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Mission of the *Academy Journal*

As the official journal of the AIA Academy of Architecture for Health (AAH), this publication explores subjects of interest to AAH members and others involved in the fields of health care architecture, planning, design, and construction. The goal is to promote awareness, educational exchange, and advancement of the overall project delivery process, building products, and medical progress that affect all involved in those fields.

About AAH

AAH is one of 21 member communities of The American Institute of Architects (AIA). AAH is unique in the depth of its collaboration with professionals from all sectors of the health care community, including physicians, nurses, hospital administrators, facility planners, engineers, managers, health care educators, industry and government representatives, product manufacturers, health care contractors, specialty subcontractors, allied design professionals, and health care consultants.

AAH currently consists of approximately 7,000 members. Its mission is to provide knowledge which supports the design of healthy environments by creating education and networking opportunities for members of – and those touched by – the healthcare architectural profession.

Please visit our website at aia.org/aah for more about our activities. Please direct any inquiries to aah@aia.org.

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About the journal

As we start the 23rd year of the Academy Journal, published by the AAH Knowledge Community, this edition includes articles that support the enhancement of the built environment for health care. As the official publication of the Academy, the Journal publishes articles of particular interest to AIA members and the public involved in the fields of health care architecture, planning, design, research, and construction. The goal has always been to expand and promote awareness, educational exchange, and advancement of the overall project delivery process, building products, and medical progress that affects all involved in those fields.

Articles are submitted to, and reviewed by, an experienced, nationally diverse editorial review committee (ERC) of medical and architectural professionals. Over the years, the committee has reviewed hundreds of submissions, responded to writers' inquiries, and encouraged and assisted writers in achieving publication. In its over 20-year history, the Journal has provided valuable opportunities for new and seasoned authors from the architecture and health care professions, including architects, physicians, nurses, other health care providers, academics, research scientists, and students from the US and foreign countries.

Published articles have explored a broad range of medical topics, including research trends, the future of health care architecture, cardiac care, future and evolving technology, patient rooms and patient safety, lighting design for health care, psychology, workplace design, cancer care environments, emergency care, women's and children's care, and various health care project delivery methods.

We encourage graduates who have received health care research scholarships and others involved with research within the health care architecture field to submit their research to the Journal for publication consideration. We will continue to develop a cross-referenced article index and a broader base of writers and readers. The deadline for the 2021 call for papers is May 27, 2021.

Since the late 1990s, this free publication has expanded to include worldwide distribution. And we are proud to report that as our readership continues to grow, it also expands internationally. Readers have viewed the Journal online from the US, Canada, Europe, the Caribbean, Asia, Africa, India, and Saudi Arabia, just to name a few. The Journal is available to the 94,000 AIA members and the public on the AIA website at aia.org/aah.

Special thanks to AIA for its continued support and hard-working staff and to the many volunteers who have contributed to our growing and continued success including Doug Paul and Southern Ellis for their leadership on behalf of the AIA and AAH. I would especially like to thank the other members of the 2020 ERC: Donald L. Myers, AIA, NCARB; Angela Mazzi, AIA, ACHA, EDAC; Sharon Woodworth, FAIA, FACHA; Dale A. Anderson, AIA, NCARB, LEED AP BD+C, CSBA, EDAC, MBA, GGP, ACHA; and Erin Mcnamara, EDAC. As always, we appreciate your feedback, comments and suggestions by emailing aah@aia.org.

Letter from the editor

2020 has been a difficult year.

The COVID-19 global pandemic has impacted our lives in a profound way. Collectively, people have gained a new appreciation for the power of a virus and its potential impact to our hospitals, economy, and social networks. Our friends and colleagues in healthcare have been tested in a manner that will have meaningful consequences on the industry and what it means to dedicate one's life to care for another. Many of us have waited on news from scientists, cheered for progress, and followed FDA trials with great anticipation and awareness for the enormity of the pursuit. Never have I felt so appreciative of the people, networks, supply chains, and infrastructure that support our healthcare system.

As this journal goes to print, the dealth toll, in the United States, for COVID-19 stands around 300,000 and the first vials of vaccine are being administered to people on the frontline. There is great hope that we are at the beginning of the end of this saga, but still reeling from the exposed vulnerabilities to both the healthcare industry and society at large. We have learned so much and yet there is so much left to understand about the last ten months.

I look to 2021 and the years to follow as an opportunity to both celebrate our successes and learn from our missteps so that we are better and more prepared for future generations of frontline workers, patients in need, and vital equipment suppliers. There is great promise at the juncture between healthcare, design, and research. I applaud Orlando Maione for his vision to foster this journal and thank him for his many years of leadership and service as The Academy Journal Editor. We close out this year with an appreciation for the work accomplished and excitement for what is to come. I look forward to exploring with and learning from you in the years to come.

Cheers to a happy new year.

Regan Henry, RA, PhD, LEED AP, LSSBB
Editor, *Academy Journal*

Telehealth and the changing shape of health spaces

Sean Cottengim/GBBN Architects

INTRODUCTION

The quarantine of early 2020 is accelerating changes taking place within the American health care system. With stay-at-home orders and limits on elective and nonurgent surgeries forcing a much wider-spread adoption of telehealth practices, now is the time to ask how the rise of telehealth will impact the spaces in which we seek health services. And in considering this question, we need to think beyond the clinic. Of course, telehealth will change the demands that we put on clinical spaces, but they will also see us seeking health services in spaces—spaces we live and work in—that we generally understand to be separate from health care spaces.

This article will outline how telehealth specifically demonstrates a basis for speculating about possible futures and exploring the kinds of experiences we should expect to design in our built environments. More specifically, this article intends to illuminate the possible effect of existing and developing technologies on how and where health care is delivered, not to prescribe specific design solutions. Designers are responsible for imagining the impact of such developments for the purposes of updating their processes for the benefit of the client and society; this article seeks to prepare the ground for future design work

What is telehealth?

Telehealth can be defined several ways, but importantly it allows people to connect with a physician or other care provider using telecommunication devices that are common—eliminating the need to attend an in-office visit. There have been distinctions made between telehealth and telemedicine, but for our purposes the distinction is not important. Using the World Health Organization's list of "Elements germane to telemedicine," we can better understand the broad scope of what telehealth is:

- Its purpose is to provide clinical support.
- It is intended to overcome geographical barriers, connecting users who are not in the same physical location.
- It involves the use of various types of information and communication technologies (ICT).
- Its goal is to improve health outcomes (World Health Organization, 2010).

Telehealth refers to a broad range of health services, from simple phone access to health education or sending messages to your doctor to more sophisticated practices like a face-to-face conversation with your physician via a mobile device, which might also involve remote diagnostics monitoring. Some of these options are already integrated into digital platforms that house a patient's electronic health records, though the adaption of this kind of technology is uneven. It is worth noting that telecommunication technology changing access to and delivery of health care has existed, rhetorically, since 1876 when Alexander Graham Bell patented the telephone and, more realistically, as far back as 1924 when Radio News magazine depicted a "radio doctor" on its cover (Field, 1996).

Changes in the occurrence of telehealth

Several leading health systems have shown a significant increase in telehealth appointments. Many indicators have shown an exponential growth of telehealth during the quarantine.

While only 24% of organizations had an existing virtual care program by January 2020, reports indicate that telehealth visits will likely reach 1 billion by the end of the year (Forrester, 2020). The repercussions of this kind of growth will be with us for years.

Cleveland Clinic logged more than 60,000 virtual visits in March. That's a 1,700% increase from the previous month. And one study found that more than two-thirds of respondents said the pandemic has increased their willingness to try virtual care (Siwicki, 2020). At the end of March, Stanford Medicine reported incredible growth of virtual health. "At 3,000 per day, televisits now make up 40% of all clinical visits at Stanford Health Care, 50 times higher than prior months. The all-time daily televisit high for Stanford Children's Health, before COVID-19 hit California, was 35; recently, clinicians conducted 500 in one day" (Stanford Medicine, 2020).

Willingness to adopt telehealth as a valid form of interaction is up as well. Even prior to the events of the COVID-19 pandemic, the Telehealth Index Consumer Survey reports that 66% of Americans were willing to use telehealth. And even seniors are on board, not just tech-savvy millennials (Amwell, 2019). It seems likely that comfort with—and patient willingness to adopt—telehealth will only grow as more and more people gain experience with it.
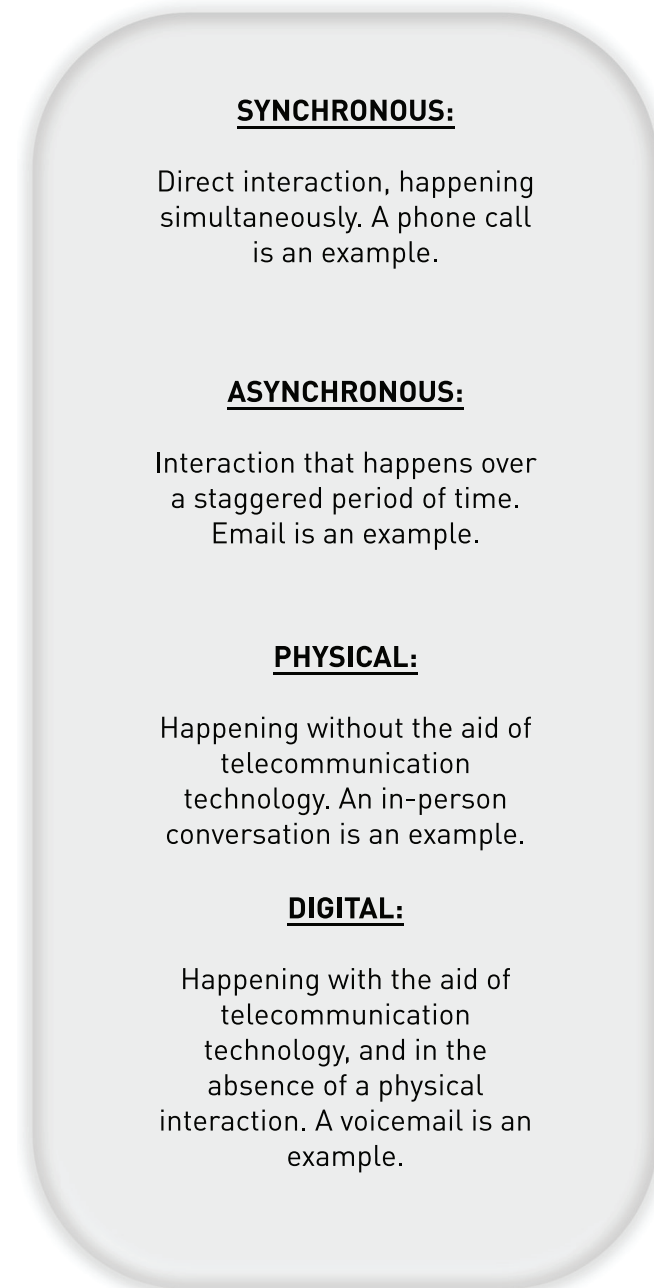
What might the research suggest?

The possibilities for telehealth and its technological successors to provide new ways to make connections between provider and patient raises new questions about the future landscape of health spaces. It is worth categorizing these types of interactions to organize our thinking on the types of spaces we may begin to include as "health" spaces.

For my purposes, I can set aside the finer points of what constitutes telehealth vs. telemedicine. What's important is the broader context of how telehealth provides care—or, even more broadly, how can people interact? It is not by coincidence that these types of interactions are not specific to medical care. This technology has been adopted rather quickly by communication and entertainment industries. Your nephew has probably been having digital interactions with his friends through his gaming console for years now. It is the medical sector, however, (and the organizations that provide that care) that is currently acknowledging these possible modes of interaction and dealing with rules and regulations built for a system that simply did not accommodate these technologies. A simple categorization of types of interaction illuminates the spectrum of possibilities for the near and far future.

Synchronous physical interaction—Actual attendee and actual attendee
Two or more people have a physical interaction in a physical place; the physicality of place is pertinent to the interaction. This could be a typical office visit, a surgery, a specialty scan, one-on-one or group therapy in an actual space. Basically, it is any conventional medical visit one would be used to. Social interaction typically works best in this way, as well as the efficient transfer of physical goods or services (chiropractor) or where the specialty resources needed have limited mobility or it's not feasible to provide them in a mobile capacity.

SYNCHRONOUS:

Direct interaction, happening simultaneously. A phone call is an example.

ASYNCHRONOUS:

Interaction that happens over a staggered period of time. Email is an example.

PHYSICAL:

Happening without the aid of telecommunication technology. An in-person conversation is an example.

DIGITAL:

Happening with the aid of telecommunication technology, and in the absence of a physical interaction. A voicemail is an example.

Ref 1. Helpful terminology

Synchronous digital interaction—Actual attendee and digital attendee
Two or more people are interacting digitally, but only one physical space is pertinent to the situation.

The virtual house call
The most common current occurrence of a telehealth visit—virtual, "face-to-face" interaction between the provider and the patient in real time—allows for a decrease in waiting time and costs; thus, it is more convenient in most cases.

The disaster dog
AI or digital interaction such as disaster relief or drone-operated assistance or rescue. A practitioner's expertise is needed in a situation, but it's too risky for them to be there in person. Think the Boston Dynamics robot dog with facetime running on a tablet on its head.

The robot buddy
In-home care and monitoring provided by a virtual or an AI assistant. Think Baymax from Big Hero Six (or simply think health care robot).

#### The third place—The masseuse, barbershop, gym
People use these services or interact in these places due to physical aspects of the body. While the primary impetus for using these services is not built around the remote presence of a health care worker, digital technology makes it easy to imagine these spaces being integrated into a broader health care ecosystem. Integration of wellness care at these locations would not only remove barriers for participation in individual health, but could also increase proactive, preventative care by catching issues before they become a problem "worth going to the doctor" for.

Asynchronous digital interaction—Digital attendee and digital attendee
Two or more people meet virtually where their location, appearance, or timing is not important.

While patient-provider interaction is between two parties, it need not be face-to-face or even within the same space over a period of time (think of passing messages back and forth over mobile devices). For that matter, there may be certain therapies provided that are enhanced by using an avatar or otherwise making one's identity anonymous. An important aspect of this interaction type, however, is the privacy of where the user is accessing the interaction. Think about answering sensitive questions over the phone for example—there may be a level of digital or physical privacy necessary (but this could occur with headphones or perhaps a small private area to text or call).

Telehealth has the power to be integrated into people's daily lives in creative and transformative ways. It may be obvious that a video call with a doctor is convenient, but the transformative power of care being literally disconnected from the clinic space can remove many of the barriers associated with an individual not pursuing
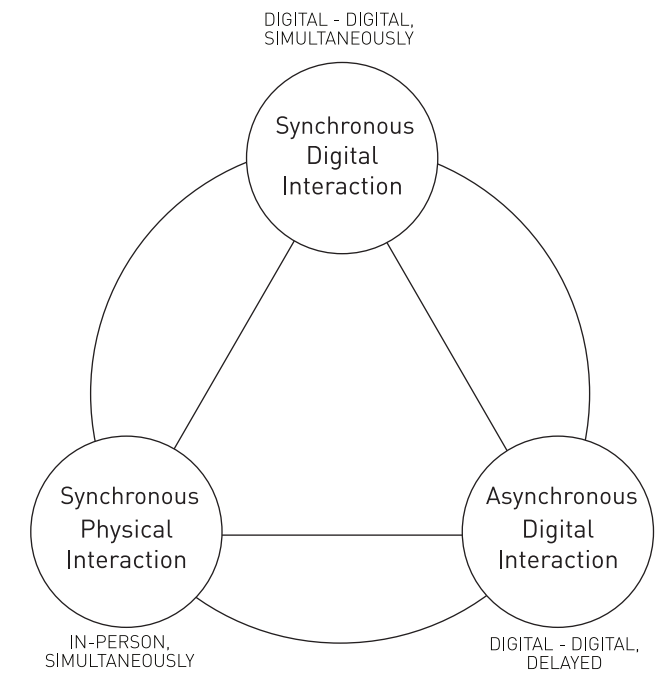
Ref 2. The spectrum of interactions

care. Receiving care for mental health, sexual health, or other health concerns may invoke deterrent social stigmas against receiving that care. When care is provided with anonymity, convenience, and incentives a community can benefit from avoiding these deterrents (Knaak, Mantler, & Szeto, 2017).

Implications for practice

What is the point of framing telehealth in this way?

Health organizations, both in their present, familiar form as well as possible future forms, will continue to shape the physical environment just as they do today. It is part of a designer's job to be comfortable considering these possibilities and what opportunities they hold.

In all the cases outlined there are characteristics of space that are important. For synchronous digital interactions we should be considering the privacy and comfort of the user side—will people begin to have a specialty space in their home for digital interactions? What if a user is going to a specialty physical space, but the provider is attending digitally? What questions does that raise about sequence of space, experience, comfort, privacy, and safety? Providing health care in the future can take several appearances, but the spectrum of synchronous/asynchronous, digital/physical may take different forms for different purposes or communities. Both designers and health

providers should be anticipating future scenarios, either within the existing health system or one drastically reshaped by market disruptors, in order to reimagine the kinds of spaces that will link individuals and communities to receiving care.
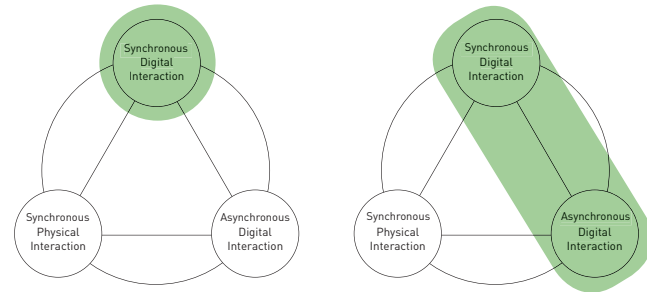

Ref 3. Health care providers can engage in one or several of these models of interaction. Are you going to choose one, two, or all of these?

Possible future scenario #1—Rural

There are indications that health care in rural environments is suffering. For instance, one study found that nearly half of hospitals remaining in rural areas are operating in the red, and rural residents are less able to access and afford care (Advisory Board, 2020). Telehealth is already being considered as a possible response to this problem. For this scenario we will follow a clinician in a rural county in middle America in the near future. This municipality has provided its population with in-home diagnostic kits (such as the Tyto home care kit) as well as public access to internet services to bolster the population's access to telehealth services. Much of the typical wellness and preventative care in this community comes from synchronous digital interactions with physicians who do not live in the immediate area—a virtual house call. The doctor(s) telehealth services could be supported by a clinician who works in a physical satellite location between the town center and the surrounding residents. This model provides space for the clinician, medical equipment, and limited medication in strategic locations near parts of the population. This position is one of a few that facilitates many of the synchronous physical interactions necessary in the community and provides efficient emergency response to a portion of the community. She is a certified dialysis and PET scan technician as well as a dietician. She works with remote physicians and experts and provides them access to information they need to diagnose members of the community. Her physical location provides for care that is a step up from virtual house calls.

A typical visit to the satellite location might look like this. A member of the community comes to the satellite location after receiving a directive from her doctor to get a PET scan to further diagnose signs of heart disease. At the location she is met by our clinician who operates the machinery and facilitates the digital oversight with the remote doctor (synchronous digital and physical interactions). While the doctor analyzes the results remotely, the clinician meets with the patient to discuss potential dietary changes associated with successful recovery from heart issues. She then directs the patient to a central facility, which has a grocery store located in the middle of town. When the patient arrives, our clinician then walks her through recommendations (synchronous digital interaction) for grocery purchases. While the patient waits on further results from the doctor, she spends the remainder of the afternoon in the community center portion of the wellness center, which includes a public library and a test kitchen where the patient can learn to cook new recipes and engage in other social interactions (synchronous physical interaction) that contribute to both her overall wellness as well as increase her chances of sticking with a new wellness regimen specified by the doctor. As the results come back, the physician requests that the patient attend yoga classes a few days a week, which are also offered at the wellness community center, to ensure she is getting the exercise she needs.

This version of a health care future treats the general access to health services as a sequence of experiences that transform from completely remote/digital/in-home as the first interaction toward centralized, community-based access to more specialized or physically dependent aspects of wellness. Instead of a single hospital campus that houses all functions, it's a dispersed model. Most provider–patient interaction is at the outskirts and in the home, and much more of the community interaction and lifestyle wellness options is centrally located. Instead of one local doctor who does in-home visits, there's a panel of doctors from around the world providing digital interactions and directions to smaller staff of certified technicians who can assist in running specialized services.
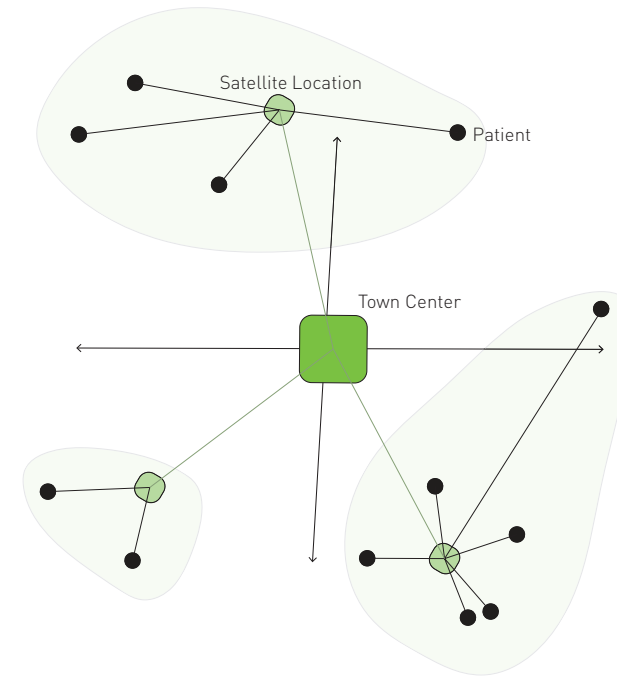
Ref 4. The network of care: In-home virtual care to satellite specialties, to centralized community and emergency services.

Possible future scenario #2—Urban

This scenario imagines how similar kinds of access could be employed differently in an urban environment, making adoption of such strategies more likely for a health system to employ in all geographic areas (Huilgol, Joshi, Carr, & Hollander, 2017). As environmental concerns advocate for renovation rather than new construction, and the introduction of autonomous vehicles allow for a reuse of parking spaces (Shaver, 2019), there is the opportunity to create a diverse set of health spaces in an existing urban context.

We follow a resident of a medium-large city who is out of his house for a visit to the nail salon. While there, the pedicurist notices one foot is slightly swollen and blue and tells the long-time customer (synchronous physical interaction). He is told that this could be a sign of circulation problems, and possibly even more severe medical issues, and the pedicurist asks if they have permission to connect him with a specialist who can provide medical advice—they can do it digitally in a private space near the back of the salon. Within minutes a physician has seen the patient's foot and has recommended he get an MRI done within a day or two as his symptoms can be a sign of deep vein thrombosis (synchronous digital interaction). The patient takes the doctor's order and uses his mobile device to search for

available MRI spaces within a few city blocks. His mobile app prompts him to a few spaces within walking distance (think of it like finding an ATM through your banking app) over the next three hours, and he reserves a space. Because the spaces are dispersed, and their operation remote, this allows for more efficient scheduling and a larger volume of appointments. After consulting his calendar, the patient receives a notice from his health provider for grocery coupons at two local stores as well as a calendar of exercise classes at an independent bootcamp gym that is partnered with his health provider (asynchronous digital interaction). The patient accesses the diagnostic space using a digital code (a bit like going to an Amazon drop-off location) and enters the room. Once within, a synchronous digital interaction begins between the patient and a technician who conducts the test (Imaging Technology News, 2006). It takes only a short time, and the patient exits while the space sanitizes itself. An hour later the patient receives notice that he needs direct observation, and he can be immediately checked in at one of two hospitals in the area. A car will be on its way soon to escort him for further medical observation.

This model exploits the potential of telehealth to align supply and demand, matching provider and patient at almost any time or place throughout the city (and beyond). It also provides choice and flexibility for how the patient may encounter that care.
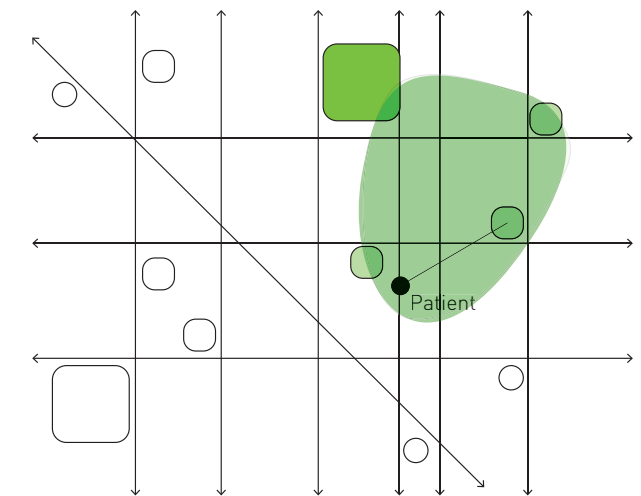
Ref 5. Flexible options activated by patient choice, availability, and convenience. As individuals move through the environment, schedules, space availability, patient and provider availability, and preferential factors are synched to locate the exact time and space for the delivery of care.

Wrap it up—It's all about people, people

Ultimately what is emerging from this is a variety of ways to connect to people, a spectrum of choice.
Each system, each community, need not necessarily do all things at all times—in fact, that is likely too difficult to manage. The health systems of the future will be integrated and coordinated and likely allow people to curate their care much like they curate their other lifestyle preferences. This will generate spaces that permit new and flexible ways for people to connect—be that the centralized community center or the completely anonymous virtual visit.

If we can learn something about each type of "space" that care is tethered to, we may be able to provide better use of space, better services within the space, and better spaces where care is not currently provided. Imagine using a park to complete virtual therapy without sacrificing privacy. Imagine the difference between going to a clinic versus going to a produce market and receiving consultation about diet or even therapy for social anxiety.

These virtual and physical interactions can take cues from one another and begin to blend rather than be binary options. Can there be multiple types of options for people to pursue? Just like spaces designed for choice, prospect, and refuge, health care systems and their spaces can be designed to support a multitude of point-of-care options.

Perhaps this spectrum of interaction is best dealt with as a set of possibilities a health organization will need to contend with. There is no right or wrong path forward. Nor is any one possibility a definite outcome. Many of these forms of interaction are already present and will need to be considered in the future model of health delivery. This is the most valuable way to digest a speculation—to take it as a narrative possibility and consider the effects of that kind of future. Perhaps this spectrum is helpful in creating models that are different and appropriate for meeting different needs in different communities. Exploring possibilities through a narrative framework is a rich and valuable mental exercise for designers and clients alike. It allows us to take trends and ideas that exist and say, "If the future looked like this, what might I do now to chart my path forward?"

Call to action: Questions we need to address now

This exploration of the possible futures that are beginning to take shape through the influence of remote care technology raises more questions than it answers. However, recent changes to Medicare reimbursement for telehealth care via executive order, and a subsequent proposal from Congress to make those changes permanent, indicate a willingness in the US to pursue a path toward making telehealth a viable endeavor for practitioners (Sokol, 2020). Among other questions that we'll need to address are: Is the management and logistics of these kind of dispersed care models all going to be run by a hospital or will they enlist independent partners? Should it be run by a hospital? How will the dynamic change between physicians and administrations? How will you handle multiple maturation lines? How do you evolve individuals or communities who have traditional views of medical access? As more of health care interactions become encoded in digital technology, who will own all the medical data? To ask these questions both internally as designers and with communities and clients is essential to the design process.

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