



Artificial Intelligence In Early Disease Detection

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Abstract — Artificial intelligence is increasingly being used to identify patterns in medical images, patient records, and other health data that may enable earlier disease detection. Although these systems may improve diagnostic speed and expand access to screening, inaccurate or biased algorithms can also produce missed diagnoses, unequal outcomes, and inappropriate medical decisions. This brief examines the policy challenges surrounding AI-enabled early disease detection and proposes a framework through human oversight.

Keywords — Artificial Intelligence (AI); generative AI; disease detection; deep learning models.

I. EXECUTIVE SUMMARY

As artificial intelligence takes an increasingly prevalent role in healthcare, policymakers face the question of how these technologies can safely supplement, rather than replace, clinical decision-making. AI has the potential to shift portions of healthcare from reactive treatment toward earlier detection and prevention by identifying patterns that may be difficult to detect through conventional methods alone.

According to the World Health Organization, AI's ability to analyze enormous quantities of information allows it to be put to use in order to detect patterns in medical images, patient records, and other data which may be otherwise overlooked by human doctors. This

means that professionals are able to spend more time assessing the best way to treat the patient, as well as pursue research and further treatment in the field. While this prospect is certainly exciting, healthcare experts around the world are still not fully convinced, pointing to flaws in AI systems which need to be smoothed out in order to ensure full safety in deployment. These concerns include the unethical collection or use of health data, algorithmic bias, patient-safety risks, cybersecurity vulnerabilities, and environmental costs associated with these AI systems. These risks ultimately pose a threat to the safety of patients, as without complete oversight and training, AI may inadvertently perpetuate or exacerbate existing disparities in healthcare delivery.

In order for artificial intelligence to play a safe role in the healthcare industry, it must be deployed in the interest of humans, putting well being and safety at the forefront of its mission, while simultaneously displaying full transparency in operations. While AI is deployed in order to be efficient and responsive, it is imperative to take its deployment cautiously, to ensure that bias and inequity are minimized, as early models today do not tend to be trained on fully inclusive datasets

which take diversity into mind. Overall, future policy should ensure that the gap between technological development and legal frameworks is closed, while simultaneously maintaining post market monitoring and human oversight to ensure effectiveness.

II. OVERVIEW

A. Relevance

Artificial intelligence has the potential to transform aspects of healthcare by helping clinicians detect diseases earlier, when treatment may be more effective and intervention may be less invasive. AI systems have the ability to analyze large amounts of medical information, including medical images and patient information, and recognize crucial patterns that might indicate disease. According to the World Health Organization, AI has the potential to improve the speed and accuracy of diagnosing diseases. This factor is especially important because it gives doctors more time to respond to a disease before it progresses. The issue also continues to become increasingly relevant as AI shifts from research into actual healthcare. The U.S. Food and Drug Administration also points to things like early disease detection, diagnosis, and assessing risk as a real use for AI in terms of medical necessities. As these technologies become increasingly involved in healthcare, their impact could expand to aid in disease detection and change how healthcare resources are used.

B. Background

Artificial intelligence has come to play a role in the early detection of disease, an evolution from what was once known as computer-assisted diagnosis. The roots of automated medical-image analysis go back to the 1960s, though it was not until computing power and digitized records allowed for more extensive analysis that the technique saw any real clinical uptake.

A case in point is the first computer-aided system for screening mammograms, which the Food and Drug Administration gave its seal of approval to in 1998. Congress then made it a matter of policy for Medicare to cover the technology. That mandate spurred quick adoption, even if there was little hard evidence at the time to suggest patient outcomes were any better. By 2016 some 92 percent of American mammography facilities had put these systems to use. But studies would show that while they did not lower breast-cancer mortality, they did lead to a rise in false positives and superfluous follow-up work. It was a policy lesson in how insurance coverage and institutional sanction can put an innovation into practice before one fully grasps its long-term value.¹

Today, machine learning has rekindled the interest in AI as a means of spotting cardiovascular, neurological or cancerous conditions ahead of conventional methods. There are vested interests on all sides: technology and device makers want regulatory clearance and hospital contracts; insurers and health systems see the upside of more efficient screening and earlier intervention. For the physician or radiologist, AI is a tool that can underpin a decision but also change the nature of their duties and open them to liability should an algorithm err. Patients have the most to gain and lose; while earlier detection can be the difference in treatment options, a biased or inaccurate system risks a missed diagnosis, privacy concerns or unequal care.

The distribution of these risks is not uniform. An underserved rural community with few specialists might welcome AI, provided the local infrastructure is up to the task. Conversely, those who have been left out of medical datasets in the past – racial minorities, women, the disabled or the poor – are more likely to be served by algorithms that are less precise.²

Regulators like the FDA hold the reins on what makes it into clinical use and how it is

policed. As of January 2025 “the FDA has authorized more than 1,000 AI-enabled medical devices and is in the process of writing rules to deal with bias and postmarket performance.³ International bodies are part of the conversation too; the World Health Organization has called on governments to safeguard patient autonomy and ensure equity.⁴ In the end, the record of diagnostic AI is one of a contest between the drive to innovate and the need for oversight, with policy being the deciding factor in whether new technology bridges or widens the gap in healthcare.

C. Notable Stakeholders

There are several parties that can benefit from or be affected by the design and regulation of artificial intelligence in the area of early disease detection. First of all, it is technology companies and makers of medical devices, who need approval to work on such software and cooperation with hospitals for its implementation. Healthcare professionals, including physicians and radiologists, might enjoy the use of AI for diagnosis; however, they are also concerned about potential liability issues, accuracy, and new roles. Patients and underprivileged groups of people will also be affected because of either better access to treatment or problems with misdiagnosis. Governmental organizations like the FDA and WHO are crucial players in setting up the criteria for using AI in healthcare.

III. POLICY PROBLEMS

AI-powered early disease detection tools are now clinically operational. These diagnostic tools are capable of successfully flagging [pancreatic cancer up to three years before clinical diagnosis](#), detecting chronic medical conditions such as early liver fibrosis from blood sample analyses, and have also found their way into healthcare administration use and preventative

care operations due to its usefulness in automating repetitive tasks and processing large volumes of data. In active practice, probabilistic risk scores and results can influence high-stake decisions surrounding insurance coverage, employment status, and access to medical care, despite existing laws such as HIPPA (Health Insurance Portability and Accountability Act), ADA (Americans with Disabilities Act), and GINA (Genetic Information Nondiscrimination Act) in effect. These existing laws were designed to consider confirmed diagnoses and genetic information, and fail to account for algorithmic predictions. This regulatory gap/grey zone enables cost-cutting behaviours that undermine the intended purpose of these tools. Empirical data shows that AI scores and results are already influencing.

This problem impacts Americans on a national level, where federal agencies and state legislatures play a part in regulating the use of AI in health and employment outcomes. The core of this issue is assessing how policymakers can ensure that AI-powered early detection tools can be implemented in the health sector without making possible discrimination issues, wrongful health claim denials, or harm to the financial stability of patients and health workers.

IV. POLICY OPTIONS

Policymakers can deploy several concrete regulatory frameworks to ensure that AI-powered early detection tools can function and assist the medical field without exacerbating discrimination, causing wrongful health claim denials, or economically destabilizing patients and healthcare workers. In fact, state and federal agencies are already addressing these concerns

through legislation, enforcement formats, and equity mandates.

The primary policy outlines are categorized by the specific harms that they aim to prevent. The first is eliminating discrimination and algorithmic bias. The U.S. Department of Health and Human Services (HHS) enforces Section 1557 of the Affordable Care Act, which applies directly to “patient care decision support tools” (including diagnostic and risk assessment algorithms). According to the [Bipartisan Policy Center in 2024](#), this rules framework dictates that covered entities must proactively evaluate and monitor their AI algorithms to prevent discriminatory treatment advice driven by demographic or socioeconomic data. Regulators can also enforce mandates requiring developers to train and test diagnostic AI on diverse, geographically and socioeconomically representative patient datasets. Stated by the [National Institutes of Health in 2021](#), this helps mitigate historical data gaps that cause tools to misdiagnose underrepresented or marginalized populations. In addition, policies can dictate that AI developers publicly disclose their methodologies, metrics, and training data characteristics. This allows public health organizations, third-party auditors, and clinics to assess algorithmic fairness before deployment.

Another important policy area of early disease detection utilizing AI is the prevention of wrongful health claim denials. Certain state-level legislation serves as models for preventing algorithmic insurance fraud and wrongful coverage denials. For instance, Nebraska’s LB 77 prohibits AI outputs from serving as the sole basis for denying or modifying health care services.

Similarly, Texas’s SB 815 strictly limits AI utilization review to administrative support or fraud detection, barring it from making final adverse medical necessity determinations. According to a [2026 Kansas Government policy review on AI in health insurance](#), California legislation such as SB 1120, or the Physicians Make Decisions Act (Act), “restricts health insurers and disability insurers from using AI, algorithms, and similar tools as the sole means to deny, delay, or modify care based on medical necessity.” In other regulation methods, policymakers can also require that any negative coverage decision or prior authorization denial generated by an AI algorithm must be reviewed and signed off on by a licensed clinician utilizing evidence-based criteria. In a [2026 Stanford Health Insurance AI review](#), analysts explain that legislation can also grant state insurance commissioners or federal entities the explicit authority to inspect and audit proprietary AI tools used by private insurers to review claims, identifying whether the algorithms replicate or amplify historic denial patterns.

The final big policy area that must be touched on in regards to AI in the healthcare space is safeguarding patient and health worker financial stability. Creating clear legal boundaries regarding liability protects healthcare professionals from professional and financial ruin. Policy frameworks, such as those explored by the FDA or the WHO, are shifting toward shared liability. When policies clearly define that developers are legally responsible for structural algorithmic flaws while clinicians are responsible for the final medical evaluation, it protects frontline workers from unjust litigation fees. In

addition, as explored by the [American Medical Association in 2025](#), to prevent patients from absorbing immediate financial harm when AI tools wrongfully flag or stall a treatment option, policies can mandate expedited, fast-tracked appeal windows for any decision generated through automated prior authorization tools. AI is often integrated into workflows to handle administrative operations like billing and scheduling. Policymakers must incentivize systems to use AI to reduce administrative burnout, rather than using the technology to entirely substitute human investment or downsize clinical teams.

According to the [National Institutes of Health in 2023](#), “It is important to see the adoption of AI systems in healthcare as a dynamic learning experience at all levels, calling for a more sophisticated systems thinking approach in the health sector to overcome these issues.” In order to ensure that AI is utilized ethically, rationally, and safely, safeguards like the ones above must be implemented by our policymakers, on both a statewide and national level.

V. IMPACT ON YOUNG PEOPLE

The increasing use of AI for early disease detection poses significant risks for young people. Adolescents are already less likely to openly discuss sensitive health concerns with medical professionals. According to Columbia University Mailman School of Public Health, fewer than 50% of U.S. youth regularly talk about sensitive health issues with their doctors. As a result, many health concerns go undiagnosed or untreated.

The rise of AI health tools may worsen this problem by giving young people an alternative source of medical advice that feels more private

and accessible than speaking with a doctor. Instead of scheduling appointments or discussing uncomfortable symptoms with healthcare professionals, some youth may choose to rely on AI systems for answers.

This reliance becomes dangerous when AI provides inaccurate or incomplete information. Unlike licensed medical professionals, AI systems can make mistakes, misinterpret symptoms, or fail to recognize serious conditions. For example, if a teenager experiencing persistent chest pain receives an AI-generated response suggesting stress or anxiety when the true cause is a heart condition, they may delay seeking medical care. Similarly, an AI tool could incorrectly dismiss symptoms of depression, diabetes, or an infection as minor issues, preventing a young person from receiving timely treatment.

These misdiagnoses can have lasting consequences. Youth who place too much trust in AI may make health decisions based on incorrect information, delay professional treatment, or develop a false sense of security about their condition. Overreliance on AI for early disease detection could ultimately prevent young people from receiving the accurate diagnoses and medical care they need.

VI. CONCLUSION

In the future, policy makers and the public should consider the risks of A.I. detection in diseases. Although A.I. seems trustworthy with detecting diseases, and the information they have is getting better, the public should still go on the side of caution, and trust doctors more. As long as the A.I. can get better, then our people will be better, but in the past, A.I. has made confidently incorrect predictions about disease.

In addition, policymakers need to perform tests in order to confirm the accuracy of the A.I. detections are within legal limits. If the A.I. is incorrect most of the time, our public health will be in danger, and disease study might be set back for a long time. When the public can confirm that the A.I. detection is reliable, then we can introduce it to many patients.

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