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Blockchain for Secure and Transparent Health Data Management

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Abstract: *In recent years, the healthcare industry has experienced significant challenges related to the secure and transparent management of patient health data. With data breaches on the rise, there is a need for a robust system that ensures the security, privacy, and accessibility of health records. Blockchain technology, with its decentralised, immutable, and transparent nature, presents a promising solution to address these challenges. This paper explores the application of blockchain in health data management, examining its potential to enhance data security, promote patient ownership of data, and enable interoperability across different healthcare systems. We propose a blockchain-based model that leverages smart contracts, access controls, and encryption mechanisms to enable secure and transparent data management. Additionally, the workflow of a hypothetical blockchain-based application is discussed, highlighting the roles of patients and healthcare providers in accessing and sharing data. This research contributes to a growing body of work advocating blockchain's role in revolutionising health data management by creating a secure, patient-centred ecosystem. The rapid digitization of healthcare data has necessitated innovative solutions to manage, secure, and share sensitive information. Traditional centralized systems often struggle with vulnerabilities such as data breaches, lack of interoperability, and limited patient control, highlighting the need for a more resilient approach. This paper proposes a blockchain-based model that uses a decentralized, immutable ledger to safeguard health data, ensuring both security and transparency. Key components include patient-centric access control, off-chain data storage with encryption, and automated smart contracts for consent management. The framework offers a comprehensive solution to data security issues, aligning with regulatory requirements and paving the way for transparent data-sharing practices across healthcare institutions. Future implications and potential challenges are discussed, with a focus on scalability and integration with existing healthcare systems.Health data security is critical, especially in today's digital healthcare landscape where breaches compromise patient privacy and data integrity. This paper presents a blockchain-based model for managing health data securely and transparently, leveraging smart contracts and encrypted off-chain storage to empower patients with data control. Key features include dynamic consent management, real-time auditing, and immutable records that align with regulatory standards. This approach aims to enhance trust in digital healthcare, making health data sharing more secure and compliant while preserving patient privacy.*

Keywords: healthcare industry