



Harvard Business Review

REPRINT H04BMO
PUBLISHED ON HBR.ORG
MAY 10, 2018

ARTICLE **TECHNOLOGY**

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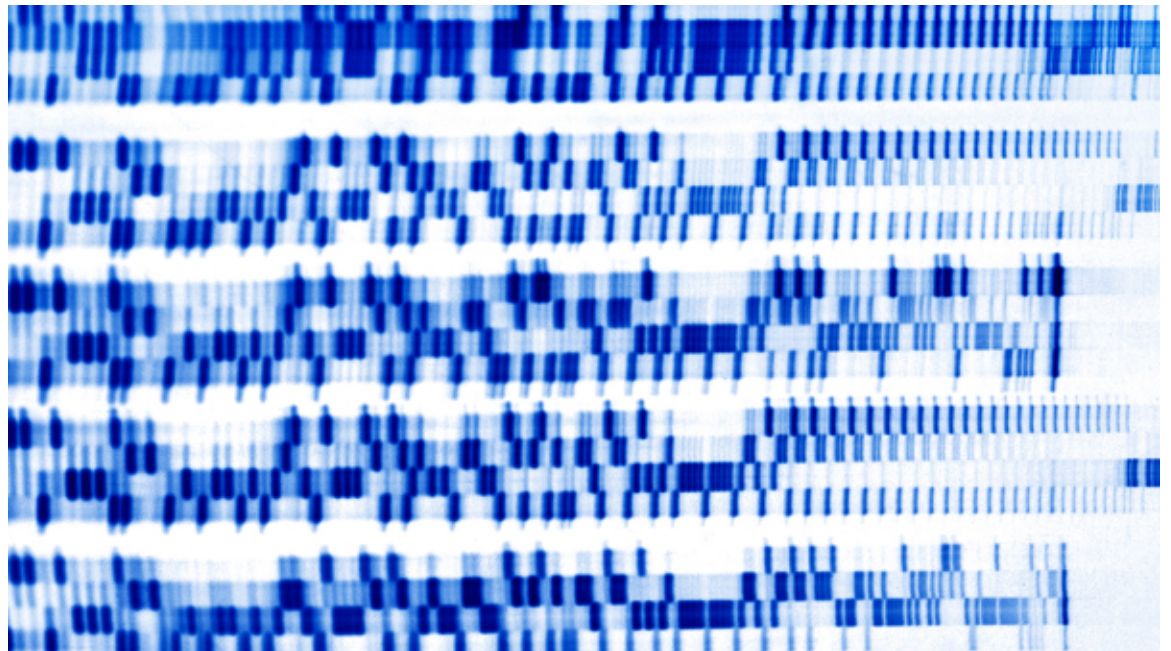
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TECHNOLOGY

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Peter Dazeley/Getty Images

There's a lot of excitement right now about how artificial intelligence (AI) is going to change health care. And many AI technologies are cropping up to help people streamline administrative and clinical health care processes. According to venture capital firm [Rock Health](#), 121 health AI and machine learning companies raised \$2.7 billion in 206 deals between 2011 and 2017.

The field of health AI is seemingly wide—covering wellness to diagnostics to operational technologies—but it is also narrow in that health AI applications typically perform just a single task. We [investigated](#) the value of 10 promising AI applications and found that they could create up to \$150 billion in annual savings for U.S. health care by 2026.

We identified these specific AI applications based on how likely adoption was and what potential exists for annual savings. We found AI currently creates the most value in helping frontline clinicians be more productive and in making back-end processes more efficient—but not yet in making clinical decisions or improving clinical outcomes. Clinical applications are still rare.

10 AI Applications That Could Change Health Care

APPLICATION	POTENTIAL ANNUAL VALUE BY 2026	KEY DRIVERS FOR ADOPTION
Robot-assisted surgery	\$40B	Technological advances in robotic solutions for more types of surgery
Virtual nursing assistants	20	Increasing pressure caused by medical labor shortage
Administrative workflow	18	Easier integration with existing technology infrastructure
Fraud detection	17	Need to address increasingly complex service and payment fraud attempts
Dosage error reduction	16	Prevalence of medical errors, which leads to tangible penalties
Connected machines	14	Proliferation of connected machines/devices
Clinical trial participation	13	Patent cliff; plethora of data; outcomes-driven approach
Preliminary diagnosis	5	Interoperability/data architecture to enhance accuracy
Automated image diagnosis	3	Storage capacity; greater trust in AI technology
Cybersecurity	2	Increase in breaches; pressure to protect health data

SOURCE ACCENTURE

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Let's take a look at a few examples of **AI on the frontline of care**. AI has demonstrated its aptitude for improving the [efficiency of image analysis](#) by quickly and accurately flagging specific anomalies for a radiologist's review. In 2011, researchers from NYU Langone Health found that this type of automated analysis could find and match specific lung nodules (on chest CT images) between 62% to 97% faster than a panel of radiologists. Our findings suggest such AI-generated efficiencies in image analysis could create \$3 billion in annual savings by giving radiologists more time to focus on reviews that require greater interpretation or judgement.

Another area is AI-assisted robotic surgery. In orthopedic surgery, a form of AI-assisted robotics can analyze data from pre-op medical records to physically guide the surgeon's instrument in real-time

during a procedure. It can also use data from actual surgical experiences to inform new surgical techniques. A [study](#) of 379 orthopedic patients across [nine](#) surgical sites found that an AI-assisted robotic technique created by Mazor Robotics resulted in a five-fold reduction in surgical complications compared to when surgeons operated alone. When applied properly to orthopedic surgery, our analysis found AI-assisted robotic surgery could also generate a 21% reduction in patients' length of stay in the hospital following surgery, as a result of fewer complications and errors, and create \$40 billion in annual savings.

AI techniques are also being applied to the costly problem of dosage errors—where our findings suggest AI could generate \$16 billion in savings. In 2016, a [ground breaking trial](#) in California found that a mathematical formula developed with the help of AI had correctly determined the correct dose of immunosuppressant drugs to administer to organ patients. Determining the dose has traditionally depended on a combination of guidelines and educated guesswork—and dosing errors [make up 37%](#) of all preventable medical errors. While this type of AI technique is nascent, the example is powerful considering that the correct dose is critical to making sure a graft is not rejected after an organ transplant.

Using AI to aid clinical judgement or diagnosis still remains in its infancy, but some results are emerging to illustrate the possibility. In 2017, a group at Stanford University tested an AI algorithm against 21 dermatologists on its ability to identify skin cancers. The clinical findings, as [reported by Nature last year](#), “achieve performance on par with all tested experts ...demonstrating an artificial intelligence capable of classifying skin cancer with a level of competence comparable to dermatologists.” Our findings suggest AI could yield \$5 billion in annual savings by doing a preliminary diagnosis before a patient enters the emergency department.

We're also starting to see potential of AI-powered virtual nurse assistants in helping patients. For example, Sensely's “Molly” is an AI-powered nurse avatar being used by UCSF and the UK's NHS to interact with patients, ask them questions about their health, assess their symptoms, and direct them to the most effective care setting. Our findings estimate AI-powered nurse assistants could save \$20 billion annually by saving 20% of the time nurses spend on patient maintenance tasks.

AI also holds promise for helping the health care industry manage **costly back-office problems and inefficiencies**. Activities that have nothing to do with patient care consume over half (51%) of a [nurse's](#) workload and nearly a fifth (16%) of [physician](#) activities. AI-based technologies, such as voice-to-text transcription, can improve administrative workflows and eliminate time-consuming non-patient-care activities, such as writing chart notes, filling prescriptions, and ordering tests. We estimate that these applications could save the industry \$18 billion annually.

For example, while Beth Israel Deaconess Medical Center [garnered attention](#) for an AI-enabled cancer screen, its first foray into AI was more prosaic: using it to reduce hospital readmission rates and identify possible no-shows. Using machine learning, technologists at Beth Israel Medical Center

developed an application to predict which patients are likely to be no shows or lapse on treatment so they can intervene ahead of time.

Errors and fraud are a similarly expensive problem for health care organizations and also for insurers. Fraud detection has traditionally relied on a combination of computerized (rules-based) and manual reviews of medical claims. It's a time-consuming process that hinges on being able to quickly spot anomalies after the incident occurs in order to intervene. Health insurers are [experimenting with AI-supported data mining](#), coupled with AI-based neural networks (which mimic the processes of the human brain, but much more quickly) to search Medicare claims for patterns associated with medical reimbursement fraud. We estimated that AI could create \$17 billion in annual savings by improving the speed and accuracy of fraud detection in Medicare claims.

Beyond fraudulent activity, the litany of data breaches, such as WannaCry or Petya, over the past few years has made cybersecurity a major concern for health care organizations. Health care breaches [are estimated](#) to cost organizations \$380 per patient record. Using AI to monitor and detect abnormal interactions with proprietary data could create \$2 billion in annual savings by reducing health record breaches.

As AI technologies become more prevalent, health care organizations will have to invest in those that deliver the most value. Uses of AI for clinical judgement still remains in its infancy and will need time to fully take root in a meaningful way. But the AI applications that can deliver the most value today (AI-assisted surgery, virtual nurse, administrative workflow) should be prioritized and invested in, so health care providers and insurers are free to focus on better care.

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