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Olunife Akinmolayan, PharmD candidate
University of Findlay, Findlay, OH, USA 45840
Email – akinmolayano@findlay.edu

LEVERAGING TECHNOLOGY TO MONITOR PATIENTS

Telehealth is a rapidly expanding sector of in healthcare, whose incorporation in mainstream medical practice has been accelerated by the COVID-19 pandemic. The American Hospital Association [AHA] specifies some of the objectives that could be achieved through the implementation of telehealth. Some of which can be categorized to enhance communications and relationships between as well as provider-patient relationships. Through the use of telehealth technology, institutions can conduct electronic consults, provide virtual ICU intensivist support, and diagnostic screening. With direct-to-consumer platforms, objectives that could be achieved include second opinions, remote-patient monitoring, video visits, and eVistis. According to AHA's Telehealth *A Path to Virtual Integrated Care* patient-initiated electronic requests can be sent to providers to get an opinion on a clinical case with capabilities that allow for medical records and images to be transferred. In providing this service, a patient can receive more information from a licensed professional on how to effectively find solutions to an acute problem. With remote-patient monitoring "providers remotely monitor patients via connected/mHealth devices"[1] and can receive monitoring data and patient-reported data. It is highlighted that many pharmacy services can be provided through remote monitoring such as medication reviews, prescription verification, as well as patient specific consulting on diabetes, congestive heart failure, and other chronic diseases. Video visits and eVisits connect providers with patients either through video, email, or secure messaging to conduct equivalent patient "visits" and "provide clinical advice or support" says the AHA. Some of the specific objectives outlined include "increasing specialist access availability and capacity, strengthening referrals and transitions of care between referring providers and long-term/post-acute care providers, improving central monitoring for early detection of decline [and] improved quality in ICU and other acute settings" which all further the mission of telehealth's ability to provide advance healthcare service with higher efficiency. With technology constantly evolving, it could be inferred that healthcare services will too.

There are many pharmacy services that can be implemented if technology is leveraged to monitor patients. The HealthAffair's "Connected Health: A Review of Technologies and Strategies to Improve Patient Care with Telemedicine and Telehealth" continues to shine light on how pharmacists can play a role in leveraging technology to provide services. The HealthAffair's research article highlights that "there are a number of technologies that help patients better adhere to their medication regimens" which means more prescriptions are being filled. Highly innovative technologies have the ability to "remind patients to take their pills and order refills" and " internet-connected pill caps alert patients (through music, ringtones, and flashing lights) to take their medications" with abilities to "send e-mail[s] to remote caregivers, create adherence reports, and refill prescriptions"[2]. Leveraging technology to this magnitude can have a profound impact on non-adherent populations. Not only will providers be able to monitor adherence, accumulated data can be effectively data mined to determine most effective medication regimen for patients. Technology connects groups of people and allows them to collaborate. With appropriate use, data sharing between physician and pharmacist could aid in creating "well-managed medication care, increasing patient self-management, improving outcomes, and lowering costs"[2]. Technology will improve communications between physicians and pharmacists leading to improved care for patients. Collaboration between healthcare professionals is proven to increase provision of quality healthcare and leveraging technology can aid this effort. Patients will have concerns about loss of privacy as a result of data sharing, so broad-based patient education and buy-in will be essential for implementation of these technology.

There are currently systems in place to conduct remote patient monitoring. In 2015 Wellbox was founded as a solution to healthcare providers who wanted to provide chronic care management services to their populations but did not have the time nor the resources to implement in-house services. Wellbox aims to assess "the comfort and preference of every patient by providing them with a path that are comfortable with and are therefore, more likely to engage with long-term"[3]. Many patients who currently receive long term therapy are not well versed with technology and Wellbox recognizes that. One of the services that Wellbox provides is "Access+" which "increases engagement with patients who have minimal technology experience"[6]. In addition, Wellbox also "increases engagement with patients who have their own technology preference or prefer to continue to use their own device"[3] which may give patients a better sense of security. While technology is capable of providing many services but there is also a sentiment that some will find it invasive. A system like Wellbox tries to answer some of these concerns by providing patient greater control.

Another large player in the telehealth sector is Carematix. In 2005, the FDA approved Carematix for remote patient monitoring (RPM) as a Class II Medical Device - to monitor blood pressure, weight scales and glucometers. According to most recent Centers for Disease Control [CDC] estimates, nearly 45% of adults have hypertension. This translates to approximately 108 million adults who have hypertension - defined as a systolic blood pressure $\geq$ 130 mmHg or a diastolic blood pressure $\geq$ 80 mmHg or currently on medication for hypertension. With the FDA's approval of this RPM system through Carematix, it would be possible to reduce the number of patients classified as hypertensive. Carematix provides insight and statistics on why RPM systems are in high demand. According to Carematix there are "44 million US consumers who are enrolled under Medicare, 68% of doctors intend to use RPM technology in [the] future, 61% of US consumers feel safer to be monitored remotely, [and] 90% of chronic patients [will] adopt RPM Devices"[4].With such statistics, remote patient monitoring will soon be a reality for many patients in the US. Carematix works as a resource that offers opportunities to rent blood pressure and glucose monitors with Wi-Fi capabilities. Opportunities especially useful for those who may not have access to Wi-Fi or afford to purchase these devices. The system can call patients to let them know when they have missed a reading as well as create custom notifications that alert the patient whenever a patient's vitals are trending too high or too low. Carematix's wireless solutions have reduced 30-day readmission by 40%, reduced ER visits by 60%, and increased pharmacy refills by 41%. If such systems could be implemented on a larger scale, greater segment of the patient could be benefited. Technology may provide the key to improving our overall healthcare system.

Behind every expansion of a new idea, there must always be a "why". Forbes article titled "Why Leveraging Technology is the Key to Improving Healthcare" provides the answer. Tej Anand highlights four elements to how technology can be leveraged for healthcare. First, data and analytics can help to "yield information about each patient's medical condition and personalized needs." He goes on to say that "'big data" could play an important role when simplified, such that patients could input quality data on their own accord. Clinical protocols would be enhanced to "use best practices to create a plan of care and minimize variability" but clinicians will need to understand they cannot become desensitized by alerts and notifications implemented by such technologies. Next, the "user experience, assessments and workflow management" can be seen as another reason why technology can be leveraged. It states that "electronic health records, [is] an important step to modernize healthcare, work well in the hospital setting"[5]. The final element described is information integration which "enables administrative and clinical information to be leveraged across care settings, to manage system-wide performance and generate new insights"[5]. All of the aforementioned elements highlight why technology should be leveraged to monitor patients and the impact they can have on providers and patients.

Technology has undoubtedly made an impact on the daily lives of every individual. Its advancements appear to be never ending as society is constantly

inundated with updates and innovations making their way to market. Leveraging technology to monitor patients is still relatively new territory but is worth exploring. With further research and implementation, the future looks bright for the healthcare sector and for future patients. Giving the power to the patient must always be top priority. At the end of the day, services provided by the healthcare system should aim to improve the outcome of the patient. Technology can be a great tool to realize this goal. Change is not always well received at first but most times, it is necessary. In this case, leveraging technology to monitor patients is a necessary change. Looking ahead, healthcare systems should look into how services will be provided to underserved communities. Many populations still do not have access to both quality healthcare and sustainable technology. Services such as these will not be cheap but can have a profound impact on those who may not be able to afford it. Affordable healthcare still remains a common goal more many nations and leveraging technology should not cause deviation. All parties involved have something to be gain from receiving better, personalized healthcare through the implementation of such technologies. The role of pharmacists is evolving at a rapid pace, much like technology. With services in higher demand and provider status beginning to sweep the nation, pharmacists will need to continue to explore innovative ways to leverage technology to monitor patients.

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