**CHAPTER-2**

**INTRODUCTION**

Healthcare supply chain is a complex network of several independent entities that include raw material suppliers, manufacturer, distributor, pharmacies, hospitals and patients. Tracking supplies through this network is non-trivial due to several factors including lack of information, centralized control and competing behaviour among stakeholders. Such complexity not only results in in-efficiencies such as those highlighted through COVID-19 pandemic [1] but can also aggravate the challenge of mitigating against counterfeit drugs as these can easily permeate the healthcare supply chain. Counterfeit drugs are products deliberately and fraudulently produced and/or mislabeled with respect to identity and/or source to make it appear to be a genuine product [2], [3]. Such drugs can include medications that contain no active pharmaceutical ingredient (API), an incorrect amount of API, an inferior-quality API, a wrong API, contaminants, or repackaged expired products. Some counterfeit medications may even be incorrectly formulated and produced in substandard conditions [4]. According to the Health Research Funding Organization, up to 30% of the drugs sold in developing countries are counterfeit. Further, a recent study by World Health Organization (WHO) indicated counterfeit drugs as one of the major causes of deaths in developing countries, and in most cases the victims are children [7], [8]. In addition to the adverse impact on human lives, counterfeit drugs also cause significant economic loss to the pharmaceutical industry. In this respect, the annual economic loss to the US pharmaceutical industry due to counterfeit medicine is estimated around $200 billion [9], [10].

**2.1 LITERATURE SURVEY:**

### 1. Title: [Role of the pharmacist in preventing distribution of counterfeit medications](https://www.sciencedirect.com/science/article/pii/S1544319115304568)

**Author**: Y Knnedy

**Abstract**: To help combat the threat of counterfeit medications, an American Pharmacists Association taskforce recommends that pharmacists purchase medications from known, reliable sources, warn patients of the dangers of purchasing medications over the Internet, determine whether  
distributors purchased the product from the manufacturer or another reliable source, and  
monitor counterfeit product alerts. Objectives To provide an overview of the counterfeit  
medication problem and recommendations of a joint American Pharmacists Association

### 2. Title: [Roles **for**pharmacy **in**combatting counterfeit drugs](https://www.sciencedirect.com/science/article/pii/S1544319115311699)

### **Author:** **RJ**Ziance

**Abstract:** Abstract Objectives: To describe (1) the international scope of counterfeit drugs,(2)  
international and US anticounterfeiting initiatives, and (3) the enhanced roles and  
challenges facing pharmaceutical organizations and individual pharmacists to thwart  
counterfeit drugs. Data sources: PubMed and Ovid from 1970 to 2008 using the search  
terms counterfeit drugs, counterfeit pharmaceuticals, and counterfeit medicines, with English  
as the limiting term. Non primary literature sources included the US Food and Drug

3. **Title**: Access to CRISPR Genome Editing Technologies: Patents, Human Rights and the Public Interest

Author: Duncan Matthews

**Abstract:** While detailed debates are underway about the scientific and ethical implications of genome editing, this chapter argues that greater attention should be paid to the patent policy issues that these technologies raise. The chapter argues that WTO Members need to consider urgently the implications of patenting genome editing inventions for human rights and the public interest, taking into account Article 27.2 of the TRIPS Agreement, which provides that Members may exclude from patentability inventions, the prevention within their territory of the commercial exploitation of which is necessary to protect ordre public or morality. Furthermore, while genome editing has great potential to transform healthcare and the wellbeing in society across a broad range of scientific fields, the granting of patent rights for these technologies will have profound implications for affordability and access, particularly for people living with chronic lifelong illnesses and for future generations not yet born who are at risk of inheriting preventable medical conditions from their parents

### 4. Title: [Pharmaceutical Counterfeit drugs:(The growing threat)](https://journals.ekb.eg/article_29452.html)

Author: Abdul salam

**Abstract**: The production of counterfeit or substandard drugs is a widespread problem which can no longer be ignored. The spread of counterfeit drugs not only in different developing countries also it was detected in developed countries as well which may take part in morbidity, mortality, drug resistance, toxicity and loss of confidence in health-care systems. Moreover effort is urgently required on the legal, enforcement and scientific levels to over come this rising problem. Reliable analysis of the suspect products with several techniques, essentially based on chromatography and spectroscopy, are now at the disposal of the analysts to enable the distinction between genuine and counterfeit products. However the determination of the components and the use of analytical data for forensic purposes still constitute a challenge. The aim of this review article is therefore to point out the intricacy of medicine counterfeiting, and its risks also its impact so that a better understanding can provide solutions to fight more efficiently against it.

### 5. Title[Understanding and fighting the medicine counterfeit market](https://www.sciencedirect.com/science/article/pii/S0731708513000186)

### Author: CW Tsai

**Abstract**: Medicine counterfeiting is a serious worldwide issue, involving networks of manufacture and distribution that are an integral part of industrialized organized crime. Despite the potentially devastating health repercussions involved, legal sanctions are often inappropriate or simply not applied. The difficulty in agreeing on a definition of counterfeiting, the huge profits made by the counterfeiters and the complexity of the market are the other main reasons for the extent of the phenomenon. Above all, international cooperation is needed to thwart the spread of counterfeiting. Moreover effort is urgently required on the legal, enforcement and scientific levels. Pharmaceutical companies and agencies have developed measures to protect the medicines and allow fast and reliable analysis of the suspect products.