



# How Can Blockchain Help People in the Event of Pandemics Such as the COVID-19?

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To the editors:

Since the first case was diagnosed in Wuhan, China in late 2019, coronavirus disease 2019 (COVID-19) has spread globally at an unprecedented rate, and was declared a pandemic by the WHO on March 11, 2020 [1]. The fatality rate of COVID-19 is 2% – 5%, and the virus has caused many deaths worldwide as it is highly infectious. [2] In addition to COVID-19, a number of other novel infectious diseases have recently been encountered, such as severe acute respiratory syndrome in 2004, novel influenza in 2009, and Middle East respiratory syndrome in 2015, and this is expected to continue in future.

Blockchain is a recently developed technology that allows transaction designers to make transactions directly through peer-to-peer (P2P) networks, without intermediary organizations, and to store transaction data in a distributed ledger. [3, 4] Because blockchain stores data from several individuals simultaneously, in order to amend the data, it is necessary to simultaneously modify the data divided between the individuals. This makes it almost impossible to forge or manipulate the data and ensure their reliability and transparency. [3, 4] The data stored in a blockchain are not erased, and so can be easily tracked. In addition, because the participation of intermediaries is minimized, savings in both financial and temporal expenses can be made. 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. Below, we discuss how blockchain can help people in the event of an infectious disease such as the COVID-19.

First, when infectious disease patients are detected, it is possible to quickly and accurately share their diagnostic information and clinical presentation. Currently, most countries have an infectious disease reporting system in which hospitals and clinics diagnose and report patients to the higher authorities, which in turn report the cases to the final authority. Whenever there are many intermediary processes for the report to pass from the hospital or clinic to the final institution, the reporting time may increase, which can make it difficult to respond promptly to infectious diseases. Moreover, this passive reporting method can result in the omission of reports. Furthermore, the use of a central server may inevitably result in greater damage if the system is exposed to a hacking attack during a crisis; thus, making it harder to detect altered data after hacking. If blockchain is used for infectious disease reporting systems, the data can be automatically reported to the final authority at the same instant that they are stored in the blockchain, without passing through any intermediary processing; this procedure would result in the improvement of the efficiency of data transfer regarding infectious disease outbreaks. In addition, because an arbitrary editing of the data would be impossible, the circumstances of the outbreak would be transparent and completely open to the public without manipulation.

Second, the use of in-kind and monetary donations will become transparent. The whole process of donation, including logistics, warehousing, and distribution, can be stored in blockchain. The donor can transparently and precisely verify the transfer process and receipt of donated money or in-kind goods. Thus, blockchain can greatly reduce corruption regarding donations and improve social trust. Encouraging donations helps in providing aid to people who face medical or

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economic difficulties due to the spread of the infectious disease.

Third, blockchain can prevent the spreading of false information regarding infectious diseases. False information confuses people and can cause psychological anxiety and economic loss. Storing news and information on a blockchain platform not only prevents its alteration, but also makes it traceable; thus, making it easier to prevent the development and spread of false information.

Fourth, by eliminating the processes of printing and delivery of a letter of diagnosis to the original hospital or clinic, the blockchain can help in reducing the risk of infection through face-to-face contact. When an insurance subscriber claims a payout, the identity of the subscriber can be ascertained and the payment made with reference to the records of the hospital that is registered on the blockchain platform.

We examined how blockchain can improve upon the shortcomings of the current system and thus help people during the current COVID-19 pandemic or in the event of other infectious diseases in future. We anticipate that blockchain technology will be able to play a greater role in future during actual infectious disease outbreaks.

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## Compliance with Ethical Standards

This article does not contain any studies with human participants performed by any of the authors.

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