

EXECUTIVE SUMMARY

The Voice First technology market is expected by some to reach \$49 billion worldwide.¹ Device makers and software firms are fighting for leadership in both devices and voice assistant software. In the past few years, multiple health-related voice assistants have been introduced, including those branded and served up by trusted organizations, adding to those from Mayo Clinic and Boston Children's Hospital. By 2019, it was becoming easier to ask about specific drugs online. And by 2019, medical transcription offerings multiplied – potentially replacing the role of 17,000 scribes. In addition, health organizations are beginning to voice-enable hospital rooms, physician charting, and wellness tracking for consumers.

Although work is being explored for using the voice as a health diagnostic tool, most uses today are rudimentary and/or experimental. But the future is exciting. With the beginning of HIPAA-compliance, diagnostics based on voice and increased personalization capability, Voice First technology promises to provide greater assistance to health professionals and a better experience for consumers and patients at home. 2020 will see more entrants into this early segment, refining what works and adds value.

INTRODUCTION

The growing effectiveness of Natural Language Processing (NLP) has fueled an explosion of activity in use of Voice First technology in healthcare. There is a seemingly daily roster of new entrants, new investments, and new partnerships. This research examines this early market, recognizing that the list of named participants and projects may be out-of-date as quickly as the publication date passes.

WHO SHOULD READ THIS REPORT?

- Investors and funds that focus on healthcare utilization and delivery
- Healthcare providers
- Senior living organizations and professional home and health care companies
- Vendors within or considering the market of voice technology and health
- Integrators and service providers helping enterprises deploy health offerings
- Technology platform providers (hardware, software)
- Telecommunication carriers supporting voice-interactions

ACKNOWLEDGEMENTS

The report is based on 21 interviews held with vendors, experts and healthcare pioneers from multiple dimensions of care delivery – all interested in the use of Voice First technologies in improving the consumer and provider experience. I would especially like to thank Stuart Patterson, CEO of LifePod. When I asked him whether it was too early in the market evolution to research this topic, he said “No, it’s not too early.” And so, here it is.

“Research shows that people are more honest with virtual assistants than they are with doctors. In person, they want to make the doctor happy.” – Bill Cava, Co-Founder, Orbita

HEALTHCARE AND VOICE FIRST

Voice First – The First Technology Breakthrough Since Web

There is a technology overhaul underway, and it's the biggest change in user experience since the introduction of the web browser in 1991.² Voice First technology – the ability to use natural language to speak to and be spoken to by devices and software – has become at least one mandatory user interface in every business and consumer interaction. From voice recognition technology to smart speakers to voice assistants, Voice First is now pervasive – in the year 2020, some predict that 50% of all searches will be by voice.³

"The entire industry needs to be Voice First, replacing 'Yet another app, download something.'— Sumit Nagpal, Global GM, Health Innovation, Comcast

Voice technology is particularly suited for older adults and those with disabilities. Devices have come and gone, and the oldest population generally was left behind by the last 'sea change' offering – particularly smart phones and their touchy glass screens. However, led by experiments with senior living organizations during 2017, it became apparent that speaking to a device was going to be one of the most significant technology enablers for seniors, their caregivers and families.⁴ Further, research shows they are comfortable using their voice to initiate a search.⁵

"For people who are mobility or cognitively disabled, the voice interface is really valuable. I have been very impressed by its caretaking aspects, although we should be careful not to imbue these devices with too much humanness." – Vint Cerf, VP, Chief Internet Evangelist for Google

Drowning in devices and a 'constant tornado of new features.' As Bradley Metrock, **Voice of Healthcare**, noted, from a sheer quantity standpoint, the plethora of devices from Amazon (claiming sales of 100 million gadgets at the end of 2018, plus a dozen introduced for the 2019 holiday sales period) captures the stampede nature of the market. And by end of January 2019, Google claimed to have Google Assistant running on 1 billion devices. By the summer, it began declaring a new version – Google Assistant 2.0. But a Rock Health survey found that just 10% of consumers were willing to share their health data with a tech giant, particularly Google.⁶

Privacy and data security – always mentioned, never really addressed. An always listening device has created plenty of media-fueled worry for users – despite identity theft and data loss on the Internet, voice technology feels different to participants. Not only are devices listening, workers for the platform companies have been listening to the recordings of what users said to the device. But despite fears and complaints, privacy concerns – as with technologies like email and web browsing – are easily traded against the utility of having the device or capability.

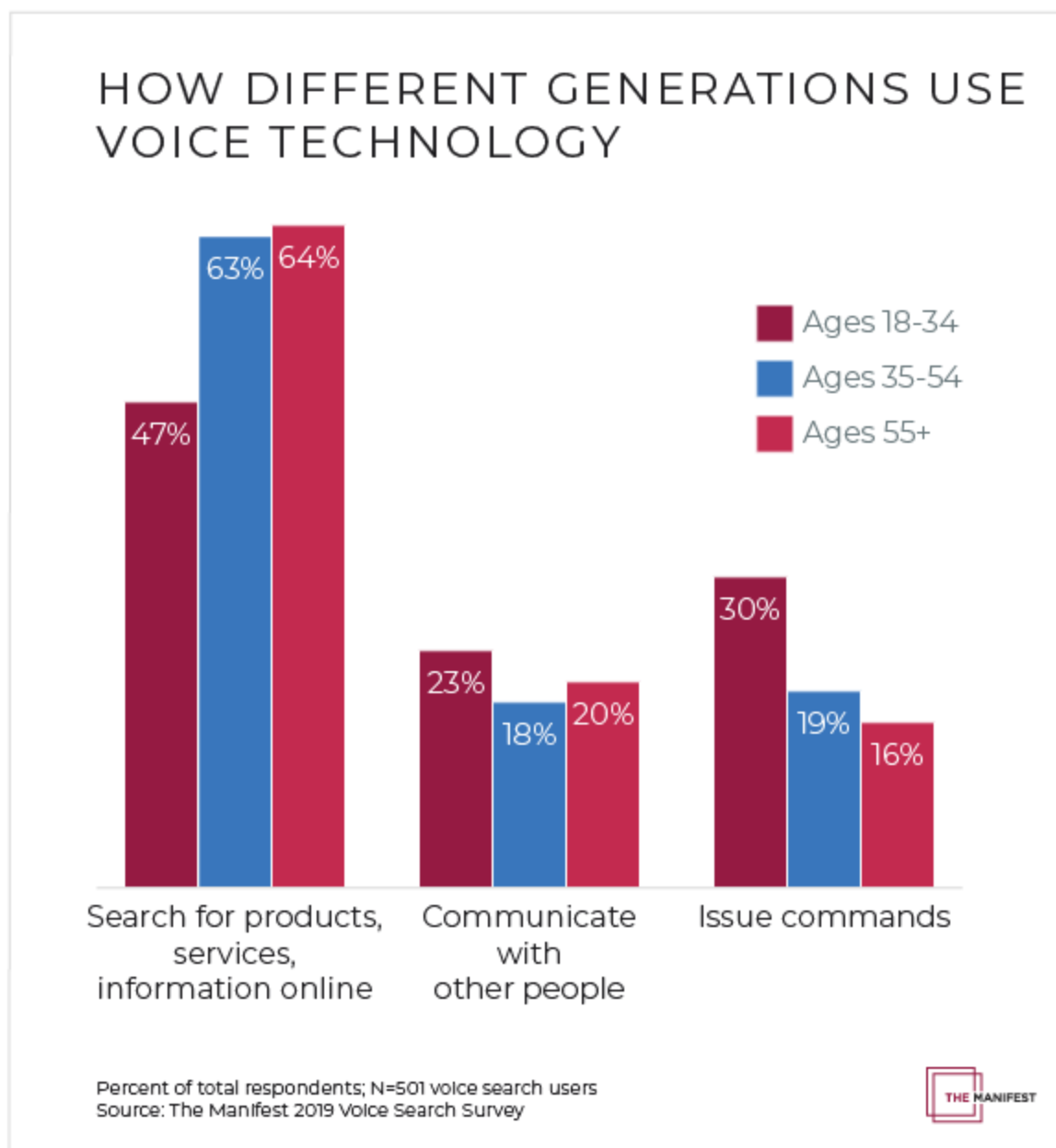


Figure 1 Source: The Manifest Voice Statistics

“Privacy and security will continue to be red-hot topics. Turning off the microphone won’t help. It is like Wile E. Coyote holding up a paper-thin umbrella while an anvil descends from above.”
– Bradley Metrock, CEO, Score Publishing

The Age of Experiments in Healthcare

Is the healthcare consumer ready? Not quite. According to research by Voicebot.ai, consumers are somewhat interested in using voice assistants to answer questions of their various voice assistants. Although 51% indicated an interest in using a voice assistant in a healthcare use case, 92% had not done so – yet (see **Figure 2**):

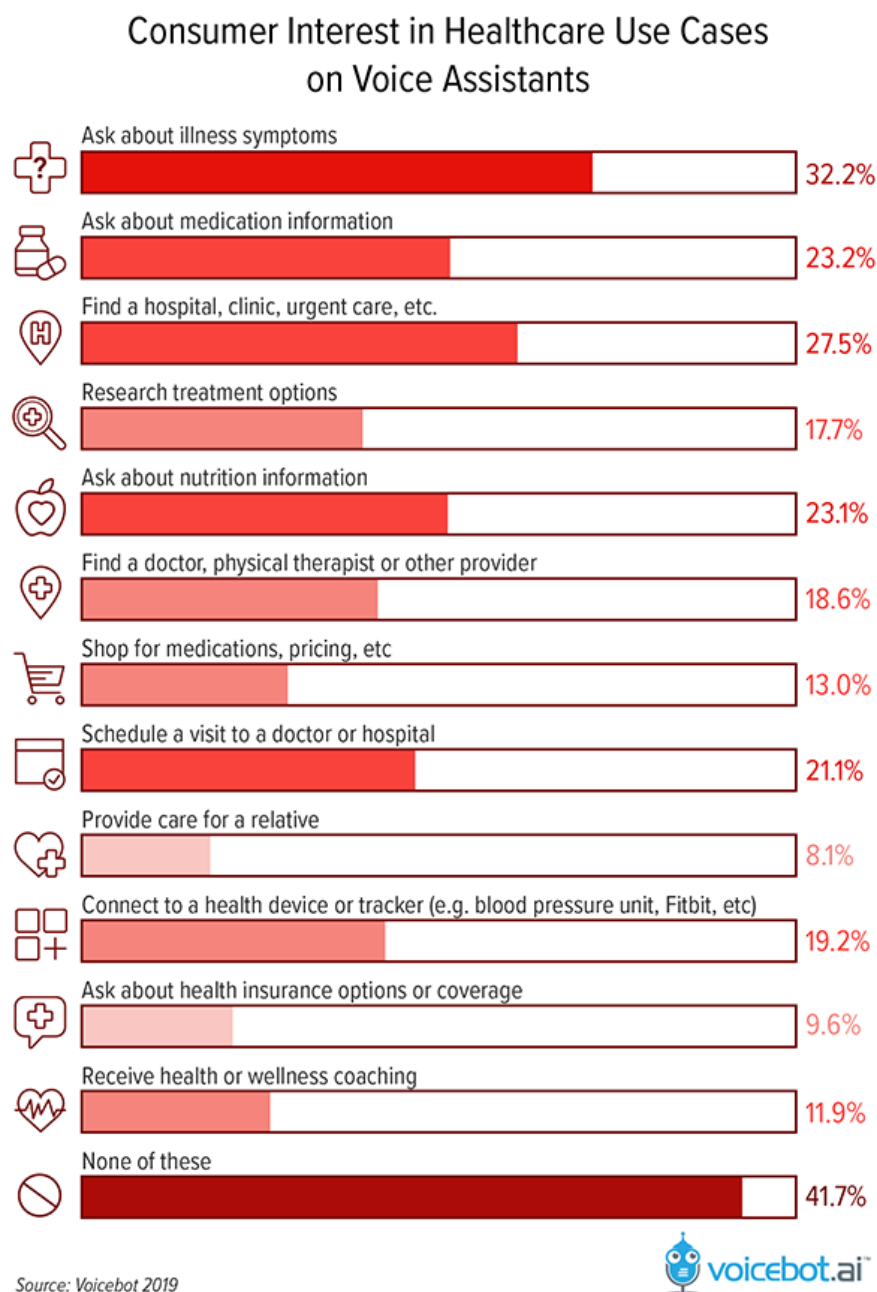


Figure 2 Consumer Interest in Voice Assistants (October 2019 Voicebot.ai and Orbita)

“We have a simple use: Remind me to take the blue pill at 9.” – Kari Olson, [Front Porch](#)

And it's a good thing they weren't ready – Voice Assistants may not be either. In MedTech Boston research performed by Dr. Matt Cybulsky, PhD and Bradley Metrock, the researchers created a measurement called “VHI – The Voice of Healthcare Index.” It was computed based on the percentage of 300 health-related queries that Alexa, Google Assistant, Siri, Cortana, Bixby and Hound (from **SoundHound**) were able to recognize. Question categories included: illegal drugs, legal drugs, medical centers, healthcare companies, isolation and symptoms/pathology. Although Google Assistant was deemed as the Voice Assistant “most ready” as of March, 2019, all needed improvement.⁷ All were stuck on location-specific responses – if you are in location A and want the best hospital by specialty, best must be ‘nearest’, regardless of whether it is viewed as ‘best’ by any measure.

Still, optimism in the healthcare ecosystem remains high. By 2016, experiments in the hospital ecosystem were beginning (see **Figure 3**). KidsMD launched at Children’s Hospital in Boston with a pioneering Alexa skill to help patients and families with generalized wellness advice.⁸ Amazon’s release of HIPAA compliance tools has made personalizing the interaction more feasible.⁹ Improving patient satisfaction and boosting staff efficiency drove pilots and deployment in hospitals. Providence St. Joseph Health built an Alexa skill to book same day appointments. [OrbitaASSIST](#) acts like a call button, using voice for connecting patients to the nurse’s station. And Lowell General in December 2019 partnered with **Frontive** -- adding voice skills to improve patient engagement and provide post-discharge instructions (see **Figure 3**).

Healthcare Organization	Technology Purpose	Date
Seattle and Boston Childrens Hospitals	Flu Doctor and KidsMD	2018, 2016
Cedars Sinai	Smart Hospital Room	2019
Children’s Hospital ERAS	Advanced Recovery After Surgery	2019
Providence Health	Book an appointment	2019
Mayo Clinic	Voice first aid skill with Google Assistant	2019
Atrium Health	Locate urgent care	2019
Lowell General	Alexa post-surgery knee replacement care	2019

Figure 3 Experiments and Pilots in Hospitals as of 2019

Senior-related service organizations see the potential. Over the past two years, the senior living ecosystem began multiple pilots of voice first technologies, mostly Amazon Echo-based, but other offerings also emerged.¹⁰ These include voice skills for use in senior living, skilled nursing, home health care, hospitals, discharge and home care settings. **LifePod**, for example, sells a customizable virtual caregiving product with the capability of initiating a conversation with the user, who could be an isolated homebound individual. And **Aiva**, a smart home technology, announced broad deployment plans for senior living communities in early 2019.

“We view it through the lens of ‘how to make emergency response work’ – just ask for help without a button.”—Rob Flippo, CEO, [MobileHelp](#)

In voice queries, Google showed a leading grasp of drug brands. In a Klick Health “tell me about” study, researchers compared Apple, Amazon, and Google to see how well each understood a query about the 50 most-commonly prescribed medicines. Google understood 92% of the brand name queries and 84% of the queries about generics. Siri had just over 58% comprehension of brand names and 51% with generics, while Alexa came in at 55% and 46%, respectively.¹¹

Amazon moves across multiple healthcare fronts. In 2018, a timeline of the firm’s forays into health care was published.¹² Then in April of 2019, Amazon announced 6 HIPAA-compliant skills, developed in partnership with these organizations (see **Figure 4**). What actually will happen with the [data depends on the agreement](#) signed with each partner, and would involve HIPAA rules for Privacy, Breach Notification, and Security:

Skill	Organization
Alexa, ask Cigna Health Today for a daily tip	Cigna Health
Alexa, ask Express Scripts where’s my order?	Express Scripts
Alexa, open MyChildren’s to start daily check in	Boston Children’s Hospital
Alexa, ask Swedish Health Connect to schedule an appointment tomorrow	Providence St. Joseph Health
Alexa, ask Atrium Health to find the nearest Urgent Care	Atrium Health
Alexa, ask Livongo for my last blood sugar reading	Livongo

Figure 4 Amazon announces six HIPAA compliant initiatives

Will the real money be in Be Medical Transcription?

Physician burnout has become a serious and costly issue, and there are multiple reasons cited.¹³ One factor often mentioned is the administrative labor required to document visits – a phenomenon that was exacerbated following the widespread adoption of Electronic Health Records.¹⁴ Time and motion studies of doctors show that they spend twice as much time on administrative tasks as on patient care.¹⁵ One of the solutions was to introduce a scribe into the exam room – a person noting the doctor’s recommendations and orders into a tablet or computer terminal -- with 17,000 scribes alongside doctors by 2016.¹⁶ In fact, there are those making the case for introducing scribes into healthcare delivery wherever they are not already in place.¹⁷

Could voice-enabled digital scribing tools reduce burnout? Digital scribing and transcription tools are rapidly emerging – and perhaps will grow in adoption as one of the more monetizable Voice First initiatives. Some believe that with proper templates specific to different categories of healthcare providers, doctors will consider adopting tools that take notes and fill out the Electronic Health Record for review. **Microsoft** is working with **Nuance** to bring its clinical voice technology to its Microsoft Azure cloud computing platform. In October, Google announced a partnership with voice assistant firm **Suki**, to improve language models for Voice Assistants.¹⁸ In early December 2019, Amazon announced the launch of a medical transcription service, **Transcribe Medical**, to make “clinical documentation more efficient.”¹⁹ It joins a growing list of transcription offerings including and to name a few (see **Figure 5**):²⁰

Technology	Firm	Example Partner/Provider
Dragon Medical Virtual Assistant	Nuance	Epic HER
Amazon Comprehend Medical	Amazon	Fred Hutchinson Cancer Research Center
Acusis	Acusis	Weston New York Urology Associates
Saykara	Saykara	New York Presbyterian Hospital
MyHealthyDay (compassion)	Tuzag	Just released
Project EmpowerMD	Microsoft	Nuance
Transcribe Medical	Amazon	Cerner

Figure 5 Examples of voice-enabled medical transcription offerings

“It is still early – a crowded space, many are working on it. We are looking at the startups and how it will work for providers.” – Maryam Gholami, Chief Product Officer, Providence Health

Sampling Voice First Interactions

Organizations want to get on board with voice technologies...A recent survey from **CapGemini** indicates willingness and expectations to use voice assistants.²¹ However, the number of hospitals, insurers and health systems publicly talking about their projects is small. One theory is that they simply don't have enough patient-facing portals and processes to enable scripting appropriate conversations. Users are interested. In an October survey by Voicebot.ai and Orbita, 52% of responders indicated willingness [to use voice assistants for healthcare](#).

"We created our own platform with integrated health information on it, including answers about a person's healthcare coverage." – Mike Cardillo, Founder, [HandsFree Health](#)

...But consumers raise concerns. Recent surveys indicate concerns about how smart a smart speaker should be about an individual's personal interests. This may cast doubt on willingness to use smart speakers for beyond symptom checkers or finding a hospital. With what they know of today's technology and its mostly mediocre privacy features, they are somewhat doubtful that consumer-oriented tools should link directly to an individual's personal data.

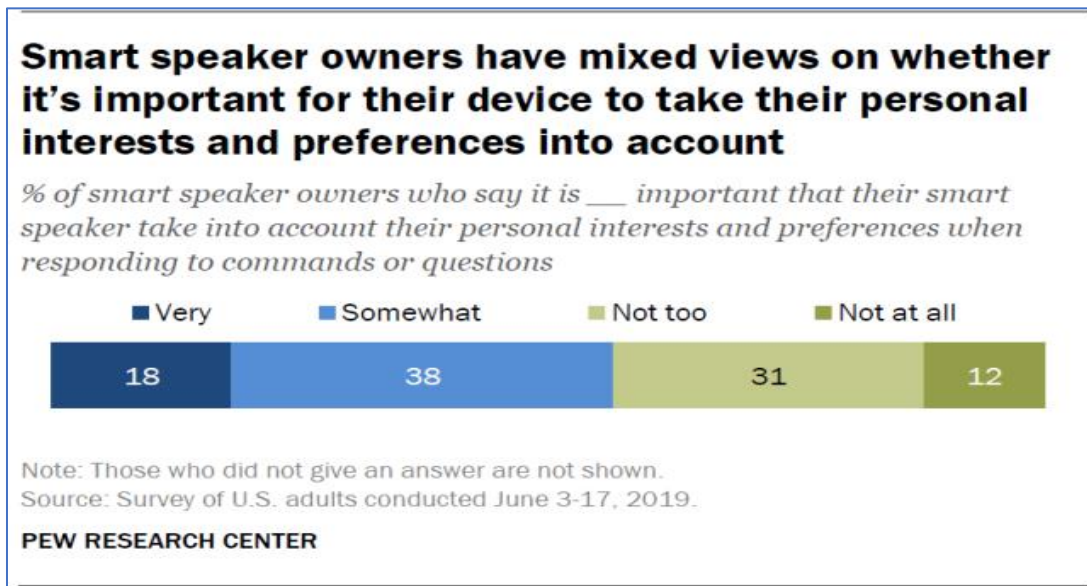


Figure 6– Surveyed consumers worry about sharing too much

Despite concerns, organizations move ahead

Supermarket pharmacies offer voice-enabled support for prescription refills. [Giant Eagle](#) was the first supermarket chain to offer this program (November 2019).²² But even in 2018, it was apparent to experts what was ahead. “Voice assistants have the opportunity to change the pharmaceutical landscape especially in the areas of adherence and distance care,” says Ray Rosti, executive VP, platform activation, Publicis Health Media. “The addition of visual voice devices, such as the Amazon Show and Google Home Hub, creates the opportunity to add a new dimension to education. Pairing these connected devices with scheduled tasks and reminders enables care teams to track the adherence of patients and loved ones.”²³

Boston Children’s Hospital uses voice technology in multiple ways. The hospital then took the technology further to the operating room and the intensive care unit, as well as the hospital rooms of young patients. Doctors are now able to verbally trigger photos to be taken during procedures, such as colonoscopies, and label them as they do their work. ICU nurses also benefit from this technology with the ability to request blood samples and properly categorize them.²⁴

Alexa as a friend and speech therapist? For home-bound individuals, numerous examples about forming a connection to the device were noted in 2017 as part of the Front Porch Amazon “Alexa” Pilot Analysis Report “If you were to take it away, I’d miss it.”²⁵ The technology has been growing in popularity in senior living settings, including Parker at Stonegate Assisted Living in New Jersey. Judy Collett-Miller, Director of Technology Innovation, described a resident with a speech difficulty who talked about using Alexa as a speech therapist: “It makes me enunciate and speak clearly.”

Voice Assistant Types of Interaction

Assistant – let’s talk. While interest is growing, voice assistant usage in a consumer’s day is mostly limited to music, weather, traffic, news and simple fact-oriented Q&A.²⁶ As the Voicebot.ai survey showed, consumers have not yet expressed interest in using voice assistants for any health-related task other than symptoms and health service locations. But with trusted sources like Mayo Clinic or Children’s Hospital, as voice assistants evolve to the next level, users may make more significant use. As health organizations begin to expand the types of voice assistants they offer, interactions will migrate (as they do across other service types, such as checking into hotels and making reservations.) **See Figure 7:**

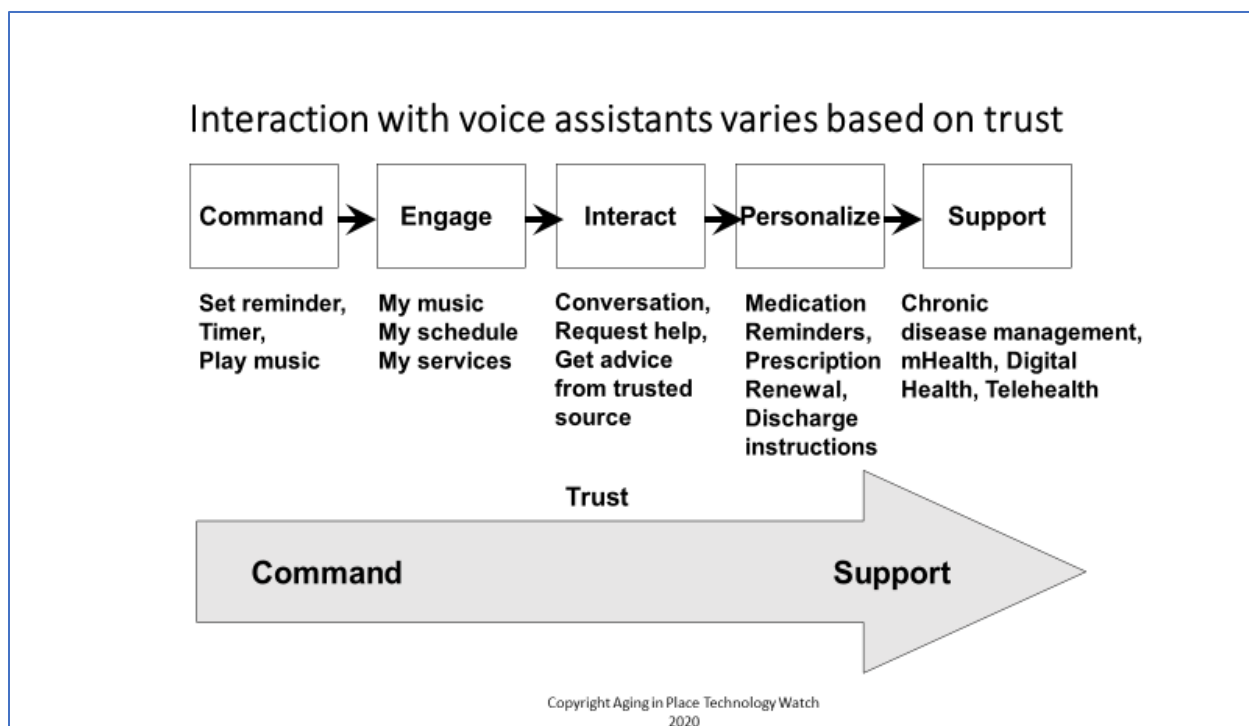


Figure 7 – Interaction with voice assistants will vary based on trust

“Whether for entertainment use or hands-free convenience, even assistive devices such as hearing aids are incorporating voice assistants using platforms from Google, Samsung, and Microsoft.” – Steve Ewell, Executive Director, Consumer Technology Association Foundation

Categories of Voice-Enabled Connected Healthcare

Branded voice and connected care – now and near term. Earlier in 2019, voice technology began to [make it to the bedside in hospital rooms](#) and into other clinical and outpatient settings, particularly those which benefit from hands-free communication. But 2019 was also the year that many more voice assistants were launched. Most of these now and in the near term are branded voice assistants (“Ask Mayo Clinic”) types, though there are also some devices for at-home wellness, patient surveys, and emerging nurse call (pull cord) replacements. Note examples of:

- **Clinical voice assistants.** Originally tried at Children’s Hospital in Boston (it didn’t go that well), more thought is being given to how a voice assistant could and [should function in an operating room](#). And the American College of Cardiology recently published a piece on [possible uses of voice assistants](#), including in the operating room or at point of care to help with diagnosis and treatment plans, or for use in [interventional radiology](#). Following care delivery, organizations can use [Survey by Voice](#), surveys from [SoundMind](#), or [Orbita Voice Surveys](#) to provide a branded survey as a follow-up to care, healthcare interaction or clinic visit.
- **Voice-based patient education.** Mayo Clinic and Boston Children’s hospital lead the way using Voice First tools for patient education. Boston Children’s [introduced KidsMD](#) in 2016, a tool to provide health advice for parents. And Mayo Clinic introduced its [First-Aid skill](#) for Alexa in 2017, available for [Google Assistant in 2019](#). Their future vision, according to Dr. Sandhya Pruthi, includes voice-enabled discharge guidance.
- **Voice enabled hospital rooms.** Other vendors and providers saw the opportunity as well. Orbita launched a bedside voice assistant, [OrbitaASSIST](#), in November, 2019. Cedars Sinai Medical Center in Los Angeles deployed an [Alexa-powered voice Assistant called Aiva](#) that enables patients to “speak requests to nurses, turn on the TV, as well as play games and listen to music in their rooms.” At Thomas Jefferson University Hospital, a patient can ask about lunch and visiting hours. Plans announced at Northwell Hospital included enabling a patient to access their medical record. The sponsor at Northwell, Dr. Vishwanath Anantraman, notes: “Voice tech can help improve service requests and deliver real-time analytics to the staff to ensure patient satisfaction and patient safety.”
- **Physician charting during patient visits.** Charting by voice (and eliminating the need for scribes) is a growing area of innovation with a single exam note, presumably, [able to be completed in 90 seconds.](#) And Unified Physician Management is rolling out a [voice-enabled digital assistant Suki](#) that uses artificial intelligence (AI) to help doctors with medical charting during patient visits. The tool is being rolled out across Unified’s national network of more than 1,500 women’s health care providers in nine states and the District of Columbia.²⁷ Others doing similar: [Sutter Health](#).

- **Filling a prescription.** In late November, [Giant Eagle Pharmacy released](#) its Alexa skill with instructions for use: “Add Giant Eagle Pharmacy skill and link their account. The customer will then be asked to create an Alexa voice profile, if they don’t already have one, and create a personal passcode for an added layer of security and peace of mind. Once set up is complete, a customer can say, ‘Alexa, manage my medication’ to get started setting up their reminders. Alexa will then help the customer review their current prescriptions and set up medication reminders based on when the customer prefers to take each medication. When the reminder goes off, customers can ask, ‘Alexa, what medication am I supposed to take right now?’ In addition, customers can use Alexa to request a refill from their pharmacy by saying, ‘Alexa, refill my prescription.’”

“Pharmacies could engage users more conversationally, answering questions like ‘how many refills are left?’ or ‘is this the generic version?’ – Bill Cava, Co-Founder, [Orbita](#)

- **At home wellness.** More tech firms are offering voice-enabled wellness capabilities focused on patient engagement and reminders – like [Pria](#) or [Pillo Health](#), [ElliQ](#), or [Care.coach](#). Or these offerings could be more customizable, like [LifePod](#) for caregiving or [Orbita Engage](#). Or patients could use **Omron Healthcare’s** blood pressure monitor HeartGuide to track their readings. And multiple offerings are emerging, with [voice health tips](#), to help with [nutrition](#) or to [guide meditation](#).

“For isolated older adults, proactive check-ins and reminders – for example, to eat healthy and have your second cup of black tea – are powerful and help the elderly feel connected and able to get access to online services.” – Stuart Patterson, CEO [LifePod](#)

- **Searching by voice, needing assistance.** In 2018, a survey of 1049 consumers showed that as many as a third were using voice search for specific health-related topics, with younger consumers (32%) making the greatest use (see **Figure 8**). Also notable in that survey, of the 15% who were aged 60+, 71% of them were checking symptoms by voice. As for 2019, according to Voicebot.ai research on use of voice assistants in healthcare, 7.5% of consumers surveyed tried a voice assistant healthcare use case (see **Figure 9**).

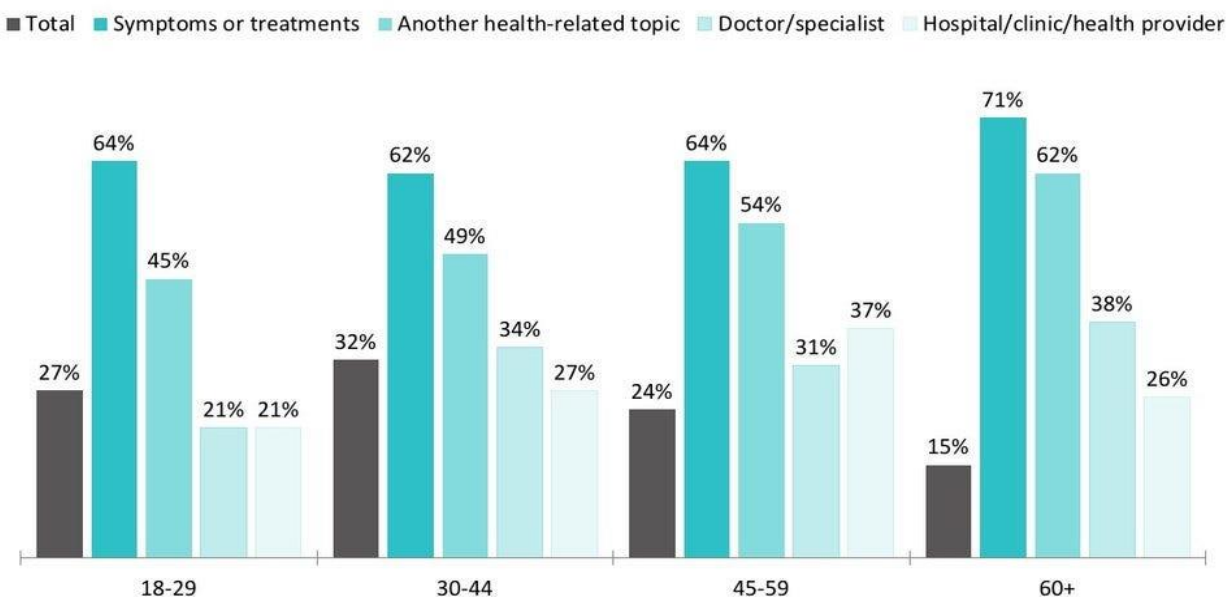
“With natural language, providers can see a way to provide discharge information and answers – potentially avoiding sending a nurse, being proactive, rather than reactive.” – Michael Abcunas, Senior Product Manager, [Stanley Healthcare](#)

- **Voice first skills reproduce wellbeing offerings.** From [breathing](#) to [sounds for meditation and sleep](#); from [Desk yoga](#), to [MyFitnessPal](#); from the [7-minute workout](#) to a stretching [exercise](#) -- if you can find an app for your phone, you’re likely to find a free voice skill, not the least of which includes self-care guidance.

“In our pilots, we let people know about WebMD – and everyone is trying medication reminders and doctors’ appointments.” – Ryan Elza, AARP Foundation

US Health Voice Search, By Age And Topics

Percent of consumers who used voice search in the past six months and percent of consumers who used voice search for each topic



Note: Values do not equal 100% because respondents could select all that apply.
Source: Zion & Zion, n=1,049, 2018

BUSINESS
INSIDER
INTELLIGENCE

Figure 8 Voice Search by Age and Topics (Zion & Zion, 2018)

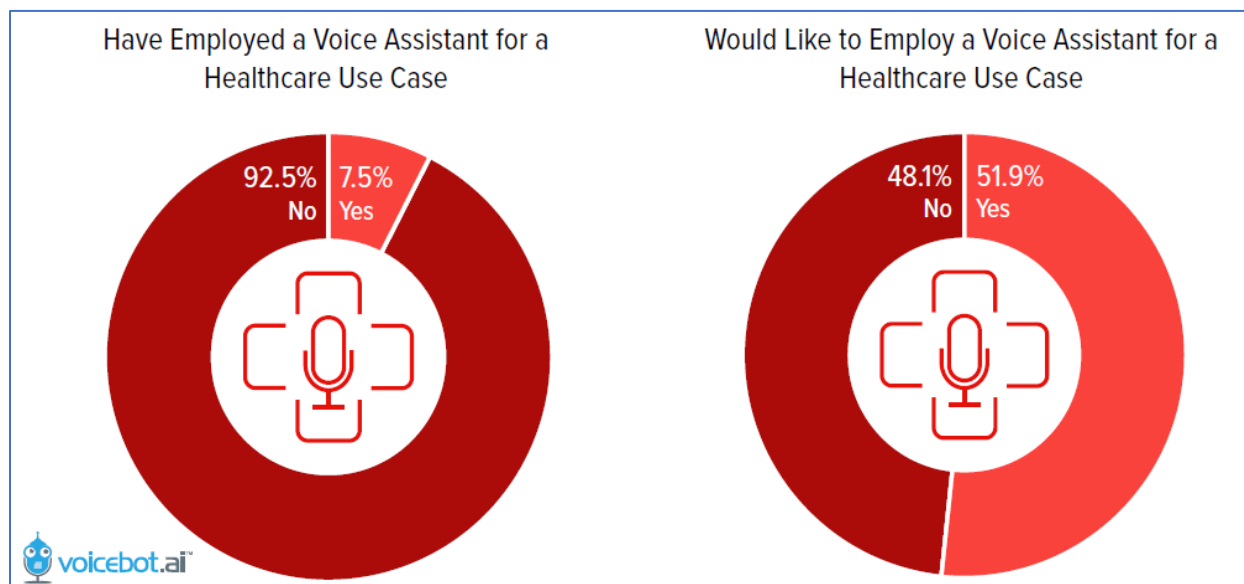


Figure 9 Already used Voice for Healthcare Use Case (voicebot.ai 2019)

Futures

Change is ahead, perhaps sooner than we think. One of the more striking aspects of the flood of Voice First innovations is the near-feverish pace – predictions turn into practice faster than a device can say “Hello.” Below are just a few of the possibilities that by next year at this time will be, so to speak, yesterday’s news. By then, thorny questions about privacy, personalization, and patient-doctor voice communication will be closer to resolution. Perhaps doctors will no longer save notes for evening if they can enter them by speaking during or just after the appointment. And in five years, perhaps scribes will not be required. Other intriguing future changes include:

- **Detecting health conditions by voice.** Healthcare providers are becoming interested in the use of voice technology to provide biomarkers – offering information from the sound of a person’s voice as a health status indicator. Recent studies show ability to recognize severely compromised breathing based on sound.²⁸ Firms like **Beyond Verbal** see themselves in the emotion-detection voice analytics space, looking at the way a person speaks, possibly correlating it with an illness like coronary artery disease, or detecting the sound of an improperly used inhaler. But other companies in the ‘emotion analytics’ segment, including **AudioAnalytic** and **Affectiva** are capable of detecting individual’s emotional status in context – with the goal to “put an emotion chip into everything.” During 2018, Amazon patented a version of its Alexa technology that perhaps could evaluate whether a person is ill (see **Figure 11**).²⁹

“Our voice will become one of our vital signs – and the home is the least invasive location to detect a change in our health status.” – Dr. Teri Fisher, [Voice First Health](#)

- **Who is speaking? Multi-factor voice authentication becomes a reality.** Just as with banking transactions, healthcare providers and patients will want to verify and be verified as the person for whom the information is intended. Verification and HIPAA compliance together will make voice-enabled care plans a reality. Just as with banking transactions, technologists have already begun thinking about the [use of two-factor authentication in healthcare](#). The voice biomarker is ‘the highest common factor’ and the easiest for the user, according to [Douwe Korff](#), of ValidSoft, or as he says, “Just Speak!”

“Voice comes with access management peculiarities that must be addressed – are you alone in a room or with multiple people?” – Jeff Becker, [Forrester Research](#)

Possibility of a healthcare trained voice agent. Early in 2019, Intuition Robotics introduced **PlatformQ** – a platform for ‘proactive goal-oriented agents within specific domains based on context and user learning.’ This is already used in some new cars – capable of proactively taking action to reduce drowsiness or alerting a driver to a potential driving mistake. How might this work in a healthcare context?

Imagine that a theoretical Hip Replacement Recovery Agent is trained by an expert and can participate in proactive dialogue with the post-discharge patient about their compliance with the specific regimen after surgery.” – Dor Skuler, CEO of [Intuition Robotics](#)

- **Standards for voice services interoperability.** Perhaps a user of an Alexa voice assistant might wish to turn on a feature in Google Home. Or data stored in one cloud service might be useful to a user whose data is stored in a different cloud service. To date, that may not be straightforward, but the platform players are beginning to talk among themselves about standards. In September, the [Voice Interoperability Initiative](#) was announced, with the intent of enabling consumers to interact with multiple voice services from a single device. And in mid-December more than 30 companies, including Amazon, Apple, Google, Samsung, and others announced collaborating on a set of smart home standards – part of [Project Connect Home over IP](#). The healthcare industry should look at these efforts as signals for future healthcare voice assistant interoperability.

We are linking our HIPAA-compliant software to EHR systems so that providers and patients can access information by voice.” – Erum Khan, CEO, [Soundmind, Inc.](#)

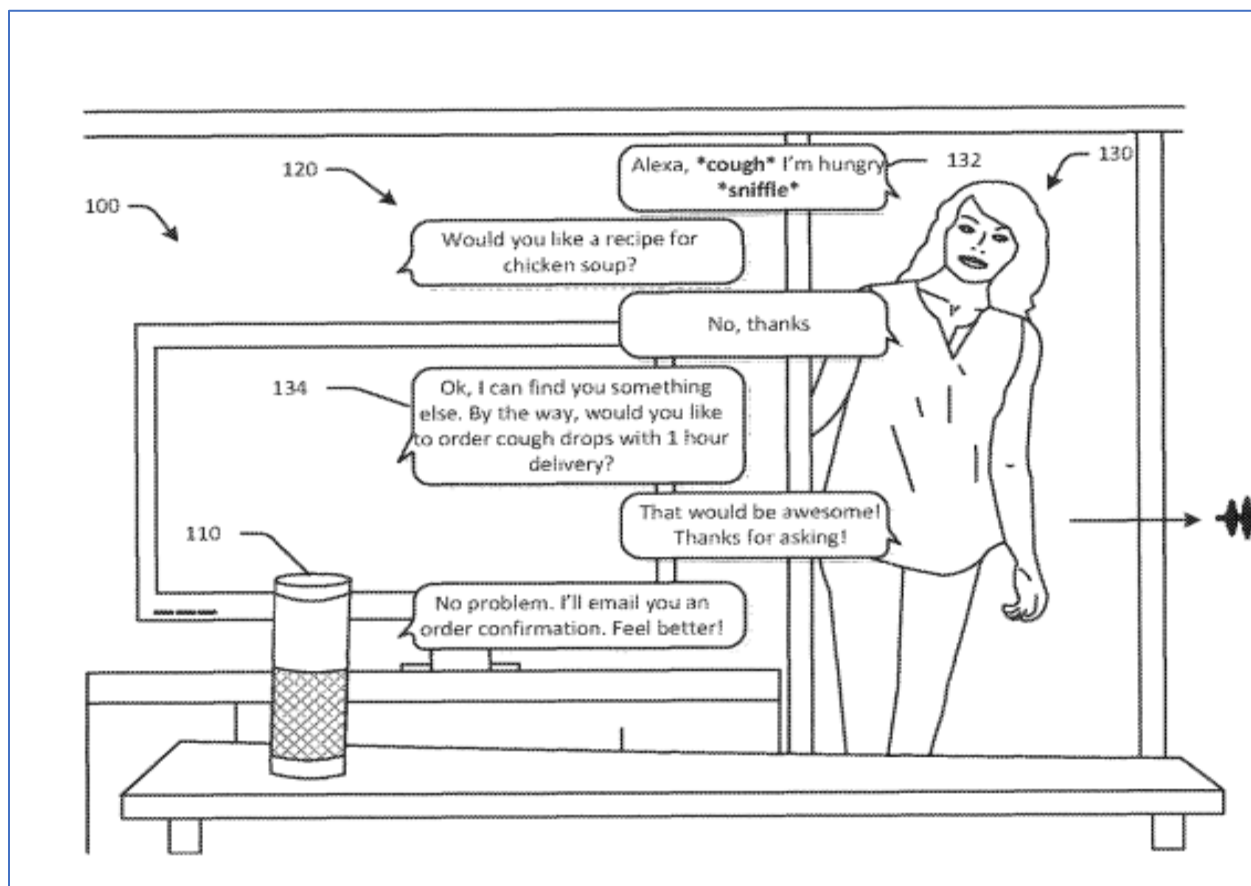


Figure 11 “Would you like cough drops for your cold?” ([Telegraph UK, 2018](#))

Conclusion: From Now to What's Next

Voice technology will be expected as an informational and interactive option along with other media, websites, devices, and apps. Interviewees for this report offered possibilities that they believe will become realities within the next five (or fewer) years (see **Figure 12**). These changes will encompass the user experience, back-end data connections, and the ability of software agents to transcend being ‘assistants’ to becoming agents acting on behalf of individuals, knowing their needs and preferences, increasingly personalized (see **Figure 13**):

From	To
Predominantly English	Multi-lingual, even within a single conversation
Proprietary software	Standards-based interoperability
Transactional, limited Q&A	Contextual, proactive, with qualitative analysis
Disconnected from health data	Integrated with patient care plans, records
Generalized	Personalized
Disease aware skills	Disease specific assistants and agents
Educating the patient	Assessing the patient
Voice assistant	Voice expert agent

Figure 12 Possible changes over the next five years



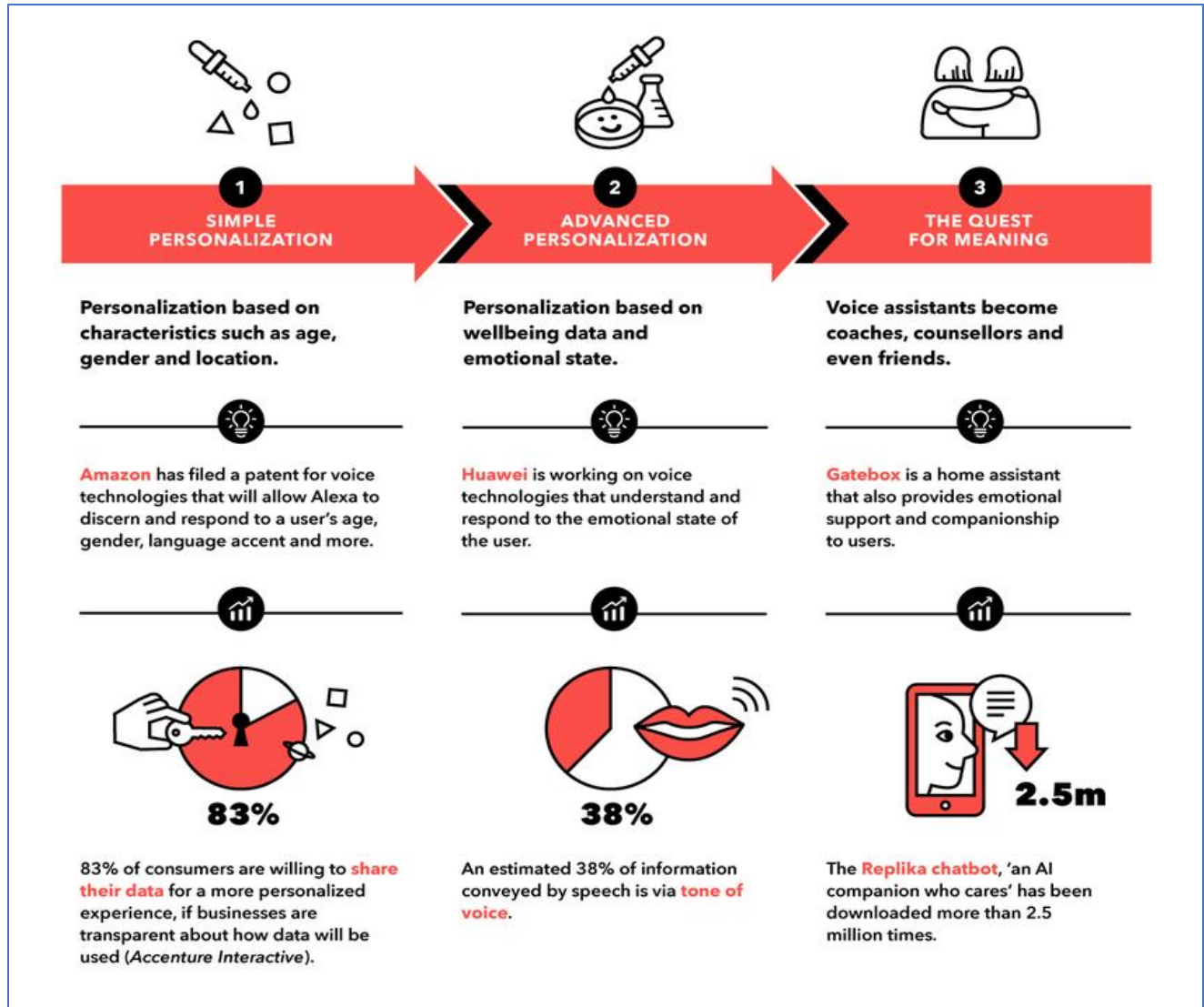


Figure 13 Voice services will be increasingly personalized (Source: David Mattin, TrendWatching, from [World Economic Forum July, 2019](#))

Further Reading

AARP Foundation: Reducing Social Isolation in Affordable Senior Housing using Voice Assistant Technology

Wellpepper: Using Voice Assistants to Deliver Patient Care Outside the Clinic

Forbes Future of Voice

Assessing the Healthcare Readiness of Mainstream Voice Assistants

[The Voice Assistant in Healthcare Report Voicebot.ai 2019](#)

Future of Voice First Technology and Older Adults 2018

Front Porch: Amazon Alexa Pilot Report 2017

Interviewees for this report were from:

AARP Foundation

Forrester Research

CTA Foundation

Intuition Robotics

Dr. Teri Fisher

Front Porch

Handsfree Health

Comcast Health

LifePod

Sensely

Mayo Clinic

MobileHelp

Parker Healthcare Group, Inc.

Providence Digital Innovations Group

Orbita

SoundMind

Stanley Healthcare

Voicebot.Ai

Wingate Healthcare

Voice of Healthcare

Google

Appendix A: Sampling of Scenarios

Providence Health: Meet the patient where they are

“For the past year and a half, Dr. Matthew Fradkin, a pediatrician with Swedish Medical Group in Seattle, has been using Saykara, a virtual assistant that “listens” in the background during patient visits and automatically documents notes in the electronic health record system. He began using the app as part of a pilot project with Swedish Medical’s parent organization, Renton, Wash.-based Providence St. Joseph Health, to help address provider burnout, but since then, he’s continued to use it.”

“Consider hands free during surgery, pulling up medical records. But also care navigation – consider the location of the patient, time of day, profile, symptoms and condition – to offer the best modality of care.” – Maryam Gholami, [Providence Health](#)

Scenario: Ask NHS -- mobile app, using Sensely

A virtual healthcare assistant, Olivia, asks a series of questions to assess a patient’s symptoms in a clinically safe way. Olivia will then recommend the most appropriate care for them. This might be self-care advice via www.nhs.uk, a GP appointment, GP call back or direct them to urgent or emergency care. For patients who need to see a GP, the app can prioritize patients into the most appropriate appointment slots based on their needs. Patients can directly book an urgent or routine appointment without having to call the practice.

“We have our own NLP processing engine – based on content from our symptom triage providers, including symptom checkers and self-care library.” – Joseph Tyler, [Sensely](#)

Scenario: Help a care recipient be more self-sufficient

“Gloria is originally from Jamaica and lives independently. Her two sons live in the area and look in on her regularly. She has a green thumb and is passionate about tending to her plants. She depends on LifePod to keep her on track with medications and appointments”.

“We talk...I look forward to hear her (LifePod) wake me up. When I hear the signal, I’m coming out. I’m not missing anything.” – Stuart Patterson, [LifePod](#)

Scenario – Speech Therapy for Children with Cerebral Palsy

Keck School of Body Computing Voice Assistants for All (2018)

The winning concept has patients choose their own adventure experience using an engaging mythical and magical world of gamification exercises that incorporate loudness, pitch, duration and phrases and speech. The team wowed the judges with their integration of Voice Assist technology as well as entertainment and storytelling to address a critical therapeutic need for this population. And while this idea was focused on speech therapy for children, Laine explained that using interactive gamification and storytelling for health and therapeutic needs applies to all age groups.

Scenario: Taking stress off nurses

John Kravitz, CIO of Geisinger Health System, [believes](#) that “voice is one of those areas where, in our hospital setting, we want to have the ability and hopefully take some of the stress off our nurses, where a patient can speak to an Alexa or Google Home type voice- enabled device. Nurses should and be able to interact with the devices and hopefully be able to serve our customer population more effectively.”

Scenario: Find urgent care

North Carolina based Atrium Health’s [Alexa pilot](#) is using voice recognition to help customers identify a nearby urgent care center and get a same day appointment. This will significantly improve access and drive consumer satisfaction, not to mention the bottom-line impact from increased revenues for the health system.

About the Author

Laurie M. Orlov, a tech industry veteran, writer, speaker and elder care advocate, is the founder of [Aging in Place Technology Watch](http://ageinplacetech.com), a market research consultancy that provides thought leadership, analysis and guidance about technologies and related services that enable boomers and seniors to remain longer in their home of choice. In addition to her technology background and years as a technology industry analyst, Laurie was a certified long-term care ombudsman and received a graduate certificate in geriatric care management from the University of Florida.

In her previous career in the technology industry, Laurie held senior positions in IT organizations, followed by 9 years as a leading industry analyst at Forrester Research. While there, she was often the first in the industry to identify technology trends and management strategies. She has spoken regularly and delivered keynote speeches at forums, industry consortia, conferences, and symposia, most recently on the business of technology for boomers and seniors. She advises large organizations as well as non-profits and entrepreneurs about trends and opportunities in the age-related technology market and was a participating expert on the Think Tank for The Philips Center for Health and Well-Being, as well as testifying before the US Senate on the role of technology for older adults. Her perspectives have been quoted in Business Week, Forbes, Kiplinger, the New York Times, the Wall Street Journal, California Healthline and the Palm Beach Post. She has a graduate certificate in Geriatric Care Management from the University of Florida and a BA in Music from the University of Rochester. Her other recent reports are the 2018 **Future of Voice First Technology and Older Adults** and the 2019 **Market Overview of Technology for Aging in Place**.

Endnotes

- ¹ <https://www.cbinsights.com/research/facebook-amazon-microsoft-google-apple-voice/>
- ² <https://midlothianweb.com/history-of-web-browsers/>
- ³ <https://www.brafton.com/blog/seo/8-voice-search-statistics-in-2019-and-why-they-matter/>
- ⁴ <https://www.ageinplacetech.com/page/future-voice-first-technology-and-older-adults-2018>
- ⁵ <https://www.abc-7.com/story/41405371/older-generations-more-likely-to-use-voice-search-suggesting-a-solution-to-generational-digital-divide>
- ⁶ <https://finance.yahoo.com/news/rock-health-fund-survey-health-data-google-155439629.html>
- ⁷ <https://medtechboston.medstro.com/blog/2019/03/01/assessing-the-healthcare-readiness-of-mainstream-voice-assistants/>
- ⁸ <https://voicebot.ai/2018/07/17/the-story-behind-boston-childrens-hospital-kidsmd-alexa-skill/>
- ⁹ <https://www.mobihealthnews.com/content/amazon-alexa-celebrates-hipaa-compliant-data-transfer-six-new-healthcare-skills>
- ¹⁰ <https://www.ageinplacetech.com/blog/voice-first-senior-living-whats-happened-and-whats-next>
- ¹¹ <https://www.cnn.com/2019/06/19/google-assistant-beats-alexa-and-siri-at-recognizing-medications.html>
- ¹² <https://www.beckershospitalreview.com/healthcare-information-technology/amazon-moves-into-healthcare-a-2018-timeline.html>
- ¹³ <https://www.forbes.com/sites/robertpearl/2019/07/08/physician-burnout-1/#5e629f4119e8>
- ¹⁴ <https://www.aafp.org/media-center/kits/aafp-sustains-fight-to-reduce-administrative-burden-for-family-medicine.html>
- ¹⁵ <http://www.annfammed.org/content/15/5/419.long>
- ¹⁶ <https://www.statnews.com/2016/04/25/scribes-emergency-room/>
- ¹⁷ <https://www.statnews.com/2019/08/07/scribes-transform-health-care-structured-data/>
- ¹⁸ <https://resources.suki.ai/in-the-news/suki-partners-with-google-cloud>
- ¹⁹ <https://www.modernhealthcare.com/operations/amazon-launches-medical-transcription-service>
<https://www.beckershospitalreview.com/healthcare-information-technology/amazon-moves-into-healthcare-a-2018-timeline.html>
- ²⁰ <https://www.healthcarediver.com/news/google-seeking-talent-in-voice-tech-to-improve-doctor-patient-experience/525757/>
- ²¹ <https://www.capgemini.com/wp-content/uploads/2019/09/Report-%E2%80%93-93-Conversational-Interfaces-Web-Final.pdf>
- ²² <https://www.healthpopuli.com/2019/12/09/food-as-medicine-grocery-stores-expand-as-health-destinations-while-the-federal-government-cuts-food-stamps/>
- ²³ <https://www.pharmavoice.com/article/2018-11-voice-assistants/>
- ²⁴ <https://www.omnicomhealthgroup.com/pdfs/VoiceRecognitioninHealthcare.pdf>
- ²⁵ <http://fpciw.org/wp-content/uploads/sites/15/2017/12/FINAL-DRAFT-Amazon-Alexa-Analysis-Report.pdf>
- ²⁶ <https://www.wsj.com/articles/why-you-cant-have-a-decent-conversation-with-your-voice-assistant-yet-11576418400>
- ²⁷ <https://www.fiercehealthcare.com/tech/healthcare-network-rolls-out-voice-enabled-digital-assistant-across-1-500-practices>
- ²⁸ <https://www.nature.com/articles/s41746-019-0128-7>
- ²⁹ <https://arstechnica.com/gadgets/2018/10/amazon-patents-alexa-tech-to-tell-if-youre-sick-depressed-and-sell-you-meds/>