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Life Cycle Assessment And Optimization Of Surgical Instrument Trays for Reversed Shoulder Arthroplasty

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Faculty Disclosure Information

- Nothing to disclosure.

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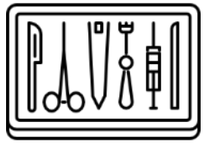
Adapted Lean 5S

Optimization result

Surgical instruments:

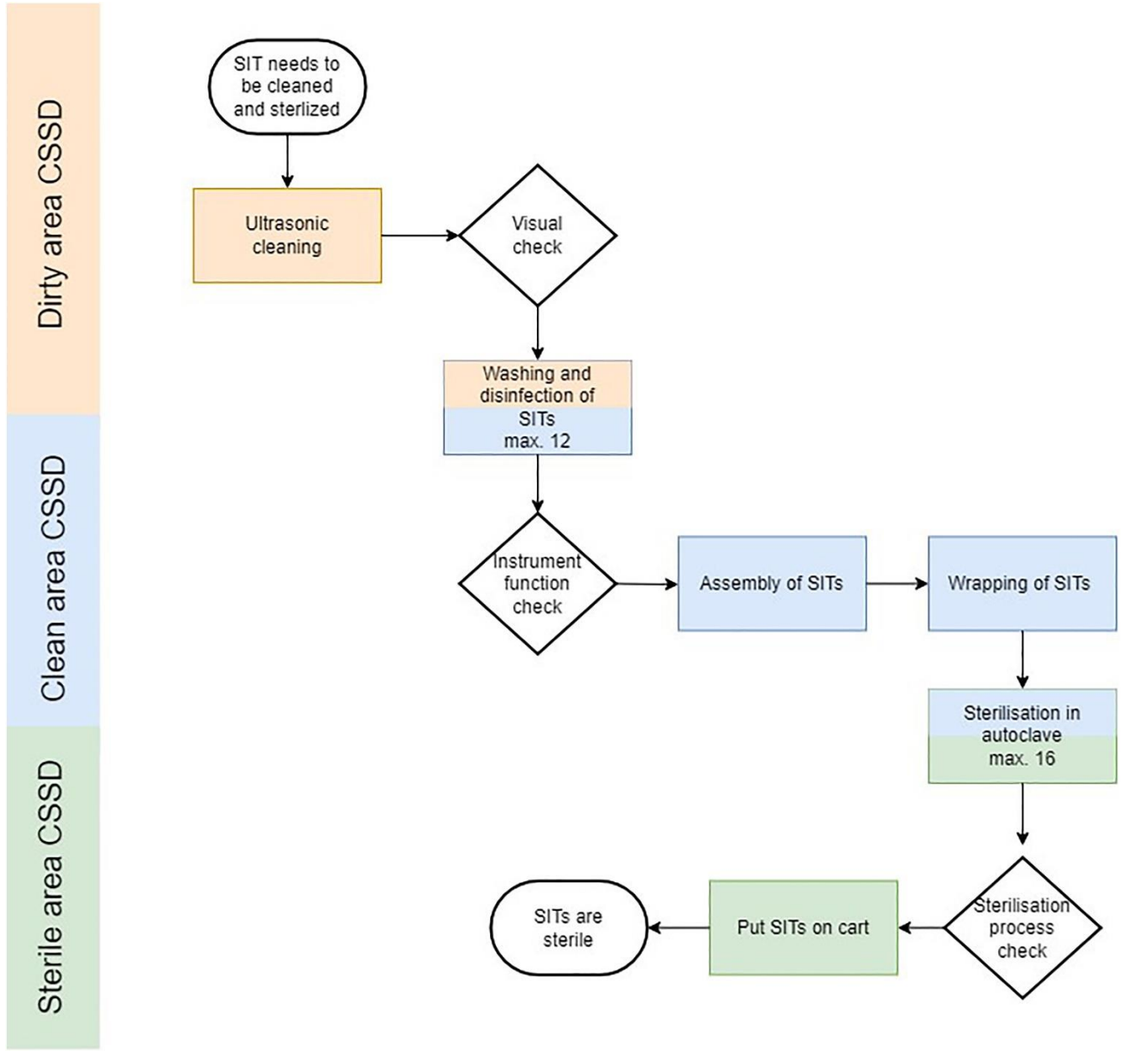
254 ➡ 115 = -55%

Surgical instrument trays:



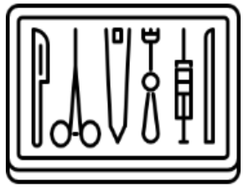
10 ➡ 7 = -30%

Cleaning, disinfecting and sterilization process

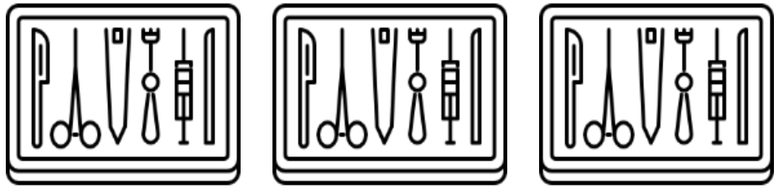


Life Cycle Assessment results

Environmental impact of -1 surgical instrument tray= 1,87 kg CO_2-eq.



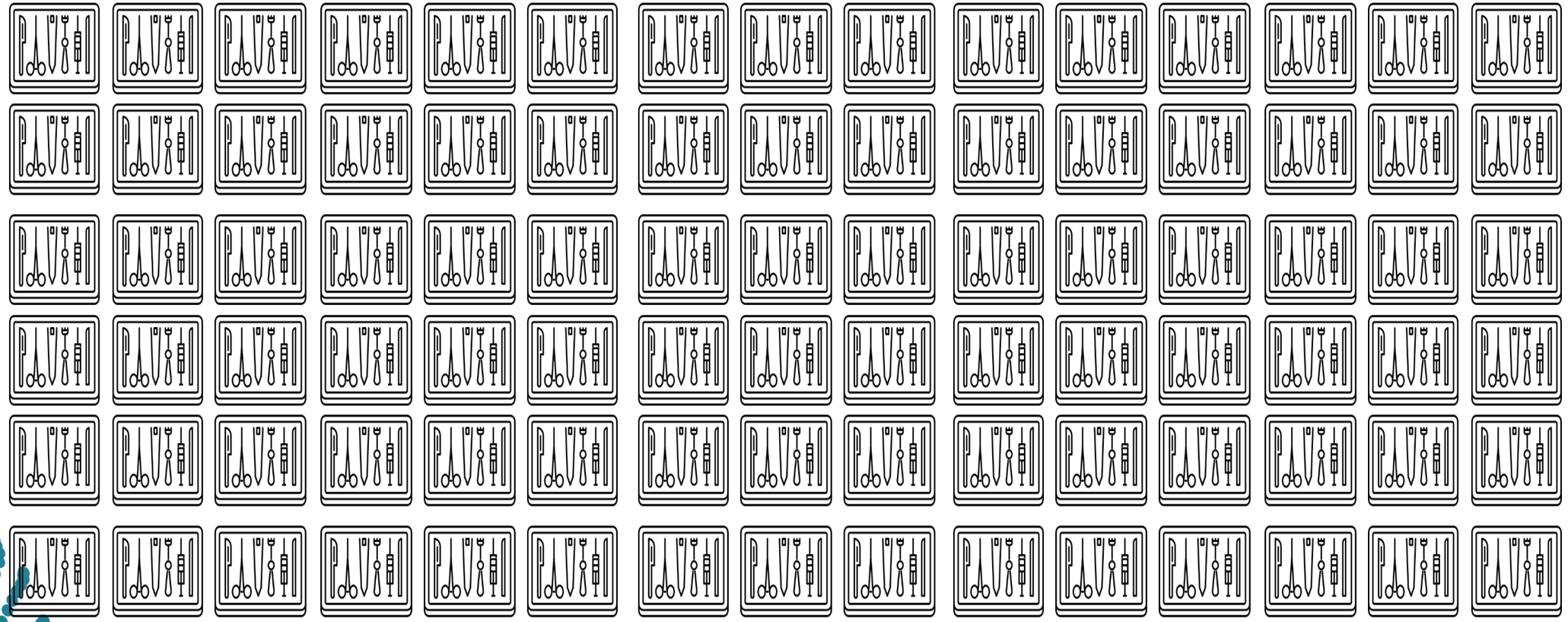
Environmental impact of -3 surgical instrument trays= 5,62 kg CO_2-eq.



Life Cycle Assessment results

Per year 524 kg CO_2-eq.

Supplemental tray in 6.67% of cases



Discussion

- Higher optimization results than previous studies
- Engagement of stakeholders
- Generalization

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Life cycle assessment and optimisation of surgical instrument trays for reverse shoulder arthroplasty

Isabella C Klarenbeek[1,2], Anne C van der Eijk[3,4], Esther RC Janssen[1,5,6], Freek Hollman[1,2], Paul C Willems[2] and Okke Lambers Heerspink[1,2]

Abstract

Objectives: Shoulder arthroplasty has a large environmental impact. Part of the environmental impact is caused by the sterilisation of surgical instruments. This study examines the effect of optimising surgical instrument trays for reverse shoulder arthroplasty (RSA), to reduce the environmental impact.

Methods: An adjusted LEAN 5s method was used to optimise the number of instruments of shoulder arthroplasty specific trays. A Life Cycle Assessment was performed to calculate the CO_2-eq.

Results: After careful selection, 139 of the 254 (55%) instruments were removed from the original RSA trays. Out of the 139 removed instruments, 19 were placed in a supplemental tray. The number of base trays was reduced with 3 trays. The estimated impact by reducing these trays from the standard pre-operative setup is a reduction of 28% of the environmental impact annually (524 kg CO_2 equivalent).

Discussion: This study confirms the feasibility of optimising instrument trays for RSA, offering a straightforward method to reduce the environmental impact of shoulder arthroplasty. Our results show that strategic instrument selection can contribute to lowering the environmental impact of orthopaedic surgery.

Keywords

Reverse shoulder arthroplasty, environmental impact, surgical instruments, life cycle assessment, sustainability, sterilisation

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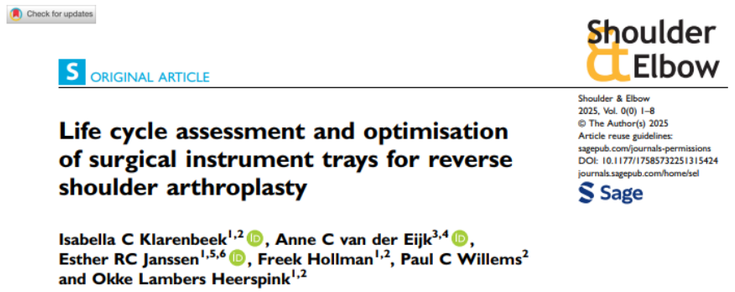
References



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