



# The Voice of Medicine

Voice technology is a life-preserver for healthcare.

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## Drowning in Data

Technology has become an integral part of healthcare, sometimes to the chagrin of the clinicians—not to mention the feelings of practice administrators.

Most health care workers spend more time interacting with the electronic health record (EHR) than the patient. Consider this further, and it is clear—after about a decade of specialized training to take care of patients, a majority of clinicians' time is spent on data entry. From a physician entering information during an exam, to a nurse recording vitals, or a scheduler filling appointments, everyone spends hours in front of a computer. Questions remain. Does all of it have to be so tedious and even mindless? Could there be a better way? Is there a solution on the horizon that will help solve this problem?

## Voice May Offer a Way Forward

Although numerous companies tout their solutions as the answer to whatever problem you may have, few have provided any real value. This could change with appropriately used voice technology, which has enormous promise to transform healthcare, in part because of enormous technologic advances being made by a range of companies from Amazon, Google, and Microsoft to smaller, but no less important, specialty companies developing the robustness of voice.

Voice assistants are computer programs that receive audio inputs, recognize words, and respond with audio output in a manner perceived as listening to and answering questions. A user can ask "What is the weather going to be today?" and the voice assistant will respond with a weather report for the user's location for that day. Voice is a natural means of communication, eliminating the need to stare (and type) information into a phone or computer. This is especially true for health care workers who must enter enormous amounts of information into an EHR for each patient. There must be a way to allow physicians to spend more time looking at a patient instead of staring at a computer screen. Not only will this improve providers well-being and decrease burnout, it will improve patient care. The patient and the provider will have more opportunities to feel connected during the health care visit, which improves adherence to treatment and health outcomes.<sup>1</sup>

## History of Voice Assistants

Speech recognition began in 1952 at Bell Laboratories where researchers developed "Audrey," which could recognize spoken single digits. Today, the use of voice assistant technology from Amazon (Alexa), Apple (Siri), Google (Google Assistant), and Microsoft (Cortana) are becoming mainstream. According to the 2019 NPR and Edison Research report, there are over 120 million smart speakers in US homes. A Juniper Research report estimates there will be 8 billion digital voice assistants in use by 2023.<sup>2</sup> Asking a voice-assisted device for information is becoming naturally integrated into daily behavior for many. Some of the most common categories of applications for these voice assistant devices include games, music, exercise, cooking, weather, home automation, and shopping. Although voice has seen enormous growth and acceptance in many business sectors, the health care industry has been slow to adopt voice primarily because of reliability, security, and medicolegal compliance, including health protected information (HPI) and Health Insurance and Portability Act (HIPAA). Despite the slow adoption, there are many outstanding opportunities for voice to radically improve health care for both patients and clinicians.

## Opportunities to Use Voice Assistants in Health Care

Among the many reasons voice has so much potential for health care include the natural aspect of speech, the speed and handsfree nature of speech, and the ability to address problems of burnout, patient engagement, and financial savings.

Talking is the most natural way for people to exchange information. Most prefer to just say what they need rather than typing a request. A typical person types 40 words/minute and speaks 150 words/minute. Imagine the time that could be saved over the course of a year by almost quadrupling the rate at which information could be entered into an EHR. By using voice technology to automate mundane office workflow tasks, staff would be able to focus on more meaningful work (eg, engaging with patients and focusing on their care).

Voice also eliminates the need for a keyboard and mouse, both of which can be inconvenient in medical practices, from examination rooms to the waiting area and offices.

Patients are often frustrated when they try to engage medical practices and often have to listen to a list of many options just to leave a voicemail. Voice technology provides to the



opportunity to quickly provide the patient with the information they need in a natural conversational manner.

**How Can Voice Technology Be Used in Healthcare?**

Voice technology has the opportunity to transform essentially every aspect of health care. that involves entering, requesting, or transmitting information provides the opportunity for voice to redefine the current workflow (Table).

**Examples of Voice in Healthcare**

Liberty Mutual, a US insurer has developed an Alexa skill allowing people to navigate through plans and manage their policy using Amazon Echo. In case the voice assistant fails to find a policy match according to a prospect’s profile and budget, it directs the call to an independent agent.

Mayo Clinic, a nonprofit academic medical center introduced an Alexa skill that allows its users to get the first-aid information. Users can make relevant statements like “Alexa, ask Mayo First Aid how do I treat my burn blister?”

VoCall is an efficient yet advanced natural language scheduling assistant that interfaces seamlessly with medical practice EHR and office communications systems. Allowing the patient to communicate naturally when scheduling appointments enhances the patient experience and improves patient engagement. By handling the repetitive and mundane tasks, VoCall frees staff for more important care-centered duties.

Advanced voice technology, integrated with artificial intelligence algorithms, power the TeleCARE-ICU system developed by Magic Medical Solutions. This USDA funded research initiative is already producing pilot systems to be fielded in the fight against COVID-19. Once complete, the TeleCARE-ICU system will project advanced services into the most remote and underserved areas. This displays the power of systems created by physicians for physicians.

**Final Thoughts**

Although enormous strides have been made in voice technology, there are still many challenges before it can be widely adopted in health care. Robustness is a key challenge. Voice assistants work well without background noise, but when a person is talking on a speaker phone while driving in a car, the results degrade significantly. If a person is stressed or excited, the tone of voice will change often diminishing the quality of the voice assistant interaction. Reliability needs to improve, both for noisy environments and for individual vocal variations (eg, accents, articulation disorders, mannerisms, and complex pragmatic language). It is not very important when Alexa does not understand which song you want to play. It could be a life or death scenario if voice technology does not understand a surgeon’s command or provides an incorrect prescription.

Despite these challenges, the opportunity for voice to

**Table. Opportunities to Use Voice-Assisted Technology in Health Care**

<b>Clinical practices</b>	Physician notes Aid to diagnosis Patient communication Phone operations Patient engagement Prescriptions Billing Surveys & feedback
<b>Patients</b>	Medication adherence Appointment reminders Education Therapy Remote monitoring Disease management
<b>Eldercare</b>	Daily activity reminders Remote monitoring Prescription reminders Social engagement Entertainment Education
<b>Surgical practices</b>	Medical device automation Supply management Operating room control Checklist Surgical information aid
<b>Education</b>	Medical school Continuing medical education
<b>Pharmaceutical</b>	Clinical trial management Patient questionnaires Patient communication Drug education/adherence

transform health care will occur as the technology continues to mature and people understand and accept it. The adoption of voice will reduce burnout, improve office workflows and efficiency, and improve patient engagement. Voice is poised to transform every aspect of the health care industry. It will become a part of the everyday experience for both patients and health care workers.

1. Young HN, Len-Rios ME, Brown R, Moreno MM, Cox E. How does patient-provider communication influence adherence to asthma medications?. *Patient Educ Couns.* 2017;100(4):696-702.  
 2. Digital Voice Assistants in use to Triple to 8 Billion by 2023 Driven by Smart Home Devices. Published February 2018. Accessed November 5, 2020. <https://www.juniperresearch.com/press/press-releases/digital-voice-assistants-in-use-to-8-million-2023>

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