

**Bonsai Development  
Corporation**

Powering RFID Information Networks



**SOLUTION WHITE-PAPER**

**DISTRIBUTED PATIENT-DRUG TRACKING  
IN HEALTHCARE ORGANIZATIONS**

An RFID Information Network

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# Distributed Patient-Drug Tracking Network

## Background

Millions of physical interactions take place each day in a healthcare organization. In particular, throughout a geographic region, many patients are treated and prescribed pharmaceuticals to support their treatment or therapy. The tracking of the distribution of these drugs can yield remarkable information to many strategic organizations.

Bonsai Development Corporation (BDC) has worked with a National Healthcare Organization to develop a distributed Patient-Drug Tracking Network. This involves the use of widespread automated data capture technology, Radio Frequency Identification (RFID) tagging of pharmaceutical packages, and the implementation of Personal Identity Cards. This network provides tremendous visibility and insight into the treatment patterns and cost of healthcare for a regional system.

This paper is intended to explain how such a network can be deployed, what benefits it can bring, and the positive implications for other networks in the future.

## The Patient-Drug Tracking Network: what's the problem?

The tracking of which drugs are consumed, where and when, and by whom, is often a mystery.

Data exists about parts of the puzzle. Where drugs are sold, there may be Point of Sale (POS) data. There may be a prescription tracking system to document what doctors are prescribing to which patients. Drug companies and distributors have sophisticated distribution and replenishment systems that track the supply chain and control how drugs are delivered to the right location.

Despite this, there are several problems which make it difficult or impossible to track the consumption of drugs by patients:

- Many systems are paper based, involve isolated databases, and contain information which is rarely shared for medical research, administration & accounting, or health safety reporting purposes.
- Drugs can be high value items, which are frequently resold, counterfeited or stolen. The problem of counterfeit drugs, which represent 7% of all drugs prescribed in the USA, is often much greater in overseas markets.
- In National Health Systems, especially in poorer regions, technical infrastructure is limited, record-keeping is paper-based and the tracking of patient-drug combinations is extremely difficult.



Pharmaceuticals



Patients



Healthcare Professionals

## What does BDC offer ?

BDC has developed an RFID Information Network to track the distribution of drugs across a wide geographical area down to detailed patient level. We do this using three key components:

- I. Patient ID Cards, using smart chip identification and/or RFID (contact-less) technology
- II. RFID tags on packaged prescription drugs
- III. Distributed, low-cost data device technology to capture and aggregate information arising from the drug-patient combinations.

These three components work together in the manner outlined in Figure A below.

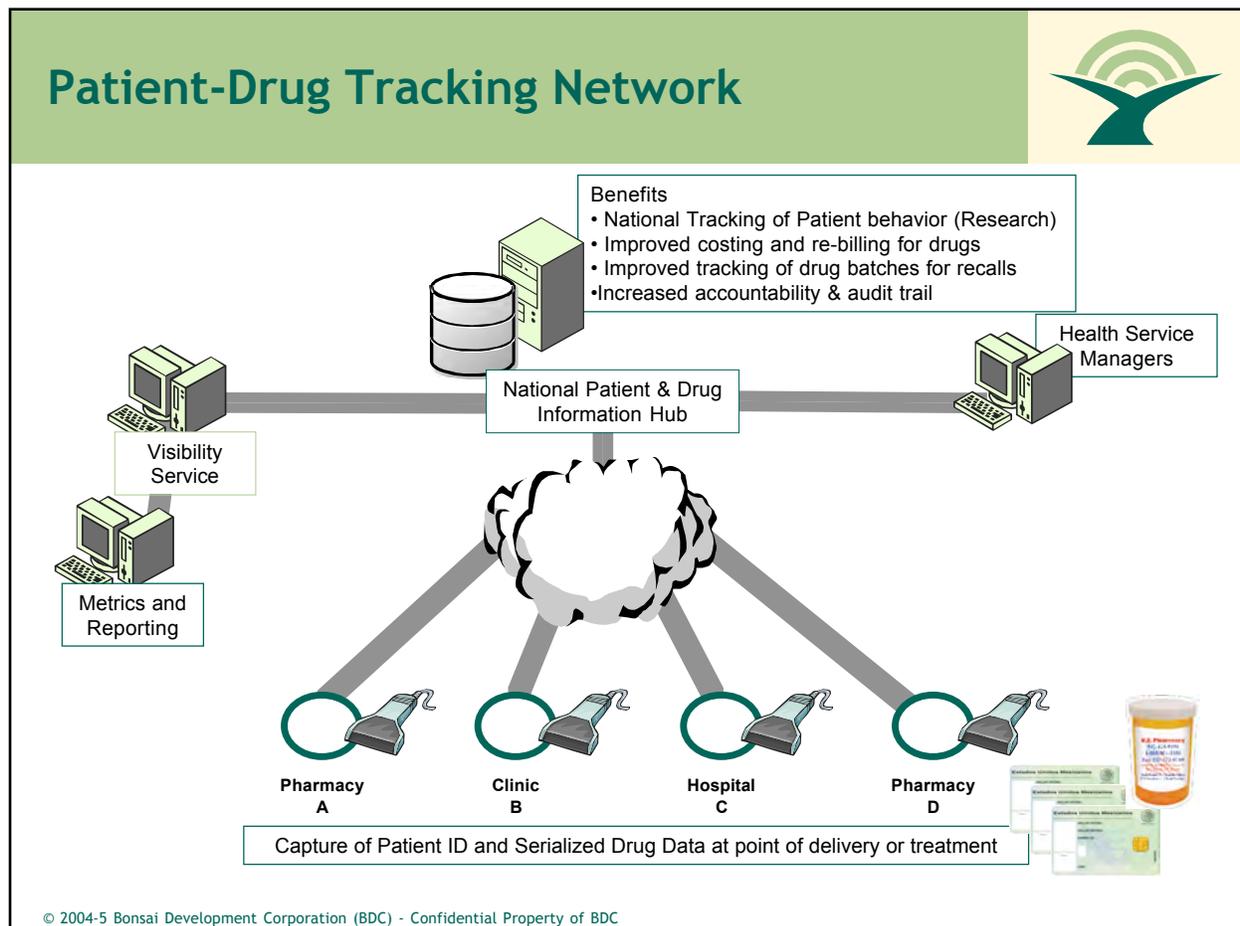


Figure A. Patient-Drug Tracking Network

In the Network, there are three main activities supported by the BDC technology and application:

- A) Data Capture at the Node level. At many distributed locations, Patient ID cards and Drug Packages are “read” using RFID. The device used to capture such information may vary widely. It can be as sophisticated as a hand-held or fixed RFID reader, or as low-cost and simple as an existing Point-of-Sale terminal with minor modifications.

Data, when captured can be communicated immediately via a secure and reliable network to a centralized



application, or “Hub” for aggregation and manipulation of the information. Where the technology infrastructure is poor and network availability is limited or non-existent, we can use the capabilities of the Point-of-Sale system to store transactions and upload the data on a periodic basis when the device can be connected to a phone line at a doctors’ home office.

B) Data Aggregation at the Hub. The activity from hundreds of locations and millions of drug-patient combinations

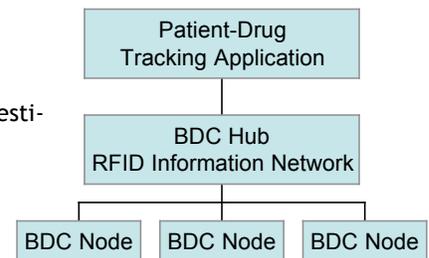
will be aggregated through the RFID Information Network into a Hub. The purpose of the hub is to establish secure and reliable communication between the many diverse locations for data capture, and to accurately record and store the transactions which are created from all this activity.

The data gathered here is sensitive in nature and highly valuable, so security is extremely important, both in terms of the way data is communicated and the way in which it is stored. The hub also manages the physical network - the “Trusted Reader Network” to monitor any problems and updates required to the many data capture devices.



C) Information management and presentation at the central location. In the case of a National Health Service, a secure, hosted data centre will store all data arising from the network. The BDC application which manipulates this data enables many important functions to take place. These include:

1. Full audit-ability and tracking of transactions within the network
2. Management of master data for pharmaceuticals being tracked
3. Management of master patient information and integration with external systems
4. Tracking of locations and drug history by patient
5. Tracking of drug distribution to batch / serialized level
6. Ability to track activity and contact locations online where further investigation is required
7. Audit reporting to provide accountability trail for drug companies
8. Export of donated drugs to feed re-billing programs for drug company reimbursement
9. Data mining for analysis of demographics, distribution and trends in patient-drug behavior
10. Service-based integration with further medical research and display organizations, where allowed.



## **Implications and Benefits of the Patient-Drug Tracking Network**

Having an on-demand picture of what drugs are being distributed to which people in a large population provides a great insight into the health of a nation. In addition to tracking medical information and trends, there are implications for how health administrators can offer increased efficiency and reduced costs throughout an entire health system.

There are quantifiable and strategic benefits from deployment of this kind of network

### **Financial (quantifiable) benefits**

- Improved accuracy of costing and re-billing for drug companies, resulting in fewer billing disputes
- Lower-cost medical research through data mining of national behavior trends
- Reduced cost and scope of drug recalls in case of defective manufactured batches, etc (targeted recalls)
- In case of national health systems, release of donated drugs under accountability guidelines for targeted regions, conditions or demographics, so that patients receive drugs quickly and equitably

### **Strategic (non-quantifiable) benefits**

- National Tracking of Patient behavior (Better, wider, cheaper research data and analysis)
- Improved risk management for Public Health administration, as well as reduction of patient risk
- Visibility into distribution patterns and demographics for drug companies

## **Conclusion and Further Information**

RFID Information Networks, and the BDC Patient-Drug Tracking Network in particular, have the power to harness new technologies and offer profound improvements in the way we distribute and monitor healthcare services. The same principles outlined here can apply to other healthcare areas, such as clinical trials, monitoring of biological samples in a physically distributed area, monitoring medical treatment across multiple sites, and potentially enhancing visibility and accountability for programs involving overseas aid.

If you would like to learn more, please contact us at [info@bonsaidevelopment.com](mailto:info@bonsaidevelopment.com) and we can arrange a discussion and demonstration.