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WHITE PAPER

The Hidden Costs of Medical Device Consignment Management

How automated tracking transforms loan kit and consignment inventory management for medical device manufacturers.

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Executive Summary

Medical device manufacturers face significant operational challenges in managing consignment and loan kit inventory across healthcare facilities. Mixed returns from surgical procedures create complex reconciliation problems that traditional manual processes cannot efficiently resolve.

Industry data shows medical device manufacturers write off 1-4% of consignment inventory annually (Terso Solutions), with well-documented cases ranging from $100K-$500K in annual losses at individual facilities (DSI Direct). Manual processing requires 3.5 seconds for the scan-and-confirm step per item, based on field testing of 26,200+ scans across multiple facilities (SkuNexus).

Key Finding

RFID implementation in medical device consignment operations enables automatic allocation of devices to specific procedures during outbound shipping and bulk scanning of mixed returns in under 2-8 seconds, while simultaneously improving billing accuracy and reducing inventory write-offs by 35-70% within the first year of deployment.

This paper examines the specific challenges of medical device consignment tracking, quantifies the hidden costs beyond direct write-offs, and demonstrates how RFID technology delivers measurable ROI through improved accuracy, reduced labour, and enhanced regulatory compliance.

1. The Scale of the Problem

Medical device consignment creates unique inventory challenges that differ significantly from traditional manufacturing or retail distribution. Devices are placed at healthcare facilities but remain the manufacturer's property until used in patient procedures. The complexity emerges when multiple devices are sent for a single case but only some are used, creating mixed returns that must be accurately reconciled.

High-Value, High-Mix Returns

A typical orthopedic procedure might involve 15-30 different implant sizes and instruments, with only 2-3 actually used. The remaining 90% must be identified, inspected, and reconciled against the original consignment list. When multiple procedures return items simultaneously, standard barcode scanning becomes prohibitively time-consuming.

Cardiovascular procedures often involve even higher complexity, with catheter sizes, guide wires, and balloon dimensions selected during the procedure based on patient anatomy. Returns frequently contain mixed items from multiple manufacturers, creating additional identification challenges.

The Billing Disconnect

Most medical device manufacturers' billing systems depend on accurate return reconciliation to generate final invoices. When reconciliation is manual and time-intensive, billing delays of 30-90 days are common. These delays compound operational costs and create cash flow challenges, particularly for high-volume distribution operations.

Scale of Write-offs

$50K-$500K

Annual inventory write-offs (depending on operation scale)

3.5 sec

Manual scan-and-confirm time per returned item

2.5-4x

True cost multiplier versus write-offs alone

Industry data shows medical device manufacturers write off 1-4% of consignment inventory annually (Terso Solutions), with well-documented cases ranging from $100K-$500K in annual losses at individual facilities (DSI Direct). For operations managing $5-15 million in consigned inventory, this translates to $50K-$600K in direct write-offs, with the total operational cost typically running 2.5x-4x higher when including labour overhead, billing delays, and administrative inefficiencies.

The disconnect between procedural use and billing accuracy creates disputed charges. When billing systems cannot definitively match device usage to specific procedures, healthcare facilities frequently challenge invoices, leading to lengthy reconciliation processes and relationship strain.

2. The Hidden Costs That Rarely Appear on a P&L

Replacement cost is the number that gets reported. It is also the smallest part of the problem. None of the categories below typically make it onto a formal P&L. Together they add up to far more than the sticker price of the assets themselves.

Operational Disruption

When surgical devices are not available for scheduled procedures, operations are delayed or cancelled. Surgeons may have to use alternative implant sizes that are not optimal, or procedures get postponed while the right equipment is located. These delays create scheduling bottlenecks and patient satisfaction issues that never appear on a simple inventory write-off report.

Emergency and Over-Procurement

When loan kits or surgical instruments seem to be missing, the immediate response is usually to send more inventory to the facility. Often these devices are not lost, they are simply in a different storage area or with another department, but without proper tracking, there is no way to know. Emergency shipments create extra logistics costs and tie up additional inventory.

Dispute Resolution

Who had it last? When was it returned? Without a scan record, these questions take days to resolve. The write-off that follows to keep a customer relationship intact rarely gets attributed to asset management.

Compliance and Audit Exposure

In food, pharma, and resources, provenance and inspection records are not optional. One compliance incident costs more than years of tracking infrastructure.

Manual Counting and Administration

A medical device facility doing periodic inventory counts can spend dozens of hours per month on a task that RFID tunnels handle automatically every time devices move through scanning areas.

Carbon and Sustainability Exposure

Every asset replaced unnecessarily has an embodied carbon cost. Under the Australian Sustainability Reporting Standards (ASRS) and AASB S2, organisations are increasingly required to account for their environmental impact. Manufacturing replacement stock for assets that were not actually lost creates measurable Scope 3 emissions that now appear in mandatory sustainability disclosures.

The Fully-Loaded Cost Model

When we work through the numbers with clients, the fully-loaded cost of a missing medical device consistently lands at three to five times the purchase price. The multiplier builds from several components including replacement procurement, emergency sourcing premiums, procedure delays, billing disputes, and manual reconciliation overhead. A $2,000 orthopedic implant that gets written off is typically a $5,000 to $8,000 problem once the full operational impact is calculated.

3. Why Traditional Approaches Are Failing

Medical device manufacturers have tried various approaches to manage consignment and loan kit inventory. Most of these work adequately for small-scale operations or single-site deployments, but start showing their limitations when dealing with multiple hospitals, complex procedures, and high-value mixed returns.

Spreadsheets and Manual Registers

Spreadsheets are the most common approach and the easiest to start with. The problem is they are only as accurate as the last person who updated them, which in a busy warehouse is rarely the priority it needs to be. Across multiple sites and trading partners the data becomes almost entirely fictional.

Barcode Scanning

Barcodes create a digital record, which is an improvement. The catch is that someone has to physically scan each device individually. In a busy medical device facility with multiple returns from different hospitals, staff often skip scanning steps to keep shipments moving, making the data unreliable when you need it most.

Periodic Audits

A physical audit tells you where things were on the day you counted. By the time an audit surfaces a large deposit of your assets at a third-party site, months have passed and recovery becomes a commercial negotiation rather than a straightforward retrieval.

Pooling and Leasing

Pooling transfers some of the headache to a third party, but not the operational consequences of shortfalls. You still need to know what you have on hand, and if the pool provider is invoicing you for assets in your custody, you need the data to check that invoice.

4. The RFID Difference

RFID technology works by automatically reading small tags attached to medical devices as they move through scanning areas. There's no need for staff to point scanners at individual items or scan each barcode manually. When shipping loan kits to a hospital, the RFID tunnel allocates every device to that specific procedure. When mixed returns come back from surgery, the same tunnel identifies every tagged device instantly, even items packed inside containers or mixed together in bags.

Each device gets a passive UHF RFID tag, applied either at manufacture or during a tagging project at your facility. These tags are read automatically by handheld readers for targeted scanning, desktop RFID stations for workstation-based processing, or RFID tunnels for bulk scanning of entire shipments. Everything is timestamped and attributed to a location, procedure, or shipment record, giving you real-time visibility into your consignment inventory.

99.9%	<2 sec	10–18mo
Read accuracy with RFID tunnels (optimal conditions)	Time to count a full pallet at a read point (site dependent)	Typical payback period for returnable asset RFID

Three RFID Reading Technologies for Different Use Cases

RFID tunnels provide bulk scanning capability for both outbound and inbound processing. When sending loan kits to hospitals, staff push tubs containing surgical sets through the tunnel to automatically allocate every tagged device to that specific procedure and destination. On the return side, when mixed returns come back from surgical procedures, the same tunnel identifies every tagged item in seconds. This

eliminates the need to unpack and individually scan items, dramatically reducing processing time while improving accuracy at both ends of the workflow.

Desktop RFID stations are perfect for workstation-based processing where staff need to verify specific devices or perform detailed reconciliation. These compact units sit on countertops and can quickly scan individual instruments or small kits during inspection, sterilisation preparation, or when building custom surgical sets.

Handheld Readers: Targeted Scanning for Route and Customer Delivery

Handheld readers give your team a fast way to scan assets against a specific customer or delivery run before they leave the site. A driver or pick operator scans the load in seconds and the system records exactly which assets went out, to which customer, on which vehicle.

Handheld RFID readers give your team flexibility to scan devices anywhere in your facility. Field service representatives can verify loan kit contents before leaving for hospital deliveries, ensuring complete sets. At healthcare facilities, the same handheld units can be used to confirm returns or locate specific devices within storage areas.

What Changes Day to Day

The most immediate change is that you stop guessing. Asset location is visible across all sites and partners in real time. Disputes get resolved with a scan record rather than a phone call. Fleet size decisions get made on actual utilisation data rather than worst-case assumptions. Manual stock counts at monitored locations drop dramatically or disappear entirely.

A Note on Implementation

For a single facility starting with an RFID tunnel and handheld readers, deployment typically takes just a few weeks from sign-off to go-live. Ramp handles site assessment, tag selection, hardware installation, platform setup, and training as a managed process. Integration with existing ERP and inventory systems is scoped upfront to ensure seamless data flow. Every engagement starts with a discovery conversation to understand your operation, work through where RFID is the right fit, and shape the right scope from there.

5. Building the Business Case

Getting internal sign-off on a tracking investment usually comes down to two questions: what does it cost and how quickly does it pay back. The five steps below give you a framework to answer both with your own numbers.

Step 1 – Quantify Your Loss Rate

Run a physical count and compare it against your registered fleet size. The gap is your minimum unaccounted asset number. Multiply by your replacement cost per unit for your direct loss baseline. Most operations find this number is higher than expected even before any other costs are considered.

Step 2 - Apply the Multiplier

Apply a 3x multiplier as a conservative estimate of the fully-loaded cost, accounting for the categories in Section 2. If your operation has high dispute frequency or significant manual counting overhead, 4x to 5x is more realistic.

Step 3 - Estimate Labour Savings

Add up the hours spent on manual counts, chasing disputed assets, and managing emergency procurement each month. Apply a blended labour rate. This number is almost always larger than people expect when they sit down and actually calculate it.

Step 4 - Model the Investment

Ramp provides budgetary pricing during early scoping, so you can run a preliminary ROI calculation before any capital commitment is made. Hardware, installation, tagging, and first-year platform costs are all scoped upfront with no surprises.

Step 5 - Calculate Payback

Payback typically falls between ten and eighteen months. Operations with loss rates above ten percent often see it within the first year. From year two onwards the ongoing cost of the platform is a fraction of the annual saving.

Case Study Illustration

Based on a real-world orthopedic device manufacturer implementation. A company managing loan kit programs across 120+ hospitals identified recurring billing disputes and write-offs averaging $180,000 annually across their surgical device inventory. Manual reconciliation was taking 45-60 minutes per complex return shipment. After implementing RFID tracking for high-value orthopedic implant kits using handheld readers and RFID tunnels, they gained automatic allocation of devices to specific procedures during outbound shipping and instant reconciliation of mixed returns. Billing accuracy improved to 99.2% and reconciliation time dropped to under 5 minutes per shipment. Total first-year investment including tags, tunnels, handheld units, and integration: $165,000. Documented savings from reduced write-offs and labour: $240,000. ROI achieved in 8 months.

6. Next Steps

If any of this matches what you are seeing in your operation, the simplest next step is a conversation. We engage with you directly to understand the operation, work through where RFID is a genuine fit and where it is not, and scope from there. A typical scoping engagement, usually completed remotely or with a single site visit, gives you:

- **An honest read** of your current medical device consignment management approach
- **A clear view** of where RFID would deliver the highest value in your specific operation
- **A preliminary ROI model** built around your consignment volume and write-off patterns

- **A costed proposal** with phasing options that suit your budget cycle

There is no obligation to proceed. The conversation is designed to give you enough information to make a confident decision either way.

Let's start a conversation

Contact Ramp RFID Solutions to discuss your medical device consignment challenges.

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About Ramp RFID Solutions

Ramp RFID Solutions is an Australian specialist in RFID tracking and inventory management. We work with operations teams across retail, logistics, food manufacturing, healthcare, and resources to design and deliver tracking systems that give real-time visibility over assets, inventory, and people.

Our clients range from single-site businesses running their first RFID pilot to large national operators with multi-site deployments. We handle everything from site assessment and hardware selection through to installation, platform configuration, and ongoing support. The Ramp360 Partner Program extends our reach across Australia through a network of qualified implementation partners.

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