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WHITEPAPER

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 to 4 percent of consignment inventory annually (Terso Solutions), with well documented cases ranging from $100K to $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 more than 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 to 8 seconds, while simultaneously improving billing accuracy and reducing inventory write offs by 35 to 70 percent 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.

SECTION 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 orthopaedic procedure might involve 15 to 30 different implant sizes and instruments, with only 2 or 3 actually used. The remaining 90 percent 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 to 90 days are common. These delays compound operational costs and create cash flow challenges, particularly for high volume distribution operations.

$50K to $500K	3.5 sec	2.5 to 4x
Annual inventory write offs, depending on operation scale.	Manual scan and confirm time per returned item.	True cost multiplier versus write offs alone.

For operations managing $5M to $15M in consigned inventory, write offs of 1 to 4 percent translate to $50K to $600K in direct losses, with total operational cost typically running 2.5 to 4 times higher once labour overhead, billing delays, and administrative inefficiencies are included. When billing systems cannot definitively match device usage to specific procedures, facilities frequently challenge invoices, leading to lengthy reconciliation and relationship strain.

SECTION 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

Provenance and inspection records are not optional in regulated supply chains. 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
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> When the numbers are worked through with clients, the fully loaded cost of a missing medical device consistently lands at three to five times the purchase price, built from replacement procurement, emergency sourcing premiums, procedure delays, billing disputes, and manual reconciliation overhead. A $2,000 orthopaedic implant that gets written off is typically a $5,000 to $8,000 problem once the full operational impact is calculated.

SECTION 3

Why traditional approaches are failing

Medical device manufacturers have tried various approaches to manage consignment and loan kit inventory. Most work adequately for small scale operations or single site deployments, but start showing their limitations across 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 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.

SECTION 4

The RFID difference

RFID technology works by automatically reading small tags attached to medical devices as they move through scanning areas. There is 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%	Under 2 sec	10 to 18 mo
Read accuracy with RFID tunnels in optimal conditions.	Time to count a full pallet at a read point, site dependent.	Typical payback period for returnable asset RFID.

Three reading technologies for different use cases

RFID tunnels

Bulk scanning for outbound and inbound processing. Push tubs of surgical sets through to allocate every tagged device to a procedure, and on return identify every item in seconds without unpacking.

Desktop stations

Workstation based processing for verifying specific devices or detailed reconciliation. Compact units that scan individual instruments or small kits during inspection or sterilisation prep.

Handheld readers

Flexible scanning anywhere in the facility. Verify loan kit contents before delivery, 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. The process is handled end to end: site assessment, tag selection, hardware installation, platform setup, and training. 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.

> **On UDI.** RFID complements your unique device identification obligations under TGA, FDA UDI and EU MDR by automating the capture and movement of the identifiers you already carry. It does not replace labelling or database submission, which remain your responsibility.

SECTION 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 replacement cost per unit for your direct loss baseline. Most operations find this number is higher than expected 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 once they actually calculate it.

Step 4 **Model the investment**

Budgetary pricing is provided during early scoping, so you can run a preliminary ROI calculation before any capital commitment. 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

Orthopaedic loan kit program across 120 plus hospitals

Based on a real world orthopaedic device manufacturer implementation. A company running loan kit programs across more than 120 hospitals identified recurring billing disputes and write offs averaging $180,000 annually across their surgical device inventory. Manual reconciliation was taking 45 to 60 minutes per complex return shipment. After implementing RFID tracking for high value implant kits using handheld readers and tunnels, they gained automatic allocation of devices to procedures during outbound shipping and instant reconciliation of mixed returns.

99.2%	Under 5 min	$240K	8 mo
BILLING ACCURACY	RECONCILIATION	YEAR ONE SAVINGS	PAYBACK

Total first year investment including tags, tunnels, handheld units, and integration: $165,000. Documented savings from reduced write offs and labour: $240,000.

SECTION 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.

Start a conversation

Talk through your surgical kit and consignment challenges, or request a walk through of your own numbers.

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About this resource

Surgical Kit Tracking is an educational resource on tracking orthopaedic and surgical loan kits and consignment inventory with item level RFID. It is produced by an Australian RFID specialist that works with operations teams to design and deliver tracking systems giving real time visibility over assets, inventory, and people, from single site pilots through to multi site deployments. This document is for general information purposes only.