

"SIGNIFICANCE OF HEALTH INFORMATICS IN PATIENT CARE"

Abstract

Health informatics is the science that allows us to use data, information, and knowledge to improve the health of the people and how ensure the speedy and efficient delivery of healthcare services. By applying the knowledge from the domain of information science and information technology in the service of better health and better healthcare, we can enrich the arena of health informatics. The history of health informatics dates back almost 80 years to the time of world war 2nd when several doctors and medical professionals were thinking of how computers could help diagnose diseases. They tried combining logic and reasoning to tackle healthcare problems in biology and medicine. During the 1950s, people worked extensively in bioengineering, biophysics, epidemiology, and biometry.

The era of the internet has given a significant boost to this field. Even today, the attainment of Universal Health Coverage heavily depends on how we can utilize and churn this field of health informatics. Governments across the nation-states are focusing on incentivizing the adoption of electronic medical records so that this field can be enriched with valuable data.

As we know, a substantial number of stakeholders are there to contribute to this field of health informatics. The patients provide information and resources for the vital data sets; Collaborating industries like (Insurance, MedTech, laboratories, radiology, etc.) bioresearch, and engineering systems all contribute heavily towards data transfer like wearables, AI-fitted devices, etc. Information released in bulk is mostly in raw form, so it needs to be

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analyzed and stored in a management system to be further used for decision-making and other work.

The main aim of a well-functioning Health information system is an integrated effort to collect, process, report, and use health information for the public good and business needs. The health information life cycle involves collecting data from various sources or stakeholders, then maintaining the data and storing the data for further usage.

There are many challenges in the pathway of Health Informatics i.e., Conventional Healthcare Environment, Cyber security threats, Device Diversity and interoperability, Data Integrity and consistency, etc.

Keywords: Health Informatics, Health Informatics in patient centered care, Evolution of Health Informatics, Public Health Informatics, Concepts of Health Informatics.

I. INTRODUCTION TO HEALTH INFORMATICS

Health informatics is the science that allows us to use data, information, and knowledge to improve the Health of the people and how ensure the speedy and efficient delivery of healthcare services. By applying the knowledge from the domain of information science and information technology in the service of better Health and better healthcare, we can enrich the arena of Health Informatics. It is used to develop and improve ways to use information in healthcare. It is the practice of procuring, analyzing, and managing data from the healthcare domain and applying medical concepts in concurrence with health information technology systems to help clinicians provide better healthcare. The field of health informatics has grown substantially due to the rapid adoption of the electronic system, which generates plenty of data and intrusion of the med tech industry in shaping different dimensions of healthcare. The wide use of Hospital Information management systems has helped this domain become data rich as HIS is connected with Laboratory information systems, Radiology information systems, systems of various departments like pharmacy, accounts, supply chain, etc., and picture archiving and communication systems, which regularly throw data. Each data acts as a drop in the ocean, which is already filed with data. But, each drop has its unique characteristics that enrich this field. Health Informatics is also known as Health Information systems. It is a diverse domain having various sub domains like clinical informatics, nursing informatics, public health informatics, etc. Health informatics is not an aloof field but is formed by the conjunction of several areas together, like computer science, AI and Machine learning, data analytics, statistics, etc. It is an interdisciplinary field. It relies heavily on information technology to provide better health outcomes to its people, be they doctors, patients, nurses, medical administrators, or other stakeholders. It makes the work of the medical fraternity much easier and more efficient. It stores and retrieves all applicable information regarding patients, treatments, and all eventual outcomes. It also develops methods to gather, analyze and implement patient solutions using existing resources and devices. It also deals with building an efficient communication system to efficiently exchange information between doctors, nurses, and staff for better clinical, business, or other types of decision-making. It connects different facilities so data sharing can occur quickly, accurately, and securely. It also helps in improving process management in different healthcare verticals.

II. EVOLUTION OF HEALTH INFORMATICS: A BRIEF HISTORY

Health informatics is not new. The history of Health Informatics dates back almost 80 years to the time of world war 2nd when several doctors and medical professionals were thinking of how computers could help diagnose diseases. They tried combining logic and reasoning to tackle healthcare problems in biology and medicine. During the 1950s, people worked extensively in bioengineering, biophysics, epidemiology, and biometry. They gave birth to the 'International society of cybernetic medicine' in 1958; then, a new decade brought the evolution of computing and data analysis from 1960 to 2000. Earlier, the discipline had different names, like computer medicine, medical computer science, and medical software engineering, but they all meant the same and were used interchangeably. Later, a universal term, "Health Informatics," was coined, encompassing the combination of science, engineering, health tech, etc. The coming of mainframe Computers provided a big help to this field during the era of the 1960s. Hospitals started using computers in their day-to-day operations. The first electronic medical record system called for Health Evaluation through logic programming (HELP) was developed at Latter-day saints hospitals in 1967. Later,

computers became small and portable so that they could be easily used to maintain data history of health records and can produce an analysis of voluminous data using software in more readable and dashboard form. By 2000 the potential of technology was realized in medical care like diagnosis, record keeping, information sharing, and care coordination. It could prevent several grave medical errors and can bring efficiency. The USA brought Health Information and technology to the economic clinical health act, popularly called the HITECH act. This law incentivizes the usage of keeping the patient record in digital forms. Earlier, only 12% of hospitals were paying attention to it. Later on, by 2015, 85-90% of hospitals accepted it. The future of health informatics is being built and is helpful in patient scheduling, practice management software, medical billing, telemedicine, telehealth, quality reporting, and analytics. The era of the internet has given a significant boost to this field. Even today, the attainment of Universal Health Coverage heavily depends on how we can utilize and churn this field of health informatics. Governments across the nation-states are focussing on incentivizing the adoption of electronic medical records so that this field can be enriched with valuable data. In recent years we have seen Government has rolled out the e-sanjeevani teleconsultation app to provide a free consultation to people via online mediums. It also aims to generate a Patient health record that can be accessed on a real-time basis to provide crucial Health related information.

III. THE INTERCONNECTEDNESS OF HEALTH INFORMATICS WITH OTHER SUBDOMAINS AND DISCIPLINES

Health informatics is the field of science and engineering. It aims to develop methods and technologies for the acquisition, processing, and study of patient data. Data come from different areas and should be converted into a helpful form using analytical tools, i.e., AI and Machine learning, so that decision-making can be done based on that data sets. As this field involves the usage of technology, analytics, computer, medicine, Health, statistics, and reasoning, we can say that its a spectrum of multidisciplinary fields that includes the study of computing fields, bioinformatics, data science, IT, medical informatics, AI, behavior informatics, big data, theoretical computer science, etc... All fields significantly contribute towards the day to day enrichment of this ocean-like field filled with data from the healthcare domain.

1. Sub-Specialties of Health Informatics: Several highly sub-specialized areas of informatics have been developed. They all are significantly contributing to health informatics. These are some but not limited to. It includes clinical research informatics, data mining, neuroinformatics, nursing informatics, social computing, human-computer interaction, public health informatics, translational bioinformatics, and research informatics.

- **Clinical Research Informatics:** It is a sub-field of health informatics that pushes to improve the efficiency of clinical research by using information methods. It focuses on the use of informatics for discovering new knowledge about Health and disease and managing it efficiently so that the knowledge can be used to provide aid in clinical research. Clinical Research Informatics is rapidly evolving due to the increase in complex research activities in the medical arena and information management challenges. It focuses on developing new informatics theories, tools, and techniques to boost clinical research. It is helpful for the rapid expansion of the biomedical science

field and the need for research and development in medicine. Clinical research informatics is also helpful in interventional studies to support clinical trials that aim to evaluate the intervention or effectiveness of treatment by using randomized controlled trials. Clinical research informatics can also be beneficial in clinical data mining for research purposes. Deep learning techniques can be employed to mine electronic health records data to search for primary research questions such as clinical outcomes, risk of death, quality of care, etc. It also helps us make a cohort as it has so much data on the patient, so patients with similar attributes can be selected and put together in a cohort for further clinical studies. It is used to create data warehouses for research, support data collection in clinical trials by using an electronic data capture system, and maintain past clinical data. It also helps in optimal protocol design, patient recruitment and management, adverse event reporting, data, storage, transfer processing, and analysis.

- **Translational Bioinformatics:** It involves the development of analytical methods for the usage and interpretation of increasingly voluminous biomedical data and genomic data so that it can be used in proactive, predictive, and participatory Health. It's a relatively new field that came up in 2000 when the human genome was released. Translational bioinformatics was first used in 2006 by Butte and Chen in a paper titled "Finding disease-related genomic experiments within an international repository: First steps in Translational Bioinformatics." It has involved a large community of professionals associated with developing algorithms to analyze basic molecular and cellular data with the explicit aim of affecting clinical care. Translational bioinformatics researcher integrates information about molecular entities (DNA, RNA, proteins, small molecules, lipids) with information about clinical entities, including patients, disease, symptoms, lab test, pathology, reports, clinical images, etc., to improve patient care. It is also helpful in drug discovery as it has drastically lowered human intervention and reduced expenditure and time. It is also helpful in the development of precision medicine in cancer treatment. It helped in genomic data collection and personalized genome testing. The most complex human diseases, i.e., cancer, drug repositioning, biomarkers, and pharmacogenomics, are among the prime areas for translating genomic discoveries into clinical care.
- **Medical Imaging Informatics and Signal Processing:** This is also a sub-specialty of health informatics heavily dependent on the radiology department to enrich itself. It is also called Medicine imaging informatics or radiology informatics. The Radiology department produces several images and signals that are made part of this domain to deliver better clinical outcomes. It captures medical images through acquisition and stores them for further processing and interpretation. This field develops the tools and methods to transform image data into valuable information in driving clinical decisions. It helps excel research and develop Digital Imaging and communications in medicine, i.e., DICOM, so that real-time data can be captured and fed into HIS system using tools like PACS(Picture Archival Communication System). It also aims to create an efficient, accurate, usable, and reliable medical imaging service within healthcare setups. It captures images and signals from digital tech imaging devices. It deals with how acquiring, processing, and analyzing images and signals can be enhanced and exchanged throughout the medical enterprise.

- **Neuroinformatics** is the study of information flow and processing in the nervous system. Neuroinformatics is a research domain that is inclined towards the development of neuroscience data and knowledge bases. It employs analytical models and computational tools to transfer, integrate, and analyze experimental data and advance nervous system function theories. It gathers data about our nervous system and how it functions. It gathers scientific information about primary experimental data, ontology, metadata, etc. Advancement in this field helps in the free exchange of data and ideas among neurological researchers worldwide. Progress in this field helps in the treatment of several neurological disorders. It helps in the enhancement of the researcher's knowledge. Magnetic resource imaging (MRI) is used to reveal the organization of brain networks involved in human thought. Brain simulation is the notion of creating a function of a computer model of a brain. Neuroinformatics is used to develop computational models of the nervous system and neural process, analyze data from devices for neurological diagnostic services and form tools and databases for managing and sharing patients' brain data.

Neuroinformatics is also used in mind uploading by scanning the brain, emulating the mental state, and copying it in digital format.

- **Public Health Informatics:** It is the systematic application of information, computer science, and technology in public health practice, research, and learning. It is one of the sub-specialties of health informatics. It involves the usage of computers and information systems, which apply to the vast majority of public Health-related professions such as nursing, clinical care, public Health, and medical research. It involves data collection through several research and feeding them into a system to enrich this field. It requires improvement in the efficiency of different public health systems. Data is stored and is further used to solve an array of current Health related problems. Due to the varied nature of data and its complexity, the relational database is increasingly used in the public health informatics domain. Then the stored data is used for analysis as there is a need to mine usable public health information from the heap of data available. This requires the use of a range of analysis tools. The information obtained can be used in public health areas, including surveillance, prevention preparedness, and health promotion. The focus is to develop an interoperable information system. These systems are used for a range of public health functions like outbreak management, biosurveillance, disease prevention, and health promotion and delivering better health outcomes by optimizing health resources and improving quality of life. New public health informatics tools are continuously being developed to provide an impetus to this field for comprehensive assessment for tracking community health.
- **Nursing Informatics:** It refers to the practice and science of integrating the knowledge of the nursing domain with information and technology to manage and integrate health information. Its goal is to improve the Health of people and communities while reducing costs. It helps to manage and maintain medical data and develop data systems designed to improve patient outcomes and boost the overall performance of a healthcare organization. It uses data to make patient care decisions using technology to collect and share data for analyzing it to update nursing practices and protocols. It improves communication within the team through the use of standard

data. It involves the ability to analyze care more effectively. It improves clinical accountability. It provides the information to support and enhance the continuity of care across the continuum.

2. Contribution of different Stakeholders in Health Informatics: As we know, a substantial number of stakeholders are there to contribute to this field of health informatics. The patients provide information and resources for the vital data sets; Collaborating industries like (Insurance, Medtech, laboratories, radiology, etc.) bioresearch, and engineering systems all contribute heavily towards data transfer like wearables, AI-fitted devices, etc. Information released in bulk is mostly in raw form, so it needs to be analyzed and stored in a management system to be further used for decision-making and other work. Data sources that give this field an edge disseminates from an array of fields like surveys, administrative and medical records, claims data from insurance companies, vital records, health surveillance, Electronic medical records, data that is generated by different departments like radiology, laboratory, etc. and fetched into Laboratory Information System, Radiology Information System and finally fetched into Hospital Information System which uses cloud storage to store those data. Government platforms like e -sanjeevani app, National health accounts, etc., are reliable sources for amassing huge amounts of data. Information output is utilized by patients, industry, media, the research community, public health agencies, payors, regulators, and health care professionals. Data keeps generating even during treatment and can be used in personalized medicine and disease prediction. Polygraphy and Narco tests also leverage the use of Health informatics to collect and map computational images of the brain. The data collected from varied sources makes this field more enriching.

3. Core Concepts behind Health Informatics: The main aim of a well-functioning Health information system is an integrated effort to collect, process, report, and use health information for the public good and business needs. The health information life cycle involves collecting data from various sources or stakeholders, then maintaining the data and storing the data for further usage. Data is also shared among different entities using the interface to meet their ends. Again data collection takes place from these stakeholders, but now data is available with some more additions because of further research or operations. Data sources are used to collect the data and feed the same into the system. The source of data can be varied like tech wearables, radiology information systems, laboratory information systems, patient monitoring devices, internet of things sensors fitted in devices,

These data are in raw form, and there is no relation between them. They are only useful once a relationship is established among themselves, so the data needs to be analyzed using several computational and analytical tools. Before data analysis, the quality of data, flow, and processing should be ensured. Then data is converted into information that will become the basis for evidence and decision-making. The value of health informatics can be enhanced by making it available to decision making for making business decisions.

4. Role of Informatics in Promoting Patient-Centered Care: Patient centred care is essential to high-quality care. Health Informatics mainly uses high technology that has the potential to facilitate patient-centered care. It has the potential to provide critical information to different stakeholders so that they can contribute to effective patient care.

Clinicians can use Electronic health records to coordinate care and share information with various departments in real time, resulting in a faster claim disbursement process. Health informatics is also used in electronic patient-reported health outcomes assessment. Compared to paper-based outcomes, PRO in electronic forms helps in faster and more effective scoring, administration, and increasing patient satisfaction.

- **Cost Reduction:** Health informatics has immensely contributed towards reducing the cost in the medical business as it has helped the medical community to reduce the errors, which cost a lot in the business. COPE, i.e., computer provider order entry systems or clinical decision support systems, are programmed in a manner to detect medical errors, specifically in duplication, mismatches, and allergies of the patient based on their data leading to substantial cost reductions for health care organizations, and patients.
- **Enhanced Coordination:** With increased healthcare specialization, patients usually receive care simultaneously from different medical professionals. Health informatics has led to enhanced coordination among several medical professionals involved in providing care as each has access to real-time data, be it doctors, nurses, pharmacists, etc. They can record, share and disseminate the patient's records to involve speedy care delivery. Health informatics has also helped in the growth of teleconsultations across the hemispheres of the healthcare domain. And ensuring faster and hassle-free discharge of patients.
- **Efficient Storage of Patient Records:** Earlier, manual recording and storing data was prevalent but time-consuming. Doctors and nurses used to face problems searching for the correct files, often leading to errors compromising patient care. With the coming of technology, healthcare is blooming and allowing healthcare experts to deliver better patient results. With the onset of EHR, patient records can be stored in computer systems. The workload is reduced, allowing healthcare professionals to focus more on patient care, which is their core job.
- **Patient Empowerment:** Nowadays, patients have electronic access to their health history. They can also keep track of medications and symptoms. The systematic process allows users to reach the right healthcare experts and access their advice from their dashboard; also, they can post their queries there. These kinds of innovations are creating vast possibilities in the healthcare field. Due to automation, the money and time of the patient are saved. Health Informatics is helping the patient become more engaged and empowered when delivering healthcare outcomes.
- **Internet of Medical Things:** IOMT is making a tangible impact in the medical industry, helping society. Several devices are now available to connect medical devices for remote monitoring of patients. Using different applications and tools, hospitals can provide information to see patients' conditions and provide real-time consultations. Tech wearables are also fitted with IOMT to provide real-time access to data and information to improve patient safety and quality.
- **Robotic Services:** Robot-assisted surgeries are coming in which doctors' involvement has become minimal. Robot surgeons are compatible with the latest technologies and

provide several benefits to the healthcare industry. Robotic surgeries are performed in a sophisticated manner without more complications.

5. Health informatics as an Educational Tool: It is an essential source of knowledge for doctors, patients, and nurses. Before modern digital technology, doctors and nurses had to search for libraries and books to access the crucial information they had to incorporate into patient care. It made the process complicated, time-consuming, and exhaustive. Advancement in health informatics has made crucial knowledge available at the fingertip, aiding in effective patient care.

- **Data-Driven Health care:** Health care professionals are using healthcare informatics to develop data-driven algorithms to reduce treatment risks and aid in clinical decision support systems. Using algorithms, clinicians can analyze the potential outcomes of particular procedures or treatments. Thus, providing patients with the best course of action.
- **Searching Information:** Patients can efficiently utilize informatics to identify relevant information related to their diagnosis, treatment, suggestion, etc. Patients who learn about the information show how more participation and engagement in decision-making. It also increases their health literacy and can make patients more actively engaged. It also helps family participation by providing real-time information, thereby broadening the scope of care beyond the individual.
- **Patient Navigation:** Patient Navigation software allows patients to organize many aspects of care from the initial diagnosis to internet communication chat rooms, blogs, etc., and online support groups help them connect. The online calendar is used to schedule a meeting.

Informatics has changed how patients and doctors communicate by allowing remote patient tracking and communication by bringing telemedicine consultation via dashboards/interfaces rather than travel. All details, imaging scans, etc., can be easily read, and consultations are given accordingly.

- **Miscellaneous Usage:** Crucial Predictive analysis can be carried out with the help of Artificial Intelligence and Machine Learning using lots of data sets that are a part of the health informatics domain.
 - Social media tools are also integrated with EHR to easily exchange information and clinical experience.
 - Laboratory, radiology, operation theatres, wearables, etc. data can be quickly sent, which helps in efficiently helping the patient promptly; locations of the ambulance, etc., can also be traced and recorded; reports can also be transferred in real-time from one system to another.
 - Health informatics is also widely adopted in supply chain management to track materials in real-time. All things will somehow aid in delivering efficient patient-centered care.

IV. LATEST TRENDS IN THE FIELD OF HEALTH INFORMATICS

Earlier, the healthcare industry depended on a paper-based manual system to organize, store and analyze patient health information. But with the coming of the Information Technology system into play, physicians and Health Care Organisations can now efficiently store data on a secure cloud-based platform. Healthcare IT and communication systems have been linked to enhancing quality and safety. Patient's medical record is signed digitally with health informatics to be instantly retrieved from any smart device. Common goals of health informatics include:

- Improved collaboration and coordination among providers.
 - Enhanced cost-effectiveness in care delivery.
 - Increased accuracy and efficiency in practice management.
1. **Virtual Reality:** Augmented and virtual reality can be a forerunner in changing care delivery in the medical informatics domain. These health informatics technologies will be extensively used in the coming years. The AR VR market is expected to touch 350 billion dollars in the coming years. VR technology will make medical informatics smarter with innovative technology. VR is useful in the Nursing informatics domain and public health informatics for interactively doing research. It can also train physicians, pre-surgical planning, and surgical interventions.
 2. **Interoperability:** Different devices and applications can access, integrate, utilize and seamlessly share patient information for optimizing population health management. Clinical informatics, when effectively used, can help in better health outcomes. Interoperability is necessary for the effective communication of EHR data to bring efficiency to patient treatment by collaborating with different stakeholders. Also, interoperability is a feature widely used in wearable devices to ensure real-time data exchange over the interface.
 3. **Usage of Big Data and AI in Predictive Analysis:** In recent years health industry has witnessed a rise in the usage of big data and AI. AI uses predictive analytics by utilizing the data collected in the health informatics domain to predict a disease's growth earlier. Looking at different data sets, medical history, pre-diagnosis, and other clinical records, prediction is made so that preventive measures can be taken accordingly and early medication can start. This will increase the chance of getting rid of the disease.
 4. **Combating Opioid crisis in USA:** Nearly 44 deaths per day occur in the USA due to the opioid crisis. Health informatics combines data analytics and population health management strategy to respond more effectively. It is used to reassess prescribing practices and introduce opioid alternatives. It can also be used to crack down more effectively on a few percent of patients trying to scam the providers.
 5. **Health Data Analytics:** Healthcare industry has no shortage of data. With the coming of several technologies like wearables, teleconsultation apps, and IOMT devices, the proliferation of data has exponentially increased. This data can be utilized by using data analytics tools to crunch the data to get information from it and use it in patient care and making crucial business decisions. Life-saving technology is leveraging health

informatics to detect diseases like sepsis. Data analytics has also been used to detect and maintain a thorough record of positive patients and real-time infection tracking. Data analytics tools have also been used to develop next-generation non-invasive radiology tools for the diagnostic process. The scope of health data analytics is rising as this industry is becoming more data-intensive daily.

V. CHALLENGES IN THE PATHWAY OF HEALTH INFORMATICS

- 1. Conventional Healthcare Environment:** The healthcare environment is still changing with the adoption of new technology. Even now, a significant proportion of hospitals are using a manual system for recording and storing vital health-related information of patients. Thus, It's a challenge for this field as health informatics can bloom with the help of data fed into the system. If it has to grow exponentially, it should try to include healthcare organizations under the ambit of electronic systems. There are also a lot of infrastructure issues with the current conventional healthcare environment. There is a shortage of storage facilities where extensive data can be stored safely and retrieved when required. As the data volume increases, the demand for more space is expanding. So, there is a high need to create more warehouses or cloud storage facilities where data can be stored.
- 2. Cyber Security Threats:** The data is regarded as a resource. Most companies consider data a vital resource for their business and day-to-day operations. When it comes to the healthcare industry, data becomes more crucial as it is directly linked to patient safety and privacy. The demand for data is increasing, so the cases of data breaches; cyber-attacks are growing. The data is sold in the market to raise money. Cybercriminals are increasingly stealing and selling this data to make money. This poses a challenge for the health informatics domain to protect the data so that it does not fall into the wrong hands, as the consequences of a data breach are huge for every stakeholder. It can lead to patient safety compromises and mar the reputation of healthcare organizations. Data breaches should be protected so they cannot be misused.
- 3. Device Diversity and Interoperability:** In the medical industry, the source of data is vast and varied. Different types of medical wearable devices have been used in the health informatics system. Also, the adoption of telehealth is significantly contributing to the arena of health informatics. Thus, it's imperative to have interoperable devices and systems so that the data can be easily exchanged for easy access to the information. Information exchange occurs across multiple interfaces where the device should be compatible. Telehealth faces problems due to secure connections, accessibility, technical malfunctions, etc. Here, Health IT challenges should be monitored so that data can be easily collected.
- 4. Data Integrity and Consistency:** Health informatics is a matter of concern. It is necessary to preserve the originality of data even in the case of any alterations. Ensuring integrity in a Health informatics system guarantees data correctness, which leads to minimizing errors and improving the patient experience. Everyone is using the different features of the system without proper knowledge, which makes the system inconsistent. Dealing with a huge number of incompatible data is challenging for Health informatics. As the concept of precision medicine rises, we need consistent data for more accurate analysis. All the data related to AI and predictive analysis should be in a separate

warehouse to avoid cluttering. Adopting the system of including consistent data will boost this field of health informatics.

- 5. Ethical Issues:** The ethical issues will comprise various problems like data privacy, patient safety, risk assessment, research ethics, etc. A patient's medical history is profoundly sensitive, so guarding the patient's privacy is of utmost importance. Any data breach can lead to dissatisfaction in the patient community, and they will be less willing to share their crucial information, weakening the arena of health informatics. A privacy breach can further lead to financial loss, a compromise with patient safety, and a loss of goodwill. Also, when researching public Health, we must be cautious while collecting data. The data must be collected by adhering to the norms of research ethics. The entry of big tech like amazon, google, etc., to provide reliable cloud data storage will boost this domain in maintaining data privacy and patient safety.

VI. CONCLUSION

The adoption of technology or informatics in healthcare has been considerably slow over the last few decades. However, the advancements in the last decade have been remarkable, aided by the heavy reliance on technology-based solutions during the recent pandemic. Developing a capable, determined, and supported health workforce is essential for the achievement of national and global health goals. Based on various skill-gap assessments and the need for allied healthcare professionals, it is evident that the healthcare workforce sufficiently skilled in technology will pave the way forward for a new digital revolution in the healthcare industry.

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