

AI in Healthcare: Beyond IBM Watson

AI in healthcare shows promise, but security concerns prevail



In this e-guide

Four uses for artificial intelligence in healthcare p.2

AI in healthcare must overcome security, interoperability concerns p.7

Five ways a healthcare virtual assistant can improve patient engagement p.11

Six health IT trends and technologies executives should watch in 2017 p.15

About SearchHealthIT p.19

In this e-guide:

IBM Watson is without a doubt the most well-known use of artificial intelligence (AI) in healthcare and has been used in a number of disciplines, including with payers, oncology, and patient risk assessment.

But today, AI in healthcare goes beyond Watson. In this e-guide, discover:

- 4 key uses for AI in a healthcare settings
- Security and interoperability concerns surrounding AI
- How AI can improve patient engagement
- 6 health IT trends to watch in 2017 (Hint: AI is included!)

In this e-guide

- Four uses for artificial intelligence in healthcare p.2
- AI in healthcare must overcome security, interoperability concerns p.7
- Five ways a healthcare virtual assistant can improve patient engagement p.11
- Six health IT trends and technologies executives should watch in 2017 p.15
- About SearchHealthIT p.19

Four uses for artificial intelligence in healthcare

Reda Chouffani, Co-founder | Biz Technology Solutions

We surround ourselves with technology that is able to help us in our daily lives. The success of autonomous cars, advancements in clinical research and [personal digital assistants](#) has shown the incredible potential of technology and how far it has come in recent decades. Despite the progress that many other industries have made, healthcare is likely to be the one market where artificial intelligence can truly have an impact that goes beyond convenience and positively affects human lives.

[Artificial intelligence \(AI\)](#) is defined as the science and engineering of creating intelligent computer systems that are able to perform tasks without receiving instructions directly from humans. These computer systems use a number of different algorithms and decision-making capabilities, as well as vast amounts of data, to provide a solution or response to a request.

Today, more than ever, many technology vendors are making significant investments in AI to ensure they are able to offer solutions and services that can use the technology. Microsoft, Google, Apple, IBM and Amazon, to name a few, have all adopted and fully committed to AI and are already providing these services to consumers.

In this e-guide

- [Four uses for artificial intelligence in healthcare](#) p.2

- [AI in healthcare must overcome security, interoperability concerns](#) p.7

- [Five ways a healthcare virtual assistant can improve patient engagement](#) p.11

- [Six health IT trends and technologies executives should watch in 2017](#) p.15

- [About SearchHealthIT](#) p.19

Anytime a new technology enters healthcare, there are a number of challenges it faces. Common setbacks of artificial intelligence in healthcare include a lack of data exchange, regulatory compliance requirements and patient and provider adoption. AI has come across all of these issues, narrowing down the areas in which it can succeed.

The most popular [use of artificial intelligence](#) in healthcare is in IBM's smart cloud, where Watson lives. The Watson platform has been used in a number of disciplines within healthcare [including with payers](#), oncology and patient risk assessment.

There are a number of other applications within healthcare where AI can deliver incredible value, but healthcare executives must evaluate and see if they can adopt some or all of them in order to begin their journey in the AI space. The following are four areas in which artificial intelligence in healthcare is gaining steam.

Personal health virtual assistant

With most of today's U.S. adolescents, adults and seniors owning a smartphone, they are likely to have access to an intelligent personal virtual assistant on their device. [The likes of Cortana](#) and Siri are backed by powerful systems with robust AI capabilities. These systems have the potential to provide tremendous value when combined with healthcare apps.

Healthcare apps can be used to deliver medication alerts, patient education material and human-like interactions to gauge a patient's current mental

In this e-guide

Four uses for artificial intelligence in healthcare p.2

AI in healthcare must overcome security, interoperability concerns p.7

Five ways a healthcare virtual assistant can improve patient engagement p.11

Six health IT trends and technologies executives should watch in 2017 p.15

About SearchHealthIT p.19

state. The application of AI in the form of a personal assistant can have an incredible impact on monitoring and assisting patients with some of their needs when clinical personnel are not available.

Advanced analytics and research

The capabilities of AI do not stop at understanding human commands and knowing what type of response is needed. For example, AI has been used in many advanced use cases in oncology to help [detect abnormalities in X-rays](#) and MRIs, in genomics to perform complex processing and in precision medicine to provide assistance in creating highly customized treatments for individual patients.

In the example of IBM Watson, the AI has successfully applied its capabilities to process structured and unstructured patient data. In the field of oncology, IBM Watson can [provide evidence-based treatment recommendations](#) for cancer patients.

Personal life coach

Care providers who treat patients with chronic diseases recognize the [importance of maintaining contact with their patients](#) outside of the exam room. Several hospitals have introduced life coaching services as part of their overall care, but the cost of such services compared to the current shrinking reimbursements makes it difficult to sustain such programs.

In this e-guide

- Four uses for artificial intelligence in healthcare p.2

- AI in healthcare must overcome security, interoperability concerns p.7

- Five ways a healthcare virtual assistant can improve patient engagement p.11

- Six health IT trends and technologies executives should watch in 2017 p.15

- About SearchHealthIT p.19

However, with today's robust AI capabilities and mobile apps, patients can receive feedback on a number of data elements captured on their phone or wearable devices. Whether it relates to medication adherence or is simply a motivational voice that [encourages fitness activities and healthy habits](#), AI as a personal life coach creates a customized experience for each individual patient and offers proactive alerts that can be sent back to physicians.

Healthcare bots

One of the new areas of AI that is beginning to gain adoption is in the field of customer service, and healthcare bots are likely to be available soon as part of what healthcare providers offer. A bot is an AI application patients can interact with through a chat window on a website or via telephone to receive help with their requests. Bots can be used in situations such as scheduling follow-up appointments with a patient's provider online. Other examples include when a bot helps a patient with their medication or [billing needs](#). These use cases improve customer service; offer 24/7 assistance for basic requests, such as scheduling, billing and other clinical requests; and reduce the overall administrative costs for hospitals.

Today, some feel confident in trusting AI to drive them from point A to point B, but while healthcare is not ready to fully trust AI to independently diagnose patient diseases, advancements in [machine learning](#) and big data have contributed to healthcare by assisting in processing data and discovery insights much faster than humans can. AI, working alongside experienced clinicians, is likely to continue to be the current course for many healthcare

//////
In this e-guide

■ Four uses for artificial intelligence in healthcare
p.2

■ AI in healthcare must overcome security, interoperability concerns
p.7

■ Five ways a healthcare virtual assistant can improve patient engagement
p.11

■ Six health IT trends and technologies executives should watch in 2017
p.15

■ About SearchHealthIT
p.19

organizations for some time, and until we can prove that AI has what it takes to accurately diagnose patients, the expansion of its current use in healthcare is likely to be a careful and well-planned process.

//////
▶ Next article

In this e-guide

- Four uses for artificial intelligence in healthcare p.2
- AI in healthcare must overcome security, interoperability concerns p.7
- Five ways a healthcare virtual assistant can improve patient engagement p.11
- Six health IT trends and technologies executives should watch in 2017 p.15
- About SearchHealthIT p.19

AI in healthcare must overcome security, interoperability concerns

Reda Chouffani, Co-founder | Biz Technology Solutions

Artificial intelligence is beginning to gain ground in healthcare. The combination of advanced algorithms, large data sets and powerful computers has offered a new way to leverage technology in patient care. AI is also able to perform complex cognitive tasks and analyze large amounts of patient data instantly. However, despite the powerful capabilities that AI can offer, some physicians are skeptical about the safety of using AI in healthcare, especially in roles that can impact a patient's health.

Today, most consumers have been exposed to some form of AI. Services like Google Home and Amazon's Alexa extensively use artificial intelligence and [machine learning](#) as part of their core application. But AI is not limited to taking basic commands to give weather forecasts or set reminders. [Artificial intelligence has shown](#) that it can perform several complex and cognitive tasks faster than a human. The automotive industry has already showcased its ability to leverage AI to offer [driverless cars](#), while other industries have also found ways to use machine learning to detect fraud or assess financial risks. These are just a few examples that highlight the maturity level of AI.

Companies such as IBM play a big part in pushing AI into healthcare. Its use in [leveraging its Watson platform in cancer research](#), insurance claims and clinical support tools has encouraged many in the industry to see the

In this e-guide

- Four uses for artificial intelligence in healthcare p.2

- AI in healthcare must overcome security, interoperability concerns p.7

- Five ways a healthcare virtual assistant can improve patient engagement p.11

- Six health IT trends and technologies executives should watch in 2017 p.15

- About SearchHealthIT p.19

importance of this technology. Despite these encouraging signs and positive [uses of artificial intelligence](#) in healthcare, there are still some concerns and questions around its potential risks, and some healthcare professionals are uneasy about AI getting into the business of patient care. Below are four challenges of artificial intelligence in healthcare that need to be overcome before physicians will fully adopt the technology.

Concerns around security and privacy

Patient health data is [protected under federal law](#), and any breaches or failure to maintain its integrity can have legal and financial penalties. Since AI used for patient care would need access to multiple health data sets, it would need to adhere to the same regulations that current applications and infrastructures must meet. As most AI platforms are consolidated and require extensive computing power, patient data -- or parts of it -- would likely reside in the vendor's data centers. This would cause concerns around data privacy, but could also lead to significant risk if the platform is [breached](#).

Lack of interoperability between AI vendors

One of the popular subjects in the healthcare industry in recent years has been interoperability. Hospitals across the nation face the challenge of not being able to efficiently exchange patient health data across other healthcare organizations, despite the availability of data standards across

In this e-guide

- Four uses for artificial intelligence in healthcare p.2

- AI in healthcare must overcome security, interoperability concerns p.7

- Five ways a healthcare virtual assistant can improve patient engagement p.11

- Six health IT trends and technologies executives should watch in 2017 p.15

- About SearchHealthIT p.19

the world. Adding AI to the mix would likely complicate things even further. When vendors like IBM or Microsoft actively deliver health-related services [using their AI capabilities](#), the likelihood of these organizations talking to each other is very slim due to competition and proprietary technology. However, if policies are put in place that require these platforms to meet current interoperability requirements, this may help address the exchange of data right away.

Humans are not perfect, but AI could be worse

Opponents of AI in healthcare have argued that computers are not always reliable and can fail on us from time to time. These failures can lead to catastrophic consequences if AI prescribes the wrong medication or gives a patient the wrong diagnosis. However, AI could eventually move to a stage where it can be trusted once it has proven its safety and readiness for patient care. If its error margins are less than or equal to those of its human counterparts, then the platform could be ready to take on an active role in patient care.

Logical choices are not always the same as human choices

AI has progressed to the point where robots or virtual characters can mimic human behavior and interact naturally with humans. [Emotional responses expressed in voice tones](#) or text have been engineered based on human

//////
In this e-guide

■ Four uses for artificial intelligence in healthcare p.2

■ AI in healthcare must overcome security, interoperability concerns p.7

■ Five ways a healthcare virtual assistant can improve patient engagement p.11

■ Six health IT trends and technologies executives should watch in 2017 p.15

■ About SearchHealthIT p.19

emotional reactions. However, there are several decisions physicians make that are based on their gut feeling, and intuition that may never be replicated using algorithms and super computers. These are the [areas of patient care that would be hard to replace](#) with a robot.

AI technology is advancing at a rapid rate. Several well-known scientists and popular figures such as Stephen Hawking, Bill Gates and Elon Musk have said that [AI could become so powerful and self-aware](#) that it may put its own interests before those of humans. But before robots become the enemy, there are tremendous benefits of artificial intelligence in healthcare, and many physicians are welcoming the technology. AI in healthcare offers the opportunity to help physicians identify better treatment options, detect cancer early and engage patients.

//////
➤ Next article

In this e-guide

- Four uses for artificial intelligence in healthcare p.2
- AI in healthcare must overcome security, interoperability concerns p.7
- Five ways a healthcare virtual assistant can improve patient engagement p.11
- Six health IT trends and technologies executives should watch in 2017 p.15
- About SearchHealthIT p.19

Five ways a healthcare virtual assistant can improve patient engagement

Reda Chouffani, Co-founder | Biz Technology Solutions

Apple's Siri, Google's Assistant and Microsoft's Cortana have successfully made voice-enabled devices popular with smartphone users, including healthcare professionals and patients. Powered by [artificial intelligence \(AI\)](#), these voice assistants are able to interact with users and help them with day-to-day tasks. As the technology begins to [find its way into the homes of consumers](#) through voice-based assistant devices, vendors are exploring the different capabilities and features that can benefit patients and healthcare professionals.

It is not uncommon for technology enthusiasts to equip their homes with voice-enabled devices like Amazon's Echo and Echo Dot. These standalone gadgets have become [home virtual assistants that use voice commands](#) to turn lights on or off, play music, set reminders or reorder home supplies. Now along with the Echo, Google has released its own home automation and voice-based assistant, adding another option for consumers who want powerful and inexpensive tech gadgets.

The big question for many in healthcare is how this technology can drive patient engagement. Here are five uses for a healthcare virtual assistant.

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In this e-guide

- Four uses for artificial intelligence in healthcare p.2
- AI in healthcare must overcome security, interoperability concerns p.7
- Five ways a healthcare virtual assistant can improve patient engagement p.11
- Six health IT trends and technologies executives should watch in 2017 p.15
- About SearchHealthIT p.19

Patient reminders at home

The ability to remind patients about their medication is a critical function. Medication adherence is one area that physicians recognize is challenging to enforce. A healthcare virtual assistant can **verbally notify** and interact with patients when it's time to take their medication. There are also additional reminders that can be delivered through the interactive system. For example, patients suffering from diabetes can benefit from friendly reminders to check glucose levels. Reminders can be set up by a provider or the patient **through an app**. The healthcare virtual assistant offers a friendly voice patients are familiar with that provides a way to keep up with tasks and reminders that are relevant to their health.

Data collection capabilities

In the past, providers looking to collect specific data at a certain frequency from their patient relied on paper, home computers or mobile devices to capture it. The new voice-based devices have the ability to **capture data simply by interacting with patients verbally**. Platforms such as Voice Experience Designer by Orbita are already on their way to showcase those capabilities how they can interact with patients using the Echo Dot at HIMSS17. Orbita recognized that physicians and hospitals frequently need to survey patients when at home, and built a tool that allows them to create any set of questionnaires to **interact with the patient 24/7** and collect the necessary data from them.

In this e-guide

- Four uses for artificial intelligence in healthcare p.2
- AI in healthcare must overcome security, interoperability concerns p.7
- Five ways a healthcare virtual assistant can improve patient engagement p.11
- Six health IT trends and technologies executives should watch in 2017 p.15
- About SearchHealthIT p.19

A constantly evolving system with integration capabilities

Beyond the abilities of processing voice requests and responding to voice commands, voice-based assistants have the ability to interact with other third-party platforms to perform different tasks and pull data from. This allows it to be the central hub for interacting with a number of different devices and systems, as well as a common interface for the patients.

A health assessment tool at home

Another area of impact would be around performing different health assessments at home and triggering specific events based on the findings. The results of such assessments may be directing patients to the nearest emergency room, or simply writing a note that is sent to their primary care physician. Hospitals can use these assessments to monitor patients who have recently been discharged. The healthcare virtual assistant can interact with the patients at certain intervals, assess their condition and identify if anything raises concerns that they may be at risk.

//////
In this e-guide

■ [Four uses for artificial intelligence in healthcare](#) p.2

■ [AI in healthcare must overcome security, interoperability concerns](#) p.7

■ [Five ways a healthcare virtual assistant can improve patient engagement](#) p.11

■ [Six health IT trends and technologies executives should watch in 2017](#) p.15

■ [About SearchHealthIT](#) p.19

A patient education tool

The voice-based device can also turn into an instruction manual or patient education library. It can deliver educational content to patients based on their condition or answer questions they may have. Patients can also inquire about symptoms of certain health illnesses from the digital assistant.

While these home tech gadgets have been widely adopted for [smart home automations](#), healthcare is going to consider these voice-based assistants as an option to support patient engagement initiatives. These devices offer a human-like interaction and are able to be personalized to the individual. But Alexa, Cortana, and other AI voice assistants all have one common threat and weakness -- their dependence on internet connectivity. These devices may one day have their own built in cellular signal so they are less dependent on the home connectivity, but until then, we can expect more voice-based assistants to enter the healthcare arena.

//////
➤ Next article

In this e-guide

- Four uses for artificial intelligence in healthcare p.2
- AI in healthcare must overcome security, interoperability concerns p.7
- Five ways a healthcare virtual assistant can improve patient engagement p.11
- Six health IT trends and technologies executives should watch in 2017 p.15
- About SearchHealthIT p.19

Six health IT trends and technologies executives should watch in 2017

Reda Chouffani, Co-founder | Biz Technology Solutions

Health IT executives are expected to engage and experiment with several emerging and disruptive technologies in 2017. The outcome for those who succeed in adapting to new trends in [health IT](#) will be better patient care, more efficiencies and better data protection. Here are six health IT trends and technologies healthcare executives should watch in 2017.

Advancements in artificial intelligence

There have been significant advancements in [artificial intelligence \(AI\)](#), such as IBM's Watson [assisting with cancer diagnoses](#) and babylon Health using AI to interact with patients and collect data about their symptoms through an app. These developments have led IT executives to consider the possibility of [introducing more AI](#) into their hospitals by adopting smarter apps and services. This can be in the form of mobile apps with built-in intelligence that are available to patients, or machine learning that can perform specific advanced analytics and predictive tasks.

In this e-guide

- [Four uses for artificial intelligence in healthcare](#) p.2

- [AI in healthcare must overcome security, interoperability concerns](#) p.7

- [Five ways a healthcare virtual assistant can improve patient engagement](#) p.11

- [Six health IT trends and technologies executives should watch in 2017](#) p.15

- [About SearchHealthIT](#) p.19

Cybersecurity and next generation protection tools

The security threats the healthcare industry experienced in 2016 proved that [cyberattacks are getting bolder](#) and more sophisticated. Many of these attacks can go undetected by most antivirus products because they [frequently change signatures](#). Malware, ransomware and data breaches require far more proactive and advanced protection mechanisms. Thus, many hospitals will have more interest in security solutions that can leverage machine learning, behavioral detection, browser protections and URL detonation to better classify and block suspicious activities and content. This can [help hospitals mitigate their risks](#) and improve their security and protection.

Bots for healthcare

In 2016 there were several [bots](#) being used by businesses [such as Taco Bell](#) and Microsoft in an [experimental way](#). Combined with the advancements in AI, bots have shown that they are ready for primetime and can take on a position within healthcare. This means that hospitals are likely to make the move in 2017 to implement more bots in their environments to [assist with tasks such as appointment scheduling](#) and patient education, as a hospital directory and even a clinical assistant to capture a patient's basic data and symptoms.

In this e-guide

- Four uses for artificial intelligence in healthcare p.2
- AI in healthcare must overcome security, interoperability concerns p.7
- Five ways a healthcare virtual assistant can improve patient engagement p.11
- Six health IT trends and technologies executives should watch in 2017 p.15
- About SearchHealthIT p.19

A stronger push for cloud services

Compared to previous iterations, the [cloud services available today](#) are more mature, reliable, [secure and compliant](#) to different healthcare, life and science regulations. Hospitals are looking to continue their shift toward hybrid environments that enable them to have the best of both worlds by leveraging existing infrastructure investments and moving some workloads to the cloud to reduce maintenance and support costs. Hospital IT executives will also continue to engage their teams in several [popular cloud services around collaboration](#), security and healthcare apps delivered in a [SaaS](#) model.

The internet of things

More connected devices and wearables are making their way to patients, and that encourages hospitals that held back from adopting internet of things (IoT) in the past [due to security concerns](#). However, IoT has been shown to add value in many use cases, including the use of medical devices in the home health setting to provide [remote patient monitoring](#) and the use of IoT to offer smart beds in hospitals that can adjust automatically and continuously monitor patient's movements. Each hospital may have a different take on which devices they will evaluate first, even though many are already using some sort of connected smart device. IoT brings a lower cost of technology, real-time data capture and patient monitoring capabilities.

In this e-guide

Four uses for artificial intelligence in healthcare p.2

AI in healthcare must overcome security, interoperability concerns p.7

Five ways a healthcare virtual assistant can improve patient engagement p.11

Six health IT trends and technologies executives should watch in 2017 p.15

About SearchHealthIT p.19

Blockchain in healthcare

Blockchain was a hot topic in 2016, even though the technology has been in use since 2009 and is one of the foundational pieces used for trading the digital currency Bitcoin. The technology is receiving a lot of attention in healthcare and support from the Office of the National Coordinator of Health Information Technology due to its potential ability to solve several key challenges faced by healthcare. Security, interoperability, universal shared infrastructure and global standards would become available once blockchain technology is used to manage and transport electronic health data. While it is still in its infancy stage in healthcare, blockchain is one of the health IT trends executives will be watching in 2017.

With the ever-changing technology landscape and constant innovation coming into healthcare, IT executives are recognizing that their role is to ensure the right health IT trends and technologies are adopted. However, health IT executives must be careful not to risk being early adopters of immature technology that put a patient's wellbeing at risk. The increasing concerns around security and current uncertainties of the political climate will influence which health IT trends and technologies are adopted first in 2017.

Next article

In this e-guide

- Four uses for artificial intelligence in healthcare p.2
- AI in healthcare must overcome security, interoperability concerns p.7
- Five ways a healthcare virtual assistant can improve patient engagement p.11
- Six health IT trends and technologies executives should watch in 2017 p.15
- About SearchHealthIT p.19

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