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INDIA Forbes

epillo™

DECENTRALIZED MED-TECH

TACKLING MILLIONS OF
UNSUPERVISED INTERACTIONS



INTR_x™

A BLOCKCHAIN-BASED
DIGITAL THERAPEUTICS
(DTx) DEVICE THAT
AMPLIFIES THE BENEFITS
OF YOUR DRUG PLANS.



DRUG-FOOD



DRUG-DRUG

Dr. Bhupinder Singh,
Chair of Board at
Epillo Health System

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Network 18

Chairman's Message



Dr. Bhupinder Singh

Epillo Health Systems is dedicated to creating a world with more effective medicine, healthcare data security, and safer lifestyles. By using a distributed ledger and disruptive technologies in the field of artificial intelligence and machine learning, we are unlocking new use cases for healthcare applications for a safer world. This helps us address the growing need for precision medicine; prevent adverse drug reactions; tackle unsupervised medical care; increase drug adherence, food safety, and traceability; track and manage drug-food and drug-drug interactions (DDI); and provide healthcare data security.

We believe that the health industry is reaching a tipping point. Technologies are now breaking down data silos, ushering in a new era of health—one in which healthcare is customized for each person. With each new connection, the collective human trust and intelligence will grow stronger.

The revolution starts here: Blockchain is being celebrated as a technology revolution that will positively impact the society in whole.. It is already having a growing impact on heterogeneous research and application domains. In healthcare, blockchain offers usage guarantees (transparency and immutability) that are not possible in traditional distributed data architectures.

Blockchain technology has the potential to transform healthcare, placing the patient at the center of the healthcare ecosystem. It also increases the security, privacy, and interoperability of health data. This technology could provide a new model for health information exchange (HIE) and digital healthcare applications.

The adoption of the distributed ledger methodology at Epillo will create an unprecedented level of accuracy, privacy, and security in health data for healthcare stakeholders and patients, offering an innovative way to ensure robust data integrity. This will also give patients greater access to and control over their data.

CEO's Message



Mr. Aasif Shah

Our aim is to build technologies that work towards improving the quality of life of people: At Epillo Health, we are deploying tools and initiatives that are designed to help people make more informed health decisions for themselves and their loved ones. By making health information more secure, safe, and immutable, we aim to assist the broader healthcare community. By leveraging blockchain's decentralized models, we can help make healthcare more predictive, preventative, and personal.

The company is dedicated towards delivering innovative technologies for a safer world. Our patent-pending digital therapeutics devices are based on proprietary algorithms and machine-learning models, which are uniquely capable of detecting drug-food interactions (DFI) in real-time. They will also provide insights into the lifestyles of patients and assist in the co-administration of drug plans.

Data sharing in healthcare has always been a safety and security concern for individual consumers (as well as between organizations and consumers). Today, it is crucial to present a secure, safe, and anonymous data transmission and storage model for disruptive healthcare applications.

We anticipate that blockchain will be the key that unlocks barriers to healthcare data-sharing, and that it will ultimately enable an industry-wide shift to value-based care.



Epillo Health Systems is committed to creating a world with more effective medicine and safer lifestyles

MISSION

At Epillo Health Systems, we want to help everyone lead a healthier and safer lifestyle every day through products and services that connect, automate, disrupt, and bring innovation to the digital health landscape. We're working on products and features to empower people to be healthier with the information, assistance, and connections they need to act on their health. We're developing technology solutions and deep insights to

enable care teams that can deliver better, faster, and more connected healthcare. And we're exploring the use of artificial intelligence, machine learning, and blockchain in predicting drug-food and drug-drug interactions, preventing adverse drug reactions (ADR), and much more. Our work complements our country's mission to imbibe more care into the ecosystem and bring innovative healthcare solutions to everyone's lifestyle.



DRUG-FOOD AND DRUG-DRUG INTERACTIONS



ADVERSE DRUG EFFECTS



EFFECTIVE MEDICINE



HEALTHCARE DATA SAFETY



FOOD TRACEABILITY

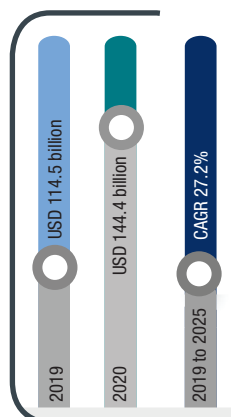
VISION

At Epillo Health, we are deploying tool and initiatives that are designed to help people make informed health decisions. By making health information more secure, safe, and immutable, we aim to assist the broader healthcare community and leveraging blockchain's decentralized models. This, in turn, can help make healthcare more predictive and personal.

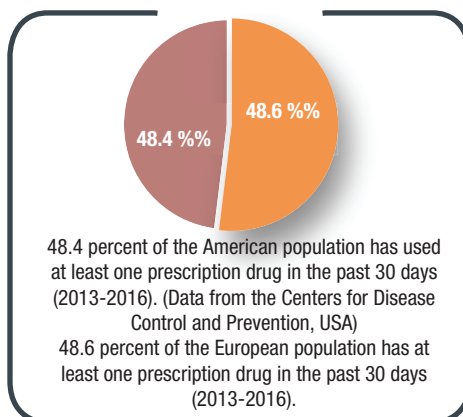
The company is dedicated to delivering innovative technologies for a safer world. Addressing ADRs

(Adverse Drug Reactions), unsupervised medical care, drug adherence, food safety, drug-food and drug-drug interactions, and healthcare data security concerns, our patent-pending digital therapeutics devices that are based on proprietary algorithms and machine-learning models are capable of providing deep insights into the lifestyle of patients, and assist in co-administrating patients for their drug plans and eating habits, improving the quality of life of billions of people around the world.

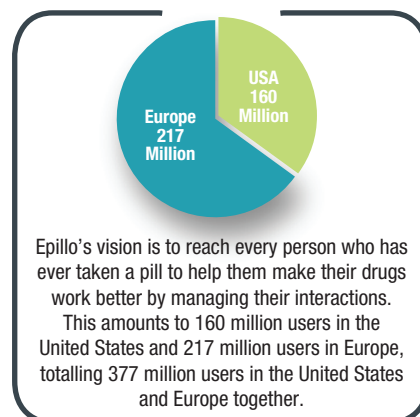
The digital health industry at a glance and where Epillo fits in it:



The global digital health market size was estimated to be around \$114.5 billion in 2019 and \$144.4 billion in 2020. The industry is expected to grow at a CAGR of 27.2 percent from 2019 to 2025.



48.4 percent of the American population has used at least one prescription drug in the past 30 days (2013-2016). (Data from the Centers for Disease Control and Prevention, USA)
48.6 percent of the European population has at least one prescription drug in the past 30 days (2013-2016).



Epillo's vision is to reach every person who has ever taken a pill to help them make their drugs work better by managing their interactions. This amounts to 160 million users in the United States and 217 million users in Europe, totalling 377 million users in the United States and Europe together.

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INTRx - for everyone

(Patent-pending medical AI technology around the world)

A digital therapeutics (DTx) device that aids in the prevention of undesired drug-food and drug-drug interactions in unsupervised home settings.

Digital therapeutics are patient-facing software applications that help patients treat, prevent, or manage the disease. They come with proven clinical benefits. For example, digital therapeutics can support patients in self-managing symptoms and adding benefits to their current therapy.

Epillo's innovative digital healthcare technology 'INTRx' is based on patent-pending innovation in 153 countries around the world.

SYSTEM AND METHOD FOR BLOCKCHAIN BASED DIGITAL THERAPEUTIC DEVICES TO PREDICT DRUG-FOOD INTERACTIONS

The 27 EU countries with active patent-pending status are Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden.

The Patent Cooperation Treaty (PCT) application filed through the United States Patent and Trademark Office (USPTO) gave Epillo an active patent-pending status in 153 PCT-contracting countries.

The medical innovation

A disruptive medical technology that aims at effective and precision medicine, drug contraindications, dynamic dosing, and informed food choices.

The food that we eat and the drugs that we consume may interact with each other in both negative and positive ways. Undesirable pharmacological effects in a consumer of prescription drugs are often triggered by the drug interactions either among themselves or with the food consumed. Also, the effects of any drugs can be slowed down by the consumption of specific foods that block their absorption capacities. A drug is administered to efficaciously provide medical aid; however, this efficacy can be altered when such a drug is co-administered with another drug or consumed with certain foods.

Also, the absorption or bioavailability (pharmacokinetic activity) of a drug can be altered when consumed with particular food constituents. The 'INTRx' invention in the form of a digital therapeutics device aims to comprehensively focus on drug-food and drug-drug interactions to reduce unexpected adverse drug events (ADE) and unknown interactions. It also aims to maximize synergetic benefits when treating a disease.

The co-administration of food or drink with active prescriptions can affect drug release (volume and composition of luminal fluids, transit time, and motility), absorption mechanism of the drug (uptake and efflux transporters), distribution of the drug throughout the cells (lymphatic drug transport, lipoprotein, and plasma protein binding), metabolism and elimination mechanism (drug-metabolizing enzymes and drug transporters).

Food and drink intake can change the physiology of the human gastrointestinal (GI) tract and this may affect the pharmacokinetic profile of orally administered drugs, by changing their release, absorption, distribution, metabolism, bioavailability, and efficacy.

An adverse drug event is an "injury resulting from medical intervention related to a drug". This includes medication errors, adverse drug reactions, allergic reactions, and overdoses.

ADEs can happen anywhere: in hospitals, long-term care settings, and outpatient settings. In inpatient settings, ADEs account for an estimated one in three of all adverse hospital events, affecting about two million hospital stays each year, prolonging hospital stays by 1.7 to 4.6 days.

Each year, ADEs in outpatient settings account for over 3.5 million physician office visits, an estimated 1 million emergency department visits, approximately 125,000 hospital admissions, and countless drug-adherence failures.

(Data from the Food and Drug Administration, USA)

INTRx is proprietary medical technology for a large consumer-base in the world. It is a unique utility model to unlock a whole new data relationship and care model for the patients, consumers of therapeutic drugs, healthcare industry, care teams, and the pharma industry. A digital therapeutics solution to address the inefficacy of drugs caused by DFIs and DDIs, it will consist of:

AI-based computational molecular docking

The AI-based computational molecular docking model used in the present invention can autonomously explore multiple possible binding sites and modes, and score them according to the interaction potential of drug compounds and food constituents with target protein sites. It can thus detect the drug and food interaction type by predicting the most probable binding sites.

Proprietary algorithms

A set of proprietary algorithms forming flow and systems is used to create a digital therapeutics device for the patient and clinician's use.



Forming a digital therapeutics device

A user-facing application based on machine-learning models to evaluate and predict food-drug constituent interactions through an AI-based computational molecular docking model has been established and accompanied by a set of clinical tools, together forming a digital therapeutics device.





A patient/user mobile application based on the innovation

In one embodiment of the present invention, a user-facing application based on machine-learning models to evaluate and predict food-drug constituent interaction through an AI-based computational molecular docking model has been established.

A user-facing application supplemented with the consumer's active prescriptions, health history, nutritional profile, eating patterns, taste profile (parameters), based on systems discussed in the present invention, would act as a personalized, secure, and all-time available drug-food constituent interaction indicator tool, drug-food coadministration guide, intake recommender, meal planner, and food menu filter. This invention offers such assistance to the healthcare industry, pharmaceutical industry, food industry, and consumers/patients on active prescriptions, while also giving the application a dynamic nature that would take into account user feedback.



INTRx: for clinicians

A connected tool for clinicians and care teams, providing deep insights for effective medicine and co-administration of drug and food items.

INNOVATION BACKED ANALYTICS ON CHANGES IN PHARMACOLOGICAL PROFILE OF DRUGS WHEN CO-ADMINISTERED WITH FOOD.

A set of clinical tools for doctors to access, manage, and analyze DDIs and DFIs, patient-wise. **Deep Insights on Pharmacological profile change of Drugs.**

The data from the user application in the form of clinical analytics can be integrated with the dietician's workflow and the existing workflow of electronic health record (her) systems.

Dynamic dosing of prescription drugs

Accurate drug dosing and frequency prediction of prescription drugs for patients is done through innovation-backed analytics on changes in the pharmacological profiles of drugs when co-administered with food.

INTRx: for researchers and the pharma industry

A support vector machine model (SVM) to study the effects of co-administration of different food items with different therapeutic drugs on a public healthcare level.

Decentralized ledger model

The blockchain distributed ledger methodology promises to create an unprecedented level of accuracy, privacy, and security for healthcare stakeholders, offering an innovative new way to ensure robust data integrity while giving patients more control over their data.

As a distributed shared ledger and database, blockchain technology has the characteristics of openness, transparency, decentralization, and anti-tampering. With the above characteristics, it has wide applications in the healthcare industry. By leveraging blockchain's decentralized models, we can help make healthcare more predictive, preventative, and personal.

Partnership with USA-based blockchain firm Hydrus7 Labs

At Epillo Health Systems, we believe that blockchain has the potential to revolutionize the way patients own and control their health data, and the way healthcare stakeholders manage, secure, and share patient data.

Issues in current healthcare networks, storage, and transmission protocols

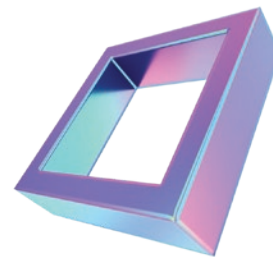
In the current scenario, healthcare organizations are facing serious problems when it comes to sharing medical information with different stakeholders, without sacrificing the privacy and integrity of the data.

To store and share such a large volume of sensitive and personally identifiable information (PII) securely is an important issue. Patients have less or no control over the storage and transmission of their health data. Hence, their trust in the care system's efficiency, safety, reliability, and security is being compromised with current models in use. From the way we see it, blockchain can augment the quality of our innovative healthcare solutions positively by creating a standard for the healthcare industry and masses. Here's how:

(A) Improving patient health data ownership, safety, and security through data access and control

In a blockchain, every member of the community holds their local copy of the shared dataset. When one entity wishes to make a change to that data, the potential edit must meet a series of cryptographic criteria that confirms the identity of the entity making the change. Patients could receive automated notifications when a party asks permission to access a certain piece of data or requests a change, giving them more control over how, when, and for what purpose their data is shared.





For Epillo's blockchain-based digital therapeutics devices, a distributed ledger approach can increase patients' agency, foster empowerment, and give individuals the data management tools they need to become more engaged and proactive in taking charge of their care.

(B) Facilitating the work of healthcare providers

In a similar approach, providers will be able to benefit from a trusted, unified view of an individual, shared across the care team. As value-based reimbursements continue to prioritize cooperative, long-term management of patients across multiple care settings, providers are in dire need of data management tools that can help, rather than hinder, the care coordination process.

There has been a lot of health- and wellness-related data that has been collected by care providers and individuals, but it has not been converted into consumable formats that can enable a comprehensive individualized care plan, which can contribute to effective long-term patient wellness.

Epillo's set of clinical tools, coupled with user-facing DTx, provide complete integration and interoperability with a clinician's workflow, allowing for an integrated picture of food prescriptions and drug interaction data, thereby facilitating an individualized and complete e-health record of a patient.

(C) Addressing medication reconciliation and patient safety

Medication reconciliation is one of the most difficult patient management tasks. Even when patients can accurately remember all of their medications, errors in medication lists are shockingly common.

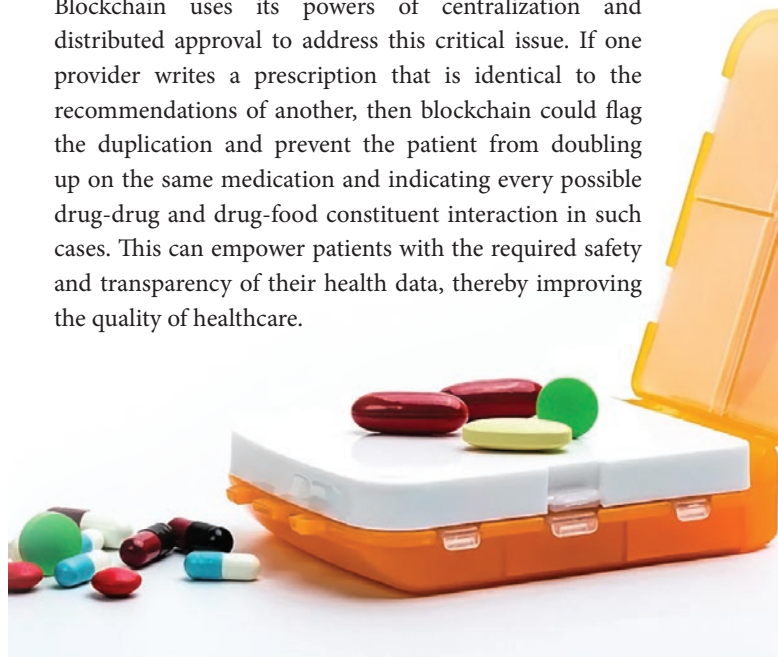
Epillo's systems and products utilize continuous prescriptions and health-related data from the central health records after checking their transparency and immutability, and removing any discrepancies and human errors (using a distributed ledger model) that may arise due to the duplication of records in a secure way.



A study from the American Journal of Managed Care in 2015 found that 77 percent of patients have found discrepancies or errors in their active medication lists. In 2014, Express Scripts found that close to 60 percent of patients taking opioids are also using prescriptions that could produce serious or fatal interactions.

Patient safety isn't just a care quality concern. Negative events can also have significant financial penalties for hospitals that fail to prevent avoidable harm.

Blockchain uses its powers of centralization and distributed approval to address this critical issue. If one provider writes a prescription that is identical to the recommendations of another, then blockchain could flag the duplication and prevent the patient from doubling up on the same medication and indicating every possible drug-drug and drug-food constituent interaction in such cases. This can empower patients with the required safety and transparency of their health data, thereby improving the quality of healthcare.



epillo™

DECENTRALIZED MED-TECH



ONE AT A TIME

Tackling millions of unsupervised interactions

PROPRIETARY MEDICAL TECH BUILT WITH AI BASED ON THE DISTRIBUTED LEDGER MODEL



EPIILLO AND INTRX TRADEMARKS ARE WHOLLY OWNED BY EPIILLO HEALTH SYSTEMS

SYSTEM AND METHOD FOR BLOCKCHAIN-BASED DIGITAL THERAPEUTICS DEVICES TO PREDICT DRUG-FOOD CONSTITUENT INTERACTION IS A PATENT-PENDING INNOVATION IN THE 27 COUNTRIES OF THE EUROPEAN UNION AND 153 STATES THROUGH THE USPTO PCT.

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