

Review Article

Artificial intelligence in rural healthcare in India: applications, challenges and a strategic implementation framework

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ABSTRACT

India's healthcare system is marked by a paradox wherein innovative medicine technologies exist alongside significant accessibility issues in rural areas where the majority (more than 66%) of its citizens live. As much as 80% of specialist positions at community and primary health centres in rural India are vacant, contributing to diagnostic inefficiencies and placing an emphasis on chronic disease prevalence. The purpose of this paper is to examine the role of artificial intelligence (AI) in enhancing healthcare services in rural India based on literature reviews from 2015 to 2025. The integration of machine learning algorithms and computer vision has enormous potential to bypass geographical and personnel limitations. Potential use cases involve tele-radiology services powered by AI for detecting tuberculosis and stroke, edge AI technologies that can perform offline diagnostics, decision support systems in telemedicine, and epidemic predictions. However, widespread adoption faces multiple socio-digital and structural challenges, including the lack of independent studies performed in rural settings, insufficient basic infrastructure (e.g., power supply and internet connectivity), and the potential of creating biased algorithms when training is primarily performed using historical data unrelated to local conditions. For optimal utilization of AI, a phased approach focusing on augmenting the intelligence of medical professionals is crucial. The government should concentrate on developing digital public infrastructure, engaging public-private partnerships, and creating context-specific, offline-ready solutions.

Keywords: Artificial intelligence, Rural healthcare, Telemedicine, Primary care, Health systems, India

INTRODUCTION

The healthcare sector of India is characterized by a paradoxical nature. On the one hand, it has achieved an impressive level of development in terms of innovative technologies and drug manufacturing. However, the accessibility of primary health services is still low in rural and semi-urban areas. Over 66% of the country's population lives in rural zones, but 75% of doctors work

in urban centers, generating a significant disparity in the availability of health resources.¹ Statistics reveal that there are only 20.6 healthcare professionals per 10,000 residents in India, which is far lower than the WHO's goal of 44.5. Furthermore, rural communities report 0.45 doctors per 1,000 people. Almost 80% of specialist positions at rural CHCs and PHCs are vacant.² Hence, rural patients suffer from delayed diagnoses, poor chronic

illness management, and substantial costs associated with seeking urban health services.

In addition to the lack of healthcare workers, rural areas are currently experiencing a transition in the disease burden. The health system needs to focus not only on combating infectious diseases such as tuberculosis but also on increasing NCDs (e.g., diabetes, cardiovascular disease, and cancer). The infrastructure is also inadequate; over 50% of rural health centers use paper-based health information systems, and less than 50% of PHCs are functional round the clock, having no access to electricity, clean water, and the internet.³

Against this backdrop, AI can be viewed as an essential tool for optimizing health systems, moving beyond mere digital transformation. Machine learning, natural language processing, and computer vision provide possible tools to overcome obstacles related to the geographical location and shortage of specialists. The Indian government recognizes the potential of AI through various initiatives, such as NITI Aayog's National Strategy for Artificial Intelligence (#AIforAll) and the Strategy for AI in Healthcare for India (SAHI).^{4,5} Both strategies emphasize that AI should serve society and its well-being, providing equal access to health services, utilizing diverse data sources, and preserving transparency and safety. Moreover, fundamental digital infrastructure is available, such as ABDM and eSanjeevani telemedicine service, with over 276 million consultations carried out.^{5,6}

However, even under favourable conditions, introducing complex AI models in resource-scarce and multilingual contexts is fraught with various technological and socioethical issues. This review outlines the current state of AI deployment in rural and small health clinics in India, discusses key infrastructural, socioethical, and technological barriers to implementing AI, and provides a practical step-by-step approach for policymakers and health system leaders.

METHODS

This review analyzes the literature published between 2015 and 2025 to clarify the use of artificial intelligence (AI) in poor settings, particularly rural India and similar areas. The search strategy for academic sources involved searching the PubMed, IEEE Xplore, arXiv, and Google Scholar databases for keywords such as "artificial intelligence, rural healthcare, India, telemedicine"

In addition to exploring the academic literature, this review examines grey literature to ensure an all-encompassing overview of policy development and implementation. This includes government documents and reports from governmental organizations like the Press Information Bureau, NITI Aayog, India AI/AI Mission, and Ministry of Health, and non-governmental organizations. This review focuses on English-language

literature and official policy documents published over the previous decade. The data extracted are related to the key aspects of the application of AI, which include technology used, impact on health care, approaches, infrastructure, ethical issues, regulation, and economic factors. The study quality assessment process includes a narrative approach that considers the type of study design, sample size, outcome measures' clarity, and source credibility. Observational studies and pilots have been screened for possible bias, which could be due to selection, reporting, and conflict of interest. There is no specific tool for assessing risks of bias but attempts have been made to report study limitations and place the results into context.

REVIEW

Present uses of AI in rural clinical practice and opportunities

Healthcare services in rural India struggle with workforce deficits and unstable infrastructure. In this regard, Artificial Intelligence (AI) has become a crucial tool that revolutionizes the workings of the entire health system rather than merely enhancing the digital aspect of operations. Using machine learning, natural language processing, computer vision, and predictive analysis, AI solutions help tackle the problem of remoteness and a shortage of specialists. Examples of such uses include automated radiology, telemedicine decision support, point-of-care diagnostics, and predictive surveillance, all contributing to a shift towards preventive healthcare services.^{7,8} The principal applications of artificial intelligence across various levels of care are summarized in Table 1.

AI-powered diagnostics and tele-radiology

India faces a significant diagnostic challenge in the form of only about 20,000 practicing radiologists serving the country's population of over 1.4 billion people, where nearly 40% of radiologists specialize only in ultrasounds.⁹ Thus, rural clinics often have extensive queues. AI-driven teleradiology tools represent a significant innovation in democratizing access to imaging expertise. Instead of replacing doctors, the technology becomes an effective triage and clinical decision support tool (CDSS), able to differentiate between normal and pathological results on X-rays or CT scans independently.¹⁰

Empirical implementations of the technology have produced impressive improvements in the system's functioning. For instance, in mass public health screening initiatives, the qXR algorithm developed by Qure.ai reached an Area Under the Curve (AUC) of 0.81 at the detection of pulmonary TB with 71% sensitivity and 80% specificity in a tertiary hospital setting. The state wide AI screening program implemented in Maharashtra helped diagnose TB cases incidentally 35% more often, while similar programs in Goa allowed to detect lung cancer

with regular chest X-rays.¹¹ Moreover, deployment of the Synapsica Radiolens solution helped decrease diagnostic times by up to 60% and total turnaround times by 80%, thereby multiplying a radiologist's ability to process patients threefold. During emergencies, state-sponsored stroke networks in Punjab used AI to analyze imaging of a brain rapidly, cutting diagnostic times by 85%.¹² Ophthalmic Screenings: Remidio's Medios HI platform incorporates AI into a portable "Fundus on Phone" camera for screening purposes in conditions without internet access. During field trials, this approach proved to be 100% sensitive to referable DR and detected 94%

cases of actual glaucoma, significantly outclassing manual human grading.¹³ Oncology and Laboratory Diagnostics: With Niramai's Thermalytix, which performs portable and radiation-free screenings for breast cancer via thermal imaging, one can reach a 27% increase in accuracy compared to mammography.¹⁴ Point-of-care laboratory diagnostics relies on companies such as SigTuple, which utilise deep learning models for scanning blood and urine smears with motorised microscopes at the PHC level, with a reported accuracy of 98% when detecting malaria parasites.¹⁵

Table 1: Applications of AI in rural healthcare.

Domain	AI application	Clinical use case	Level of care	Impact on healthcare delivery
Radiology	AI-assisted imaging (X-ray, CT)	Tuberculosis detection, stroke, trauma triage	Secondary / district hospitals	Reduced turnaround time, improved diagnostic accuracy
Clinical decision support	AI-based CDSS	Differential diagnosis, risk stratification	Primary / secondary care	Improved clinical decision-making and standardization
Telemedicine	AI-enabled triage systems	Remote consultations, referral filtering	Primary care / PHC	Reduced unnecessary referrals, improved access
Point-of-care diagnostics	Edge AI devices (portable tools)	Diabetic retinopathy screening, respiratory disease detection	Primary care / outreach	Decentralized diagnostics, early detection
Pathology	AI-assisted microscopy	Malaria, anemia, infectious disease detection	Primary / secondary care	Faster reporting, reduced dependency on central labs
Workflow optimization	Ambient AI, automation tools	Documentation, discharge summaries, scheduling	Secondary hospitals	Reduced clinician workload, improved efficiency
Public health	Predictive analytics	Disease surveillance, outbreak prediction	System level	Proactive disease control and resource allocation

AI in clinical decision support and telemedicine

Offline/edge AI: The implementation of cloud AI can often be impractical in rural clinics due to issues with power supply and internet availability. Edge AI is therefore prioritized by developers, with algorithms being included in various medical devices or smartphones to ensure that operation can take place completely off the network.¹⁶

Triage: AI Steth, which is a smart stethoscope that uses machine learning algorithms to turn auscultation sound waves into visual representations through a phone app, enables health professionals to diagnose cardiac anomalies, asthma, and COPD with 93% accuracy.¹⁷ Meanwhile, another smartphone application called Shwaasa performs lung disease screening based on cough analysis.¹⁸ Telemedicine services are among the crucial aspects of rural healthcare delivery since eSanjeevani, a platform run by the government, recorded 276 million consultations by the end of 2024. As for 2023, eSanjeevani 2.0 featured AI-powered clinical decision support for differential diagnosis with a model consisting of about 300 symptoms.¹⁹ At rural outposts, frontline workers can use AI symptom-checker and risk-score

modules to enter information into the system, generating clinical risk scores indicating whether a patient needs immediate referral or local care. AI can be used to pre-screen patients, collect structured medical history, and reduce physician workload and consultation time. The burden of administrative work contributes to physician burnout in rural clinics. Tools like Eka Scribe and Sunoh. AI use natural language processing to turn audio recordings of doctor-patient encounters into structured EHRs and e-prescriptions. Offline solutions have been created by companies like Eka Care, which means clinics lacking a consistent internet connection can now automate their records and save doctors' time.^{20,21}

AI in public health and surveillance

AI technology is shifting India's epidemiological surveillance toward proactive prediction rather than retrospective analysis. The NCDC reports its intentions to deploy real-time data analytics and AI to assist disease surveillance.²² In 2022, the IDSP integrated state-of-the-art AI to monitor print and digital media for event-based surveillance. To date, the system has processed over 300 million news articles and flagged more than 95,000 distinct health events, vastly accelerating the detection

and verification of potential outbreaks nationwide.²³ Meteorology and vector data integrated into predictive analytics systems are helping officials to predict dengue spread in rural regions of Bihar.²⁴ A number of

indigenous artificial intelligence-enabled healthcare platforms have emerged in India, addressing key gaps across diagnostics, screening, telemedicine, and hospital operations (Table 2).

Table 2: Overview of selected artificial intelligence-enabled healthcare platforms in India, highlighting their domain of application, core technological features, and real-world implementation with available evidence on diagnostic performance or health system impact.

Platform	Domain	Key features	Implementation / evidence
Qure.AI (QXR)	Radiology (X-ray, CT)	Automated AI-based image analysis for TB, pneumonia, ICH, stroke	Evaluated in high TB-burden settings with AUC ~0.88–0.91, sensitivity approaching WHO benchmarks; deployed in national TB screening programs. ¹¹
Niramai (thermalytix)	Cancer screening	AI-based thermal imaging for breast cancer (non-invasive, portable)	Validated in Indian cohorts with high sensitivity (~90%); used in community and outreach screening programs. ¹⁴
SigTuple (manthana)	Lab pathology	AI-enabled automated microscopy (blood smears, urine, semen analysis)	Early pilot deployments; deep learning enables parasite/cell detection; large-scale independent validation remains limited. ¹⁵
Practo	Telemedicine	Symptom checker, doctor discovery, e-consultation	Widely adopted digital health platform contributing to telemedicine expansion in India, especially in tier-2/3 cities
Shwaasa	Respiratory screening	AI-based cough sound analysis for COPD/asthma screening	AI respiratory sound analysis demonstrates ~80–90% diagnostic accuracy in clinical validation studies. ¹⁸
Esanjeevani (AI-CDSS)	Telemedicine	National telemedicine platform with integrated AI-based decision support	World’s largest telemedicine platform; AI-CDSS improves structured data capture and diagnostic precision, with >280 million consultations supported. ²⁹

Economic paradigms, and business models

Traditionally, the use of technology has been restricted by the high costs of purchasing and maintaining on-premises server systems and associated licensing. However, the growing popularity of cloud-first SaaS solutions addresses this challenge.

Platforms should be designed specifically for the Indian market, should offer advanced AI and telemedicine integrations, and follow the pay-per-use pricing strategy. More importantly, the SaaS platforms should meet the requirements of the Ayushman Bharat Digital Mission (ABDM) and can facilitate the creation of health IDs (ABHA) and support digital record-keeping.^{25,26}

AI can also help hospitals with Revenue Cycle Management. AI helps predict which insurance claims will be denied, thereby avoiding potential revenue leakage and maintaining the financial sustainability of rural clinics.²⁷

The initial expenses for software and hardware can be rather high, but existing evidence shows that AI screening models (retinal/thermal) are effective and economically

viable, especially when used by PPPs with significant patient discounts.²⁸

TECHNICAL, INFRASTRUCTURE, AND SOCIO-DIGITAL CHALLENGES

Vendor costs remain variable and often opaque; multiple AI products are implemented through PPP and subscription models. Crucially, despite the availability of numerous AI-based tools at various stages of development for application in rural India, most products have yet to undergo peer-reviewed validation in rural Indian clinical environments. Although tools like Qure.ai’s qXR, Niramai’s Thermalytix, and SigTuple’s laboratory automation tools appear promising based on pilot test results from certain tertiary facilities, there is a clear need for more extensive, independent validation trials among rural Indian patients.^{11,14,15} Moreover, with a large number of new offline triage and ambient documentation tools being introduced, no randomised study evidence of these technologies’ efficacy, cost-effectiveness, and workflow benefits has been made available. It is therefore imperative to conduct rigorous local validation studies for the purpose of ensuring the applicability and relevance of these technologies in India’s rural regions, making such work a top priority.

The deployment of advanced AI models in rural Indian health care faces significant challenges, including infrastructure limitations, sociotechnical issues, and data issues. Problems with electricity access, limited Internet connectivity, and restricted computer use hamper the introduction of AI models in a significant number of PHCs. Over 50% of rural health facilities still use paper-based recordkeeping, and the lack of EMR integration poses a significant barrier. Moreover, AI development requires large amounts of high-quality labelled clinical data, which is lacking among the rural population.^{29,30} This problem is further exacerbated by a 'trust deficit': according to one study, almost 50% of surveyed rural users still had little understanding of AI due to limited digital literacy, while more than 10% had fears concerning data privacy and poor infrastructure.³¹

The introduction of health AI in rural India faces significant structural inequalities stemming from a lack of high-quality medical data. Since most basic AI models are trained on historical data from the Global North, the genetic makeup, environmental conditions, languages, and cultures of rural Indians are not incorporated. Using such AI without localisation leads to systematic underdiagnosis and perpetuation of structural injustice in clinical decision-making.¹⁹

Furthermore, reliance on proprietary AI 'black box' software creates a 'recourse deficit.' Should the AI model incorrectly diagnose a disease or make another mistake, rural residents would have little recourse available. The liability for algorithmic errors would be uncertain, and addressing them may prove difficult and complicated. To ensure responsible use, India's Strategy for AI in Healthcare (SAHI) and the 2025 Governance Guidelines for AI require prioritising health AI deployments to emphasise safety, equity, fairness, and public trust, while conducting India-specific risk assessments and preventing bias.²²⁻²⁹

Successful AI implementations require adequate human capital and intensive training tailored to each region's unique culture. From specialists to ASHAs, each employee requires thorough training on how to safely utilise AI in their work, as well as knowledge about limitations, potential sources of bias, and ethical considerations. Free six-month courses on clinical AI provided by NBEMS are excellent examples of such programs.³² Change management initiatives should also be implemented; facility administrators can reach out to key opinion leaders to support technology adoption and clearly state that AI serves as an assistive tool to alleviate work-related stress.

STRATEGIC IMPLEMENTATION FRAMEWORK AND ROADMAP

To avoid blind and unsustainable implementation of technologies, it is advisable to follow a phased approach in their introduction.²²⁻²⁶

Foundation phase: Telemedicine expansion (eSanjeevani) in all districts; AI diagnostic tools at primary care level; introduction of digital identity, electronic health records (EHRs) via ABDM initiative.

Scale-up phase: Provision of major district hospitals, tertiary/sub-district hospitals with advanced AI diagnostic tools (e.g.: X-rays, CTs, pathological examinations); clinical decision support systems (CDSS) throughout the nation; broadband upgrading of rural areas.

Mature phase/learning health system: Interoperability achieved; population health analytics using AI introduced; continuous model assessment.

In terms of operations, it is advised that all hospitals implement offline-first procurement policies to ensure AI algorithms can function independently without a stable internet connection. Hospitals are advised to maintain dynamic inventories of models used, analyse data use, and implement a multidisciplinary ethics committee to monitor models for sociodemographic bias. Procurement guidelines should include requirements for model explainability and vendor disclosure regarding data origin.³³

Human and AI workflows

Clinical AI requires an augmented intelligence approach, in which the machine's role is to augment rather than replace clinicians' work. Workflow redesign should involve the use of AI-checklist and human-final models, allowing the AI to provide preliminary diagnostic recommendations, prioritise patients for high-risk scans or collect symptoms while leaving the ultimate diagnostic responsibility to humans.³⁰⁻³³

Measurable KPIS (key performance indicators) and monitoring and evaluation.^{29,34}

Continuous monitoring and evaluation of AI systems is required to confirm that the technology results in actual health improvements, justifying investment. Specific KPIs should be developed to assess performance:

Accessibility: Teleconsultation rates per capita, distance reduced for each patient.

Diagnostic accuracy: Increase in detection rates compared to human performance alone.

Efficiency: Reduction in turnaround times in diagnosing diseases in radiological or laboratory services.

Health outcomes: Disease-specific indicators, e.g., acute condition diagnosis speed or chronic disease control rate.

Economic: Cost per diagnosis made, length-of-stay reduction in hospitals; patient/community satisfaction.

Research gaps and future directions.^{22,33,34}

There is currently a crucial lack of randomized controlled trials (RCTs) investigating the effects of AI tools in Indian primary care and rural settings, with only pilot studies available in the literature. It needs to be confirmed whether models designed based on an urban cohort are effective for rural patients. Data science gaps also exist and need to be addressed with new methods, including federated learning, explainable AI, and approaches to handle sparse and biased data. Further research should not be restricted to diagnostics but should also explore how AI can help with supply chain management, workforce optimisation, and public health surveillance.

Policy recommendations.^{4,5,26,30}

To build a resilient and democratized health system, policymakers are recommended to:

Develop digital public infrastructure: Expand broadband and provide uninterrupted electrical power in rural areas; mandate EHR (Electronic Health Records) implementation in primary health centres and their integration with Ayushman Bharat Digital Mission;

Foster public-private partnership: Subsidise the purchase of AI diagnostic equipment, funding of rural pilot projects via partnerships between ministries, NGOs, and AI companies;

Improve regulations: Develop and finalise comprehensive data protection legislation; require validation and fairness analysis for AI devices from regulators;

Encourage context-appropriate innovation: Allocate money for the design of frugal, offline-capable and multilingual AI tools.

Public health implications

Use of artificial intelligence to augment primary care in rural India has the potential to promote health equality and decrease the burden of disease. Broadened access to diagnostics and specialist care helps reduce the urban-rural healthcare gap, enabling patients to receive timely, precise treatment. Early diagnosis of diseases like TB, diabetes and heart disease with the aid of AI allows for quicker therapy initiation and prevention of complications. Introduction of AI in rural primary care (through telemedicine and decision-support systems) provides rural primary care providers with additional tools to deliver evidence-based care. Such practice will minimise unnecessary referrals and costs while ensuring system efficiency and improved disease surveillance.

LIMITATIONS

The review described above suffers from several limitations. First, because it is a narrative review, it is

prone to selection bias, making it less reliable than other review types. Secondly, the evidence in the field is scarce; most available studies are pilot projects, observational studies, or reports; very few RCTs have been conducted to assess the effectiveness or cost-effectiveness of AI tools. Lastly, there is little Indian-specific data; many findings are drawn from the international literature because studies of Indian healthcare are not yet sufficiently extensive.

CONCLUSION

The introduction of AI in rural and semi-urban healthcare in India is a chance for addressing long-standing deficiencies and injustices in the country's healthcare ecosystem. Recent developments demonstrate that AI is advancing from theory into practice and is now able to transform the way care is provided.

AI-driven teleradiology, offline diagnostics, telemedicine triaging, and disease surveillance allow extending access to cutting-edge medicine and improving accuracy of diagnosis even in the most inaccessible areas. However, no matter how valuable this emerging technology might be, it will not solve structural problems existing in India's health system. To realize the maximum potential of AI in rural India, it is important to shift from the use of this technology in isolated projects to building fully functional, sustainable, and effective health systems. This process calls for the implementation of a holistic strategy that considers not only technical but also socio-cultural factors.

It is crucial to involve policymakers, tech specialists, and stakeholders of health systems in collecting representative data for minimizing AI bias. Meanwhile, investments should be made in infrastructure development, the adoption of interoperable platforms like Ayushman Bharat Digital Mission, and transparent governance.

Finally, it would be wise to focus on the role of AI in augmenting rather than replacing healthcare workers. The introduction of technology that is relevant to the specific context, which can help in automating routine paperwork and providing clear decision-making guidance in clinical practice, would allow optimizing the work of rural health workers. In other words, the proper implementation of AI in the Indian context requires careful planning and training programs.

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REFERENCES

1. Ahuja DS. Assessing health workforce distribution across rural and urban India—policy gaps and recommendations. 2023.
2. Mehta V, Ajmera P, Kalra S, Miraj M, Gallani R, Shaik RA, et al. Human resource shortage in India's health sector: a scoping review of the current landscape. *BMC Public Health*. 2024;24:1368.
3. Mani S, Patnaik S, Lahariya C. Electricity access, sources, and reliability at primary health centers in India and effect on service provision: evidence from two nation-wide surveys. *Indian J Community Med*. 2021;46(1):51-6.
4. Kapoor A. Commercialization of elastography in India: a critical analysis of screening practices and healthcare policy implications. *Int J Gastroenterol*. 2025;9(2):122-33.
5. Das SK, Dasgupta R, Deb Roy S, Shil D. AI in Indian healthcare: from roadmap to reality. *Intelligent Pharmacy*. 2024;2(3):329-34.
6. Dastidar BG, Jani AR, Suri S, Nagaraja VH. Reimagining India's national telemedicine service to improve access to care. *Lancet Reg Health Southeast Asia*. 2024;30:100480.
7. Babarinde AO, Ayo-Farai O, Maduka CP, Okongwu CC, Ogundairo O, Sodamade O. Review of AI applications in healthcare: comparative insights from the USA and Africa. *Int Med Sci Res J*. 2023;3(3):92-107.
8. Kumar A. AI-driven telemedicine: enhancing remote diagnostics and patient monitoring. *Int J Res Innov Soc Sci*. 2025;9(3):6033-7.
9. Chandramohan A, Krothapalli V, Augustin A, Kandagaddala M, Thomas HM, Sudarsanam TD, et al. Teleradiology and technology innovations in radiology: status in India and its role in increasing access to primary health care. *Lancet Reg Health Southeast Asia*. 2023;23:100195.
10. Dvijotham K, Winkens J, Barsbey M, Ghaisas S, Stanforth R, Pawlowski N, et al. Enhancing the reliability and accuracy of AI-enabled diagnosis via complementarity-driven deferral to clinicians. *Nat Med*. 2023;29:1814-20.
11. Vijayan S, Jondhale V, Pande T, Khan A, Brouwer M, Hegde A, et al. Implementing a chest X-ray artificial intelligence tool to enhance tuberculosis screening in India: lessons learned. *PLOS Digit Health*. 2023;2(12):e0000404.
12. NITI Aayog. Reimagining radiology: faster, smarter diagnostics with AI. 2025. Available at: <https://frontiertech.niti.gov.in/story/ai-driven-radiology-transforming-diagnostic-accuracy-and-efficiency-in-india/>. Accessed on 17 March 2026.
13. He J, Cao T, Xu F, Wang S, Tao H, Wu T, et al. Artificial intelligence-based screening for diabetic retinopathy at community hospital. *Eye*. 2020;34(3):511-9.
14. Kakileti ST, Madhu HJ, Krishnan L, Manjunath G, Sampangi S, Ramprakash HV. Observational study to evaluate the clinical efficacy of Thermalytix for detecting breast cancer in symptomatic and asymptomatic women. *JCO Global Oncol*. 2020;6.
15. Koirala A, Jha M, Chetty G, Bodapati S, Mishra A, Sahu PK, et al. Development of intelligent suite for malaria pathogen detection in microscopy images. *Sci Rep*. 2024;14.
16. Perez K, Wisniewski D, Ari A, Lee K, Lieneck C, Ramamonjiravelo Z. Investigation into application of AI and telemedicine in rural communities: a systematic literature review. *Healthcare (Basel)*. 2025;13(3):324.
17. Balakrishnan K, Velusamy D, Hinkle HE, Li Z, Ramasamy K, Khan H, et al. Artificial intelligence in rural healthcare delivery: bridging gaps and enhancing equity through innovation. *arXiv*. 2025.
18. Pentakota P, Rudraraju G, Sripada NR, Mamidgi B, Gottipulla C. Screening COVID-19 by Swaasa AI platform using cough sounds: a cross-sectional study. *Sci Rep*. 2023;13(1):18284.
19. Chettri SK, Deka RK, Saikia MJ. Bridging the gap in the adoption of trustworthy AI in Indian healthcare: challenges and opportunities. *AI*. 2025;6(1):10.
20. Zhou J, Park S, Dong S, Tang X, Wei X. Artificial intelligence-driven transformative applications in disease diagnosis technology. *Med Rev*. 2025;5(5):353-77.
21. Sasseville M, Yousefi F, Ouellet S, Naye F, Stefan T, Carnovale V, et al. The impact of AI scribes on streamlining clinical documentation: a systematic review. *Healthcare (Basel)*. 2025;13(12):1447.
22. India AI. Compendium on real world impact of AI in health. Ministry of Electronics and Information Technology, Government of India. 2026. Available at: https://aikosh.indiaai.gov.in/public/files/usecase/uploads-0eeff5e3-b2d7-48d5-ae3a70011482/AI_Health_Compndium_2026_5604af298c.pdf. Accessed on 17 March 2026.
23. Pant D, Grandhe RR, Agrawal J, Kalra JS, Kumar S, Khanna S, et al. Health Sentinel: an AI pipeline for real-time disease outbreak detection. *arXiv*. 2025.
24. Sophia Y, Roxy MK, Murtugudde R, Karipot A, Sapkota A, Dasgupta P, et al. Dengue dynamics, predictions, and future increase under changing monsoon climate in India. *Sci Rep*. 2025;15:1637.
25. Mishra US, Yadav S, Joe W. The Ayushman Bharat Digital Mission of India: an assessment. *Health Syst Reform*. 2024;10(2):2392290.
26. Sharma RS, Rohatgi A, Jain S, Singh D. The Ayushman Bharat Digital Mission (ABDM): making of India's digital health story. *CSI Trans ICT*; 2023.
27. Chaturvedi R, Sharma S, Kirupa P, Pandian G, Sharma S. Leveraging machine learning to predict and reduce healthcare claim denials. 2024.

28. Purohit N, Gupta PC, Buttan S, Chauhan AS, Choudhury RK, Gupta V, et al. Optimizing diabetic retinopathy screening at primary health centres in India: a cost-effectiveness analysis. *PharmacoEconomics Open*. 2025;9.
29. Ministry of Health and Family Welfare. Steps taken to include AI-based diagnostic tools in healthcare. Press Information Bureau. 2024. Available at: <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2199422>. Accessed on 17 March 2026.
30. Kerketta A, Balasundaram S. Leveraging artificial intelligence tools to bridge the healthcare gap in rural areas in India. *J Assoc Physicians India*. 2025;73(10).
31. A SK, G VI, Chaudhari S. A survey on rural internet connectivity in India. arXiv. 2021.
32. National Board of Examinations in Medical Sciences. Artificial intelligence in medical education: curriculum design. 2026. Available at: <https://natboard.edu.in/Sangam/images/AI%20in%20Medical%20Education%20%20Curriculum%20Design.pdf>. Accessed on 17 March 2026.
33. Khalique N, Nasir M, Ahmed S, Siddiqui K. The Role of Artificial Intelligence in Improving the Public Health Care Delivery System in India: A Legal-Ethical Audit. *Indian J Community Med*. 2026;51(1):32-41.
34. Andersen ES, Birk-Korch JB, Hansen RS, Fly LH, Röttger R, Arcani DMC, et al. Monitoring performance of clinical artificial intelligence in health care: a scoping review. *JBI Evid Synth*. 2024;22(12):2423-46.

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