The Intersection of

Technology and Healthcare in

One of the most important facts to keep in mind is that there are many physicians uncomfortable with the technological change in healthcare; thus, just introducing technological changes will not provide any easy solutions that are being sought. Technology does, indeed, have its limits in the healthcare industry and can only go so far; it cannot be treated as infallible or without question. One of the biggest drawbacks about the intersection of technology and healthcare is the compromise of privacy. In recent years, while it has become easier to get essential information across to one's doctor, it is also easier to let out personal information that one may not want to expose. In addition, the costs are astronomically high. Therefore, the risks (both personally and financially) are high, but so are the possibilities for something greater than ever before. Contributor BMO Harris Bank has written an article for *Forbes* , titled "5 Ways Technology Is Transforming Healthcare," in which it informs that "the federal government is also planning to spend up to $29 billion in incentives to encourage hospitals and doctors' offices to digitize healthcare records." (BMO Harris Bank). This goes to show that much of the time and energy that the technology sector currently invests into social mediaht. Tah4(be)4(r)5(3(c)4((be9(a)4(l(o e)4(i)

		materials
8	Morbidity due to central venous catheter insertion	Use of real-time ultrasound guidance during central line insertion
9	Adverse events related to chronic anticoagulation with warfarin	Patient self-management using home monitoring devices
10	Morbidity and mortality in post-surgical and critically ill patients	Various nutritional strategies

> that online information, including peer conversations, may not be based on science. It is essential to use the internet to seed the field with facts, to open access to medical journals and clinical-trial results, and to free the data (Landro).

With the elderly and disabled, both groups disproportionately at risk of poor healthcare, so disconnected to the Internet, it is crucial for information to be delivered to them through technological means that can help them or at least provide a younger adult who can assist them. Overall, the worst aspects of making medical data processing more technologically charged are the ease of sharing misinformation and the lack of accessibility for the disabled and senior citizens. As it is, those who are old and disabled but experienced in the intersection of medical data processing and technological innovation can use their expertise to help others who are old and disabled. This would work well alongside the help that doctors and younger, healthier family or friends may provide.

In addition to increasing safety and personalization, technology in healthcare allows can improve physicians' performance and, in some cases, patient outcomes. Such changes may provide the reconciliation needed between physicians and advocates for technology in healthcare, as physicians remain averse to such change in the industry. One of the ways that technology in healthcare saves time and increases safety is by preventing severe mistakes that could be dangerous from occurring. Information technology in general can reduce the rate of errors in three ways: by preventing errors and adverse events, facilitating a more rapid response after an adverse event has occurred, and tracking and providing feedback about adverse events. These errors are important to catch before they are entered and processed as true information. Furthermore, information technology can reduce the frequency of errors of different types and possibly the frequency of associated adverse events. This kind of change brought about by

information technology prevents so many past errors from occurring and lead to a safer, more stable future. It goes to show that the advocates for technological change in healthcare need to consider the costs and benefits, and which one outweighs the other.

Devices

Physicians continue to remain resistant toward technological change in the healthcare sector. Planning for a new health information technology system in healthcare requires identifying the needs of users and what the system is expected to do. In addition, designing the system for a clinic's specific needs, planning the implementation process, and determining how to evaluate how well the system has addressed the identified needs are crucial steps in personalizing the patient's healthcare through the use modern technology (Agency for Healthcare Research and Quality). Such identification and personalization of needs then leads to more accurate data processed medically. Perhaps there has been a disconnect between advocates for information technology in healthcare and physicians, since they differ so vastly in opinion on the matter. Anoj Bhattacherjee and Neset Hikmet have written an informative article for *Researchgat* titled "Physicians' resistance towar

to champion change and encourage others to see beyond immediate frustrations, and (4) leveraging house staffs (younger physicians) who were exposed to CPOE as medical students and are comfortable with its usage (Poon et al., 2004).

So far, these are just suggestions on how to make physicians more comfortable with technological change occurring in healthcare. Patients whose cases are more severe and cannot simply conduct every important step through a computer will be able to minimize their struggles by covering online whatever they can. Thus, in turn, will make room in their (and their physicians') schedules to meet with their physicians in person when necessary.

One of the best moves for patients to currently make is to take more initiative in improving their access to information and keeping track of their daily habits and health. Patients need to be assured that they have control and choice over their healthcare information and the means that they use to record data. The ease of access to information for both parties (the doctor and the patient) allows for a healthier relationship between the two and, thus, makes crucial information easier to transmit. In addition, the initiative for the patient to take action toward better health, as well as accessibility for the doctor to make sure that the patient is taking such initiative, needs to be emphasized so that there is better health. Thus, while much of the change needed in healthcare is technologically, much of it is also cultural and needs to start from the patient and doctor.

One of the most important notes to take in such a setting is that there are also negative aspects of technology playing an increasing role in medical data processing. For example, as life expectancy is increasing, so are the costs for healthcare. Even though technology does tend to change for the better, it does so at higher costs. Compared with people 19 to 64 years old, those aged 65 to 74 spend two times as much; those 75 to 84 spend four times as much; and those 85

Another extremely important tactic in dealing with the technological transition of healthcare is the recognition of a need of wearable technologies. They are very much projected to be the next big technology in the market. Wearable technology allows for people not only to wear gadgets as a fashion statement, but much more easily and conveniently plan their schedules due to allowing for smartwatches to schedule meetings, appointments, and other such dates. With fitness becoming a much bigger and more relevant part of people's lives each day, people are turning to health-monitoring applications (such as Samsung's Health application or Fitbit) that allow users to keep track of how many steps they take a day, how much exercise they complete, etc. In 2017 alone, the sales for wearable technologies, such as smartwatches and body-

doctors, which means that they are now able to perform their jobs more quickly than before and with more accurate results. Without modern technology, healthcare is outdated and not completing the task for which it is made. It is important to note that, while some patients do need in-person meetings with their doctors to occur, there are many patients who do not need such exchange. It is far more convenient for a patient who does not require meeting in person with a doctor to engage in physical therapy sessions at home. This allows for the patient to contact the

individual patients prevent much long-term health problems such as diabetes, obesity, and other such issues from occurring. The database goes to describe how eating healthy foods and limiting unhealthy ones can reduce risk for “heart disease, type 2 diabetes, high blood pressure, some types of cancer, and osteoporosis” (healthfinder.gov). Hence, serious health problems can be prevented by taking little steps.

Indeed, the steps needed to prevent extraneous healthcare spending and technological programming are not utilized nearly as much as they could be. The Center for Disease Control and Prevention cites that, at least as far as one nation in concerned, “Americans use preventive services at about half the recommended rate” (cdc.gov). This shows that patients do not use the resources available to them for better health as easily as they could. Even though chronic diseases can be generally prevented through close partnership with one’s healthcare team, or detected through appropriate screenings, they are responsible for 7 of every 10 deaths among Americans each year and account for 75% of the nation’s health spending! This is troubling, as it shows how much is being invested into the development of healthcare, both financially and technology, yet how little is actually produced in results. The five leading causes of death (at least in the United States) according to this database are “heart disease, cancer, chronic lower respiratory disease, stroke, and unintentional injuries” (cdc.gov). Proper tracking and planning of health diets and processes (such as exercise) onto a computer, online database shared with the doctor and patient, or any other such easily accessible technological device, is essential to preventing lethal incidents from occurring.

Data Processing

While such preventive measures can vastly reduce the need for the investment of even more money and time into healthcare, they still cannot solve critical issues such as medical

emergencies. Technological advancements in the technology sector allow for greater personalization, more accurate information recorded at quicker speeds, and more effective treatment for the problems at hand. It is important to note that advanced technology cannot be given only to the figure of authority in charge of healthcare but must also involve the people being treated so that they can have control and choice over their healthcare problems. Connective technologies that involve both patients and doctors allow for better interacth ealte-6(o)-4(n1144(s)2-6(o)-14p1(s)

has made in healthcare is higher breast cancer survival rate than other groups, but that is minimal compared to its lag behind the other countries in terms of healthcare efficiency.

One of the ways to combat the rising cost of technology-infused healthcare is, of course, raising money. In Silicon Valley, there are many causes currently raising money for better quality of healthcare and spending. Some large companies in California are working with the government to provide better technology and healthcare. Though those in power are the ones raising money, there is still concern that so much money needs to be raised in the healthcare sector. Silicon Valley startup Clover Health has helped raise money for better technology in healthcare. Clover has put in almost $300 million and has 19,000 members whose data-driven approach to health care could substantially bring down what Americans spend annually. Thus, if companies with the power to raise money can do so, then this will assist with working around the issue of the high costs of high quality technology incorporated into healthcare.

Healthcare is a heavily regulated industry, but for health companies to work with the government to improve technology in healthcare and raise the money to do so can bring forth the benefits of technology while also tackling the issue of cost. There is a lot of work to be done, but better healthcare can be brought about without the worry of costs if companies take the initiative to raise such money.

One of the ways for those in power to raise money for better technology in healthcare is for large, influential companies in both sectors to work together. This has been happening more

Be the Next Tech Giant Muscling Into Health Care," associate editor Jamie Condliffe writes of the merging and collaboration taking place between technology and healthcare companies. He notes that even though "Apple and Google are already trying to use existing or available hardware for health purposes [it is worth to note] that has a key advantage over other fi(i)-6s wtho ts(s)-1oph istiaerealandd isti(2(bu(t)-2(i)-2(onnbe)4(t)-2(w)2(or)3k([)-7(a)4(ndot)-2(he)4(r)3he)4 f)3((r)-7he)4(om(r)3(e)4(he)4nsrive(s)-13herieti(28(ha)4n Aw)2p pleo(r)3(G-2o(o)-10ng)10(l)-12(e)4(c)4(u(l)-12d (r)3(i)-2r aingsrc(mt)-2onkeyher(r)3hemtay(he)4olly hecster32(s)-1(w)2honnbee ter32(he)4(a)4(l)-2(t)-2(hc)-6(a)4(r)3(e)

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Blumenthal discuss the future of physicians under this intersection in their article, “The Impact of Health Information Technology And e-Health On The Future Demand For Physician Services” for the a governmental database for Michigan called michigan.gov. They bear the unfortunate conclusion that if health information technology were “fully implemented in 30 percent of community-based physicians’ offices, [then] the demand for physicians would be reduced by about 4–9 percent” (Weiner). Such statistics contribute largely to physicians’ cold attitude toward technology becoming prominent in healthcare.

One important fact about the current healthcare system is that different forms of health need to be considered as different systems. For example, cardiovascular health is a different department from mental health and, therefore, requires different treatment and consideration when it comes to adding electronic health records and other forms of technology. Thus, the challenge of personalization still persists, as there is a lot of work to be done so that individual needs can be met for people in healthcare.

One of the most important factors of determining quality in healthcare is the satisfaction

who report higher levels of autonomy and control at are likelier to report greater satisfaction and lower rates of turnover. This means that giving physicians more autonomy is another way to improve the healthcare system. They also need to be treated as they are getting the respect that they deserve as healthcare professionals - meaning a high salary for the work that they put in; studies show that employees who achieve high salaries, especially for putting in hard work, end up being more productive and capable of yielding effective, positive results. Another important factor is a good relationship between the doctor and patient; physicians who perceive good working relationships with other physicians (including perceptions of teamwork), as well as with staff in their practices, are also likelier to report being satisfied with their jobs and their overall career than were those who do not share such positivity. This, in turns, means that patients need to also perceive their doctor as attentive and their healthcare as of good quality, with patients improving in their health and receiving the results for which they aim. Electronic health records and technological means of communications will be able to alleviate some of the issues that exist with electronic health records and allow for patients and doctors to have more efficient, easy communication.

One way that information technology has become more relevant within the realm of healthcare is that well-known technologically based corporations have become more likely to take initiative for working on healthcare issues. In his article "The Real Reason Apple Made the Apple Watch" for *Time* , technology consultant and analyst Tim Bajarin discusses this case in depth and outlines Apple's endeavor to expand to healthcare. Barajin states that "Apple was looking at ways to deliver on Jobs' goal of making their customers healthier by using technology to help monitor and track health related data points" (Bajarin). Similar to Samsung's health app, this device for Apple allows for users to keep themselves more fit and use technology to record

treatment, and prevention of illness via social media and state-of-the-art data mining; and—less sexy but no less important—lean production methods to squeeze more care and more health out of a given quantity of resources" (Graboyes). This shows that there is a lot of room for improvement in the healthcare sector to be made before healthcare can be affordable for all. The mechanisms of these technologies need to be learned so that information can freely flow between doctors and patients. So far, technology has shown to improve the transfer of information and bring about accuracy, which is essential to a successful healthcare experience. With more time to develop the technologies in healthcare and for information to be transferred freely, there will be much more success to come.

Risks

Disruption of the status quo

So far, the data present a paradox: the free flow of accurate, high-quality information is increasing, but so are the costs with it. Still, how much of this is actually known by doctors and patients alike remains a matter of further investigation. While electronic medical records are certainly a major step in the technological revolution of medical data processing, how helpful are

since technology is a very significant part of the change currently taking place in the world in general (not just the healthcare industry), and millennials are all for it.

Still, however, a majority of millennial physicians prefer not to work with a computerized healthcare system. Thus, it is important to note that, though many generational changes do occur, many trends remain throughout the generations. Millennials' ambivalence toward technological changes in the healthcare sector, along with large technology corporations like Apple taking initiative to capitalize on healthcare, is a promising sign that information technology will develop more of a role within the healthcare industry as time goes on.

Regardless of the potential risks posed by large corporations, competition and new ideas are arising at high rates, giving way to innovation. Competing to develop jerseys, shoes, and bras loaded with sensors and wireless circuitry. Thus, the very style of fashion may be revolutionized with the rise of wearable technology. Of course, the problem of battery life still remains; if this is not worked on and addressed, then there will still be problems facing the wearable technology industry. Unlike smartphones and many other new technologies, wearable technology has a great amount of appeal for young adults, parents, and the middle aged rather than just for teenagers and young adults. One type of wearable technology that is extremely intriguing is the development of devices that track children's locations if they get lost or wander off too far. This is something that could seriously garner a great deal of support with parents whose children wander off too often and create extra tasks that consume time and energy.

The age-old conundrum of technological process is the compromise of human communication. With smartphones and wearable technology, it is hard to tell whether the technological devices hinder human interaction or communication, or actually make people more connected. It is a question with many different factors that need to be taken into account in order

Human learning

As far as the issue of higher costs with better technology in healthcare goes, will this ever be resolved? There needs to be solid scientific research, as well as application of said science, done to ensure that there is a safe healthcare plan when it is carried out. The relationship between science and technology is that of theory and application; one gives the data acquired from extensive research, whereas the other applies the data garnered. This is a major reason why it is crucial for doctors, scientists, and those working in the healthcare and technology sectors to have just as much contact and accessibility er as it is for doctors to have with patients.

The Less Certain Uses

What lies beyond the challenges of increased costs when technology is added onto healthcare? 3D printing is one of the most interesting and stimulating topics currently discussed in the matter of technology intersecting with medical data processing. One form of 3D printing allows for children to be designed prenatally. This is 3D immersive visualization of unborn babies. Many are afraid of this type of technology being implemented in medical data processing, since they see it as a threat to a newborn baby's humanity and differences as a person. In the *Science Daily* article, "Realistic 3D immersive visualization of unborn babies," the effects of a designer baby are discussed in great detail. The article discusses how similar the 3D designs of the baby are to the actual makeup of the baby when born. It lists more benefits of technology in the healthcare sector, stating that such "technology has numerous potential applications, including assessment of fetal airway patency [and coordination of] care with multidisciplinary teams and provide better visual information to parents to help them understand malformations and treatment decisions" (ScienceDaily). This shows a lot of promise and

potential for the future of 3D printing but leaves many people on a noose, pondering in fear what this will bring about. It is something that needs time and consideration.

Conclusion

Interestingly, physicians are actually more open and receptive to this type of technological change within the healthcare sector, since they are more familiar with the blueprint behind the design of the baby. This kind of confidence comes from the free exchange between physicians and computer scientists as they find out more crucial information and deliver it to each other in times of need. It is important that this medical information stay accessible to those working in the different sectors and honestly communicated so that it can be improved for all. With a collaborative workforce among the medical, scientific, and technological sectors, there is so much that can be accomplished. Such information systems lead to a more efficient system for an industry that is already severely behind in terms of technological modernization. This, like the trend of technological firms now taking their own initiative regarding healthcare, shows a promising future when it comes to technology being incorporated into medical data processing.

Even though smartwatches are less prone to physical security threats, they are still risky in that their short battery life can make it very hard to know for sure if they will last long enough to lock and unlock the car whenever it is needed. In addition, these easy ways to decode and unlock systems with the use of smartwatches make it easier for cybercriminals to perform hacks and carry out any destructive agenda that they please. One of the other biggest problems is inaccuracy, as well as a one-size-fits all program. In reality, this kind of system is inefficient and problematic since it does not take into account how different two people’s needs can be from each other. These issues can lead to a lot of problems and a failure to help the majority of patients’ needs. In an industry as related to people’s lives as healthcare, it is important that

medical data are processed accurately so that patients can receive the correct treatment that they need; misinformation entered leads to miscommunication and the wrong step being taken by the doctors on whom the patients depend.

There are many different challenges and benefits that arise from the intersection of technology and healthcare. At the moment, an extensive amount of research is being performed in the field so that there can be more safety and certainty as technology grows within healthcare. Luckily, many large, influential technology corporations such as Apple and Samsung are already working on a better healthcare system that will be implemented into the corporations themselves

are nervous to report information on their mental health since it may cause for information that they do not want exposed to be exposed. Another factor to consider if whether technology is an important factor for all departments of healthcare. Many agree that, for fitness training and disease prevention, it is an important feature to install, but when it comes to mental health provisions, then meeting in person is still the preferred method of communication and receiving treatment. Therefore, personalization of healthcare depends not only on the individual patient but also on the specific type of healthcare service being received.

The rise of wearable technology gives way to both greater technological innovation and greater risk. It raises both irresistible opportunities and unavoidable threats. Interestingly, the

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