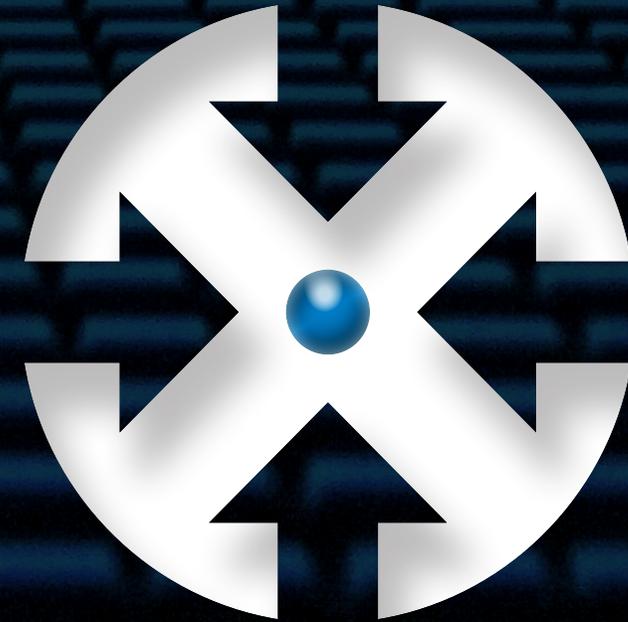


Agile



PATIENT ENGAGEMENT

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When parents learn their newborn has Hypoplastic Left Heart Syndrome (HLHS), a form of single ventricle heart disease, they face the unknown. Will their baby die? Will surgery help? What complications might arise? Similar questions race through the minds of parents facing such diagnoses, but there's one question they all ask: "What can we do to save our child?"

Dr. Girish Shirali, a pediatric cardiologist at Children's Mercy Hospital in Kansas City, Missouri, understood too well the challenges facing parents of babies with HLHS. He knew the outcomes were poor, and that the postoperative journeys for babies and their families were stressful and fraught with peril.

Twenty percent of babies died before their second surgery. Improving a baby's chances after surgery required constant monitoring for potential complications. Parents would record vital signs several times a day in a three-ring binder, which they brought to the hospital once a week. "If the team is doing weekly evaluations on Monday, then maybe a baby's chance of surviving is better if something happens on Sunday versus Tuesday, which is a really sad issue in the care paradigm," said Dr. Shirali.

In between visits, families had to go through a challenging ritual of documenting measurements and observations, and then deciding whether to call the hospital if they had concerns. Each decision could be life or death. It was too much to ask of parents who weren't medical professionals, and who were already overwhelmed by dealing with a sick child, not to mention attending to their daily lives.

Dr. Shirali knew he needed to find a way to decrease mortality rates for these fragile infants. His initial idea was simple: to digitize the paper-based aftercare, or interstage process, that parents followed once their

babies returned home after the first surgery. Parents would enter the measurements into an app, running on a tablet, that would do calculations for them, relieving them of the need to figure out whether the baby's vital signs warranted medical attention.

Dr. Shirali worked on a concept with the heart center's informatics director, Richard Stroup. With a software architect, they built a revolutionary app that runs on Microsoft Azure called Cardiac High Acuity Monitoring Program, or CHAMP. In the three years following the deployment of CHAMP in March 2014, Children's Mercy did not lose any of its 70 single ventricle patients during the interstage period.

With CHAMP, the care team signs into a web portal to review patient vitals and videos that parents record throughout the day using a hospital-issued, specially configured Microsoft Surface tablet connected to Microsoft Azure. Together, the data and videos provide the care team with critical information in almost real time, making it possible to take corrective actions very quickly when they become necessary.

[Learn more about Children's Mercy Hospital and CHAMP.](#)

Removing latency

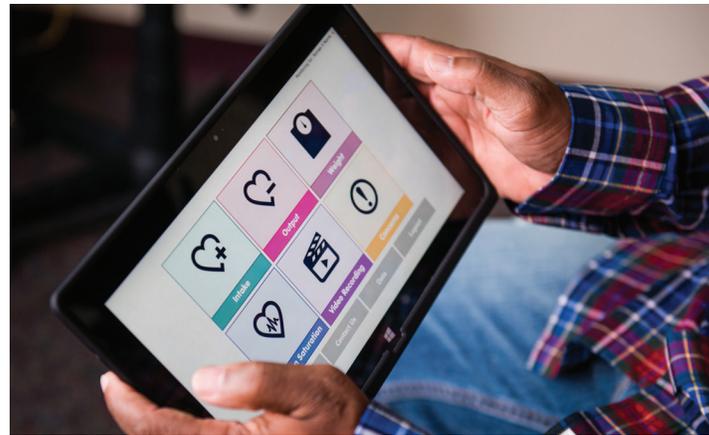
"One of the best things about CHAMP is that it reduces latency," said Gareth Hall, Director of Business

Development for Microsoft's worldwide health marketing team. "Everyone knows latency undermines healthcare, whether that's doctors consulting with each other via written letters as in the UK, or the time it takes a payer and provider in the US to communicate. If you're a patient, and your provider sends you a letter four weeks after a test saying, 'By the way, the results weren't very good. You need to come in. We have an appointment next month,' your engagement experience is dreadful."

If care teams could share information quickly, connect the patient within a day to the next clinician for the next engagement, and then check in right afterwards for any follow up, the engagement experience would be far better, said Hall. "These interactions happen now, but they happen over a really long period with lots of wasted time. That wasted time costs money—and lives.

"It is extremely frustrating for patients when basic tasks in an otherwise interconnected world take too long. They don't understand why they can have a concurrent series of events and interaction with almost any service in the world, but with health, they have to wait for things to happen in the background, with massive gaps in between."

- Gareth Hall, Director of Business Development
Microsoft Worldwide Health



Delays between clinician-to-clinician and clinician-to-patient interactions can significantly affect the success of a treatment, and increase the likelihood that a patient must be treated repeatedly, resulting in a bad clinical outcome and higher cost. "CHAMP got rid of the latency of a parent filling in a piece of paper and bringing it to the hospital every week," said Hall. "Technology changed a weekly process into a daily one, and saved kids' lives."

The goal isn't necessarily to reduce frequency of care, but level of care. Although it may seem counterintuitive, CHAMP babies actually come to the hospital more often than babies whose parents don't use CHAMP. "Catching problems earlier allows for smaller and faster fixes," said Hall. "That is great financially, and great for society."

Using technology to remove latency in an emergency situation can make the difference between recovery

and death or impairment. For example, teams at Brighton & Sussex University Hospitals NHS Trust (BSUH) use Skype for Business to reach stroke specialists when an incident occurs outside of normal working hours. When someone is possibly having a stroke, there's no time to wait for a clinician to travel from home to attend to the patient in person. The video quality that Skype for Business provides is clear enough that specialists can make diagnoses quickly.

"It feels like you're almost in the room, assessing the patient," said Dr. Ingrid Kane, consultant stroke physician at BSUH NHS Trust. "You can see how they move their arm, you can look at their face and assess their speech. We know that if you treat people quicker, less brain cells are affected, and you're likely to be left with less disability."

[Learn more about how Brighton & Sussex University Hospitals NHS Trust uses telemedicine.](#)

Quick intervention is critical for improving a stroke victim's chances of making a strong recovery. "I always want to do a better job," said Kane, "and part of doing that is being able to see patients as quickly as possible." Skype for Business allows the hospital to reach her the moment a patient is in need. "I don't feel I'm disadvantaging people if they don't turn up nine to five Monday to Friday," she said.

The ability for care teams to connect with each other, and with patients, on short notice improves patient outcomes and reduces costs. “Technology like Skype for Business stops clinicians from phoning and leaving voicemails for each other, and then trying to get back to each other,” said Hall. “They can see that the other doctor is online and they can talk to them right away using instant messaging, voice, or video.”

Continuous patient engagement

“The traditional model is very much ‘healthcare happens to you,’ then nothing happens for a year, then ‘healthcare happens to you again,’” said Hall, “but this idea of healthcare delivered at discrete points in time now seems strangely out of date.

“The new patient engagement model creates a more integrated, continuous feedback loop where technology can help patients stay connected to providers, both inside and outside of care facilities. As stroke patients and babies with HLHS demonstrate, the time between doctor visits is just as crucial as the visits themselves.

While more efficient and responsive patient engagement can improve outcomes for people who are ill, the future of patient engagement lies in communicating closely with people when they are

still well. “The problem with health is ‘finite resources, infinite demand.’ It’s always going to be that way,” said Hall. “You can mitigate that through patient engagement that encourages wellness to reduce the incidents of illness. If you do that, you will create space for illness to be managed properly.



Putting patients at the center

The crux of continuous patient engagement is sharing information so that patients can be more proactive about their own care. The goal is to connect providers with patients at the right time, and with the right information when they need it. Ideally, caregivers would share real-time information, not only with patients, but also with the people around them. The Oneview Patient Engagement and Clinical Workflow solution is an example of helping patients

stay informed. It gives patients access to information about their care, and to their care teams, right from their hospital room. Using a bedside tablet, workstation, or wall-mounted television, patients can explore multi-media content tailored to their condition, review their doctor’s instructions, post questions, and send messages to nurse’s aides or other nonclinical staff. They can even use the system to view menus and order food based on customized dietary options, or to watch movies.

The same solution allows clinicians at a patient’s bedside to access electronic health records and other hospital tools, including a real-time location system that helps them quickly find critical equipment, such as crash carts. They can project MRIs and X-rays onto the in-room TV to review with a patient. They can also view streaming data about a patient from IoT devices like glucometers.

Before or after their hospital stay, patients can sign in to the hospital’s portal and use Oneview to learn about pre- and post-surgery procedures, communicate with their care team, and book appointments.

[Read more about the Oneview Patient Engagement and Clinical Workflow Solution.](#)

“More informed patients are more involved and easier to help,” said Hall. “In other words, they make better patients.”

Partnering with patients to customize care

Solutions that gather data from multiple sources, including multiple providers, can give care teams a more holistic view of a patient so they can customize treatment plans that involve a patient's support system.

"Our approach is much different from what's happened historically, where you have an episode-specific or a disease-specific treatment plan," said Kevin Lampi, Product Marketing Manager for Tribridge Health360, a solution that enables personalized and perpetual care plans.

"A person isn't a collection of symptoms, a collection of diseases, or a specific disease. A clinical approach would tell a patient with diabetes: just do these six things and hopefully you will get your disease under control. But those steps fall by the wayside, because they're not adaptable. It's like telling everyone to go on this one specific diet to lose ten pounds. Everyone has their own unique behaviors and preferences and lifestyles. What's needed for one person is different from what's needed for another."

Care teams can partner with patients and families on personalized care plans using Tribridge's Health360 Population Health solution, powered by Microsoft Dynamics 365.

[Learn more about this solution.](#)



Tribridge believes that care teams need to understand not only the clinical aspects of a patient's condition, but also the social dynamics that influence whether they will follow the care regimen prescribed for them. Social determinants of health include a patient's environment, the support group they have (or lack), availability of transportation, and financial situation. "All of these nonclinical factors go into a personalized care plan," said Lampi. "Instead of saying 'this person has diabetes' and creating a treatment plan for that, you're looking at diabetes and everything else about them, including personal goals, such as, 'I want to be able to walk in my child's wedding.' Then you work toward that plan together with the patient, who's now more motivated to make progress."

A platform to engage patients

Bringing health information together in one place will help facilitate the process of continuous engagement anchored in personalized care plans. Currently, patients who are able to access their health information online may need to sign in to one portal for billing information, another to see their medical records, and another to manage their prescriptions.

One cause of such information silos is the proliferation of dedicated apps. Health organizations transitioning from siloed solutions to solutions built on platforms are gaining efficiencies and economies of scale that improve care. "Microsoft is not strictly a healthcare company," said Hall. "We make platforms that work for every industry equally, but aren't specific to any industry. But we've learned that healthcare customers and healthcare partners can build solutions on top of our platforms that make it easier for them to do things better, faster, cheaper."

Skype for Business is a platform many health organizations already use for internal communications. They're now expanding the mission of this platform beyond their own walls. "There are two advantages to this," said Hall. "First there's the Enterprise angle. I've got ten thousand employees all using Skype for Business. I've already paid for it. Now I can put a



solution on top of that platform at a lower cost, because I already own the underlying technology. A hospital doesn't need to build a completely separate communications or video infrastructure to enable virtual health. They just use their internally focused communication tool in an external way. Then there's the advantage for patients. They already know Skype."

The platforms advantage

Platforms make it easier to integrate solutions into an organization's IT system. Oneview's Patient Engagement and Clinical Workflow Solution is based on Windows, which many hospitals already use. Hospitals can tap into a large community of Windows developers and Microsoft partners to help them tailor solutions that fit their evolving needs. These solutions can take advantage of Oneview's platform, as well as the functionality that Microsoft platforms offer, such as single sign-on.

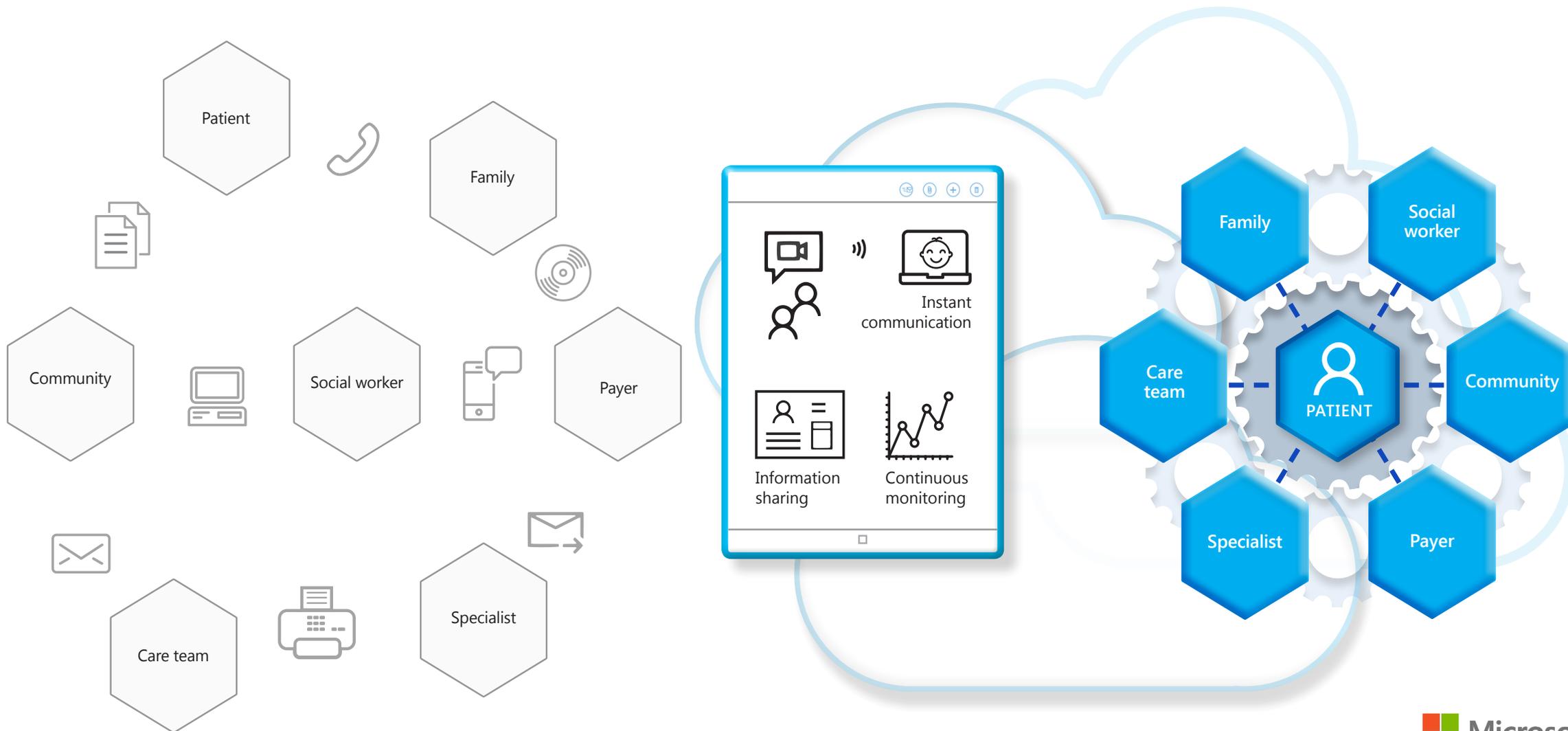
Using platforms also makes it easier to deploy patient engagement solutions to multiple organizations very quickly. "Children's Mercy built CHAMP for the cloud right from the start, using Microsoft Azure," said Hall. "Once it was running well, the next hospital, Seattle Children's, could just be switched on. Because it's on a cloud platform, it's ready to be scaled and used with any customer," said Hall. "Clinical work and training

aside, they could actually switch the solution on at every hospital in the US tomorrow if they wanted to."

Because Azure can keep data within the geographical boundaries of a single country, and has achieved multiple country-specific certifications, it's possible to extend CHAMP's reach internationally. In addition, because the solution already uses Azure, the hospital can take advantage of other services in the Microsoft cloud. "The next step is to use Microsoft's analytics engines, machine learning resources, and PhD researchers to see if we can help them spot correlations and causations even faster than the doctors and nurses can do today," said Hall.

Using a cloud platform offers health organizations other advantages. "Health providers shouldn't have to worry about standing up servers or whether the air conditioner is on in the server room," said Hall. They can instead rely on providers who are experts at running datacenters, and are constantly trying to improve how they operate. "Everyone gets to focus on how to drive down costs in their area of expertise," Hall continued. "Getting IT in health to help build solutions that provide better ongoing care to patients, rather than spending their time fixing printers or building servers, is clearly a great thing for them."

Patient engagement solutions use digital tools to enable direct and continuous interaction among patients and care givers.





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