



Greening Health Care Sector Report: Waste Management

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Introduction

The Green Hospital Scorecard (GHS) is a benchmarking and recognition program which aims to reflect hospitals' environmental performance as indicated by their operations, management, and policies. Hospitals that participate in the GHS program receive an individual GHS report, which is created using the data submitted through the GHS Survey. The individual report allows hospitals to benchmark their own year-over-year performance, as well as their performance relative to their peers.

To provide Ontario Hospital Association (OHA) members with a sector-wide view of hospitals' environmental performance, GHS data from the first two years of the program were aggregated into sector reports. These reports provide a de-identified summary of participating hospitals' environmental performance in the areas of leadership, planning and management; waste management; and utility conservation and management as defined in GHS Survey.

The sector data have been aggregated and are presented by year and peer group (Community, Non-Acute, Small and Academic) for the hospital sites that participated in the GHS. Figure 1 shows the number of hospital sites that participated in the first (reporting year 2012) and second (reporting year 2013) year of the program.

The **Global Reporting Initiative** (GRI) reporting principles were utilized during the development of the report. GRI is an organization that promotes the use of sustainability reporting as a way for organizations to become more sustainable. The guidelines recommend having at least two previous periods in addition to the current reporting year before reporting on trends. In addition, GHS waste generation and recycling rate Key Performance Indicators (KPI) definitions have changed for the 2013 reporting year. The changes consist of expanding the number of waste streams that are included in the waste generation and recycling rate definitions. For these reasons, this first report mainly presents 2013 participating hospital sites' results. Continuing with the GHS program will enable the monitoring of trends with respect to Ontario hospitals' environmental performance and their contribution to achieving environmental sustainability.

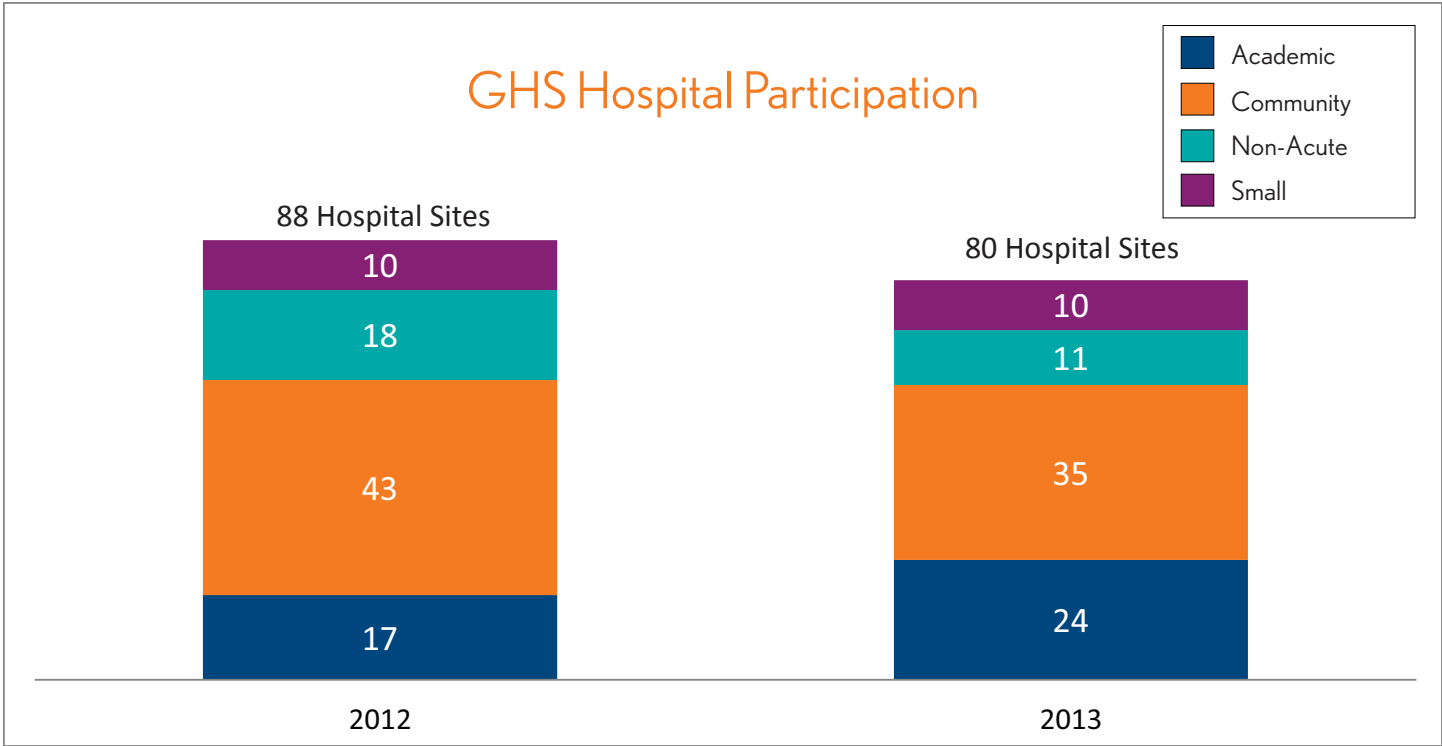
Sector Reports

The "Greening Health Care Sector Report: Waste Management" is the second of three reports, which captures waste management activities.

The first sector report, "Greening Health Care Sector Report: Corporate Leadership, Planning and Management", is available for download at the **OHA's Knowledge Centre**. The first report summarized measures that capture hospitals' corporate commitment to an environmentally sustainable culture and integration of green objectives into corporate planning and regular business. It was based on questions in the Pollution Prevention and Corporate Leadership, Planning and Management sections of the GHS Survey. The third, and final, report, "Greening Health Care Sector Report: Utility Conservation and Management", will summarize energy use and sources, and water management. It will be based on questions in the Energy and Water sections of the survey.

This second report, "Greening Health Care Sector Report: Waste Management," is drawn from questions in the Waste section of the GHS Survey.

Figure 1: Number of participating hospital sites by Year and Peer Group



Peer Group

- Academic Hospitals – All acute general and pediatric hospitals that are members of the Council of Academic Hospitals of Ontario (CAHO).
- Community Hospitals – Acute care hospitals that do not fit the definition of a small or academic (teaching) hospital.
- Non-Acute Hospitals – Complex continuing care (CCC), rehabilitation, and mental health hospitals. Have stand-alone CCC or Rehabilitation beds. They may or may not be members of CAHO.
- Small Hospitals – Provides less than 3,500 weighted cases, have a referral population of less than 20,000, and is the only hospital in the community.

Managing Waste

Health care facilities in developed countries have been estimated to contribute 3% to 8% to the climate change footprint (Frost & Sullivan, 2011). For example, in 2012, the National Health Service in England carbon footprint was 25 million tonnes of carbon dioxide equivalents (MtCO₂e), which is approximately 4% of the country's greenhouse gas emissions (Department of Energy & Climate Change, 2014; Sustainable Development Unit, 2014).

In 2012, total waste disposal (solid, wastewater handling and waste incineration) in Canada contributed approximately 6% of Canada's greenhouse gas emissions (Environment Canada, 2014; Statistics Canada, 2012). According to Statistics Canada, the amount of waste that the Ontario's non-residential sector disposed of into landfill in 2010 (which is the most recent year with published data from Statistics Canada) was 6,043,151 tonnes; Table 1 has the disposed of quantities. Statistics Canada's non-residential sector disposed quantities consist of non-hazardous waste disposed of in public and private waste disposal facilities by industrial, commercial and institutions. The amount of material that the Ontario's non-residential sector diverted from landfill in 2010 was 752,990 tonnes; Table 2 has the diverted quantities. The GHS data from the 2013 reporting year suggest that the Ontario hospital sector generated approximately 64,560 tonnes¹ of general (non-hazardous) waste and diverted approximately 31,102 tonnes² of waste from landfill. When the GHS 2013 waste and diverted quantities are compared with the Statistics Canada 2010 data for Ontario's non-residential sector, they represent, approximately, 1% of the Ontario non-residential sector waste destined for disposal and 4% of the diverted waste³.

Table 1: Disposal of waste in tonnes, by source and geography

Geography	Sources of waste for disposal	2010
Canada	All sources of waste for disposal	24,883,546
	Non-residential sources of waste for disposal	15,627,006
Ontario	All sources of waste for disposal	9,247,415
	Non-residential sources of waste for disposal	6,043,151

Table 1 data consists of non-hazardous waste disposed of in public and private waste disposal facilities by industrial, commercial and institutions. For more information, please see Statistics Canada Table 153-0041: Disposal of waste, by source, Canada, provinces and territories.

¹ The 64,560 tonnes of waste consists of the general (non-hazardous) waste quantities submitted in GHS survey for reporting year 2013. GHS data was extrapolated to the entire Ontario hospital sector using statistical analysis and the Ontario Healthcare Reporting Standards Bed and Inpatient Data for 2013.

² The 31,203 tonnes of waste consists of all the waste streams quantities in GHS survey for the reporting year 2013 that were diverted, i.e. blue bin, green bin, cardboard, shredded paper, e-waste, batteries, lights, scrap metal, scrap wood, pallets and the category of other waste stream. GHS data was extrapolated to the entire hospital sector using statistical analysis and the Ontario Healthcare Reporting Standards Bed and Inpatient Data for 2013.

³ The estimates of 1% of the waste disposed and 4% of waste diverted represent minimum numbers as GHS does not have waste quantities for all the waste streams from participating hospitals.

Table 2: Materials diverted in tonnes, by source and geography

Geography	Sources of waste for disposal	2010
Canada	All sources of diverted materials	8,505,257
	Non-residential sources of diverted materials	3,557,966
Ontario	All sources of diverted materials	2,749,047
	Non-residential sources of diverted materials	752,990

Table 2 data consists of the following type of materials: all paper fibres, glass, ferrous metals, copper and aluminum, mixed metals, white goods, electronics, plastics, tires, construction, renovation and demolition, organics and other materials. For more information, please see Statistics Canada Table 153-0043: Materials diverted, by type, Canada, provinces and territories.

The GHS data from the 2013 reporting year also suggest that the average composition of Ontario hospital waste consists of:

- General (non-hazardous): 59%
- Diverted wastes (recycle, reuse and compost): 34%
- Biomedical waste: 7%

The GHS program does not track hazardous waste – its focus is on waste streams that have opportunities for diversion and waste reduction. Biomedical waste is tracked as part of the GHS program to measure possible contamination with conventional wastes. The Green Hospital Champion Fund (GHCF) Environmental Audit Program (EAP) waste auditors advised that although hospitals are diligent in ensuring biomedical wastes are properly managed, greater care can be taken to prevent conventional waste materials from entering the biomedical waste stream (Ontario Hospital Association, 2014).

Waste avoidance and waste diversion are environmentally sound practices that reduce the environmental footprint. Waste avoidance is reducing the need to manage and dispose of waste by preventing its generation through better procurement, minimizing packaging, and utilizing vendor services such as product take-back programs. Waste diversion includes recycling, reuse and composting, and focuses on improving the handling of waste after it is generated by ensuring discarded materials are diverted from landfill (Ontario Hospital Association, 2014).

Waste auditors, engaged in GHCF EAP, projected that waste diversion can be increased between 1.5% and 34% by improving conventional recycling, implementing an organics diversion program, ensuring the biomedical waste stream is free of conventional wastes and negotiating improved services with waste haulers. EAP waste auditors suggested that implementation of waste diversion or waste reduction measures would result in small but meaningful savings – between \$5,000 and \$10,000 per year for most hospitals, while for larger hospitals, projected savings could exceed \$50,000 annually through improved waste diversion (Ontario Hospital Association, 2014).

Characterization and Monitoring of Hospital Waste

Waste management encompasses a variety of activities from waste generation, handling, characterization, monitoring and treatment to disposal. Having waste management activities supported at a corporate level with organization-wide policies, goals and plans, facilitates the implementation and success of waste avoidance and diversion activities. GHS data from the 2013 reporting year suggest that most of the participating hospitals have waste planning and management measures in place, it showed:

- Participating hospitals that have waste management policies in place, 74%
- Participating hospitals that have waste management targets in place, 69%
- Participating hospitals that have waste management action plans in place, 61%

Waste segregation and monitoring activities allow organizations to understand the composition of hospitals' waste streams which can be used to set objectives, targets and implement plans to make further improvements in waste avoidance and diversion. To characterize each waste stream and monitor its weight requires ongoing commitment to the process, and in many cases, assistance from the waste service provider. The characterization and monitoring activities of the waste streams defined in the GHS survey are illustrated in Figures 2 and 3, as well as Table 3. Figures 2 and 3 show how many participating hospitals submitted quantitative data for each waste stream for the 2012 and 2013 reporting years, respectively. Table 3 illustrates how 2013 participating hospitals have quantified the weight of the 6 waste streams that make up 94% of hospitals' total waste.

Figure 4 shows the 2013 participants waste distribution by weight.

Key observations in 2013:

- Eighty percent or more of participating hospitals quantify general (non-hazardous), blue bin, shredded paper, cardboard and biomedical wastes. Five percent of participating hospitals quantified scrap wood waste.
- Sixty-three percent of participating hospitals rely on hauler records to determine the weight of the waste stream, and 37% estimate waste quantities. Table 3 illustrates the two practices of quantifying waste; it summarizes the percentage of participating hospitals by peer group.
- Only 9% of participating hospitals indicate that they do not have the option to divert waste streams, with 26% of hospitals not having the option of diverting green bin (organics) waste.
- Cooking/fryer oil, grease, grease traps comprise a common, non-quantified waste stream that is diverted from landfill among participating hospitals.

Figure 2: Participating hospitals that submitted quantitative data on waste streams in 2012

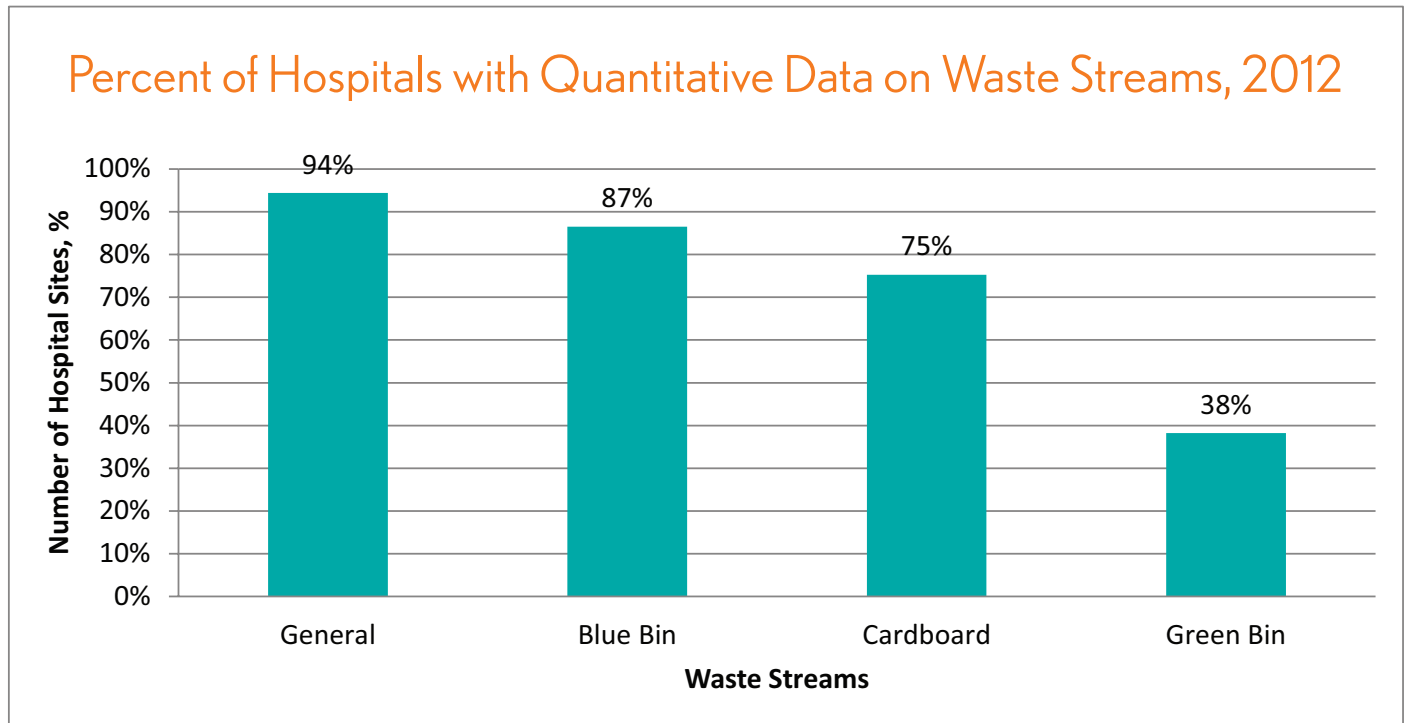


Figure 3: Participating hospitals that submitted quantitative data on waste streams in 2013

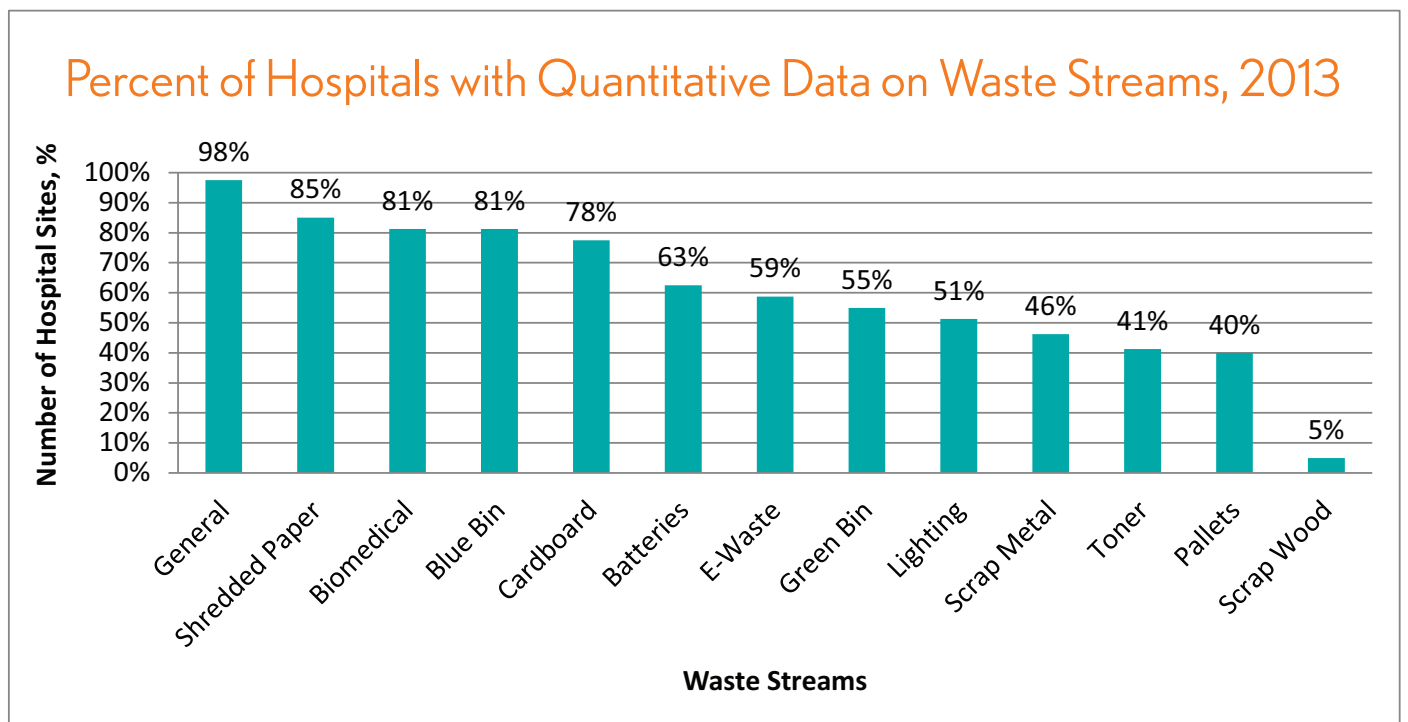
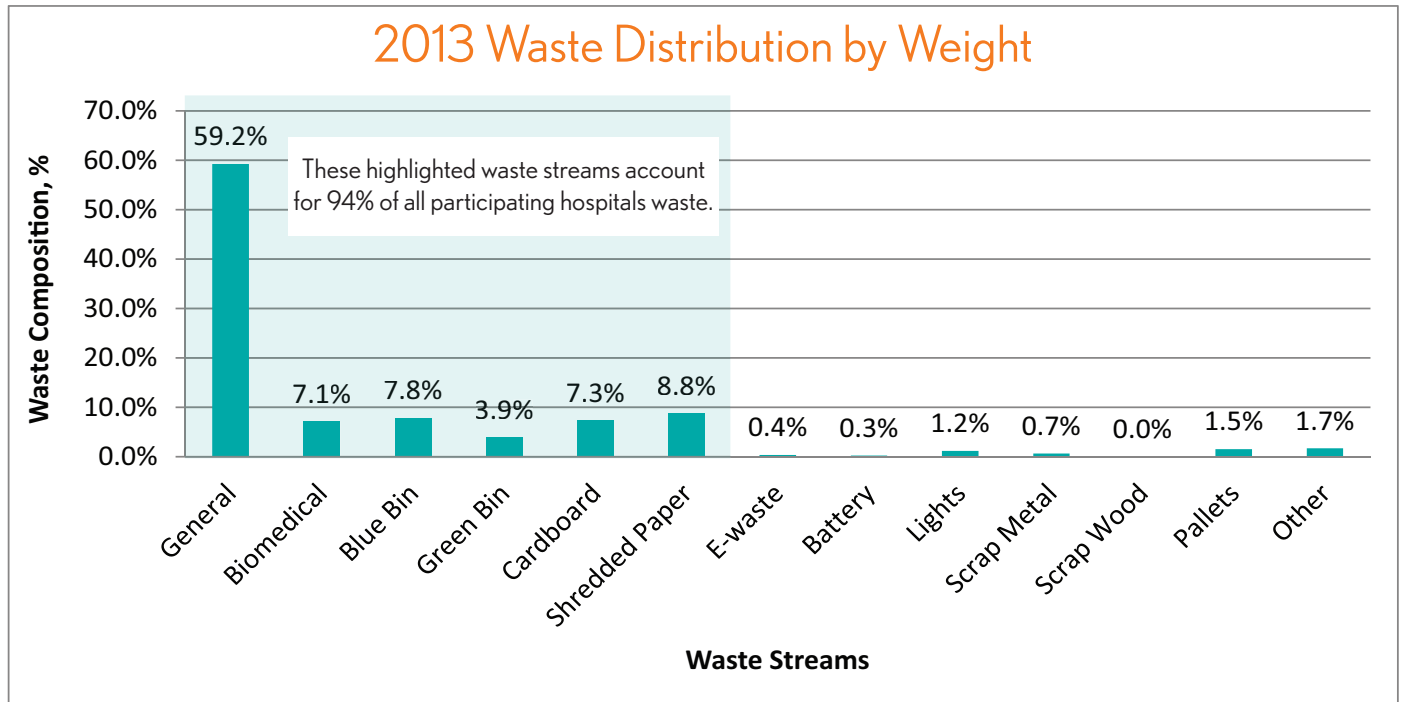


Table 3: 2013 Participating hospitals source of quantified data, by peer group

Peer Group	Source	Waste / Material Streams					
		General	Biomedical	Blue Bin	Green Bin	Cardboard	Shredded Paper
Academic	Estimate	17%	19%	17%	44%	32%	23%
	Hauler	83%	81%	83%	56%	68%	77%
Community	Estimate	25%	7%	30%	31%	28%	28%
	Hauler	75%	93%	63%	69%	72%	72%
Non-Acute	Estimate	10%	14%	13%	17%	14%	17%
	Hauler	90%	86%	88%	83%	86%	83%
Small	Estimate	80%	11%	71%	100%	100%	38%
	Hauler	20%	78%	14%	0%	0%	63%

Figure 4: 2013 Participating hospitals waste distribution by weight



Waste Reduction Measures

Water Intensity KPI

The GHS program aims to measure a hospital's overall waste management performance using the Waste Intensity KPI. The indicator measures how much waste is generated in a facility relative to the hospital size and activity, which is measured in beds, inpatient days and the floor space in square meters (m²). Frequency distribution of the 2013 Waste Intensity KPIs are shown in Figures 5, 6 and 7.

Frequency distribution of the Waste Intensity KPI, tonnes per m², among the 2013 participants is shown in Figure 5.

Frequency distribution of the Waste Intensity KPI, tonnes per bed, among the 2013 participants is shown in Figure 6.

Frequency distribution of the Waste Intensity KPI, tonnes per inpatient day, among the 2013 participants is shown in Figure 7.

Figure 5: Frequency distribution of 2013 Waste Intensity KPI, tonnes per m²

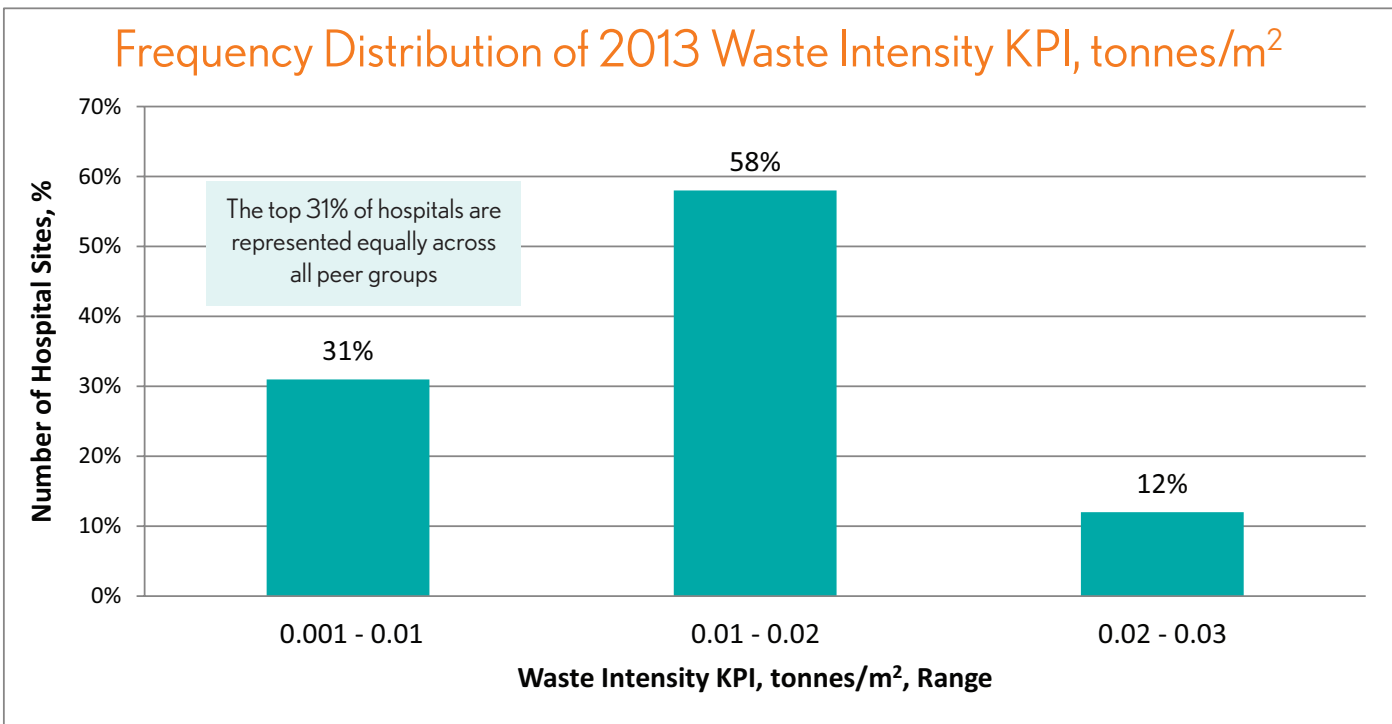


Figure 6: Frequency distribution of 2013 Waste Intensity KPI, tonnes per bed

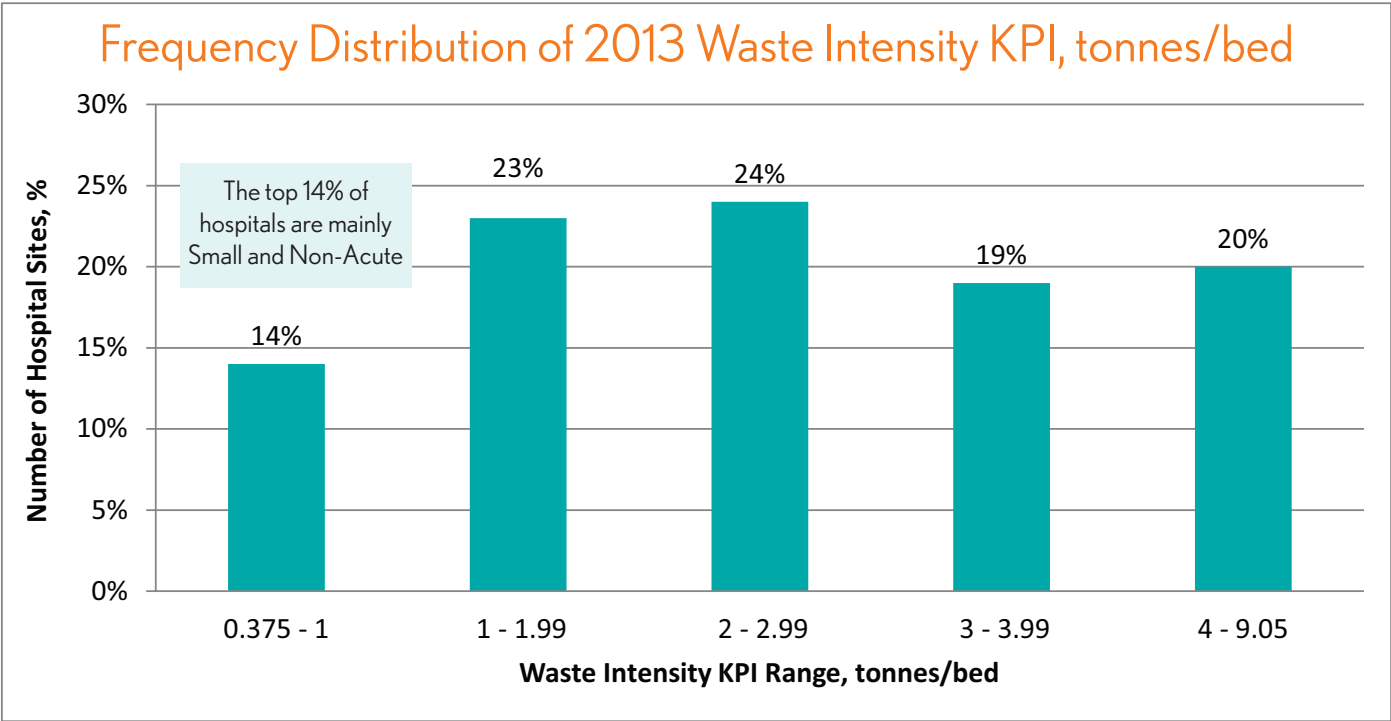
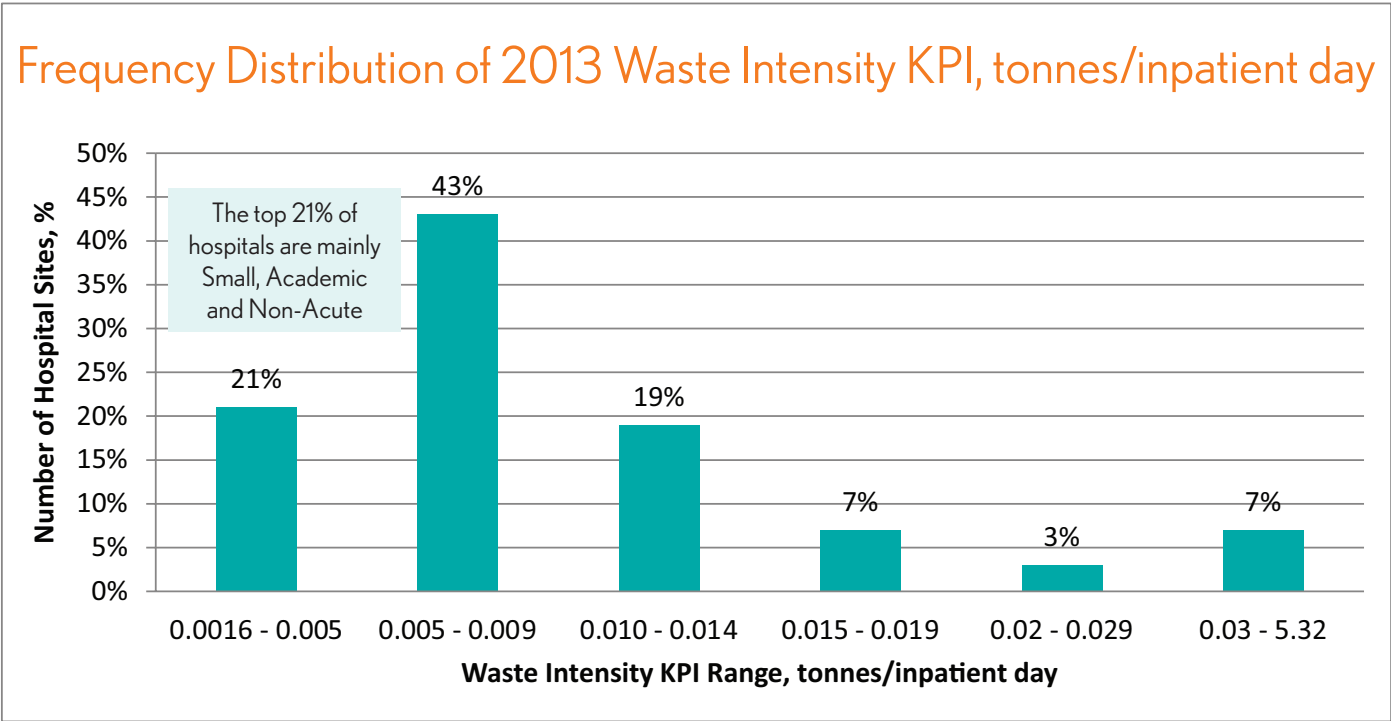


Figure 7: Frequency distribution of 2013 Waste Intensity KPI, tonnes per inpatient day



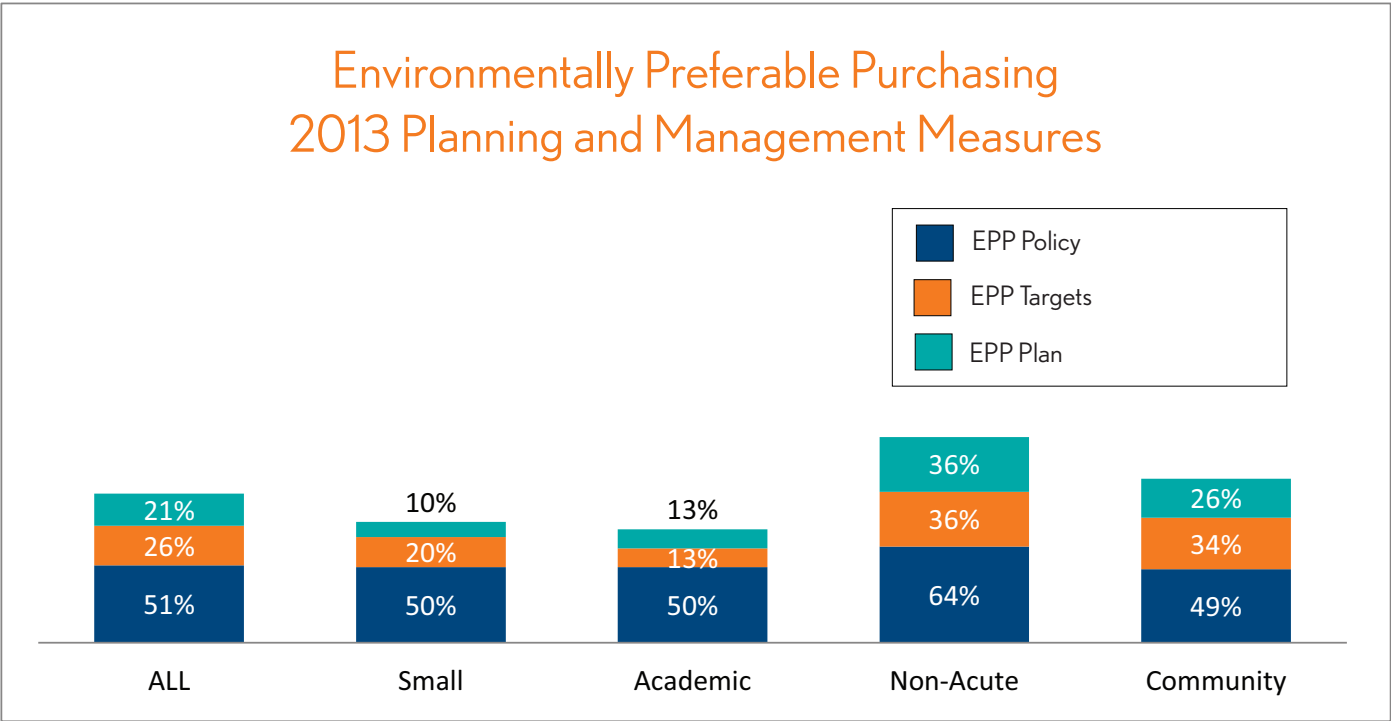
Environmentally Preferred Purchasing

While the GHS program found that most participating hospitals do not have green procurement planning and management measures in place, there are many environmentally preferred purchasing activities taking place in hospitals across Ontario, including:

- Some supplies delivered in reusable totes
- Reusable biomedical sharps containers
- Coolers/ice packs are sent back to drug companies (or used by local bait shops)
- Skids are returned to vendors, local scrap company or delivery contractors
- Toners sent back to company for refills
- Purchase of energy efficient materials

Figure 8 illustrates the 2013 GHS green procurement planning and management measures that participating hospitals have in place.

Figure 8: Percentage of participating hospital sites in 2013 with Environmentally Preferable Purchasing Planning and Management measures



Waste Diversion

Recycling and composting are environmentally sound means of diverting waste from landfill. Reusing materials by finding different purposes is another mechanism to minimize the amount of waste that is sent to landfill sites. Many GHS-participating hospitals are finding creative ways to recycle and reuse items (please see the *Hospitals' Waste Avoidance and Diversion Activities* section for what and how hospitals are diverting materials from landfill sites).

Key Observations in 2013:

- The average Recycling Rate per peer group ranged between 32% and 39% with Non-Acute hospitals averaging the highest recycling rate and Small hospitals the lowest. Frequency distribution of the Recycling Rate KPI among the 2013 participants is shown in Figure 9. Table 4 captures 2013 participating hospitals' average scale factors including size (m²), beds and inpatient days for each Recycling Rate range.
- The highest Recycling Rates are found in the Toronto Central LHIN; Table 5 shows the average Recycling Rate for LHINs of 2013 participating hospitals.

Figure 9: Frequency distribution of 2013 Recycling Rate KPI

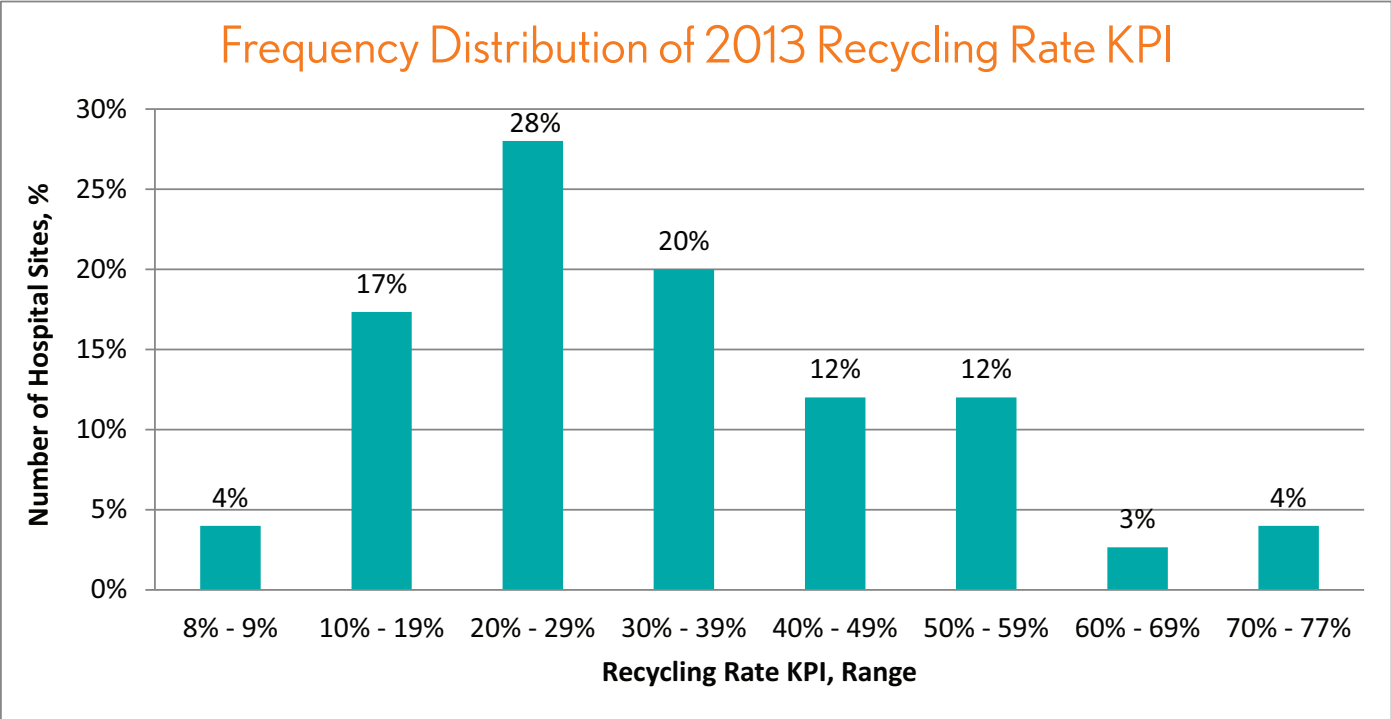


Table 4: Hospitals scale factors by Recycling Rate, 2013

Recycling Rate Range	Average Size (m ²)	Average Beds	Average Inpatient Days
8% - 9%	25,916	165	5,267
10% - 19%	63,187	289	88,005
20% - 29%	70,635	322	139,439
30% - 39%	67,445	343	111,680
40% - 49%	50,218	148	44,562
50% - 59%	20,322	128	30,917
60% - 69%	29,164	227	78,322
70% - 77%	31,578	97	44,689

Table 5: Average Recycling Rates by LHIN, 2013

LHIN	Average Recycling Rate
Toronto Central	44%
Mississauga Halton	41%
South West	38%
Hamilton Niagara Haldimand Brant	35%
Erie St. Clair	34%
Waterloo Wellington	32%
Champlain	29%
Central	29%
Central East	28%
South East	24%
North East	20%
North Simcoe Muskoka	20%

Hospitals' Waste Avoidance and Diversion Activities

Hospital items such as old or surplus electronics and accessories, furniture (desks, tables, cabinets, doors), household items, clothing, other textile items are picked up by organizations such as Habitat for Humanity, Canadian Diabetes Association or given to local agencies supporting the community or sold to employees or recyclers, or via Auction Sales. The following list captures examples of hospitals' waste avoidance and diversion engagements:

Donations

- Over 1,050 kilograms of outdated PC's/laptops/cabling were sent to Cuba in August, 2014. There are two doctors who take turns collecting medical items, linens, etc. In September 2014, a shipment was sent with older Renal Dialysis Units and a large amount of fluids that were compatible with these older units.
- Medical equipment, therapeutic used toys and orthotic devices were sent to Children's Hospital in Ecuador.
- Old electronics are given to a local agency that receives money for e-waste. The e-waste is picked up by an e-waste vendor that dismantles electronic components to be melted down and reused; nothing from the e-waste goes into landfill. The local agency receives funds from the e-waste vendor that go to local youth programs. In addition, the e-waste vendor plants a tree for every green container that is filled.
- Third world donations include expired products, un-used equipment and un-contaminated surgical supplies.
- Supplies near expiration or medical items no longer in use, or not meeting current standards that would normally be discarded, have been sent to Syria for the last two years.
- One hospital collects milk bags that are donated to a local high school. The students make mats for third world countries. Pop can tabs are also collected and provided to a company that makes wheelchairs.
- Disposable Operating Room wraps are saved and provided to staff for use as packing materials and drop sheets.

Reuse

- There is a store location within the hospital where new employees or those wanting to upgrade their office material can find supplies such as filing cabinets, white boards and desks, etc. that were previously used by other employees.
- Re-use of surgical wrappers.
- Many hospitals use reusable plastics and reusable containers, for example:
 - The yellow sharp smart program at one of the participating hospitals: their reusable containers undergo a controlled disinfecting and decontamination process. Although the container is rated for 500 washes, it doesn't last that long due to aesthetics (because the colour can fade and while it is still a fully

functional unit, it is often removed from circulation), and as a result, they are reused about 250 times before destruction. At that point, the labelling is removed and the high quality plastic is recycled.

- o Reusable medication collection container for hospital units and medication carts. Implementing the reusable containers has other benefits including a reduction in needle stick injuries through the design of the container, and fewer spills due to the leak-proof design.

Other Waste Diversion Activities

- At one hospital's request, a hazardous waste hauler safely cleans metal pails/drums, crushes them and then recycles the metal.
- In 2013, one hospital, along with volunteers, was responsible for diverting 8,571 pounds of battery waste across the Niagara region. This program is ongoing with battery bins distributed all across the region. The battery waste translated into \$3,000, which was then re-invested back into hospital equipment purchases.
- Light bulbs and fluorescent tubes are converted to mercury, glass and phosphor by the bulb eater onsite.
- Instrument tray wraps are recycled. Instrument tray wraps are composed of number five (polypropylene) film plastic.
- Where possible, the plastic wrap on linen carts is collected and sent back to Booth Centennial Healthcare Linen Services, which recycles all plastic wrap and soiled bags.
- E-waste and batteries are picked up by external vendors free of charge and recycled.
- Printer toners are returned to the vendor they were purchased from for recycling.
- Pallets that are not returned to the vendor are diverted with scrap wood.
- Scrap metal and wood are taken to recycling facilities.
- Fluorescent and compact fluorescent lamps are gathered for an external vendor to recycle for a fee. At one hospital, 475 lamps were recycled in 2013.
- Styrofoam and plastic wrap waste are collected and taken to the local collection boxes for recycling.

Kitchen and Organic Wastes

- At some hospitals, the kitchen uses a food cycler that converts food waste to a bio-mass material used in composting.
- One hospital uses on-site composting by vermiculture for food waste.
- On-site composting of organic materials such as grass clippings, dead plant material and leaves are used by some hospitals. This compost is used on-site for flower bed fertilizer throughout the year.
- Many hospitals divert cooking oil, kitchen grease and grease traps.

Resources

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