

# Blockchain Technology to Prevent Future Pandemics

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**Abstract** - The sudden uncontrolled worldwide spread of the Coronavirus shows us the failure of existing healthcare systems to timely handle public health emergencies. Though improvements in healthcare surveillance are realized, these still disappoint in preventing pandemonium. Lack of necessary steps taken to verify containment and tracking of the virus have aggravated matters. There are several uses of blockchain technology in healthcare. So, this research paper may be a summary on how we are going to take precaution within the long run pandemic using the blockchain technology. The utilization of blockchain can help prevent pandemics by enabling early detection of epidemics, fast-tracking drug trials, and impact management of outbreaks and treatment.

**Key Words:** Blockchain, Healthcare, Smart Contract, Pandemics, Records Management, Drug Discovery

## 1. INTRODUCTION

Blockchain is taken into account as a ledger system that assists in managing and storing data in timestamped blocks that works mainly decentralized manner over any computing networks and linking using cryptography. Blocks on the blockchain are made from digital pieces of knowledge. Specifically, they need three parts:

- Blocks store information about transactions just like the date, time etc.
- Blocks store information about who is participating in transactions. Rather than using your actual name, your purchase is recorded with none identifying information employing a unique "digital signature," form of sort of a username.
- Each block stores a novel code called a "hash" that permits us to inform it but every other block. Hashes are cryptographic codes created by special algorithms. At its most simple level, blockchain could be a database which is shared by multiple participants.

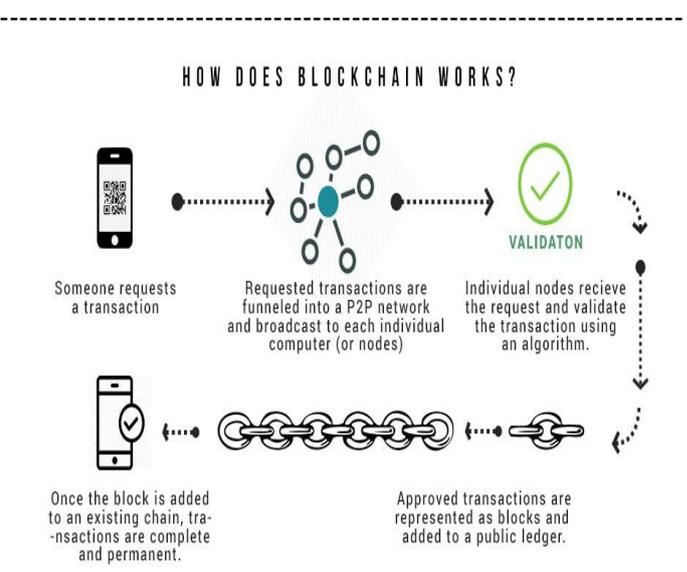


Figure1: Working of Blockchain Technology

## 1.2 SMART CONTRACT

A smart contract is additionally a self-enforcing agreement embedded in writing managed by a blockchain. The code contains a gaggle of rules under which the parties of that smart contract accommodates interact with one another. If and when the predefined rules are met, the agreement is automatically enforced. Smart contracts provide mechanisms for efficiently managing tokenized assets and access rights between two or more parties. One can consider it type of a cryptographic box that unlocks value or access, if and when specific predefined conditions are met. The underlying values and access rights they manage are stored on a blockchain, which might be a transparent, shared ledger, where they're shielded from deletion, tampering, and revision. Smart contracts, therefore, provide a public and verifiable thanks to embed governance rules and business logic in a very only some lines of code, which might be audited and enforced by the bulk consensus of a P2P network.

There have been attempts to use blockchain in various industries, including finance, distribution, and manufacturing, and its use in the field of medicine is also being researched.

## 2. LITERATURE SURVEY

Previously, the reports are generated on papers. There is no such system which can actually hold the patient data and can be equally secure. No proper data about the drug discovery, the medicines which are available and which needs to be imported. It involves a lot of time for processing tests and generating the reports and which also includes the chances of human errors.

In this research paper I've got discussed the chances to beat future pandemics with the assistance of blockchain technology. Currently, most countries have a communicable disease reporting system during which hospitals and clinics diagnose and report patients to the upper authorities, which successively report the cases to the ultimate authority. This technique will save plenty of your time processing the reports and might also help in treating patients fast. Also, we will analyze the information stored inside the database and take necessary decisions and may also do drug discovery.

Below, let's discuss how blockchain can help preventing in the future pandemic events.

### 2.1 TRACKING OF MEDICINES

There is no track of details on "which medicine is produced? Where and why that medicine is being imported from other countries?". Keeping a track of medicines could have solved this pandemic situation earlier. As we all know blockchain stores the information in ledger format which assigns the unique key to every entity involved within the transaction. So, with the assistance of blockchain, we are able to assign a singular code to the medicines which are developed and may keep a track of it.

Keeping a track by means, recording a sale of the medicine in a decentralized server of the blockchain. Generating a report from the data gathered can help doctors and researchers help in understanding the drug discovery for a particular disease. With the help of blockchain we can keep a track on medicines which are being imported in other countries and can also come to know the cause for which they are using these medicines. So that, if there is any such pandemic occurs, we have a report generated about how much medicines we have available with us and how much more we need to discover or make.

### 2.2 PATIENT RECORD MANAGEMENT

As a large amount of medical data is being produced because of COVID-19 infection, everything has to be stored and secured properly. Blockchain are often handle medical records, maintain its integrity, and also handle real-time data. This can help scientists during data analysis.

Data collection may be automated using blockchain. As blockchain stores data in ledgers and that they are protected against unauthorized access, patient privacy is going to be maintained. Data like patient names, treatments, and progress is stored. This data is made available for all specialist doctors, which is able to help in treatment, diagnosis. The medical data of novel coronavirus has to be preserved and digitally maintaining its security and patients' privacy is paramount. Moreover, it's to facilitate the research and development of vaccinations and medicines for the COVID-19 and future pandemics.

The concept of tokenization is that the process of converting some sort of asset into a token that may be moved, recorded, or stored on a blockchain. We will tokenize unique assets sort of a patient's identity and a non-unique asset, like a ventilator. Consider this from a supply chain perspective and every one the challenges we've encountered identifying what medical equipment we've available. Public health needs include tracking infections, deaths, recovery, research and more that would get pleasure from the provenance and auditability provided by blockchain technology.

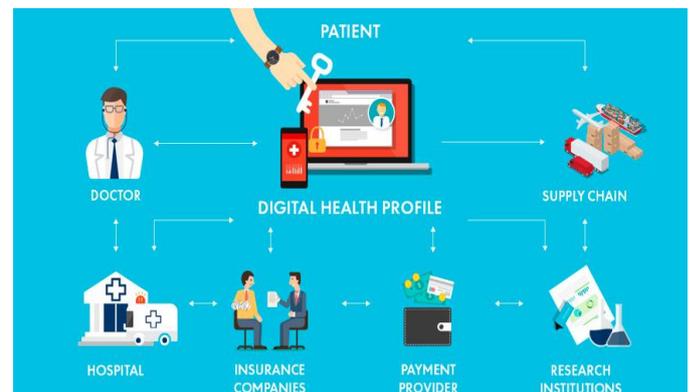


Figure2: Patient's digital profile being used for different purposes

### 2.3 TRACKING INFECTIONS/DISEASES

As all medical data surveillance and storage will increase transparency among various departments, this can lead to more accurate reporting. Better reporting will, in turn, cause faster processing of health data. It'll enable doctors and scientists to trace infections before they transform into a virus.

Scientists can catch the virus origins efficiently using blockchain. They'll review a patient's symptoms, recovery, and monitor data in real-time. This may immensely help in controlling the transmission and analyzing this situation.

### 3. CONCLUSION

The vulnerable situation created due to the COVID-19 pandemic has shown the necessities of developing one sourced blockchain based pandemic health record management system to handle the several existing and future challenges. The blockchain technology can assist in drug development, creating preventive policies, treatment plans, vaccine verification, and drug trials – all of which may cumulatively help in preventing pandemics like COVID-19 within the long run. I examined how blockchain can improve upon the shortcomings of this technique and thus help people during this pandemic or within the event of other infectious diseases in future. I anticipate that blockchain technology are ready to play a greater role in future during actual disease outbreaks.

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