Blockchain Technology in Pharmaceutical Industry to Prevent Counterfeit Drugs

International Journal of Computer Applications
Foundation of Computer Science (FCS), NY, USA

Volume 180
Number 25

Year of Publication: 2018

Authors:
Ijazul Haq, Olivier Muselemu Esuka

10.5120/ijca2018916579

Abstract

The production and distribution of counterfeit drugs is an urgent and increasingly critical worldwide issue, especially in developing countries. The market value of pharmaceutical counterfeiting has reached billions of dollars annually. One of the reasons for drugs counterfeiting is the imperfect supply chain system in pharmaceutical industry. Drugs change ownership from manufacturers to wholesaler, distributor and then pharmacist before it reach the customer. In current supply chain system, information is not shared between systems, manufacturers don’t know what happened to their products, drugs regulatory authority has no visibility of the system, recalls are complicated and costly, and companies cannot follow-up patients. In this paper we explain how to use blockchain technology in pharmaceutical supply chain to add traceability, visibility and security to the drugs supply system. The proposed system will be used in pharmaceutical industry to track the drugs from its manufacturing until its delivery to patient. After the usage of a drug, its effect on patient will be recorded to a database for future statistics. A permissioned blockchain will be used for storing transactions and only trusted parties will be allowed to join the network and push data to blockchain.
References

1. S. F. Roy and M. Jerremy, "African Counterfeit Pharmaceutical Epidemic: The Road Ahead," ACAPPP, 2009.
2. "WHO | Growing Threat from Counterfeit Medicines," Bulletin of the World Health Organization, vol. 88, no.4, pp. 2010.
3. H. Julian, S. Philip and M. Julian, "Combating the spread of fake drugs in poor countries," International Policy Network, 2009.
4. G. R, "The state control of medicines: The first 3000 years.," Br. J. Clin. Pharmac.,, vol. 8, no. 2, pp. 93-305, 1979.
5. "United Nations Interregional Crime and Justice Research Institute (UNICRI)," Global counterfeiting., 2003.
6. E. Roxanne, D. K. Lisa and P. W. George, "Anti-counterfeiting in the fashion and luxury sectors: trends and strategies," Anti-counterfeiting – A Global Guide, 2013 .
7. N. Satoshi, "Bitcoin: A Peer-to-Peer Electronic Cash System," 2008.
8. Mehdi, Raphael and Philippe, "Blockchain protocols in clinical trials: Transparency and traceability of consent." F1000Research, 2017.
9. X. QI, B. S. EMMANUEL, O. KWAME, G. JIANBIN, D. XIAOJIANG and G. MOHSEN, "MeDShare: Trust-Less Medical Data Sharing Among Cloud Service Providers via Blockchain," IEEE Access, 2017.
10. A. Asaph, E. Ariel, V. Thiago and L. Andrew, "MedRec: Using Blockchain for Medical Data Access and Permission Management," in 2nd International Conference on Open and Big Data, Cambridge, MA, 02139, USA, 2016.
11. M. Mettler, "Blockchain Technology in Healthcare: The Revolution Starts Here," in IEEE 18th International Conference on e-Health Networking, Applications and Services, Healthcom, 2016.
12. C. Edward, L. Ying, Z. Jia and L. Yang, "Healthcare services across China – on implementing an extensible universally unique patient identifier system," International Journal of Healthcare Management , pp. 1-7, 2017.
13. "Tierion - Blockchain," [Online]. Available: https://tierion.com/. [Accessed 24 1 2018].
14. "Every Product Has a Story," Provenance, [Online]. Available: https://www.provenance.org/. [Accessed 2 1 2018].
15. "Blockchain in Healthcare," [Online]. Available: https://www.hyperledger.org/wp-content/uploads/2016/10/ey-blockchain-in-health.pdf. [Accessed 23 1 2018].
16. "Blockcypher," [Online]. Available: https://www.blockcypher.com/. [Accessed 11 1 2018].
17. "BlockRx," iSolve, [Online]. Available: https://www.blockrx.com/. [Accessed 1 1 2018].
18. G. Jeff, "Public versus Private Blockchains - Part 1: Permissioned Blockchains," 2015.
19. G. Jeff, "Public versus Private Blockchain - Part 2: Permissionless Blockchains," 2015.
20. "Bitcoin," Bitcoin Blockchain, [Online]. Available: https://bitcoin.org/. [Accessed 1 12 2017].
21. "Ethereum," Ethereum, [Online]. Available: https://www.ethereum.org/. [Accessed 14 11 2017].
22. "Hyperledger," Linux Foundation, [Online]. Available: https://www.hyperledger.org/. [Accessed 25 12 2017].
23. "BigchainDB," BigchainDB, [Online]. Available: https://www.bigchaindb.com/. [Accessed 20 1 2018].

**Index Terms**

Computer Science | Information Sciences

**Keywords**

Blockchain, Information Security, Counterfeiting, Pharmaceutical Supply Chain.