Carbon Hotspot Briefs: Addressing Major Sources of Carbon Emissions for **Surgical Gowns**

Category: Reusable Medical Textiles

Medical textiles include single-use products made from polyester and polypropylene and reusable products made from cotton or cotton-polyester blends. Surgical gowns are a typical product in this category; other common products include drapes, wound dressings, and linens. Products are manufactured, sterilized, individually packaged, boxed, and shipped in bulk by truck, train, or cargo ship.

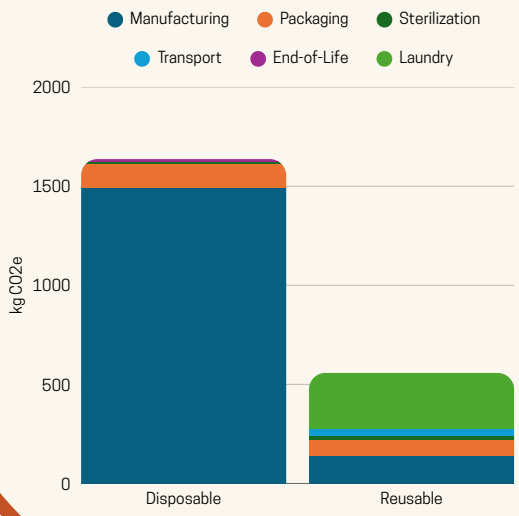
This brief summarizes a carbon footprinting study of a single-piece, long-sleeved, size x-large surgical gown used in an operating room in the US to identify typical hotspots and potential interventions to decrease product emissions.

Carbon Emissions Across Life Cycle

The major hotspot for disposable surgical gowns is **manufacturing**, especially nonwoven fabrics (polyester, polypropylene). Sterilization and transportation make negligible contributions. Gowns are assumed to be landfilled at end-of-life and use of the product has no associated emissions.

The major hotspot for reusable gowns is **laundering**, followed by manufacturing. End-of-life makes negligible contributions to the overall life cycle emissions.

Distribution of Emissions



Surgical gown emissions breakdown – for 1,000 gowns/uses.

Focusing on Carbon Hotspots

The most impactful interventions focus on **switching to reusable** surgical gowns. Based on these results, specific suggestions for different stakeholders include:

1. **Switch to reusable alternatives**:
   - Reusable gowns reduce greenhouse gas emissions by 66%.
   - Reusable gowns also reduce landfilled waste by 84%.
2. **Optimize laundering for reusable gowns**:
   - Improve energy efficiency of laundering operations.
   - Explore water-saving laundry processes.
3. **Decarbonize the manufacturing process**:
   - Procure renewable electricity for manufacturing operations.
   - Optimize cutting and forming processes to reduce waste material.

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