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Bridging Technology and Medicine: A Review of Emerging Trends in Health Informatics

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ABSTRACT

Health informatics transforms healthcare practice through its combination of advanced technology features which include artificial intelligence (AI) and big data and telemedicine and wearable devices. The innovative healthcare solutions improve diagnosis precision as well as individualized medical care to better serve patients. Health informatics faces ongoing barriers which involve protecting patient data and making different systems communicate properly and bridging the gap between individuals who have access to technology and those who do not. Health informatics' prospective developments will create future systems that use predictions and prevention as well as provide virtual hospital services and simplify global healthcare data access and sharing while healthcare operators need to solve privacy ethics issues that stem from AI bias and transparency problems. Assurance of accessibility along with security and effectiveness will become essential criteria as these health technologies continue to develop so they can improve health outcomes for diverse community populations. Various sectors must work together to establish an integrated efficient healthcare system based on equity during the upcoming years.

INTRODUCTION

A profound revolution in healthcare arises from the quick advancement of modern technology throughout the world. The advancement from standard patient documentation to sophisticated AI systems that anticipate medical patterns made health informatics become the essential link which joins medicine with technological advancement [1]. These junctions represent a transformative

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advancement beyond tools toward a complete medical revolution which affects healthcare delivery and management across the world.

Health informatics serves primarily to develop methods for acquiring healthcare information storage while providing tools for database retrieval and utilization to bring healthcare providers together under one system. Health informatics expanded its scope well past initial data processing responsibilities in recent times [2]. Health informatics transforms healthcare operations by implementing advanced tools including big data analytics with machine learning algorithms and telemedicine and mobile health and block chain technology which redefine medical practice in addition to research and healthcare management operations [3].

The rapid advancement of healthcare services depends primarily on the need to develop better accessible and patient-specific more efficient care delivery systems. Patient-centered care has become essential and technology provides tools to make medicines more individualized and produce health projection data while letting patients chart their healthcare paths [4]. Health technology allows patients to receive continuous measurement of essential health parameters through smart wearable gadgets while telemedicine technology enables rural patients to access top medical specialists and AI helps doctors make fast accurate diagnoses of challenging conditions. The principles of health informatics drive technological progress that enables proper informational access during critical judgment moments [5].

Public health management depends on health informatics as an indispensable tool which the COVID-19 pandemic made completely apparent. The crisis management relied heavily on electronic health records (EHRs) and real-time data sharing as well as remote monitoring technologies to demonstrate the fundamental requirement of secure and interoperable health information systems [6]. Modern medicine now recognizes health informatics as an essential foundation because the global emergency expedited investments in and innovations of digital health solutions.

Health informatics faces various challenges due to its high pace of growth while holding its extensive potential. Health informatics faces increasing challenges from privacy issues and security risks together with technological discrepancies and ethical obstacles to AI decisions. Future success in healthcare depends on handling these challenges to keep technology as an element of good rather than creating new social inequalities and vulnerabilities [7].

THE DIGITAL EVOLUTION OF MEDICINE: A JOURNEY THROUGH TIME

Medical informatics progress displays an exact reflection of how technology affects modern societies at large. The history depicts how essential innovations and forward-thinking along with medical necessities brought our modern digital healthcare systems into existence from early manual record

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systems [8].

During previous years before digital technology patient information was written by hand onto paper charts then saved inside physical storage systems. Medical records received through handwritten note practices have lasted throughout centuries although such records were often inadequate and hard to distribute and tended to be at risk of destruction or permanent loss [9]. The management of extensive patient information between different healthcare institutions turned out to be virtually unfeasible which resulted in disjointed and inefficient medical care.

The implementation of electronic health information management systems started during the 1960s and 1970s. The Mayo Clinic and Massachusetts General Hospital became among the first healthcare facilities that tested electronic health record (EHR) systems. These basic yet costly systems marked a turning point because they demonstrated digital tools could extremely enhance data storage and management for patient information [10].

A stable period of health information technology advancement and development occurred throughout the 1980s and 1990s. Healthcare organizations started installing complex hospital information systems (HIS) through personal computers to track patient admissions and billing together with laboratory results and clinical notes. Healthcare organizations made essential progress in order to expand technological integration within clinical processes [11].

Digital health initiatives increased rapidly during the starting years of the new millennium. The world's governments along with organizations observed the revolutionary capabilities of health informatics so they dedicated funds to create nationwide health information systems. The Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 delivered significant financial supports to encourage the use of EHRs in the United States [12]. The starting point of telemedicine was established during this period as it enabled distant consultation and monitoring services which progressed the movement toward patient-centered healthcare.

Digital technology advances along with internet and mobile technology development triggered another era of healthcare innovation. Health informatics extended its reach from health institutions to personal electronic devices where mobile health (mHealth) programs and wearable exercise trackers and patient interaction platforms were developed. The healthcare industry moved beyond basic data collection to provide patients with healthcare data access that improves their involvement in medical decisions [13].

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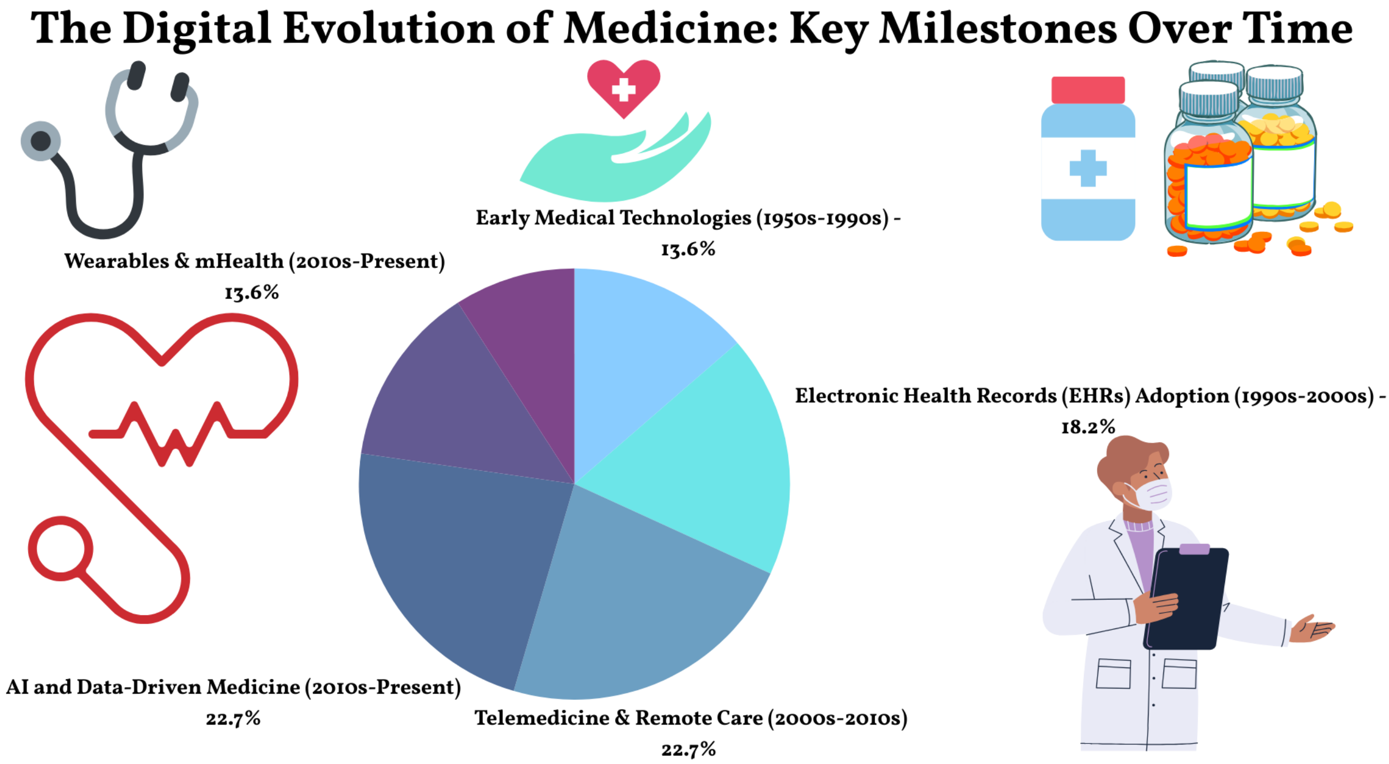

Figure: 1 showing digital evolution of medicine

Current health informatics maintains its position between leading-edge technologies which incorporate artificial intelligence along with big data analytics as well as blockchain and Internet of Medical Things (IoMT). Health informatics systems today utilize extensive data analysis capabilities to foresee disease outbreaks in addition to general information storage and management features which deliver beneficial clinical data and individualized treatment solutions with genetic information [14].

REVOLUTIONARY TECHNOLOGIES RESHAPING HEALTHCARE

The transformation medical healthcare receives due to new emerging technologies stands as a complete revolution. Products from artificial intelligence (AI) combined with big data analytics and telemedicine and blockchain solutions bring revolutionary changes to healthcare services and opened innovative avenues for illness protection measures and customized healthcare delivery. Multiple technological advancements enable health systems worldwide to handle vital deficiencies and deliver solutions which work more efficiently and accessibly to benefit both providers and patients individually [15].

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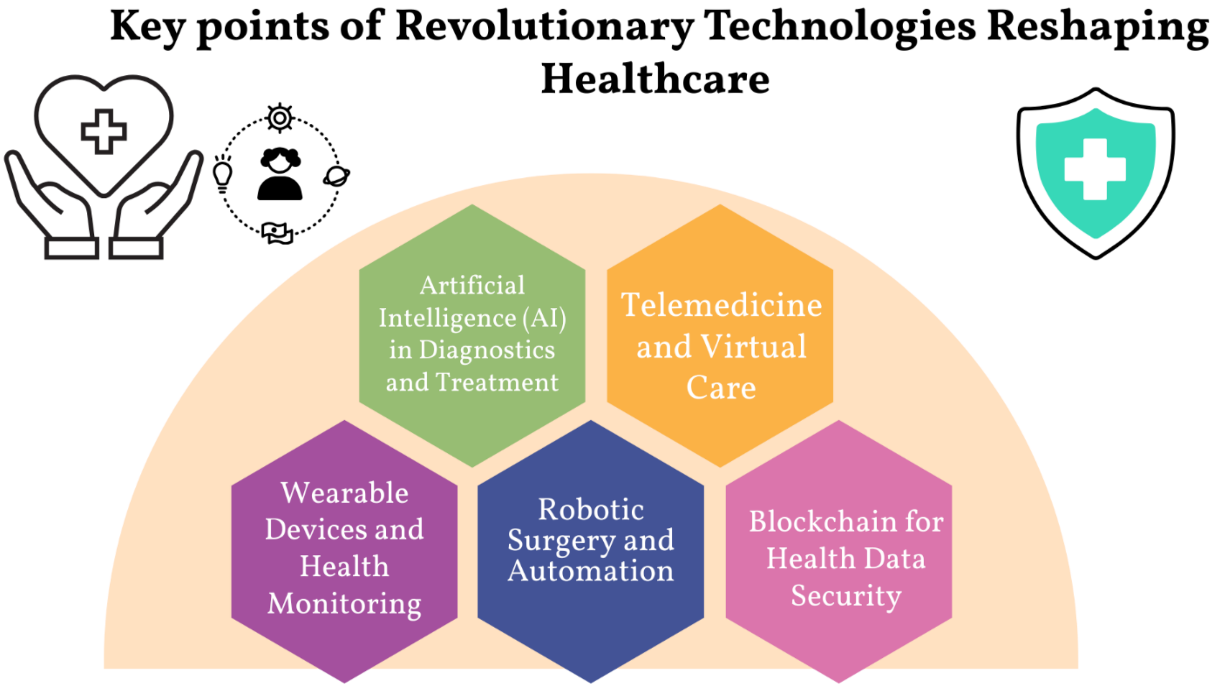

Figure: 2 showing key points of revolutionary technologies reshaping healthcare

Artificial intelligence (AI) serves as an essential foundation for current health care operations. Through its subset category machine learning enables healthcare systems to process unlimited data amounts thereby identifying patterns which humans cannot perceive. The analysis of AI algorithms produces predictions of how patients will do and helps doctors perform disease diagnoses and matches patients to their best treatment choices [16]. AI technology currently analyzes medical pictures to detect cancer in radiology images with excellent accuracy rates. Through AI-based clinical tools physicians obtain better treatment options that minimize mistakes and enhance protection for their patients [17].

The discovery process for medicinal drugs has experienced accelerated development through AI which allows researchers to swiftly discover promising pharmaceutical agents at better prices. Through genetic data analysis AI becomes a foundation for precise medical care that lets healthcare providers develop individualized treatment approaches resulting in efficient care with fewer negative side effects [18].

The health industry attained a new predictive analysis potential when it adopted big data methods. Healthcare organizations have started gathering immense volumes of patient data from a wide spectrum of information systems including Electronic Health Records alongside wearable technology and genetic test analysis and community health conditions assessment. Analysis of this data enables researchers to discover deep understanding about disease occurrences and patient actions and health results [19].

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Healthcare institutions benefit from big data predictive analytics which forecasts health complications and disease expansion and enables preventive actions. The analysis of patient information through algorithms can identify hospital readmission possibilities which allows providers to organize preventative interventions [20]. Epidemiological research depends on big data since researchers employ it to monitor disease transmission patterns while projecting outbreak scenarios which was particularly shown during the COVID-19 pandemic [21].

Telemedicine proves itself as a true breakthrough technology especially when the COVID-19 pandemic emerged. Through video consultations telemedicine gives health providers the capability to treat distant or medically deprived patients which minimizes the necessity of personal appointments. The medical technology provides excellent service to people managing persistent diseases because it lets them consult with healthcare providers at any time without needing physical movement [22].

The management of diabetes together with hypertension and heart disease has dramatically improved through the implementation of remote monitoring devices including health trackers and sensors. The technology allows healthcare providers to receive direct vital sign data reports from real-time in an instant which enables them to monitor patients continuously through time without hospital confinement. Better health results become achievable through remote care because it creates better patient-driven healthcare management and improves operational efficiency of health systems [23].

NEXT-GENERATION TRENDS IN HEALTH INFORMATICS

Health informatics continues to develop rapidly because remarkable new technologies enter the field to completely transform healthcare delivery procedures. The health informatics field continues to mature through the development of new-generation trends which will build highly customized efficient data-centric healthcare systems [24]. This evolution of trends possesses dual benefits which strengthen healthcare treatment services while adjusting the entire healthcare system framework. The recent growth of healthcare includes three major areas which combine personalized healthcare with mobile health solutions and the Internet of Medical Things and artificial intelligence application in existing advancements [25].

Classic precision medicine stands as the leading revolutionary healthcare trend of the contemporary healthcare era. The delivery of specialized healthcare treatment to individual patients becomes possible through the combination of their genetic data with personal life factors and environmental conditions. Advanced genomics technologies together with data analytics and bioinformatics drive the creation of patient-specific effective therapies which healthcare providers develop through interpreting genomic data [26].

ISSN : 3079-6830
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Personalized healthcare demonstrates its highest value in cancer treatment through therapy lines developed to attack individual cancer-targeting mutations. Through pharmacogenomics practitioners obtain genetic data about patients which helps doctors find medications with high probabilities of success therefore decreasing erroneous prescriptions together with medication side effects [27].

Advancements in data analysis along with improved capabilities will drive precision medicine forward thus allowing better patient results and enabling healthcare providers to act proactively. Mobile health (mHealth) consists of employing mobile devices and applications to track health features and manage wellness and now represents a vital component in healthcare systems because it enables people to actively manage their health with smartphones, tablets along with wearable devices. Healthcare providers obtain important patient data from these technologies that track vital signs and physical activity and sleeping patterns by offering real-time monitoring capabilities before using them for ongoing care management purposes [28].

Modern wearable technology including fitness trackers, smartwatches as well as biosensors has transformed the way patients deal with diabetes and hypertension diseases. CGMs represent an advance that lets diabetics monitor their blood sugar in real time thus helping them achieve better condition management [29]. Patients together with their doctors receive warnings about heart rhythm abnormalities through wearable heart monitors which allows for prompt medical attention before dangerous heart events develop. Enhanced technology adoption will generate possible reductions in hospital visits and lead to better chronic disease controls and encourage preventive healthcare strategies [30].

The Internet of Medical Things (IoMT) describes medical devices connected in a network which utilize internet-based communication to exchange data with each other. Hospitals alone make up a small portion of this connected network of medical devices which includes wearable gadgets and implantable sensor equipment together with hospital monitoring platforms and diagnostic technologies. IoMT systems that connect medical devices to a network for automated patient data collection enhance health outcome monitoring specifically for people with ongoing illnesses [31].

Smart insulin pumps that monitor blood glucose levels automatically manage insulin dosage for diabetic patients parallel smart inhalers which provide tracking systems for asthma patients for their medications and symptoms. IoMT solutions have become essential for hospitals because they help track patient conditions, operate equipment effectively and display vital signs to deliver more efficient proactive healthcare services [32]. Advanced IoMT devices will increase the capability of real-time data to fuel clinical decisions in medical practice. The medical field will develop a stronger interconnected system with such advances since doctors will obtain current data for making treatment

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choices [33].

Healthcare technology development at the next level significantly depends on artificial intelligence (AI) functionality. Health informatics systems use artificial intelligence algorithms for precise medical diagnosis and evaluation of patient outcomes and customized individual treatment planning. By rapidly analyzing vast patient datasets AI detects patterns that produce both prompter and more precise medical diagnoses in radiology together with oncology and pathology diagnosis [34].

AI tools utilize individual patient data including health records and genetic makeup to generate exclusive healthcare recommendations for personal needs. Algorithms powered by artificial intelligence examine the genome of patients in order to determine appropriate treatment options for both cancer and chronic illnesses. AI technologies enable the creation of predictive health models to forecast risks which leads to proper preventive interventions for chronic disease management [35].

The new health informatics trends lead healthcare institutions toward better connected healthcare systems which deliver more efficient treatments designed specifically for individual patients. The integration of personalized treatments as well as wearable devices and AI-powered systems within clinical practice will lead healthcare toward better outcomes and proactive preventive approaches for health management [36]. The integration of cutting-edge health systems requires stakeholders to form alliances in order to tackle essential privacy and data security problems alongside ethical AI issues which arise in modern health informatics practice [37].

BARRIERS TO PROGRESS IN HEALTH INFORMATICS

Health informatics together with state-of-the-art technological integration offers transformative healthcare benefits although it creates substantial obstacles throughout its fast development. Healthcare providers need to resolve these barriers because they block digital health benefits from being seen by the system and limit maximum advancement potential [38]. The advancement of healthcare faces pivotal challenges because data privacy alongside data security measures need improvement and health organizations must solve compatible data issues between systems and address the morality of artificial intelligence healthcare applications [39].

Health informatics faces a significant challenge because securing patient information represents one of its main troubles. Patients generate and distribute a growing amount of health data because of increasing use of electronic health records (EHRs) along with telemedicine services and wearable devices and additional health technologies in medical practice. Patient health data containing sensitive information makes it the number one target for cybercriminals. The exposure of patient data breaches causes dual privacy violations while exposing people to identity theft risks and fraud and adverse reputation impacts [40].

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Cybersecurity improvements have not eliminated the major challenge of health data breaches which persist as a key concern in health systems. Health information systems developed vulnerabilities because cyberattacks like hospital ransomware incidents became more prevalent. To keep digital health systems trustworthy it becomes essential to improve data protection systems through implementing Encryption procedures effectively [41]. Health organizations together with governmental authorities need to establish thorough regulations which will compel healthcare providers to satisfy privacy requirements as specified by HIPAA in America and GDPR in European markets [42].

A substantial health informatics obstacle exists when different healthcare platforms together with systems and devices cannot exchange information without technical barriers. Healthcare providers operate with multiple patient data management software which cannot exchange data between their different platforms. Healthcare fragmentation emerges because several medical databases remain separate which prevents healthcare providers from obtaining integrated live patient health information [43].

Poor interoperability between healthcare systems makes it difficult to exploit health data effectively which both extends diagnostic time and raises the danger of mistakes. When labs results cannot be shared between different healthcare institutions these result in patients undergoing repeated tests and possible incorrect treatment diagnosis or substantiated delays. The solution for this challenge requires standardized data formats together with communication protocols. Health informatics continues to develop interoperability solutions although complete system interoperability remains a difficult accomplishment to achieve [44].

The quick expansion of health informatics technology has exposed the digital divide problem which separates people with technological access from those without it. People from wealthy backgrounds and residents in big cities obtain innovative healthcare technologies yet many individuals in remote and disadvantaged regions struggle to receive digital medical care [45]. The disconnect between health care facilities and patients in remote locations leads to worsened healthcare access because these populations lack both wearable health devices and telemedicine platforms and stable internet connectivity [46].

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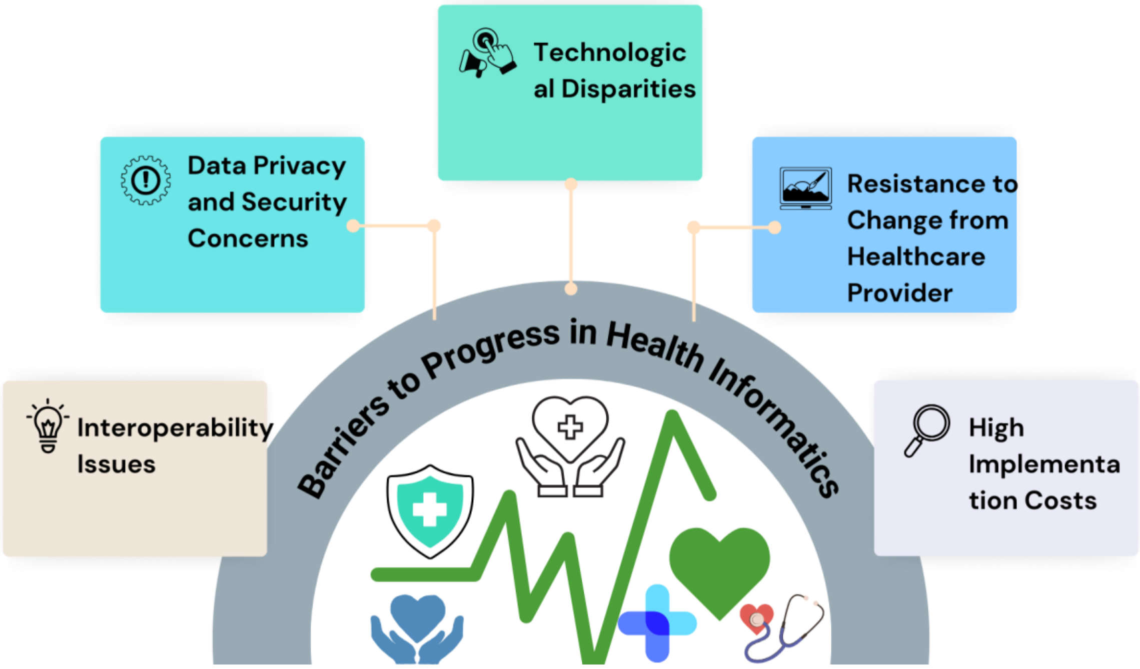

Figure: 3 showing barriers to progress in health informatics

People who are older as well as those lacking sufficient technological skills will find it difficult to use digital health tools which results in their inability to benefit from health informatics advantages. The full access to healthcare innovations by vulnerable population's demands infrastructure development alongside educational initiatives coupled with ongoing support which aims at reducing digital inequality in healthcare services [47].

Healthcare professionals face growing ethical challenges about AI-based tools which gain prominence in medical practices. The main issue with AI algorithms involves their possibility to incorporate biased features during operations. The incomplete diversity of training data-collection sets may lead AI algorithms to generate incorrect recommendations or faulty diagnostic outcomes because the systems have not sufficient sample representation [48]. Marginalized groups may experience the negative effects of this bias because it produces unequal treatment which intensifies health-related inequality.

There exist substantial doubts regarding the clearness of artificial intelligence decision procedures and the lack of responsibility in AI system operations. AI systems admit limited transparency since their decision pathways which direct their operations remain locked from human interpretation. Lack of transparency weakens trust by healthcare providers and their patients to verify AI-based clinical choices. The advent of AI creates a situation that contradicts the customary medical professional role as sole decision-makers during patient care procedures [49].

The automation of work traditionally handled by healthcare providers creates various complex moral

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challenges. The improved efficiency and reduced costs from AI and automation does not match the importance of human elements during healthcare interactions since patients need to trust their medical providers alongside receiving emotional support [50]. Health informatics progress depends on finding equilibrium between computerized systems and human emotional care and systemic oversight in medical practices [51].

The potential of health informatics to reshape healthcare requires proper implementation of solutions to overcome these obstacles. A solution requires joint efforts between governments and healthcare providers and technologists to overcome these obstacles for safe and equitable benefits in patient digital health care [52].

THE HORIZON AHEAD: FUTURE VISIONS FOR HEALTH INFORMATICS

Health informatics will shape the way healthcare is delivered and experienced and managed because digital healthcare transformation continues to advance. The upcoming decades will unite sophisticated technologies with better healthcare systems and adjusted care delivery patterns to transform provider-patient collaboration as well as entire healthcare operational structures at all levels. Various promising innovations will construct a superior healthcare system with better results and lower costs and equal access for all populations worldwide [53].

Health informatics shows great promise through its ability to introduce an innovative model of healthcare that predicts and prevents disease occurrence. Health informatics enables healthcare providers to perform early risk assessments for their patients to prevent critical health situations from developing. Healthcare services will benefit from predictive analytics by receiving earlier alert warnings and conducting more accurate disease treatments and adopting tailored preventive strategies [54]. AI algorithms study genetic information together with lifestyle patterns and environmental elements to determine potential disease risks from cardiovascular disease through cancer and diabetes. The acquired information allows healthcare providers to establish prevention methods including life-style modification alongside specific testing protocols and early medication approaches to stop disease development [55].

Research indicates that healthcare facilities will adopt telemedicine systems through virtual hospitals combined with remote medical services as the standard practice. Telemedicine gained immense popularity during COVID-19 but will transform video consultations into a complete telehealth framework which delivers online healthcare services throughout the country. Through AI diagnostic capabilities together with remote monitoring equipment and virtual medical staffing patients can access full medical service delivery at their home addresses [56].

Healthcare organizations are currently establishing virtual hospitals that let patients receive treatment

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digitally from any location. Through a combination of telemedicine and remote monitoring equipment along with AI processing the healthcare facilities will deliver primary healthcare services in addition to specialty medical advice to patients. Remote patient care will play a crucial role in rural communities because these locations typically have restricted access to medical facilities and healthcare providers [57]. Healthcare professionals will provide expert support to patients who can control their care needs at home through improved model maturity.

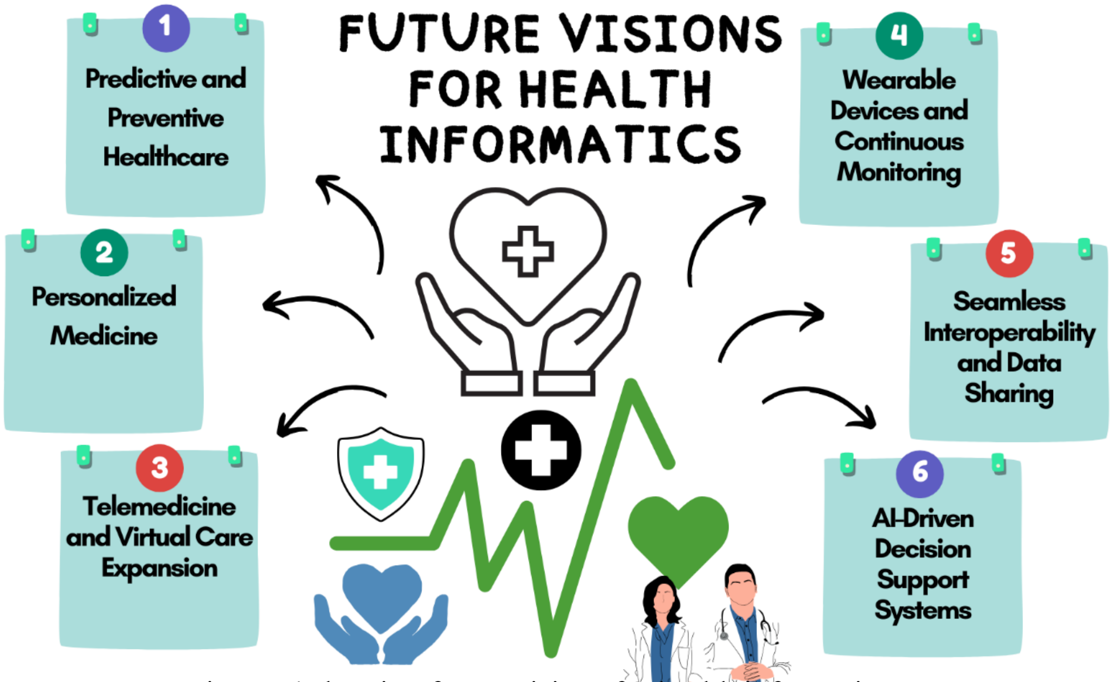

Figure: 4 showing future visions for health informatics

Global health increasingly depends on health informatics systems to serve its healthcare needs. Future healthcare improvement programs together with pandemic management and health inequity solutions depend heavily on linking and analyzing medical data between different nations. Health informatics will evolve into global health data systems that allow present-time exchange of medical data and disease-tracking information and epidemiological trends spanning across worldwide geographic regions [58].

The establishment of worldwide health informatics platforms allows governments together with organizations and research groups to improve their response during unexpected health emergencies including the current COVID-19 pandemic. Through extensive data sharing at a global level health programs can achieve their goal of lessening healthcare gaps and providing better medical treatment to underserved regions. Global health data aggregation provides researchers with superior research accuracy while enabling they to develop better health policy decisions [59].

Personalized medical techniques driven by AI represent one of the most transformative capabilities

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Volume 1, Number 3, 2025
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in health informatics research for the near future. AI systems that combine genetic profiles with health records and life choices and social health factors will serve healthcare providers by helping them provide unique patient treatment plans [60]. Through personalized medicine practitioners can progress from optimal drug prescription to individualized physical exercise planning as well as dietary instructions preventive treatments and therapeutic methods for mental health. AI systems evaluate individual patient risk variables to identify the optimal treatment solutions thus limiting the partialness that exists in numerous medical fields [61].

The block chain system which became prominent in transaction security is expected to emerge as a key technology for health informatics development. Health data storage and sharing through block chain provides a decentralized protection system that becomes vital as interoperable exchanges between patients and institutions and healthcare facilities increase. Through blockchain patients will maintain full authority over their health information while selecting users who need access along with specific purposes for their information usage [62]. This secure information system fights against data breaches while boosting patient privacy and generating digital health system trust from users.

Augmented reality (AR) together with virtual reality (VR) technology will significantly change how medical education is taught while revolutionizing patient care delivery in the following years. Medical students and healthcare professionals will benefit from these technologies which enable them to undertake surgical practices along with complex diagnosis and procedure training without putting actual patients at risk [63].

Medical practitioners using healthcare technologies can improve diagnosis accuracy through an AR and VR system that provides surgical patients with visual alerts containing necessary biometric information. AR technology allows surgeons to view patient scans that appear directly on top of their subject during surgery thus boosting accuracy together with safety [64]. By uniting virtual and physical elements decision makers will fulfill their tasks in a more precise manner to achieve better overall patient success.

Health informatics will create a health environment where technology transforms medical treatment delivery methods and patient system relationships while managing health information better and creating improved patient advantages [65]. The creation of predictive and personalized and connected healthcare frameworks provides exponential benefits that improve medical results and operation flexibility while offering wider health services worldwide.

CONCLUSION

Health informatics continues to change significantly the way healthcare operates. Healthcare delivery methods experience continuous change because technology brings artificial intelligence along with

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big data analytics as well as personalized medicine and telehealth solutions. Research has shown that health informatics has amazing potential ahead since predictive analytics along with virtual hospitals and worldwide health data exchange will change global patient care standards.

Implementing this transformation faces various obstacles as part of its implementation. Healthcare needs strategies to resolve data privacy and security problems and the functional integration of multiple healthcare systems and the resolution of technology configuration issues and the ethical management of artificial intelligence in healthcare for the smooth deployment of new innovations. Creating a secure and equal healthcare system that includes everyone requires all healthcare workers along with technology creators and global health group members and governmental representatives to unite for building an equitable healthcare environment.

Health informatics currently presents an optimistic outlook with seamless growth predicted. Healthcare services will evolve into proactive more accessible and personalized systems through ongoing advancement in blockchain alongside augmented reality and predictive analytics technologies. These innovations will achieve maximum potential when stakeholders maintain their commitment to resolving the emerging issues. Increased connections between technology and patient care through the future development of health informatics will lead to better results and healthcare equality and usher in a new system of global health and wellness delivery.

REFERENCES

[1]. Legris P, John I, Pierre C. Why do people use information technology? A critical review of the technology acceptance model. Inf Manage 2003; 40(03):191–204

[2]. Davis FD, Bagozzi RP, Warshaw PR. User acceptance of computer technology: a comparison of two theoretical models. Manage Sci 1989; 35(08):982–1003

[3]. Lee Y, Kozar KA, Rt LK. The technology acceptance model: past, present, and future. Comm Assoc Inform Syst 2003; 12(01):50

[4]. Fischer HF, Rose M (2019) Scoring depression on a common metric: a comparison of EAP estimation, plausible value imputation, and full Bayesian IRT modeling. Multivar Behav Res 54:85–99. https://doi.org/10.1080/00273171.2018.149138 1

[5]. Alghamdi KS, Petzold M, Alsugoor MH, et al. Community pharmacists' perspectives towards automated pharmacy systems and extended community pharmacy services: an online cross-sectional study. Explor Res Clin Soc Pharm. 2023; 12:100363. https://doi.org/10.1016/j.rcsop.2023.100363.

ISSN : 3079-6830
Volume 1, Number 3, 2025
https://doi.org/10.70445/giaic.1.2.2025.1-19

[6]. Lam MK, Nguyen M, Lowe R, et al. "I can do it": Does confdence and perceived ability in learning new ICT skills predict pre-service health professionals' attitude towards engaging in e-healthcare? HIC. 2014; 204:60–6. https://doi.org/10.3233/978-1-61499-427-5-60

[7]. Hovenga EJ. Health workforce competencies needed for a digital world. Health Inf Gov Digital Environ. 2013; 141:68.

[8]. Venkatesh V, Davis FD. A theoretical extension of the technology acceptance model: Four longitudinal field studies. Manage Sci 2000;46(02):186–204 29 Sharp JH. Development, extension, and application: a review of the technology acceptance model. Director 2006; 5:7

[9]. Hsiao CH, Chyan Y. The intellectual development of the technology acceptance model: a co-citation analysis. Int J Inf Manage 2011; 31(02):128–136

[10]. Hoyt RE, Yoshihashi A, Bailey NJ. Health informatics: practical guide for healthcare and information technology professionals. Informatics Education; 2014:533

[11]. Turban E, David K, Jae L, Dennis V. Electronic Commerce: A Managerial Perspective 2002. Prentice Hall; 2002. ISBN 0 13 (975285):4

[12]. Gondal MN, Shah SU, Chinnaiyan AM, Cieslik M. A systematic overview of single-cell transcriptomics databases, their use cases, and limitations. Frontiers in Bioinformatics. 2024 Jul 8; 4:1417428.

[13]. Gagnon M-P, Desmartis M, Labrecque M, et al. Systematic review of factors influencing the adoption of information and communication technologies by healthcare professionals. J Med Syst 2012; 36(01):241–277

[14]. Moosbrugger H, Kelava A, editors. Testtheorie und Fragebogenkonstruktion. 3. vollständig neu bearbeitete, erweiterte und aktualisierte Aufage. Berlin: Springer; 2020.

[15]. Wilson IB (1995) Linking clinical variables with health-related quality of life: a conceptual model of patient outcomes. JAMA 273:59. https://doi.org/10.1001/jama.1995.03520250075037

[16]. Choi, Seung W.; Podrabsky, Tracy; McKinney, Natalie; Schalet, Benjamin D.; Cook, Karon F.; Cella, David. Prosetta Stone® methodology - a Rosetta stone for patient reported outcomes. n.d.

[17]. Gondal MN, Chaudhary SU. Navigating multi-scale cancer systems biology towards model-driven clinical oncology and its applications in personalized therapeutics. Frontiers in Oncology. 2021 Nov 24; 11:712505.

ISSN : 3079-6830
Volume 1, Number 3, 2025
https://doi.org/10.70445/giaic.1.2.2025.1-19

[18]. Bjorner JB, Chang C-H, Thissen D, Reeve BB (2007) Developing tailored instruments: item banking and computerized adaptive assessment. Qual Life Res 16:95–108. https://doi.org/10.1007/s11136-007-9168-6

[19]. Jordan MI, Mitchell TM. Machine learning: trends, perspectives, and prospects. Science. (2015) 349:255–60. doi: 10.1126/science.aaa8415

[20]. LeCun Y, Bengio Y, Hinton G. Deep learning. Nature. (2015) 521:436–44. doi: 10.1038/nature14539 3. Pete S. Congressional intent for the HITECH Act. Am J Managed Care. (2010) 16(12 Suppl HIT):SP24–8

[21]. Jamoom E, Beatty P, Bercovitz A, Woodwell D, Palso K, Rechtsteiner E. Physician adoption of electronic health record systems: United States, 2011. NCHS Data Brief. (2011) 98:1–8. 5. Jacobs A. The pathologies of big data. Commun ACM. (2009) 52:36–44. doi: 10.1145/1536616.1536632

[22]. Wolfe PJ. Making sense of big data. Proc Natl Acad Sci USA. (2013) 0 110:18031–2. doi: 10.1073/pnas.1317797110

[23]. Herland M. A review of data mining using big data in health informatics. J Big Data. (2014) 1:1–35. doi: 10.1186/2196-1115-1-2

[24]. Gable CB. A compendium of public health data sources. Am J Epidemiol. (1990) 131:381–94. doi: 10.1093/oxfordjournals.aje.a115513

[25]. Institute of Medicine (US) Committee on Assuring the Health of the Public in the 21st Century. The Future of the Public's Health in the 21st Century. (2002).

[26]. Patel S, Park H, Bonato P, Chan L, Rodgers M. A review of wearable sensors and systems with application in rehabilitation. J Neuroeng Rehabil. (2012) 9:21. doi: 10.1186/1743-0003-9-21

[27]. Chen J, Qian F, Yan W, Shen B. Translational biomedical informatics in the cloud: present and future. Biomed Res Int. (2013) 2013:658925. doi: 10.1155/2013/658925

[28]. Pedrycz W, Chen SM, editors. Information Granularity, Big Data, and Computational Intelligence. Switzerland: Springer International Publishing (2015). doi: 10.1007/978-3-319-08254-7

[29]. Wu PY, Cheng CW, Kaddi CD, Venugopalan J, Hoffman R, Wang MD. - Omic and electronic health record big data analytics for precision medicine. IEEE Trans Biomed Eng. (2017) 64:263–73. doi: 10.1109/TBME.2016. 2573285

ISSN : 3079-6830
Volume 1, Number 3, 2025
https://doi.org/10.70445/giaic.1.2.2025.1-19

[30]. Yang HC, Dasdan A, Hsiao RL, Parker DS. Map-reduce-merge: simplified relational data processing on large clusters. In: Proceedings of the ACM SIGMOD International Conference on Management of Data. Beijing (2007). p. 1029–40. doi: 10.1145/1247480.1247602

[31]. Karun AK, Chitharanjan K. A review on Hadoop–HDFS infrastructure extensions. In: IEEE Conference on Information and Communication Technologies. Thuckalay (2013). p. 132–7.

[32]. Mohri M, Rostamizadeh A, Talwalkar A. Foundations of Machine Learning. London: MIT Press (2012).

[33]. Bacha A, Abid N. AI-Driven Drug Discovery: Revolutionizing the Pharmaceutical Industry and Reducing Time to Market. Global Journal of Machine Learning and Computing. 2025 Jan 23; 1(1):1-4.

[34]. Bellazzi R, Zupan B. Predictive data mining in clinical medicine: current issues and guidelines. Int J Med Inform. (2008) 77:81–97. doi: 10.1016/j.ijmedinf.2006.11.006

[35]. Cohen AM, Hersh WR. A survey of current work in biomedical text mining. Brief Bioinform. (2005) 6:57–71. doi: 10.1093/bib/6.1.57

[36]. Bedard N, Pierce M, El-Naggar A, Anandasabapathy S, Gillenwater A, Richards-Kortum R. Emerging roles for multimodal optical imaging in early cancer detection: a global challenge. Technol Cancer Res Treat. (2010) 9:211–7. doi: 10.1177/153303461000900210

[37]. Weissleder R, Pittet MJ. Imaging in the era of molecular oncology. Nature. (2008) 452:580–9. doi: 10.1038/nature06917

[38]. Pierce MC, Javier DJ, Richards-Kortum R. Optical contrast agents and imaging systems for detection and diagnosis of cancer. Int J Cancer. (2008) 123:1979–90. doi: 10.1002/ijc.23858

[39]. Ravi D, Wong C, Deligianni F, Berthelot M, Andreu-Perez J, Lo B, et al. Deep learning for health informatics. IEEE J Biomed Health Inform. (2016) 21:4–21. doi: 10.1109/JBHI.2016.2636665

[40]. Suzuki K, Yan P, Wang F, Shen D. Machine learning in medical imaging. Int J Biomed Imaging. (2012) 2012:123727. doi: 10.1155/2012/123727

[41]. Holzinger A, Biemann C, Pattichis CS, Kell DB. What do we need to build explainable AI systems for the medical domain? (2017). arXiv[Preprint].arXiv:1712.09923. doi: 10.48550/arXiv.1712.09923

[42]. Balka E, Bjorn P, Wagner I. Steps toward a typology for health informatics. Proc 2008 ACM Conf Comput Support Coop Work. 2008, November: 515–524.

ISSN : 3079-6830
Volume 1, Number 3, 2025
https://doi.org/10.70445/giaic.1.2.2025.1-19

[43]. Zheng YL, Ding XR, Poon CCY, Lo BPL, Zhang H, Zhou XL, Zhang YT. Unobtrusive sensing and wearable devices for health informatics. IEEE Trans Biomed Eng. 2014; 61(5):1538–1554.

[44]. Achampong EK. The state of information and communication technology and health informatics in Ghana. Online J Public Health Inform. 2012; 4(2).

[45]. Oak M. A review on barriers to implementing health informatics in developing countries. J Health Inform Dev Countries. 2007; 1(1).

[46]. Khairat S, Sandefer R, Marc D, Pyles L. A review of biomedical and health informatics education: a workforce training framework. J Hosp Adm. 2016; 5(05): 10–20.

[47]. Wilkinson SG, Chevan J, Vreeman D. Establishing the centrality of health informatics in physical therapist education: if not now, when? J Phys Ther Educ. 2010; 24(3):10–15.

[48]. Bacha A, Abid N. AI-Driven Drug Discovery: Revolutionizing the Pharmaceutical Industry and Reducing Time to Market. Global Journal of Machine Learning and Computing. 2025 Jan 23; 1(1):1-4.

[49]. Patrício, L., Sangiorgi, D., Mahr, D., Čaić, M., Kalantari, S., & Sundar, S. (2020). Leveraging service design for healthcare transformation: Toward people-centered, integrated, and technology-enabled healthcare systems. Journal of Service Management, 31(5), 889-909. https://www.emerald.com/insight/content/doi/10.1108/JOSM-11-2019-0332/full/htmlMoody-Williams,J . (2020).

[50]. A journey towards patient-centered healthcare quality. Springer International Publishing. https://link.springer.com/content/pdf/10.1007/978-3-030-26311-9.pdf

[51]. Graffigna, G., Barello, S., & Triberti, S. (2015). Patient engagement: A consumer-centered model to innovate healthcare (pp. 1-12). Berlin: De Gruyter Open. https://www.degruyter.com/document/doi/10.1515/9783110452440/pdf?licenseType=open-access

[52]. Agarwal, R., Dugas, M., Gao, G., & Kannan, P. K. (2020). Emerging technologies and analytics for a new era of valuecentered marketing in healthcare. Journal of the Academy of Marketing Science, 48, 9-23. https://link.springer.com/article/10.1007/s11747-019-00692-4

[53]. Kushida, C. A., Nichols, D. A., Holmes, T. H., Miller, R., Griffin, K., Cardell, C. Y., & Walsh, J. K. (2015). SMART DOCS: a new patient-centered outcomes and coordinated-care management approach for the future practice of sleep medicine. Sleep, 38(2), 315-326. https://academic.oup.com/sleep/articleabstract/38/2/315/2416997

ISSN : 3079-6830
Volume 1, Number 3, 2025
https://doi.org/10.70445/giaic.1.2.2025.1-19

[54]. Chen, J., Mullins, C. D., Novak, P., & Thomas, S. B. (2016). Personalized strategies to activate and empower patients in health care and reduce health disparities. Health Education & Behavior, 43(1), 25-34. https://journals.sagepub.com/doi/abs/10.1177/1090198115579415

[55]. Bacha A, Shah HH, Abid N. The Role of Artificial Intelligence in Early Disease Detection: Current Applications and Future Prospects. Global Journal of Emerging AI and Computing. 2025 Jan 20;1(1):1-4.

[56]. Mallipeddi, S. R., Goda, D. R., Yerram, S. R., Varghese, A., & Ande, J. R. P. K. R. (2017). Telemedicine and Beyond: Navigating the Frontier of Medical Technology. Technology & Management Review, 2(1), 37-50. https://hal.science/hal-04495006/

[57]. Lorenzi, N. M., & Riley, R. T. (2000). Managing change: An overview. Journal of the American Medical Informatics Association, 7(2), 116-124.

[58]. Annas, G. J. (2003). HIPAA regulations - a new era of medical-record privacy? New England Journal of Medicine, 348(15), 1486-1490.

[59]. Krumholz, H. M. (2014). Big data and new knowledge in medicine: The thinking, training, and tools needed for a learning health system. Health Affairs, 33(7), 1163-1170.

[60]. Obermeyer, Z., & Emanuel, E. J. (2016). Predicting the future — big data, machine learning, and clinical medicine. New England Journal of Medicine, 375(13), 1216-1219.

[61]. Halamka, J., & Tripathi, M. (2018). The HITECH Era in Retrospect. New England Journal of Medicine, 377(10), 907-909.

[62]. Engelhardt, M. A. (2017). Blockchain technology in healthcare: The revolution starts here. IEEE 18th International Conference on e-Health Networking, Applications and Services (Healthcom), 1-3.

[63]. Maritz R, Tennant A, Fellinghauer C, Stucki G, Prodinger B. Creating a common metric based on existing activities of daily living tools to enable standardized reporting of functioning outcomes achieved during rehabilitation. J Rehabil Med 2020:0. https://doi.org/10.2340/16501977-2711.

[64]. Oude Voshaar MAH, Vonkeman HE, Courvoisier D, Finckh A, Gossec L, Leung YY et al (2019) towards standardized patient reported physical function outcome reporting: linking ten commonly used questionnaires to a common metric. Qual Life Res 28:187–197. https://doi.org/10.1007/s11136-018-2007-0