

Blockchain



AAHKS Digital Health Committee

A blockchain is a digitized, decentralized, public ledger of all cryptocurrency transactions. Constantly growing as “completed” blocks, the most recent transactions are recorded and added to it in chronological order. It allows market participants to keep track of digital currency transactions without central recordkeeping. Each node (a computer connected to the network) gets a copy of the blockchain, which is downloaded automatically.

Originally developed as the accounting method for the virtual currency Bitcoin, blockchains – which use what's known as distributed ledger technology (DLT) – are appearing in a variety of commercial applications today. Currently, the technology is primarily used to verify transactions within digital currencies; although, it is possible to digitize, code and insert practically any document into the blockchain. Doing so creates an indelible record that cannot be changed; furthermore, the record's authenticity can be verified by the entire community using the blockchain instead of a single, centralized authority.

Source: Investopedia (<https://www.investopedia.com/terms/b/blockchain.asp>)

Blockchain's application in healthcare can be extensive, with examples outlined below:

Patient medical records

Most people have access to just a sliver of their health history, but blockchain could help pull together a lifetime of transactions from multiple health systems, pharmacies and health plans. This information could be processed into readable information for a patient's own use or converted into records that can be read by a variety of electronic medical records systems. Links to detailed information about procedures, encounters, diagnoses, claims and prescriptions could be added over time, and access to this information could be managed by the patient or the patient's designees.

Clinical trials and registries

Using blockchain, companies can securely share data generated by clinical trials, such as patient demographics and information about adverse reactions. Interim results could be shared with sponsors and regulators. The technology also can help manage and track informed consent across multiple sites, systems and protocols. Blockchain could be used to collect, build upon and share patient data profiles across multiple trial sites—even virtual trial sites as they are developed. If applied to consent management, blockchain could give the patient control to grant access to other researchers who might access their data in the future.

Insurance authorization and claims

The ability to ensure that claims are accurate, and to spot fraudulent claims, is particularly important in Medicare and Medicaid where payments must be coordinated between payers, providers, the federal government and banks. A smart contract could be used to show proof of adjudication. For example, the act of a patient checking in for a clinic visit, or logging into a virtual appointment online, could be confirmed by the health system's financial or clinical systems. This transaction could be combined with others from the same clinic that day and uploaded to a blockchain that is accessible to the health plan. An employee at the health plan could see the completed transaction and reimburse the health system

accordingly. Claims review could be streamlined because encounter data would be accessible and easily verified on a blockchain. Health systems and physicians also could connect with health plans to determine information about a patient’s health coverage, or to verify patient demographics.

A look at *blockchain technology*

What is it? The blockchain is a decentralized ledger of all transactions across a peer-to-peer network. Using this technology, participants can confirm transactions without the need for a central certifying authority. Potential applications include fund transfers, setting trades, voting, and many other uses.

How it works:

Someone requests a transaction.

The requested transaction is broadcast to a P2P network consisting of computers, known as nodes.

Validation
The network of nodes validates the transaction and the user's status using known algorithms.

A verified transaction can involve **cryptocurrency**, contracts, records, or other information.

The transaction is complete.

The new block is then added to the existing blockchain, in a way that is permanent and unalterable.

Benefits

- Increased transparency
- Accurate tracking
- Permanent ledger
- Cost reduction

Unknowns

- Complex technology
- Regulatory implications
- Implementation challenges
- Competing platforms

Cryptocurrency

Cryptocurrency is a medium of exchange, created and stored electronically in the blockchain, using encryption techniques to control the creation of monetary units and to verify the transfer of funds. Bitcoin is the best known example.

- Has no intrinsic value in that it is not redeemable for another commodity, such as gold.
- Has no physical form and exists only in the network.
- Its supply is not determined by a central bank and the network is completely decentralized.

Potential applications

Automotive
Consumers could use the blockchain to manage fractional ownership in autonomous cars.

Financial services
Faster, cheaper settlements could shave billions of dollars from transaction costs while improving transparency.

Voting
Using a blockchain code, constituents could cast votes via smartphone, tablet or computer, resulting in immediately verifiable results.

Healthcare
Patients' encrypted health information could be shared with multiple providers without the risk of privacy breaches.

Sources:
 "Money is no object: Understanding the evolving cryptocurrency market," PwC, 2015
 "A Strategist's Guide to Blockchain," strategy-business, January, 2016
 "How Blockchain Technology Is Disrupting Everything," TechDay, 2016

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Source: PWC (<https://deloitte.wsj.com/cfo/2018/04/12/five-possible-uses-for-blockchain-in-health-care/>)