BD ecoFinity[™] Life Cycle Solution Turning a waste stream into a resource stream: Landfill diversion and recycling of sharps waste

Reducing waste and increasing recycling are common sustainability goals of hospitals. BD and WM Healthcare Solutions, Inc. have formed an alliance to recycle medical sharps waste from hospitals and other healthcare facilities. The BD ecoFinity Life Cycle Solution is designed to safely and economically recycle medical sharps devices. Recycled plastic is utilized to manufacture products rather than disposing of the material in landfills.

The Issue of Hospital Waste:

Waste is an increasing concern to healthcare facilities. Health Care Without Harm and the World Health Organization list waste reduction and recycling as one of the seven elements of a climate-friendly hospital and waste reduction is often a key sustainability goal for hospitals.

Key waste statistics according to the **American Hospital Association Sustainability** Roadmap for Hospitals:

\$10 billion

6,600 tons ->

annual waste disposal costs due to material consumption in healthcare facilities

daily waste generated by US hospitals



amount that is regulated waste such as medical waste, pharmaceutical and hazardous chemical waste, radiological waste, and sharps

Single-use medical sharps (syringes and needles, infusion products, etc.) provide clear clinical and public health benefits but can comprise a significant portion of the regulated medical waste stream. Today, used medical sharps are commonly treated and disposed of in landfills or incinerated.



Turning a Waste Stream into a Resource Stream Use Safety, convenience, and affordability of single-use devices **New Product** Recycled plastics are used to make new BD Recykleen collectors, thereby closing the loop Recycling Plastic and metal materials are recovered Plastic material is pelletized for injection molding

Printed on 100% recycled paper

With BD ecoFinity, powered by an alliance with Waste Management[®], hospitals can continue to realize the clinical benefits of BD's best-in-class medical devices while reducing their environmental impact and avoiding new costs.

BD devices commonly disposed of in sharps container

Syringes

BD ecoFinity Life Cycle Solution expects to recycle 70% or more of the sharps

Rady Children's Hospital Pilots Medical Sharps Recycling Program

Rady Children's Hospital-San Diego, the largest children's hospital in California, is a 442-bed pediatric-care facility providing the largest source of comprehensive pediatric medical services in San Diego, Southern Riverside, and Imperial counties.

"This environmentally-friendly solution to disposing of sharps wastes falls perfectly in line with our hospital initiatives to reduce, reuse, and recycle," said Randy Veenstra, Green Team leader at Rady Children's. "We estimate that, thanks to this program, 38,000 pounds of sharps waste that might have been sent to a landfill will be recycled." (annually)

Authors: Richard Ji, Ken McCord, Becton, Dickinson and Company. Services are provided by WM Healthcare Solutions, Inc., a Waste Management company. WM Waste Management logo is a registered service mark of Waste Management, Inc. www.wm.com BD, BD Logo and BD ecoFinity are trademarks of Becton, Dickinson and Company. © 2011 BD and WM Healthcare Solutions, Inc.

Disposal

• Syringes, catheters, etc. are safely disposed of in clean, new containers for optimal infection control

Collection & Treatment

 Waste Management sanitizes materials and converts them to usable form



- Safety syringes

- Catheters
 Flush syringes
- Wing sets
 Specimen tubes
- Spinal needles
- Vacuum tubes
 - Blood collection
 Others needles
- **Epidural needles**
- Vacuum tubes

Total Sharps Waste Stream

waste stream





Environmental Life Cycle Assessment of a Novel Hospital Sharps Waste Recycling Program Millie Calistri-Yeh,* PhD; Di Lu,* PhD, LCACP; Nathan Ayer,** MS, LCACP; Lise Laurin,** BS

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Summary: The BD ecoFinity[™] Life Cycle Solution, powered by an alliance with Waste Management[®], is a new healthcare sustainability model that recycles medical sharps waste and utilizes the materials to manufacture new products rather than disposing of them in landfills or incinerators. Life Cycle Assessment (LCA) shows that the BD ecoFinity Life Cycle Solution is environmentally preferable versus current methods for handling medical sharps waste.

What is Life Cycle **Assessment (LCA)?**

An LCA is widely recognized as the most comprehensive method available to quantify, assess, and interpret the environmental impacts of products across their **entire** lifecycle.

Why is LCA important?

Because LCA gives a comprehensive environmental accounting, it enables a comparison of product tradeoffs and process differences. These impacts are reported as effects on human health, ecosystems, resources, and climate change.

What did BD do?

BD compared the environmental impact of current sharps collection disposal methods to the BD ecoFinity Life Cycle Solution following ISO14040, 14044 guidelines.

Major Assumptions & System Boundaries

Functional Unit: collection and safe disposal of 10,000 lbs of sharps waste from standard hospital patient rooms using disposable or reusable 3-gallon sharps collection systems

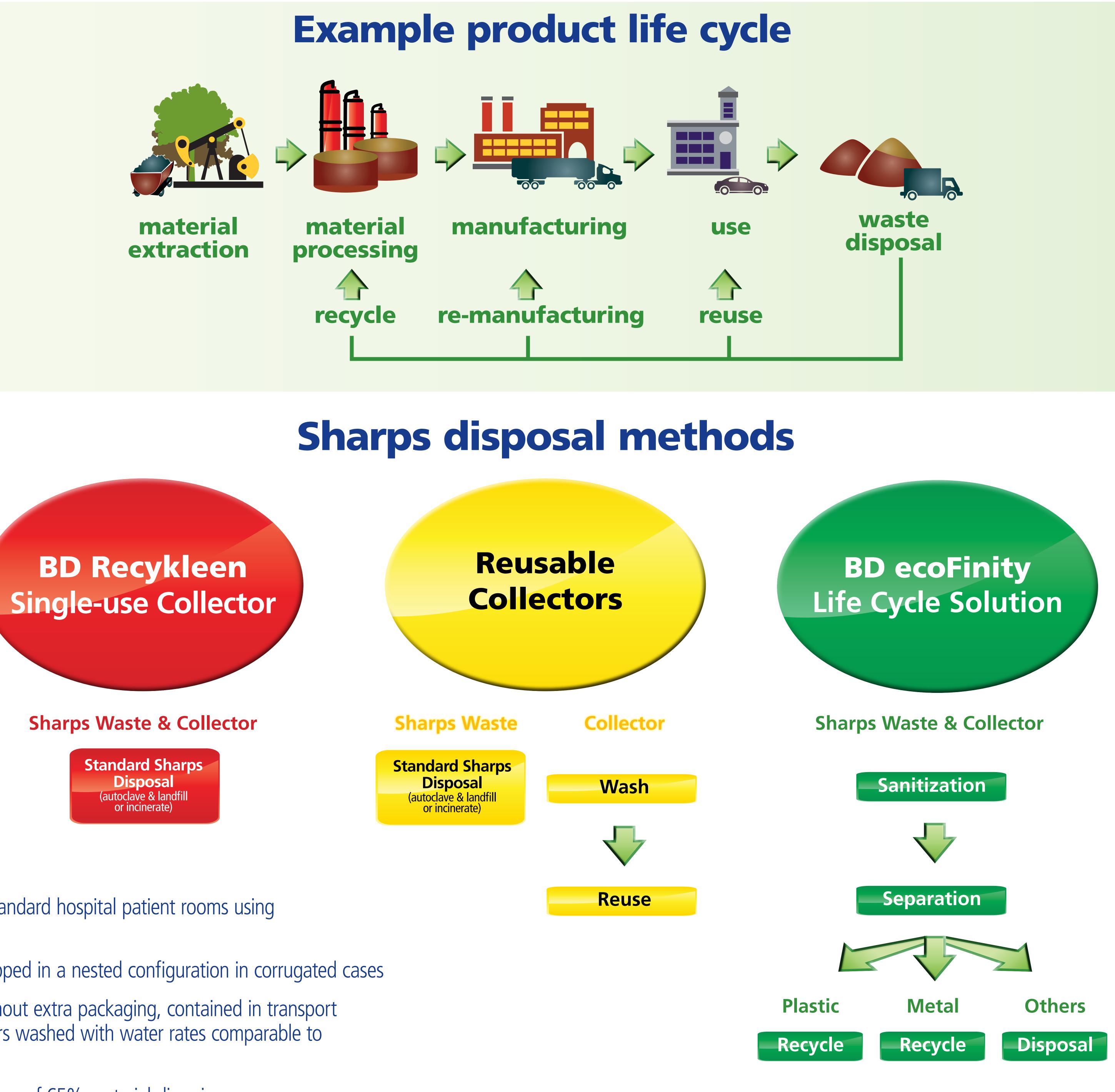
BD Recykleen Single-use Collector: manufactured with 20% recycled resin, shipped in a nested configuration in corrugated cases

Reusable Containers: manufactured with virgin materials, shipped assembled without extra packaging, contained in transport carts for relocation to offsite regional washing and waste processing centers, collectors washed with water rates comparable to commercial dishwashing systems, reused an average of 200 times each

BD ecoFinity Life Cycle Solution: manufactured with 20% recycled resin, minimum of 65% material diversion to plastics and metal recycling

Standard Sharps Disposal: waste disposition of sharps waste is 35% incineration and 65% autoclave, grinding, and landfill

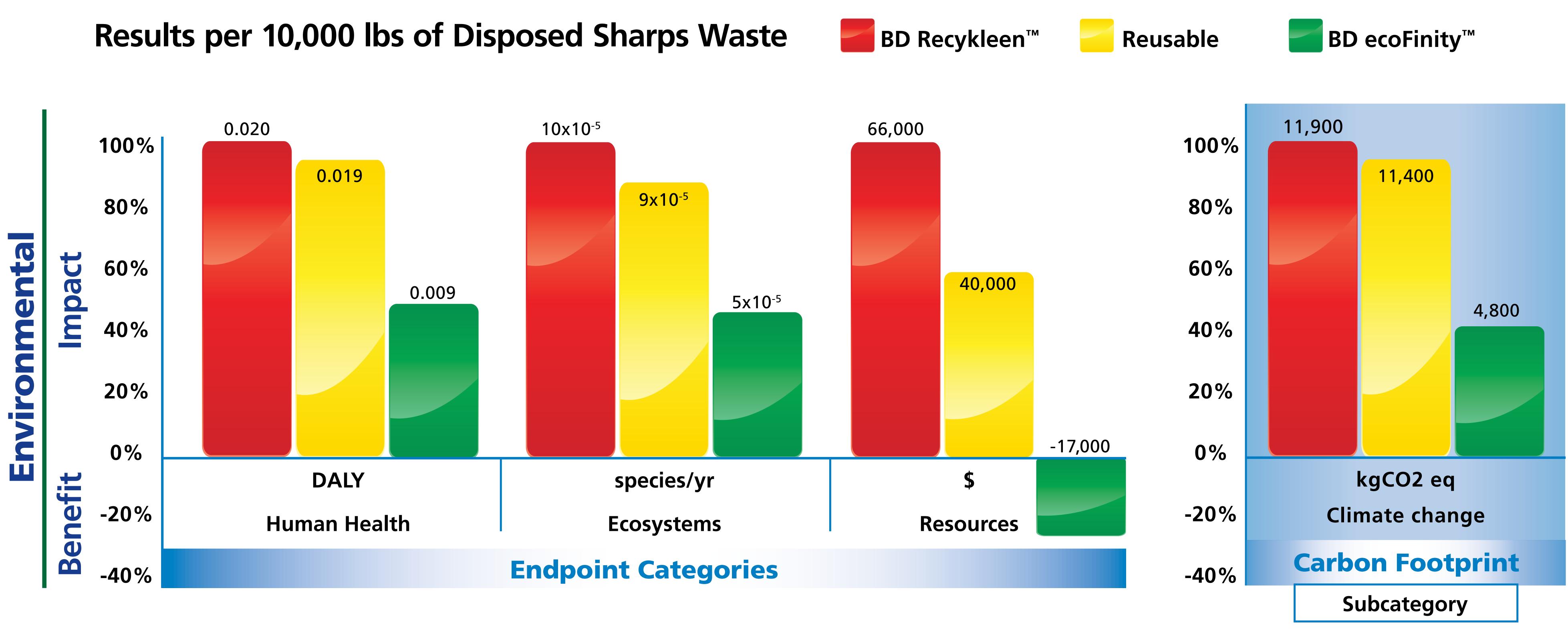
Waste/Collector Volume: average 4.1 pounds per collector



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What is an Endpoint Category?

Endpoint categories are aggregate scores made of several sub-categories. Climate change, shown above, is an example of one such sub-category or midpoint category. Endpoint categories reported in this study:

- and climate change damage, among others
- acidification, and eutrophication impacts, among others
- **Resources:** measured in cost (\$), includes fossil fuel and metal depletion effects

Practically, why is BD ecoFinity[™] Life Cycle Solution preferable?

BD ecoFinity is the only sharps disposal method that diverts the contents of the container (syringes, catheters, needles, etc.) from the infectious sharps waste stream. The contents comprise an estimated 70% of this waste stream. The LCA suggests that the benefits gained from recycling, including landfill diversion, plastics and metals recycling, etc., outweigh the tradeoffs involved including transportation, refurbishment of materials, etc.

Methodology & Reviewers: This study follows guidelines from ISO 14040, 14044. The study boundaries include the manufacture, use, and disposal of the sharps collector itself, and the proper disposal of the collected sharps waste. A combination of primary and secondary data was utilized. Secondary data is from U.S. LCI database, modifications of Ecoinvent data with U.S. electricity, published information and personal communications from experts in the field familiar with reusable sharps collections systems. The recycling impact approach taken in this study was the market-based model for system expansion (Weidema, 2003). The primary impact assessment method used in this study was the ReCiPe 2008 midpoint (hierarchist) method. The independent reviewers are H. Scott Matthews (chair), Arpad Horvath, and Richard Helling.



LCA shows that BD ecoFinity[™] Life Cycle Solution is environmentally

• Human Health: measured in disability adjusted life years (DALY), includes human toxicity, ozone depletion,

• Ecosystems: measured in species lost per year, includes climate change damage, land and marine ecotoxicity,

