

EVALUATING THE ECONOMIC AND ENVIRONMENTAL IMPACT OF REPROCESSED
IPC SLEEVES FOR VTE PROPHYLAXIS: A COST-CONSEQUENCE ANALYSIS

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Objectives

- Healthcare provision is resource-intensive and creates a substantial environmental burden through waste and CO₂ emissions.
- Single-use medical devices contribute to this, especially when applied broadly such as in prevention protocols.
- Intermittent pneumatic compression (IPC) for venous thromboembolism (VTE) prophylaxis uses IPC sleeves to improve circulation in the lower extremities.
- A previously published life cycle analysis showed the environmental benefit of reprocessed IPC sleeves.¹ However, the impact on hospital budgets remains unknown.
- Here the economic and environmental impact of switching from single-use to multi-use, reprocessed IPC sleeves for VTE prophylaxis in acute care patients is assessed from the US hospital perspective.

Methods

- A decision tree was developed to estimate costs and consequences of single-use versus reprocessed IPC sleeves (with up to four cycles of reprocessing).
- Data for IPC were derived from a life cycle analysis of the Kendall SCD™ 700 Smart Compression™ system (Cardinal Health).¹
- IPC costs are based on the US mean acquisition price for 2024.
- Other model data were identified through a structured literature review of PubMed. (Figure 1)

Table 1 Key inputs

Input	Value
Cost per lbs of hazardous waste	\$0.60 ²⁻⁷
Cost per lbs of non-hazardous waste	\$0.05 ²⁻⁷
CO ₂ emissions per pair of single-use compression sleeves	3.09 lbs ¹
CO ₂ emissions per pair of reprocessed compression sleeves (4x reprocessed)	1.85 lbs ¹
Waste per pair of single-use compression sleeves	0.59 lbs ¹
Waste per pair of reprocessed compression sleeves (4x reprocessed)	0.12 lbs ¹

- Model outcomes per 100 IPC patients were total costs (in 2024 USD), IPC waste, and related CO₂ emissions.
- Model uncertainty, presented as the 95% credible interval (95% CrI) was quantified using a 1,500-iteration Monte Carlo probabilistic analysis.

Results

- For every 100 IPC patients, the model resulted in median cost savings of \$190 (95% CrI: \$155-225). (Figure 2)
- Total costs were \$828 (95% CrI: \$672-978) for reprocessed and \$1,018 (95% CrI: \$826-1,203) for single-use IPC sleeves.
- Reprocessing IPC sleeves saved 47 lbs (95% CrI: 34-63) of hospital waste and 122 lbs (95% CrI: 56-197) of CO₂ emissions.
- This amounts to an 80% (95% CrI: 74-85) reduction in waste.

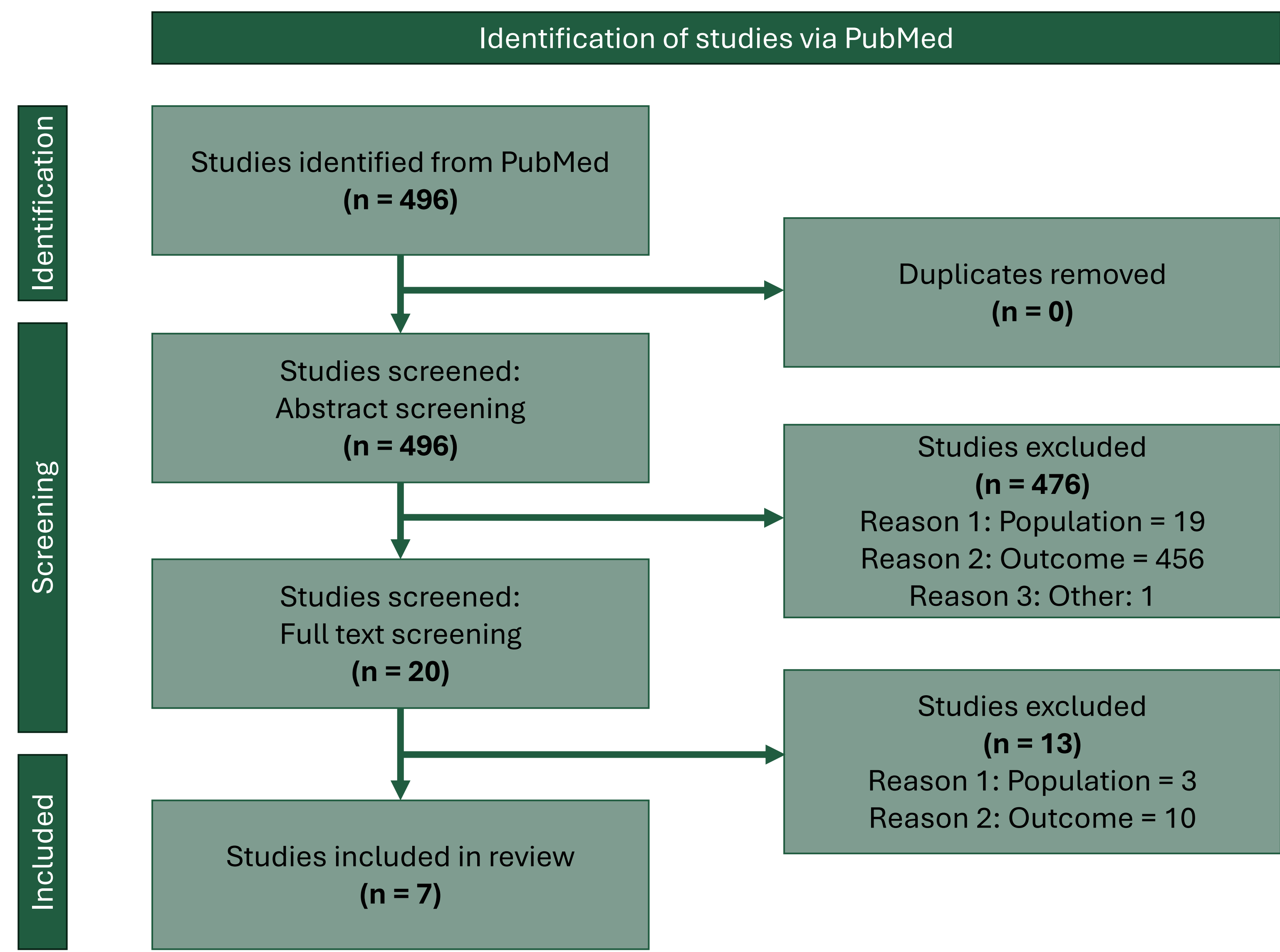


Figure 1 PRISMA diagram
A previously performed structured literature review for a life cycle analysis¹ of compression sleeves was updated for this work.

Conclusion

- From a hospital perspective, reprocessing IPC sleeves can be both cost-saving and environmentally beneficial by reducing waste and CO₂ emissions compared to single-use IPC sleeves.
- Hospitals should consider environmental parameters in a holistic, evidence-based assessment to estimate the impact of purchasing decisions beyond the total cost.

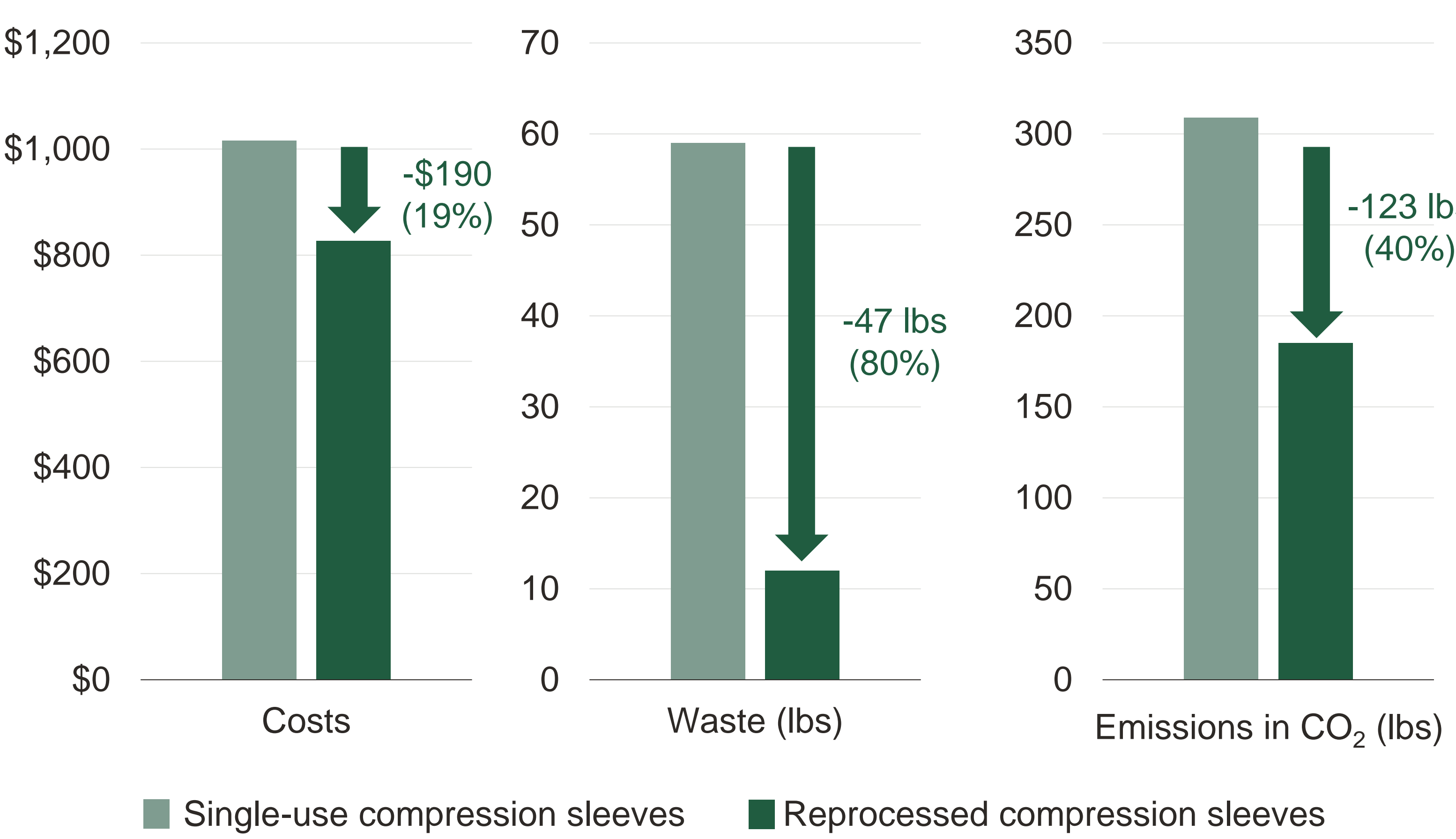


Figure 2 Main economic and environmental outcomes

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Disclaimer

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