# Hospital Waste and Cost Prevention Potential of Reprocessing Medical Devices

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# Objectives

- Surgery and related postoperative care are resource-intensive, generating large amounts of healthcare waste within a hospital.
- Single-use medical devices can exacerbate this problem.
- Long-term change in practice within the hospital is often only feasible if it can help with cost containment.
- We assessed the waste and cost prevention potential of switching from a single-use to a reprocessed intermittent pneumatic compression (IPC) sleeve from the US hospital's perspective.

## Methods

• Focusing on Cardinal Health's Kendall SCD™ Express Sleeves (Figure 1), we compared a hospital's waste generation and disposal costs when using the single-use (9529) versus the reprocessed (9529R) sleeve, which can be reprocessed up to 4 times.

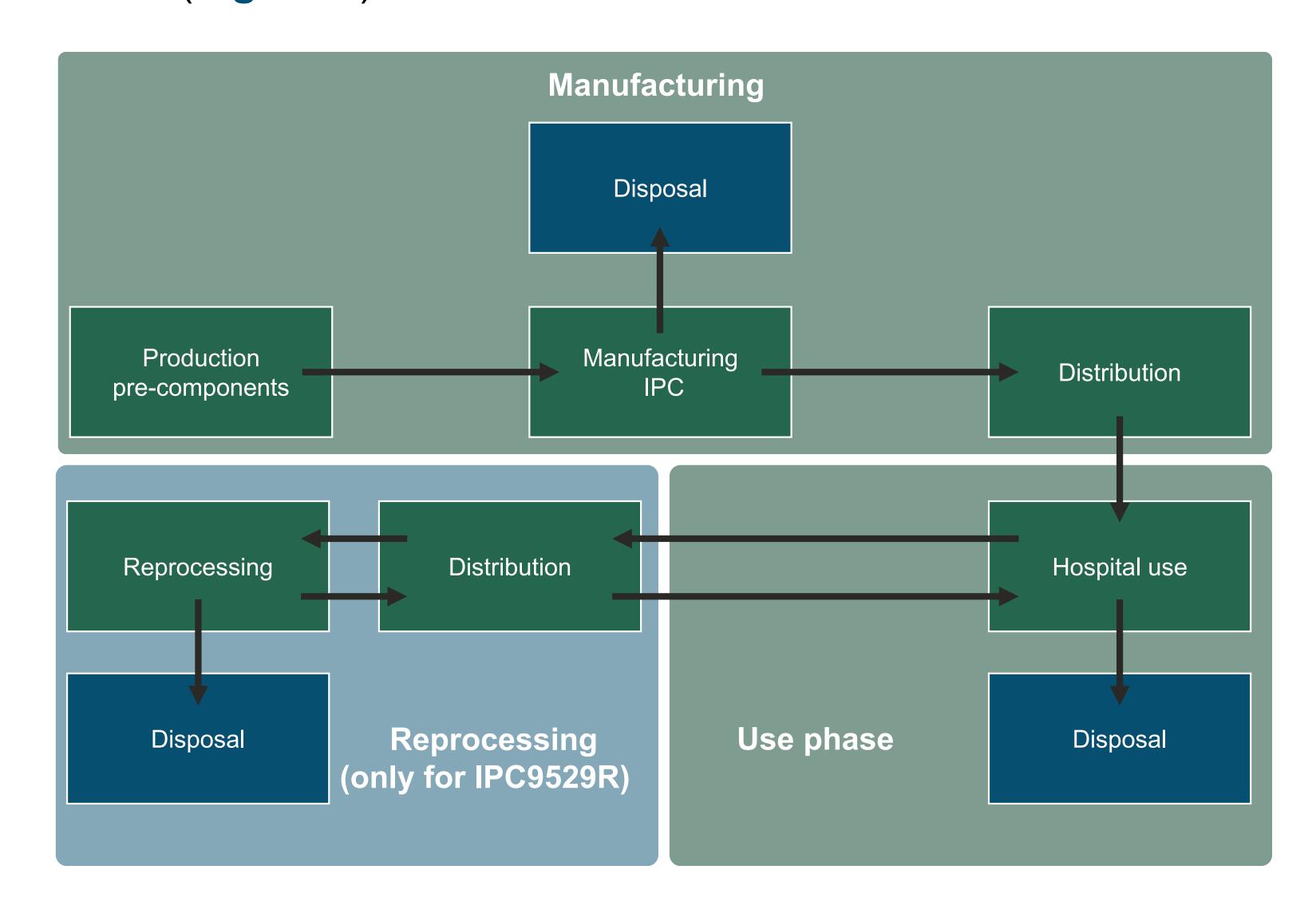




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**Figure 1** Kendall SCD™ Express Sleeve: OEM & Reprocessed Packaging with Reprocessed Sleeve.

• The analysis included packaging waste of the IPC devices and pre-components as well as material waste, losses, and reject within the primary production and the reprocessing in the year 2021 (Figure 2).



**Figure 2** Phases of manufacturing, use, and reprocessing of the single-use (9529) versus the reprocessing (9529R) sleeve including required disposal.

- Waste generated during the production of the pre-components was not considered, as these are not costs or resource use associated with the hospital payer.
- Waste was measured in US tons.
- Waste disposal costs from the hospital perspective were taken from published literature and are presented in 2021 USD (Table 1&2).<sup>1,2,3</sup>

Table 1 Costs of non-hazardous waste.

Reference	Original cost year	Cost per ton in USD
Babu et al. 2019	2017	\$7,843.53
Kagoma et al. 2012	2010	\$181.35
Riedel 2011	2008	\$94.25
Riedel 2011	2008	\$110.90
		Median: \$146.13

Table 2 Costs of hazardous waste.

Reference	Original cost year	Cost per ton in USD
Babu et al. 2019	2017	\$61,018.14
Kagoma et al. 2012	2010	\$1,251.06
		Median: \$3,1134.60

- Results are presented for 100 patients treated, assuming that 90% of waste is standard, non-hazardous hospital waste and the remaining 10% is contaminated, hazardous waste (contaminated products are not reprocessed for neither 9529 nor 9529R).
- Sensitivity analyses were run using the upper land lower cost estimates for waste disposal.

### Results

- Reprocessing saves 27.7 lbs (30%) of total waste compared to single-use.
- Of this, 4.6 lbs of waste were reduced in manufacturing or during reprocessing (non-hospital) and 23.1 lbs of hospital waste were prevented (Figure 3).

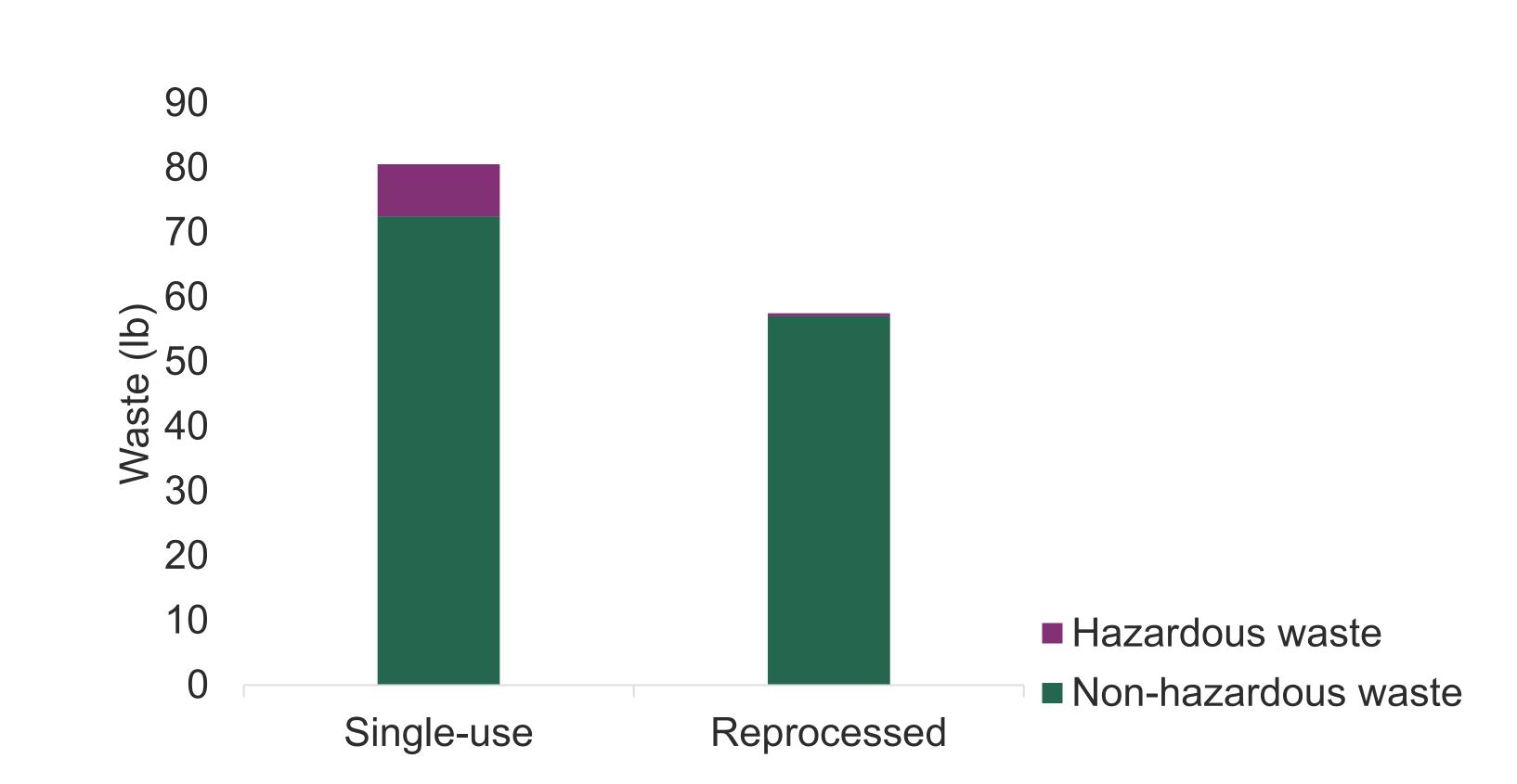


Figure 3 Waste accumulated for the treatment of 100 patients.

### Disclosure

**MM** is employee and associate of pulswerk GmbH; **SL** is CEO of Ecofides GmbH; **FP, US, JH** are employees and **RS** is the owner of Coreva Scientific GmbH & Co KG, all of whom received consultancy fees for this research.

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# CONCLUSION

- Reprocessing IPC sleeves has clear waste prevention and cost savings potential for hospitals.
- •The environmental impact of reduced waste is also an important factor to consider in the conservation of finite natural resources.
- Three studies were identified reporting on hospital waste disposal costs in the US (Table 1&2):1,2,3
  - Non-hazardous waste: \$146.13 (range \$94.25; \$7,843.53)
  - Hazardous waste: \$31,134.60 (range \$1,251.06; \$61,018.14)
- Hospital costs for waste disposal were \$130.69 for single-use and \$11.49 for reprocessed, a \$119.20 (91%) saving (Figure 4).
- The lower and higher savings estimate were \$5.47 and \$292.07 respectively.

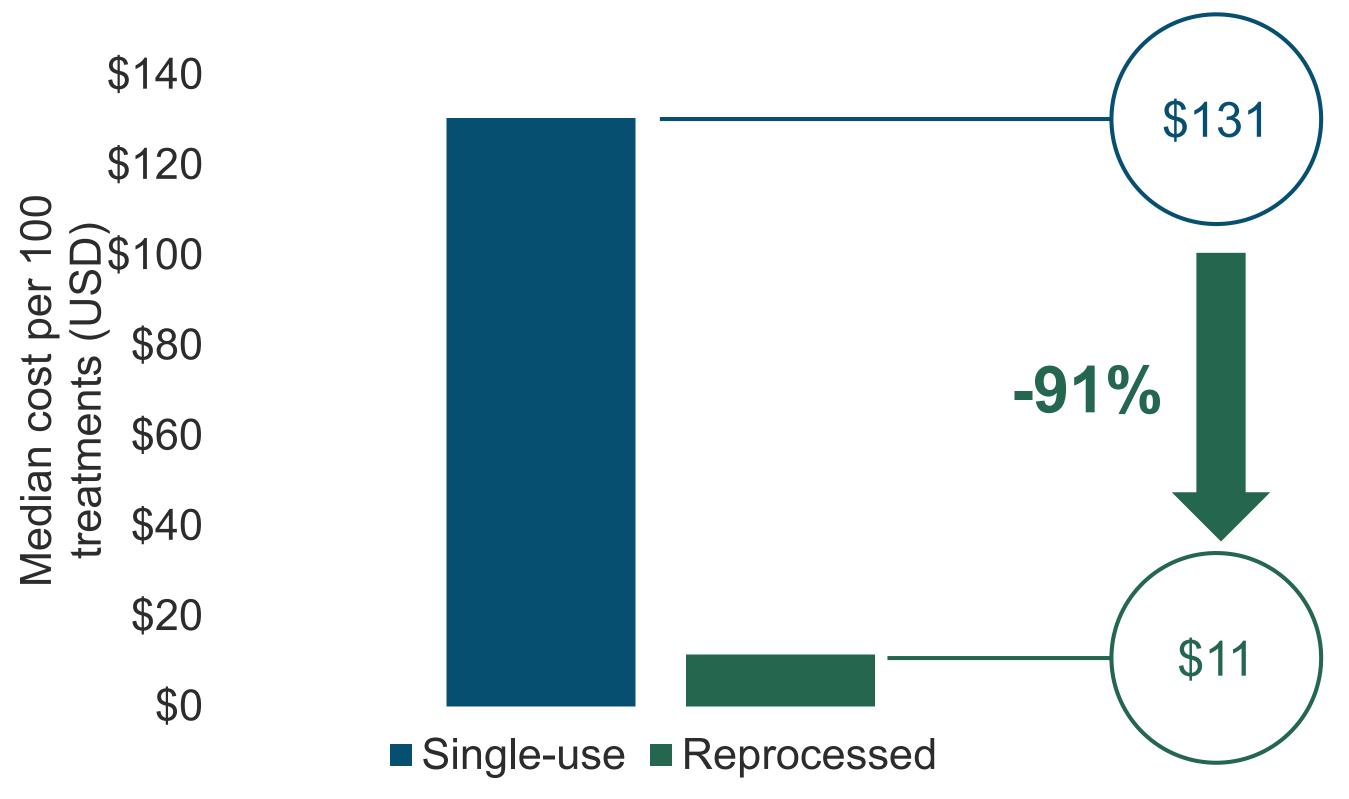


Figure 4 Reduction of waste disposal costs based on the implementation of a single-use and reprocessed sleeve of IPC.

### References

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