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Dr. Maniaci (Mayo) on @Home to Care Anywhere



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Dr. Michael Maniaci: An internal medicine doctor, a hospitalist that has practiced exclusively in the hospital for the last 15 years at Mayo Clinic on the Florida campus. Dr. Maniaci is the Medical Director of the physical Florida hospital. He is also the director for the entire Mayo enterprise for our Hospital@Home program, which is called Advanced Care @Home.

Darryl Gibbings-Isaac, MD: A clinician who practiced in the NHS who now co-leads the Virtual Health practice and is a clinical innovation expert for Accenture.

Greg Smith: Co-lead of the Virtual Health practice for Accenture.

Greg Smith: We want to go on a journey focused initially on @Home, discuss health equity, and finish with a perspective on Care Anywhere. There are three main goals.

1. Understand the @Home concept
2. Recognize that health equity is an important consideration
3. Identify how you address health equity in other alternative modes of delivering care - Care Anywhere.

The important thing about the @Home, especially Hospital@Home, is how we could better leverage the brick-and-mortar beds focusing on those individuals with the highest acuities and most unstable but still able to care for other acute care patients while creating a scaling opportunity over time.

Dr. Michael Maniaci: Hospital@Home is not a new concept. Doctors visiting homes with doctor bags have been around for 100 years. The newer efforts in treating people in the home setting had been around for 20 years. So, why is there excitement about it now, independent of what we've seen with the Covid pandemic - that's because we've entered a new 2.0 version of Hospital@Home.

The old version (1.0) was doctors going around the houses visiting people, making house calls, taking a nurse from a hospital, putting them at the bedside in a patient's home, and hospitals sending resources to that home to treat that patient. Doable but not scalable and had many limitations.

1. A physician traveling around town could only see so many patients, a handful at most.
2. A hospital, if they gave away their nursing staff and physical therapy staff to a home, who's left in the hospital, take care of those patients? Finally, a hospital



Mike Maniaci, MD
Mayo Clinic Hospital
Medical Director



Darryl Gibbings-Isaac, MD
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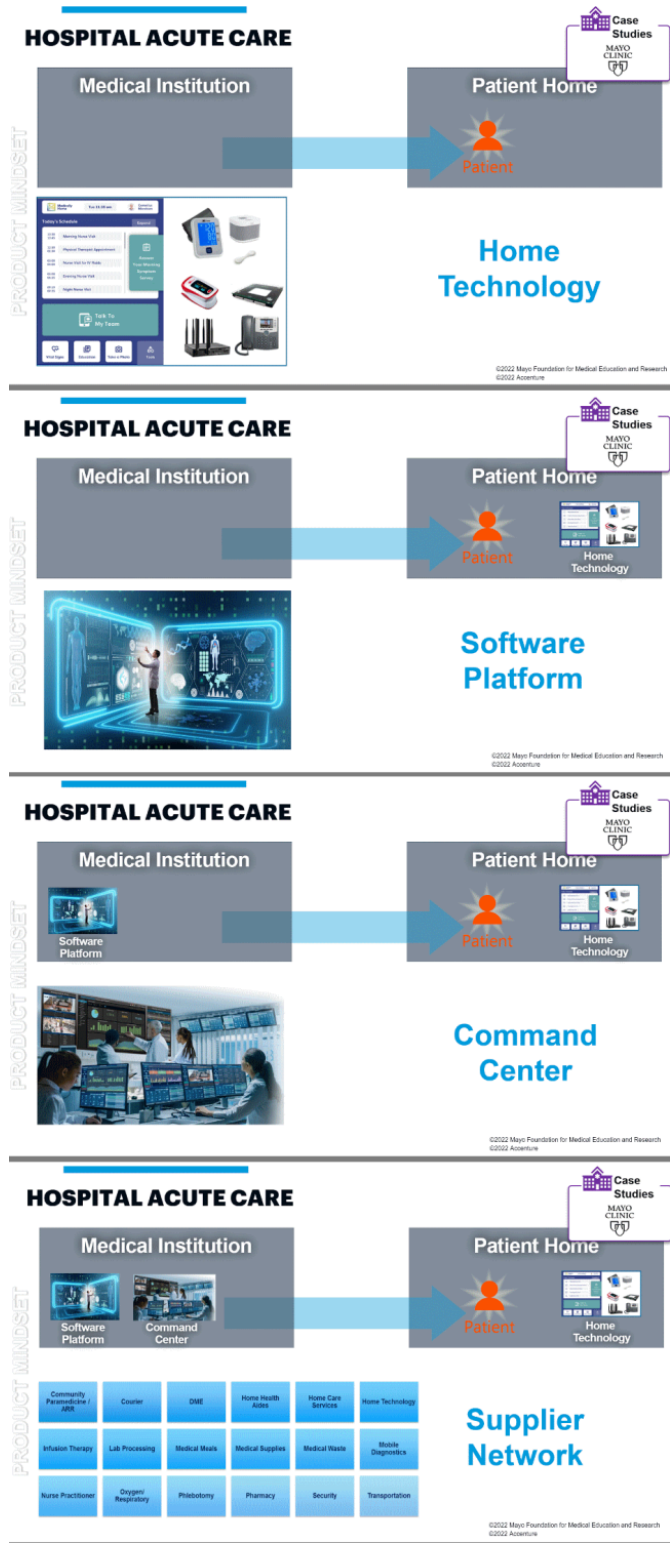


Greg Smith
Accenture
Virtual Health Lead

would drain its resources trying to do this in a home setting.

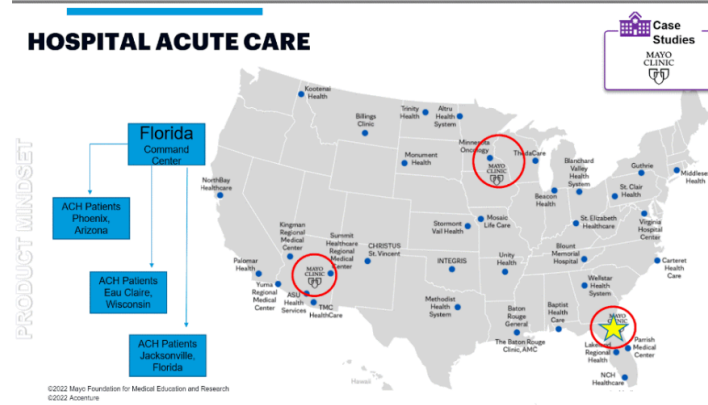
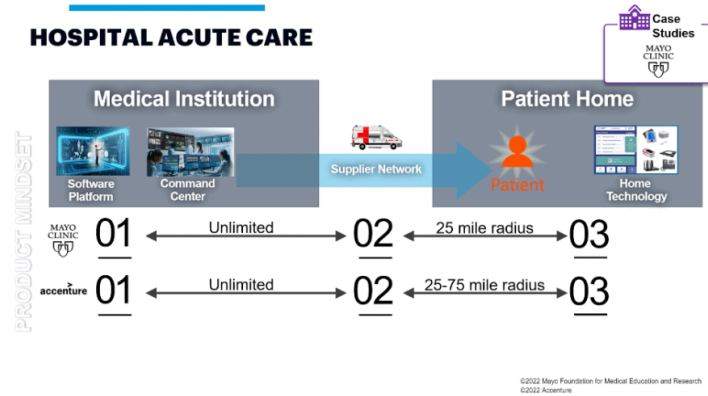
The newer version - 2.0 - of Hospital@Home integrates virtual technology. So we keep the highest cost resources centralized and then use that connection to deliver care in the home. Not just by the hospital's resources but by putting together a vendor-mediated supply chain so that the community kind of comes together and vendors deliver things to the home, as opposed to one person doing it. Much like, you see, Amazon, Walmart, and other big companies do today.

1. We start with a medical institution, wherever it may be, and the patient in their home, as opposed to the hospital. First, we have to monitor that patient, so a whole package of home technology goes into the home setting. That consists of a virtual technology to integrate with the patient to communicate with them and devices that collect information and give it back to us so that we know vital signs, how they're doing, and redundancies in that backup.
2. Next, there's a software platform. We have to get all this data from home, deliver it to healthcare professionals at the institution, and do so in real time. We are not looking in the past 3 or 4 hours. When caring for hospital patients, you must know what's going on minute by minute.
3. The third thing we have is a command center. The command center is the centralized brain of what's going on. The command center is where all the information is processed, and if you look at a command center, like at Mayo Clinic, it has doctors, nurses, physical therapists, and case managers. It looks like a hospital ward. But the only thing that's missing is the patients. They're at home. They come up with care plans. They decide what to institute on that hospital-level patient in their home setting.
4. The final piece is the supplier network. How do you deliver that care to the home setting? We must build all the resources we use in a physical hospital in the community around the patient.



So now we have four processes over three kinds of destinations. We have a command center with software. We have a supplier network delivering care. And we have the patient at home with the technology. We've learned that the supplier network must be around the patient. I'm in Jacksonville, Florida. With my paramedics here, I can't send care to Macon, Georgia. It takes 6 hours to get there. I can't do that. I have to build a supplier network around the

patient to deliver that care very quickly. But my command center, located in Florida, has unlimited space for that supplier network. Meaning here in Florida, I can see patients anywhere, and your command center could do the same. The technology and virtual care can be directed anywhere from that command center. So, as long as the supply chain surrounds the patient, central resources and the command center can be located anywhere (see figure).



In Jacksonville, Florida, as I mentioned, where I practice. That is where Mayo Clinic's Florida command center resides, but this command center not only sees patients in Jacksonville, Florida, virtually. We also take care of patients in Eau Claire, Wisconsin, and in the Minnesota area, as well as in Phoenix, Arizona. So, three different time zones. Three different sets of patients in other areas. One physician, one command center, overseeing that care, and theoretically, I could take care of patients across the United States and other countries all from this command center all in one day.

Greg Smith: What is the acuity of the patients? What types of care do you move into the home?

Dr. Michael Maniaci: So these are hospital-level patients. These would require hospital-level care. So, this is heart failure exacerbation, pneumonia, post-surgical patients, and people with advanced infections that don't need ICU care. We don't want somebody so ill that they need a ventilator or something else or unstable. So they have to be clinically stable but have high acuity care. These are not observation patients. Hospital@Home is not glorified home health care. Hospital@Home is true inpatient-level care, and I can care for a clinically stable patient in any setting.

If you think of the hospital setting, how much of my time is spent with the patient? Fifteen, twenty minutes a day, a nurse goes in and out, paying some fluids, giving some medications. There's a lot of lag time there and a lot of care that doesn't actually have to take place in a physical building - we can do it at home. And those are precisely the patients we provide care.

Greg Smith: What are some of the benefits you've seen?

Dr. Michael Maniaci: Besides patient satisfaction, which is higher than our physical hospital because people love being in the home setting, it's actual ownership of patients better. That patient becomes mine. People ask, "Is there any loss with a virtual connection as opposed to me being there at the bedside physically?" You think there would be, but I get to see that patient in their home, favorite chair, family, dog, food, and beverage. I can individualize that care plan just for them, and it ends up being better care. With that, multiple health outcomes show a better quality of care, better safety, and reduced readmissions at Mayo Clinic.

In this set of patients, we've had a 50 to 65% reduction in readmission rate into the hospital as we own them over time. Plus, there's no rush to get them out of the hospital. So, when they're ready for discharge, I can slowly hand that off to their community providers and other specialists to ensure they get the aftercare they need. And that makes for fewer escalations to an ED facility or something where you can use resources poorly. And if they need help, I can just deliver it home right there. So it's been a vast system. Our patients have enjoyed that.

Greg Smith: Where are you going to go next with your program?

Dr. Michael Maniaci: We will go next throughout the Mayo Clinic health system. So, there are 9 to 10 hospitals throughout the Midwest that Mayo Clinic interacts with. Then we look at the Mayo Clinic care network, which is multiple hospitals across the United States with which we can partner. And then Mayo sites in Abu Dhabi, London, across the world, we're looking at all these sites to expand the Mayo platform, and this type of platform is not just Mayo Clinic. So our program looks at multiple institutions throughout the country, putting this together and expanding this throughout the world.

Greg Smith: And so, if I were to ask you to, sort of, take a step back and say, "What were the two successes that you would communicate to anybody contemplating this?" What do you think those successes would be?

Dr. Michael Maniaci: Sure, the most significant success is it can be done. Putting together a virtual command center, patient-related care, and a virtual setting with home supplier-directed resources is possible; it is scalable, and we can expand our reach. Next, we're able to keep the quality, safety, experience, and costs all within the margin, and that's when I started this; I said, "Safe, happy, affordable." Those are my big three things. It had to be high quality in safety, patients had to be happy with it and like it more than the hospital itself, and the same thing with the staff; the staff had to enjoy it as well, and it was affordable. Hospital@Home costs less than the actual brick-and-mortar hospital, and we see those outcomes.

Greg Smith: Can you explain the staffing model?

Dr. Michael Maniaci: We take a certain portion of our staff, and they are virtually accessible. So I'm a hospitalist in a normal brick-and-mortar hospital. I see 15-18 patients a day. With this Hospital@Home program, I'm seeing the same amount of acute patients through the program and supervising up to 20 or 30 post-acute care patients I can advise as well.

So I'm able to stretch myself out to see a lot of different patients. Because again, I'm not running all over the place in the physical hospital. The same with our nursing ratios, which is the biggest concern. Virtual professionals are a big thing because we will use it not only in Hospital@Home, but a model like this can be used in physical hospitals. The usual physical hospital has a nursing ratio of one nurse to 4 or 5 patients on the floor. That's because they're swamped seeing patients, charting many different things, and delivering medications. Because our bedside nurses are virtual in this program, we have a 6 to 8 patients per nurse ratio for the sickest patients. Then when you move to post-acute restorative care patients, that ratio increases the 1 to 10 1 to 12. With pure, real patient monitoring, we're doing 50 patients to one nurse who can watch during remote patient monitoring of the lowest acuity patients. So you get to stretch your resources out and follow patients closely with that.

Greg Smith: Darryl, where are we seeing the market going?

Darryl Gibbings-Isaac: We see 3 or 4 areas of high priority.

1. The first is around the value drivers and economic sustainability within Hospital@Home models. We've discussed numerous value drivers, not exhaustive, but, including
 - Readmission prevention - Mike just shared the importance of that from Mayo.
 - Reduction of acquired infections. Especially as you're a distance from the central site, a decrease in length of stay through limiting hospital-acquired infections if you're not in the hospital, capturing diseases that live there is hard.
 - The reduction in capital costs of the building leads to the inpatient stay. They'll call out that, given most of the capital costs are effectively prepaid in a hospital environment. Realizing value here requires the hospital to fill the available bed with another appropriate case effectively. So, capacity needs to be a consideration there.
 - Reduction in labor costs by

1. Ensuring the skills mix reflects the top of the license.
2. We just touched on previously that one-to-many relationship use for virtual care where possible, and we just heard about that expansion of nursing ratios going up to 50 to 1 for low acuity patients.

I think the importance here is that these value drivers emphasize how enhancing the care model optimizes jobs and who does them. How technology is used to enable that is critical to unlocking that value. But also how the payment contracts need to reflect the value capture costs of the care continuum here.

1. The second area we discussed here was health equity and social determinants of health. We discussed the need to ensure that models are in place that don't amplify the existing health equity issues, for example, in areas with critical access hospitals that often cannot support a Hospital@Home program, which highlights how important it is to look at broader networks. We also touched on how it's best to take the opportunity of being inside the home to enhance the carefully optimizing social determinants of health. Like what can you tell from the fridge, smoke detectors, medicine cabinet, et cetera?
2. The third point was around incentives and adoption. The narrative goes beyond profits, splitting between different health factors, as we often talk about, anchored around a return to value to society. It was known that cost structure optimization could have diminishing returns for some actors, such as payers. And so, there was a push to look for other unifying constructs, such as patient experience, when incentivizing value capture. Cultural barriers to adoption and work consideration, particularly in the medical community, are areas we need to navigate too.
3. I think a fourth piece is solving some skills gaps needed to deliver these new models effectively. For example, the staff can set up the equipment and ask some of the clinical questions at that point of delivery. For example, EMTs are trained to set up the gear.

Greg Smith: Mike, what does it mean from a provider?

Where's their level of enthusiasm, and what's driving their willingness to practice this way?

Dr. Michael Maniaci: I think it comes down to when it comes to the value for the patient, and for the provider and the institution, there's several. There are tangible and intangible.

The tangible is the pure black-and-white costs. 50% of health care costs in a hospital setting are related to costs of implementing care. It's the cost of building the huge building that costs 500 million dollars. It's the cost of cleaning the beds, keeping the lights, utilities, and other things. It helps the patient but isn't health care. So, if we remove those from the equation and treat patients in the home, there's a sizeable black-and-white cost benefit. It costs more to implement a supply chain, but that is less than the actual cost of these buildings we're building and what it costs to keep them clean, open, and running. So, our program has reduced black-and-white costs two years into it. When you compare somebody who is in a bladder infection at home versus a bladder infection at a hospital, we've seen about a 10% reduction in cost. We think over time, as we scale and the technology gets better, we can probably get that up towards 20%, and that's comparatively right there.

Then there's this value equation of intangible things, which I mentioned before, reduces readmissions, costing health care millions of dollars a year. For example, instead of using ED or other acute care resources, escalations in the home create a better recovery for patients. If they're in their home, they're much more mobile up out of bed, 10 hours a day versus one hour in the hospital. They're using nursing homes and skilled nursing less for faster recovery, saving hospitals and opening beds in the hospital for high acuity patients, cancer patient, or patient who needs emergency surgery. As opposed to that, that is a value equation, and just the chance to recover home patients enjoy that. And patients were very accepting of this upfront. I wasn't sure if they would take this upfront, but 3 out of 4 patients initially offered to accept this program, which stayed consistent

throughout the plan. Physicians were wary of first, like the wearables or anything else. They had to see it in action to work. But as we've seen

- over 1000 patients are now in our program
- we've seen outstanding outcomes
- a very safe program
- very low morbidity mortality, lower than our physical hospital itself

That gives providers the confidence to exemplify this program to their patients and share it with them as an option.

Greg Smith: Mike, where else are you contemplating the @Home?

Dr. Michael Maniaci: We're looking at what we are not doing at home that we could do. Other acuties include chemotherapy, post-transplant care, and other high acuity things that take a hospital stay. So we have bone marrow transplant patients; we've done three through our system. Usually, you get a bone marrow transplant, and then you have to spend 2 to 3 weeks in the hospital recovering your cell counts, getting infusions, labs, and blood transfusions. But usually, that care is very streamlined and protocolized. Anything protocolized could be implemented @Home, as long as you build a supply chain to deliver that care. So we've had transfer bone marrow transplant patients get their transplant immediately, move home and then take care of them for 2 to 3 weeks in the home setting. And we have to escalate their care if we need advanced imaging or something we can bring them back to the hospital do very quickly. Get them back home, but, you know, they stay in the hospital hours instead of days to weeks, dramatically impacting their care.

The other thing we're looking as you mentioned, is post-acute care. How can we longitudinally own patients and care for them in their recovery? There are not enough skilled nursing rehabs. Not enough psychiatric facilities and other places. Behavioral health across the country is very limited, but we can share those resources. Making doctor's available virtually and implementing this care at home.

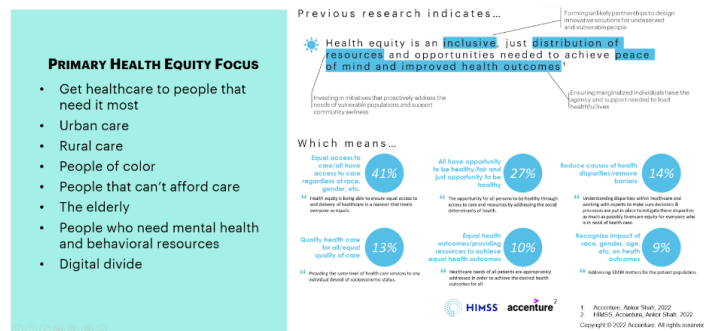
Then we can tackle some of the problems we're dealing with today.

Greg Smith: Darryl, any last thoughts on the @Home and thinking about this from a product mindset?

Darryl Gibbings-Isaac: I think principles at least have the product mindset could be applied in at least two ways. I think one is taking a patient-centric view and pasting their experience at the center of the offering, and that's something I think we've heard throughout our discussion so far. But this can help overcome potential friction from regulatory and payment silos between programs. For example, care transitions, especially for those eligible for multiple programs, whether Hospital@Home, SNF@Home or otherwise, move towards a total Help@Home or a similar model.

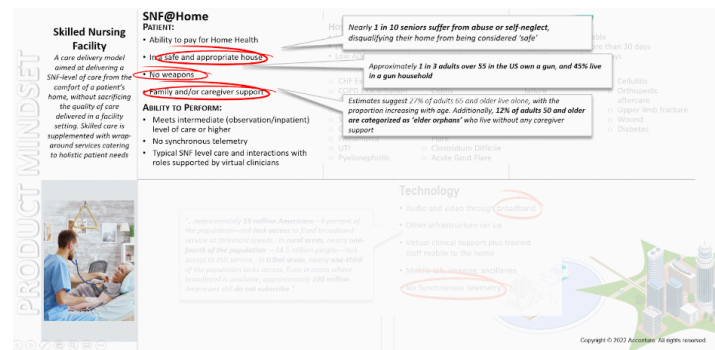
The other is looking at productizing some of the technology components within the offering to scale the offerings economically and sustainably. For example, the demand and supply aggregation and matching, the orchestration and distribution of medical resource bundles, or the analytics capturing and reporting on care effectiveness. Overall, the key here is to be intentional, experience-based and continuously thinking about how to scale the offering effectively.

Greg Smith: There is excitement about @Home, but it also encourages us to consider health equity issues. On the right-hand side of the image is within Accenture, around health equity and HIMSS. But Mike, on the left side, are some we've identified as we've talked - how do you think about health equity?



Dr. Michael Maniaci: Sure. If you look at the things on the left, although different, they all have the same theme, which is the ability to get the resources. The problem with health care today is we have great institutions with excellent care, but we have people who can't get to them from the same distance. So, how do you break that cycle? You have to decentralize the healthcare system, which Hospital@Home is doing. The decentralizing healthcare so that all these means can get to the people that need it the most and often don't get to use it the most. And that's what we're pushing towards, which lists all these populations needing healthcare. They can't get to it. We have to deliver care to them despite living in different parts of the country, not having a home to go to, and being in a mission or church or shelter, despite being at an advanced age, despite not having digital technology. So we have to build the infrastructure in this country around delivery. Just as we've done with everything else with shopping and food, we do that with healthcare - then we're able to deliver this to many people, which drives better health in our population and pays dividends down the road.

Greg Smith: Let's take a look at a SNF@Home concept. In the figure below, I've circled areas that highlight where you might have health equity or issues that would preclude you from wanting to bring someone home. Looking at the areas circled - "I want to go to a Hospital@Home program, but I don't want to do so in an environment that's not safe, doesn't have weapons, those kinds of things" That eliminates many people. So, as Mike just said, look for alternatives. How do we resolve these health equity issues, so every patient receives the benefits of being cared for closer to my home?



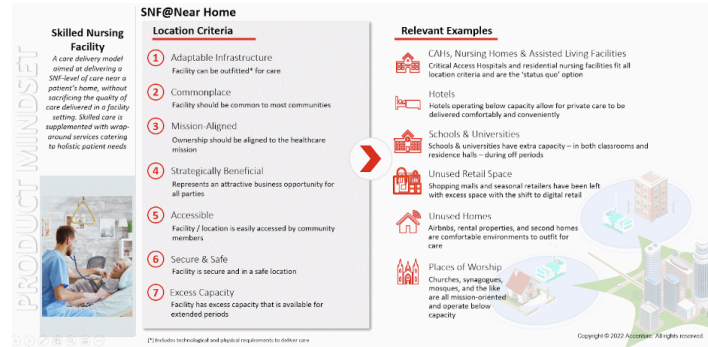
Dr. Michael Maniaci: I think there are several options. First is flexibility. I mean, many Americans own a weapon. We go to patients' homes that have weapons as long as they're locked up, we'll go into the home. So you have to have flexible rules. You can't say, "Oh, if you own a gun, we're not going to do this." You have to be flexible, and it's not, you know, your standard of what a home should be. It's what's safe for the staff and the patient to recover and their essentials, and then there are luxury things that we can work with. So, I think you have to be flexible.

Next, you have to think of other options. Suppose a patient can't safely get care in the home. What's closer than an institution that's one hundred miles away? Do we build medical communities or hubs where people can come to and get the care they need? Do we partner with supply chain partners? So if you get diagnosed with cancer in an average year, you must make eighteen trips to a medical institution for chemotherapy, follow-up checkups, and labs. Can you instead do 16 of those around town? Maybe 5 in your home, go to the local CVS that we've partnered with and get your chemotherapy, a local radiologist to get some studies and then travel to the institution twice, saving you time, money, travel time, everything else. There are hybrid versions; it doesn't have to be all or one in this mode. I think those types of ideas kind of go to some of this. We can partner with other institutions and develop ways of delivering care. So then you're in the extreme rural, you know, we can't get a physical therapist to your home, but maybe I put one of those big screen workout sessions in your house the mirror one of those. And a virtual physical therapist can now come to your home. You have weights, and you work out; they guide you through it as a coach, the same type of things we're doing for home gyms and such we can do for physical therapy. And that separates all the types of medical care there is. We'll develop innovative ways of delivering care where we can work in conjunction with the patient's needs.

Greg Smith: Darryl, has Mike highlighted Care Anywhere?

Darryl Gibbings-Isaac: Absolutely. The key here is appropriateness. They are finding an appropriate

environment to deliver that the use case determines care. Different places would be appropriate, depending on what that use case is. Let's think about what determines the appropriateness. There are some things specific about the location, which could be, you know, elements around the ability to provide privacy or the sterility of the area and all those kinds of pieces within it. There could be a part around the resource characteristics and how we must move resources. So, how mobile are those things, and how much space is required?



There also could be a piece around the, you know, the care intensity. Essentially, how much supervision is required? What's the degree of medical staff? And how far are they away from that location itself? These are some important considerations. Covid stretched our minds as to what could be done outside the hospital. Field hospitals were created pretty quickly that could scale up or scale down. Some of the considerations in the illustration, such as places of worship or hotels, et cetera, may create a visceral reaction. But when you think about what we can do to build around those things, for example, if you have mobile care units with imaging within, it could be an adjunct to some of these places, which could be converted into outpatient centers, et cetera. The possibilities are endless, but the key is having that appropriateness and flexibility at the center.

Greg Smith: This feels like that product mindset again?

Darryl Gibbings-Isaac: Absolutely. I think it speaks to that first principle, which is putting the patient and their experience at the center instead of taking a service line view when it comes to these things. Because I think if you do that, you can transcend some of those silos that wouldn't be introduced if you're looking specifically at

SNF@Home or Hospital@Home, or any of these other kinds of programs, which have a particular set of regulations and requirements around it.

If you're looking at what experience you are providing and the care you're providing within that, you can start productizing the components required to provide this care. And those components can have some flexibility around it in terms of their application. We have these components, which are played in a specific setting, such as Hospital@Home. Components can be redeployed with a new location as a focus, but you need to have that structure around those components to know where you are redeploying. And to be able to reapply those then where required. So, I think the key is to have that kind of intentionality around that organizing principle.

Greg Smith: Mike, any last thoughts around this journey?

Dr. Michael Maniaci: I think this will only get bigger, and it'll lead to the two big things in the future that we'll see and have to invest in. One is total care in the home as an option, meaning you'll feel sick one day, the worst headache you've ever had. You'll say it, and your Alexa will pick it up. It'll tap into your smartwatch and a smart camera in your house and say, "Oh, your blood pressure's up, and your pulse rate is high. Would you like to connect to the emergency room physician to do an analysis?" You'll say yes or no, and they'll do that. ED care in the home will take place; they'll decide whether you need hospital-level care or a sub-specialist, and they'll drive that forward and do hospital in the home or into an institution if you're critically ill. This care will be built around the patient and what we have in technology. And I think that will also mean that the future of medicine isn't institutions per se, but really, it's acuity: need and resources.

The acuity can determine, both with the providers and the technology feeding into it, that the need will be based on what you need, decided mainly by providers and technology. And then, the system will choose the cyber resources you need, so if you're ill and there are not a lot of resources available. It'll direct you to a hospital emergency room because that's the best thing, or they'll say you have

an infection - Walmart can give you your IV antibiotics right now. Walgreens can give you some IV fluids, and you're in perfect geography for Hospital@Home, and we'll move you there. The system will push you through, as opposed to many people making a bunch of phone calls, trying to get something to you. So, you'll get expedited care at a low cost at what's best in the system pushes you through. I think that will get care to many different people throughout this country and the world.

Greg Smith: Thanks, Mike and Darryl. Your thoughts highlight the strategy and market development opportunities to impact care's future.

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