



## CASE STUDY

### UNIVERSITY OF CHICAGO MEDICINE SETS THE STAGE FOR TRANSFORMATION WITH BLOCKCHAIN TECHNOLOGY



#### THE CLIENT

University of Chicago Medicine  
[www.uchicagomedicine.org](http://www.uchicagomedicine.org)



University of Chicago Medicine (UChicago Medicine) is a leading academic medical institution comprised of multiple medical centers as well as a 900-doctor physicians group. The private institution is affiliated with 12 Nobel Prize winners in physiology and medicine.

#### THE CHALLENGE

In the fall of 2018, UChicago Medicine embarked on an evaluation of technologies that would disrupt and accelerate business processes and require them to think differently about how they operate. Their existing process for patient consent management in a health information exchange (HIE) setting was cumbersome. A new approach would solve interoperability and patient consent management challenges and also potentially improve the patient experience.

HIEs have achieved a certain level of success, but they also introduce intermediaries and require additional layers of integration. UChicago Medicine needed a new framework that would allow patients to control their information, provide consent for sharing with providers, and limit the scope of information provided based on an event. A more robust solution would not only address these shortcomings, but also potentially improve quality of care as well as the patient experience.

#### THE SOLUTION

Together with Sirius, UChicago Medicine conducted a technology evaluation of blockchain technology for the representative use case "patient consent management." The requirements included a secure data-sharing framework that would consistently apply the right security access and functional controls for every event and participant. The

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patient would retain control over which provider(s) can access their data, as each provider focuses on delivering patient care. The framework also needed to limit duplication of hospital records and provide direct access to electronic health record (EHR) data when needed. Such a solution could potentially solve the challenges at hand, but would also unleash the true potential of health data; this is because blockchain technology can revolutionize how information is shared, simplifying, securing and enhancing collaboration between partner providers and patients.

With the help of the Sirius Blockchain Engagement Framework, UChicago Medicine's IT leaders participated in a Sirius Envision Workshop to evaluate their current business process, design the desired future state process, and develop requirements for a proof of concept (PoC) leveraging blockchain technology. The strategy is currently under review with stakeholders in the health system. The PoC findings are the foundation of an accompanying Sirius white paper titled *Healthcare Interoperability Using Blockchain Technology*, which articulates how a new system built upon smart contracts that employ blockchain technology can allow patients to control access to their health records within the system through a secure, streamlined digital consent process.

## THE POTENTIAL IMPACT OF BLOCKCHAIN ON HEALTHCARE

Blockchain is one of the most talked-about technologies among healthcare IT professionals today because of its potential impact on continuity of care, quality of care, improvements in health revenue cycle management, and much more. It is also a powerful platform for new services based on machine learning and artificial intelligence (AI).

Together, blockchain's shared ledger and smart contracts can ensure patient privacy to meet regulatory standards while providing appropriate visibility to caregivers and the payer network, all of which can be controlled by owners—patients, providers and health systems. Data access can be granted by the data owner, and access to every piece of data can be shared instantly in a secure, compliant way.

Blockchain technology can fundamentally simplify the way information is shared, and enhance collaboration between partner providers and patients. If clinicians have access to patients' full medical histories, they are more likely to make good decisions. And when all medical records, pharmaceutical purchases, genetic, social and even IoT data are combined in the future, a single clinician will have more information available to make even better decisions. When all these different types of data are combined with other similar data sets from thousands or even hundreds of thousands of others, that data could arguably lead to dramatic improvements in wellness. Machine learning and AI can be applied to these richer data sets to discover correlations between non-clinical data and clinical outcomes, identify clinical workflows that work well, and offer insights that help providers improve the quality of care.

## WHY UCHICAGO MEDICINE SELECTED BLOCKCHAIN TECHNOLOGY

In the fall of 2018, UChicago Medicine was poised to grow through formal partnerships, which put a heightened focus on improving interoperability and patient consent management. While there are several technologies that could solve the interoperability and patient consent challenges, blockchain offers three distinct features that address the consent management of patients in the client's consortium setting. They include:

- **Trust:** Blockchain, through its distributed, immutable ledger framework and cryptography, helps to establish trust between patients and the provider consortium network. All participants have up-to-date copies of the ledgers, which are consistent across consortium participants.
- **Contract governance:** Through digital smart contracts, blockchain unleashes the power of digitalizing the legal contracts that govern the rights in sharing data between consortium providers, and gives patients the ability to grant the appropriate access to providers.
- **Shared control:** Healthcare interoperability between trusted providers requires a shared control responsibility in terms of the data they can access, own and

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share. At its core, blockchain solves the shared control challenge through smart contracts, distributed ledgers and key infrastructures.

Proving the capabilities of these features was the key requirement of the PoC, and determined the criteria for success.

## THE SIRIUS BLOCKCHAIN ENGAGEMENT FRAMEWORK

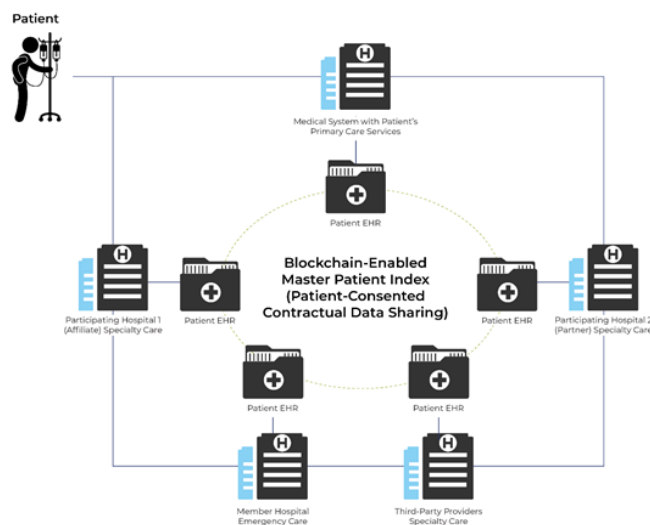
UChicago Medicine tapped Sirius experts across key IT disciplines to evaluate blockchain applicability for this use case. The Sirius IT Consulting practice led the process with a technology-agnostic, phased approach that began with a briefing. A technology overview and identification of experts and disciplines required to build the solution were covered as part of this initial phase. Specialized Sirius experts as well as stakeholders within the medical system's IT ecosystem were identified. This phase also included the review of sample use cases as well as the client's target use case, the focus of which was on the application of blockchain to the client's processes around EHRs.

A Sirius Envision Workshop attended by representatives from the client's medical system was the next phase of the engagement. During the workshop, the use case was clearly defined, data and contractual requirements were reviewed and agreed upon, and permissions and technology platforms selected. A phase followed where cloud innovation center methods were also reviewed, and a DevOps framework came together.

With an initial focus on the patient experience and healthcare interoperability, the solution can be extended in the future to the payer/insurance landscape and ultimately support the three-legged healthcare ecosystem of patients, providers and payers. The chosen PoC environment consisted of a Linux Foundation™ Hyperledger Fabric™ with a permissioned, private blockchain network, hosted on Amazon Web Services. The blockchain solution's PoC was developed to establish patient identity, key medical information, and medications external to its EHR systems. It also allowed for consent to be granted during patient onboarding so that health information exchange across member entities would be compliant with regulations and enforced with a smart contract.

The result of this work was a prototype solution that will allow patients to grant access to their health data with other medical facilities in the member network, as well as with non-affiliated medical institutions. The blockchain-based prototype solution was designed to facilitate patient consent and the electronic transmission of pertinent medical history that is requested to be shared, while still maintaining HIPAA compliance. This digital process would replace a slower and less scalable process, and in doing so empowers patients to seek out the best possible care without delays.

The final phase of the Sirius Engagement Framework for Blockchain will focus on scale, security, resiliency and support services.



## THE RESULTS

The PoC conclusively indicates a good fit for interoperability in regional health systems. It is a strong first step in that it provides a roadmap for implementation, identifying capabilities that will need to be developed prior to execution.

The PoC also allowed UChicago Medicine to establish a baseline to extend to the payer and provider network over time, completing a holistic, three-legged ecosystem view of the patient experience, insurance/payer requirements, and the healthcare provider landscape.

The group collaboratively reviewed current business process characteristics and pain points, and agnostically considered blockchain technologies and runtime environments. They also effectively developed the scope for a seamless transition from their client's existing patient consent management process to the blockchain-based solution.

## THE BENEFITS

- The blockchain-based prototype solution was built to provide all hospitals within the system with real-time access to accurate patient information. It can also allow patients to receive a consistent level of HIE service across all member medical institutions.
- Patients will be provided appropriate power of consent to align with HIPAA compliance, which will ensure that they receive needed medical services across the medical system without delays.
- Just as with medical data, IoT data typically resides in a silo. The blockchain data platforms allow individuals to bring their IoT data together with their medical records, which will help healthcare providers make better-informed decisions.
- Rather than being a passive recipient of care, a patient on a properly configured blockchain platform would be empowered to take a proactive role in managing their own health and to provide the information to whomever they choose, which would benefit the entire healthcare ecosystem.

This blockchain proof of concept is the subject of the Sirius white paper, *Healthcare Interoperability Using Blockchain Technology*. [Click here to download it now.](#)

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- *IT Strategy*
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