HEALTH SYSTEM
UNIVERSITY OF MICHIGAN

# Multidisciplinary Analysis of RSI and Miscounts

A Quality Improvement Initiative & Longitudinal Case Study
Aug. 2021 - Jun 2025 (47 months): n = 1,537 X-rays

## RSI X-rays 1 - 2x per day

There were 1,537 intraoperative X-rays ordered for RSI concerns, averaging 1-2 per day or 32 per month, and 53% were due to count discrepancies.


**Category 1: Top Missing Surgical Items**

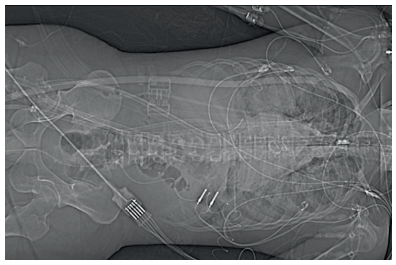
| Item | Volume (n=1,537) | Positivity Rate |
|---|---|---|
| Suture needles | 442 (28.76%) | 2.04% |
| Surgical Sponges | 85 (5.53%) | 25.88% |
| Screws | 58 (3.77%) | 8.60% |

## Needles: only 2% yield

Suture needles account for nearly 30% of all intraoperative X-ray volume but yield only a 2% positive rate. Meanwhile, surgical sponges has 26% X-ray detection rate.

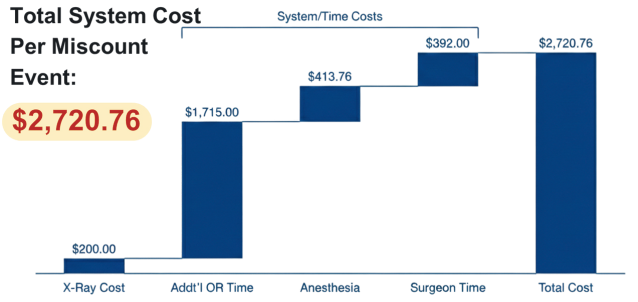
## X-rays detected only 2.6% unknown objects

Of 63 positives (1,537 X-rays), 23 were known fragments—leaving 40 true unknowns (2.6%). X-rays are highly specific but poorly sensitive (~30%), so a negative does NOT rule out an RSI.



## $2,720 per Miscount

The X-ray itself costs around $200. But when factoring in OR time, anesthesia, staff, and workflow disruption, the real cost per miscount event is **$2,720**. After multiplying the incorrect counts and unrealized baseline counts, it cost almost $58,000 a month.




## People Perspectives

*"It's difficult to tell which items are supposed to be there and which are not, yet we're asked to confirm absence in a system not built for certainty."*

*"99% of the time it's not in the patient but a communication error—X-ray feels sloppy and adds infection risk, radiation exposure, and prolonged anesthesia."*

*"Incorrect counts happen 1–2x per week—amid noise, pressure, and surgeons pushing speed, showing we must build a culture where everyone feels psychologically safe to speak up."*

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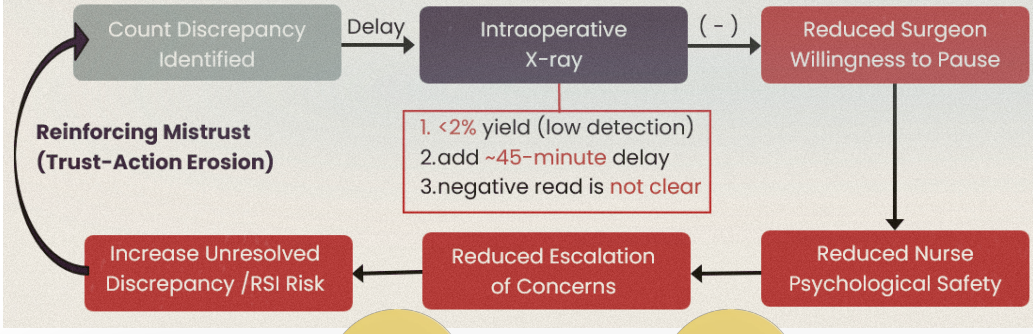
# PRACTICAL GUIDE

Unlocking Opportunities for De-escalation and Trust

## Traditional: The 45-minute Penalty

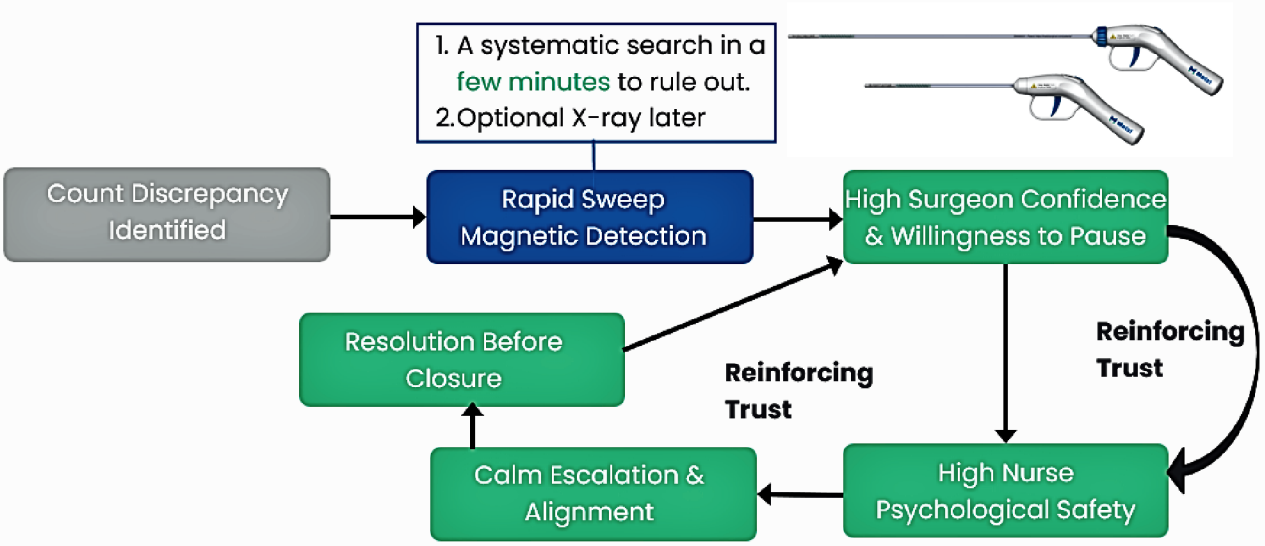
The traditional response is an intraoperative X-ray. It is a mechanical hurdle that imposes a significant time penalty on the procedure.




The current RSI protocol relies on intraoperative X-ray, adding ~45 minutes without reliably ruling out retained items, as negative reads remain uncertain. This delay and OR pressure discourage nurses from speaking up and erode trust; rapid in-vivo detection resolves discrepancies in minutes, enabling surgeons to pause briefly, confirm before closure, and restore team confidence and safety.

## Rapid Resolution: De-escalation to build trust

Calm escalation leads to alignment. The team works together to resolve the discrepancy before closure.





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