SIEMENS Healthineers

Case study

Leveraging health information exchange to enable patient-centered care

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Foreword by Siemens Healthineers

Siemens Healthineers strives to understand the broader changes taking place in healthcare and how they may bring in changes to improve working practices, and to share these insights with our community. One of the transformative developments changing every facet of the healthcare industry landscape is digitalization. Digital transformation has been redefining our lives for several decades now, and the recent pandemic has served to accelerate many of these changes. It is essential that healthcare providers, patients, and all stakeholders understand the scope and breadth of these changes, and learn how to use them for their benefit – to expand precision medicine, transform care delivery and improve the patient experience.

From our survey with 269 C-level healthcare leaders from ten countries regarding the state of digitalization, the integration of clinical data and patient outcome sharing are seen most critically globally. In this article, we are honored to have Dr. Jeffrey Sunshine, Chief Medical and Information Officer of University Hospitals Cleveland Medical Center (UH Cleveland), to share with us how he has led his team to overcome the challenges of health information sharing. As a leading voice in the CMIO community, Dr. Sunshine is recognized for his efforts to promote and advance the use of technology to improve patient outcomes. Dr. Sunshine has partnered with IT to optimize and connect EMRs and other key clinical systems, advance digital health capabilities and elevate the patient experience through technology.
We trust that this case study provides readers with practical insights from Dr. Sunshine's success in facilitating the exchange of health information in Ohio, USA.

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Dr. Ralph Wiegner,
Global Head of Digitalizing Healthcare,
Siemens Healthineers

Unique challenges with patient records

The increasing importance of digitalization is evident in every element of healthcare today. Clinical processes, data management, doctor-patient communication, research—all have been dramatically altered by digital tools and innovations, to the point where they now depend on them utterly. There is a strong intra-organizational component to healthcare digitalization which includes the transformation of services, products, structures, and business models. And there is an outward-facing component in areas like marketing and patient liaison.

One area where the transition to digitalization holds great promise but also presents unique challenges is in the realm of patient records. There is much discussion in healthcare circles today about what is called a "longitudinal patient record." What this is, basically, is a single comprehensive patient record which is comprised of data drawn from across the healthcare continuum. The record is evergreen, an evolving and incremental document that follows patients throughout their healthcare journey and is updated at each and every clinical encounter.

This kind of detailed and highly accurate information about a patient's medical history is of singular value to caregivers, yet it must be treated with particular care as such information raises ethical issues of confidentiality, legal issues of privacy, and complex questions of ownership. Ensuring that information is available when, where and to whom it is needed involves contending with both technological barriers (e.g. inconsistent storage protocols and incompatible platforms) as well as cultural and operational issues (e.g. integrating data exchange into existing clinical workflows).

The single most important requirement is that hospitals and other healthcare institutions be both willing and able to exchange patient health information. It is extremely rare for patients to receive all of their healthcare in any one place—between the various hospital options that exist as well as the different care institutions in their community, most patient data is created in multiple locations. For a longitudinal patient record to exist, all of this data must be gathered, organized and made available in one place.

If hospitals and health systems are able to establish the local and broader infrastructure and connections necessary to create a health information exchange (HIE), and also adapt their workflow in order to use the data that is exchanged, they stand to realize significant rewards. Effective exchange of patient data not only benefits patients, it also provides competitive advantages to providers including greater efficiency, lower costs, and the reputational benefits that flow from a more seamless patient experience.

Longitudinal patient records

The importance of longitudinal patient records cannot be overstated. They ensure that healthcare providers who are in the process of deciding on treatment plans have all the information it is possible for them to have, easily accessible in one electronic file. This results in improved outcomes for the patient, increased safety and a better care experience.

Longitudinal patient records are also the cornerstone of better population health management, an overarching system of care that encompasses preventative care, disease management, clinical integration and physician alignment. Good population health management results in improved outcomes and better experiences for individual patients, specific patient populations, and entire communities.

"So it took a while, but now we really have moved from a paper world to a digitized world. So, problem fixed, right? Well, maybe not. Because while in certain areas and certain situations, patient information is shareable, in other areas it still isn't."

Dr. Jeffrey Sunshine, Chief Medical Information Officer
University Hospitals Cleveland

Creating and leveraging a health information exchange

University Hospitals Cleveland Medical Center is a major not-for-profit medical complex located in Cleveland, Ohio, U.S., and is the main campus of the University Hospitals Health System. With >300 locations throughout the Cleveland metropolitan area, the University Hospitals Health System encompasses hospitals, outpatient health centers, and primary and specialty care physicians' offices.

Dr. Jeffrey Sunshine is University Hospitals Cleveland's Chief Medical Information Officer. Since 2009, he has led the implementation of an electronic medical record (EMR) across all the UH hospitals and has taken up the challenge of enabling and improving patient care through HIE and the creation of a longitudinal patient record. He explains his mission in this way:

"Our role is to make medical information transparent and to use that information to enable the kind of healthcare that patients need."

Dr. Sunshine's early commitment to this effort has produced remarkable results and has provided him with unique insights into both the opportunities and the challenges of the transition to digital patient records. This paper explores the steps taken by Dr. Sunshine in creating a health information exchange system that supports his vision, and the results he and his team have achieved by doing so.

If you ask Dr. Sunshine about the importance of patient information sharing, he will mention his gray hair and tell you that he is old enough to remember when healthcare was paper-based, and everything was siloed. He remembers dealing with patients who presented at the hospital at night, in distress, and having to ask them about their medical history—what tests they had taken, what drugs they were currently taking. He says sometimes they knew, and sometimes they didn't.

For Dr. Sunshine, the fact that everything is now digitized is a huge step forward. Information is more readily available, it is much less likely to ever be lost, and the infamous problem of reading doctors' illegible handwriting has become a joke from the past. The big remaining challenge, the battle he launched in 2009 and is still fighting to this day, is to see that digital information shared immediately, on demand, across distances, organizations and providers, so that HIE is a reality everywhere.

Dr. Sunshine would be the first to admit that he has benefited from working in the United States, and specifically in Ohio. The 21st Century Cures Act passed by the US Congress and signed into law in 2016 was another giant leap towards patient information sharing.

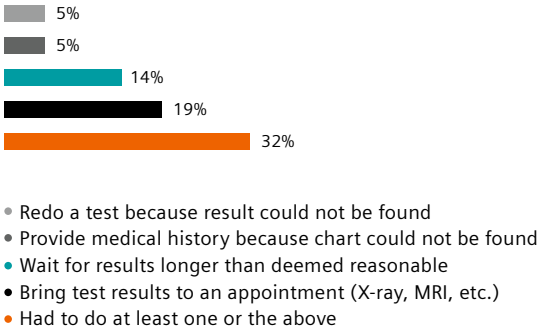
It was designed to help accelerate medical product development and bring new innovations and advances to patients who need them faster and more efficiently. The act focuses, among other things, on preventing information blocking. It challenges the commercial space, providers and vendors, to meet the requirements of easy access to patient information, making data available on various portals. In the process, it has paved the way for connected healthcare providers in Cleveland and across Ohio to be able to share patient health information, including clinical laboratory, pathology, microbiology, blood bank, and transcribed reports.

At the state level, Ohio approved the creation in 2009 of a non-profit organization called Ohio Health Information Partnership (OHIP), tasked with creating the infrastructure for a statewide health information exchange where the medical community could electronically view and share patient health information.

If nothing else, the 21st Century Cures Act and Ohio's OHIP provided Dr. Sunshine with a receptive environment in which to advance UH Cleveland's HIE agenda.

The 21st Century Cures Act passed by the US Congress focuses on preventing information blocking, which consequently fuels the development of patient information sharing.

In the past 12 months, patients reported that they had to:



Nearly 1/3 of patients experience a gap in information exchange[2]

Yet to fully realize the benefits of patient information sharing, they had to undertake a three-stage process to overcome immediate challenges:

1 Invest in foundational work

A system of information exchange on the scale envisioned by Dr. Sunshine requires a great deal of foundational work. Dr. Sunshine spent the first ten years of his career advocating for a rock-solid infrastructure in UH Cleveland. It began with the need to prepare for immediate disaster recovery, which meant redundancy in data. As time went on and more of this data became available, it also became possible to exchange it. To this day, Dr. Sunshine credits the success he and UH Cleveland have enjoyed in HIE to their early commitment to data quality and data accessibility.

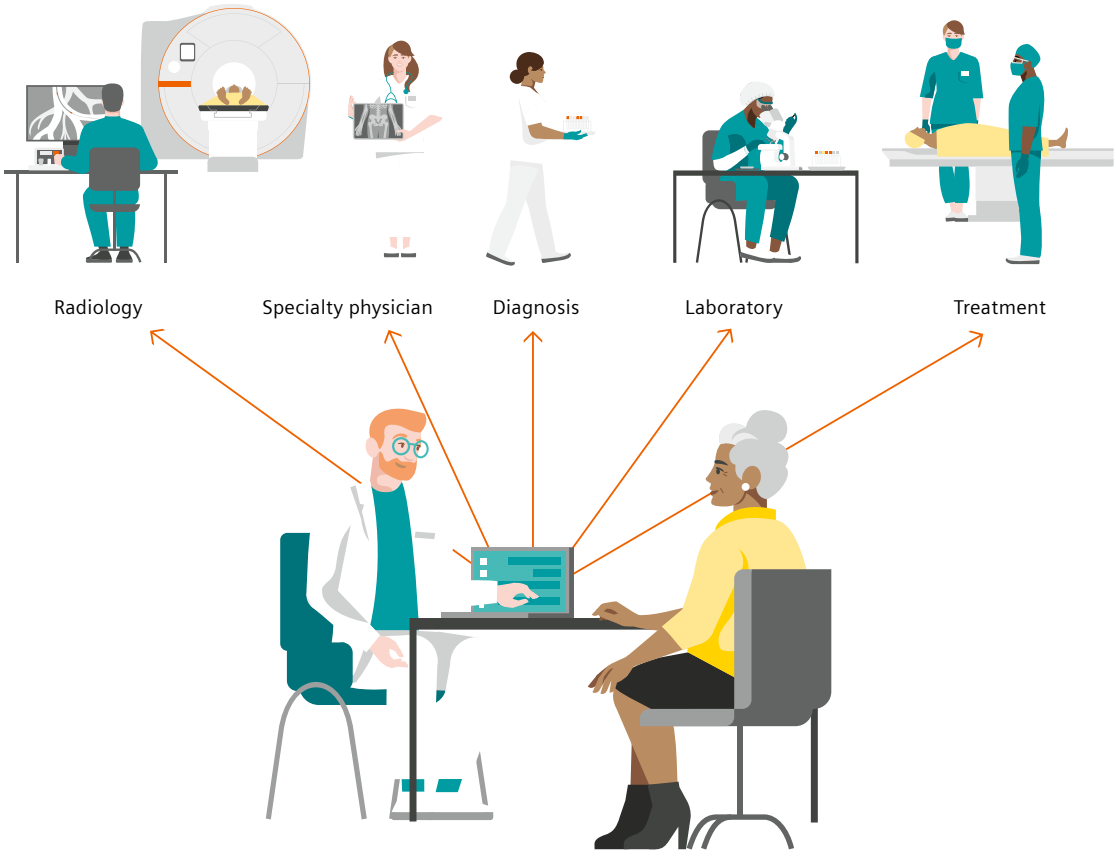
The next step was to ensure that patient information could be made available within and across all the UH Cleveland Medical Centre hospitals. With hospitals joining UH Cleveland through acquisitions, many were not on the same EMR. Dr. Sunshine and team's solution was to develop a way to load information from the multiple EMRs into a patient-centric *"Community Record"*—a platform that enables providers to directly view patient data from other EMRs.[1] It took several years to put the system in place, but the many sites of UH Cleveland now all have the same access to patient information.

2 Leverage local health information exchange

The bigger challenge that Dr. Sunshine and his team had to contend with was sharing patient records with hospitals outside of the UH Cleveland network. There are 290 hospitals in Ohio, and they are all on different EMRs. This is where the Ohio Health Information Partnership (OHIP) became so important. The Partnership created CliniSync—Ohio's statewide health information exchange—to electronically connect hospitals, physicians and others who care for patients through a secure network. Under the continuity of care model, providers can access patient's information without the hurdle of having to explicitly ask patients for their permission. When a care team logs onto the portal, that utilizes permission to share by implication and therefore opens up the flow of patient data. While security and privacy remain paramount, they no longer prevent sharing. Dr. Sunshine and the team at UH Cleveland recognized early on how important a resource like this could be. It was not necessary to spend a significant amount of money to develop their own technology when they could instead tap into the local network. UH Cleveland was among the very first to begin providing their data to OHIP, and as he remembers it, the very next day several other institutions followed suit. Today there are at least 155 different hospitals feeding data in to the HIE organization, allowing providers in Ohio to access longitudinal patient records that are central to patient-centered care.

"It has taken years. We have been consistent backers of health information exchange, and we were early to the table. Others are now happy to participate, but I think we saw this light sooner than others. It takes effort, but we see it as an obligation to our patients and the betterment of their health."

Dr. Jeffrey Sunshine, Chief Medical Information Officer
University Hospitals Cleveland



Continuity of care
An approach to ensure that the patient-centered care team is cooperatively involved in ongoing healthcare management towards a shared goal of high-quality medical care.

"We're much better at it than we were, but we have to continue learning to engage the patients. They can tell us what we need to do specifically to help them."

Dr. Jeffrey Sunshine, Chief Medical Information Officer
University Hospitals Cleveland

3 Improve operation workflows

By far the biggest challenge facing Dr. Sunshine, and this has been true for many other proponents of HIE, has been workflow. Hospitals have possessed the electronic capacity to process and share data for a very long time, but they have not been in a good position to leverage that capacity. Lisa Bari is CEO of Civitas Networks for Health, an organization dedicated to using health information exchange and health data, and multi-stakeholder, cross-sector approaches to improve health. She describes the problem this way:

"The biggest problem is workflow. Hospitals and health systems and providers really grudgingly adopted health IT, and then those systems were designed to be silos of data. They were not designed with exchange at the core of the capabilities and requirements. And so exchange has been an afterthought at best. And then exchange is also very limited in terms of who they are exchanging with."

Committed to making data patient-centric and user-friendly for clinicians at UH in Cleveland, Dr. Sunshine and his team set about overcoming workflow challenges, beginning with the exchange of patient data through Clinisync. In the early days, that workflow was cumbersome. To access patient data outside of their own networks, providers had to exit out of their interface, log on to Clinisync, and go back to their hospital's EMR. To make the process more seamless, Dr. Sunshine worked with the IT team to build an interface to the exchange in their EMR, allowing doctors and nurses to effectively link with and ask questions of the exchange. Dr. Sunshine calls it a *"contextual interface."* Essentially, it reduces the number of steps that providers have to take in order to find the information they need—it is all available with just one click.

Another example of workflow innovation involves image exchange. Even though digital imaging first entered widespread use in healthcare in the 1980s, the problem was always getting the images generated in one hospital or lab to providers at another hospital who need them. The solution for a long time was burn a CD or DVD, deliver it to another site, and load it to the other hospital's DVD drive. Dr. Sunshine and his team developed a method for transferring medical images by linking the PACS at one hospital to the PACS at another. This eliminated the need for a middleman, either in the form of a DVD or a person to transport it. As soon as doctors make a request for images housed in a different PACS, the image data can be transferred under continuity of care.

While the technology took a relatively short time to develop, getting through the various legal, compliance, privacy and patient advocacy obstacles before they were able to put the process in place was not easy.
Dr. Sunshine had to convince not only colleagues but competitors to get on board and allow his IT team to set up a link. In fact, the first health system that UH Cleveland approached when initiating information exchange was its main competitor, on the grounds that two hospitals with high volumes would surely both reap benefits. As Dr. Sunshine puts it, the first one is always the hardest. His approach was to focus on finding champions in other hospitals who support the HIE vision and who also strive for patient-centered care.
From there, finding other champions became easier, and over time, more and more hospitals signed up.

Improving workflow to make it easy for clinicians to interact with EMR is a key to ensure high technology adoption.

"Health information exchange is the price of entry. The role of providers is to make medical information transparent to enable better care for patients. The better an organization is at exchanging patient data, the more competitive advantage it has."

Dr. Jeffrey Sunshine, Chief Medical Information Officer
University Hospitals Cleveland

Next steps

Dr. Sunshine looks back on UH Cleveland's 23-year health information exchange journey with real pride, but no sense that the journey is over. He says there is still much work left to do.

First and foremost, it is still not possible for University Hospitals in Cleveland to immediately and easily exchange information with hospitals around the country irrespective of the EMR vendor they use. The focus until now has been regional exchanging, which benefits the greatest number of patients, but Dr. Sunshine sees a national HIE as the next frontier to be conquered.

"The record should go with patients, everywhere they go. Providers should have complete access to it, so they can add to it, but it's got to be about the patient," he says. "For me that's the ideal that I think we will be much better able to adhere to five to ten years from now. We'll all have our input mechanisms, but at the end of the day, the patient can hand you whatever it is, a phone, card or thumb-drive, and you can see his or her record and add to it."

Dr. Sunshine says there is also a great deal of progress to be made in how we use our freshly exchanged information, and he wants to see widespread focus on better population health management. As he explains, successful health information exchange can create a longitudinal patient record, but the critical next step is to use this complete patient data to develop predictive models in order to better manage population health.

Hospitals should be using the patient's longitudinal information for more than just helping that one person walking through the door, and think more broadly and use the data to engage with population health activities.

"We have to figure out a way to use the information we are now able to access to be more predictive about how to get proactive rather than reactive in healthcare," he says. "We want our patients to not receive just 'sick' care, but proactive 'health' care."

More than just exchanging information
The goal is to use longitudinal patient record to develop predictive models for better population health management.

Conclusion

If you ask Dr. Sunshine for his final word on HIE, and creating a longitudinal patient record, he will emphasize, and emphasize again, how critical it is that

"The core of what data sharing is all about is making information available to the people who need it, when and where they need it, so they can use it to help their patients. That's the whole game, right there."

And at that point, Dr. Sunshine takes the discussion away from technology and directly onto patients themselves. The ultimate goal, he emphasizes, is to enable the patients. The data that providers are collecting helps them better understand their patients' needs, and better predict patient outcomes. It changes the conversation they can have with patients, and empowers them to share decision-making. This can create a new relationship—a partnership—between providers and patients, where patients' personal preferences are taken into consideration. Patients who are involved in their healthcare decisions often experience more favorable health outcomes. And more favorable outcomes, says Dr. Sunshine, are the reason for everything.

Suggested follow-up on

siemens-healthineers.com/digitalizing-healthcare

- Insights Series, issue 24: Redefining telehealth. Available at: **siemens-healthineers.com/insights/news/redefining-telehealth**
- Insights Series, issue 26: How innovators are driving digital transformation in healthcare. Available at: **siemens-healthineers.com/insights/news/digital-maturity-in-the-era-of-patient-consumerism**
- Insights Series, issue 28: Frictionless healthcare: Why it matters and how to get there. Available at: **siemens-healthineers.com/insights/news/frictionless-healthcare**

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2. Gaps in Individuals' Information Exchange | HealthIT.gov [Internet]. Healthit.gov. 2022 [cited 17 March 2022]. Available from: **https://www.healthit.gov/data/quickstats/gaps-individuals-information-exchange**

About University Hospitals in Cleveland, Ohio

Founded in 1866, University Hospitals serves the needs of patients through an integrated network of 23 hospitals (including 5 joint ventures), more than 50 health centers and outpatient facilities, and over 200 physician offices in 16 counties throughout northern Ohio. The system's flagship quaternary care, academic medical center, University Hospitals Cleveland Medical Center, is affiliated with Case Western Reserve University School of Medicine, Northeast Ohio Medical University, Oxford University and the Technion Israel Institute of Technology. The main campus also includes the UH Rainbow Babies & Children's Hospital, ranked among the top children's hospitals in the nation; UH MacDonald Women's Hospital, Ohio's only hospital for women; and UH Seidman Cancer Center, part of the NCI-designated Case Comprehensive Cancer Center. UH is home to some of the most prestigious clinical and research programs in the nation, with more than 3,000 active clinical trials and research studies underway. UH Cleveland Medical Center is perennially among the highest performers in national ranking surveys, including "America's Best Hospitals" from U.S. News & World Report. UH is also home to 19 Clinical Care Delivery and Research Institutes. UH is one of the largest employers in Northeast Ohio with more than 30,000 employees.

Dr. Jeffrey Sunshine, MD, PhD
Chief Medical Information Officer University Hospitals & Professor CWRU School of Medicine

As a leading voice in the CMIO community, Dr. Sunshine is recognized for his efforts to promote and advance the use of technology to improve patient outcomes. In Cleveland, he is the primary liaison between University Hospitals (UH) clinical and IT staff, helping to facilitate the integrated use of their UHCare electronic medical record and many clinical applications across UH. In his tenure as CMIO, Dr. Sunshine has partnered with IT to optimize and connect EMRs and other key clinical systems, advance our digital health capabilities and elevate the patient experience through technology. Having contributed to many advances in MRI technology and clinical use, he remains in practice of Diagnostic and Interventional Neuroradiology.

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