A.I. eUpdate – Autumn 2024

Figure 1 NHS Lanarkshire Logo

Contents

AI and Cancer

1. Hill, Harry, Cristina Roadevin, Stephen Duffy, Olena Mandrik and Adam Brentnall. **Cost-Effectiveness of AI for Risk-Stratified Breast Cancer Screening.** JAMA network open. 2024.Vol.7(9), ppe2431715. Previous research has shown good discrimination of short-term risk using an artificial intelligence (AI) risk prediction model (Mirai). However, no studies have been undertaken to evaluate whether this

might translate into economic gains. To assess the cost-effectiveness of incorporating risk-stratified screening using a breast cancer AI model into the United Kingdom (UK) National Breast Cancer Screening Program. This study, conducted from January 1, 2023, to January 31, 2024, involved the development of a decision analytical model to estimate health-related quality of life, cancer survival rates, and costs over the lifetime of the female population eligible for screening. The analysis took a UK payer perspective, and the simulated cohort consisted of women aged 50 to 70 years at screening. Mammography screening at 1 to 6 yearly screening intervals based on breast cancer risk and standard care (screening every 3 years). Incremental net monetary benefit based on quality-adjusted life-years (QALYs) and National Health Service (NHS) costs (given in pounds sterling; to convert to US dollars, multiply by 1.28). Artificial intelligence-based risk-stratified programs were estimated to be cost-saving and increase QALYs compared with the current screening program. A screening schedule of every 6 years for lowest-risk individuals, biannually and triennially for those below and above average risk, respectively, and annually for those at highest risk was estimated to give yearly net monetary benefits within the NHS of approximately £60.4 (US $77.3) million and £85.3 (US $109.2) million, with QALY values set at £20 000 (US $25 600) and £30 000 (US $38 400), respectively. Even in scenarios where decision-makers hesitate to allocate additional NHS resources toward screening, implementing the proposed strategies at a QALY value of £1 (US $1.28) was estimated to generate a yearly monetary benefit of approximately £10.6 (US $13.6) million. In this decision analytical model study of integrating risk-stratified screening with a breast cancer AI model into the UK National Breast Cancer Screening Program, risk-stratified screening was likely to be cost-effective, yielding added health benefits at reduced costs. These results are particularly relevant for health care settings where resources are under pressure. New studies to prospectively evaluate AI-guided screening appear warranted.

2. Uwimana A, Gnecco G, Riccaboni M. **Artificial intelligence for breast cancer detection and its health technology assessment: A scoping review.** Computers in biology and medicine. 2025 Jan 1;184:109391.

AI and Education

1. Hammoudi Halat, Dalal, Rula Shami, Alaa Daud, Waqas Sami, Abderrezzaq Soltani and Ahmed Malki. **Artificial Intelligence Readiness, Perceptions, and Educational Needs Among Dental Students: A Cross-Sectional Study.** Clinical and experimental dental research. 2024.Vol.10(4), ppe925–n/a. Objectives With Artificial Intelligence (AI) profoundly affecting education, ensuring that students in health disciplines are ready to embrace AI is essential for their future workforce integration. This study aims to explore dental students' readiness to use AI, perceptions about AI in health education and healthcare, and their AI-related educational needs. Material and Methods A cross-sectional survey was conducted among dental students at the College of Dental Medicine, Qatar University. The survey assessed readiness for AI using the Medical Artificial Intelligence Readiness Scale (MAIRS). Students' perceptions of AI in healthcare and health education and their educational needs were also explored. Results A total of 94 students responded to the survey. AI readiness scores were average (3.3 ± 0.64 out of 5); while participants appeared more ready for the vision and ethics domains of MAIRS, they showed less readiness regarding cognition and ability. Participants scored average on AI perceptions (3.35 ± 0.45 out of 5), with concerns regarding AI risks and disadvantages. They expressed a high need for knowledge and skills related to AI use in healthcare (84%), AI for health-related research (81.9%), and AI in radiology and imaging procedures (79.8%). Student readiness had a significant correlation with AI perceptions and perceived level of AI knowledge. Conclusions This is the first study in Qatar exploring dental students' AI readiness, perceptions, and educational needs regarding AI applications in education and healthcare. The perceived AI knowledge gaps could inform future curricular AI integration. Advancing AI skills and deepening AI comprehension can empower future dental professionals through anticipated advances in the AI-driven healthcare landscape.

2. Montejo, Leigh, Ashley Fenton and Gerrin Davis. **Artificial intelligence (AI) applications in healthcare and considerations for nursing education**. Nurse education in practice. 2024.Vol.80 pp104158. To review the current AI applications in healthcare and explore the implications for nurse educators in innovative

integration of this technology in nursing education and training programs. There are a variety of Artificial Intelligence (AI) applications currently supporting patient care in many healthcare settings. A nursing workforce that leverages healthcare technology to enhance efficiency and accuracy of patient health outcomes is necessary. Nurse educators must understand the various uses of AI applications in healthcare to equip themselves to effectively prepare students to use the applications. Qualitative synthesis and analysis of existing literature. Generative AI (ChatGPT) was used to support the development of a list of the current AI applications in healthcare. Each application was evaluated for relevance and accuracy. A literature review to define and understand the use of each application in clinical practice was completed. The search terms "AI" and "Health Education" were used to review the literature for evidence on educational programs used for training learners. Ten current applications of AI in healthcare were identified and explored. There is little evidence that outlines how to integrate AI education into educational training for nurses. A comprehensive multimodal educational approach that uses innovative learning strategies has potential to support the integration of AI concepts into nursing curriculum. The use of simulation and clinical practicum experiences to support experiential learning and to offer opportunities for practical application and training. Considerations for ethical use and appropriate critical evaluation of AI applications are necessary.

3. Naqvi, Waqar M., Habiba Sundus, Gaurav Mishra, Ramprasad Muthukrishnan and Praveen K. Kandakurti**. AI in Medical Education Curriculum: The Future of Healthcare Learning.** European Journal of Therapeutics. 2024.Vol.30(2), ppe23–e25. To address the evolving, quantitative nature of healthcare in the twenty-first century, it is imperative to integrate artificial intelligence (AI) with healthcare education. To bridge this educational gap, it is imperative to impart practical skills for the utilisation and interpretation of AI in healthcare settings, integrate technology into clinical operations, develop AI technologies, and enhance human competencies 1]. The swift rise of AI in contemporary society can be ascribed to the progress of intricate algorithms, cost-effective graphic processors, and huge annotated databases. AI has been a crucial component of healthcare education in recent years

and has been implemented by numerous medical institutions globally. AI is widely prevalent in medical education in Western countries, in contrast to developing countries. The disparity could be mitigated through more infrastructural assistance from medical institutions in underdeveloped nations. It is crucial to raise awareness among medical educators and students regarding AI tools to facilitate the development and integration of AI-based technologies in medical education 2]. AI can impact the student learning process through three methods: direct instruction (transferring knowledge to the student in a teacher-like role), instructional support (assisting students as they learn), and learner empowerment (facilitating collaboration among multiple students to solve complex problems based on teacher feedback). Incorporating artificial intelligence (AI) tools into education can augment students' knowledge, foster skill acquisition, and deepen comprehension of intricate medical topics 2,3]. Virtual reality (VR) can enhance the immersion of learning sessions with virtual patients. Virtual Reality (VR) is a software-driven technology that generates a virtual environment with three-dimensional characteristics. Virtual Reality (VR) uses a head-mounted display or glasses to build a computer-simulated environment that provides a convincing and lifelike experience for the user. Conversely, augmented reality (AR) enhances the real-world environment by superimposing virtual elements onto a user's perspective of the actual world through a smartphone or similar device. By integrating these technologies, learners are able to investigate and actively participate in intricate clinical situations, resulting in a more pleasurable and efficient learning experience 4,5]. AI-powered games utilise data mining methodologies to examine the data gathered during gameplay and enhance the player's knowledge and abilities. In addition, they provide a personalised and engaging encounter that adapts the speed and level of challenge according to the player's achievements. Incorporating game components such as points, badges, and leaderboards enhances the enjoyment and engagement of the learning process. The implementation of gamification in the learning process boosts student engagement, fosters collaborative efforts, and optimises learning results. Additionally, they offer chances for clinical decision-making without any potential risks and provide instant feedback to the students, thereby becoming an essential component of undergraduate medical education 6]. By incorporating artificial

intelligence (AI) techniques into learning management systems (LMS), learners are equipped with the necessary resources to achieve mastery at their own individualised pace. These computer algorithms assess the learner's level of understanding and deliver personalised educational material to help them achieve mastery of the content. The AI-powered platforms guide learners by effectively organising and arranging learning experiences, and then implementing targeted remedial actions. These customised and adaptable teaching techniques enhance the effectiveness and efficiency of learning. Virtual patients are computer-based simulations that replicate real-life clinical events and are used for training and education in health professions. Virtual patients are built to simulate authentic symptoms, react to students' treatments, and create dynamic therapeutic encounters. The student assumes the position of a healthcare provider and engages in activities such as gathering information, proposing potential diagnoses, implementing medical treatment, and monitoring the patient's progress. These simulations can accurately reproduce a range of medical settings and expose trainees to the problems they might encounter in real-world situations. Medical students can enhance their communication and clinical reasoning skills by engaging with virtual patients in a simulated environment that closely resembles real-life situations 6,7]. Furthermore, AI-driven solutions can be advantageous for educational purposes in diagnostic fields such as radiology, pathology, and microbiology. Content-based image retrieval (CBIR) is a highly promising method utilised in the field of radiology for educational and research purposes. CBIR facilitates the search for photos that have similar content with a reference image, utilising information extracted from the images 8]. Moreover, artificial intelligence (AI) integrated with machine learning techniques is currently being employed to accurately diagnose microbial illnesses. This application of AI has significant potential in training and educating specialists in the field of microbiology. Conversely, the current progress in AI-driven deep learning technologies that specifically target cellular imaging has the potential to revolutionise education in diagnostic pathology 9]. Ultimately, incorporating AI training into the medical education curriculum is a transformative step that will shape the future of healthcare practitioners. This sequence provides enhanced diagnostic precision, personalised learning prospects,

and heightened ethical awareness. These potential benefits surpass the obstacles, initiating a new era in medical education where human beings and technology collaborate to deliver optimal patient care. The purposeful and calculated integration of AI into medical education will have a pivotal impact on shaping the future of healthcare as we navigate this unexplored territory.

4. Robleto, Emely, Ali Habashi, Mary-Ann Benites Kaplan, et al. **Medical students' perceptions of an artificial intelligence (AI) assisted diagnosing program**. Med.Teach. 2024.Vol.46(9), pp1–1186. As artificial intelligence (AI) assisted diagnosing systems become accessible and user-friendly, evaluating how first-year medical students perceive such systems holds substantial importance in medical education. This study aimed to assess medical students' perceptions of an AI-assisted diagnostic tool known as 'Glass AI.' Data was collected from first year medical students enrolled in a 1.5-week Cell Physiology pre-clerkship unit. Students voluntarily participated in an activity that involved implementation of Glass AI to solve a clinical case. A questionnaire was designed using 3 domains: 1) immediate experience with Glass AI, 2) potential for Glass AI utilization in medical education, and 3) student deliberations of AI-assisted diagnostic systems for future healthcare environments. 73/202 (36.10%) of students completed the survey. 96% of the participants noted that Glass AI increased confidence in the diagnosis, 43% thought Glass AI lacked sufficient explanation, and 68% expressed risk concerns for the physician workforce. Students expressed future positive outlooks involving AI-assisted diagnosing systems in healthcare, provided strict regulations, are set to protect patient privacy and safety, address legal liability, remove system biases, and improve quality of patient care. In conclusion, first year medical students are aware that AI will play a role in their careers as students and future physicians.

5. Singla, Rohit, Nikola Pupic, Seyed-Aryan Ghaffarizadeh, et al. **Developing a Canadian artificial intelligence medical curriculum using a Delphi study**. npj Digit.Med. 2024.Vol.7(1), pp323–10. The integration of artificial intelligence (AI) education into medical curricula is critical for preparing future healthcare professionals. This research employed the Delphi method to establish an expert-based AI curriculum for Canadian undergraduate medical students. A panel of 18 experts in health and AI

across Canada participated in three rounds of surveys to determine essential AI learning competencies. The study identified key curricular components across ethics, law, theory, application, communication, collaboration, and quality improvement. The findings demonstrate substantial support among medical educators and professionals for the inclusion of comprehensive AI education, with 82 out of 107 curricular competencies being deemed essential to address both clinical and educational priorities. It additionally provides suggestions on methods to integrate these competencies within existing dense medical curricula. The endorsed set of objectives aims to enhance AI literacy and application skills among medical students, equipping them to effectively utilize AI technologies in future healthcare settings.

6. Yakusheva, Olga, Monique J. Bouvier and Chelsea O. P. Hagopian. **How Artificial Intelligence is altering the nursing workforce**. Nurs.Outlook. 2025.Vol.73(1), pp102300. This paper focuses on the implications of Artificial Intelligence (AI) for the nursing workforce, examining both the opportunities presented by AI in relieving nurses of routine tasks and enabling better patient care, and the potential challenges it poses. The discussion highlights the freeing of nurses' time from administrative duties, allowing for more patient interaction and professional development, while also acknowledging concerns about job displacement. Ethically integrating AI into patient care and the need for nurses' proactive engagement with AI—including involvement in its development and integration in nursing education—are emphasized. Finally, the paper asserts the necessity for nurses to become active participants in AI's evolution within health care to ensure the enhancement of patient care and the advancement of nursing roles. •Impact of Artificial Intelligence (AI) on nursing workforce is infrequently discussed.•We discuss AI-driven opportunities and threats for nursing profession and practice.•Data show that nursing’s person-centeredness protects against job displacement by AI.•Nurses must engage in the ethical integration of AI in education and practice.

AI and Ethics

1. Arjanto, Paul, Feibry F. W. Senduk, Umi Nahdiyah and Mukti S. Utami. **AI and ethics in mental health: exploring the controversy over the use of ChatGPT**. Journal of public health (Oxford, England). 2024.Vol.46(2), ppe340–e341.

2. Bouderhem, Rabaï. **Shaping the future of AI in healthcare through ethics and governance**. Humanities & social sciences communications. 2024.Vol.11(1), pp416–12. The purpose of this research is to identify and evaluate the technical, ethical and regulatory challenges related to the use of Artificial Intelligence (AI) in healthcare. The potential applications of AI in healthcare seem limitless and vary in their nature and scope, ranging from privacy, research, informed consent, patient autonomy, accountability, health equity, fairness, AI-based diagnostic algorithms to care management through automation for specific manual activities to reduce paperwork and human error. The main challenges faced by states in regulating the use of AI in healthcare were identified, especially the legal voids and complexities for adequate regulation and better transparency. A few recommendations were made to protect health data, mitigate risks and regulate more efficiently the use of AI in healthcare through international cooperation and the adoption of harmonized standards under the World Health Organization (WHO) in line with its constitutional mandate to regulate digital and public health. European Union (EU) law can serve as a model and guidance for the WHO for a reform of the International Health Regulations (IHR).

3. Crider, Cori. **Two paths for health AI governance: paternalism or democracy**. Future healthcare journal. 2024.Vol.11(3), pp100180. This article assesses the cyclical failures of NHS data modernisation programmes, and considers that they fail because they proceed from a faulty – excessively paternalistic – governance model. Bias in algorithmic delivery of healthcare, a demonstrated problem with many existing health applications, is another serious risk. To regain trust and move towards better use of data in the NHS, we should democratise the development of these systems, and de-risk operational systems from issues such as automation bias. As a comparison, the essay explores two approaches to trust and bias problems in

other contexts: Taiwan's digital democracy, and American Airlines' struggles to overcome automation bias in their pilots.

4. Goirand M, Austin E, Clay-Williams R. **Bringing clarity and transparency to the consultative process underpinning the implementation of an ethics framework for AI-based healthcare applications: a qualitative study**. AI and Ethics. 2024 Apr 3:1-21.

5. Lawrence, Calvin, PhD Dobrin Seth, PhD Alterovitz Gil, Yoav Schlesinger and Moderator: Dennis Chornenky. **AI Governance in Healthcare: Best Practices, Solutions, and Unresolved Issues**. Telehealth and medicine today. 2024.Vol.9(4),What challenges are presented by AI adoption in healthcare? What role should AI governance play in regard to the opportunities and risks for generative AI (large language models like ChatGPT-4, etc.) in health? How do we responsibly evaluate new technology and ensure guardrails for its deployment, but without stifling innovation? How do we address societal fears and biases? What level of reliability and robustness should algorithms achieve before being adopted with confidence across healthcare? How can AI support health equity and expand access? We will explore these questions and more with some of the nation's leading experts on these topics. Learning Objectives Understand key opportunities and challenges for AI governance in healthcare, particularly in regard to rapidly emerging generative AI applications Discuss various responsible AI and AI governance frameworks that seek to ensure safety and efficacy in AI adoption Explore the role of government, legislation, and regulators in supporting safe and equitable adoption of AI in healthcare Explore opportunities for government, industry, and academic partnerships to accelerate AI validation, development, and adoption of safety standards Consider the potential impact of AI on the healthcare workforce and provider and patient experiences Identify the risks we should be most concerned with and what approaches can we take to mitigate those risks? By the end of the presentation, participants should have a sense of the opportunities and challenges of adopting AI in healthcare, key risks and frameworks for mitigating them, and the potential role of government, academia, and industry in addressing these issues Generative AI application examples Patient Communication and Engagement

Intelligent chatbots interacting with patients, answering their queries, providing health advice, and helping them manage their conditions Mental Health Support Provide psychological support to patients, helping them manage stress, anxiety, depression, and other mental health issues. Provide interventions based on CBT and other therapeutic techniques Automated Medical Documentation Note-taking can allowing doctors to focus more on patient care Education and Training Create educational content and personalized training for medical students and healthcare professionals, potentially simulating things like patient cases and providing guidance on diagnosis, etc. Synthesis and Summarization of Medical Research Make it easier for people to keep up with the latest developments Public Health Communication In a public health emergency, help craft health messages, FAQs, and timely and accurate updates for the public Generative AI challenges and limitations Ensuring the accuracy of AI-generated information Maintaining patient privacy Handling the ethical implications of AI and human-machine interactions in healthcare "Hallucinations" (false or inaccurate information) can occur when model has limited knowledge of a particular domain "Distraction" (losing track of earlier inputs) can occur when inputs go beyond allowable token count for model "context window" and models start to produce responses not relevant to queries and context.

6. Ning, Yilin, Xiaoxuan Liu, Gary S. Collins, et al. **An ethics assessment tool for artificial intelligence implementation in healthcare: CARE-AI**. Nat.Med. 2024.Vol.30(11), pp3038–3039.

7. Tavory, Tamar. **Regulating AI in Mental Health: Ethics of Care Perspective**. JMIR mental health. 2024.Vol.11 ppe58493. This article contends that the responsible artificial intelligence (AI) approach-which is the dominant ethics approach ruling most regulatory and ethical guidance-falls short because it overlooks the impact of AI on human relationships. Focusing only on responsible AI principles reinforces a narrow concept of accountability and responsibility of companies developing AI. This article proposes that applying the ethics of care approach to AI regulation can offer a more comprehensive regulatory and ethical framework that addresses AI's impact on human relationships. This dual approach is essential for the effective regulation of AI in the domain of mental health care. The article delves into the emergence of

the new "therapeutic" area facilitated by AI-based bots, which operate without a therapist. The article highlights the difficulties involved, mainly the absence of a defined duty of care toward users, and shows how implementing ethics of care can establish clear responsibilities for developers. It also sheds light on the potential for emotional manipulation and the risks involved. In conclusion, the article proposes a series of considerations grounded in the ethics of care for the developmental process of AI-powered therapeutic tools.

8. Wagner, Jennifer K., Megan Doerr and Cason D. Schmit. **AI Governance: A Challenge for Public Health**. JMIR public health and surveillance. 2024.Vol.10 ppe58358. The rapid evolution of artificial intelligence (AI) is structuralizing social, political, and economic determinants of health into the invisible algorithms that shape all facets of modern life. Nevertheless, AI holds immense potential as a public health tool, enabling beneficial objectives such as precision public health and medicine. Developing an AI governance framework that can maximize the benefits and minimize the risks of AI is a significant challenge. The benefits of public health engagement in AI governance could be extensive. Here, we describe how several public health concepts can enhance AI governance. Specifically, we explain how (1) harm reduction can provide a framework for navigating the governance debate between traditional regulation and "soft law" approaches; (2) a public health understanding of social determinants of health is crucial to optimally weigh the potential risks and benefits of AI; (3) public health ethics provides a toolset for guiding governance decisions where individual interests intersect with collective interests; and (4) a One Health approach can improve AI governance effectiveness while advancing public health outcomes. Public health theories, perspectives, and innovations could substantially enrich and improve AI governance, creating a more equitable and socially beneficial path for AI development.

AI and Healthcare

1. Abdulai, Abdul-Fatawu. **Is Generative AI Increasing the Risk for Technology-Mediated Trauma Among Vulnerable Populations?.** Nurs.Inq. 2025.Vol.32(1), ppe12686. The proliferation of Generative Artificial Intelligence (Generative AI) has

led to an increased reliance on AI-generated content for designing and deploying digital health interventions. While generative AI has the potential to facilitate and automate healthcare, there are concerns that AI-generated content and AI-generated health advice could trigger, perpetuate, or exacerbate prior traumatic experiences among vulnerable populations. In this discussion article, I examined how generative-AI-powered digital health interventions could trigger, perpetuate, or exacerbate emotional trauma among vulnerable populations who rely on digital health interventions as complementary or alternative sources of seeking health services or information. I then proposed actionable strategies for mitigating AI-generated trauma in the context of digital health interventions. The arguments raised in this article are expected to shift the focus of AI practitioners against prioritizing dominant narratives in AI algorithms into seriously considering the needs of vulnerable minority groups who are at the greatest risk for trauma but are often invisible in AI data sets, AI algorithms, and their resultant technologies.

2. Alhejaily, Abdul-Mohsen G. **Artificial intelligence in healthcare (Review).** Biomedical reports. 2025.Vol.22(1), pp11. The potential of artificial intelligence (AI) to significantly transform numerous aspects of contemporary civilization is substantial. Advancements in research show an increasing interest in creating AI solutions in the healthcare sector. This interest is driven by the broad spectrum and extensive nature of easily accessible patient data-including medical imaging, digitized data collection, and electronic health records - and by the ability to analyze and interpret complex data, facilitating more accurate and timely diagnoses. This review's goal is to provide a comprehensive overview of the advancements achieved by AI in healthcare, to elucidate the present state of AI in enhancing the healthcare system and improving the quality and efficiency of healthcare decision making, and to discuss selected medical applications of AI. Furthermore, the barriers and constraints that may impede the use of AI in healthcare are outlined, and the potential future directions of AI-augmented healthcare systems are discussed.

3. George AS, George AH, Baskar T. **Artificial Intelligence and the Future of Healthcare: Emerging Jobs and Skills in 2035**. Partners Universal Multidisciplinary Research Journal. 2024 May 13;1(1):1-21.

4. Khang, Alex, Geeta Rana, R. K. Tailor and Vugar Abdullayev Hajimahmud. **Data-centric AI solutions and emerging technologies in the healthcare ecosystem.** 2024"Data-Centric AI Solutions and Emerging Technologies in the Healthcare Ecosystem focuses on the mechanisms of proposing and incorporating solutions along with architectural concepts, design principles, smart solutions, decision-making process, and intelligent predictions. It offers state-of-the-art approaches for overall innovations, developments, and implementation of the smart healthcare ecosystem and highlights medical signal and image processing algorithms, healthcare-based computer vision systems, and discusses explainable AI (XAI) techniques for healthcare" **Order**

5. Mona, Mohammed Matmi, Sayed Shahbal, Senaitan Alharbi Amirah, et al. **AI-Led Healthcare Leadership: Unveiling Nursing Trends and Pathways Ahead**. Evolutionary studies in imaginative culture. 2024. pp1028–1046. Background: Artificial intelligence (AI) is transforming healthcare systems by improving operational efficiency, simplifying patient care procedures, and improving diagnostic accuracy. Artificial intelligence (AI) technologies, like machine learning and natural language processing, present previously unheard-of chances to quickly and accurately evaluate enormous volumes of healthcare data, assisting with clinical decision-making and enhancing patient outcomes. Aim thorough examination and analysis of artificial intelligence's impact on healthcare leadership, with a particular emphasis on present nursing trends and their implications for the future. The study tries to uncover the advantages, difficulties, and consequences of AI integration by looking at how AI technologies including clinical decision support systems, predictive analytics, robots, natural language processing, and telehealth are being used in nursing practice. Method: A comprehensive analysis including research articles published between 2015 and 2024 was carried out. To give a thorough overview of AI's present and future uses in healthcare, major themes and trends were found and summarized. Results: By stressing AI's role in improving diagnostic accuracy and patient outcomes, the study highlights the technology's major contributions to drug discovery, virtual patient care, and medical imaging. Human-centered design concerns, the necessity of educational changes, and ethical challenges surrounding

the application of AI surfaced as crucial topics needing attention. Conclusion: AI has enormous potential to transform healthcare by enhancing operational effectiveness, optimizing the delivery of care, and increasing diagnostic precision. Still, ethical issues must be resolved, interdisciplinary cooperation must be promoted, and educational frameworks must be improved in order to provide healthcare workers with the necessary AI skills.

6. Nwebonyi, Ngozi and Francis McKay. **Exploring bias risks in artificial intelligence and targeted medicines manufacturing**. BMC medical ethics. 2024.Vol.25(1), pp113–10. Though artificial intelligence holds great value for healthcare, it may also amplify health inequalities through risks of bias. In this paper, we explore bias risks in targeted medicines manufacturing. Targeted medicines manufacturing refers to the act of making medicines targeted to individual patients or to subpopulations of patients within a general group, which can be achieved, for example, by means of cell and gene therapies. These manufacturing processes are increasingly reliant on digitalised systems which can be controlled by artificial intelligence algorithms. Whether and how bias might turn up in the process, however, is uncertain due to the novelty of the development. Examining stakeholder views across bioethics, precision medicine, and artificial intelligence, we document a range of opinions from eleven semi-structured interviews about the possibility of bias in AI-driven targeted therapies manufacturing. Findings show that bias can emerge in upstream (research and development) and downstream (medicine production) processes when manufacturing targeted medicines. However, interviewees emphasized that downstream processes, particularly those not relying on patient or population data, may have lower bias risks. The study also identified a spectrum of bias meanings ranging from negative and ambivalent to positive and productive. Notably, some participants highlighted the potential for certain biases to have productive moral value in correcting health inequalities. This idea of "corrective bias" problematizes the conventional understanding of bias as primarily a negative concept defined by systematic error or unfair outcomes and suggests potential value in capitalizing on biases to help address health inequalities. Our analysis also indicates, however, that

the concept of "corrective bias" requires further critical reflection before they can be used to this end.

7. Oremule, Babatunde, Gabrielle H. Saunders, Karolina Kluk, Alexander d'Elia and Iain A. Bruce. **Understanding, experience and attitudes towards artificial intelligence technologies for clinical decision support in hearing health: a mixed-methods survey of healthcare professionals in the UK**. J.Laryngol.Otol. 2024.Vol.138(9), pp928–935. ObjectivesClinician acceptance influences technology adoption, but UK health professionals' attitudes towards artificial intelligence (AI) in hearing healthcare are unclear. This study aimed to address this knowledge gap.MethodsAn online survey, based on the Checklist for Reporting Results of Internet E-Surveys, was distributed to audiologists, ENT specialists and general practitioners. The survey collected quantitative and qualitative data on demographics and attitudes to AI in hearing healthcare.ResultsNinety-three participants (mean age 39 years, 56 per cent female) from three professional groups (21 audiologists, 24 ENT specialists and 48 general practitioners) responded. They acknowledged AI's benefits, emphasised the importance of the clinician–patient relationship, and stressed the need for proper training and ethical considerations to ensure successful AI integration in hearing healthcare.ConclusionThis study provides valuable insights into UK healthcare professionals' attitudes towards AI in hearing health and highlights the need for further research to address specific concerns and uncertainties surrounding AI integration in hearing healthcare.

8. Pool J, Indulska M, Sadiq S**. Large language models and generative AI in telehealth: a responsible use lens**. Journal of the American Medical Informatics Association. 2024 Mar 4.

9. Razai, Mohammad S., Roaa Al-Bedaery, Liza Bowen, et al. **Implementation challenges of artificial intelligence (AI) in primary care: Perspectives of general practitioners in London UK**. PloS one. 2024.Vol.19(11), ppe0314196. Implementing artificial intelligence (AI) in healthcare, particularly in primary care settings, raises crucial questions about practical challenges and opportunities. This study aimed to explore the perspectives of general practitioners (GPs) on the impact of AI in primary

care. A convenience sampling method was employed, involving a hybrid workshop with 12 GPs and 4 GP registrars. Verbal consent was obtained, and the workshop was audio recorded. Thematic analysis was conducted on the recorded data and contemporaneous notes to identify key themes. The workshop took place in 2023 and included 16 GPs aged 30 to 72 of diverse backgrounds and expertise. Most (93%) were female, and five (31%) self-identified as ethnic minorities. Thematic analysis identified two key themes related to AI in primary care: the potential benefits (such as help with diagnosis and risk assessment) and the associated concerns and challenges. Sub-themes included anxieties about diagnostic accuracy, AI errors, industry influence, and overcoming integration resistance. GPs also worried about increased workload, particularly extra, unnecessary patient tests, the lack of evidence base for AI programmes or accountability of AI systems and appropriateness of AI algorithms for different population groups. Participants emphasised the importance of transparency, trust-building, and research rigour to evaluate the effectiveness and safety of AI systems in healthcare. The findings suggest that GPs recognise the potential of AI in primary care but raise important concerns regarding evidence base, accountability, bias and workload. The participants emphasised the need for rigorous evaluation of AI technologies. Further research and collaboration between healthcare professionals, policymakers, and technology organisations are essential to navigating these challenges and harnessing the full potential of AI.

10. Strange, Michael. **Three different types of AI hype in healthcare**. AI Ethics. 2024.Vol.4(3), pp833–840. Healthcare systems are the embodiment of big data – as evident in the logistics of resource management, estate maintenance, diagnoses, patient monitoring, research, etc. – such that human health is often heralded as one of the fields most likely to benefit from AI. Yet, the prevalence of hype – both positive and negative – risks undermining that potential by distracting healthcare policy makers, practitioners, and researchers from many of the non-AI factors that will determine its impact. Here we categorise AI hype in healthcare into three types that include both utopian and dystopian narratives and plot a series of more

productive paths ahead by which to realise the potential of AI to improve human healthcare.

11. Thacharodi, Aswin, Prabhakar Singh, Ramu Meenatchi, et al. **Revolutionizing healthcare and medicine: The impact of modern technologies for a healthier future—A comprehensive review**. Health care science (Print). 2024.Vol.3(5), pp329–349. The increasing integration of new technologies is driving a fundamental revolution in the healthcare sector. Developments in artificial intelligence (AI), machine learning, and big data analytics have completely transformed the diagnosis, treatment, and care of patients. AI-powered solutions are enhancing the efficiency and accuracy of healthcare delivery by demonstrating exceptional skills in personalized medicine, early disease detection, and predictive analytics. Furthermore, telemedicine and remote patient monitoring systems have overcome geographical constraints, offering easy and accessible healthcare services, particularly in underserved areas. Wearable technology, the Internet of Medical Things, and sensor technologies have empowered individuals to take an active role in tracking and managing their health. These devices facilitate real-time data collection, enabling preventive and personalized care. Additionally, the development of 3D printing technology has revolutionized the medical field by enabling the production of customized prosthetics, implants, and anatomical models, significantly impacting surgical planning and treatment strategies. Accepting these advancements holds the potential to create a more patient-centered, efficient healthcare system that emphasizes individualized care, preventive care, and better overall health outcomes. This review's novelty lies in exploring how these technologies are radically transforming the healthcare industry, paving the way for a more personalized and effective healthcare for all. It highlights the capacity of modern technology to revolutionize healthcare delivery by addressing long-standing challenges and improving health outcomes. Although the approval and use of digital technology and advanced data analysis face scientific and regulatory obstacles, they have the potential for transforming translational research. as these technologies continue to evolve, they are poised to significantly alter the healthcare environment, offering a more sustainable, efficient, and accessible healthcare ecosystem for future

generations. Innovation across multiple fronts will shape the future of advanced healthcare technology, revolutionizing the provision of healthcare, enhancing patient outcomes, and equipping both patients and healthcare professionals with the tools to make better decisions and receive personalized treatment. As these technologies continue to develop and become integrated into standard healthcare practices, the future of healthcare will probably be more accessible, effective, and efficient than ever before.

12. Wilhelm, Christoph, Anke Steckelberg and Felix G. Rebitschek. **Benefits and harms associated with the use of AI-related algorithmic decision-making systems by healthcare professionals: a systematic review**. The Lancet regional health.Europe. 2025.Vol.48Despite notable advancements in artificial intelligence (AI) that enable complex systems to perform certain tasks more accurately than medical experts, the impact on patient-relevant outcomes remains uncertain. To address this gap, this systematic review assesses the benefits and harms associated with AI-related algorithmic decision-making (ADM) systems used by healthcare professionals, compared to standard care. In accordance with the PRISMA guidelines, we included interventional and observational studies published as peer-reviewed full-text articles that met the following criteria: human patients; interventions involving algorithmic decision-making systems, developed with and/or utilizing machine learning (ML); and outcomes describing patient-relevant benefits and harms that directly affect health and quality of life, such as mortality and morbidity. Studies that did not undergo preregistration, lacked a standard-of-care control, or pertained to systems that assist in the execution of actions (e.g., in robotics) were excluded. We searched MEDLINE, EMBASE, IEEE Xplore, and Google Scholar for studies published in the past decade up to 31 March 2024. We assessed risk of bias using Cochrane's RoB 2 and ROBINS-I tools, and reporting transparency with CONSORT-AI and TRIPOD-AI. Two researchers independently managed the processes and resolved conflicts through discussion. This review has been registered with PROSPERO (CRD42023412156) and the study protocol has been published. Out of 2,582 records identified after deduplication, 18 randomized controlled trials (RCTs) and one cohort study met the inclusion criteria, covering specialties such as psychiatry, oncology, and internal

medicine. Collectively, the studies included a median of 243 patients (IQR 124–828), with a median of 50.5% female participants (range 12.5–79.0, IQR 43.6–53.6) across intervention and control groups. Four studies were classified as having low risk of bias, seven showed some concerns, and another seven were assessed as having high or serious risk of bias. Reporting transparency varied considerably: six studies showed high compliance, four moderate, and five low compliance with CONSORT-AI or TRIPOD-AI. Twelve studies (63%) reported patient-relevant benefits. Of those with low risk of bias, interventions reduced length of stay in hospital and intensive care unit (10.3 vs. 13.0 days, p = 0.042; 6.3 vs. 8.4 days, p = 0.030), in-hospital mortality (9.0% vs. 21.3%, p = 0.018), and depression symptoms in non-complex cases (45.1% vs. 52.3%, p = 0.03). However, harms were frequently underreported, with only eight studies (42%) documenting adverse events. No study reported an increase in adverse events as a result of the interventions. The current evidence on AI-related ADM systems provides limited insights into patient-relevant outcomes. Our findings underscore the essential need for rigorous evaluations of clinical benefits, reinforced compliance with methodological standards, and balanced consideration of both benefits and harms to ensure meaningful integration into healthcare practice. This study did not receive any funding.

AI and Imaging

1. Alqahtani, Saeed. **Systematic Review of AI-Assisted MRI in Prostate Cancer Diagnosis: Enhancing Accuracy Through Second Opinion Tools**. Diagnostics (Basel). 2024.Vol.14(22), pp2576. Prostate cancer is a leading cause of cancer-related deaths in men worldwide, making accurate diagnosis critical for effective treatment. Recent advancements in artificial intelligence (AI) and machine learning (ML) have shown promise in improving the diagnostic accuracy of prostate cancer. This systematic review aims to evaluate the effectiveness of AI-based tools in diagnosing prostate cancer using MRI, with a focus on accuracy, specificity, sensitivity, and clinical utility compared to conventional diagnostic methods. A comprehensive search was conducted across PubMed, Embase, Ovid MEDLINE, Web of Science, Cochrane Library, and Institute of Electrical and Electronics Engineers (IEEE) Xplore for studies published between 2019 and 2024. Inclusion criteria focused on full-text, English-

language studies involving AI for Magnetic Resonance Imaging (MRI) -based prostate cancer diagnosis. Diagnostic performance metrics such as area under curve (AUC), sensitivity, and specificity were analyzed, with risk of bias assessed using the Quality Assessment of Diagnostic Accuracy Studies (QUADAS-2) tool. Seven studies met the inclusion criteria, employing various AI techniques, including deep learning and machine learning. These studies reported improved diagnostic accuracy (with AUC scores of up to 97%) and moderate sensitivity, with performance varying based on training data quality and lesion characteristics like Prostate Imaging Reporting and Data System (PI-RADS) scores. AI has significant potential to enhance prostate cancer diagnosis, particularly when used for second opinions in MRI interpretations. While these results are promising, further validation in diverse populations and clinical settings is necessary to fully integrate AI into standard practice.

2. Awan T, Ali M, Hussain M, Rashid M, Ali S, Noon SK. **AI-Powered Lung Cancer Detection From CT Imaging.** VFAST Transactions on Software Engineering. 2024 Jun 30;12(2):241-9.

3. Bowers, Kelly A. and Megan O. Nakashima. **Digital Imaging and AI Pre-classification in Hematology**. Clin.Lab.Med. 2024.Vol.44(3), pp397–408. A leukocyte differential of peripheral blood can be performed using digital imaging coupled with cellular pre-classification by artificial neural networks. Platelet and erythrocyte morphology can be assessed and counts estimated. Systems from a single vendor have been used in clinical practice for several years, with other vendors' systems, in a development. These systems perform comparably to traditional manual optical microscopy, however, it is important to note that they are designed and intended to be operated by a trained morphologist. These systems have several benefits including increased standardization, efficiency, and remote-review capability.

4. Desai D, Mirza SB. **Virtual Simulation Skill Labs and AI in Medical Education and Healthcare**. Medical Journal of Dr. DY Patil University. 2024 Jul 1;17(4):900-1.

5. Ding, Ting, Kaimai Shi, Zhaoyan Pan and Cheng Ding. **AI-based automated breast cancer segmentation in ultrasound imaging based on Attention Gated Multi ResU-Net**. PeerJ.Computer science. 2024.Vol.10 ppe2226. Breast cancer is a leading cause

of death among women worldwide, making early detection and diagnosis critical for effective treatment and improved patient outcomes. Ultrasound imaging is a common diagnostic tool for breast cancer, but interpreting ultrasound images can be challenging due to the complexity of breast tissue and the variability of image quality. This study proposed an Attention Gated Multi ResU-Net model for medical image segmentation tasks, that has shown promising results for breast cancer ultrasound image segmentation. The model's multi-scale feature extraction and attention-gating mechanism enable it to accurately identify and segment areas of abnormality in the breast tissue, such as masses, cysts, and calcifications. The model's quantitative test showed an adequate degree of agreement with expert manual annotations, demonstrating its potential for improving early identification and diagnosis of breast cancer. The model's multi-scale feature extraction and attention-gating mechanism enable it to accurately identify and segment areas of abnormality in the breast tissue, such as masses, cysts, and calcifications, achieving a Dice coefficient of 0.93, sensitivity of 93%, and specificity of 99%. These results underscore the model's high precision and reliability in medical image analysis.

6. Govindaraju, B., S. T. Kakileti, S. Sampangi and G. Manjunath. **Multi-modal AI-based imaging for improving breast cancer screening across breast densities: A pilot study**. European journal of cancer (1990). 2024.Vol.200 pp113804.

7. Hu, Chao, Zhicheng Lin, Ning Zhang and Li-Jun Ji. **AI-empowered imagery writing: integrating AI-generated imagery into digital mental health service**. Frontiers in psychiatry. 2024.Vol.15 pp1434172.

8. Lee, Lauren, Raimat Korede Salami, Helena Martin, et al. **"How I would like AI used for my imaging": children and young persons' perspectives**. Eur.Radiol. 2024.Vol.34(12), pp7751–7764. Objectives Artificial intelligence (AI) tools are becoming more available in modern healthcare, particularly in radiology, although less attention has been paid to applications for children and young people. In the development of these, it is critical their views are heard. Materials and methods A national, online survey was publicised to UK schools, universities and charity partners encouraging any child or young adult to participate. The survey was "live"

for one year (June 2022 to 2023). Questions about views of AI in general, and in specific circumstances (e.g. bone fractures) were asked. Results One hundred and seventy-one eligible responses were received, with a mean age of 19 years (6–23 years) with representation across all 4 UK nations. Most respondents agreed or strongly agreed they wanted to know the accuracy of an AI tool that was being used (122/171, 71.3%), that accuracy was more important than speed (113/171, 66.1%), and that AI should be used with human oversight (110/171, 64.3%). Many respondents (73/171, 42.7%) felt AI would be more accurate at finding problems on bone X-rays than humans, with almost all respondents who had sustained a missed fracture strongly agreeing with that sentiment (12/14, 85.7%). Conclusions Children and young people in our survey had positive views regarding AI, and felt it should be integrated into modern healthcare, but expressed a preference for a “medical professional in the loop” and accuracy of findings over speed. Key themes regarding information on AI performance and governance were raised and should be considered prior to future AI implementation for paediatric healthcare. Clinical relevance statement Artificial intelligence (AI) integration into clinical practice must consider all stakeholders, especially paediatric patients who have largely been ignored. Children and young people favour AI involvement with human oversight, seek assurances for safety, accuracy, and clear accountability in case of failures. Key Points Paediatric patient’s needs and voices are often overlooked in AI tool design and deployment. Children and young people approved of AI, if paired with human oversight and reliability. Children and young people are stakeholders for developing and deploying AI tools in paediatrics.

9. Raj, Anish, Ahmad Allababidi, Hany Kayed, et al. **Streamlining Acute Abdominal Aortic Dissection Management—An AI-based CT Imaging Workflow**. J Digit Imaging.Inform.med. 2024.Vol.37(6), pp2729–2739. Life-threatening acute aortic dissection (AD) demands timely diagnosis for effective intervention. To streamline intrahospital workflows, automated detection of AD in abdominal computed tomography (CT) scans seems useful to assist humans. We aimed at creating a robust convolutional neural network (CNN)-based pipeline capable of real-time screening for signs of abdominal AD in CT. In this retrospective study, abdominal CT data from

AD patients presenting with AD and from non-AD patients were collected (n 195, AD cases 94, mean age 65.9 years, female ratio 35.8%). A CNN-based algorithm was developed with the goal of enabling a robust, automated, and highly sensitive detection of abdominal AD. Two sets from internal (n = 32, AD cases 16) and external sources (n = 1189, AD cases 100) were procured for validation. The abdominal region was extracted, followed by the automatic isolation of the aorta region of interest (ROI) and highlighting of the membrane via edge extraction, followed by classification of the aortic ROI as dissected/healthy. A fivefold cross-validation was employed on the internal set, and an ensemble of the 5 trained models was used to predict the internal and external validation set. Evaluation metrics included receiver operating characteristic curve (AUC) and balanced accuracy. The AUC, balanced accuracy, and sensitivity scores of the internal dataset were 0.932 (CI 0.891–0.963), 0.860, and 0.885, respectively. For the internal validation dataset, the AUC, balanced accuracy, and sensitivity scores were 0.887 (CI 0.732–0.988), 0.781, and 0.875, respectively. Furthermore, for the external validation dataset, AUC, balanced accuracy, and sensitivity scores were 0.993 (CI 0.918–0.994), 0.933, and 1.000, respectively. The proposed automated pipeline could assist humans in expediting acute aortic dissection management when integrated into clinical workflows.

10. Said, Mourad and Houneida Sakly. **Insights on Progressive Bone Marrow Lesions with AI: An Imaging Biomarker for Knee Osteoarthritis Prediction**. Radiology. 2024.Vol.312(3), ppe241943.

11. Singh, Yashbir, Quincy A. Hathaway and Bradley J. Erickson. **Generative AI in oncological imaging: Revolutionizing cancer detection and diagnosis**. Oncotarget. 2024.Vol.15(1), pp607–608. Generative AI is revolutionizing oncological imaging, enhancing cancer detection and diagnosis. This editorial explores its impact on expanding datasets, improving image quality, and enabling predictive oncology. We discuss ethical considerations and introduce a unique perspective on personalized cancer screening using AI-generated digital twins. This approach could optimize screening protocols, improve early detection, and tailor treatment plans. While

challenges remain, generative AI in oncological imaging offers unprecedented opportunities to advance cancer care and improve patient outcomes.

12. Uchikov, Petar, Usman Khalid, Granit Dedaj-Salad, et al. **Artificial Intelligence in Breast Cancer Diagnosis and Treatment: Advances in Imaging, Pathology, and Personalized Care**. Life (Basel, Switzerland). 2024.Vol.14(11), pp1451. Breast cancer is the most prevalent cancer worldwide, affecting both low- and middle-income countries, with a growing number of cases. In 2024, about 310,720 women in the U.S. are projected to receive an invasive breast cancer diagnosis, alongside 56,500 cases of ductal carcinoma in situ (DCIS). Breast cancer occurs in every country of the world in women at any age after puberty but with increasing rates in later life. About 65% of women with the and 45% with the gene variants develop breast cancer by age 70. While these genes account for 5% of breast cancers, their prevalence is higher in certain populations. Advances in early detection, personalised medicine, and AI-driven diagnostics are improving outcomes by enabling a more precise analysis, reducing recurrence, and minimising treatment side effects. Our paper aims to explore the vast applications of artificial intelligence within the diagnosis and treatment of breast cancer and how these advancements can contribute to elevating patient care as well as discussing the potential drawbacks of such integrations into modern medicine. We structured our paper as a non-systematic review and utilised Google Scholar and PubMed databases to review literature regarding the incorporation of AI in the diagnosis and treatment of non-palpable breast masses. AI is revolutionising breast cancer management by enhancing imaging, pathology, and personalised treatment. In imaging, AI can improve the detection of cancer in mammography, MRIs, and ultrasounds, rivalling expert radiologists in accuracy. In pathology, AI enhances biomarker detection, improving and assessments. Personalised medicine benefits from AI's predictive power, aiding risk stratification and treatment response. AI also shows promise in triple-negative breast cancer management, offering better prognosis and subtype classification. However, challenges include data variability, ethical concerns, and real-world validation. Despite limitations, AI integration offers significant potential in improving breast cancer diagnosis, prognosis, and treatment outcomes.

13. Valter, A., T. Kordemets, A. Gasimova, et al. **1214P Imaging AI prognosis of early stage lung cancer using CT radiomics**. Annals of oncology. 2024.Vol.35 ppS782.

14. Yang, Yuzhe, Haoran Zhang, Judy W. Gichoya, Dina Katabi and Marzyeh Ghassemi. **The limits of fair medical imaging AI in real-world generalization**. Nat.Med. 2024.Vol.30(10), pp2838–2848. As artificial intelligence (AI) rapidly approaches human-level performance in medical imaging, it is crucial that it does not exacerbate or propagate healthcare disparities. Previous research established AI's capacity to infer demographic data from chest X-rays, leading to a key concern: do models using demographic shortcuts have unfair predictions across subpopulations? In this study, we conducted a thorough investigation into the extent to which medical AI uses demographic encodings, focusing on potential fairness discrepancies within both in-distribution training sets and external test sets. Our analysis covers three key medical imaging disciplines—radiology, dermatology and ophthalmology—and incorporates data from six global chest X-ray datasets. We confirm that medical imaging AI leverages demographic shortcuts in disease classification. Although correcting shortcuts algorithmically effectively addresses fairness gaps to create 'locally optimal' models within the original data distribution, this optimality is not true in new test settings. Surprisingly, we found that models with less encoding of demographic attributes are often most 'globally optimal', exhibiting better fairness during model evaluation in new test environments. Our work establishes best practices for medical imaging models that maintain their performance and fairness in deployments beyond their initial training contexts, underscoring critical considerations for AI clinical deployments across populations and sites. When tested across tasks, diseases and imaging modalities, the performance of AI models depends on encoding of demographic shortcuts, and correcting for them decreases their ability to generalize in new populations.

15. Yoon, Christine, Kai Jones, Barlas Goker, Jonathan Sterman and Edward Mardakhaev. **Artificial Intelligence Applications in MR Imaging of the Hip**. Magn.Reson.Imaging Clin.N.Am. 2025.Vol.33(1), pp9–18. Artificial intelligence (AI) can provide significant utility in the management of hip disorders by analyzing MR images. AI can automate image segmentation with success. Current models have

been successfully tested in the diagnosis of osteoarthritis, femoroacetabular impingement, labral tears, developmental dysplasia of the hip, infection, osteonecrosis of the femoral head, and bone tumors. Many of these models have shown strong performances with accuracies in the range of 76% to 97%, and area under the curve of 77% to 98%. The recent trends indicate high interest and adoption of these tools in MR imaging assessment of hip disorders.

16. Zhang Y. **Promises and Risks of Applying AI Medical Imaging to Early Detection of Cancers, and Regulation for AI Medical Imaging**. The Journal of Purdue Undergraduate Research. 2023;13(1):48.

AI and Pregnancy

1. Desseauve D, Lescar R, de la Fourniere B, Ceccaldi PF, Dziadzko M. **AI in obstetrics: Evaluating residents' capabilities and interaction strategies with ChatGPT**. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2024 Nov 1;302:238-41.

2. Karacan, Emine. **Healthy nutrition and weight management for a positive pregnancy experience in the antenatal period: Comparison of responses from artificial intelligence models on nutrition during pregnancy**. International journal of medical informatics (Shannon, Ireland). 2025.Vol.193 pp105663. •ACOG–Med-PaLM similarity is higher with WORD2VEC, suggesting general embeddings may yield increased scores.•BioLORD-2023, with its medical focus, captures nuances, offering potentially more accurate ACOG alignment.•ACOG–MedicalGPT and ACOG–GPT-4 show similar semantic performance across both embedding models.•GPT-4 and MedicalGPT demonstrate superior performance with BioLORD-2023, reflecting their better handling of medical nuances and technical details.•Selecting the right model is crucial for reliable antenatal nutrition information due to response quality differences. As artificial intelligence AI-supported applications become integral to web-based information-seeking, assessing their impact on healthy nutrition and weight management during the antenatal period is crucial. This study was conducted to evaluate both the quality and semantic similarity of responses created by AI models to the most frequently asked questions about healthy nutrition and weight

management during the antenatal period, based on existing clinical knowledge. In this study, a cross-sectional assessment design was used to explore data from 3 AI models (GPT-4, MedicalGPT, Med-PaLM). We directed the most frequently asked questions about nutrition during pregnancy, obtained from the American College of Obstetricians and Gynecologists (ACOG) to each model in a new and single session on October 21, 2023, without any prior conversation. Immediately after, instructions were given to the AI models to generate responses to these questions. The responses created by AI models were evaluated using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) scale. Additionally, to assess the semantic similarity between answers to 31 pregnancy nutrition-related frequently asked questions sourced from the ACOG and responses from AI models we evaluated cosine similarity using both WORD2VEC and BioLORD-2023. Med-PaLM outperformed GPT-4 and MedicalGPT in response quality (mean = 3.93), demonstrating superior clinical accuracy over both GPT-4 ($p = 0.016$) and MedicalGPT ($p = 0.001$). GPT-4 had higher quality than MedicalGPT ($p = 0.027$). The semantic similarity between ACOG and Med-PaLM is higher with WORD2VEC (0.92) compared to BioLORD-2023 (0.81), showing a difference of +0.11. The similarity scores for ACOG–MedicalGPT and ACOG–GPT-4 are similar across both models, with minimal differences of −0.01. Overall, WORD2VEC has a slightly higher average similarity (0.82) than BioLORD-2023 (0.79), with a difference of +0.03. Despite the superior performance of Med-PaLM, there is a need for further evidence-based research and improvement in the integration of AI in healthcare due to varying AI model performances.

AI and Surgery

1. Lama, John, Joshua Winograd, Alia Codelia-Anjum, et al. **AI for BPH Surgical Decision-Making: Cost Effectiveness and Outcomes**. Curr Urol Rep. 2025.Vol.26(1), pp4. Purpose of Review Benign prostatic hyperplasia (BPH) is prevalent in nearly 70% of men over the age of 60, leading to significant clinical challenges due to varying symptom presentations and treatment responses. The decision to undergo surgical intervention is not straightforward; the American Urological Association recommends consideration of surgical treatment after inadequate or failed response

to medical therapy. This review explores the role of artificial intelligence (AI), including machine learning and deep learning models, in enhancing the decision-making processes for BPH management. Recent Findings AI applications in this space include analysis of non-invasive imaging modalities, such as multiparametric Magnetic Resonance Imaging (MRI) and Ultrasound, which enhance diagnostic precision. AI models also concatenate serum biomarkers and histopathological analysis to distinguish BPH from prostate cancer (PC), offering high accuracy rates. Furthermore, AI aids in predicting patient outcomes post-treatment, supporting personalized medicine, and optimizing therapeutic strategies. Summary AI has demonstrated potential in differentiating BPH from PC through advanced imaging and predictive models, improving diagnostic accuracy, and reducing the need for invasive procedures. Despite promising advancements, challenges remain in integrating AI into clinical workflows, establishing standard evaluation metrics, and achieving cost-effectiveness. Here, we underscore the potential of AI to improve patient outcomes, streamline BPH management, and reduce healthcare costs, especially with continued research and development in this transformative field.

AI and Urology

1. Shah, Nikhil, Usman Khalid, Rajesh Kavia and Deepak Batura. **Current advances in the use of artificial intelligence in predicting and managing urological complications**. Int.Urol.Nephrol. 2024.Vol.56(11), pp3427–3435. Background Artificial intelligence (AI) has emerged as a promising avenue for improving patient care and surgical outcomes in urological surgery. However, the extent of AI's impact in predicting and managing complications is not fully elucidated. Objectives We review the application of AI to foresee and manage complications in urological surgery, assess its efficacy, and discuss challenges to its use. Methods and materials A targeted non-systematic literature search was conducted using the PubMed and Google Scholar databases to identify studies on AI in urological surgery and its complications. Evidence from the studies was synthesised. Results Incorporating AI into various facets of urological surgery has shown promising advancements. From preoperative planning to intraoperative guidance, AI is revolutionising the field, demonstrating remarkable proficiency in tasks such as image analysis, decision-

making support, and complication prediction. Studies show that AI programmes are highly accurate, increase surgical precision and efficiency, and reduce complications. However, implementation challenges exist in AI errors, human errors, and ethical issues. Conclusion AI has great potential in predicting and managing surgical complications of urological surgery. Advancements have been made, but challenges and ethical considerations must be addressed before widespread AI implementation.

AI and Workforce

1. Pavuluri, Suresh, Rohit Sangal, John Sather and R. A. Taylor. **Balancing act: the complex role of artificial intelligence in addressing burnout and healthcare workforce dynamics**. BMJ Health Care Inform. 2024.Vol.31(1), ppe101120. Burnout and workforce attrition present pressing global challenges in healthcare, severely impacting the quality of patient care and the sustainability of health systems worldwide. Artificial intelligence (AI) has immense potential to reduce the administrative and cognitive burdens that contribute to burnout through innovative solutions such as digital scribes, automated billing and advanced data management systems. However, these innovations also carry significant risks, including potential job displacement, increased complexity of medical information and cases, and the danger of diminishing clinical skills. To fully leverage AI's potential in healthcare, it is essential to prioritise AI technologies that align with stakeholder values and emphasise efforts to re-humanise medical practice. By doing so, AI can contribute to restoring a sense of purpose, fulfilment and efficacy among healthcare workers, reinforcing their essential role as caregivers, rather than distancing them from these core professional attributes. 10.1136/bmjhci-2024-101120

2. Radhwi, Osman O. and Mawyah A. Khafaji. **The wizard of artificial intelligence: Are physicians prepared?.** Journal of Family & Community Medicine. 2024.Vol.31(4), pp344–350. Despite the increasing use of artificial intelligence (AI) in medicine, research into the knowledge and attitudes of medical experts toward AI is limited. This study aimed to assess physicians' attitudes and perceptions of AI applications in healthcare. A cross-sectional study was conducted at the College of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia between November 1 and December 20,

2023. Data was collected using a web-based validated self-administered questionnaire; information sought included demographics, familiarity with AI technology, attitudes towards AI applications in medicine, and perceived risks associated with its implementation. Data analysis performed using SPSS. Categorical variables were presented as frequencies and percentages, whereas mean and standard deviations were calculated for continuous variables. Four domains were used as study variables: familiarity, attitude, AI application, and possible risks. The domains were compared to the scored individual question using Pearson's correlation coefficient. A total of 128 academic staff participated (response rate 21.3%). About 41% reported being aware of AI as an emerging field and expressed desire to learn about AI. Concerns about the effect of AI on physicians' employability were not prominent. Instead, most (65.6%) agreed that new positions would be created and that the job market for those who embraced AI would increase. Thirty-two percent reported actively seeking out new technologies in their practice areas, and 24.2% would be willing to adapt AI to practice if its usefulness was published in scientific journals. Most participants (87.5%) agreed that dedicated courses would help them implement AI in their specialty. The most commonly reported problem of AI was its inability to provide opinions in unexpected scenarios. A quarter of participants believed that both AI creators and doctors should be liable for AI-caused medical errors. Physician's age, gender, or years of experience were not related to their familiarity with or attitudes toward AI. Doctors are open to learning about AI use in medicine. Including AI learning objectives or short courses in medical curricula would help physicians develop the necessary skills for an AI-augmented healthcare system. 10.4103/jfcm.jfcm_144_24

3. Vos, Shoko, Konnie Hebeda, Megan Milota, et al. **Making Pathologists Ready for the New Artificial Intelligence Era: Changes in Required Competencies**. Modern pathology. 2025.Vol.38(2),In recent years, there has been an increasing interest in developing and using artificial intelligence (AI) models in pathology. Although pathologists generally have a positive attitude toward AI, they report a lack of knowledge and skills regarding how to use it in practice. Furthermore, it remains unclear what skills pathologists would require to use AI adequately and responsibly.

However, adequate training of (future) pathologists is essential for successful AI use in pathology. In this paper, we assess which entrustable professional activities (EPAs) and associated competencies pathologists should acquire in order to use AI in their daily practice. We make use of the available academic literature, including literature in radiology, another image-based discipline, which is currently more advanced in terms of AI development and implementation. Although microscopy evaluation and reporting could be transferrable to AI in the future, most of the current pathologist EPAs and competencies will likely remain relevant when using AI techniques and interpreting and communicating results for individual patient cases. In addition, new competencies related to technology evaluation and implementation will likely be necessary, along with knowing one's own strengths and limitations in human-AI interactions. Because current EPAs do not sufficiently address the need to train pathologists in developing expertise related to technology evaluation and implementation, we propose a new EPA to enable pathology training programs to make pathologists fit for the new AI era "using AI in diagnostic pathology practice" and outline its associated competencies.

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