

Environmental impact of reprocessing IPC Sleeves

Background

A major contributor to healthcare waste is single-use devices, which have been estimated to contribute between 59% and 71% of the carbon footprint of healthcare.² In comparison, reprocessed devices have repeatedly been found to be more resource efficient, produce less waste, and have a lower environmental impact.³⁻⁶ To address the greenhouse gas (GHG) emissions and waste generated from the healthcare industry, it's important to incorporate more circular approaches into existing and future business models. A circular approach enables the use of materials repeatedly to reduce or prevent the creation of waste in a system. Confirming the existence and extent of these benefits requires a lifecycle perspective.⁶⁻⁸



Between 1% and 5% of the total global environmental footprint is **caused by the global healthcare sector.**¹

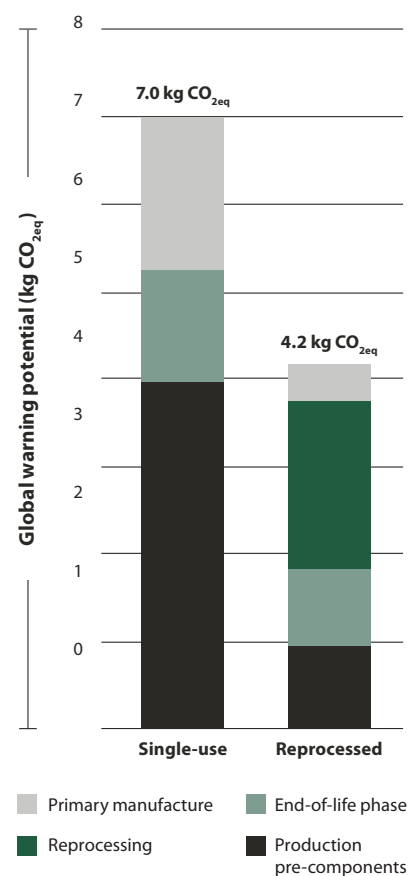
What is an LCA?

Life cycle assessment (LCA) is a method to determine the environmental footprint and ecological impact of a product throughout its life cycle. This study did a comparative life cycle analysis of intermittent pneumatic compression (IPC) sleeves that only differed in their use model: one is a single-use device, the other is reprocessed. The results provide insight into the environmental footprint of reprocessing compared to single usage of IPC sleeves.

Introduction

- An LCA was commissioned by Cardinal Health and performed by a third-party to compare the environmental footprint of a single-use and a reprocessed version of otherwise identical intermittent pneumatic compression (IPC) sleeves.
- The environmental impact of the product was measured across 16 different categories.
- What makes this LCA unique in comparison to others is that the initial production process and material composition of single-use and reprocessed IPC sleeves are identical, whereas the devices studied in other LCAs often differ.^{3,4,9}
- A sensitivity analysis was performed to identify the most influential inputs and to evaluate potential uncertainties.

Breakdown of accumulated impacts for the impact category 'climate change' comparing single-use and reprocessed IPC sleeves



Outcome/results



The results showed reprocessed IPC sleeves had a 40% lower carbon footprint, creating 4.2 kg CO₂eq compared to 7 kg CO₂eq generated from single-use IPC sleeves.



Reprocessing IPC sleeves reduces the overall environmental footprint by 43% (following characterization).



Waste disposal costs for end users were also reduced by 90%.



Reprocessed IPC sleeves have an environmental benefit across all considered impact categories, with a reduction of more than 30% in all but two categories.

Reprocessing of IPC sleeves provides an environmental and economic benefit in comparison to single-use devices.

This LCA shows that reprocessing has an environmental advantage even with rigorous standards around device cleaning and disinfection in reprocessing and long transport distances.



Full Study: Lichtnegger S, Meissner M, Paolini F, Veloz A, Saunders R. **Comparative life cycle assessment between single-use and reprocessed IPC sleeves.** *Risk Manag Healthc Policy.* 2023;16:2715-2726 <https://doi.org/10.2147/RMHP.S43998>

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