

## Article

# Three Artificial Intelligence Qualities for Boosting Productivity in Healthcare

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Much has been written and spoken about artificial intelligence (AI) in healthcare – the promises of improved health outcomes, increased efficiencies, and cost savings are well known. The business imperative to adopt AI technology in healthcare, however, is unclear. Healthcare leaders have questioned whether or not AI is a fad, a too-complicated technology, or just a rehash of existing big data analytics, to name a few.

When evaluating any new technology, it is helpful to approach the topic as an objective observer. This is what a team of USC Healthcare Decision Analysis students recently accomplished. Knowledgeable of both the technical and business aspects of healthcare, this team of graduate students approached the topic of artificial intelligence skillfully but without any preconceived notions.

The team discovered three key qualities about AI that a manufacturer or care provider can weave into their strategy to capture opportunities created by the novel technology.

## 1. Human Ingenuity

Today, the top ten AI applications cover everything from robot-assisted surgery to administrative workflow to connected machines, automated image diagnosis, and cybersecurity. What all these applications have in common are vexing problems that burdened hospitals with lower quality care, unnecessary costs, and lost time. For example, in robot-assisted surgery, AI enables safer surgeries due to increased precision, shorter recovery time, and less blood loss. In short, improved quality of care.

Between 12 to 18 million Americans every year experience some sort of diagnostic error.<sup>2</sup> As many health programs are value based centered, diagnostic aids are invaluable for both patient lives and clinicians. The USC team identified various clinical decision support systems ranging from decision trees, symptom finders, and other advanced features to help address the epidemic of diagnostic errors and to support clinicians. In addition, Artificial intelligence can greatly enhance automated image diagnosis.

Historically, physicians manually interpreted medical images. This practice was time-consuming and led to high error rates in the reading of images. With AI-enhanced automated image diagnosis, the USC team found quantification of images was more accurate and consistent, leading to streamlined results and improved quality.

The USC team identified additional areas of human ingenuity, including patient monitoring, dosage error reduction, and clinical trial participation. AI applications can help researchers to match appropriate subjects for their clinical studies and help patients find potentially valuable treatments at the same time. With more applications in the pipeline, the adaptability of AI can yield significant cost-effective gains for any healthcare organization.

## **2. Patient Centricity**

The second quality that makes AI a great tool for healthcare providers and manufacturers alike is patient centricity. The care quality improvements mentioned above for AI-assisted robotic surgery greatly benefit patients. Connected care systems can speed the process from diagnosis to therapy and reduce anxiety. Machine learning enables physicians to leverage the power of hundreds of thousands of clinical studies and case data to optimize treatments for individual patients. Natural language processing allows physicians to spend more time with patients while helping make insightful conclusions based on precise data.

AI also provides personalized healthcare, rather than one-size-fits-all approaches. With more data, AI can better predict and manage what health conditions may arise amongst certain patients group based on their genetics, age, and lifestyle. This will allow companies to identify gaps in the current therapeutics to bring products to market and capture sections of existing market.

Today, the U.S healthcare system is complicated by rising healthcare costs yet inequivalent health outcomes and patient satisfaction. The USC team investigated the opportunity of virtual nursing assistants that can reduce unnecessary hospital visits and yet provide patients the immediate support they need. Leveraging artificial intelligence to maintain continuous transitions of care is vital when prioritizing patient care.

When prioritizing the patient, safety first. Adverse events related to unsafe care represent one of the top causes of death and disability. Investments in reducing harm can lead to substantial savings and improved patient outcomes. Real world evidence, sensors, wearables, safety checklists are at the front of population-based datasets. We concluded that artificial intelligence has great potential to improve the safety of care.

### 3. Optimization

The third quality that makes AI a great tool for healthcare providers and manufacturers alike is optimization. AI systems can provide pedagogical guidance for trainees, even patients and family members.

AI also provides numerous benefits within the realm of cybersecurity. Today, the health care industry increasingly relies on internet-connected technology. Unfortunately, 98% of internet traffic is unencrypted, and 57% is vulnerable to cyberattacks. The USC team discovered that AI could proactively assist in intelligently stopping threats, securing internet-connected devices, and recommending security policies.

One of the most expensive rooms in the hospital is the surgery room when the revenue generated per square foot is considered. The progression towards modular, adaptable platforms is focused around efficiency. The USC team discovered that artificial intelligence can also be strategically leveraged to improve efficiency in the surgical space resulting in more profits. Through big data and machine learning, workflows and scheduling can be optimized to reduce turnaround times, minimize length of stay, and increase number of surgeries per day.

#### **But aren't all these positive qualities expensive?**

The ROI for artificial intelligence is still emerging, but the signs are very favorable for efficiency-minded hospitals and healthcare companies. In other words, in the final analysis, can AI deliver? And if so, how much?

The often-overlooked area of surgical suite scheduling provided a rich reflection of the money-saving power of artificial intelligence. Almost 90% of surgical cases are delayed – at the cost of approximately \$6000/hour. In one study<sup>[1]</sup>, AI algorithms resulted in a 70% reduction in overall scheduling inaccuracy for a typical 20 room OR. In turn, this created \$3 million in additional capacity annually, more than \$3 million in labor savings, and about \$50K of “soft” labor savings by freeing up nurses who typically would provide updates to family members.

Digging deeper into a healthcare topic requires skill, intelligence, and the objectivity that a third party can provide. That enabled the USC graduate student team to identify and analyze many valuable insights about artificial intelligence.

1. Harvard Medical School study: Leap Rail AI algorithms
2. <https://www.healthcareitnews.com/news/how-ai-and-machine-learning-are-transforming-clinical-decision-support>