

# Chapter 9

## Counterfeit Drug Detection in the Pharmaceutical Industry Using Blockchain

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### **ABSTRACT**

*Counterfeit drugs pose a significant threat to public health and patient safety, with the World Health Organization estimating that 10% of the global pharmaceutical market consists of fake medications. This study proposes a novel solution to combat counterfeit pharmaceuticals by leveraging blockchain technology. By establishing a secure and transparent health data network, the proposed approach aims to detect and prevent the distribution and consumption of counterfeit medicines effectively. Through the implementation of blockchain technology, a robust and trustworthy pharmaceutical supply chain can be created, enabling the tracking of drugs from manufacturing to patient consumption. This not only facilitates the immediate identification of counterfeit drugs but also impedes their further distribution. By integrating blockchain technology into the drug supply chain, stakeholders can verify the authenticity of pharmaceutical products and ensure patient safety. Moreover, the use of blockchain enhances transparency and accountability by integrating disparate databases and stakeholders.*

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## **1. INTRODUCTION**

Counterfeit drugs pose a significant threat to public health, representing a persistent challenge in the pharmaceutical industry. These deceptive medications, often indistinguishable from authentic products, jeopardize consumer safety by containing incorrect ingredients or harmful substances. With the global expansion of pharmaceutical supply chains and the proliferation of online pharmacies, the prevalence of counterfeit drugs has surged, demanding immediate and effective detection measures. Amidst this urgency, blockchain technology has emerged as a promising solution for enhancing drug traceability and authentication. In this chapter, we explore the imperative of counterfeit drug detection and the pivotal role of blockchain in revolutionizing pharmaceutical supply chain management. Through insightful analysis and real-world examples, we uncover the transformative potential of blockchain-enabled solutions in safeguarding public health and ensuring the integrity of pharmaceutical products worldwide.

### **Influx to Counterfeit Cures and Blockchain**

Blockchain electronics is a delivered, dispersed account book structure that makes undertaking proof and safe repository potential. It is built upon a chain of CPUs famous as nodes, that together validate and record undertaking dossier in blocks. After that, a chain connecting these blocks creates an unchangeable and transparent record of every transaction. Due to its potential to reduce the risk of counterfeit medications, blockchain technology has drawn attention from the pharmaceutical industry. The pharmaceutical sector can create a transparent and safe system for tracking and authenticating medications all the way through the supply chain by utilizing blockchain technology. This can greatly lower the prevalence of fake medications and protect patients from potential harm. Drug counterfeiting is a significant issue for the healthcare sector putting the safety and health of patients at serious danger. One potential way to address this problem is through the request of blockchain science in the drug area. The pharmaceutical sector is increasingly concerned about counterfeit medications, as they can have detrimental effects on patient health and safety. Counterfeit cures can be delimited as “one that is wilfully and fraudulently mislabelled concerning correspondence and/or source.”

These are drug output that involve either the wrong parts or the correct elements but blameworthy quantities. Around the world, drug counterfeiting is recognized as a major concern to users. A patient’s health could deteriorate significantly or even die as a result of consuming these bogus items, among other grave consequences.

The World Health Organization (WHO) estimates that 10% of the global pharmaceutical market is comprised of fake medications, putting countless lives in danger and degrading public trust in the healthcare system. The offensive revelation is that the World Health Organization (WHO) has before determined that thirty-five portion of the total counterfeit drug usable about the realm are introduced from India (Pandey et al., 2021). The market for phony drugs is expanding at the expense of patient lives, and the governmental structure is powerless to stop or disrupt this unethical trade in bogus medications. A significant source of incentive for the fake medicine mafias is the high-profit margins compared to making investments in the industry. The absence of an effective and trustworthy surveillance system further supports this illegal activity.

The complete process of producing, distributing, and delivering pharmaceutical products to customers is included in the pharmaceutical supply chain. It is an intricate network that consists of several steps,

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