TEAM PROTOCOL 10

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TABLE OF CONTENTS
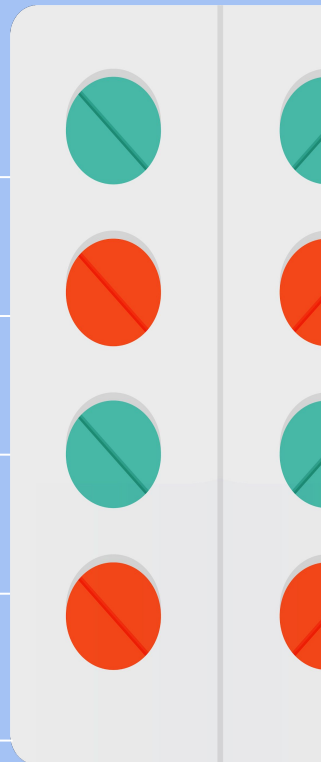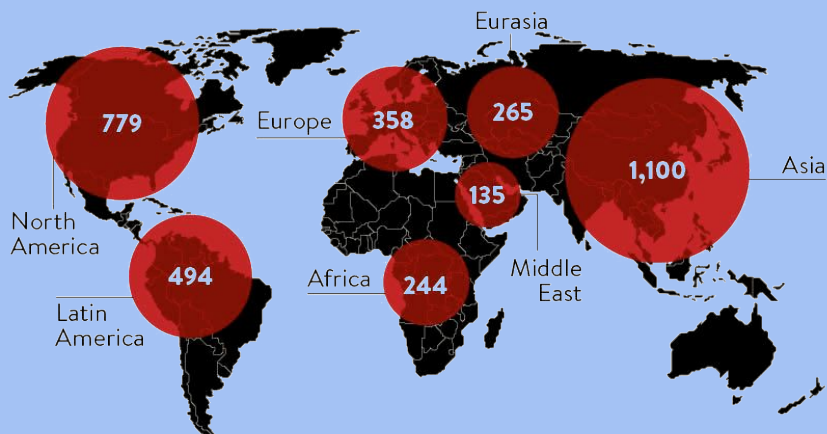
DRUG COUNTERFEITING

Counterfeited drugs are drugs that are deliberately contaminated with incorrect ingredients or the wrong dose of the active pharmaceutical ingredients.

779 — North America

494 — Latin America

358 — Europe

Eurasia — 265

135 — Middle East

Africa — 244

Asia — 1,100

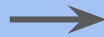**WORLDWIDE PHARMA CRIME CASES (2015)**

PHARMACEUTICAL SUPPLY CHAIN

Supplier
Supplies the raw materials to the pharma company

Manufacturing Unit
Manufactures the medicines

Repackager
Repackages/Rela-bels the medicine

Customer
Consumes the medicine

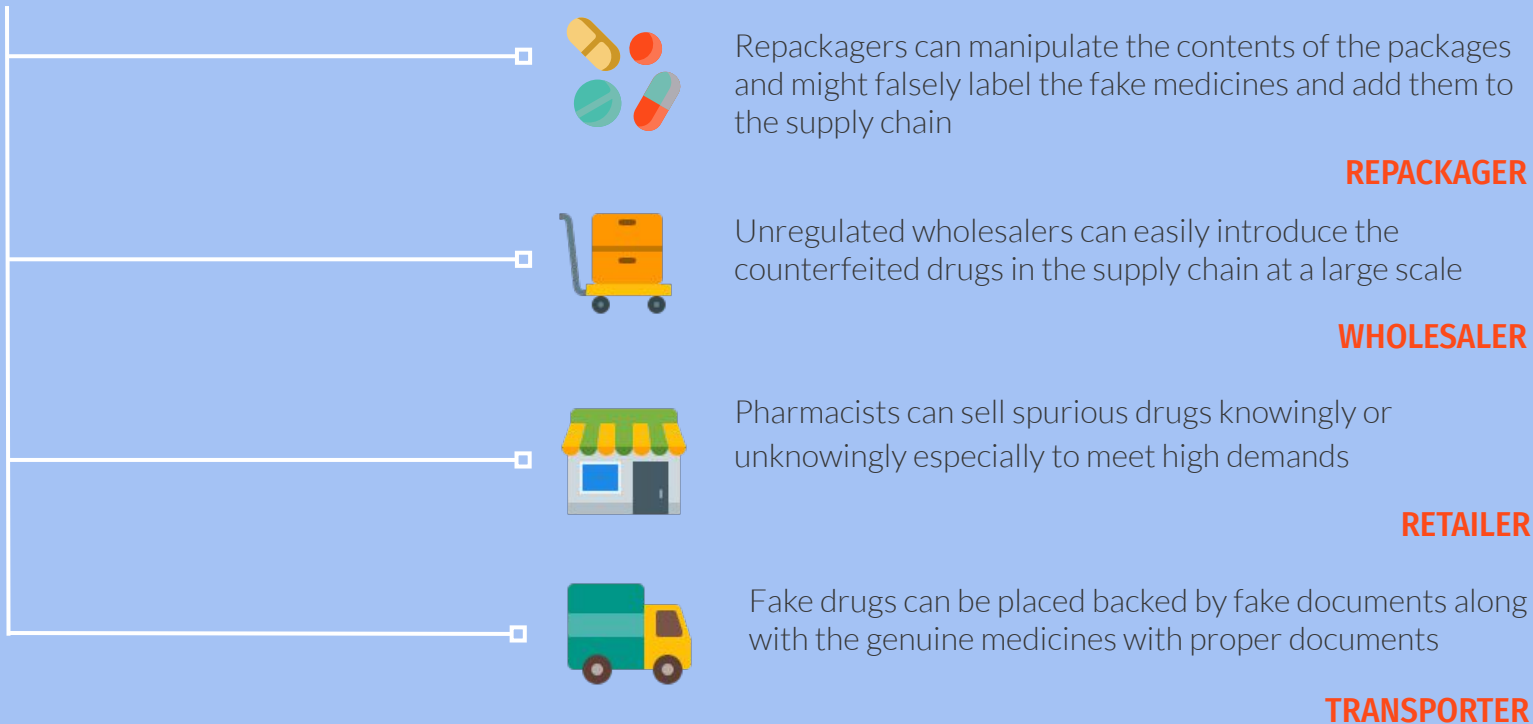**Retailer**
Pharmacies and hospitals selling the medicines

Wholesaler
Purchases medicines in bulk and sells it to retailers

WEAK LINKS IN THE SUPPLY CHAIN

Repackagers can manipulate the contents of the packages and might falsely label the fake medicines and add them to the supply chain

REPACKAGER

Unregulated wholesalers can easily introduce the counterfeited drugs in the supply chain at a large scale

WHOLESALER

Pharmacists can sell spurious drugs knowingly or unknowingly especially to meet high demands

RETAILER

Fake drugs can be placed backed by fake documents along with the genuine medicines with proper documents

TRANSPORTER

OUR PROPOSITION

Lack of transparency and **traceability** of the origin of a drug make it vulnerable to breaches and frauds.
The **interaction between blockchain and IoT technologies** can help improve the traceability and reliability of information along the chain.

BLOCKCHAIN

Blockchain works with a distributed ledger which is shared among all stakeholders, not owned by anyone, and records events and transactions in a secure, immutable, and unalterable manner.

IoT

IoT helps in communicating and aggregating the data collected from the sensor into information and present the results to system or user so that decisions can be made.

IoT ARCHITECTURE LAYERS AND INTEGRATION WITH BLOCKCHAIN

CREATE

Sensor and actuator create data and initiate the flow of information.

COMMUNICATE

Hardware, software and messaging protocols communicate the data from sensor and transmit it to the server.

AGGREGATE

Aggregates the sensor data and integrates it with other external data for analysis that occurs in the augmented intelligence layer.

ANALYZE

Receives raw data, analyzes it and derive actionable insights. Information exists for data in motion as well as data in rest.
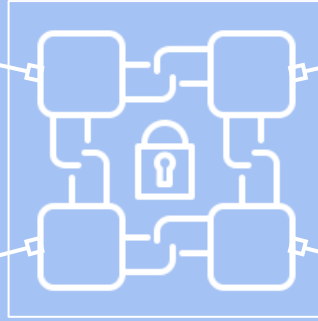
BLOCK CHAIN

TRANSPARENCY VIA BLOCKCHAIN

Information at each stage is sent to an online cloud accessible to all the players and authenticated using the blockchain.

Each transaction in the supply chain is updated on the blockchain in real time.

Drug manufacturers, their suppliers, pharmacies, and patients can access the data and see when the data is updated in real-time.

Any potential fraud can be identified and traced back to the suspected location if there is an attempt to tamper with the electronic seal.

Hash	1A4Z	Hash	2K0G	Hash	2Y3L
Previous Hash: 0000		Previous Hash: 1A4Z		Previous Hash: 2K0G	

01
Manufacturer
Attaches an RFID E-seal on each package and QR code on each blister pack and bottle to uniquely identify it

02
Wholesaler
Scans the RFID E-seal, tracing previous location and updating the current one

03
Repackager
Apart from scanning, assigns a new RFID E-seal to each of the new containers linking them to the previous ones

04
Retailer
Scans the QR code which shows all the information related to the medicine verifying its authenticity.

05
Customers
After the transaction,the consumer receives a SMS from the company

HOW DOES IT WORK?

SECOND LAYER OF SECURITY

- Due to the easy replicability of normal QR codes, their authenticity is maintained by introducing a **special**, **secure QR code system.**

- They have a unique composition of **several thousand pixels** at their centre. At this level of precision, any attempt to **copy the codes results in significant loss of data**.

- The pharmacist **scans the QR code**, which redirects him to a webpage showing the **genuineness** of the product.

- It shows the details about the checkpoints the medicine has passed through, expiry, MRP, ingredients, and the batch number.

- Upon receiving a **confirmation message** from the pharma company, the customer completes the transaction successfully.
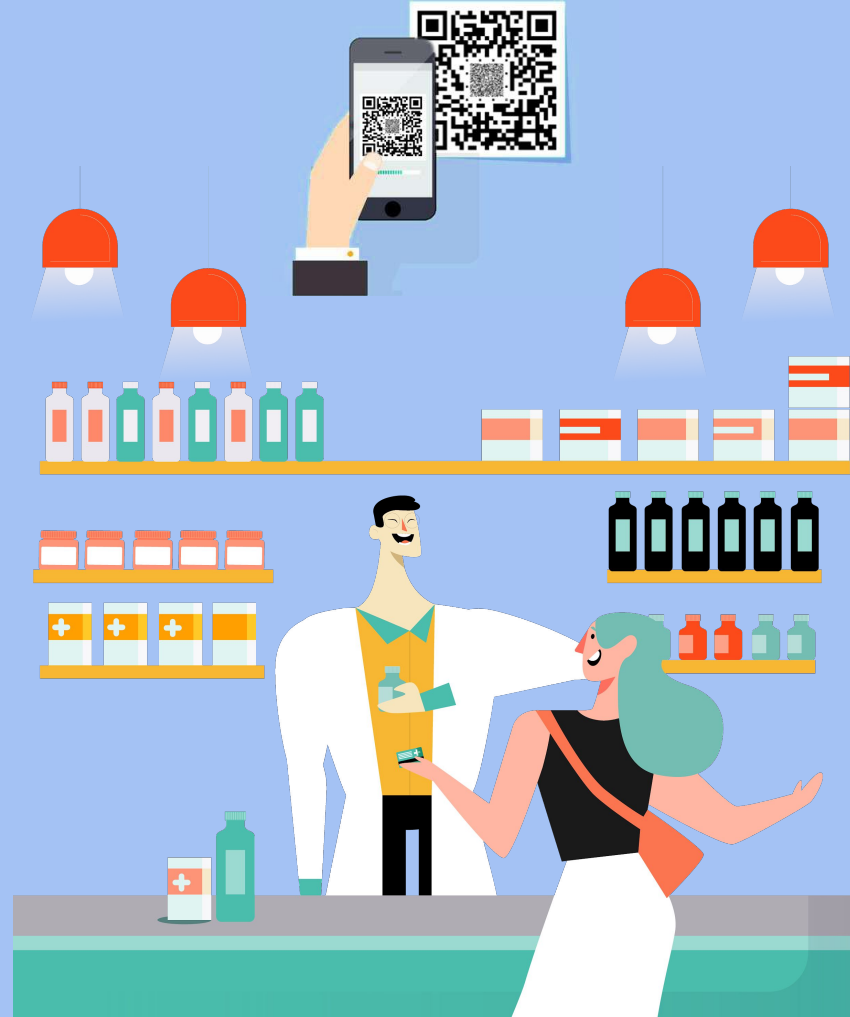
GOVERNMENT ENFORCEMENT

IMPLEMENT
The government must make proper arrangement for the execution of the above proposed plan

REGULATE
Compulsory for the supply chain stakeholders to implement the suggested changes in the system.

PENALIZE
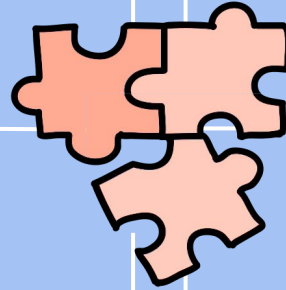Counterfeiting of drugs must be declared a heinous crime with grave punishments.

FACTORS TO CONSIDER

Small spice shops are pharma stores are hard to regulate

Many unregulated online stores exist which sell their products directly to the consumers from the wholesaler.

Unchecked and under-regulated import of drugs

Lack of government support and insufficient policies to implement the above ideas

Retailers might be reluctant to scan the QR code at every transaction

Dearth of consumer awareness and consumer ignorance

THANK YOU