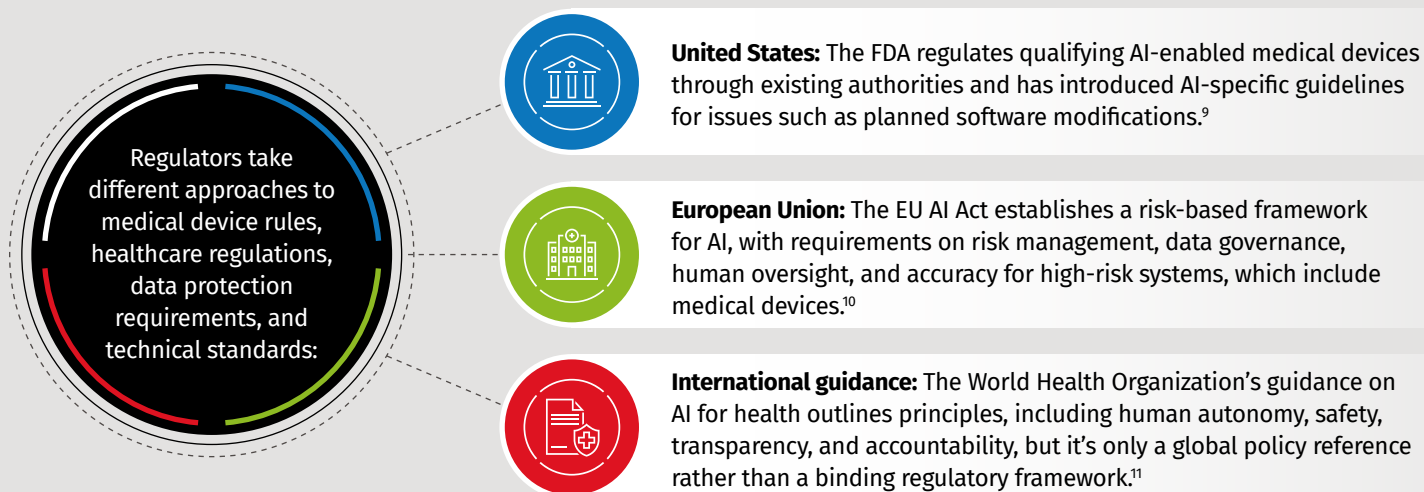
Since problems usually surface in the gap between testing and deployment, governance has to extend well past the initial approval decision. Leadership should agree on and apply AI governance structures even before first use.

Responsible AI governance defines the clinical goal a tool is meant to serve, plans how it will fit into existing workflows, and sets up how the institution will monitor performance after deployment. This translates into several practical areas for institutions, including:

	Usage approval		Clinical accountability assigned
	Defined clinical objective		Ongoing monitoring framework established
	Local validation completed		Escalation process documented

How regulators are approaching medical imaging AI

No single law or regulatory framework governs AI in healthcare. Healthcare organizations operate within a developing patchwork of existing healthcare laws layered with AI-specific provisions.



Clearance under one doesn't carry over to another. An institution implementing AI needs to identify the rules that apply to the specific technology, data, intended use, and jurisdiction, rather than assuming approval anywhere means compliance everywhere.

Reducing bias and improving generalizability

AI performance can change when the data used for development does not accurately reflect the patients or environments where the system is deployed. This mismatch can lead to unexpected outcomes, underscoring the need for diverse, representative data sets, and continuous monitoring.

Sometimes that starts with demographic imbalance in the training data.¹² Other times, the model has quietly learned something else entirely — a pattern called shortcut learning, where an AI system picks up on an incidental feature that happens to correlate with the right answer in its training data, rather than the actual clinical signal it was supposed to learn.¹³

A model's published bias profile does not carry over unchanged from one setting to another. This is why testing a model outside its development environment is critical — it reveals whether previously observed patterns persist and uncovers new challenges that may arise in practice.

Institutions can compare performance across relevant patient groups, use external testing data, and continue monitoring after implementation as populations, equipment, and clinical protocols change.

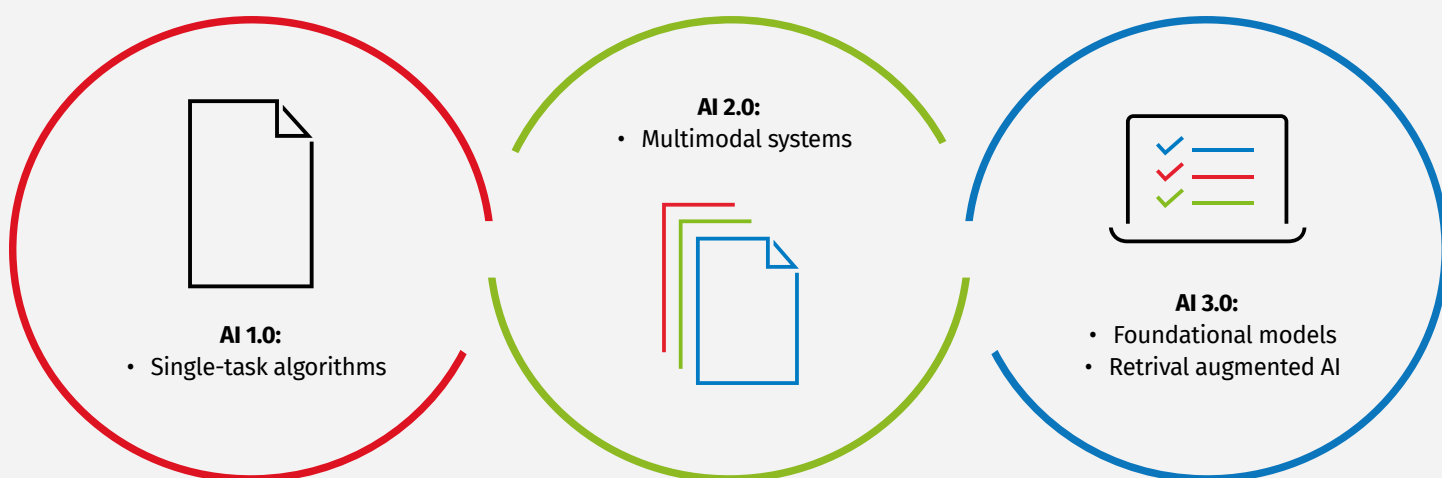
Where medical imaging AI goes next

Medical imaging AI is moving beyond systems built for one narrow task. The next wave of research is testing whether broader models can combine different types of clinical information without sacrificing the reliability required in healthcare.

What else can imaging AI do?

Researchers are testing AI systems that combine imaging with clinical information and perform broader sets of tasks, including:

Multimodal AI	Models that combine images with clinical notes, laboratory data, or other information
Foundational models	Large models trained on broad datasets that can be adapted to multiple downstream tasks
Retrieval-augmented approaches	Systems that retrieve external information to support a generated response or analysis



These approaches could expand AI's role well beyond image classification, but they also introduce new questions about data quality, verification, and provenance. Clinicians will also need new strategies to evaluate outputs that synthesize information from multiple sources.

What does AI in imaging still need to prove?

As imaging AI expands into broader clinical use, the field needs stronger evidence of generalizability, reliability, and clinical value.

The Checklist for Artificial Intelligence in Medical Imaging (CLAIM) by the Radiological Society of North America (RSNA) provides reporting guidance to improve transparency and reproducibility in medical imaging AI research, addressing questions such as:¹⁴

Does performance hold across institutions and patient populations?	Do prospective studies demonstrate clinically meaningful results?
How do clinicians interact with AI in real workflows?	Does performance remain stable as data and clinical environments change?

As AI is applied to broader clinical tasks, the evidence burden rises. The more tasks and information a system handles, the more researchers need to establish where its performance holds and where limitations emerge.

Radiology: Artificial Intelligence® ranked #1 out of 217 radiology and imaging journals, with an Impact Factor of 20.1 in 2025. This makes it the leading scientific journal on advances of AI in radiology.

Journals like *Radiology: Artificial Intelligence*® provide dedicated peer-reviewed evidence for research in this area, examining AI's impact on diagnostics and patient care, radiology education, and ethical considerations.

Why comprehensive radiology literature access matters?

A single study can show how a model performed under defined conditions, while related literature can help researchers and clinicians understand the underlying clinical problem, compare approaches, and evaluate new findings with context.

Connecting AI research to the wider radiology literature

The evidence needed to evaluate an AI study may extend from the model itself into the problem it is designed to address. For example, a question about AI-assisted lung cancer imaging might require previous diagnostic studies, cancer imaging research, cardiothoracic evidence, and educational material alongside current AI research.

Different teams in an institution follow different parts of that evidence trail to answer the same research question:

Researchers:	Prior methods, citation trails, related specialty research, and current AI studies
Clinicians:	Specialty and clinical evidence to determine where an AI finding fits within an established diagnostic pathway
Educators and students:	Resources connecting emerging technologies with imaging knowledge and clinical application
Librarians and institutional decision-makers:	Supporting access across information needs while assessing the value and relevance of institutional resources

RSNA's journal portfolio maps directly onto these needs, with titles covering research, education, AI evaluation, clinical practice, and specialty imaging — brought together in the RSNA Complete Collection on Ovid®.¹⁵

With one connected subscription, radiology practitioners can access literature spanning nearly a century of prior research, including *Radiology*®, *RadioGraphics*®, *Radiology: Artificial Intelligence*®, *Radiology: Cardiothoracic Imaging*®, and *Radiology: Imaging Cancer*®, to support research in medical imaging AI.

Conclusion

Medical imaging AI is already producing measurable results in defined diagnostic and workflow applications. The remaining challenge is establishing where those results hold, how systems perform after implementation, and how institutions should evaluate technologies that continue to change.

That evaluation depends on evidence. New AI research needs to be read alongside the clinical, specialty, and educational literature that explains the problem the technology aims to solve and what prior research has established.

[Explore the RSNA Complete Collection on Ovid® to connect current AI research with the broader radiology evidence base.](#)

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