

Instrument oversupply

Surgical instrument oversupply drives cost, confusion, and workload in the operating room. With an estimated 78%-87% of instruments being unused, many health systems have recognized the need for supply refinement. By manually recording instrument use and tasking surgeons to review instrument trays, previous quality improvement initiatives have achieved an average 52% reduction in supply. While demonstrating the degree of instrument oversupply, previous methods for identifying required instruments are qualitative, expensive, lack scalability and sustainability, and are prone to human error. In this work, we aim to develop and evaluate an automated system for measuring surgical instrument use.

Hill et al. present the first system that automates the collection of real-time instrument use data with radio-frequency identification (RFID). Over 15 breast surgeries, 10 carpometacarpal (CMC) arthroplasties, and 4 craniotomies, instrument use was tracked by both a trained observer manually recording instrument use and the RFID system.

The average Cohen's Kappa agreement between the system and the observer was 0.81 (near perfect agreement), and the system enabled a supply reduction of 50.8% in breast and orthopedic surgery. Over 10 monitored breast surgeries and 1 CMC arthroplasty with reduced trays, no eliminated instruments were requested, and both trays continue to be used as the supplied standard. Setup time in breast surgery decreased from 23 min to 17 min with the reduced supply.

The RFID system presented herein achieves a novel data stream that enables accurate instrument supply optimization. ¹⁾

Ethnography is a cost-effective method to track instrument utilization and determine optimal tray composition for small services but is not scalable to large health systems. The time and cost required to observe sufficient surgeries to enable supply reduction to motivate the need for more efficient methods to determine instrument utility ²⁾

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Hill I, Olivere L, Helmkamp J, Le E, Hill W, Wahlstedt J, Khoury P, Gloria J, Richard MJ, Rosenberger LH, Codd PJ. Measuring intraoperative surgical instrument use with radio-frequency identification. JAMIA Open. 2022 Jan 19;5(1):ooac003. doi: 10.1093/jamiaopen/ooac003. PMID: 35156004; PMCID: PMC8827029.

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Helmkamp JK, Le E, Hill I, Hein R, Mithani S, Codd P, Richard M. Addressing Surgical Instrument Oversupply: A Focused Literature Review and Case-Study in Orthopedic Hand Surgery. Hand (N Y). 2021 Jun 8;15589447211017233. doi: 10.1177/15589447211017233. Epub ahead of print. PMID: 34098770.

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