



**Presented**  
**by**  
**Sadhana Cheemalamarri**

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## **Executive Summary**

230 million US health records have been lost or stolen in just the last decade, accounting for around 41.2 million a year. The lack of medical records can result in delays in medical treatment and also cause incorrect diagnoses, which can result in the patient's death. The loss of data is also dangerous for the doctor because it can result in lawsuits for breaking HIPAA guidelines, cost thousands of dollars, and the revocation of their medical license. Additionally, Medical records take around 15 days to transfer, and urgent requests can take up to 2 hours. The slow transfer can often prove life-threatening in emergencies, as even a second loss can affect a patient's health immensely.

MediBlock uses blockchain and a single chain to securely hold the patient's medical records. Through this method, records can be found and transferred in seconds. In addition to quick and easy transfers, MediBlock provides top-notch security for medical records during storage and transfer while being cost-effective.

MediBlock also promotes scalability as it can transfer hundreds of transactions in a second, allowing large hospitals to use this service easily.

At MediBlock, we aim to provide patients and doctors with easy access to medical records with the utmost confidentiality and security. With a team of experienced security, financial, and chief marketing officers, Blockchain designers, engineers, legal consultants, and data scientists, we are able to develop the most efficient and practical database to revolutionize the healthcare industry.

Together with MediBlock, we can Save Lives, Time, and Money while protecting patients' confidentiality through blockchain technology.

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# Description of the MediBlock

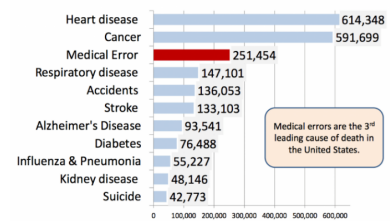
## Problem

**Loss of Health Records:** In the past decade, about 230 million US Health Records have been lost or stolen. The loss of such information can result in patient confidentiality leaks, delays in treatment, and an incorrect diagnosis.

Medical records traditionally require large storage units, in which records are often misplaced or lost.

In comparison, standard Electronic health records are more efficient ways of storing information; however, because the rate of hacking and stolen records is considerably higher, this method is unreliable.

Number of Deaths in the United States



Sources: CDC, National Center for Health Statistics. Number of deaths for leading causes of death, 2014.

**Transferring Medical Records:** Transferring medical records from doctors to doctors or patients is a lengthy process that can legally take 15 - 20 days on average, per transfer. This transfer setback can be very dangerous, as it often results in a delay in treatment which may prove life-threatening to the patient.

## **Time efficiency**

When visiting a doctor, an individual spends, on average, 10-30 minutes inputting personal information such as medical history, social security numbers, and insurance details. This process is not only time-consuming and tedious but could also result in a threat to confidentiality. Research shows that after filling out these forms, they are often placed in the office for 10 minutes to an hour. During this wait time, strangers or clients can view the patient's information, which breaches patient confidentiality. The leak of such personal data, SSA, and more violates patient confidentiality

## MediBlock Proposed Solution

MediBlock utilizes the fundamentals of blockchain to provide people with medical records efficiently and safely. Through hashing and encryption, Mediblock can store medical records while maintaining confidentiality and following HIPAA guidelines.

Using the single-chain blockchain allows for information to be accurately sent and received in seconds.

Additionally, due to the MediBlocks ledger that holds the patients' data, the patient will never need to fill in forms. The employees won't need to spend time validating and imputing patient information.

Instead, the fully validated information can be found on the MediBlock ledger, saving time and minimizing the chances of personal information leaks.

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## Structure

MediBlock will utilize a single-chain blockchain called MediChain which focuses on storing and transferring medical records safely and securely. MediChain works as one large blockchain that stores Medical records in the form of Blocks, which hold your medical records as Non-Fungible tokens. The Blocks on MediChain will have a block size of 30MB; this large block size will allow patients to transfer many documents at a time. And as the National Institute of Health states, each individual has an average of 200 medical records, with an average of 13 pages per appointment. With this information, it can be assumed that each NFT needs to be able to hold ~13 pages. Suppose the patient is required to send multiple appointments worth of documents. In that case, the block needs to be able to send these documents, making a larger block size more applicable.

Additionally, sending all necessary documents at one time in one block makes the transaction/gas fees cheaper as well as more organized. This blockchain utilizes a proof of history consensus algorithm to make the blockchain more efficient while maintaining security (more information on page 7). This POH will be used to validate blocks that are entering the MediChain and validating gas fees for sending the documents. In turn, people validating these blocks are given an MBKT token as a reward (Not an investment product or offering).

The MediChain is one of the first blockchains focusing solely on sending and receiving NFT. Therefore the blockchain is made in specific to send and receive large NFTs while still providing high speeds.

## **Protocol, Implementation, and Network:**

Compared to many of the existing blockchain projects that use a public blockchain (Ethereum and Bitcoin), MediBlock (MediChain) will be a private blockchain allowing hospitals and private patients to safely hold medical records while maintaining a high level of security. Private blockchain, also called permissioned blockchain, can restrict who can access the network and whether they can view specific data on the blockchain.

Our private blockchain allows MediBlock to hold patient medical records in a safe and organized manner, providing hospitals and patients with a streamlined solution for managing medical data. The MediChain network ensures secure data transfer between hospitals and patients, safeguarding sensitive information.

For example, a patient named Julia at John Judes Hospital in Texas shares three medical documents with Dr. John at Baylor Scott and White Hospital in Houston, using the MediBlock network. The network will record that three papers were sent at 3:30 PM on 11/12/24, but the contents of the documents will remain encrypted and inaccessible to anyone other than Dr. John. Julia's and Dr. John's identities will remain pseudonymous, with the blockchain recording only their wallet addresses, providing an additional layer of privacy.

At MediBlock, we're committed to ensuring the security and confidentiality of patient medical records while providing a user-friendly and efficient platform for managing medical data. Our private blockchain offers hospitals and patients a reliable and secure solution for managing medical records, paving the way for a better healthcare system.

# Validating system

The NFTS and any medical record transactions will be validated through a Proof of History concept. This method will allow for thousands of transactions to be done in seconds while maintaining high-quality security and convenience.

## Proof of History

Proof of history in blockchain refers to a mechanism used to verify the order and timestamp of transactions on a blockchain. It works by creating a verifiable record of events that can be used to prove when a particular transaction occurred. This record is generated by a trusted source known as a "time-stamping authority" and is typically based on a cryptographic proof of work or consensus mechanism. By using proof of history, blockchain networks can ensure that all transactions are recorded accurately and cannot be altered or tampered with after the fact. This provides a secure and reliable way to track the history of transactions on the blockchain, making it a useful tool for MediBlock.

Proof of History (PoH) is a consensus mechanism that is used in some blockchain networks to establish the order of transactions. Unlike traditional consensus mechanisms like Proof of Work or Proof of Stake, PoH does not require complex calculations or staking of assets. Instead, PoH uses a verifiable delay function to create a timestamp for each transaction.

In PoH, miners are not required as there are no blocks to be mined. However, validators are required to verify the timestamps created by the PoH generator. Validators must meet the following requirements:

MediBlock utilizes this concept of Proof of history in order to -----

## Validators:

They perform complex mathematical calculations that require a significant amount of computational power to validate new transactions and add them to the blockchain. This process helps to prevent fraudulent transactions and ensures that the blockchain remains secure and tamper-proof.

In addition, miners are incentivized to maintain the integrity of the blockchain through the use of rewards, such as cryptocurrency tokens or transaction fees, which they receive for their efforts in securing the network. These incentives help to ensure that miners are motivated to continue performing their crucial role in the proof of history system.

MediBlock will be focused on the work the miners do in order to run the system. For the medical records to be recorded, the medical records need to become NFTs and then enter the system, and in order for this to happen, they will need a miner. In order to keep the miners interested in continuing to validate transactions, the miners will be rewarded with MediBlock tokens.

## **MediBlock Token (MBKT):**

Transaction fee:

**Burn:** *There will be a total token supply of 1,000,000 tokens, of which a certain amount will be burnt over time. This means that this type of token is deflationary, and therefore, the value of the token will grow as time progresses. This is done in order to motivate miners to continue validating records.*

**The MBKT token is a utility token and is not an investment product or offering.**

## **MBlock Wallet system:**

In order for the medical records to be stored in an organized and easy-to-find manner, the medical records will be held in a wallet in the form of an NFT. This MBlock wallet will have the capacity to store 1-10,000+ NFTS and MDKT tokens. Additionally, with aims of promoting worldwide collaboration, the owner of medical records will be able to monitor and give viewing access to certain people. This is done through the creation of a smart contract that will allow the owner to set certain passwords or private keys to certain groups of medical records. Then this password will be shared with the doctors and people involved with those documents, and through the smart contract, they will have access to these documents until the owner of the files changes the password of the documents (through a smart contract) at this point, they would no longer be able to access these medical records until a new password is shared. This processing method can be used for many different applications, from the 18-year-old deciding medical records ownership and if their parents are allowed to see them to the collaboration with many doctors.

Additionally, while creating an NFT, a small gas fee will be required, as the NFT will enter the blockchain and be validated.

Lastly, it is crucial to know that one is responsible for remembering their wallet password; losing this password may result in a permanent lock-out. This is done in order to ensure the highest amount of security with your documents. However, although we currently don't have a method of resetting passwords while not decreasing security, this is something that MediBlock is working to tackle.



The wallet that contains tokens and NFTs will be connected to the MediChain through an Application Programming Interface (API), where the transactions are then validated through the MediChains **Proof of History**.

## NFT:

NFT stands for Non-Fungible Token, which is a unique digital asset that represents ownership of a specific item or piece of content on a blockchain. It allows for the creation, ownership, and transfer of one-of-a-kind digital assets, such as art, music, and collectibles. Due to their ability to hold documents in the Blockchain system, Medical records will enter the MediBlock Blockchain in the form of NFTS.

Each medical record will enter the blockchain as an encrypted NFT, due to this property, the document will be able to maintain its immutable and secure property. Additionally, in order to provide the highest security, these files will be encrypted through a Hash system. “Hashing is the process of transforming any given key or a string of characters into another value” (Investopedia). In this method, the medical records will be well recorded in the form of audit logs. These logs will record when the medical records were verified, if they were edited, if the smart contract was edited, etc. This will increase the available security. In order to decrypt your NFTs and view your medical record, the owner of the wallet will be required to unlock the wallet, and all the medical records will automatically unlock for the owner. If the NFT record is being shared with someone else, the other person will need to enter a password in order to decrypt and view the NFT.

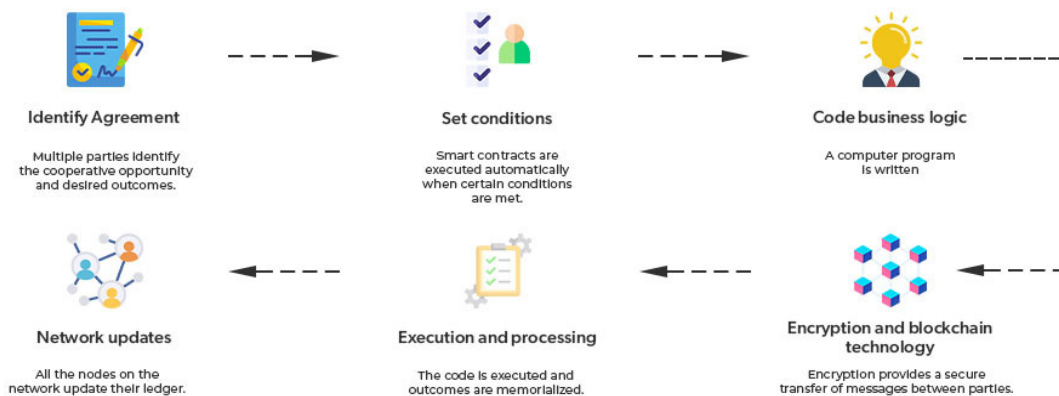
\*\*\* Disclaimer: this does not prevent people from taking a picture of your documents and now having the contents of the medical records, therefore be aware of your surroundings when accessing your medical records to prevent unwanted pictures and videos of personal documents.\*\*\*

## Smart Contracts:

Smart contracts are self-executing digital contracts that use blockchain technology to enforce the terms of the agreement. These Smart contracts are the base of the MediChain which will be used for password recovery, gas fees and document sharing. Each NFT medical record that is created will also contain a MDK Smart contract. This smart contract contains one of MediBlocks unique qualities, its Upgrading ability.

## **Passwords:**

One of the largest issues with blockchain based wallets are the passwords. Due to the blockchain structure, if the wallet password is lost or forgotten, the owner is permanently locked out of their wallet. This is done with aims to bring the highest level of security, something we as MediBlock aim to maintain. However, while dealing with information as important as Medical records, we recognize there needs to be a way to recover the password for the wallet that holds all the patient's medical records. Therefore, our solution was to utilize the concept of Upgrading Smart Contracts in order to create a space for the owner of the wallet to make a new password for the Wallet. Similar to the reset the password button most standar websites have, the owner will be able to reset the password through the smart contract. However in order to provide the same level of high level security with the ability to reset the password, the owner needs to remember the password to the smart contract instead. This means in order for the patient to access their wallet, they either need to remember the smart contract password or the wallet password. The smart contract password will be used to decrypt the smart contract and access it.



# Sharing Medical Records

Patients often work with different doctors throughout their lives, which can create challenges when it comes to transferring medical records between providers. At MediBlock, we aim to solve this problem by providing a simple and secure way to share medical records.

Our process begins by converting medical records into encrypted Non-Fungible tokens, which are validated on the MediChain with a small gas fee. This encryption ensures that only authorized individuals can view the contents of the NFT. Once the NFT is added to the blockchain, an original hash is created, which enables the MediChain to detect any changes to the document, providing an additional layer of security.

After the medical records are converted into NFTs, patients can add them to their MBlock wallet for easy access. To share a specific NFT with another individual, patients simply share the NFT's address and provide the password to decrypt the NFT. Once shared, the recipient will have access to the document indefinitely. It is important to double-check the intended recipient before sharing to prevent unauthorized access to medical records.

In order to better explain this process an example will be used. Sally is having a heart surgery and needs to share her medical records to Mr. Josh in Columbia and Ms. Jia in South Korea. In order to send the proper documents to these doctors, she edits the smart contract to encrypt documents 1,4,5,6, and 7 with the password. She then sends the doctor the password to those doctors and asks the doctors to access the file with the password given. Then both doctors locate the files through the patient's public address and then use the password to decrypt the files that are relevant to them. From here if the patient wants to remove their access to the file, due to the documents "Upgrading" capabilities they can change the decryption passwords so the doctors no longer have access to the documents.

At MediBlock, we prioritize both ease of use and security. Our secure hashing and encryption methods make sharing medical records simple and safe for patients and healthcare providers alike.

# Data Privacy & Security

230 million US health records have been lost or stolen in just the last decade accounting for around 41.2 million a year. The majority of these medical records have been lost due to hackings, which not only adversely affect the patient but the hospital and HealthCare company as well. Understanding the importance of medical record security, we at MediBlock use Encryption, Hashing, Digital signatures, Access control and a Private blockchain in order to provide patients with the highest level of security so they don't have to ever worry about losing them.

- **Encryption**

Encryption is the process of converting medical records into jumbled code and letters, making the contents of the document unreadable. This encryption process happens when converting documents to NFTs. Encrypting the NFTs prevents unwanted eyes from seeing personal information. In order to decrypt the NFT, the owner will use a password, which will then allow them to clearly view the documents.

- **Hashing**

Hashing is the process of generating a fixed-length, unique code from a piece of data using a cryptographic algorithm. In MediBlock, sensitive information can be hashed to protect patient privacy and ensure data integrity.

- **Digital Signature**

Digital signatures are cryptographic techniques that use public and private keys to verify the authenticity and integrity of a message. In MediBlock, digital signatures can be used to ensure that only authorized parties can access and modify sensitive information.

- **Access control**

Access control is the process of restricting access to sensitive information based on user identity and permissions. In MediBlock, access control can be used to ensure that only authorized users can view, modify, or share sensitive information (Private blockchain)

## Speed and scalability

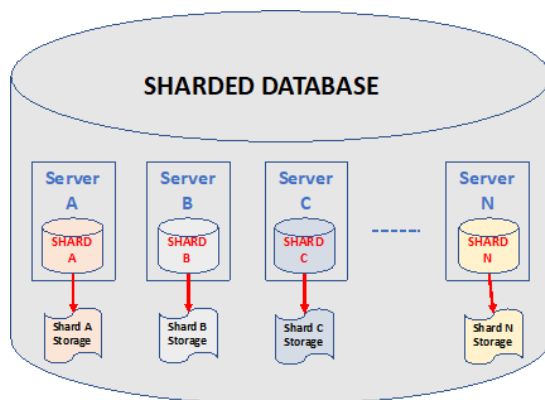
MediBlock values, patients, time and therefore works toward decreasing time spent, transferring medical records, and filling out forms. So this time can be spent with your loved ones or doing something you love.

“Lost time is never found again.” – Benjamin Franklin

With the high level of Medical Records continuously entering and traveling on the blockchain, MediBlock needs to be fast, efficient and scalable. In order to make this possible MediBlock takes advantage of sharding. Sharding is a method used in distributed database systems to divide a huge database into smaller, easier-to-manage parts known as "shards." These shards are then stored on separate nodes within the distributed system, with each node responsible for handling queries that pertain to its specific shard.

The primary objective of sharding is to boost the scalability and performance of a distributed database system by enabling queries to be processed concurrently across multiple nodes. This can prove especially beneficial for large-scale applications that necessitate high throughput and low latency.

Through this MediChain is able to hold more blocks, while still maintaining high speeds.



(quest oracle community)

# Proposed Strategies

*MediBlock utilizes the fundamentals of blockchain to facilitate people with medical records efficiently.*

## Building a Network

Mediblock aims to have around 100 loyal individual patients and 2-5 loyal hospitals within 6 months of the product's launch. Initial interest in the product may be delayed due to the reluctance to trust a new system with confidential information, therefore marketing will play a vital role in the company's success. Because of the expected slow adoption rate to this new technology by reaching many people and multiple hospitals, Mediblock will be able to efficiently hold patients' medical records and provide quick transfers of information. Some main Hospitals we are expecting to reach are the Baylor White & Scott and Texas Health Hospitals.

## Globalizing

In the long run, Mediblock's goal is to branch out globally and be able to help secure data around the world. By globalizing we will be able to help more patients feel secure and protect and provide doctors with quick, accurate patient records. Globalization will also bring in more funds for further improvements of the MediBlock system.

## Product/Service Features and Benefits

MediBlocks' most valued feature is its security. Mediblock protects the medical records uniquely through the RSA algorithm with private and public keys and through 2-factor authentication. Additionally, the process of miners and proof of transaction also provides additional security for the information.

Mediblock is also unique for its fast transaction speed. Unlike any other healthcare blockchain company, Mediblock utilizes a sharding to increase the speed of transactions which also increases the scalability of the company. This means that transactions can be done at incredible speed, for cheap and increase the scalability.

## After-sale Services

After the sale, the members will be provided with a warranty/ guarantee that all medical records will follow HIPAA guidelines and will provide quick and cheap transactions. Additionally, 24-hour support will always be available, for emergencies or issues. Overall after the purchase of MediBlocks, the buyer will receive the software of MediBlock, a course on how to properly use

MediBlock and a certificate of purchase along with a warranty of safe, cheap, transfers and record-holding.

## Industry: Blockchain in HealthCare

By 2030 the industry for blockchain is expected to reach \$459.8 billion. The global Electronic Health Records market is expected to reach \$47.25 Billion by 2027. Therefore the market for blockchain in healthcare is expected to reach \$2.3 billion (USD) by 2027. Keep in mind that due to the technology being new and developing, this value is not set in stone. In Conclusion, due to the industry value being high, the project has space to grow and impact millions everywhere..

## Target Market

The target market for MediBlock will be hospitals with a large number of customers. This accounts for around 6,210 large hospitals in the United States. This is the target market because larger hospitals that have a large number of patients are more likely to have issues with the organization of the medical records in a safe and secure manner. Therefore through such large hospitals, MediBlock could make this process more efficient and safe.

The Targeted addressable market would be 789 hospitals in Texas, this is the Targeted market because it is closer to the organization of ideas, meaning news can be spread quicker and more efficiently.

In the first 5 years of the launch, MediBlock aims to reach 74 hospitals in Dallas, Texas, including a few major hospital branches such as Balor Scoot and White. Doing so will increase brand recognition and bring more openness to the idea of online blockchain-based medical record storage. Resulting in the growth in MediBlockes popularity.

# Legality

Some legal issue that exist in MediBlock, an blockchain based medical-recording service includes:

- **Data privacy and security:** Since MediBlock is a Blockchain based medical record service that may collect, store, and process sensitive medical data. This may raise concerns about data privacy and security. However, in order to maintain a high level of security MediBlock uses Hashing, Digital Signature, Access control, private blockchain and encryption. Beyond this MediBlock complies with data protection regulations, such as HIPAA, and implements adequate security measures to safeguard the data.
- **Liability for inaccurate or incomplete records:** Due to the structure of Blockchain technology all documents that enter the MediChain need to be accurate, as due to the chain's immutable properties, anything that enters the blockchain can not be changed or removed. We understand that inaccurate or incomplete medical records may result in the hospital and MediBlock facing legal liabilities. Beyond requesting that Medical records are proofread for errors before uploading it to the blockchain, MediBlock can not prevent incomplete medical records completed by Medical professionals. However, MediBlock can guarantee that documents that have been properly uploaded into the system, will not contain errors that previously did not exist. Therefore, what you upload is what will be saved on the MediChain. And MediBlock will not be liable for any issues regarding the actual information on the medical record prior to it being uploaded into the MediChain.
- **Regulatory compliance:** The healthcare industry and the electronic health care industry is highly regulated in order to protect the patients data. Therefore, MediBlock will work to comply with all applicable HIPAA, FDA regulations, and state and federal privacy laws. Failure to comply with these regulations could result in legal penalties, fines, or other sanctions (full list of regulations will be below).
- **Jurisdictional issues:** Since MediBlock can be operated on many different countries and locations. Issues regarding jurisdictional boundaries, regulatory compliance, and cross-border data transfers, will be addressed in the future. Currently MediBlock is only available in the US, therefore this will be further explored while expanding



## MediBlock Related Laws:

Below are the list of specific laws and regulations that MediBlock follows in order to ensure patient information is maintained secure.

### **II. Medical Records Laws**

#### A. HIPAA (Health Insurance Portability and Accountability Act)

1. Overview of HIPAA
2. Privacy Rule
3. Security Rule
4. Breach Notification Rule

#### Enforcement of HIPAA

5. B. HITECH (Health Information Technology for Economic and Clinical Health Act)
6. Overview of HITECH
7. Meaningful Use

#### Electronic Health Records (EHRs)

8. C. State Laws
9. Overview of state laws
10. Examples of state laws

### **III. Transfer Laws**

#### A. EMTALA (Emergency Medical Treatment and Active Labor Act)

1. Overview of EMTALA

#### Transfer requirements

2. B. Stark Law
3. Overview of Stark Law

#### Prohibition on physician self-referral

4. C. Anti-Kickback Statute
5. Overview of Anti-Kickback Statute

#### Prohibition on kickbacks and other forms of remuneration

6. D. COBRA (Consolidated Omnibus Budget Reconciliation Act)
7. Overview of COBRA
8. Continuation of health coverage after termination of employment

# Obstacles to Adoption

## New technology = Adaptation necessary

In the creation of the idea MediBlock, its relevance with highly important information makes the idea have a variance of obstacles, from the adoption of technology in terms of users' technology background, to the storing of the information on such a new technology such as blockchain technology. In order to make this technology easier and more accessible for the general public, MediBlock will work towards creating a good user interface and experience, with steps of the process throughout the application. Additionally, to make it more accessible, MediBlock will have a website and an app from which patients can view and manage their data. To add to this, MediBlock will provide resources in the form of videos, blogs, and articles, these are resources aimed to educate and teach the public about MediBlock. Lastly, although users are not required to view these resources, it is highly recommended in order to prevent accidental error (MediBlock is not liable for any errors caused by human error).

## Lack of Government regulations

Since the creation of blockchain technology, it has found its spot at the center of controversy. Is it safe? It is not backed by anything; how can we ensure no loss? The uncertainty surrounding this technology makes the adoption of this technology exponentially stronger. The lack of government clarity surrounding Blockchain technology specific to the medical industry will likely result in high friction in introducing the idea to the public. Additionally, since the information being entered into the system is highly sensitive (medical records). Losing these records is more high-risk results in more difficulty in getting the system into hospitals and people

## Passwords

Due to MediBlocks

## Finding qualified employees

Since Blockchain is still very new and is still being developed, not many people are yet involved in this technology. Therefore finding skilled Chief executive officers, information security officers, Chief Financial Officers, Blockchain designers, Blockchain engineers, Blockchain Legal consultants, Blockchain Data scientists, and a Chief marketing officer, will be rather difficult and expensive.

## **Conclusion**

In conclusion, MediBlock offers a secure and efficient solution for storing and transferring medical records through the use of blockchain technology. Our system ensures that records can be found and transferred quickly while maintaining top-notch security and confidentiality. With the ability to handle large volumes of transactions, MediBlock is a scalable and cost-effective option for hospitals and healthcare providers.

Our team is committed to revolutionizing the healthcare industry by providing easy access to medical records for both patients and doctors. We are confident that our expertise in security, finance, blockchain design, and data science will continue to drive innovation in the healthcare industry.

Join us at MediBlock and let's work together to save lives, time, and money while protecting the confidentiality of patients through the use of blockchain technology.