

RAIN in Healthcare

Improving Visibility across the Supply Chain

Presented by:

Paul Elizondo | VP Engineering and R&D, IntelliGuard Solutions and

Kristine Lohman | Associate Marketing Manager, Terso Solutions



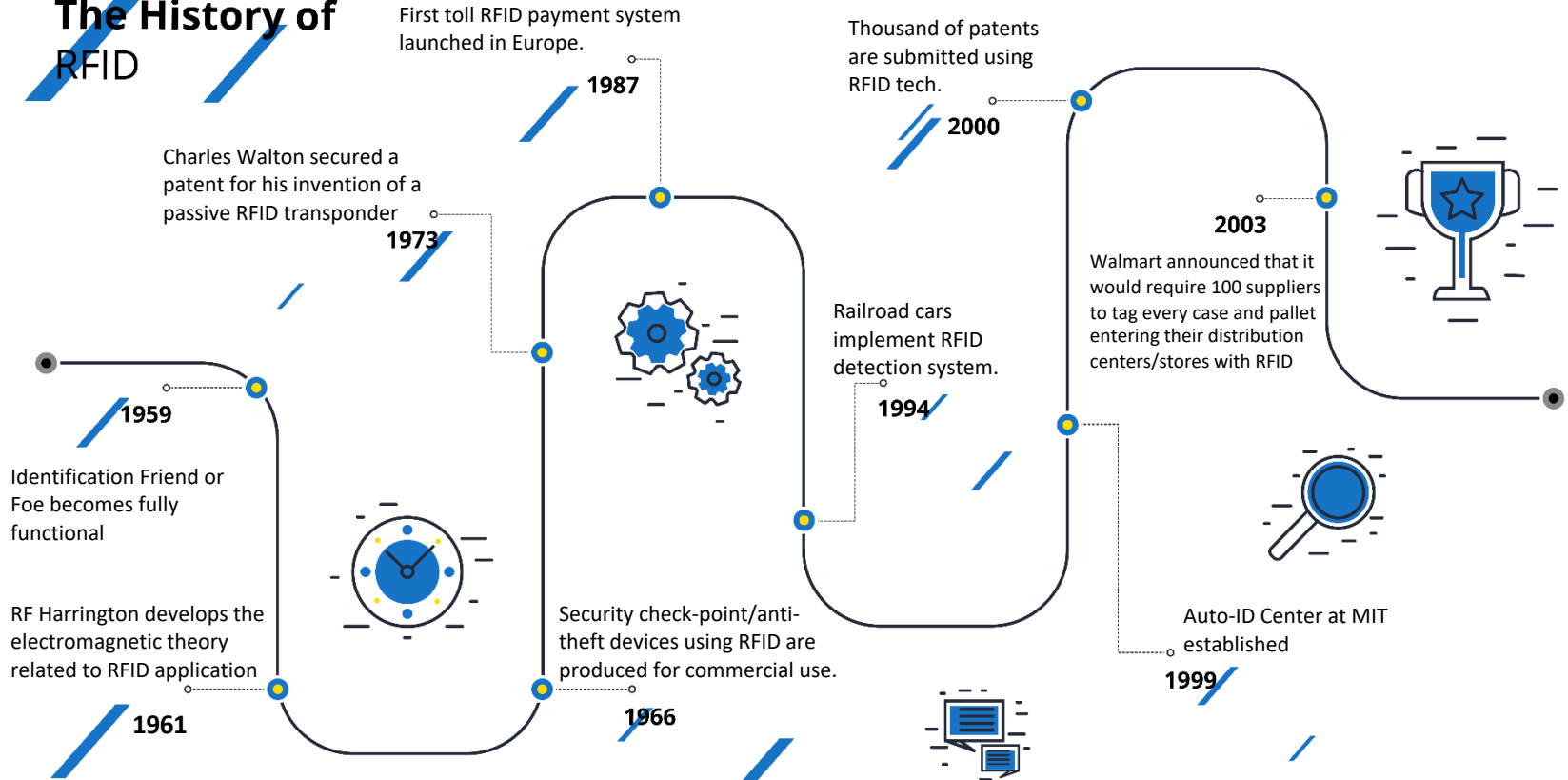
What is RAIN RFID?

RAIN RFID is a wireless technology that connects billions of everyday items to the internet, enabling businesses and consumers to identify, locate, authenticate, and engage each item.



The History of RFID

The History of RFID



RAIN- Enabling the IoT

- **Unique item identification**
- **Low cost**
- **Batteries not required**
- **Line-of-sight not needed**
- **Long or short range**
- **Authentication**
- **Connects to sensors**
- **Temperature (Passive/BAT)**
- **Tamper Evidence**

RAIN is Everywhere

HEALTHCARE

RETAIL

LOGISTICS

PHARMACEUTICAL

INDUSTRIAL
MANUFACTURING

CONSUMER
SERVICE

IoT

PACKAGING

ELECTRONICS



RAIN Adoption - Retail



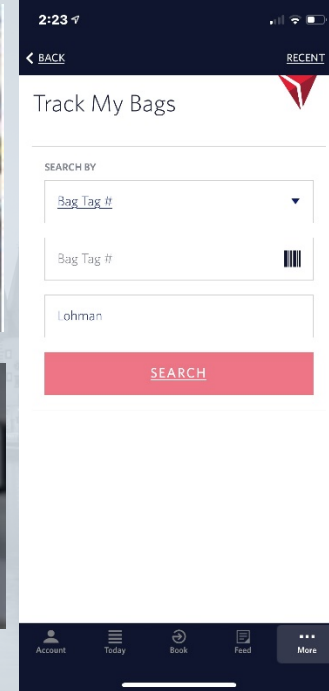
“You probably wouldn’t notice these new RFID tags on your own, necessarily, but that’s the point. This unobtrusive but significant technology will increase efficiencies by providing greater visibility into our inventory. That means guests will better be able to find out whether we’ve got the item at their Target store or at others nearby. We also expect RFID to help us better fulfill online orders placed for store pickup, which already account for 15 percent of Target.com purchases.”

- Keri Jones, VP of Global Supply Chain and Operations, Target



RAIN Adoption- Airlines

- Year 2000 – First international baggage tracking trial
- Sponsor – US FAA
- Airline Participants – Alaska Airlines, Singapore Airlines
- RFID Technology – 125KHZ, 13.56MHz, 2.45Ghz (Proprietary protocols)
- Objective – Positive Passenger Baggage Matching
- Year 2002 – Delta Air Lines
- Baggage Loss Problem – \$US 100Million / Year



RAIN Adoption - Manufacturing

ILLUSTRATING THE LEVELS OF SMARTNESS FOR TIRES



RAIN in Healthcare- Use Cases




RAIN[®]
RFID
HEALTH



ASSET TRACKING AND MANAGEMENT



-  Asset Management & Optimization
-  Loss Prevention
-  Patient File Tracking
-  RTLS
-  IT Asset Management

The Aarhus University Hospital

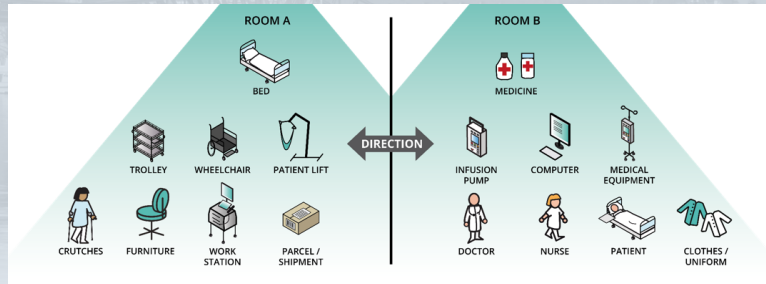
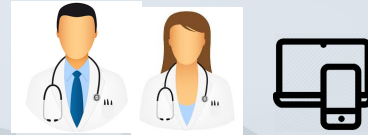
- **New generation of super-hospitals**
- **Covering 500,000 m²/ 124 acres**
- **Buildings cover 1.25 million m²/ 309 acres**
- **100,000 admitted patients and 900,000 outpatients a year at full capacity**
- **35,000 daily transports**
- **10,000 employees**

New University Hospital Aarhus Denmark








Asset Tracking

- Systems that automatically register location and identity of a mobile object at a known time
- Systems able to consume the above mentioned information
- What: eg medical equipment and people
- Where: eg room, warehouse
- When: eg arrival of bed at room



INVENTORY AND SUPPLY MANAGEMENT



-  Pharmacy automation
-  Tissue, specimen and implant tracking
-  High-value medical device and implant tracking
-  Operating room instruments and supplies
-  Surgical instrument tracking

INTELLIGUARD ENTERPRISE PLATFORM

INTELLIGUARD ENTERPRISE PLATFORM
Supply Chain – Controlled Substance - Advanced Data Analytics

Pharmacy



RFID-Enabled Kit
and Tray Processing

Anesthesia



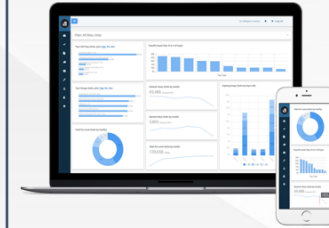
RFID-Facilitated Remote
Clinical Access Stations

Smart Cabinets



RFID-Equipped Controlled
Temperature Cabinets

IntelliGuard Insights



Data aggregation platform
with predictive analytics

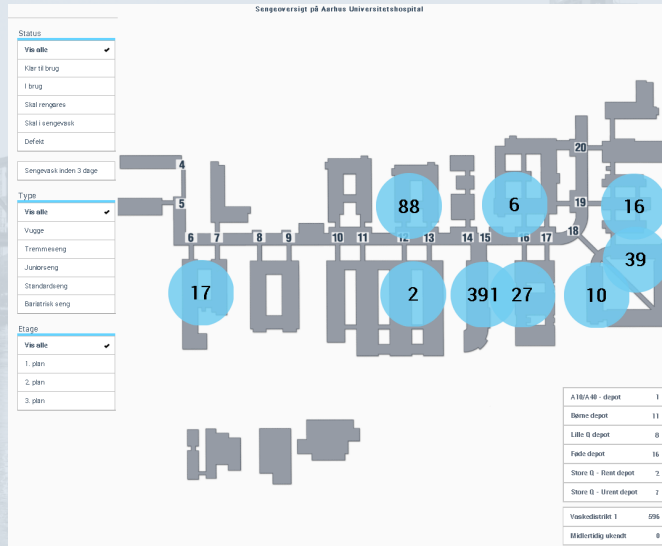


PATIENT CARE & EXPERIENCE



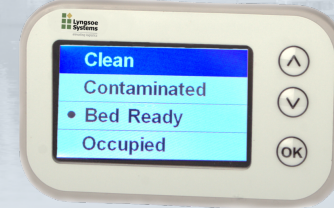
-  Hand washing monitoring
-  Infection control
-  Patient flow
-  Patient registration, admission and discharge
-  Disaster preparedness
-  Bed management

Patient Care- Bed Management



Use Case: Find beds that needs cleaning

- Bed touch pad at each bed
- Change status of bed immediately,
- 2 way communication



HEALTHCARE SUPPLY CHAIN MANAGEMENT



Track and trace/UDI



Distribution management



Consigned inventory management



Anti-counterfeiting



Drug supply chain security

Healthcare & Supply A case study



About the Company and the Project

A global leader in eye care and Intra-Ocular Lenses was in need of an inventory management solution that provided them with critical insight into their rapidly growing and complex consignment program.

CHALLENGE

Needed a low-cost, easy-to-use solution with the ability to read 3,000 tags in 30 seconds or less from a distance of 5 feet, as well as the ability for sales reps to use the same device to take inventory at multiple ambulatory surgery centers.

RESULTS

Terso developed a mobile solution made up of a mobile RFID reader, smart phone and mobile applications. With this partnership:

- Thousands of RFID Handhelds were shipped to the customer
- They're auditing process was reduced from 4 hours per account to 30 seconds.
- They are now able to perform audits weekly and their customers can perform these audits.

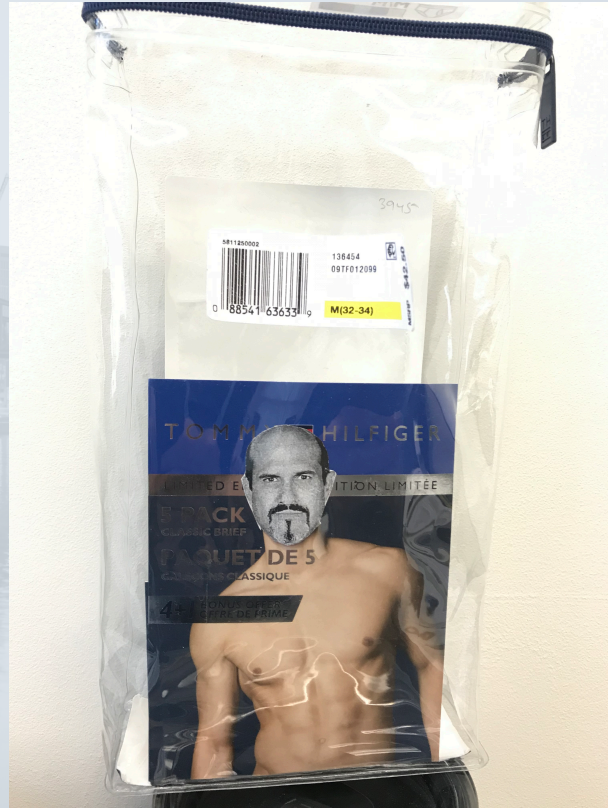


RAIN in Healthcare

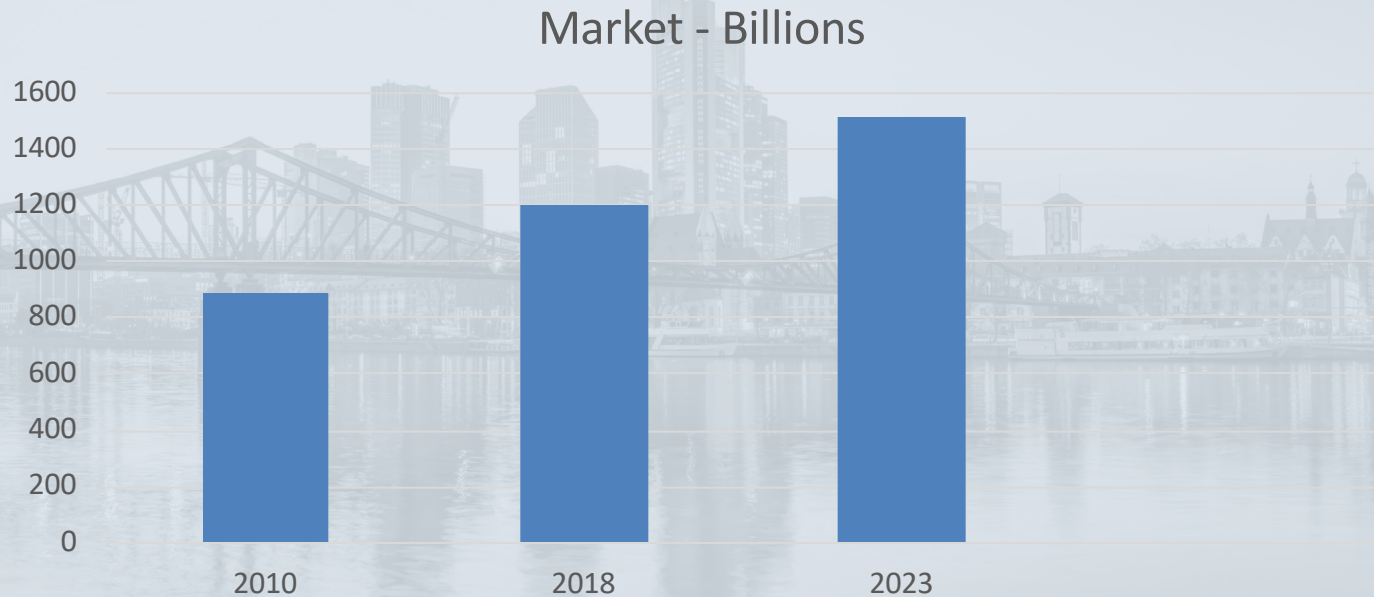
Polling Question 1



Tommy Hilfiger Unmentionables



Worldwide Pharmaceutical Market



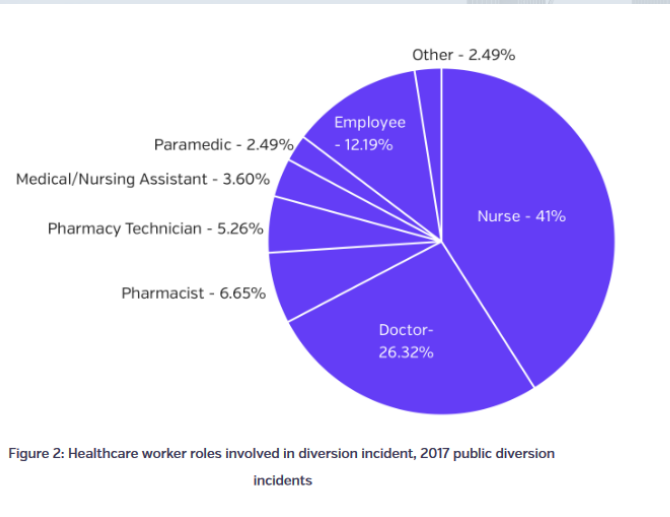
Worldwide Medication Counterfeiting

- **World Health Organization – US\$ 200 Billion**
- **10% to 30% of drugs in developing nations are counterfeit**
- **Internet sales of counterfeit drugs account for US\$ 75 Billion**
- **Anti-counterfeiting packaging market will grow from \$US 105.9 Billion in 2018 to \$US 215.7 Billion in 2027**



Acute Care Facility (Hospitals) - Diversion

‘Among health care providers, it is estimated that 15% of pharmacists, 10% of nurses, and 8% of physicians are challenged with alcohol and/or drug dependency.’ There are 287,420 pharmacists in the United States. This means that over 43,000 of these medical professionals could be substance abusers.’



Mayo Clinic (2000): sending at least one anesthesia worker a year into treatment for fentanyl addiction, one of the drugs to which that specialty has easy access

In a 2017 study of 45 different incidents, the total amount lost to the organizations and payors was \$301.1M. This included the loss in medications, prescription fraud, and fines imposed.



Every Hospital Has This Problem

Cost to the Hospital:

- **Disruption**
- **Employee impact**
- **Reportable event requiring agency involvement (FDA, DEA, etc.)**
- **Fines**
- **Jail Time**
- **Damaged Reputation**
- **Loss of licenses**
- **Time to establish prevention programs**



Avery Dennison Advertisement

This sweater will not:

- Ease the pain and suffering of a loved one
- Cure an illness
- Save a life
- Prepare a patient for surgery
- Immunize a patient against a disease or virus
- Stop bleeding for the victim of a traumatic accident
- Manage a life-threatening condition



Because It's Not Just a Sweater

You want to know that the person you hoped made your sweater... actually made your sweater.

That the cotton was picked and harvested in the right way, whether mechanically or by hand.

You want to know that it's organic if it claims to be organic.

You want to know that your sweater started out from where it should, whether the Great Plains of Texas or anywhere from Costa Rica to Burkina Faso.

You want to know that it was woven, stitched, dyed and packaged. In an ethical and sustainable manner.

Transported as it should (most ideally, at 21°C).

In fact, you want to know everything about it.

Because it's not just a sweater...

but a sweater with global cause-and-effect.

Yes, you want to know that everything you're led to believe, you can believe.

Beyond doubt.

Made Possible
by Avery Dennison

Retail is Winning

Application	Number (millions)	Biggest markets by number of tags
Medical / Healthcare	1481	
Retail apparel	26350	1 – mostly RAIN
Retail consumer goods	740	
Books	2095	7 – mostly HF/NFC
Assets, Parts, Post	4726	4 – mostly RAIN
Smartcards / Payment key fobs	20897	2 – mostly HF/NFC
Smart tickets	5890	3 – mostly HF/NFC
Air baggage	796	
Conveyances / Pallets / Cases / Rollcages	4045	5 – mostly RAIN
Animals (Livestock and Pets)	2946	6 – mostly LF
People (excludes other sectors)	207.9	
Vehicles (incl. car clickers)	1530	8 – LF and RAIN
Passports / Secure documents	1034	
Leisure	466	
Other NFC applications	1100	
Other tag applications	1725	
Total	76,644	

- **ALL FREQUENCIES** shown, passive and active, labels, fobs and cards
- RFID is used in very diverse, unrelated applications, addressing different problems
- Room for different technologies
- Total of ~16.7 Billion tags sold in 2017



Benefits of RAIN in Retail

- **2 to 20% sales boost without increasing stock levels**
- **Reduction in out of stocks**
- **96% improvement in labor productivity**
- **Over 98% inventory accuracy results**
- **Global ongoing roll-out for tagging apparel due to proven benefits**
- **Expanded from apparel to items including luxury goods, jewellery, furnishings and other high value, high complexity mix items**
- **Anti counterfeiting and anti theft are also driving adoption of RFID in retail**
- **Many are focusing on increasing sales through better customer service/engagement**



RAIN in Healthcare

Polling Question 2

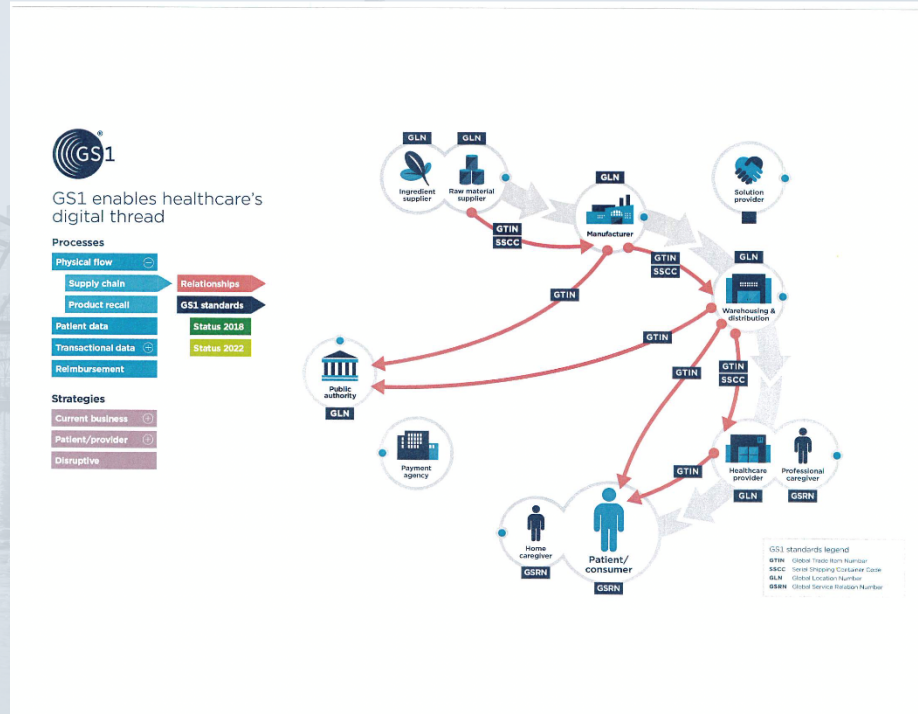


Barriers to Pharma Adoption of RAIN

- **We are nothing like the Retail Apparel market**
- **Modifying existing medication labels is costly and time consuming**
- **No industry agreement on numbering**
- **Disparate vendor solutions prevent end-to-end supply chain usage**
- **Resistance to RAIN – Improved Inventory Management and Visibility Leads to:**
 - **Elimination of expired meds – loss of sales**
 - **Elimination of safety inventory – loss of sales**
 - **Direct sales of medication from pharmaceutical manufacturer to acute care facility – IDN Direct Purchase Power**
 - **Greater visibility of narcotic supply chain – Opioid Crisis (FDA)**



GS1 Digital Thread



RAIN in Healthcare

SIMPLY RFID

2019 Installed Healthcare Base -- RAIN RFID -- just the statistics...

RFID Refrigerators for Pharmaceuticals

More than 3,000 RAIN RFID enabled refrigerators deployed in hospitals, pharmacies, and doctors offices since 2017

2,000,000 unique drugs tracked in 2019

RAIN installations in USA, Europe, and Japan

Hospital Sterilization Process

Tracking medical trays through hospital to ensure sterilization processes followed
70 units deployed in 2019, tracking thousands of reusable surgical medical trays

Pharma Cold Chain Tracking

Tracking medical transport of cold storage pharmaceuticals to ensure drugs maintain optimal temperature

Deployed initial pilots in 2019 at 2 locations. 100 additional locations scheduled for 2020-2021



RAIN in Healthcare



3,500+
GLOBAL
IMPLEMENTATIONS

U.S.A
Germany
Japan
LOCATIONS

60+
EMPLOYEES

500+
U.S. HOSPITAL
IMPLEMENTATIONS

750+
LABORATORY
IMPLEMENTATIONS



Using RAIN RFID to enable medical device manufacturers, software vendors, ASC's, Pharma, Dental, and Hospitals to track and trace:

- Tissues and biologics
- Field inventory
- Trunk stock
- Loaner kits
- And other high-value inventory items



CONTINUUM™ by DeRoyal

- Medical Device Tracking – Class I, II, and III
- Customers Using RAIN – 115
- Number of RAIN TAGS Deployed - > 1Million
- Benefits
- Visibility of Devices Stored on Shelves
- Tracking to specific patient
- Time savings for healthcare professionals
- Reduced costs / Increased Revenues



Rady Children's Hospital San Diego, CA

Hospital Overview

- Largest pediatric facility in California
- Provide 91% of pediatric care in San Diego
- Level 1 trauma center

IntelliGuard Implementation

- First IntelliGuard Anesthesia Customer
- Existing pharmacy customer
- Adopted anesthesia stations across OR's, procedural areas, and outpatient locations
- 28 units placed



RAIN in Healthcare

Polling Question 3



RFID: The Future of Healthcare



- 20% improvement in managing inventory levels
- 96% improvement in labor productivity
- 98% improvement in inventory accuracy
- 70% improvement in shrinkage and write-offs
- 52% improvement in workflow efficiency with a less than 1% error rate
- Elimination of 15,000 annual hours recording inventory



- Automation of manual processes
- Reduces labor
- Improves accuracy
- Improves compliance
- Improves safety
- Provides reliable actionable data
- Allows for predictive analytics
- Reduced time managing supply chain elements



RAIN in Healthcare/Pharma

- **Is It worth it?? YES!!!!**
- **RAIN will revolutionize the world's medication supply chain!!!!**
- **Authentication**
- **Reducing counterfeiting**
- **Reducing diversion**
- **Cold chain pedigree**
- **Reduce medication errors**
- **RAIN frees Healthcare professionals to practice at the top of their license**



RAIN in Healthcare/Pharma

- **What can we do to accelerate the tagging of medication with RAIN at the source?**
- **RAIN Alliance**
- **Support GS1 Standards and Interoperability**
- **Support the GS1 US Healthcare Initiative**
- **Engage with the FDA to promote RAIN**
- **Engage with the Pharmaceutical Industry**
- **Demonstrate the power of RAIN through pilots**
- **Work with stakeholders across the pharmaceutical enterprise to explain and demonstrate the benefit to all parties!**



Future RAIN Tag Advertisement

Because It's ~~Generic drug~~ Not Just a Sweater

You want to know that the person you hoped made your sweater...
actually made your sweater.

That the cotton was picked and harvested in the right way,
whether mechanically or by hand.

You want to know that it's organic if it claims to be organic.

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where it should, whether the Great Plains of Texas or anywhere
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Made Possible
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You want to know:

- Where the ingredients were sourced
- Who made your medication
- That it has efficacy
- That it is authentic
- When it expires
- Whether it came from Canada or India
- That it was maintained at the proper temperature during shipment
- A patient is the destination of every medication in the supply chain



RAIN in Healthcare

Polling Question 4



A faded, grayscale background image of a city skyline. In the foreground, a large truss bridge spans across a wide river. The city buildings in the background are reflected in the water. The overall tone is light and monochromatic.

Thank you!

