Leveraging Technology – Changing Healthcare in Green Bay

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The field of artificial intelligence (AI) is changing the world we live in, including healthcare. Healthcare AI offers a wide possibility of change – from patient wellness and provider access to medical diagnostics, clinical operations, and optimization of disease treatment modalities. The excitement surrounding AI medical applications seems to be supported by analysis from Accenture (a global professional services company specializing in information technology services and consulting). In 2019-2020, Accenture showed that promising AI applications could create up to $150 billion in annual cost savings for U.S. healthcare by 2026. However, despite the vast AI healthcare opportunities, the current healthcare AI applications are narrowly focused on frontline provider productivity that *might* translate to improved patient outcomes. Healthcare has started to incorporate AI technologies into patient care. With these AI changes, we have experienced both enhanced provider efficiency and improved patient treatment outcomes.

As cancer screening has improved, the demand for oncology care in the United States continues to rise with increasing cancer incidence among all age groups. In turn, cancer *deaths* have decreased due to improved surgical, radiation, and medical oncology therapies. Based on these two factors, the American Society of Clinical Oncology (ASCO) predicts an oncologist *shortage* of 2,392 oncologists by 2025. Rural areas, such as Northeast Wisconsin, will experience the largest oncologist shortages. Increasing cancer care demand with fewer oncologists will mean that patient access to cancer care will be delayed, and that will affect time to cancer diagnosis and treatment and overall patient outcomes. To counteract the oncologist shortage, maintain and improve future cancer care access, and prevent worse patient outcomes, provider efficiency must be increased.

Improving Provider Efficiency

AI applications have the potential to improve provider efficiency in three ways. First, the use of AI integrated electronic medical record applications allows providers to document patient information *while* the clinical visit occurs. The time saved from provider documentation then increases the number of patients a provider can see in a day, thus improving patient access.

Enhanced treatment algorithms are another way technology applications improve patient access. These applications evaluate multiple patient cancer risk factors, match those risk factors to the patient's tumor pathology, and then present the provider with patient-specific detailed treatment options. In the past, this treatment decision-making process could take multiple hours; now it can be done in as little as thirty minutes following the patient visit. Like AI integrated electronic medical record applications, the provider time saved with treatment algorithm assistance can also increase the number of patients a provider can see in a day.

Finally, AI technology is now being used to improve patient access through patient medical wearables. These are home monitoring devices that use AI technology to give the provider real-time patient biometrics. This digital interaction reduces the need for on-site clinical visits

without sacrificing high quality care. In these ways, AI allows for improved cancer patient care access despite an oncologist shortage.

Improving Treatment Outcomes

Another primary goal of healthcare AI is to improve patient treatment outcomes. AI applications, to date, have improved patient treatments through robot-assisted surgery and reduction of medication dosing errors. The current developing advancement in AI is precision medicine: tailoring healthcare interventions to individuals based on their disease pathology, family history, tumor genomic mutations, cancer staging, and immune profile. In the span of 51 years, between 1949 and 2000, the FDA approved 72 novel cancer drugs. In comparison, in the last 23 years the FDA has approved 145 novel cancer drugs.

This explosion of new medications over the past two decades coincides with the medical world's ability to accurately test a patient's cancer for mutations (oncogenes) that trigger cancer growth and encourage continued cancer proliferation. The process of matching a specific cancer's genetic mutation (there are more than 700 mutations to date) to available targeted drug therapy is a complex algorithm. Prior to AI applications, identifying cancer mutations and translating those mutations to targeted drug therapy would take months – and it was not accessible to all patients. Now, with AI incorporated into the process, matched therapies can be delivered to the oncologist within a few days to a few weeks. This has allowed cancer centers to provide patients with local access to national clinical trial options and the most innovative targeted medications, thus improving patients' survival and quality of life.

AI technology, when integrated into daily clinical practice, can change how we diagnose and care for patients. The current healthcare AI applications, although narrowly focused, have displayed the capacity to improve patient outcomes and treatments. With continued AI healthcare advancement, the possibility of healthcare transformation is real.

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