Setting Realistic Expectations for 5G in Healthcare

5G has a place at the table in supporting critical patient communications, but mostly for niche use cases at this time

Much has been made of 5G's entrance into the healthcare industry. Some proponents predicted 5G would be mainstream by 2020, while others touted that the latest technology standard for broadband cellular networks would expand the capabilities of such technologies as telehealth, remote patient monitoring, augmented reality and virtual reality. Thus far, two camps have emerged: one claiming that 5G is poised to be the network of the future, with the industry transitioning to a predominantly mobile-based platform, and the second claiming that 5G is an augmentation to a broader communication strategy. The truth is somewhere on the continuum between these two schools of thought, but likely closer to the latter.

HIMSS Market Insights conducted research in April 2021 among medical IT practitioner leaders to determine how 5G can help support remote patient care outside of a hospital setting.[1] The research explored current technology concerns and how they are being addressed, the most critical forms of communication in providing patient care, improvements expected or seen while using 5G and how 5G can optimize remote patient care.

5G's rank among critical communication platforms

According to HIMSS Market Insights research, 4 in 10 respondents consider 5G a critical form of communication in providing patient care (Figure 1). According to Robert Havasy, Senior Director, Connected Health at HIMSS and the Managing Director of the Personal Connected Health Alliance, the data demonstrates that more than 60% of the healthcare delivery for an organization happens inside a single building or on a single campus that can share a Wi-Fi, voice or Ethernet network. "Much of it [care delivery] can still happen within the contiguous walls of a facility or a campus where Wi-Fi, voice and Ethernet rule, and a lot of it still doesn't require that kind of cross-border… mobility," he explained. In other words, most care is being delivered via apps running on Wi-Fi, care teams communicating in near real-time via phones, and machines and fixed devices plugged into ports in the wall powered by a strong network. However, healthcare organizations do require mobility in communications when care teams cross networking boundaries outside of the main facility.

No critical communication platform was without drawbacks, according to survey respondents. Although Wi-Fi (85%) is the topmost critical form of communication to providing patient care, it also leads in challenges and concerns when it comes to security, latency and bandwidth (Figure 2). Voice (67%) is the second most critical form, although its quality of service was a considerably bigger challenge when compared to all other forms, especially in multi-hospital systems (65%) or IDNs (55%) (Figure 3).

Despite the shortcomings of other communication platforms, Havasy doesn't see 5G displacing Wi-Fi within a hospital setting for most non-critical communications. "Wi-Fi is good enough, it's everywhere and everybody knows how to run it," he pointed out. In addition, Wi-Fi and Ethernet, which are ubiquitous and therefore cost-effective and easier to manage than 5G, are getting faster and will continue to evolve. "If you asked me in years past, I'd say never bet against Ethernet. The same is likely true for Wi-Fi," he said.

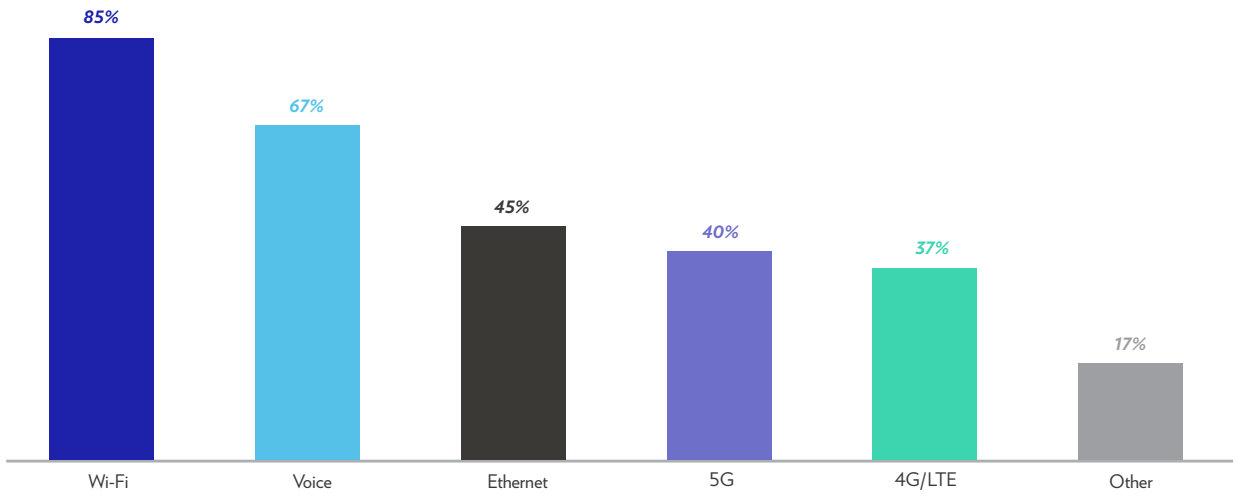
Cellular mobile conundrum: convenient and easy to use, but complex and expensive

Despite all the fanfare around 5G, Havasy emphasized that the industry should not be focusing solely on the latest generation technology standard. "Whether it's 4G LTE or 5G – for most applications, the extra speed and lower latency don't really matter that much – the real question is: Is there a place for cellular-based mobile communications, as opposed to fixed or more-or-less fixed kinds of wireless systems?" he asked.

Hands down, cellular mobile trumps Wi-Fi in the areas of convenience and ease of use. Healthcare workers can continue working on their devices in their house, car, hospital and in transit without changing networks or dropping connections. "And that's where it matters – if your workforce crosses the boundaries of your network, if they leave the area that you have defined for Wi-Fi coverage. If they want to continue having a seamless experience, cellular mobile is the only technology in town – whether it's 4G, 5G or whatever comes after this. That's where it wins and that's why people love it," said Havasy.

Figure 1. 40% consider 5G a critical main form of communication in providing patient care

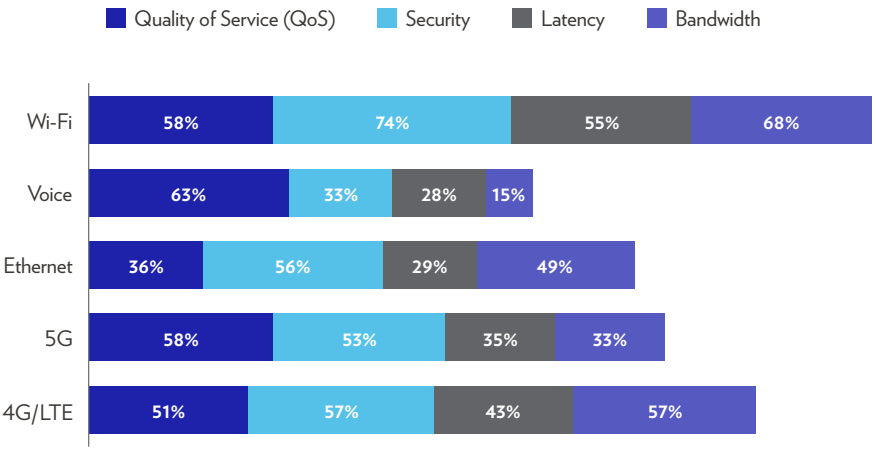
What are the main forms of communication you consider most critical to providing patient care?



Base: Total respondents; n=100

Figure 2. Though Wi-Fi is the top most critical form of communication to providing patient care, it also leads for top challenges and concerns when it comes to security, latency and bandwidth

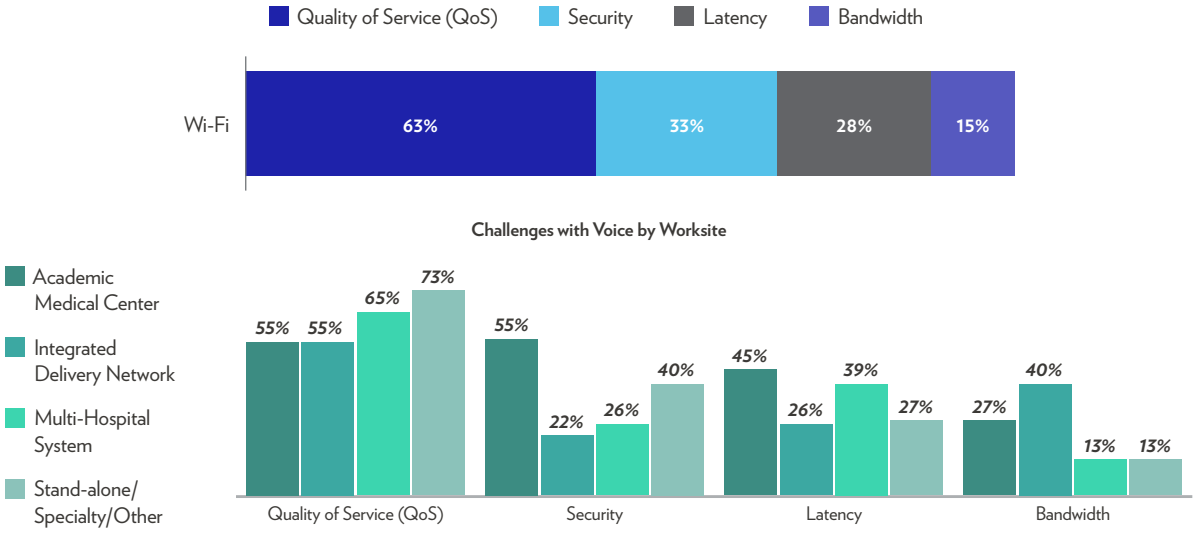
What are the biggest challenges or concerns associated with these technologies?



And, what are the biggest challenges or concerns associated with these technologies:
Base: Consider Voice most critical to providing patient care; n=67
Base: Consider 5G most critical to providing patient care; n=40
Base: Consider Wi-Fi most critical to providing patient care; n=85
Base: Consider 4G/LTE most critical to providing patient care; n=37
Base: Consider Ethernet most critical to providing patient care; n=45

Figure 3. Although Voice is the 2nd most critical form, Quality of Service was a considerably bigger challenge when compared to all forms, especially among those in a multi-hospital system or IDNs

What are the biggest challenges or concerns associated with these technologies?



Base: Consider Voice most critical to providing patient care; n=67

"Whether it's 4G LTE or 5G – for most applications, the extra speed and lower latency don't really matter that much – the real question is: Is there a place for cellular-based mobile communications, as opposed to fixed or more-or-less fixed kinds of wireless systems?"

ROBERT HAVASY | Senior Director, Connected Health | HIMSS
| Managing Director | Personal Connected Health Alliance

For applications that require clinician mobility, 5G is really the only option, although it will likely require healthcare organizations to deploy new infrastructure within their four walls. These use cases need to be mission critical for healthcare organizations to justify the complexity and expense of running a 5G network. In order to get more healthcare organizations on board, however, the industry will need to address payment strategies. While payment for Wi-Fi networking connectivity is usually a single fee, cellular devices each have a separate connection and thus require separate payments. This means costs will scale quickly for a large healthcare organization equipping each of its hundreds of nurses and physicians with a device. "For 5G to become ubiquitous, carriers have to come up with enterprise pricing plans that allow a number of different SIM cards to share pools of data and subscription fees for each device," Havasy explained. In addition, the future of 5G hinges on transforming current business processes by developing a way to manage all the SIM cards and devices in a healthcare organization under a subscription that addresses its disadvantages: cost and complexity.

Identifying 5G use cases

Of the survey respondents who plan to migrate to 5G, the top three drivers in that decision are keeping up to date with technology, increasing speed and supporting medical devices (Figure 4). In recent years, healthcare organizations spent their IT budgets on technologies such as telephony, communications and analytics. But COVID-19 has put those investments on hold for two years. "Most hospitals are looking at a substantial backlog of IT investment that they want to get through before they really take the plunge on a new technology that's marginally better but doesn't have a killer application yet," Havasy said. He doesn't see these deferred investments taking a backseat to brand new technology, 5G included.

Of course, healthcare organizations should identify their own needs and the use cases that can address those pain points. But that begs the question: is there a need for 5G in hospitals? As many patients have already attested, telehealth visits don't require a 5G connection to deliver a high-quality experience for both patient and clinician, although survey respondents have seen or expect to see improvements in better telehealth experiences (Figure 5). Most hospital operations are not dependent on high speed, Havasy argued. "I don't think anyone yet is going to say I'm going to rip and replace every other network and just go 5G, when they don't know whether they have sufficient need for mobility," he noted.

Still, 5G is an ideal communications platform when systems need to communicate with each other in near real-time for rapid autonomous decision-making. High-profile examples include the U.S. military's use of 5G for robotic surgery or robotic casualty retrieval on the battlefield, which requires very low latency and very high-speed communications.[2]

Nearly 6 in 10 survey respondents believe 5G will have a positive impact on AI (Figure 6). Different AI-enabled systems can interact with one another without going through a facility's centralized hub, Havasy pointed out, so distributed AI can benefit from 5G mobile. As noted earlier, 5G's low-latency, high-speed connection capabilities at the edge of the network also support AI's requirement of delivering near real-time decision-making.

Havasy emphasized that there is a marked difference in the type of communications platform required, for example, for AI algorithms that are looking for sepsis among a hospital's patients in an EHR system. If EHR systems, bedside monitors

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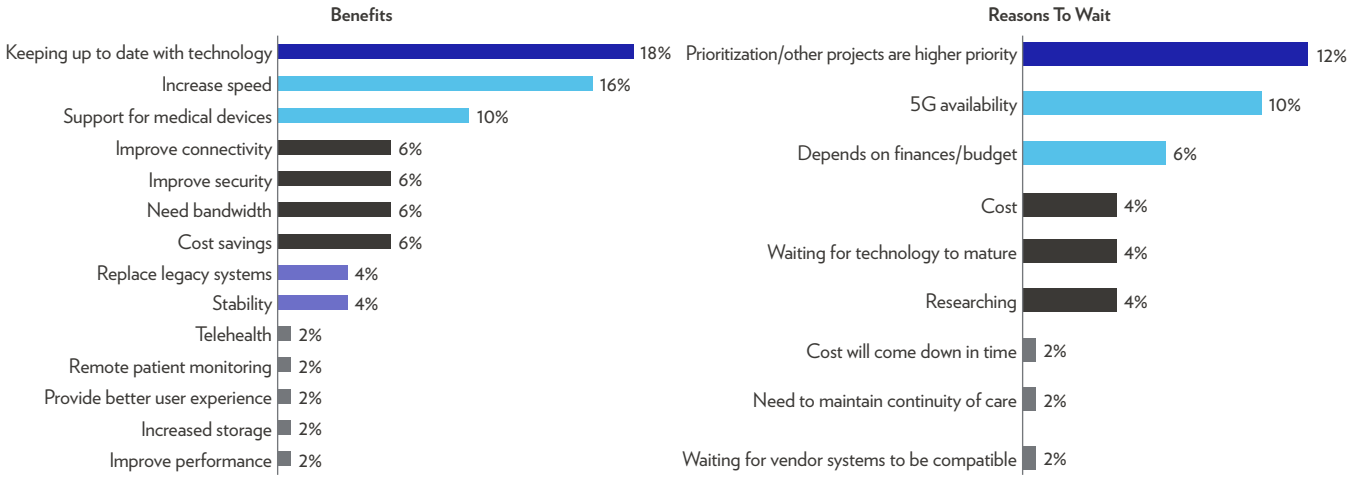
Figure 4. Of those that plan to migrate to 5G, the top drivers in that decision include keeping up to date with technology, increasing speed and supporting medical devices

Organizations have a variety of reasons when they deploy different technologies. Please tell us more about your organization's decision to...

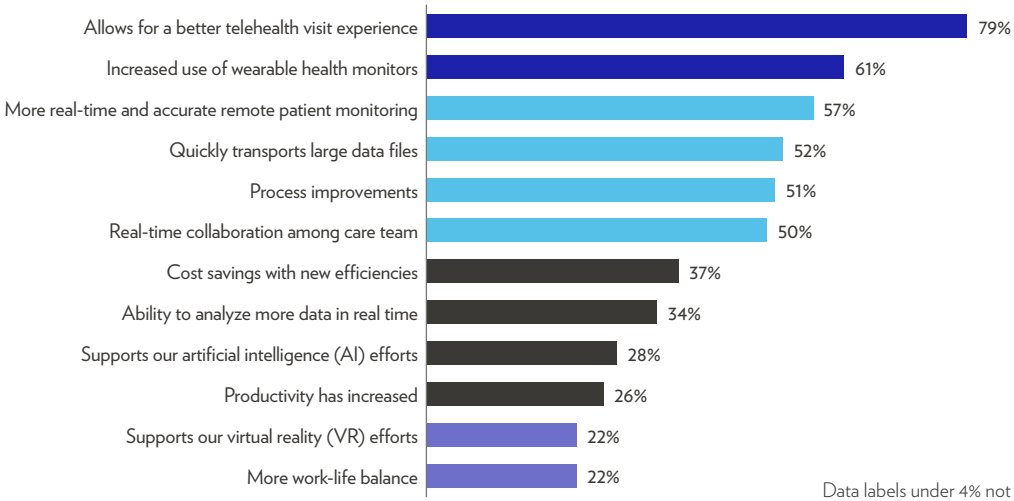


Note: Responses were spread fairly evenly across the timeframes of migration plans, for those that had a reason to wait.

Base: Plan to Migrate; n=49

Figure 5. Nearly 8 in 10 have seen, or expect to see, improvements related to using 5G, with top improvements including a better telehealth experience and increased use of wearable health monitors

Which, if any, of the following improvements have you seen/would you expect to see while using the 5G network?

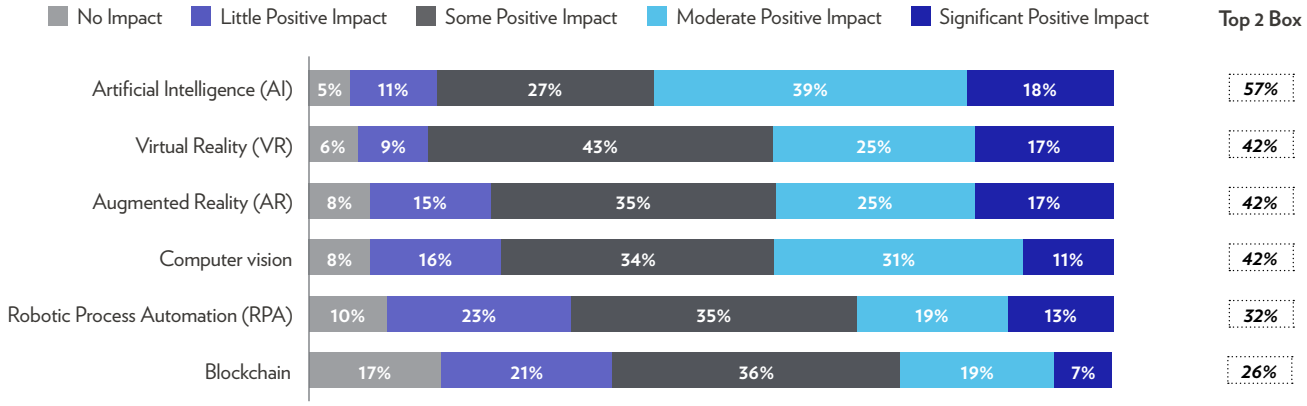


Data labels under 4% not shown

Base: Total Respondents; n=100

Figure 6. Nearly 6 in 10 believe that 5G will have a positive impact on AI

In thinking of advanced technology, please tell us the level of impact 5G will have on each of the following:



Base: Total Respondents; n=96

and other devices are plugged into the wall and connected to the core, likely all in the same building, Havasy asks: "Why would you need mobile for that [use case] when the cables already exist?"

Delivering clinician mobility

5G can make a significant difference in relieving clinician burnout, already a serious issue in healthcare that was further exacerbated by the pandemic. "Clinicians' lives would be easier if they had one thing that just connects everywhere," he said. "Even that slight increase in convenience carries extra weight, given the situation we're in with clinicians who survived COVID-19 and are not going to put up with bad work environments for much longer."

In addition, the rise of direct-to-consumer telemedicine has made mobility a requirement for clinicians, who throughout the day may be in their office (where they have Ethernet and Wi-Fi), in their homes or in transit. Independent physicians may decide that they can conduct business easily by blending personal and business phone lines. Still, Havasy insisted, "I think we're going to have to go through a broader restructuring of how healthcare works before 5G technology itself really begins to drive that change or become useful."

In search of 5G's 'killer app'

Ultimately, "all new technologies need to find their 'killer app' that makes the world see their value," Havasy said. The spreadsheet was the killer app for the business PC, SMS (texting) for cellphone and bitcoin/virtual currencies for blockchain. 5G is in a similar situation. "5G is just one flavor of wireless mobile technology. It happens to be the shiny new object looking for its 'killer app.' But other wireless mobile technologies like Wi-Fi are still viable and not static. "[Wi-Fi]'s catching up," he warned. Until 5G finds its killer app, its promised ubiquity and benefits may not be fully realized.

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> ROBERT HAVASY

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2. Cox, M. May 14, 2018. *Army Medicine Embracing Robot Surgery, Other High-Tech Procedures*. Military.com. https://www.military.com/defensetech/2018/05/14/army-medicine-embracing-robot-surgery-other-high-tech-procedures.html