MEDICINES AND HEALTHCARE

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Abstract- The advantages of health information technology (IT) include facilitating communication between health care providers; improving medication safety, tracking, and reporting; and promoting quality of care through optimized access to and adherence to guidelines. Health IT systems permit the collection of data for use for quality management, outcome reporting, and public health disease surveillance and reporting. However, improvement is needed with all health IT, especially regarding design, implementation, and integration between platforms within the work environment. Robust interoperability is critical for safe care, but this goal has proved elusive. Significant patient safety concerns already have been recognized; it is important to keep patient safety and quality as the primary focus.

Precision medicine (PM) is an emerging approach that appears with the impression of changing the existing paradigm of medical practice. Recent advances in technological innovations and genetics and the growing availability of health data have set a new pace of the research and impose a set of new requirements on the different stakeholders. Some studies are available that discuss about the different aspects of PM. Nevertheless, a holistic representation of those aspects deemed to confer with the technological perspective, in relation to the applications and challenges, have been mostly ignored. In this context, this paper surveys the advances in PM from the informatics viewpoint and reviews the enabling tools and techniques in a categorized manner. In addition, the study discusses how other technological paradigms, which include big data, artificial intelligence, and the internet of things, can be exploited to advance the potentials of PM. Furthermore, the paper provides some guidelines for future research for a seamless implementation and a wide-scale deployment of PM based on the identified open issues and the associated challenges. As a result, the paper proposes an integrated holistic framework for PM motivating informatics researchers to design their relevant research work in an appropriate context.

Index Term: Healthcare, Medical research, Interoperability
Precision Medicine ,Pathogens ,Immunotherapy, uploads, positive allosteric modulators

I. INTRODUCTION

The field of medicine and healthcare is one of the most rapidly evolving fields in the world. Medical research is the cornerstone of the development of new treatments, diagnoses, and technologies that are used to improve and save lives. In this research paper, we will be discussing the latest trends in medicine and healthcare research, focusing on different areas such as infectious diseases, cancer, cardiovascular diseases, drug discovery, and artificial intelligence. Many hail the wave of technological progress as Mankind's greatest gift to himself. Indeed, the pervasive nature of technology has permeated every stratum of our society, and the healthcare field is no exception. The

advent of technology has revolutionized the healthcare industry in multifarious ways, and this blog will discuss various aspects of how this modernizing wave has benefitted the healthcare field.

II. MEDICINES ISSUES, BENEFITS AND IMPACTS

Issues:

Prescribing

Omission

Wrong time

Unauthorized drug

Improper dose

Wrong dose prescription/wrong dose preparation

Administration errors include the incorrect route of administration, giving the drug to the wrong patient, extra dose, or wrong rate

Monitoring errors such as failing to take into account patient liver and renal function, failing to document allergy or potential for drug interaction

Compliance errors such as not following protocol or rules established for dispensing and prescribing medications

Benefits:

Medicine offers a wide range of benefits, including:

Treating and curing illnesses: One of the most significant benefits of medicine is its ability to treat and cure various illnesses, diseases, and conditions. It can alleviate symptoms, heal injuries, and save lives.

Preventing illnesses: Medicine can also be used to prevent the onset of diseases, such as through vaccinations, routine check-ups, and lifestyle modifications.

Improving quality of life: Medicines can help people manage chronic conditions such as diabetes, hypertension, and depression, allowing them to maintain a higher quality of life.

Reducing pain: Medicines can help alleviate pain caused by injury or illness, allowing patients to be more comfortable and have better recovery outcomes.

Enhancing mental health: Medicines can improve mental health conditions such as anxiety, depression, and bipolar disorder, helping individuals lead happier, healthier lives.

Prolonging life: Advances in medicine have increased the average lifespan and reduced mortality rates from various diseases.

Supporting public health: Medicines can prevent the spread of contagious diseases and protect public health, particularly through vaccinations.

Overall, medicine plays a critical role in promoting health and well-being, both for individuals and society as a whole.

Impacts:

The impact of medicine on individuals and society is significant and multifaceted. Here are some of the ways that medicine has made a difference:

Improved health outcomes: Medicine has significantly improved health outcomes for individuals by treating and curing various diseases and conditions, reducing mortality rates, and improving quality of life.

Increased life expectancy: Advances in medicine have helped increase life expectancy, allowing people to live longer and healthier lives.

Economic benefits: By treating and curing illnesses, medicine can reduce healthcare costs, increase productivity, and contribute to economic growth.

Public health benefits: Medicine has helped control the spread of infectious diseases through vaccination programs and disease surveillance.

Improved mental health: The development of psychotropic medications has improved the treatment of mental health conditions such as depression, anxiety, and bipolar disorder, helping people lead happier, healthier lives.

Advancements in technology: Medicine has driven advancements in technology, such as medical imaging, telemedicine, and electronic medical records, improving patient care and outcomes.

Ethics and moral values: Medicine has raised ethical and moral questions surrounding the role of physicians and the rights of patients. It has also contributed to the development of medical ethics and the protection of patients' rights.

Overall, the impact of medicine has been significant and far-reaching, improving health outcomes, increasing life expectancy, contributing to economic growth, and advancing technology while also raising important ethical questions.

III. HEALTHCARE ISSUES, BENEFITS AND IMPACTS

Issues:

Healthcare is a complex and constantly evolving field, and there are many pressing issues that impact patients, providers, and policymakers. Here are some key healthcare issues that are currently being discussed and debated:Access to healthcare: Many people lack access to healthcare due to factors such as cost, geography, or lack of insurance. This can lead to delayed or inadequate care, poorer health outcomes, and increased healthcare costs in the long term.[1] Rising healthcare costs: Healthcare costs in many countries have been rising faster than inflation, putting a strain on individuals, families, and governments. This can make it difficult for people to afford necessary care and can lead to financial hardship for those who need expensive treatments.[2]Quality of care: Ensuring that patients receive high-quality, evidence-based care is a key challenge in healthcare. This requires healthcare providers to stay up to date on the latest research and to work collaboratively to develop and implement best practices.[3]Health disparities: Health disparities exist when certain groups of people experience worse health outcomes than others, often due to social determinants of health such as poverty, race, or gender. Addressing these disparities requires a comprehensive approach that addresses the root causes of health inequities.[4]Chronic disease management: Chronic diseases such as diabetes, heart disease, and cancer are major contributors to healthcare costs and are a significant burden on patients and families. Effective management of chronic diseases requires a multidisciplinary approach that includes preventive measures, early detection, and coordinated care.[5]Healthcare workforce shortages: Many countries are experiencing shortages of healthcare providers, including doctors, nurses, and other professionals. This can lead to longer wait times, reduced access to care, and increased workload and stress for those who remain in the workforce.[6]

Benefits:

Here are the 5 key benefits of leveraging technology in healthcare:
Easy access to patient medical records
Reduction in medical errors
Greater patient care
Improved patient education
Reduction in cost

1. Easy access to patient medical records
The collection of patients' data is one of the most paramount aspects in the healthcare field. Medical data is essential for doctors to analyze the patient's situation and illness and then to find a possible cure for it. In the past, patient records used to create large amounts of paperwork because everything was on paper and pen. Accessing past records was troublesome. However, with the advent of digitalisation, the medical information of patients can be keyed into a cloud-based, digitized system. This has provided extraordinary ease for specialists, patients, and medical billers to access with a click of a button, from anywhere at anytime.
This system is called Electronic Medical Records (EMRs), or Electronic Health Records (EHRs). It is a collection of patient and population health information electronically stored in a digital format. Sameer Bhargava, who serves as the chief information officer and chief technology officer at Caregiver, Inc., emphasized the much-needed efficiencies EHRs had provided them with. Across an eight-month period, his team migrated eight million records from paper to an EHR system. "Moving to electronic records elevates our care ecosystem into a cohesive process that can provide a better network of services," Bhargava says. Therefore, technology has simplified the collection of medical records, enabling providers to mine out patients' information in a matter of minutes.

2. Reduction in medical errors
Medical errors are an increasing public concern as they are repeated constantly and are inevitable parts of the results of human performance. According to official Starfield, and the American Institute of Medicine (IOM), medical errors in U.S. hospitals and healthcare institutions are the third leading cause of

death and nearly 98,000 annual deaths occur due to medical errors in hospitals.

Fortunately, technology has facilitated the development of systems that are proven to reduce medical errors and save more lives. The clinical Decision Support (CDS) system provides the health care professional with medical information and patient-specific information. This information is rationally filtered and presented to the healthcare professional at appropriate times, intending to enhance the decision-making of the healthcare provider. It is capable of providing evidence-based standards and guidance; procedures and protocols; rules and recommendations for care, etc. A study done by RA. Miller and colleagues showed that the CDS system reduces serious medication errors by 55% and total medication errors by 83%, highlighting the transcendent power of such a system to aid healthcare professionals in their diagnosis.

3. Greater patient care

The use of technology can increase patient engagement, providing insight to help create hyper-targeted, personalized health and wellness plans. Devices in the form of wearables like fitness bands and other wirelessly connected devices like Fitbits can monitor one's blood pressure and Electrocardiograph (ECG), giving patients and specialists access to personalized information. These devices can depict calorie count, exercise checks, appointments, blood pressure variations, etc.

Specialists can keep track of patients' health more efficaciously, such as their adherence to treatment plans, etc. This is especially pertinent for elderly patients and those living alone, where their family members or concerned healthcare providers will be promptly alerted if any abnormality is detected. As such, such technological gadgets ensure that patients enjoy superlative care, enhancing the healthcare experience and quality for all.

4. Improved patient education

Patient education takes on an imperative role in healthcare, and specialists are embracing technologies that can help better inform and engage patients. According to the results of a recent survey of 200 U.S. physicians conducted by PatientPoint and Digital Health Coalition, more than 75% of physicians believe that leveraging patient education and engagement technology can help improve the patient experience. 95% of respondents also reported that they were currently using engagement technology tools to educate and engage with patients.

Technology has provided softwares and applications that present customized health education information to patients based on their specific needs and conditions. For example, the Patient Electronic Portal is a secure online application that provides patients access to their personal health information and 2-way electronic communication with their care provider using a computer or a mobile device. A study has found that this application has increased patients' compliance to preventive medical precautions, their medical adherence, and self-awareness and management of their diseases.

5. Reduction in costs

Medical errors in U.S hospitals and clinics cost $USD 20 Billion a year. The reduction in medical errors directly reduces costs for both the practitioners and patients. By leveraging technology to reduce diagnosis and prescription errors

While the shift from paper to Medical EMR in clinics can reduce the costs of outpatient care by 3 percent. This is estimated to be $5.14 in savings per patient each month. A cloud EMR significantly reduces the usage of paper in practice and cost in various other errors.

The benefits of health information technology (IT) include its ability to store and retrieve data;

the ability to rapidly communicate patient information in a legible format; improved medication safety through increased legibility, which potentially decreases the risk of medication errors; and the ease of retrieval of patient information.

Impacts:

The development of antibiotics, vaccines, cancer treatments, and more means that people are living longer and healthier lives than at any point in the past.

Few would contest that advancements in modern medicine have improved the lives of people today. The development of antibiotics, vaccines, cancer treatments, and more means that people are living longer and healthier lives than at any point in the past.

VI. LITERATURE SURVEY

Drug discovery and development: This area of research focuses on identifying and developing new drugs to treat diseases. A literature survey could explore the latest trends in drug discovery, including the use of artificial intelligence and machine learning to design new drugs[1].Clinical trials: Clinical trials are essential for testing the safety and efficacy of new drugs before they are approved for use by patients. The increasing use of real-world evidence. It could also explore ethical issues in clinical trials, such as the use of placebos and the inclusion of vulnerable populations[2]..Pharmacology: Pharmacology is the study of how drugs interact with the body. A literature survey could explore the latest research on drug pharmacokinetics. It could also look at the effects of drug-drug interactions and the impact of genetic variation on drug response[3].Patient care: Patient care is an essential aspect of healthcare, and a literature survey could explore the latest research on improving patient outcomes. This could include studies on patient-centered care, the impact of healthcare delivery models on patient outcomes, and the role of technology in improving patient care[4].Health policy and economics: Health policy and economics play a significant role in shaping the healthcare industry. A literature survey could examine the latest research on healthcare policy and its impact on patient outcomes[5].Global health: Global health is an increasingly important area of research, as infectious diseases and other health challenges become more prevalent worldwide. A literature survey could explore the latest research on global health issues, including the development of vaccines and treatments for infectious diseases, the impact of climate change on health, and the role of international organizations in promoting health equity[6].

VII.5 WAYS TECHNOLOGY HAS CHANGED HEALTHCARE

VIII. FUTURE SCOPE OF MEDICINS AND HEALTHCARE

New technologies and treatments—precision medicine, digital therapeutics, 3D printing, immunotherapy, gene and stem cell therapies and

Technology has revolutionized healthcare in many ways, improving patient outcomes, increasing efficiency, and enabling new forms of research and discovery. Here are five ways that technology has changed healthcare:

1. Electronic health records (EHRs): EHRs have replaced paper-based medical records, providing a more efficient and secure way to store and share patient information. EHRs enable providers to access patient data from anywhere, making it easier to coordinate care and avoid errors.
2. Telemedicine: Telemedicine allows patients to receive medical care remotely, using videoconferencing and other technologies. This can be especially useful for people who live in remote areas, have mobility issues, or have limited access to transportation.
3. Wearable technology: Wearable technology such as fitness trackers and smartwatches can monitor patients' vital signs, track their activity levels, and provide real-time feedback. This can help patients stay healthy and identify potential health problems before they become serious.
4. Artificial intelligence (AI): AI is being used in healthcare in many ways, including helping to diagnose diseases, predicting treatment outcomes, and improving clinical workflows. AI algorithms can analyze large amounts of data more quickly and accurately than humans, leading to more personalized and effective treatments.
5. 3D printing: 3D printing technology is being used to create custom implants and prosthetics, as well as to print human tissue for research purposes. This has the potential to revolutionize the way that medical devices and treatments are developed and produced, making them more affordable and accessible to patients

artificial intelligence—have arrived or are on their way. See how we're building trust in tomorrow's medical breakthroughs.[1]The future of medicine holds many exciting possibilities, driven by advances in technology, genetics, and data science. **Here are some of the potential future developments in medicine:**[2]Personalized medicine: With advances in

genetic testing and precision medicine, healthcare providers can tailor treatments to a patient's unique genetic makeup, increasing treatment efficacy and reducing adverse effects.[3]Artificial intelligence (AI): AI technology has the potential to revolutionize healthcare, improving diagnosis accuracy, predicting patient outcomes, and streamlining medical decision-making.[4]Digital health: With the proliferation of wearable technology and mobile health apps, healthcare providers can monitor patients remotely and improve patient engagement and compliance with medical treatment plans.[5]Regenerative medicine: Regenerative medicine has the potential to treat previously incurable diseases and conditions by using stem cells and other innovative therapies to regenerate damaged tissues and organs.[6]Nanomedicine: Nanotechnology has the potential to revolutionize drug delivery, allowing for targeted delivery of drugs to specific cells or tissues, reducing toxicity and side effects.[8]Telemedicine: Telemedicine can help improve access to healthcare services, especially for people living in remote or underserved areas, by allowing healthcare providers to remotely diagnose and treat patients.[8]Global health: The future of medicine may include greater focus on global health, addressing health disparities and diseases that disproportionately affect people in developing countries.[9]Overall, the future of medicine holds exciting possibilities for improving patient care, increasing treatment efficacy, and addressing previously incurable diseases and conditions, while also raising important ethical considerations and challenges.[10]The future of healthcare holds many exciting possibilities, driven by advances in technology, data analytics, and patient-centered care.

Here are some potential future developments in healthcare:Virtual healthcare: Virtual healthcare, such as telemedicine and remote monitoring, will allow healthcare providers to reach patients in remote or underserved areas, providing access to healthcare services and reducing healthcare costs.[1]Personalized healthcare: With advances in genomics, proteomics, and data analytics, healthcare providers will be able to deliver personalized treatment plans, tailored to each patient's unique genetic makeup and lifestyle.[2] Predictive analytics: Predictive analytics will help healthcare providers identify patients at risk of developing chronic diseases, allowing for early intervention and prevention.[3]Wearable technology: Wearable technology will continue to advance, providing patients with real-time data on their health status, helping them monitor chronic conditions, and promoting healthy lifestyles.[4]Precision medicine: Precision medicine will continue to advance, with the use of targeted therapies and genomics-based treatments, increasing treatment efficacy, and reducing adverse effects.[5]Artificial intelligence (AI): AI-powered clinical decision support tools will help healthcare providers improve diagnostic accuracy, identify patterns and insights, and improve patient outcomes.[6]Population health management: Healthcare providers will increasingly focus on population health management, using data analytics and patient engagement strategies to promote healthy behaviors and prevent diseases.[7]Overall, the future of healthcare holds exciting possibilities for improving patient outcomes, increasing access to healthcare services, and promoting healthy lifestyles, while also addressing healthcare disparities and raising important ethical considerations and challenges.

IX. CONCLUSION

In the scheme of things, technology has indeed revolutionized the healthcare industry, with many systems and software's available that you can consider utilizing to streamline your logistics and workflow, and at the same time provide superlative care to your patients. Health IT has become an integral part of the practice of medicine. As with any new technology, health IT brings many potential benefits and as well as potential concerns. The current literature to date, reflects outcomes at single sites or institutions. National estimates are extrapolations from these single-site studies. As the implementation and use of health IT systems increase, it is important to keep patient safety and quality as a major focus.

In conclusion, medicine and healthcare are critical to maintaining and improving individual and societal health outcomes. Advances in technology, genomics, and data analytics offer new possibilities for personalized and precision medicine, while digital health, telemedicine, and wearables offer new avenues for delivering care and promoting healthy behaviors.

As healthcare becomes more patient-centered, with a focus on prevention and population health management, it will continue to play a vital role in shaping global health and wellbeing. However, these developments also raise important ethical considerations and challenges, including access to care, privacy and security, and healthcare disparities. Therefore, continued collaboration and innovation across healthcare sectors will be necessary to ensure that these advancements benefit everyone and improve health outcomes for all.

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