

THE BRAINS BEHIND SMARTER HEALTH- CARE

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For those seeking to improve patient outcomes while optimizing efficiencies with AI, the prognosis is promising. An examination of recent advancements in patient care and communications suggests that even more commonplace applications have an equally positive impact on the business side of healthcare.

Between 2011 and 2017, \$2.7 billion was raised by health AI and machine learning (ML) companies, underscoring the interest in this sector. Research estimates that the healthcare AI market will grow to more than \$7.9 billion by 2022, up from \$667.1 million in 2016. These investments are fueling experimentation and innovation in the ways that AI can transform the science and delivery of healthcare. From robot-assisted surgery and image analysis, to personal medical devices and electronic health records (EHR), changes are already in motion.

Starting small has big returns

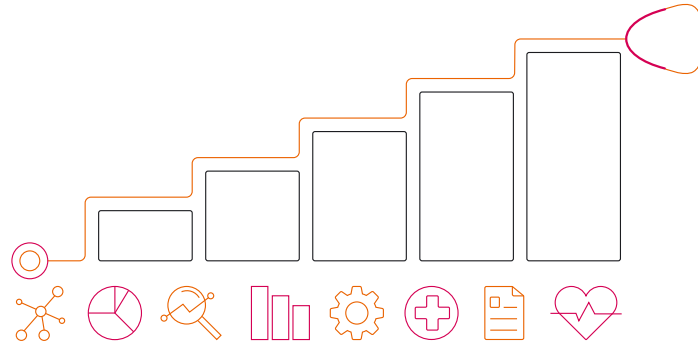
When AI is the topic, the imagination typically jumps to futuristic advancements and innovative cures, but AI-based applications are already delivering substantial savings on common tasks. A recent investigation found that the value of 10 AI applications could generate up to \$150 billion in annual US healthcare savings by 2026. The majority of these applications deal with routine matters such as administrative workflow, dosage error reduction, connected machines, fraud detection, and automated image diagnosis. The size of the prize is enormous: an estimated 14% of all waste in healthcare spending—\$91 billion—results from inefficient administration alone. AI applications make back-end processes more efficient, allowing frontline clinicians to be more productive.

Digital communications enabled by smarter AI-enabled technologies have also opened multiple avenues for innovation, from remote healthcare advice, to facilitating online appointment requests, delivery of lab and X-ray results, and supporting patient messaging. Technologists at Beth Israel Deaconess Medical Center developed an application using ML to help reduce hospital readmission rates and identify possible no-shows. The application allowed the medical center to intervene before treatments lapse, while proactively preventing medical fraud—an area of concern that potentially represents billions of dollars saved just from improving speed and accuracy of fraud detection in medical claims.

Another AI application creating greater efficiency is voice-to-text transcription, which improves workflow by decreasing non-patient care activities such as: writing chart notes, refilling prescriptions, or ordering tests. While the use of EHRs was a major step forward in the digitization of healthcare, it has not been without its challenges. Using AI, developers are tackling some of the issues associated with documentation, order entries, and inbox sorting that can absorb the majority of a user's time by creating more intuitive interfaces, and automating more routine processes for digital records.

AI + ML: A match made in the cloud

The benefits of efficiency gained by applying AI and ML extend beyond prosaic tasks, and will have a genuine impact on patient care. Computer-assisted physician documentation helps care providers cut down on documentation time and upgrade reporting quality. It can also improve real-time clinical care by ensuring that patients receive an accurate clinical history and consistent recommendations.



Collaborators are seeking to quickly and accurately analyze thousands of data points to improve both personalized and broader population care, mining big data from EHRs, administrative claims, and medical research using cognitive computing capabilities. This same data also informs surgical procedures and can impact decisions about care by analyzing long-term patterns that might be overlooked when making decisions on-the-go.

By analyzing data from pre-op medical records, AI-assisted robots can physically guide a surgeon's instrument, with fewer complications and errors reported in AI-assisted robotic surgery. If applied properly, there is the potential to generate a 21% reduction in patients' length of stay post-op, simply due to the increased accuracy.

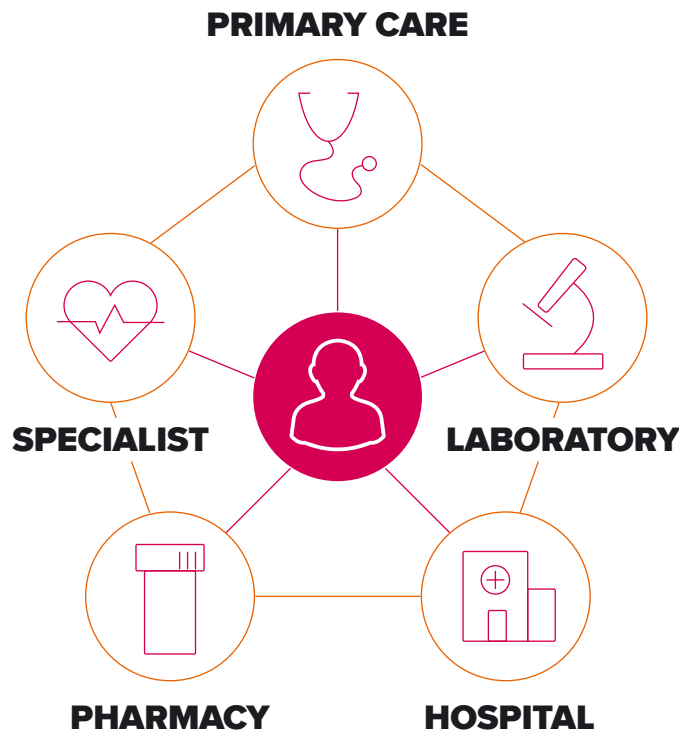
A human touch (almost)

The application of AI technology is not confined to the office or operating room. Increasingly, individual patients are practical beneficiaries. Consider the AI-powered virtual nursing assistant, perhaps one of the more novel examples of “outsourced” care via an AI application. These nursing assistants interact with patients, ask questions about health, assess symptoms, and connect patients and care providers between office visits to reduce or prevent hospital readmissions. One estimate finds that AI-powered nurse assistants could save nurses the 20% of their time that is spent on patient maintenance tasks, translating into \$20 billion in annual savings. Virtual assistants can also help ease the burden of nursing shortages.

Patients are increasingly able to monitor their status and communicate with their healthcare providers or with virtual care chatbots. One area that has particularly benefitted is the treatment of diabetes, where several advanced applications provide

virtual coaches delivering context-dependent, mood-sensitive, and emotionally aware education and guidance. Another “connected care intelligent agent” works to encourage healthy habits, as well as detect at-risk behaviors and abnormalities.

Yet another multimodal solution provides specialized voice, mobile, and web interactions to support patient adherence. Patients at home now turn to voice-based home assistants to ask and receive guidance and support with injections or raise concerns about missed dosages. And finally, AI and ML also provide the backbone for direct digital communication via chatbots on websites or apps, which help streamline initial patient inquiries or address even more complex issues.



Connection makes the heart grow healthier

While it may already be clear that these AI applications are powered by big data collected and analyzed from EHRs and research, patient-provided data (through the increased use of IoT devices) contributes unique and indispensable information.

IoT devices, sensors, and trackers monitor a patient’s vitals, and are able to track drug reactions, post-op recovery, and adherence. AI algorithms proactively search larger databases looking for patient similarities, communicating possible future steps to the doctor. This is not only useful in recovery—the analysis of information provided by sensors may assist with pre-diagnosis and thus a better future health outlook.

One example is research done on the analysis of heart rate sensors and step counts, which can help doctors identify early signs of diabetes. Other researchers are working on sensors that assist in identifying atrial fibrillation, sleep apnea, and hypertension. The hope is that by analyzing these sensor readings, individuals who start to show signs related to various medical issues would receive notifications or reminders for treatment much sooner.

Look before you leap

Despite the anticipation and excitement generated by AI advancements, there are challenges that need to be addressed.

Legacy integration

Developers and providers need to be attentive to the personal side of healthcare, the accuracy of collected data being analyzed, and the compatibility and integration across various platforms. Some who have been in the healthcare space for years may be suddenly confronted with a wide range of legacy healthcare applications that vary in design, functionality, and performance. To truly optimize and streamline, disparate systems may have to be brought into one centralized, convenient, and functional platform—a complex challenge.

Security

The security and accuracy of recorded data are of paramount importance when it comes to connecting and transmitting highly personal information. Data provides the basis for medical progress, contributes to advancements, and informs researchers, providers, and caretakers. All of this material comes from individuals whose privacy and rights need to be balanced with the desire to accumulate information in the name of progress.

Quality assurance

Reported or recorded health data may not always be accurate, and it can be a challenge to eliminate inconsistencies or skewed reports. Remove as many barriers to personal reporting as possible through user-friendly interfaces, and background capture of data that eliminates human reporting, and secure systems.

SoftServe delivers complex, integrated applications—driven by AI and the quality data it relies on—while ensuring adherence to privacy regulations and requirements. The possibilities are exciting and SoftServe is here to help you reveal, transform, accelerate, and optimize AI-driven healthcare for the future. To learn more, [contact SoftServe today](#).

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