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HEALTH 2.0 : IS TECHNOLOGY THE HEALTH-CARE WAVE OR TSUNAMI OF THE FUTURE?

Health Science

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ABSTRACT

Undeniably, a driving force behind quality healthcare is the adoption of technology that enables clinicians to provide better patient care. Monumental advances have been made in the last 20 years that have improved the way the healthcare industry delivers patient care and the way the public expects to be treated. Not only is the industry increasingly reliant on technology, our patients are tech savvy and expect to be treated as such. We're moving into an era where physicians can see patients remotely and accurately diagnose a patient's problems, even in the most rural areas, through telemedicine. The improvement itself has been constant. You can see it from the invention of X-rays to precise surgical procedures. But will it hit the plateau or grow exponentially?

KEYWORDS

Heath2.0, mHealth, technology, telemedicine, cyber security, healthcare system, big data, public health, informatics

INTRODUCTION

The technology-driven progress in healthcare is sometimes called *Health 2.0.* While it seems obvious technology will continually advance, it is going to be harder to ensure that each iteration of technology satisfactorily achieves what it claims to achieve, without having to be fixed up and upgraded soon after.

From anaesthetics and antibiotics to magnetic resonance imaging scanners and radiotherapy Healthcare has changed dramatically because of technological developments. Future technological innovation is going to keep transforming healthcare, yet while technologies (new drugs and treatments, new devices, new social media support for healthcare, etc) will drive innovation, human factors will remain one of the stable limitations of breakthroughs.

Effective use of communication and technology by health care and public health professionals can bring about an age of patient- and public-centered health information and services. By strategically combining health IT tools and effective health communication processes, there is the potential to: Improve health care quality and safety

Technology drives healthcare more than any other force, and in the future it will continue to develop in dramatic ways.

Does Technology Have A Place Within Healthcare?

The use of technology to transform industries and businesses in recent years is well known. With the rapid pace of innovation and technological advances, there are clearly advantages and disadvantages of technology in healthcare. Existing implementations of technology in healthcare have shown the potential to improve the accuracy and speed of diagnosis, treat more patients, and provide better sharing of data between parties that require it.With such fast moving innovations, there are always disadvantages — such as those highlighted in this article — to overcome and pre-empt. Without a doubt, there are still many unexplored opportunities within healthcare and technology that are set to continue the trend in advancing healthcare.

Why Technology in Healthcare?

We've seen the numerous ways the evolution of technology has impacted everything from our classrooms to our courtrooms, and the healthcare industry is no exception. Doctors and nurses who practiced a century ago would be astonished by our newfound capabilities.

From the invention of infusion pumps and dialysis machines to the creation of antibiotics, heart valves and MRI scanners, technology continues to drive us forward and streamline the way we approach medical treatment. Technology automates and extends things that previously had to be done by people while also potentially reducing the overall cost of medical care.

"Technology has done a lot to improve both our understanding of complex medical and physiological issues, as well as decrease the barriers to delivering care directly to patients,"

"Whether it is tele health allowing clinicians to interact with patients in different locations or the cost of medical and diagnostic imaging decreasing, technology is helping to improve the overall access to and quality of care."

Technology may not be the first word that comes to mind when we think of empathy, but with advances in the pharma and healthcare space, technology allows consumers to open up their hearts a little more.

Big Data

In the healthcare industry, technological advancements have ubiquitously changed the paradigm of medical records from files to digital records. With the digitalization of the healthcare sector, a large volume of real-time data has been generated and stored. It becomes necessary to systematically organize this digital medical data in databases so as to make the best possible of this data for everyone.

Through the development of technology, patients have the opportunity to share their daily health problems with their loved ones and let those closest to them understand what they experience every day. One digital agency has developed a device that can transmit muscle spasms from Parkinson's patients to others in real-time It is one aspect of technological advancements in healthcare. There is another aspect where we use technology to manage health data in today's digital world efficiently.

If computers collect data on patient illness, treatments and outcomes, one automatically obtains valuable information on the effectiveness of those treatments, or relations between side effects and patient characteristics across whole populations. Huge amounts of data will be collected, hence the name big data. Epidemiologists will benefit enormously, but the benefits to individuals are less obvious, except in the long run from big data's contribution to the progress of medical science more generally.

Personal Healthcare

MHealth and specifically mHealth mobile apps represent a potential opportunity in the delicate process of engagement of the population concerning their psychological health and well-being. At the same time, they can offer valid promotion, prevention and intervention strategies for mental health professionals. Symptoms or behavior can be self- or remotely monitored, personalized feedback, motivational support, or psychological advice can be provided and delivered.

It minimises patient-provider contact, thus ensuring physical distancing. MHealth involves the use of mobile devices such as smartphones, patient-monitoring devices, personal digital assistants, and tablets to support public healthcare practices. It could be used effectively by healthcare workers to deliver health services to patients remotely and improve overall communication with co-workers, patients and decision makers.

It is now possible to custom make titanium implants the right shape and size to fit. Going further, it is widely envisaged that custom drugs will be manufactured, customized to the patient's disease and genetic

makeup. While this seems to be enormously beneficial to patients, there are dangers. For example, a customized drug may be very effective, but its side effects will be unique to the patient too, and therefore harder to diagnose and manage.

Branching With The Future

In healthcare, we have to pay more attention to the broad context of how information is used.

Originally, email seemed like a wonderful idea – it is cheap, fast, saves paper, and so on. But we are victims of its very success: now people have so many emails that they are overloaded (it is hard to prioritize), to say nothing of spam and phishing, flames and people sending irrelevant or erroneous emails to thousands of recipients.

It is now possible for an ill-conceived email to waste thousands of hours when it is send to many staff. Emails are a recognized and growing problem; but the same trend is affecting test results, patient records, drug-drug interaction reports. For all of these reasonable tasks it seems obvious they should be computerized, but doing so often results in increasing amounts of low-level information that can distract people from doing their *real* job.

Technology Is Diverse & Surprising

Technologies that are both critical and exciting such as Nano health, personalized healthcare, mobile health, tele health and so on – the beginnings of all of these are already available and in use in first adopter places. What the brief discussion illustrates is the diversity, the rapid pervasiveness, and the complex trade-offs of future technologies. Technology can't replace the warmth of human interaction and touch.

Advances in genomic sequencing, vaccine and pharmaceutical development, and leveraging artificial intelligence (AI) have all made huge contributions to improving patient care; and connected medical devices are creating more opportunities than ever.

Technology permeates our lives more than ever, as technological advances continuously emerge. Every industry has been upended and transformed, including the health and medical industry. While any innovation may seem like progress, there are certainly advantages and disadvantages of medical technology.

CyberSecurity Risk In Healthcare

Cyber security risk doesn't just pertain to the exposure of private data or the ransoms that are sometimes associated with data breaches. The risks related to altered data can have serious consequences. Patients and healthcare professionals that are relying on data to make treatment decisions depend on correct and accurate datasets. If data is deleted or altered it can lead to a wrong diagnosis or treatment plan, or other adverse events.

Further, the medical data could be sensitive, so in addition to the proper management and ease of accessibility of this data, there is an immediate requirement to maintain confidentiality. In the environments like healthcare, where information present is critical and confidential in nature, security becomes the primary aspect. To address these requirements, there is a complete field dedicated to it, which is called as medical information management. It refers to the collection, analysing and securing of digital medical information. Medical information management becomes more beneficial when medical data shared between healthcare providers and patients are used to improve disease diagnosis, make patients more aware of diseases, and promote self-care.

Recent advancements in technology are greatly contributing in the development of a robust healthcare system. However, there is no denying the fact that organizations do not invest much in securing and maintaining the privacy of medical data. Data integrity, data usability, data auditing, and patient information privacy are some of the factors that need to be considered while protecting medical data. Further, data anonymization techniques should also be utilized by healthcare providers to maintain the privacy of the patients.

Patients generate huge amounts of information – *patient records* – from X-rays to blood test results. Replacing paper with computerized summaries makes patient care easier and more efficient. In the future the quantity of information will increase dramatically because of genomics (and the huge genomics of our symbiotic bacteria) and personalized medicine, and as more patient data is collected, more insights will become available.

Lack Of Empathy In Patient And Doctor Interaction

Utilizing technology can help keep healthcare professionals and patients connected, even when they are not physically present together. For example, leveraging data and technology, it is possible to provide and update a treatment plan on an ongoing basis, rather than via one-off consultations.

Tele health is a crucial tool that clinicians are increasingly utilizing as we move through the COVID-19 pandemic. Use of such tools have kept the healthcare system going and ensure that patients receive continuum of care during these trying times.

Similarly, remote patient monitoring can lower healthcare costs by identifying potential issues earlier and avoiding complications down the road. Remote monitoring and tele health also allow addressing the clinician shortages that have plagued many countries including here in the United States, specifically in remote areas.

However, the way in which technology has become the interface between patients and providers has the potential to cause issues. Dealing with dashboards on connected medical devices and computers removes the human touch of treatment, resulting in a lack of empathy towards patient care.

Especially for elderly and the most vulnerable patients, relying on technology as the interface of care can cause confusion and frustration; and can result in confusion, treatment plans not being understood properly, or patient non-compliance.

Frustration With Poor Implementation

As we continue to discuss medical technology pros and cons, it brings to mind the popular saying: “technology is great — when it works.” For technology to benefit healthcare, systems must be accurate, easy to use and ultimately, improve on the existing methods of patient care. For clinicians and doctors, ensuring that the technology that they are using is easy to manage and understand, rather than a burden, is critical. Healthcare professionals that spend more time struggling with technology as opposed to patient care, are likely to disregard the use of technology and future iterations. But even for healthcare professionals that are in favour of using and implementing technology, ensuring that the technology-assisted outcomes are more accurate, or better at diagnosing is crucial.

If technology is not improving healthcare – through speed, efficiency or accuracy – then the continued adoption of technology within healthcare is not likely to last!

Technology Is A 'double Edged Sword’

X-rays were discovered by Wilhelm Röntgen in 1895 and immediately recognized as having huge potential for healthcare. Only a few years later, one of Thomas Edison's assistants, Clarence Dally, who had been enamoured with the potential of X-rays died, of cancer because he had been experimenting with them every day.

It is now obvious that X-rays are not risk-free. Every exposure to X-rays helps a patient yet at the same time exposes them to risk; it is now routine to make a careful trade-off between the benefits and risks. Similarly, we now recognize that pharmaceuticals are not magic and risk-free. Despite our best endeavours, we have a growing awareness of worrying and complex side-effects, such as growing antibiotic resistance that has arisen from over-enthusiastic use of antibiotics (not least in animal husbandry). Some of the original miracle antibiotics are no longer effective.

How Technology Can Help?

In time-pressured environments, humans often suffer from tunnel vision – focusing on the original task and overlooking larger situational awareness. The classic example is intubating a patient. This is a demanding, time-critical procedure. The longer it takes, the more pressurized the clinician is to complete the procedure. Sometimes the patient will get into problems, and a tracheotomy is needed – urgently. Sometimes the clinician is so focused on the intubation that the warning signs are missed, with disastrous consequences. Here, technology can help by using monitoring technologies. Remote monitoring of the patient's vital signs can enable a trained person out of the pressured environment to make helpful Although we have said that human factors will remain a constant for the foreseeable future, there is nothing to stop technology enhancing people. Technology will not be used just to monitor and help make people well, but will be used to make them better – better as sportsmen, as healthcare professionals. We already have augmented reality, where surgeons can see an

enhanced view of the insides of patients. If patients can have brain implants to enhance their lives (to manage Parkinson, for instance) surgeons will have implants to improve their skills, using robotics to reduce tremor or computers to reduce error.

Who Makes The Future?

The future of healthcare is about the patient (or stopping people becoming patients), but patients are not the main stakeholders in healthcare. Insurance companies, big pharma, doctors, managers, suppliers, builders, governments and many other forces will influence the future. Will innovation help patients or will it be partly to help monitor clinicians delivering healthcare?

It is interesting that since hospitals started introducing computers that have made delivering healthcare more efficient or safer. Moreover, now patient records are computerized, Patient records were once on paper; now they are in proprietary formats, and the manufacturer can *lock in* the user to their particular system.

Conclusion: What We Need To Do?

If we don't know where we are going, we won't know when we don't get there says Yogi Berra. We need to figure out a way to have healthier and happier patients (and not just treating them as individuals), and to do that we've got to focus on integrating technology with culture rather than focusing on technology alone.

We should not plan the future by being technology-driven but by improving along criteria behind principles. Future planning should be as much a routine part of healthcare as responsive care is.

Are we making the healthcare future we want? If people from the past suddenly materialized in front of us, we would want to be able to convince them the world is the better place they had hoped for. What stories would they take back to help direct their technological trends and developments?

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