REVIEW ARTICLE

Strategic integration of artificial intelligence in public health: Policy recommendations for improved healthcare delivery

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Abstract

In the field of healthcare, the intersection of Artificial Intelligence (AI) and Public Health has emerged as an essential component, presenting numerous opportunities for innovation that are one of a kind. The purpose of this research paper is to investigate the historical development, current patterns, and global repercussions of incorporating AI into healthcare systems. The paper provides a comprehensive analysis of the application of AI in the field of public health. It covers the progression of the field, beginning with the initial efforts to automate diagnostic procedures and ending with the most recent developments in predictive modeling and precision medicine. The research investigates the degree to which various nations have adopted AI, highlighting both successful implementations and ongoing challenges in the framework of the global landscape. The intentional incorporation of AI is presented as a driving force for the transformation of healthcare provision. This transformation has the potential to provide potential benefits such as improved precision in diagnosis, effectiveness in treatment, and efficient utilization of treatment resources. In addition, the paper places an emphasis on the proactive role that AI plays in identifying and mitigating emerging health risks. Providing useful information about the policies, practices, and frameworks that enable the efficient incorporation of AI into public health is the primary objective of this research. The purpose of this paper is to provide policymakers, healthcare practitioners, and researchers with suggestions that can be put into practice today by combining historical perspectives and analyzing patterns that are currently occurring. The purpose of this action is to have an impact on the conversation that is taking place about the future of healthcare delivery, with the intention of highlighting the significant impact that AI can have on improving the circumstances of public health.

Keywords: Healthcare Innovation, Predictive Modeling, Precision Medicine, Healthcare Policy, Global Health Informatics

Introduction

In recent years, the combination of Artificial Intelligence (AI) and Public Health has resulted in a significant change in the healthcare industry. This change has presented the industry with a variety of opportunities and challenges that are not found elsewhere. AI is utilized in the application of complex computational models and algorithms for the purpose of analyzing large datasets in the field of healthcare. This makes it possible to recognize intricate patterns and to derive insights that can be applied in specific situations. The integration of this technology is intended to bring about a transformation in the delivery of healthcare by enhancing the precision of diagnoses, the efficacy of treatments, and the overall management of health [1].

An examination of the historical applications of AI in public health can be traced back to the initial attempts to automate medical diagnostics. This provides an illustration of the progression from fundamental algorithms to the more complex models that are utilized today [2-3]. The application of AI in public health has progressed beyond the use of simple diagnostic tools over the course of time. It now encompasses predictive modeling, personalized medicine, and the management of population health. This historical trajectory highlights the cyclical nature of technological progress, in which each new development is based on the knowledge and experiences gained from other developments that came before it [4].

The incorporation of AI into public health systems is currently going through a dynamic and varied environment in the current context of the globalization of the world. The various nations and institutions around the world are actively investigating different ways to make use of AI technologies in order to address the specific challenges that are posed by their respective healthcare systems [5]. Several nations have made significant headway in the adoption of AI-powered solutions for disease surveillance, early detection, and treatment optimization, demonstrating the potential for beneficial effects on the outcomes of public health initiatives. Nevertheless, there are some that are still in the preliminary stages of experimentation, and they are having difficulty navigating the complexities of incorporating AI into fully operational healthcare systems [6].

Because of its ability to rethink the way healthcare is delivered, the incorporation of AI into public health is of critical importance. Through the automation of routine tasks, the streamlining of processes, and the provision of data-driven insights, AI has the potential to optimize resource allocation, reduce healthcare costs, and improve patient outcomes [7-8]. Furthermore, the proactive utilization of AI can assist in the prompt identification of emerging health risks and the prompt development of effective countermeasures. In essence, the intentional application of AI in public health has the potential to not only overcome the challenges that are currently present in the healthcare industry but also to anticipate and alleviate the effects of impending health emergencies [9-10].

In India the Indian Council of Medical Research (ICMR) has released new ethical guidelines for harnessing AI in healthcare [11]. These guidelines highlight the immense potential of AI to improve diagnosis, personalize treatment, and revolutionize care delivery. However, they also emphasize the

need for a cautious and responsible approach, addressing concerns around data privacy, bias, transparency, and accountability.

Data privacy: Protecting patient data is paramount. Robust data governance frameworks and stringent security measures are crucial to prevent misuse and ensure informed consent.

Algorithmic bias: AI algorithms can perpetuate existing biases present in training data, leading to unfair outcomes. Careful selection and curation of data sets, along with diverse development teams, are necessary to mitigate bias.

Transparency and explainability: AI decision-making processes should be transparent and understandable for both healthcare professionals and patients. Explainable AI algorithms can foster trust and enable informed participation in care decisions.

Accountability and liability: Clear pathways for identifying and addressing potential harms arising from AI in healthcare are crucial. Establishing ethical frameworks and mechanisms for accountability will build trust and encourage responsible implementation.

The ICMR guidelines provide a valuable roadmap for navigating the ethical complexities of AI in healthcare. By prioritizing data privacy, mitigating bias, ensuring transparency, and establishing accountability, we can unlock the transformative potential of AI while safeguarding the well-being of patients and upholding the highest ethical standards.

The purpose of this research paper is to investigate the diverse dynamics involved in the strategic application of AI in the field of public health and to provide a comprehensive analysis of the policies, practices, and frameworks that can facilitate the successful implementation of the plan. This paper also tries to provide valuable insights for policymakers, healthcare practitioners, and researchers by conducting an analysis of historical perspectives, current trends, and global variations in the adoption of AI. In the end, the objective is to make a significant contribution to the ongoing conversation about how the transformative perspective of AI can be used to shape the future of healthcare delivery.

Related works

The intricate relationship that exists between technology and public health is becoming more evident, which is having an impact on the approaches that we take to prevent, monitor, and deal with potential health hazards. The purpose of this systematic review is to investigate the current state of digital advancements that have an impact on public health. Specifically, the review will search for both potential opportunities and challenges that need to be addressed.

In their article [12], Yardley *et al*., (2023) present the Agile Co-production and Evaluation framework, which emphasizes the significance of continuous collaboration between researchers, communities, and policymakers. In contrast to the traditional top-down models, this iterative methodology encourages comprehensive interventions that are more precisely tailored to the particular requirements and circumstances of the situation.

Research conducted by Yang *et al*., (2020) [13] demonstrates that AI is capable of accurately forecasting and predicting epidemics. Their improved SEIR model, which incorporated AI algorithms, was able to accurately forecast COVID-19 patterns in China across a variety of public health

interventions. Because of this, opportunities arise for the proactive allocation of resources and the focused implementation of containment measures.

In their study, Odone *et al*., (2019) [14] highlighted the significance of digitalization in the field of public health in Europe. The integration of data platforms, virtual communication tools, and real-time surveillance systems is causing a transformation in the processes of data collection, analysis, and dissemination. This transformation is leading to decision-making procedures that are both accelerated and well-informed.

The advancement of technology covers more than just interventions that are directed toward the entire population. By demonstrating the capabilities of using prenatal Magnetic Resonance Imaging (MRI) to visualize the fetal heart in three dimensions, Lloyd *et al*., (2019) [15] demonstrated that this technique can improve the accuracy of prenatal diagnosis and help in the process of making important medical decisions. In their study, Koshy *et al*., (2019) [16] highlighted the significance of technology in evaluating preoperative risks, improving patient outcomes, and optimizing resource distribution.

Hou *et al.,* (2020) developed a rapid diagnostic method for COVID-19 that was based on CRISPR which provided results in a matter of minutes [17]. Technologies that are used at the point of care have a significant potential for facilitating prompt diagnosis and containment, particularly in environments with limited resources. Espinoza (2019) is in agreement with this concept, highlighting the significance of fetal MRI in the detection of congenital heart abnormalities, facilitating prompt intervention, and increasing the rates of survival in infants [18].

For the reason that digital systems are becoming more widespread, it is absolutely necessary to place an emphasis on effective data management. In this day and age of data science, Chiolero *et al*., (2020) [19] have made available a glossary with the intention of improving public health surveillance. The purpose of the glossary is to facilitate efficient communication and to encourage collaboration between various sectors of the academic community.

Wahl *et al*., (2018) [20] argue that AI has the potential to overcome the disparity in healthcare accessibility that exists in environments with limited resources. The ability of AI to automate tasks, provide assistance in diagnosis, and provide access to information contributes to the empowerment of healthcare workers and the improvement of health outcomes in communities that are underserved.

Chen & Decary (2020) [21] emphasized how important it is for leaders in the healthcare industry to have the knowledge and skills necessary to successfully navigate the AI landscape. In order to integrate these technologies in a responsible manner and maximize their impact, it is essential to acquire a comprehensive understanding of the potential, limitations, and ethical considerations associated with these technologies.

Bollyky *et al*., (2019) [22] shed light on the intricate relationship that exists between democratic exposure and the well-being of adults. According to the findings of their investigation into 170 countries, it was found that more robust democratic institutions are associated with lower mortality rates that are caused by specific causes. Consequently, this highlights the significance of

social and political factors in influencing the outcomes of health evaluations.

An investigation into the capabilities of Natural Language Processing (NLP) in the field of public health was carried out by Baclic *et al*., (2020) [23]. Natural Language Processing (NLP) tools have the capacity to analyze vast amounts of written information, such as posts on social media platforms and articles in the news, in order to identify developing outbreaks, monitor public sentiment, and provide valuable insights for targeted communication strategies. This is accomplished through the use of written information.

There are numerous opportunities for improving health outcomes, making healthcare more accessible, and bolstering efforts to prevent disease that are presented by the ongoing digital revolution in public health. Agile collaboration, modeling enhanced by AI, and sophisticated diagnostic tools represent some of the potential for transformation available. It is necessary, however, to overcome challenges in order to successfully navigate this terrain. These challenges include protecting the privacy of data, addressing ethical concerns, and ensuring that everyone has access to these technologies in a fair and equal manner. It is possible for us to make use of the potential of technology to build a future that is both healthier and more equitable for all people if we foster cooperation, advocate for accountable and open execution, and give priority to the needs of communities that are marginalized.

This review provides a concise summary of the technological advancements that are causing a revolution in the field of public health. The provided references are used to draw conclusions, but the references themselves are not specifically mentioned. The text concludes with a call for the responsible and collaborative implementation of technology in order to maximize the benefits it offers while minimizing the risks that may be associated with it. It is important to keep in mind that this is just a preliminary reference. One of the options available to you is to delve more deeply into particular areas of interest or to investigate additional topics that are in line with the objectives of your research.

Strategic integration of AI in public health

The complex interplay between healthcare and technology is intensifying, fundamentally transforming the methods by which we diagnose and treat diseases. AI is at the forefront of this revolution, providing unparalleled capabilities for precise and efficient medical diagnosis in public health. This survey examines the current state of AI applications in medical diagnosis, investigating its potential in various diseases and emphasizing the strategic pathways for harnessing its transformative capabilities. Table 1 shows the major strategic impact on various health issues for public health.

Table 1: Major related works

Author	Disease	ML/DL method	Result	Strategic integration of AI
Chen *et al*., (2021) [24]	Diabetic retinopathy	General deep learning model	93% accuracy for detecting diabetic retinopathy	Automated screening during eye exams
Doshi *et al*., (2016) [25]	Diabetic retinopathy	Deep convolutional neural networks	92.3% accuracy for detecting diabetic retinopathy	Initial screening tool to prioritize patients for ophthalmologist examination
Elshennawy *et al*., (2020) [26]	Pneumonia	Deep learning models based on chest X-ray images	95% accuracy for detecting pneumonia	Assisting doctors in rapid diagnosis and treatment decision-making
Goyal *et al*., (2023) [27]	Lung diseases (pneumonia, COVID-19)	Machine and deep learning techniques	93.4% accuracy for classifying lung diseases	Initial triage tool for COVID-19 and pneumonia, reducing unnecessary testing
Huang *et al*., (2022) [28]	Lymph node metastasis (breast cancer)	Deep neural network	90.6% accuracy for detecting lymph node metastasis	Improve treatment planning and reduce unnecessary surgeries
Lee *et al*., (2019) [29]	Cervical lymph node metastasis (thyroid cancer)	Deep learning with CT scans	91.1% accuracy for detecting lymph node metastasis	Assisting radiologists and resident training for improved diagnosis
Haas *et al*., (2021) [30]	Liver fat accumulation	Machine learning with genetic data	Identify genetic variants associated with fatty liver disease	Personalized risk assessment and early intervention strategies
Hamid *et al*., (2017) [31]	Liver disease	Machine learning with abstention	94.5% accuracy for diagnosing liver disease	Automated screening and triage, freeing up specialists for complex cases
Fan *et al*., (2022) [32]	Lympho-vascular invasion (gastric cancer)	Machine learning with PET/CT and CT scans	92.7% accuracy for predicting lympho-vascular invasion	Guide treatment decisions and improve prognostic accuracy
Dong *et al*., (2020) [33]	Lymph node metastasis (gastric cancer)	Deep learning radiomic nomogram	Improved prediction of lymph node metastasis count	Optimize surgical planning and personalize treatment

Table 1 elaborates the emerging domain of AI-driven medical diagnosis and offers a compelling glimpse into the future of healthcare. The showcased advancements presented here encompass a range of automated screening tools and personalized treatment plans, which present a compelling vision for enhancing patient outcomes, streamlining workflows, and improving disease management. Nevertheless, successfully navigating this terrain requires a careful and comprehensive approach. To ensure responsible and fair implementation of these powerful technologies, it is essential to go thorough validation, strong regulatory frameworks, and a steadfast dedication to ethical considerations. As we adopt AI in medical diagnosis, it is crucial to prioritize collaboration, transparency, and patient-centricity in order to establish a healthier and fairer healthcare ecosystem for everyone.

Challenges and opportunities in integrating AI into public health

The incorporation of AI into public health systems offers a terrain abundant with both obstacles and possibilities. Several obstacles impede the smooth integration of AI in healthcare. The utilization of sensitive health data in AI applications gives rise to concerns regarding consent, confidentiality, and potential misuse, thereby posing a significant challenge in terms of ethical considerations and privacy [34]. Challenges related to data security and interoperability present a major barrier, as there is a requirement for smooth data sharing between different healthcare platforms.

Furthermore, limitations in resources and infrastructure, especially in underdeveloped areas, can hinder the extensive implementation of AI, thereby restricting the availability of advanced healthcare technologies. On the other hand, incorporating AI into public health systems creates new possibilities and advantages. The utilization of advanced disease surveillance and early detection methods has become a crucial benefit, allowing healthcare professionals to promptly and accurately identify and respond to health threats. The concept of personalized medicine and treatment approaches signifies a fundamental change, customizing healthcare interventions based on individual genetic, lifestyle, and environmental factors.

Moreover, AI has the capacity to optimize health resources and enhance cost-effectiveness through the streamlining of processes, enhancing diagnostic accuracy, and ultimately facilitating the more efficient allocation of healthcare resources. The challenges notwithstanding, the opportunities offered by AI in public health highlight its capacity to transform healthcare delivery and greatly enhance public health outcomes worldwide [35].

Policy frameworks and regulations for AI integration in public health

Policy frameworks and regulations are essential in determining the responsible and efficient incorporation of AI into public health systems. These guidelines establish a systematic method to regulate the creation, implementation, and utilization of AI technologies in the healthcare sector, taking into account ethical, legal, and societal factors. Establishing comprehensive policies is crucial for maximizing the advantages of AI while minimizing potential risks and safeguarding patient rights. An essential component of policy frameworks involves establishing clear ethical guidelines and robust privacy protections. To ensure the protection of health data used in AI applications, policies should establish principles

that give priority to patient confidentiality, informed consent, and transparent data usage. This will foster confidence among individuals who contribute their data to AI systems and serve as a safeguard against potential abuse [36].

Policy frameworks encompass crucial aspects of data sharing and interoperability standards. Facilitating uninterrupted communication and transfer of health data between various systems is crucial for the effective implementation of AI integration. Policies should define procedures for data formats, security standards, and interoperability to enhance cooperation between healthcare providers and technology developers. Furthermore, policy frameworks must tackle concerns pertaining to accountability, liability, and transparency. Precise guidelines should delineate the obligations of stakeholders, encompassing healthcare professionals, AI developers, and regulatory bodies, in the event of unfavorable incidents or malfunctions in the system. Transparency requirements guarantee that AI algorithms operate in a manner that can be comprehended and interpreted by relevant parties, thereby enhancing trust and acceptance [37]. Policy recommendations must prioritize providing both financial and strategic support for AI research and development, as it is a critical aspect. It is imperative for governments and regulatory bodies to allocate resources towards promoting innovation, facilitating interdisciplinary collaborations, and ensuring that the advantages of AI are accessible to a diverse range of healthcare providers and communities. Policy frameworks and regulations are essential for ensuring responsible integration of AI in public health. These policies facilitate the ethical and effective implementation of AI technologies in healthcare by addressing ethical concerns, establishing data management standards, ensuring transparency, and providing support for research and development [38]. As a result, they contribute to improved healthcare delivery and public health outcomes.

The exponential growth of AI in the field of public health necessitates the establishment of strong policy frameworks and regulations to guarantee its responsible, ethical, and efficient incorporation. These frameworks need to navigate an intricate terrain, striking a balance between novelty and responsibility, privacy and data-driven observations, and individual rights and collective welfare.

Essential elements of policy frameworks

Data governance: Data privacy and security: Strict regulations such as GDPR and HIPAA govern the process of collecting, storing, and using data, ensuring the protection of individual privacy and preventing any form of misuse.

Data quality and transparency: Ensuring the accuracy, completeness, and diversity of data is vital for reliable AI models and equitable outcomes, thereby emphasizing data quality and transparency. Trust is established through the implementation of transparent practices in the selection and processing of data.

Algorithmic governance

Bias mitigation

Bias mitigation is crucial in order to prevent discriminatory outcomes by addressing biases present in training data and algorithms. It is essential to have development teams with a variety of backgrounds and to conduct regular audits to identify and address any biases.

Explainability and Interpretability

Explainability and interpretability are crucial in allowing healthcare professionals and the public to comprehend the decision-making process of AI algorithms, thereby promoting trust and transparency.

Risk management and oversight

Regulatory frameworks: Establishing unambiguous regulatory frameworks for the development, implementation, and supervision of AI ensures the protection of public health. Regular risk assessments and audits are crucial.

Ethical considerations

Ethical considerations should be paramount in guiding the development and application of AI in public health, with principles such as beneficence, non-maleficence, justice, and autonomy serving as the guiding framework.

Implications for improved healthcare delivery

The convergence of AI and healthcare is no longer science fiction, but a tangible reality transforming how diseases will be diagnosed, treated, and prevented. This integration holds immense potential for revolutionizing healthcare delivery across various dimensions, leading to: [39-40]

Enhanced diagnostics and prognosis: AI-powered algorithms can analyze vast medical data, including images, genetics, and electronic health records, aiding in faster, more accurate diagnoses and personalized risk assessments. Early detection and proactive intervention become tangible possibilities. Machine learning models can predict disease progression and treatment response, allowing healthcare professionals to tailor therapy plans and optimize resource allocation.

Streamlined clinical workflows and efficiency: Automated tasks like appointment scheduling, data entry, and administrative work can be tackled by AI, freeing up healthcare professionals to focus on patient care and decision-making. Virtual assistants and chatbots can answer patient questions, provide health information, and triage symptoms, reducing workload on medical staff and increasing patient accessibility.

Personalized and preventive healthcare: AI algorithms can analyze individual data to predict health risks and recommend personalized preventive measures, fostering proactive health management. Precision medicine approaches empowered by AI can tailor treatment plans to individual genetic profiles and biological markers, maximizing therapeutic efficacy and minimizing side effects.

Improved accessibility and equity in healthcare: AI-powered telemedicine platforms can extend healthcare access to remote and underserved communities, bridging geographical and financial barriers. Language translation tools powered by AI can facilitate communication between healthcare providers and patients with diverse linguistic backgrounds, improving healthcare equity and inclusion.

Optimized public health management: AI-driven surveillance systems can analyze real-time data to detect disease outbreaks, predict epidemics, and inform rapid public health interventions. Resource allocation and logistics can be optimized using AI models, ensuring efficient deployment of healthcare personnel and medical supplies during emergencies.

However, navigating this landscape requires careful consideration of potential challenges [41]:

1. Data privacy and security concerns must be addressed through robust regulations and ethical frameworks.
2. Algorithmic bias can lead to unfair outcomes if not mitigated proactively through diverse data sets and development teams.
3. Transparency and explainability of AI decisions are crucial for building trust and ensuring patient autonomy.
4. Building the necessary infrastructure and training a skilled workforce to support AI integration is essential.

The integration of AI in healthcare presents a paradigm shift, unlocking exciting possibilities for improved healthcare delivery. By embracing the opportunities while addressing the challenges responsibly, we can ensure that AI serves as a powerful tool to create a healthier future for all.

Conclusion

Ultimately, the deliberate incorporation of AI into public health presents itself as a powerful catalyst capable of fundamentally transforming the way healthcare is provided. In this research paper, we have examined the historical development of AI applications in public health, investigated the difficulties and possibilities associated with its implementation, and analyzed the important role of policy frameworks in guiding responsible integration. The implications for enhanced healthcare delivery are apparent, encompassing improved diagnostic precision and tailored treatment methods, as well as optimized resource allocation and proactive measures to address emerging health risks. In order to effectively incorporate AI, it is crucial to acknowledge the ethical, legal, and societal consequences. This requires the development of strong policy frameworks that prioritize both innovation and the protection of patient rights. Despite the ongoing challenges of privacy concerns and resource constraints, the potential benefits of AI are extensive, offering the promise of a future where healthcare is more readily available, efficient, and personalized to individual requirements.

Future directions

The future prospects for research and implementation in this field are vast. It is crucial to continue refining AI algorithms for healthcare applications, tackling interoperability challenges, and promoting international collaboration. Furthermore, it is crucial to prioritize research that assesses the enduring effects of AI implementation on health results, inequalities, and the availability of healthcare. The creation of standardized frameworks for assessing the ethical ramifications of AI technologies in public health, along with the establishment of global guidelines, will enhance the responsible implementation of AI. Furthermore, the continuous progress in AI technologies, such as explainable AI and federated learning, offer potential solutions to current issues and enhance the clarity of AI applications in healthcare. By exploring these boundaries, we can guarantee that the incorporation of AI into public health remains a catalyst for beneficial transformation, leading to a more robust, adaptable, and fair healthcare environment.

References

1. Johnson KB, Wei WQ, Weeraratne D, Frisse ME, Misulis K, Rhee K, *et al*. Precision Medicine, AI, and the Future of Personalized Health Care. *Clin Transl Sci* 2021;14(1):86-93.
2. Gouda S, Sathyajith R, Peerapur B V. A novel approach to predict the risk of invasive candidiasis using artificial neural networks and comparison with other models. *J Krishna Inst Med Sci Univ* 2022;11(4):10-19.
3. Sannathimmappa MB, Nambiar V, Patil R. Emerging and re-emerging viral infections in the 21st century: Microbiological and public health perspectives. *J Krishna Inst Med Sci Univ* 2021;10(2):1-20.
4. Mehta N, Pandit A, Shukla S. Transforming healthcare with big data analytics and artificial intelligence: A systematic mapping study. *J Biomed Inform* 2019;100: 103311.
5. Alaboud K, Toubal IE, Dahu BM, Daken AA, Salman AA, Alaji N, *et al*. The quality application of deep learning in clinical outcome predictions using electronic health record data: A systematic review. *South East Eur J Public Health* 2023; 21(XXI):9-23.
6. Khetani V, Gandhi Y, Bhattacharya S, Ajani SN, Limkar S. Cross-domain analysis of ML and DL: Evaluating their impact in diverse domains. *Intell Syst Appl Eng* 2023;11(7S):253-262.
7. Gobianidze M, Hammond J, Jürgens K, Reisser K, Kalaitzi V. Advancing the diversity and inclusion agenda in healthcare organizations: The case of German university hospitals. *South East Eur J Public Health* 2023:1-14.
8. Eick D, Aubert O, Dempsey K, Ozawa M, Van EE, Neicun J. The COVID-19 pandemic and the right to health of people who use drugs. *South East Eur J Public Health* 2023:1-22.
9. Iqbal J, Cortés JDC, Makineni P, Subramani S, Hemaida S, Thugu TR, *et al*. Reimagining Healthcare: Unleashing the Power of Artificial Intelligence in Medicine. *Cureus* 2023;15(9): e44658.
10. Kaur S, Singla J, Nkenyereye L, Jha S, Prashar D, Joshi GP, *et al*. Medical diagnostic systems using artificial intelligence (AI) algorithms: Principles and perspectives. *IEEE Access* 2020;8:228049-228069. .
11. Team DHR-ICMR AI Cell, New Delhi, India. Ethical guidelines for application of artificial intelligence in biomedical research and healthcare. ICMR 2023; 3:1-63. Accessed on 23rd Nov 2023: https://main.icmr. nic. in/ sites/default/files/upload_documents/ Ethical_ Guidelines_AI_Healthcare_2023.pdf
12. Yardley L, Denford S, Kamal A, May T, Kesten JM, French CE, *et al*. The agile co-production and evaluation framework for developing public health interventions, messaging and guidance. *Front Public Health* 2023;11:1094753.
13. Yang Z, Zeng Z, Wang K, Wong SS, Liang W, Zanin M, *et al*. Modified SEIR and AI prediction of the epidemics trend of COVID-19 in China under public health interventions. *J Thorac Dis* 2020;12(3):165-174.
14. Odone A, Buttigieg S, Ricciardi W, Azzopardi-Muscat N, Staines A. Public health digitalization in Europe. *Eur J Public Health* 2019; 29(Supplement_3):28-35.
15. Lloyd DFA, Pushparajah K, Simpson JM, van Amerom JFP, van Poppel MPM, Schulz A, *et al*. Three-dimensional visualisation of the fetal heart using prenatal MRI with motion-corrected slice-volume registration: a prospective, single-centre cohort study. *Lancet* 2019; 393(10181):1619-1627.
16. Koshy AN, Ramchand J, Farouque O. Functional capacity and preoperative risk evaluation. *Lancet* 2019; 393(10181):1593.
17. Hou T, Zeng W, Yang M, Chen W, Ren L, Ai J, *et al*. Development and evaluation of a rapid CRISPR-based diagnostic for COVID-19. *PLoS Pathog* 2020;16(8):1-12.
18. Espinoza J. Fetal MRI and prenatal diagnosis of congenital heart defects. *Lancet* 2019; 393(10181): 1574-1576.
19. Chiolero A, Chiolero A, Chiolero A, Chiolero A, Buckeridge D. Glossary for public health surveillance in the age of data science. *J Epidemiol Community Health* 2020;74(7):612-616.
20. Wahl B, Cossy-Gantner A, Germann S, Schwalbe NR. Artificial intelligence (AI) and global health: how can AI contribute to health in resource-poor settings? *BMJ Glob Health* 2018; 3(4):e000798.
21. Chen M, Decary M. Artificial intelligence in healthcare: An essential guide for health leaders. *Healthc Manag Forum* 2020; 33(1):10-18.
22. Bollyky TJ, Templin T, Cohen M, Schoder D, Dieleman JL, Wigley S. The relationships between democratic experience, adult health, and cause-specific mortality in 170 countries between 1980 and 2016: an observational analysis. *Lancet* 2019; 393(10181):1628-1640.

23. Baclic O, Tunis M, Young K, Doan C, Swerdfeger H, Schonfeld J. Challenges and opportunities for public health made possible by advances in natural language processing. *Can Commun Dis Rep* 2020; 46(6):161-168.
24. Chen PN, Lee CC, Liang CM, Pao SI, Huang KH, Lin KF. General deep learning model for detecting diabetic retinopathy. *BMC Bioinformatics* 2021; 22(Suppl 5):84.
25. Doshi D, A. Shenoy A, Sidhpura D, Gharpure P. Diabetic retinopathy detection using deep convolutional neural networks. *Int Conf Comput Analyt Secur Trend* 2016: 261-266.
26. Elshennawy NM, Ibrahim DM. Deep-pneumonia framework using deep learning models based on chest X-ray images. *Diagnostics (Basel)* 2020;10(9):649.
27. Goyal S, Singh R. Detection and classification of lung diseases for pneumonia and Covid-19 using machine and deep learning techniques. *J Ambient Intell Humaniz Comput* 2023;14(4):3239-3259.
28. Huang SC, Chen CC, Lan J, Hsieh TY, Chuang HC, Chien MY, *et al*. Deep neural network trained on gigapixel images improves lymph node metastasis detection in clinical settings. *Nat Commun* 2022;13(1): 1-14.
29. Lee JH, Ha EJ, Kim JH. Application of deep learning to the diagnosis of cervical lymph node metastasis from thyroid cancer with CT. *Eur Radiol* 2019; 29(10):5452-5457.
30. Haas ME, Pirruccello JP, Friedman SN, Wang M, Emdin CA, Ajmera VH, *et al*. Machine learning enables new insights into genetic contributions to liver fat accumulation. *Cell Genom* 2021;1(3):100066.
31. Hamid K, Asif A, Abbasi W, Sabih D, Minhas FUAA. Machine learning with abstention for automated liver disease diagnosis. In: Proceedings-International conference on frontiers of information technology, FIT 2017. Institute of Electrical and Electronics Engineers Inc.; 2017: 356-361.
32. Fan Z, Guo Y, Gu X, Huang R, Miao W. Development and validation of an artificial neural network model for non-invasive gastric cancer screening and diagnosis. *Sci Rep* 2022;12(1):21795.
33. Dong D, Fang MJ, Tang L, Shan XH, Gao JB, Giganti F, *et al*. Deep learning radiomic nomogram can predict the number of lymph node metastasis in locally advanced gastric cancer: An international multicenter study. *Ann Oncol* 2020;31(7):912-920.
34. Mikhaylov SJ, Esteve M, Campion A. Artificial intelligence for the public sector: opportunities and challenges of cross-sector collaboration. *Philos Trans R Soc A Math Phys Eng Sci* 2018; 376(2128):20170357.
35. Wang Q, Su M, Zhang M, Li R. Integrating digital technologies and public health to fight COVID-19 pandemic: Key technologies, applications, challenges and outlook of digital healthcare. *Int J Environ Res Public Health* 2021;18(11):6053.
36. Pesapane F, Bracchi DA, Mulligan JF, Linnikov A, Maslennikov O, Lanzavecchia MB, *et al*. Legal and regulatory framework for AI solutions in healthcare in EU, US, China, and Russia: New scenarios after a pandemic. *Radiation* 2021; 1(4): 261-276.
37. Gama F, Tyskbo D, Nygren J, Barlow J, Reed J, Svedberg P. Implementation frameworks for artificial intelligence translation into health care practice: Scoping review. *J Med Internet Res* 2022; 24(1):e32215.
38. Wirtz BW, Weyerer JC, Kehl I. Governance of artificial intelligence: A risk and guideline-based integrative framework. *Gov Inf Q* 2022; 39(4):101685.
39. Kelly JT, Campbell KL, Gong E, Scuffham P. The internet of things: Impact and implications for health care delivery. *J Med Internet Res* 2020;22(11):e20135.
40. Olawade DB, Wada OJ, David-Olawade AC, Kunonga E, Abaire O, Ling J. Using artificial intelligence to improve public health: a narrative review. *Front Public Health* 2023;11:1196397.
41. de Almeida PGR, dos Santos CD, Farias JS. Artificial intelligence regulation: A framework for governance. *Ethics Inf Technol* 2021; 23(3):505-525.

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