Blockchain & Healthcare

In this section we look at all the different sectors within the healthcare industry where blockchain could be applied — including Supply Chain, Health Records and Interoperability, Patient Matching, Patient Engagement, Care Coordination, Genomics, Insurance Claim Processing, Clinical Trials, Fighting the Opioid Epidemic, and Security.

Where appropriate, we'll list companies offering related solutions.

Supply Chain

Blockchain and supply chain are seen by many as a match made in heaven. Major tech companies — such as IBM, SAP, Microsoft and Accenture — are already working on decentralized versions of their supply chain solutions, or are creating new ones from the ground up. Also, some of them are developing universal blockchain solutions that would be able to power a different kind of applications, supply chain management included.

What is a Supply Chain?

Wikipedia defines supply chain as the connected network of individuals, organizations, resources, activities, and technologies involved in the manufacture and sale of a product or service. A supply chain starts with the delivery of raw material from a supplier to a manufacturer and ends with the delivery of the finished product or service to the end consumer. Consequently, Supply Chain Management (SCM) presumes the management of the flow of goods and services, including the movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption.

In other words, companies implement SCM solutions for multiple reasons — including to increase revenues and decrease costs, improve quality, accelerate production & distribution, and more.

When it comes to healthcare, a comprehensive SCM solution may even be **mandated by the government**, which wants to know that medical supplies and drugs are properly produced and that their production abides to previously defined standards.

Supply chains are all about trust

For a supply chain to function properly, it is required that all parties involved in the process trust each other.

In the medical setting, supply chain management requires dealing with factors such as regulatory compliance, product security, product damage and/or spoilage.

In current systems, the Supply Chain Management is centralized, with one big company — typically the one making an order — controlling the process from one or a few locations. With the use of blockchain, that process could be decentralized, increasing the trust in the process every step along the way. Simply put, once the information is saved on a ledger, it can't be (easily) changed.

Speaking of which [information], a blockchain-based system can make sure that all parties involved in the supply chain have the right information, from material suppliers to end users.

Among the things that could be improved with blockchain are:

- **Traceability** – a blockchain-based system lets parties easily trace the materials used, and see who did what in a supply chain.
- **Contract Enforcement & Management** – with a smart contract making sure every company included in a supply chain does its part; otherwise, it doesn't get paid.
- **Damage & Mishandling Management** – if there was a mistake/error with a product, a blockchain-based solution could help determine where the problem was caused.
- **Oversight On Counterfeiting** – which is very important in drug manufacturing, not only for pharmaceutical companies but also for patients.
- **Supply Chain Auditing** – makes life easier to auditing firms, with blockchain letting them explore the process from the inside out.
- **Consumer Trust** – if a product is made for end-users, a blockchain-based solution could let them learn the ins and outs of the item they are looking to buy.

In a nutshell, blockchain adds a lot to supply chain management, and unsurprisingly there are many companies looking to take advantage of the technology.

Supply chain in healthcare space

Generally speaking, there are three major groups within the supply chain in the healthcare space: producers, intermediaries, and providers.

- **Producers** – these are manufacturers of pharmaceuticals, medical devices, and other healthcare supplies and equipment.
- **Intermediaries** – the distributors and group purchasing organizations that secure products from the producers, negotiate prices, and bring healthcare products to the provider marketplace.
- **Providers** – include the hospitals and medical practices that use those products.

Supply chain management by itself is complicated; in the medical setting, there are additional factors to deal with — such as regulatory compliance, product security, product damage and/or spoilage. The situation gets even trickier when products require special handling, such as temperature regulation during transport, when shippers have to keep the product within the required range and prove to regulators that they've done so. Blockchain can make this process far more efficient, while saving time and money.

Which leads us to the next part…

Adding IoT to the mix

Small sensors can and are already used to ensure some products are produced and then transported to **meet certain standards**. For instance, a sensor could be placed in every container to make sure products such as drugs and blood are kept in the previously defined temperature and humidity ranges. One company, Chronicled, has developed such sensor that tracks and stores readings on a blockchain to ensure secure data transmission.

Similarly, an **adhesive sticker** could be placed on boxes of drugs or other medical supplies that would be used to identify physical items at each stop in the supply chain. During every scan, the item would be verified for authenticity against the blockchain registry.

At the end of the road when the drug reaches a local pharmacy, the same system would allow the buyer to verify the drug, to make sure it is genuine and properly managed on its way to the pharmacy.

Select companies

The following companies are developing (or have already developed) blockchain-based systems for supply chain management for healthcare:

Chronicled

Headquarters: San Francisco, California, United States
Funding Amount: $12M
Select investors: Colbeck Capital, Mandra Capital, Pantera Capital, Solon Mack Capital, Streamlined Ventures
https://chronicled.com/

Chronicled builds special purpose blockchain-based applications for supply chain and IoT clients. The company's technology can sync with several blockchain protocols and has applications ranging from medical devices and pharmaceuticals to package tracking. For specific products like pharmaceuticals, blood, and human organs — which often need to be kept at low temperatures — Chronicled has developed a portable sensor that tracks and stores temperature readings on a blockchain to ensure secure data transmission. Also, it has made a tamper-proof adhesive sticker called CryptoSeal to identify physical items.

Modum

Headquarters: Zurich, Switzerland
Funding Amount: $10M
Select investors: FinForge, Kickstart Accelerator, The Entrepreneur Club, Venture Kick
https://modum.io/

Founded in 2016, Modum has developed a blockchain-based and IoT-enabled supply chain monitoring an optimization solution that measures environmental conditions at high shipment volumes for the pharma industry. It offers instant notifications of temperature excursions and other events, such as motion, when the sensing device is read out wirelessly. The entire solution can be seamlessly integrated with existing workflows and enterprise management systems, such as SAP, and leverage a recorded trusted event for further process automation. It also integrates well with track-and-trace systems across supply chain.