A previous study found that converting from disposable to reusable sharps containers (DSC, RSC) reduced sharps waste stream GHG by 84% but found transport distances impacted significantly on GHG outcomes and recommended further studies where transport distances are large" McPherson et al (2019).

Abstract:

BACKGROUND: Sustainable purchasing can reduce greenhouse gas (GHG) emissions at healthcare facilities (HCF). A previous study found that converting from disposable to reusable sharps containers (DSC, RSC) reduced sharps waste stream GHG by 84% but found transport distances impacted significantly on GHG outcomes and recommended further studies where transport distances are large. This case-study examines the impact on GHG of nation-wide transport distances when a large US health system converted from DSC to RSC.

METHODS: The study's scope was to examine life cycle GHG emissions during 12 months of facility-wide use of DSC and RSC at Loma Linda University Health (LLUH). The facility is an 1100-bed US, 5-hospital system where: the source of polymer was distant from the RSC manufacturing plant; both manufacturing plants were over 3,000 km from the HCF; and the RSC processing plant was considerably further from the HCF than was the DSC disposal plant. Using a "cradle to grave" life cycle GHG tool we calculated the annual GHG emissions of CO2, CH4 and N2O expressed in metric tonnes of carbon dioxide equivalents (MTCO2eq) for each

container system. Primary energy input data was used wherever possible and region-specific energy-impact conversions were used to calculate GHG of each unit process over a 12-month period. The scope included Manufacture, Transport, Washing, and Treatment & disposal. GHG emissions from all unit process within these four life cycle stages were summed to estimate each container-system's carbon footprint. Emission totals were workload-normalized and analysed using CHI2test with $P \leq 0.05$ and rate ratios at 95% CL.

RESULTS: Converting to RSC, LLUH reduced its annual GHG by 162.4 MTCO2eq (-65.3%; $p < 0.001$; RR 2.27-3.71), and annually eliminated 50.2 tonnes of plastic DSC and 8.1 tonnes of cardboard from the sharps waste stream. Of the plastic eliminated, 31.8 tonnes were diverted from landfill and 18.4 from incineration. DISCUSSION: Unlike GHG reduction strategies dependent on changes in staff behavior (waste segregation, recycling, turning off lights, car-pooling, etc), purchasing strategies can enable immediate, sustainable and institution-wide GHG reductions to be achieved. This study confirmed that large transport distances between polymer manufacturer, container manufacturer, user and processing facilities, can significantly impact the carbon footprint of sharps containment systems. However, even with large transport distances, we found that a large university health system significantly reduced the carbon footprint of their sharps waste stream by converting from DSC to RSC.

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Reference:
McPherson, B., Sharip, M. and Grimmond, T. (2019) The impact on life cycle carbon footprint of converting from disposable to reusable sharps containers in a large US hospital geographically distant from manufacturing and processing facilities. PeerJ. February 22nd. eCollection 2019.

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