



RAIN in Healthcare

Is it worth it?

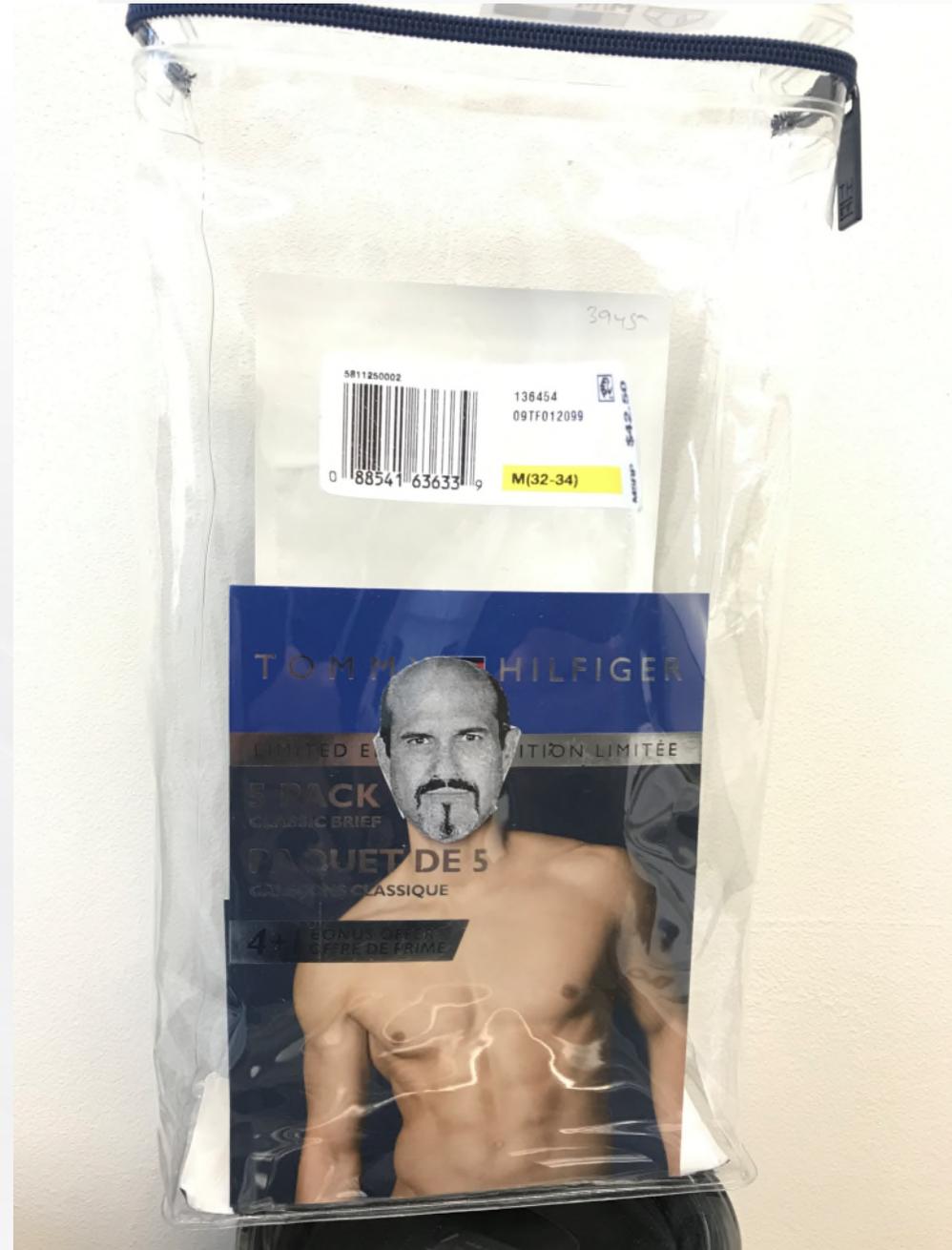


RAIN®
RFID

Paul M Elizondo – IntelliGuard
VP Engineering and R&D



Tommy Hilfiger Unmentionables



Airline Baggage Tracking

- 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



6 Ton Paper Roll Tracking

- Year 2001 – International Paper / Little Rock, Arkansas
- Paper Roll Loss Problem – \$US 1 Million / Week

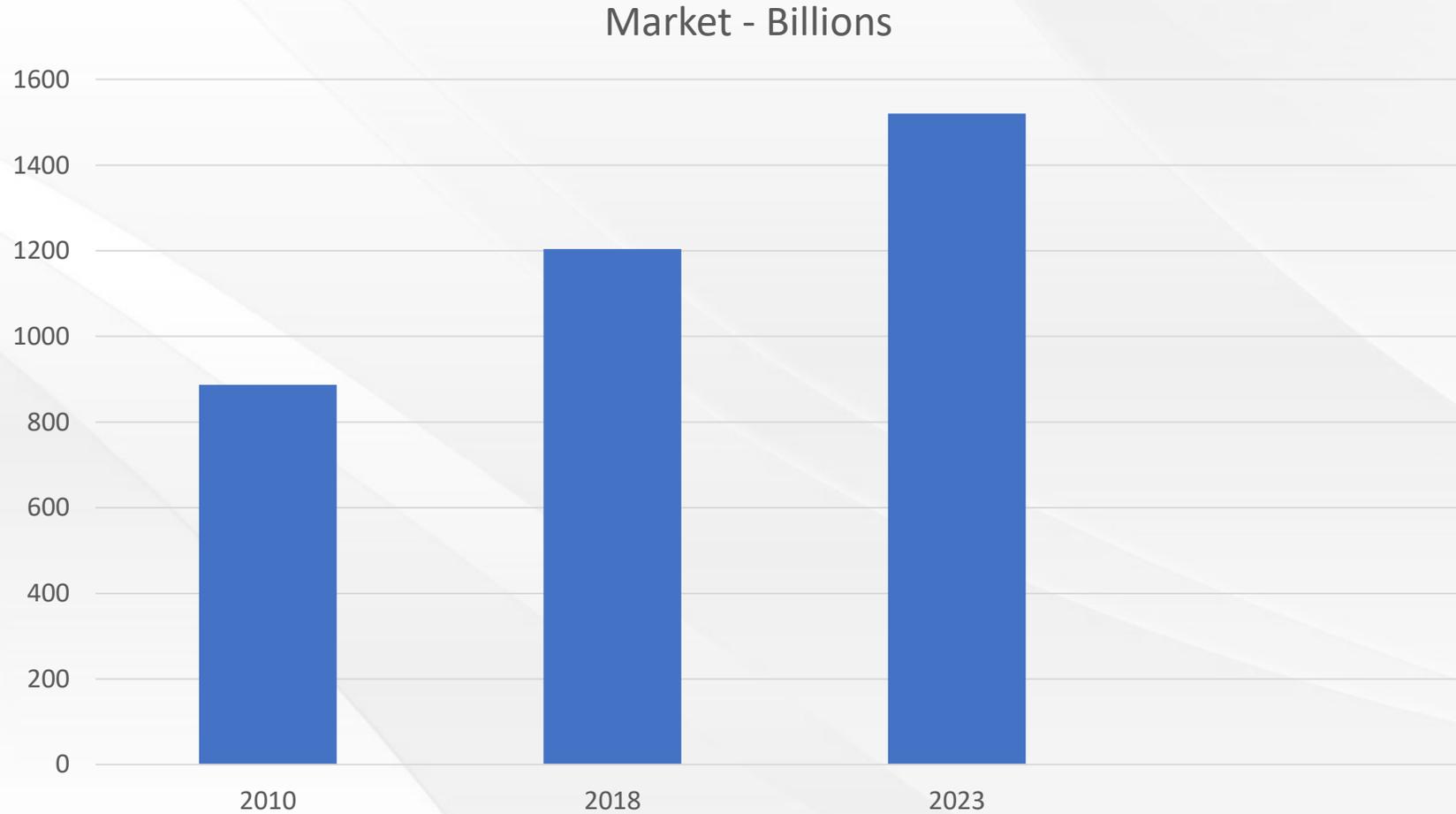


Oncology Medication Dispensing

- Year 2002 – MD Anderson / Houston, Texas
- RFID Technology – 2.45GHz (Proprietary protocol)
- Product – 2.3 CF Lab Refrigerator with Access Control
- Oncology Theft – US\$ 6 Million over two years
- MD Anderson Annual Pharmacy Budget - > 1.2 US\$ Billion
- Monetary Loss – 0.25 % of Annual Budget
- Real Loss - Thousands of oncology patients received medication transfusions with 0% efficacy!!!



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.'

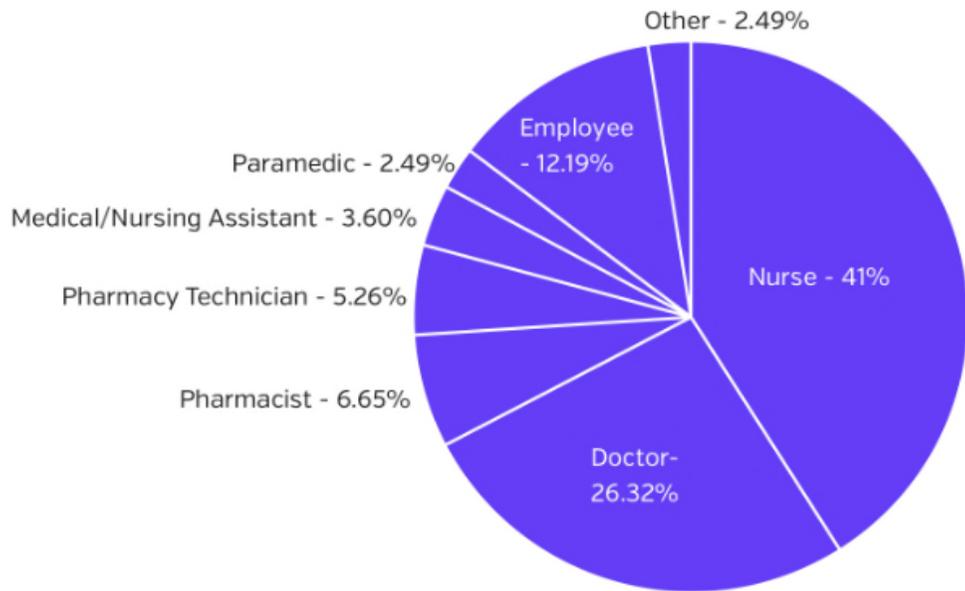


Figure 2: Healthcare worker roles involved in diversion incident, 2017 public diversion incidents

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



**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

- 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



Retail is "WINNING"

Cumulative Sales - 2018

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

Source – ID TechEx



IntelliGuard™

Over 100 Retailers RAIN RFID

Intelligent Inventory Solutions

7&i Holdings	C&A	Gardeur	Liverpool	Sears
Acne Studios	Calcedonia	Gerry Weber	lululemon	Seidensticker
Adidas	Carrefour	Gottfried Schmidt	Macy's	Suit Supply
Adler	celio	H&M	Marc O'Polo	Target
AEON	Chicos	Hailan	Marks & Spencer	TESCO
American Apparel	Club21	Hudson Bay	Max Mara	TK Maxx
American Eagle	Dazzle	Hugo Boss	Mood of Norway	Tommy Hilfiger
AZ Modell	Decathlon	Intersport	Mersmann Design	Under Armour
Beams	Decks	JBC	Nespresso	UNIQLO
Beaumanoir	Dilliards	JC Penney	Old Navy	Urban Outfitters
Bed Bath Beyond	Dior	Kohl's	Oxylane	VandeVelde
Bel & Bo	Elie Tahari	Komono	Pepe Jeans	Veritas
Boboli	Etam	L'Oreal	Ralph Lauren	VF
Bon-Ton Stores	Fast Retailing	Lacoste	Rebecca Minkoff	Vivienne Westwood
Brascol	G-Star	Levis	River Island	Zara

Source – ID Tech Ex



Benefits of RAIN in Retail

Intelligent Inventory Solutions

- 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



Healthcare/Pharma is “WHINING”

- 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)

DSCSA Goals

1. Implement an interoperable, electronic tracing of products at the package level by 2023 that will:

Enable secure tracing of product at the package level

Use product identifiers to verify product at the package level

Enable prompt response to suspect and illegitimate products when found

Improve efficiency of recalls

2. Establish national standards for licensure for wholesale distributors and third-party logistics providers

Key Requirements*



*The requirements under section 582 of the FD&C Act apply to manufacturers, repackagers, wholesale distributors, and dispensers (pharmacies).

Product Identifier Requirement

Product Identifier

National Drug Code (NDC)

Serial Number

Lot Number

Expiration Date

- **Human and machine readable formats**
- **2D data matrix barcode for packages**
- **Linear or 2D data matrix barcode for homogenous cases**

NDC: XXXX-XXXX-XX
 SERIAL: XXXXXXXX
 LOT: XXXXXXXX
 EXP: YYYY-MM-DD



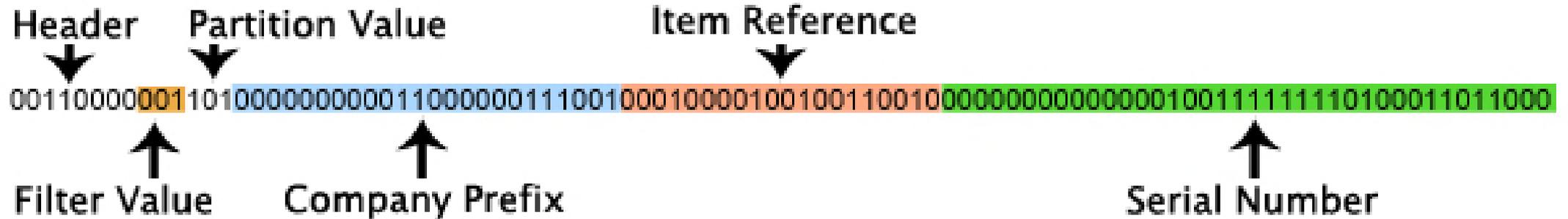
Manufacturers/Repackagers

- **Encode product identifiers on prescription drug packages (November 2018)**
- **Determine smallest individual saleable unit**

Verification requirements change once products are serialized with product identifier

GS1 SGTIN - 96

EPC SGTIN-96 Binary

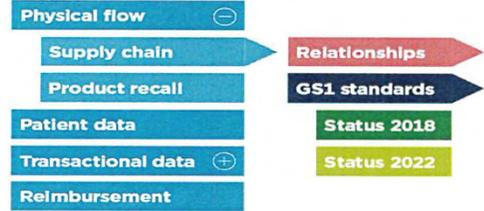


GS1 Digital Thread

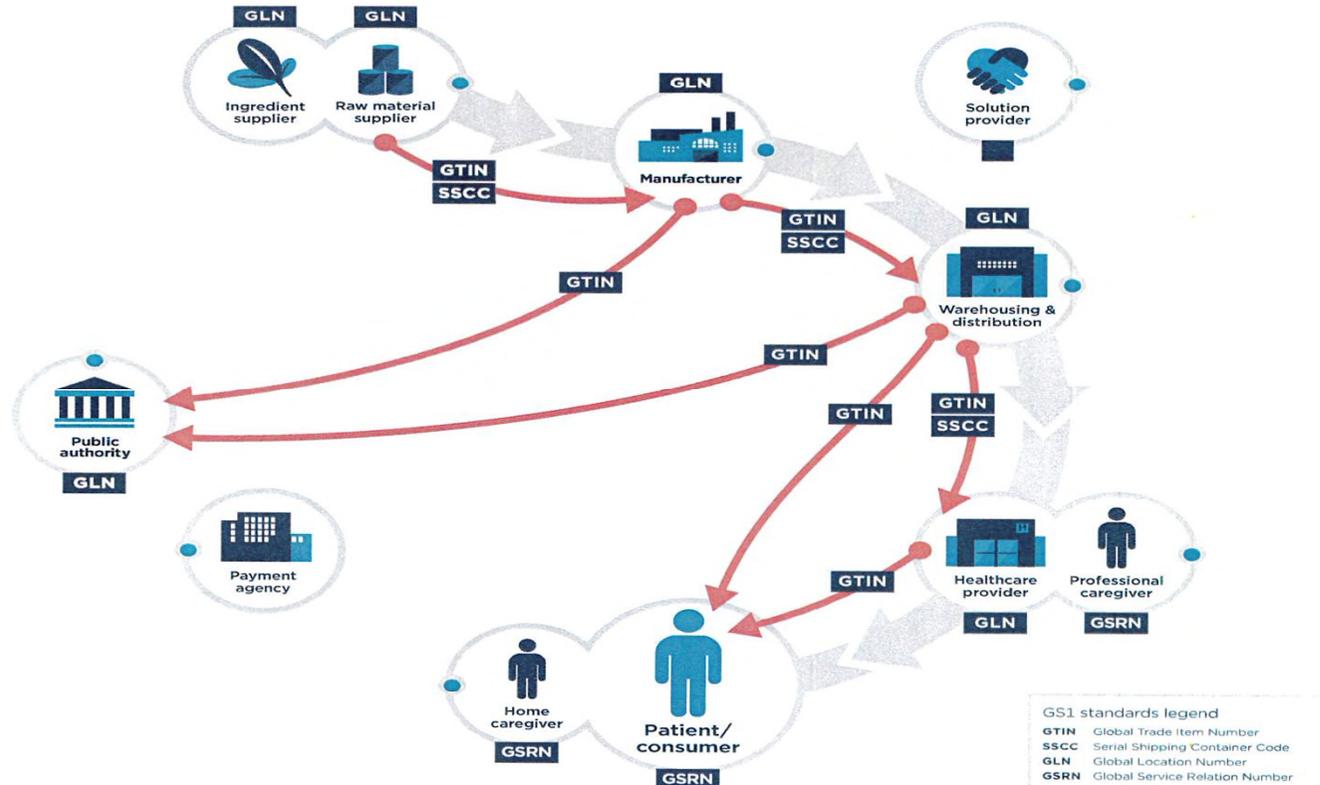


GS1 enables healthcare's digital thread

Processes



Strategies



GS1 standards legend

- GTIN Global Trade Item Number
- SSCC Serial Shipping Container Code
- GLN Global Location Number
- GSRN Global Service Relation Number



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

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



U.S.A
Germany
Japan
LOCATIONS



3,200 +
GLOBAL IMPLEMENTATIONS

60+
EMPLOYEES



500+
U.S. HOSPITAL
IMPLEMENTATIONS



INTELLIGUARD ENTERPRISE PLATFORM

Supply Chain – Controlled Substance - Advanced Data Analytics

Pharmacy



RFID-Enabled Kit and Tray Processing

Anesthesia



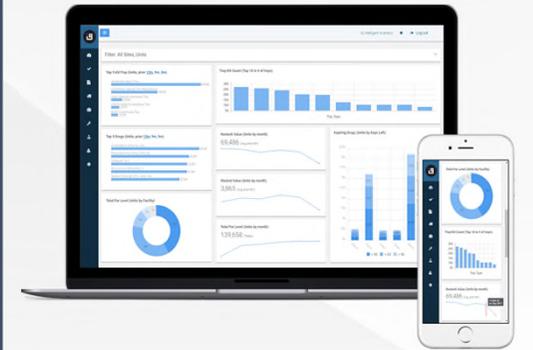
RFID-Facilitated Remote Clinical Access Stations

Smart Cabinets



RFID-Equipped Controlled Temperature Cabinets

IntelliGuard Insights



Data aggregation platform with predictive analytics



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

RFID: The Future of Healthcare



Compelling statistics from other industries

- 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



Proven Results that translate to Healthcare

- 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 Not Just a ~~Sweater~~

Generic
Drug

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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



Eloise Nicole !!!





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