2015 SUSTAINABILITY BENCHMARK REPORT

FINANCIAL **STEWARDSHIP**

HEALTH AND **WELLNESS**

EMPLOYEE **ENGAGEMENT**

ENVIRONMENTAL **BENEFIT**

PRACTICE Greenhealth®

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2015 Environmental Excellence Awards Top 25 Winners

The Top 25 Environmental Excellence Award is now Practice Greenhealth's highest honor for hospitals. Selected from the Greenhealth Partner for Change Awards applications, these 25 hospitals are leading the industry with innovation in sustainability, demonstrating superior programs and illustrating how sustainability is entrenched in their culture. Competition was fierce, with many advanced and innovative programs at member hospitals vying for these 25 spots.

Advocate Christ Medical Center & Advocate Children's Hospital

Advocate Good Samaritan Hospital

Advocate Illinois Masonic Medical Center

Beaumont Hospital

Bon Secours Good Samaritan Hospital

Bon Secours St. Francis Medical Center

Cleveland Clinic

Dartmouth-Hitchcock Medical Center

Dell Children's Medical Center of Central Texas

Gundersen Health System

HackensackUMC

Harborview Medical Center

Hudson Hospital and Clinics

James E. VanZandt VA Medical Center

Littleton Adventist Hospital

Magee-Womens Hospital of UPMC

Memorial Sloan Kettering Cancer Center

Metro Health Hospital

Ridgeview Medical Center

Seattle Children's Hospital

The University of Vermont Medical Center Unit

UCSF Medical Center/UCSF Benioff Children's Hospital

University of Washington Medical Center

VA Portland Healthcare System

Virginia Mason Hospital & Seattle Medical Center

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Executive Summary

Practice Greenhealth's 2015 Sustainability Benchmark Report is the nation's premier compilation of sustainability performance and benchmarking for the health care sector. The report highlights the achievements of the 2015 Environmental Excellence award winners[1]—a set of 220 hospitals who are setting the standard for health care environmental stewardship. These and other awards were presented to 435 recipients at CleanMed 2015 in Portland, Oregon. This year's data set is based on reported activities during the 2014 calendar/fiscal year.

As health care leaders gain a better understanding of how environmental health supports human health, and as the call for providers to better support disease prevention grows louder, a focus on environmental stewardship is more obviously aligned with the hospital's mission to "first, do no harm." Hospitals are taking on a range of programs that demonstrate this mission, from the creation of policies to minimize the use of chemicals of concern (81.6 percent), to purchasing meat and poultry not produced with the use of non-therapeutic antibiotics (51.4 percent), to choosing to use renewables for some portion of their energy portfolio as a means to lessen the human health impact of energy production (30.6 percent).

In 2014, U.S. hospitals generated more than 4.84 million tons of waste.[2] Award-winning hospitals diverted 92,205 tons from the landfill in 2014 through recycling, saving nearly $4 million. If hospitals across the country could achieve the same median recycling rates as award winners (29.8 percent), there is potential to recycle millions of additional tons of waste annually. The seventh annual edition of this report also demonstrates unequivocally that environmental stewardship supports financial stewardship. Award-winning hospitals were able to repeatedly document the many ways that sustainability programs add value to the bottom line. Table 1 highlights a snapshot of aggregate cost-savings and environmental benefits from the programs implemented by the 2015 award winners.

1 The *2015 Sustainability Benchmark Report* includes activities reported by 220 winners of the Greenhealth Partner for Change Award, Greenhealth Emerald Award and the Top 25 Environmental Excellence Award.

2 Based on median total tons of waste generated per staffed bed multiplied by the number of staffed beds in U.S. -registered hospitals, per AHA Fast Facts (available at: http://www.aha.org/research/rc/stat-studies/fast-facts.shtml).

Earlier reports[3] have already demonstrated that by increasing the uptake of these programs in hospitals across the country, the sector could save billions of dollars while dramatically improving its environmental performance.

TABLE 1: COST SAVINGS FROM ENVIRONMENTAL PROGRAMS

Environmental Program	Aggregate Cost-Savings for Award Winners	Environmental Benefit
Recycling	$16,545,710	92,205 tons diverted from landfiill
Energy reduction	$22,106,321	1.35 billion kBtus saved or 2.6% of total energy
Solvent reprocessing	$639,629	39,005 gallons diverted from hazardous waste
Single-use device (SUD) reprocessing and other OR programs (kit reformulation, rigid sterilization containers, LED lighting, and more)	$22,121,587	485 tons diverted from medical waste
Single use device reprocessing (beyond the OR)	$13,347,783	388 tons diverted from medical waste
Water reduction	$1,938,432	145,073,693 gallons of water saved
Total	**$76,714,344**	

The report is organized into ten distinct benchmarking profiles on the different topic areas that may comprise a hospital environmental stewardship program—leadership, waste, chemicals, greening the operating room, food, environmentally preferable purchasing (EPP), energy, water, climate and green building. Each section of the report highlights a mix of performance measures and key metrics for that category. The report is designed to help member institutions assess

3 The Commonwealth Fund. Can Sustainable Hospitals Help bend the Health Care Cost Curve? November 2012. Available at: http://www.greenribboncommission.org/downloads/bending_the_curve.pdf.

4th Annual Get Healthy! Go Green! Family Walk and Health Fair, MacNeal Hospital. Berwyn, Illinois

how they compare with other hospitals engaged in this arena. From improvement within surgical suites to leadership infrastructure to supply chain engagement, this report allows hospitals to identify additional sustainability program opportunities, and more importantly, to celebrate the accomplishments achieved by their teams and colleagues.

Practice Greenhealth recognizes that as environmental stewardship becomes a more standardized part of health care operations, there is a need to standardize the measurement of sustainability performance for the sector. Practice Greenhealth currently tracks more than 25 different metrics across the different sustainability categories.

The 2015 report presents the nation's most robust data set yet on greening practices in U.S. hospitals, and speaks loudly to health care leadership in an era of transition by providing evidence that successful environmental stewardship programs not only support health and employee engagement, but also provide substantial cost savings for the institution.

Learn more about how your facility performs against Practice Greenhealth's award-winning data set. Identify your opportunities for continuous environmental improvement while also gleaning insights on some of the most successful strategies to drive that improvement.

Representatives of award-winning VA facilities at the 2015 Environmental Excellence Awards

Memorial Sloan Kettering Mortimer B. Zuckerman Research Center, New York, New York

Introduction

The 2015 Sustainability Benchmark Report provides an analysis of health care environmental performance in a data set of 220 award-winning hospitals. Practice Greenhealth is pleased to share median performance data for all hospitals, and also provide an analysis based on institutional size—primarily the number of staffed beds. Energy and water metrics continue to use square footage as the primary normalizer. The report is organized into ten distinct benchmarking profiles on the different topic areas that may comprise a hospital environmental stewardship program—leadership, waste, chemicals, greening the operating room, food, environmentally preferable purchasing (EPP), energy, water, climate and green building. Each section of the report highlights a mix of performance measures and key metrics for that category.

The Data

The data presented in this report was analyzed by Informing Ecological Design, LLC (www.iecodesign.com). Their statistical team worked closely with Practice Greenhealth staff to review the data submitted and remove outliers before using statistical methods to analyze the cleaned data. For data we wished to normalize, the teams worked together to select a set of normalizing measures that best correlated with the data to support more informative comparisons among hospitals (such as regulated medical waste (RMW) per patient day or gallons of water used per square feet).

Generally, the tables in this report present the percent of respondents answering in the affirmative for a given question (for example, the percent of hospitals that indicated they have developed a green revolving fund, or use reusable sharps containers). Some of the data tables highlight the median value for a data set (pounds of RMW generated per patient day). In older reports (pre-2014), Practice Greenhealth used the average rather than the median value. However, medians and percentiles were used this year as these values typically provide a stronger basis for comparisons and benchmarking than averages and standard deviations.

In addition to highlighting median performance, the report also highlights the performance of the Top 25 hospitals and in some cases, the 90th percentile performance. This data is provided so member institutions can not only understand their performance relative to the median, but can also understand how well health care institutions can perform on a particular metric so they can better assess how much remaining opportunity is realistically available to them for each program area.

Energy consumption data is again presented in detail with a focus on building size and the climate zones defined by the Commercial Building Energy Consumption Survey (CBECS). This allows the analysis to consider not only energy-use improvements but also to understand those improvements in the context of regional climate zones and building size. The use of this normalizing data allows for a meaningful comparison of energy consumption across the United States. It should be noted, however, that the available CBECS data is dated at this point. New data is due to come out in early 2016—but not soon enough for comparison in this report.

We invite you to review the new data set and identify useful benchmarks for your facility. Your Practice Greenhealth liaison can help you identify opportunities and support the goal-setting process. And we hope you will consider participating in the 2016 Environmental Excellence Awards or one of our other initiatives to support member benchmarking of environmental performance. A special thanks to all of the health care institutions that invested their time in completing award applications in the 2015 awards season. We look forward to learning more about how this report supports your sustainability journey.

Littleton Adventist Hospital, Littleton, Colorado

The Data Set

The data set includes 220 hospitals that submitted the 2015 Partner for Change Award application and won Greenhealth Partner for Change (PFC), Greenhealth Emerald or Top 25 Environmental Leadership Awards. The data extracted from the 2015 applications is from calendar/fiscal year 2014. All facilities in the data set have overnight beds and operating rooms. To best facilitate member comparison, this report breaks the data into several cohorts, including a comparison of all, small, large and in some cases—the Top 25 hospitals, where there is a particularly interesting data point.

Hospitals with less than 200 beds are grouped in the "small hospitals" data set and hospitals with more than 200 beds are grouped in the "large hospitals" data set. Top 25 refers to the winners of the Top 25 Environmental Excellence Award, Practice Greenhealth's premier award for outstanding all-around leadership in environmental performance. This separation maintains a statistically significant number of members in each group for analysis. Both the small and large subsets were included in the "all" data set. For example, the median square footage of "all hospitals" is 908,914, while the median smaller hospital is 387,207 square feet and the median larger hospital is 1,381,571 square feet.

The data set includes hospitals of all sizes, types and locations across the country. The hospitals analyzed in this data set range from 16 staffed beds with three ORs to over 1,500 staffed beds with more than 70 ORs, including small critical access hospitals (CAHs) in rural locations and large, academic medical and research centers that treat the country's sickest patients. Practice Greenhealth continuously reviews the data set for opportunities to draw new inferences based on these different cohorts of hospitals.

Following the analysis from last year, Practice Greenhealth used median (middle of the range) data points to highlight member performance instead of average, which provides much more robust data that is less affected by a few incorrect data points. Every year, Practice Greenhealth works with an outside statistical firm to "clean" the data set—looking for outliers and incorrect data. The use of median rather than mean provides a more statistically robust look at how the data clusters rather than accounting for the "tail" ends of the data set, which can drag down (or drag up) the average. Data set medians for the normalization factors used in the 2015 awards season are presented in Table 2 below. These factors are defined and explained in the "Normalization of Data" section of this report.

TABLE 1: THE DATA SET

Partner for Change Data Set	Sample Size	Data Set Statistics - All Hospitals	Median
Smaller hospitals (<200 staffed beds)	109	Staffed beds	205
Larger hospitals (>200 staffed beds)	111	Patient days	48,985
All hospitals	220	Adjusted patient Days	88,616
Top 25	25	Number of ORs	11
		Full-time equivalents (FTEs)	1,414
		Square feet	578,234

How to Interpret the Data Tables

Most data tables have four colored column headers: the first (darker shading) data column shows a median value for all 220 hospital winners, the second column shows data for the 109 hospitals with less than 200 staffed beds, and the third column shows data for the 111 hospitals with greater than 200 staffed beds. The fourth blank column has been added for your convenience to enter your hospital's data for comparison. Some tables will also have a column highlighting the 90th percentile performance point or the percentage of Top 25 winners reporting they have implemented the program.

Any member hospital who completes the Partner for Change application receives a 2015 Benchmark Report Card that demonstrates the individual facility's performance on the 23 metrics measured within the 2015 award application. The Sustainability Benchmark Report allows any member (regardless of whether they completed an award application) to go deeper into the data set and explore how they compare on a wider range of programmatic activity areas.

TABLE 2: DATA SET BY FACILITY TYPE

Hospital Type	Number of Small Hospitals	Number of Large Hospitals
General acute care	108	105
Children's	0	3
Oncology	0	1
Specialty	1	2
Critical access hospital	16	4
Academic medical center	23	69
Academic medical center with onsite research[1]	2	46

[1] Academic Medical Centers with Onsite Research facilities is a subset of Academic Medical Centers in the row above.

Surprisingly, Practice Greenhealth has a fairly homogeneous data set. Other than differences in the size of the facility—most are acute-care hospitals and 41.8 percent are academic medical centers. When comparing metrics performance, it is common to hear facilities talk about how their site is "different." Only three hospitals identified themselves as specialty hospitals - one cardiac, one women's and one acute rehabilitation. This data should reassure hospitals that the data set included in this report is valid for (and representative of) their facility type. If you have questions about where your institution fits into this data set, reach out to your Practice Greenhealth liaison for more information.

Normalization of Data

In order to effectively compare data between hospitals, or even to compare one hospital's data from year to year, most data must be normalized. Because patient volume can change dramatically from one year to the next and because it is unreasonable to compare the total tons of waste from an 850-bed hospital with that of a 75-bed hospital, Practice Greenhealth uses normalizing data to help identify comparable metrics. The idea is to determine how characteristics that one is interested in (waste generation rates, energy consumption or water use) are affected by certain variables (such as patient days, staffed beds, number of operating rooms or square footage). Normalizing the data allows one to look at each variable (such as patient days) that may affect the characteristic of interest (waste generation) individually, while holding the other variables constant (beds, number of operating rooms and square feet). These variables are referred to as normalizing factors in this report.

Each year, Practice Greenhealth conducts a search for the best normalization factors using statistical analysis. Multiple regression techniques identify which normalizing factors correlate best with the characteristic of interest—providing a clearer picture of which factors most strongly affect the data. Some of the normalization factors correlate well with the data and some do not, because some variables affect the characteristics we are interested in more than others (for example, the number of staffed beds more strongly influences waste generation rates than the number of outpatient visits). Regression techniques identify which variables are considered the best "predictors" for a given characteristic. For example, in 2015 it was determined that number of operating rooms was the best normalization factor, or predictor, of total waste generation, with an R-squared (R^2) value of 0.94, which is very good (1.0 would be a perfect correlation). This means that the number of ORs can explain 94 percent of the variation in waste generated.

Presentation of Data

Normalized data (such as total pounds of waste per patient day) is generally presented in the tables in order of decreasing correlation; the best normalization factor or predictor (such as total tons of RMW per OR) is presented first, followed by the next best predictor, (such as total tons of RMW per square foot).

In the past, Practice Greenhealth has utilized adjusted patient days (APD), patient days, or other variables as "favored" normalization factors. Regression analysis of the data in 2015 identified six factors (out of the nine characteristics presented

in the next section, below) that correlate well with (or can be used to best predict) the characteristics of interest (waste generation, energy and water use). These include:

- **Adjusted patient days (APD)**
- **Patient days**
- **Staffed beds**
- **Number of operating rooms/suites**
- **Full-time equivalents**
- **Square feet**

Normalization Factors

The list below includes the nine normalization factors considered in the regression analysis used to interpret the data set presented in the 2015 report. Table 1 on page 8 presents median values for each factor. It should be mentioned that the appropriate normalization factor should be selected based on three considerations—meaningfulness, comparability and availability. Practice Greenhealth has used factors that are commonly used and readily available in the industry.

Normalization Factors

Adjusted Patient Days	Adjusted patient days (APD) take into account inpatient and outpatient activity and are generally calculated as: *APD = (total patient days)*(total patient revenue/inpatient revenue); where total patient revenue = inpatient + outpatient revenue.*
Patient Days	Each patient day represents a unit of time during which the services of the institution or facility are used by a patient; thus 50 patients in a hospital for one day would represent 50 patient days.[1]
Staffed Beds	Staffed beds are those in-service and patient-ready for more than half of the days in the reporting period. Staffed beds does not include beds ordinarily occupied for less than 24 hours, such as those in the emergency department, clinic, labor (birthing) rooms, surgery and recovery rooms and outpatient holding beds.
Licensed Beds	The maximum number of beds a hospital is licensed to staff.
Employees	Practice Greenhealth uses the term "*full-time equivalents*" or "*FTEs*" in the report to designate the number of staff at a facility. This number does not count contracted employees.
Operating Rooms	The number of operating rooms at a facility is a relatively easy variable to account for, and does not typically change throughout the year.
OR Procedures	The number of OR procedures indicates how busy a facility's ORs were over a given year.
Square Footage	Square footage provides data on how large a facility is and can be an excellent normalization factor when looking at energy data and cost, as well as other variables. Square footage is measured as gross floor area.
Case Mix Index	The 2015 data was again analyzed against case mix index, a measure of how sick the patients are. While we anticipated a good correlation for RMW or waste, case mix index was not observed to be a good predictor of any variable of interest.

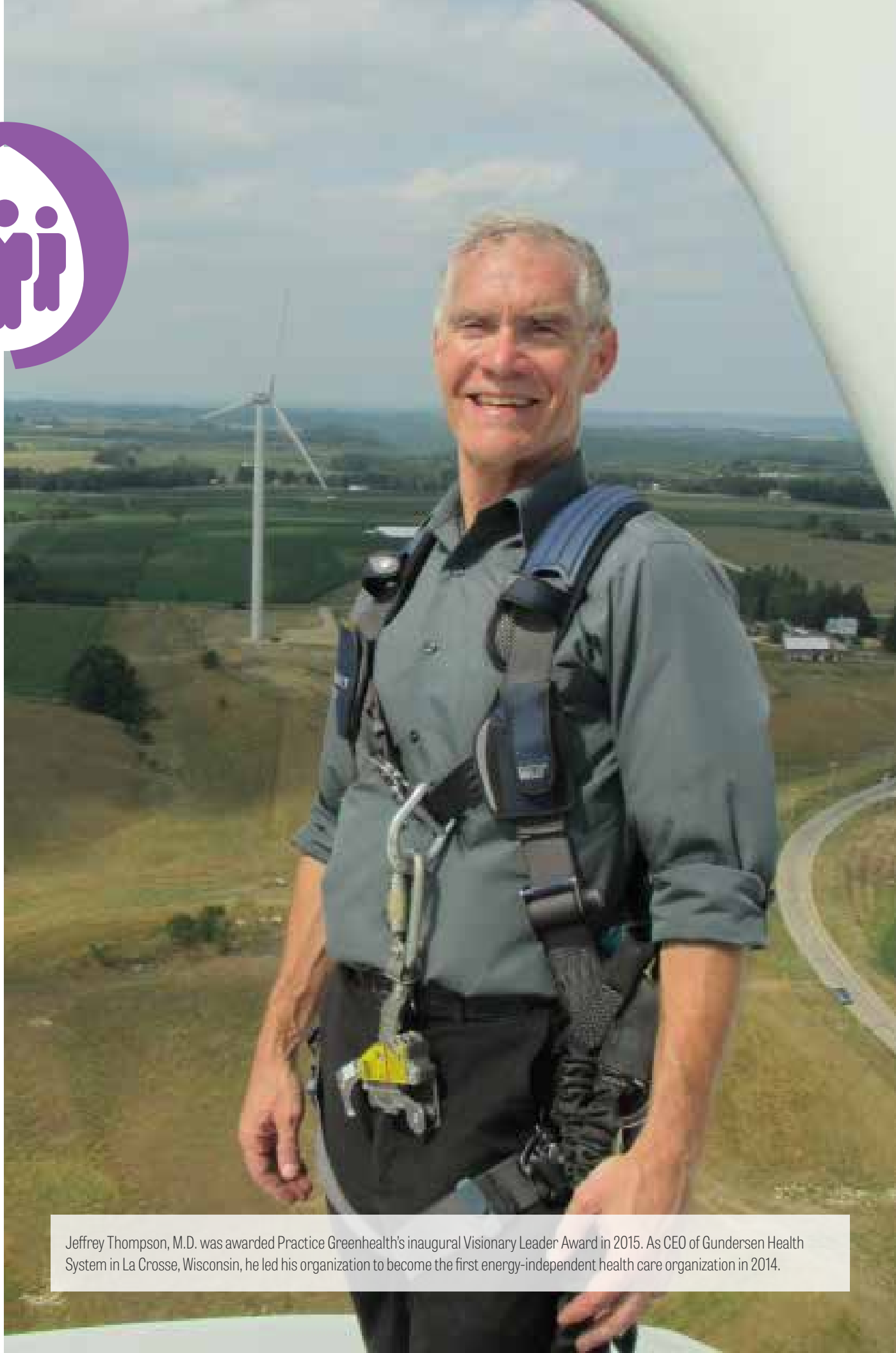
[1] Patient day. (n.d.) *Mosby's Medical Dictionary, 8th edition*. (2009). Retrieved January 27 2015 from http://medical-dictionary.thefreedictionary.com/patient+day

Engaged Leadership

Support from executive leadership is imperative for hospitals who want to progress from piecemeal to comprehensive sustainability programs. The most successful programs can clearly point to a high degree of leadership engagement. Engaged leaders recognize and support sustainability initiatives for their myriad benefits—fiscal responsibility, alignment with mission, an employee recruitment/engagement/retention strategy, community benefit, and an advantage for quality patient care.

Practice Greenhealth has identified a series of qualitative measures that, with support from leadership, can create a firm foundation and structure for environmental stewardship that helps programming endure for the long term. The qualitative measures below are separated into four sections – Infrastructure, Human Resources, Finance and Reporting, and Communication. Practice Greenhealth's research has demonstrated that those hospitals making the greatest strides in sustainability are also those hospitals that have the strongest support from leadership. How does sustainability align with other organizational priorities? Are sustainability leaders framing the benefits of sustainability programs in a way executives can appreciate? Building sustainability into the organizational culture remains one of the biggest opportunities for many hospitals.

> **"It is our obligation as public health professionals to evolve with the changing health care landscape while staying true to our core principals of putting our patients' best interests first. Embracing sustainability is integral to that effort."**
>
> **Robert Garrett**
> President and Chief Executive Officer
> Hackensack, University Health Network



Jeffrey Thompson, M.D. was awarded Practice Greenhealth's inaugural Visionary Leader Award in 2015. As CEO of Gundersen Health System in La Crosse, Wisconsin, he led his organization to become the first energy-independent health care organization in 2014.

Infrastructure for Environmental Stewardship

Changing hearts and minds is critical to changing behavior—whether we're talking about a new patient care protocol or a new waste segregation guideline. While smaller actions like taking home recycling from a patient care unit or turning off lights and computers can be accomplished by passionate individuals, an in-depth examination of organizational processes that impact sustainability requires a greater degree of infrastructure, planning and accountability. Data from award-winning hospitals demonstrates that nearly every award-winning institution has a leader or team coordinating and/or directing their sustainability activities. Eighty-eight percent of award-winning hospitals had appointed or hired someone to lead sustainability work in 2014—up from 33 percent in 2009. And 48 percent of award-winning facilities now have a full-time person overseeing sustainability activities at either the hospital or health system level.

TABLE 1: LEADERSHIP FOR ENVIRONMENTAL STEWARDSHIP

Leadership for Environmental Stewardship	All	Small	Large	Top 25	Your Data
Has the facility appointed an executive champion to provide administrative support for environmental stewardship?	**93.6**	94.2	93.3	100	
Has the facility established a green team/sustainability committee (or did it utilize an existing committee) for ownership/oversight of designing, implementing and reporting on environmental sustainability initiatives?	**99.1**	100.0	98.1	96	
Has the facility appointed or hired someone to lead sustainability efforts across the organization?	**95.5**	96.1	93.4	100	
Has the facility identified a clinical champion(s) to lead efforts on clinical engagement and education?	**69.3**	63.7	74.0	96.0	

The percentage of facilities claiming to have appointed an executive champion grew to 93.6 percent in 2014. Despite this impressive number, many hospitals still struggle to get leadership buy-in or support for key new program areas or investments. It becomes important then to qualify what we mean by "appointed an executive champion." Is this someone who is merely aware of the sustainability program and tacitly supportive, or someone who is advocating for the program and helping to identify allies and connect key stakeholders?

Beyond staffing and program management, there are three other key areas where leading hospitals are focusing their infrastructure development. Establishing a commitment or policy to support environmental stewardship is often a foundational step. Conducting a baseline assessment is critical to an accurate assessment of opportunities. And a strategic sustainability plan demonstrates the facility has gone beyond a random array of sustainability programs, to do the work needed to align environmental stewardship efforts with other organizational priorities and determine a process for measuring progress.

FAIRVIEW HEALTH

As a mechanism to grow engagement across the system, Fairview Health developed a "Green Masters" program in 2014. This is a three-tiered certification program for all of the clinics across the system. For each clinic that successfully completes a certain number of sustainability-related tasks in each area, such as powering down computers and lights, reuse of furniture and equipment, or recycling, they will receive certification. The certification ensures that the clinics are incorporated into Fairview's broader sustainability mission.

More than 85 percent have a set of principles and have conducted a baseline assessment. And in 2015, the percent of organizations creating a sustainability plan increased by six percent to 67.6 percent of award-winning facilities.

TABLE 2: COMMITMENT COMPONENTS

Commitment Components	All	Small	Large	Top 25	Your Data
Has the facility established an organizational environmental commitment statement/principles/charter for integrating environmental sustainability that is approved by top leadership?	**86.6**	83.2	90.5	96.0	
Has the facility conducted a sustainability baseline assessment?	**87.7**	86.3	88.6	96.0	
Has the facility created a strategic sustainability plan that aligns with other organizational priorities or embeds sustainability objectives or goals within the overall strategic plan?	**67.6**	72.5	66.7	88.0	

Human Resources

Creating a culture of commitment to environmental health and wellbeing requires the engagement of every staffer. Human resources (HR) has a unique role to play in setting expectations for new and current employees by integrating the environmental stewardship commitment and corresponding responsibilities in job descriptions and employee training. The data in Table 3 demonstrates that engagement with HR continues to increase with a nearly 10 percent increase (to 72.6 percent) in the number of hospitals integrating sustainability programming into new employee orientation. One hundred percent of the Top 25 achieved this measure. Training employees on sustainable practices and expectations during orientation can ensure they can add value to these programs from the get-go.

Green Team at Hillcrest Hospital, a Cleveland Clinic hospital, Mayfield Heights, Ohio

Hospitals are beginning to document linkages between being a socially and environmentally responsible organization and employee satisfaction rates with more than 20 percent now including a question on their annual employee surveys. The Society of Human Resource Management (SHRM) defines Sustainable Human Resource Management as: "Sustainable HRM is the utilization of HR tools to help embed a sustainability strategy in the organization and the creation of an HRM system that contributes to the sustainable performance of the firm. Sustainable HRM creates the skills, motivation, values and trust to achieve a triple bottom line and at the same time ensures the long-term health and sustainability of both the organization's internal and external stakeholders, with policies that reflect equity, development and well-being and help support environmentally friendly practices."[1] More and more, hospitals with an environmental stewardship commitment are formalizing accountability for these programs—with just over 40 percent of hospitals building sustainability measures into the performance evaluation process. At a nearly 30 percent increase, 68 percent of the Top 25 hospitals had built in accountability for sustainability measures. Hospitals can gain considerable leverage in their sustainability programs by engaging HR and prioritizing the actions below.

TABLE 3: HUMAN RESOURCES

Human Resources	All	Small	Large	Top 25	Your Data
Has the facility added sustainability measures for leadership staff into performance objectives/evaluations?	**47.3**	55.0	47.0	14.0	
If yes, is executive compensation tied to these objectives?	**80.8**	19.0	23.0	9.0	
Has the facility added language to job descriptions on the organization's commitment to the environment and the role that each employee plays?	**19.6**	18.6	21.9	36.0	
Has the facility included an overview of organizational sustainability goals in new employee orientation?	**72.6**	71.6	73.3	100.0	
Has the facility included questions about the sustainability/environmental stewardship program in its employee engagement/satisfaction survey?	**20.5**	15.7	24.8	40.0	

Health care has more to learn from other industry sectors about how to engage human resources in supporting the integration of environmental stewardship into the culture of the organization.

Finance and Reporting

Making the business case for new programs is critical to gaining support for these initiatives. Sustainability stakeholders need to understand return on investment (ROI), payback periods, and project financing elements such as rebates and incentives in order to set their organizations up for success. Likewise, ensuring that there is accountability and a reporting hierarchy for sustainability activities will help embed these programs as valid business priorities.

Data in Table 4 shows 53.4 percent of award-winning facilities now have sustainability program budgets—with 84 percent of the top performers stating they have sustainability program budgets. The ability to budget in advance for these programs rather than fight real-time for capital can make a significant difference in building sustainability programming. The number of facilities exploring or building green revolving funds (GRFs) continues to increase—up from 17.5 to 25.6 percent in 2014.

1 HRM's Role in Corporate Social and Environmental Sustainability. SHRM Foundation's Effective Practice Guidelines Series. 2012. SHRM Foundation. Available at: http://www.shrm.org/about/foundation/products/documents/4-12%20csr%20report%20final%20for%20web.pdf. Accessed on July 10, 2015.

These funds allow the organization to reinvest savings from current sustainable programs into new green initiatives and offerings.

TABLE 4: FINANCE

Finance	All	Small	Large	Top 25	Your Data
Has the facility calculated and delineated a payback period/return on investment (ROI)/internal rate of return (IRR) for sustainability activities that have up-front costs as part of program development process?	**66.7**	60.8	71.4	88.0	
Has the facility formulated a sustainability program budget?	**53.4**	50.0	55.2	84.0	
Has the facility developed a green revolving fund?	**25.6**	23.5	29.5	36.0	

The drumbeat for public reporting on corporate responsibility measures—including sustainability—continues to grow. Today, 95 percent of the 250 largest companies in the world produce a sustainability report—with four out of five of those companies publicly reporting through the Global Reporting Initiative (GRI) (www.globalreporting.org). In health care, we saw a 10 percent increase in 2014 (to 61.4 percent) in the number of hospitals that write some form of annual sustainability report, and more than 75 percent of award-winning hospitals now report on sustainability performance to their Board of Directors. Yet there remains a significant opportunity for improvement for hospitals in public reporting—especially GRI-level reports, which help organizations report not only on their current programs but also to what environmental issues matter most to their organizations—by forcing them to define materiality.

Moving to greater transparency and public goal-setting can be challenging but also demonstrates a commitment to continuous environmental improvement. Some hospitals fear publicly reporting goals—worried they won't be able to achieve aggressive targets and will earn public backlash. The more hospitals articulate their challenges, however, the more opportunities there are to work together and address shared obstacles.

Within the award-winning hospitals, 22 reported that their organization had developed a sustainability report using GRI guidelines. Another 25 reported their organizations had also developed a formal sustainability report. While still a small subset of the whole, there is growing interest in this area. The percentage of facilities reporting environmental stewardship activities to the IRS through community benefit reporting increased slightly from last year (59.4 percent to 64.6 percent). Organizations like Practice Greenhealth and the Catholic Health Association continue to support health care institutions in understanding these linkages—especially as the term population health is used more frequently. Learn more about how hospitals are tying this work to community benefit reporting in the Catholic Health Association's Guidelines for Reporting Environmental Improvement Activities as Community Benefit and Community Building to the Internal Revenue Service.

"For us, it's natural, since this work fits hand-in-hand with our mission of improving the quality of life of every patient who enters our door."

Trevor Fetter

President and CEO, Tenet Healthcare Corporation

TABLE 5: REPORTING

Reporting	All	Small	Large	Top 25	Your Data
Has the facility implemented a sustainability reporting structure (e.g., making certain positions accountable for reporting sustainability progress up the organizational hierarchy)?	**79.0**	77.5	80.0	92.0	
Has the facility implemented annual sustainability reporting to the Board of Directors/Trustees?	**75.3**	80.4	70.5	84.0	
Does the facility report sustainability initiatives within its community benefit report to the IRS (for non-profit organizations) through IRS Schedule H, Form 990?	**64.6**	63.9	67.8	85.7	
Does the facility write a publicly available annual report that details environmental stewardship accomplishments?	**61.9**	63.4	60.0	72.0	

Communication and Community Connections

Sustainability programs often begin by communicating first to staff, then to patients and finally to the community. Research continues to demonstrate that sustainability initiatives require explanation. Staff engagement on sustainability requires continuous communication to ensure employees understand why the organization is taking on a particular initiative, how the new program affects their work and that they have clear instructions on new practices or products. Leading hospitals are using a range of innovative approaches to communicate and grow their sustainability awareness with staff and key stakeholders, including the creation of champion programs, internal awards and recognition, employee suggestion programs and competitions—in addition to the use of posters, newsletter articles and web resources. The most advanced programs are also finding ways to communicate the commitment of executive leadership to these programs, either through "town hall" meetings or other mechanisms. In 2014, 77.6 percent of award-winning hospitals reported having leadership communicate to staff at least annually about their commitment to sustainability.

HACKENSACKUMC

The Vice President of Hospitality at HackensackUMC required each director reporting to him to have a sustainability goal for 2015 that they will be evaluated on; this includes the directors of environmental services, plant operations, design and construction, food services, environmental health and safety, and the operations manager. Each director has their own specific goal that they must cascade down to their managers and supervisors.

Increasingly, hospitals recognize that a commitment to a healthier environment is integral to their mission to provide a high-quality environment of care, to provide a healthy place to work and to contribute positively to healthier communities. Hospitals are anchors in their communities—and people place their trust in them to provide education about lifestyle and personal choices that will impact their health. Committed hospitals and health systems are identifying a range of ways to connect with their patients and communities. Hospitals reported that 83.6 percent created visuals to help educate patients.

Award-winning hospitals are also demonstrating their leadership by mentoring other hospitals and sharing their successes and challenges. Table 6 below highlights how participating hospitals are using different communications strategies to engage staff, patients and communities.

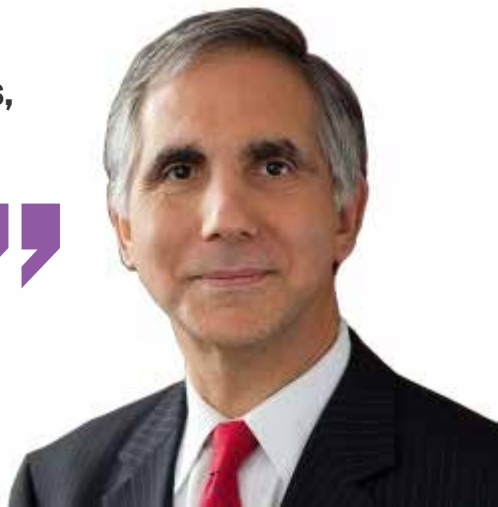
TABLE 6: COMMUNICATION AND COMMUNITY CONNECTIONS

Communication and Community Connections	All	Small	Large	Top 25	Your Data
Has the facility developed a Leadership Walks, Talks and Envisions statement for a C-level executive within the organization?	**17.4**	15.7	20.0	32.0	
Has the facility communicated sustainability goals and progress from the leadership team to the staff at least annually?	**77.6**	77.5	79.0	88.0	
Has the facility developed education and communication strategies to convey the organization's sustainability initiatives?	**90.9**	88.2	94.3	100.0	
Does the facility display visuals to patients (such as segregation signage, posters, lanyards) describing organization's environmental commitment?	**83.6**	81.4	84.8	96.0	
Does the facility include a question about sustainability in its patient satisfaction survey?	**20.5**	15.7	24.8	40.0	
Does the facility educate the community on environmental topics? (Provide information on proper medication disposal when issuing prescriptions or link human health to global warming.)	**78.1**	72.5	84.8	96.0	
Does the facility include sustainability components in local or national marketing or educational campaigns?	**47.0**	49.5	46.7	72.0	
Did the facility share its environmental sustainability successes in a media story?	**79.8**	84.2	76.2	88.0	
Did the facility feature a sustainability topic connecting health and the environment in at least one grand rounds event this year?	**21.1**	15.8	26.7	56.0	
Did the facility present publicly on the organization's sustainability efforts in 2013?	**69.3**	71.3	65.7	80.0	
Did the facility provide mentoring to other hospitals either within the health system or externally?	**71.1**	72.3	72.4	100.0	
Did the facility work with city government or local organizations to promote sustainability locally or plan a local event (like clean air days, drug or electronic take-back events)?	**79.8**	78.2	81.9	96.0	

In last year's Benchmark Report, we noted that education to physicians is still lacking in many award-winning hospitals—with 19.8 percent reporting they had engaged clinical staff through a grand rounds event on sustainability. This number crept to 21.1 percent this year—leaving lots of opportunity for improvement. Engaging clinicians—especially physicians—can be challenging. Using existing physician education forums to share examples of how other sites are working with their physicians to make changes that benefit patients, staff and community health can be a very effective engagement strategy. Top 25 hospitals were 35 percent more likely to use this strategy than other award-winning institutions (56 percent vs. 21.1 percent for all hospitals).

From the beginning, Partners HealthCare has made a commitment to improving the health of our communities, locally and globally. We accept the responsibility to take a leadership role in protecting our environment through a focus on sustainability.

Gary Gottlieb, MD
CEO, Partners HealthCare



Dayton VA Medical Center, Ohio

Table 7 highlights some of the strategies hospitals are using to communicate to staff, patients and the community.

TABLE 7: COMMUNICATION STRATEGIES

Has the facility developed education and communication strategies to convey the organization's sustainability initiatives?

Of those the 193 facilities indicating "yes," these strategies were identified:	All	Small	Large	Top 25
Internal web page for staff	**87.9**	87.8	88.9	96.0
Public web page	**64.8**	63.3	67.7	88.0
E-learning modules	**50.3**	53.3	46.5	76.0
Newsletter	**76.9**	73.3	77.8	92.0
Poster campaign	**64.8**	67.8	64.7	80.0
Other	**46.7**	42.2	49.5	64.0

For examples of exemplary Practice Greenhealth member materials, see the Hospital Member Toolkit.

CEO tree planting at Littleton Adventist Hospital in Littleton, Colorado

Less Waste

Improved waste and material management is typically one of the first areas tackled with a sustainability focus. Leading hospitals are finding innovative ways to go beyond recycling to waste prevention and smarter pharmaceutical waste management.

Key to understanding your organization's waste management effectiveness is understanding your waste profile. In health care, there are four primary categories waste is organized into—solid waste, recycling, regulated medical waste (RMW) and hazardous waste. Understanding the relative percentage of these waste streams as a portion of the whole is how waste management effectiveness is often evaluated. The median percentages for these waste types (as a percent of total waste) are shown in Table 1. The breakdown of waste costs are shown in Table 2. Comparing the two tables demonstrates that certain waste streams—such as RMW—may be a fairly small percentage of total waste (6.5 percent) but can comprise a large percentage of cost (43 percent). Recycling on the other hand comprises 29.8 percent of waste in the typical award-winning hospital while generating only 11.6 percent of total cost. Quick diagnostics like this can easily convince leadership that RMW reduction and recycling programs make good business sense.

When reviewing benchmarks, look to the Top 25 facilities and the 90th percentile performers when setting long-term goals, but aim to get there in increments.

Notable in this year's report:

- Award-winning hospitals diverted over 92,205 tons of solid waste from the landfill through recycling , saving $22 per ton, for a combined savings of $1.8 million.
- Award-winning hospitals recycled over 3,750 tons of universal waste, saving $3,930 per ton, for a combined savings of $14.7 million.
- Median recycling rates dipped slightly from 31 percent to 29.8 percent.
- The percent of RMW improved—from 6.8 to 6.5 percent this year. This is likely a reflection on continued focus on better segregation and is impressive despite hospitals treating more of their non-hazardous pharmaceuticals as RMW versus solid waste.

Paper recycling at work at Advocate Eureka Hospital in Eureka, Illinois.

- The percent of total cost of RMW remains fairly steady, dropping from 43 to 38.9 percent of total waste cost. This percent of cost has increased slightly in recent years despite better segregation because of the added costs to manage non-hazardous pharmaceutical waste as RMW.

TABLE 1: WASTE GENERATION AS A % OF TOTAL WASTE

Waste Generation as a % of Total Waste	All	Small	Large	Top 25	90th %	Your Data
Percent solid waste (in tons)	**60.7**	59.5	61.6	56.4	45.0	
Percent recycling (in tons)	**30.9**	33.4	28.8	35.5	47.3	
Percent RMW (in tons)	**7.6**	6.4	8.7	7.3	3.6	
Percent hazardous waste (in tons)	**0.8**	0.7	0.9	0.8	0.1	

TABLE 2: WASTE GENERATION AS A % OF TOTAL WASTE COST

Waste Generation as a % of Total Waste Cost	All	Small	Large	Top 25	Your Data
Percent solid waste cost ($)	**31.9**	31.0	32.2	30.6	
Percent recycling cost or revenue ($)	**14.4**	18.5	10.6	11.0	
Percent RMW costs ($)	**38.9**	34.8	42.8	43.0	
Percent hazardous waste costs ($)	**14.8**	15.7	14.4	15.4	

FIGURE 1: AVERAGE WASTE PROFILE

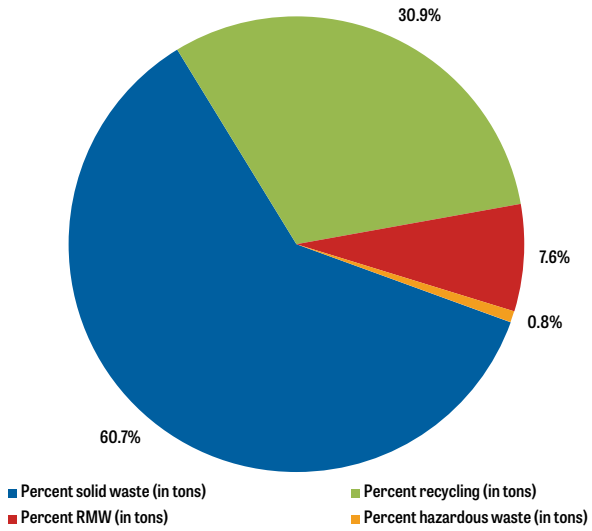
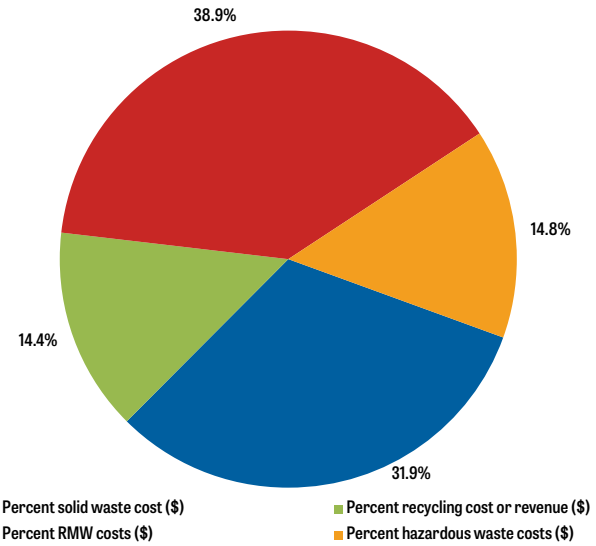


FIGURE 2: AVERAGE WASTE COST PROFILE



Hospitals use a range of different normalizing factors to normalize the fluctuation in waste generation rates. The tables below highlight the best normalization factors for each waste types—factors with the highest correlation listed first. Regression analysis tells us which normalizers are the best predictors for a given waste type (or other variable, like energy or water consumed). For example, square feet is consistently the best predictor for (or correlates the best with) the amount of energy a hospital uses, no matter how busy the hospital. Case mix index, a measure of how sick the patients are, has a very low correlation with how much energy is used, which tells us that having higher acuity patients doesn't necessarily mean organizations use significantly more energy to treat those patients.

Solid Waste

Solid waste in most health care organizations goes directly to the landfill, where it generates methane and contributes to greenhouse gas emissions. Some organizations send their solid waste to solid waste incinerators where in some cases, they may generate energy that can be recovered but also generate air pollutants and greenhouse gas emissions. The end goal is to decrease the volume of solid waste by two mechanisms—increasing recycling and reducing the total amount of waste generated through products or processes that produce less waste (such as source reduction).

TABLE 3: NORMALIZED SOLID WASTE METRICS

Normalized Solid Waste Metrics	All	Small	Large	Top 25	90th %	Your Data
Total tons of solid waste per OR	**52.6**	43.4	58.6	53.7	29.1	
Total tons of solid waste per staffed bed per year	**3.0**	3.1	3.0	3.0	1.8	
Total pounds of solid waste per patient day	**25.1**	27.6	24.3	22.3	16.4	
Total pounds of solid waste per APD	**13.0**	12.0	13.8	13.8	7.6	
Total pounds of solid waste per square foot per year	**1.9**	1.9	2.0	1.8	1.1	
Total tons of solid waste per FTE per year	**0.42**	0.42	0.42	0.34	0.22	

*Because many Practice Greenhealth members utilize adjusted patient day (APD) as a normalizer, we have included it, and it correlated nearly as well as square feet.

The tons of solid waste per OR and tons of solid waste per staffed bed per year were the two best normalizers this year but all of the normalizers correlated strongly for solid waste end this year.

As recycling rates begin to plateau for many organizations, the focus turns to waste reduction and prevention efforts. Some key ways hospitals are addressing waste prevention are noted in Table 4. These types of waste reduction and prevention programs are on the radar of most award-winning hospitals, as illustrated by the high percentages of participation. The percentage of hospitals focused on paper reduction jumped from 85 to 93 percent this year—as hospitals zero in on easy cost reductions. Assurance for hospital donation programs also jumped six percent this year.

TABLE 4: WASTE REDUCTION AND PREVENTION

Waste Reduction and Prevention	All	Small	Large	Top 25	Your Data
Has the facility developed an internal reuse program or strategy for office supplies, clinical products and equipment, and furniture before making these materials available for external donation?	**93**	91	94	96	
Has the facility developed an equipment and supplies donation program (domestic or abroad) for materials, equipment and furniture that can no longer be used internally?	**92**	89	95	92	
Does the organization ensure all donated medical supplies, equipment and electronics are actually needed, such as working with an organization that ensures the needs of developing countries are met with the donated items?	**84**	81	87	92	
Has the facility implemented a paper reduction program?	**93**	93	95	100	

Recycling

The vast majority of award-winning hospitals have achieved strong recycling rates with a median recycling rate of 29.8 for all participants in the data set this year and an impressive 47.2 percent for the 90th percentile performers (top 10 percent of the data set). As hospitals routinely manage the large volume waste streams such as cardboard, paper, plastics and metals as recycling, it can be more difficult to grow recycling numbers with new smaller volume materials that also have limited opportunities for rebates. Increasing the capture rate of recyclable materials in areas of the organization that were not necessarily an initial focus (such as outpatient and administrative buildings), can help hospitals continue to grow their diversion volumes.

TABLE 5: RECYCLING RATES BY HOSPITAL COHORT[1]

Recycling Rate by Hospital Cohort	Median Recycling Rate (as a Percent of Total Waste)
All	29.8
Small	32.4
Large	27.8
Top 25	34.5
90th Percentile	47.2

The recycling rates across all hospitals did decrease slightly this year—perhaps a reflection of some recycling loads being rejected by end recycling markets. *(see sidebar: What Does Operation Green Fence Mean for Your Organization?)* That said, normalized recycling rates appeared to go up slightly this year. Recycling normalization factors are listed below beginning with the best correlation. Recycling does not appear to correlate as well with adjusted patient days (APD), patient day or staffed beds. ORs, FTEs and square footage are better indicators.

TABLE 6: NORMALIZED RECYCLING METRICS

Normalized Recycling Metrics	All	Small	Large	Top 25	90th %	Your Data
Total tons of recycling per OR	**24.2**	21.6	26.1	30.1	51.8	
Total pounds of recycling per FTE per day	**1.1**	1.3	0.9	1.1	2.0	
Total pounds of recycling per square feet	**0.9**	0.9	0.9	1.0	2.0	
Total tons of recycling per staffed bed per year	**1.4**	1.4	1.3	2.0	0.8	
Total pounds of recycling per patient day	**11.9**	13.0	10.9	13.8	30.5	
Total pounds of recycling per APD	**5.9**	5.9	6.0	6.4	15.6	

Table 7 shows the materials most commonly recycled by award-winning hospitals—both universal waste and solid waste recyclables. Universal wastes are those materials that would otherwise be considered hazardous waste per state and federal definition, but when recycled are taken out of hazardous waste totals. If not recycled, these materials are required to be managed as hazardous waste, which is considerably more expensive.

1 Hospital Cohort is defined as the grouping of hospitals included in the data set. For more information on these groupings, see Chapter 2. Data Set.

TABLE 7: MOST COMMONLY RECYCLED MATERIALS

Most Commonly Recycled Materials	Percent of Award Winners Recycling
Cardboard	95.5
Batteries	91.4
Cans - aluminum	87.3
Fluorescent lamps	84.5
Computers and electronic waste	82.7
Paper - HIPAA	79.1
Plastic - mixed	78.2
Paper - mixed (includes newspaper)	72.7
Glass, all	71.4

It is interesting to note that just over 15 percent of hospitals are not reporting that they recycle fluorescent lamps. In a few states, fluorescent lamps can legally be thrown in the trash based on state-level universal waste regulations. Practice Greenhealth actively discourages this practice. All fluorescent lamps contain mercury (even the "low-mercury" green tip lamps). The goal is to prevent any mercury from getting into landfills by ensuring there are proper recycling programs in place.

When we consider the volume of material being recycled, the top waste streams can be seen in Table 8. A hospital who is launching a new recycling program should focus on capturing these materials initially for the largest impact. Note: Single stream is by far the largest waste stream being recycled. Only individual component waste streams are tallied in Table 8 below.

TABLE 8: TOP RECYCLED MATERIALS BY VOLUME

Material	Tonnage Recycled in 2014
Paper, HIPAA	26,321
Cardboard	13,341
Mixed paper (includes newspaper)	6,305
Food waste compost	5,883
White paper	2,669
Mixed metals	2,550
Computers	2,417

WHAT DOES OPERATION GREEN FENCE MEAN FOR YOUR ORGANIZATION?

Recycling regulation changes and enforcement efforts in China are forcing the recycling industry to reexamine the way they do business. Chinese authorities have decreased the amount of allowable contaminants in loads of imported recyclable scrap materials such as mixed plastics, mixed paper and metals from single-stream recycling centers. How does this affect your organization? According to the Institute of Scrap Recyclers (ISRI), China is the number one destination for recyclable scrap material with a value of more than $8.8 billion.[1] Operation Green Fence—as it has been dubbed—is forcing the recycling industry to focus on less contamination of recycling loads (such as a piece of newspaper ending up in a bale of cardboard bound for recycling). According to sources,[2] Chinese mills are also changing their buying habits and inventory management practices. This is reducing both demand and market prices for certain scrap material. Hospitals should talk to their recyclers about how this enforcement effort may impact their recycling loads and any precautions they may need to take in reducing contamination of recycling loads sent for processing.

1 Institute of Scrap Recycling Industries Inc. Number of Countries Scrap was Exported to and Leading Destination/Value. Available at: http://www.isri.org/policy-regulations/international-trade#.VaK08a5Vikp

2 Rooney K. China's Green Fence Changed Recycling--What Does it Mean for You? Advanced Disposal Blog. November 20, 2014. Available at: http://www.advanceddisposal.com/whywasteblog/chinas-green-fence-changed-recycling-what-does-it-mean-for-you-2/

METRO HEALTH HOSPITAL

In 2014, Metro Health Hospital's regulated medical waste only accounted for 4.75 percent of their total waste stream. In addition, their RMW per adjusted patient day (APD) is one of the lowest in the country at 0.65 pounds per APD. A reusable sharps program, a strong SUD reprocessing program, the absence of red bags in patient rooms and continuous education of staff have all contributed to keeping RMW levels low.

Regulated Medical Waste

Regulated medical waste (RMW) minimization offers the largest potential from both cost savings and waste diversion perspective, due to the high cost of disposal and the historical tendency to not segregate comprehensively. Most facilities pay by the pound, so tracking this material is fairly straight forward. Table 9 compares RMW generation as a percent of total waste stream to RMW treatment/disposal costs as a percent of total waste disposal budget.

- The best performers (top 10 percent) lowered RMW generation rates to 3.6 percent and below.
- The median RMW rate for all award-winning hospitals improved slightly from 6.8 to 6.5 percent in 2014.
- RMW costs increased slightly from 40.3 to 43.0 percent of total waste disposal budget—likely as a result of better management of non-hazardous pharmaceuticals.

TABLE 9: MEDIAN REGULATED MEDICAL WASTE AS A PERCENT

Median Regulated Medical Waste as a Percent	All	Small	Large	Top 25	90th %	Your Data
RMW as a percent of total waste (in tons)	**6.5**	5.6	7.4	6.6	3.6	
RMW as a percent of total waste cost	**43.0**	36.9	47.4	46.3	12.1	

Table 10 demonstrates the normalized metrics for RMW generation—presenting those with the highest correlation first. Across the board, the normalized volumes of RMW have decreased slightly this year. The best predictor of RMW volume in 2014 was (again) the number of operating rooms (ORs).

TABLE 10: NORMALIZED REGULATED MEDICAL WASTE METRICS

Normalized Regulated Medical Waste Metrics	All	Small	Large	Top 25	90th %	Your Data
Total tons of RMW per OR	**5.41**	3.82	7.30	6.50	2.50	
Total pounds of RMW per square foot	**0.21**	0.17	0.24	0.21	0.09	
Pounds of RMW per staffed bed per day	**1.85**	1.62	2.06	2.28	0.84	
Total tons of RMW per staffed bed	**0.34**	0.30	0.38	0.42	0.15	
Total pounds of RMW per FTE	**86.27**	78.03	96.45	67.22	38.33	
Total pounds of RMW per patient day	**2.82**	2.80	2.86	2.81	1.40	
Total pounds of RMW per APD	**1.31**	1.19	1.62	1.48	0.65	

Medical Waste Treatment Strategies

Forty-one facilities, equal to 19 percent of the data set, treat their RMW waste onsite. Of those treating onsite:

- 75.6 percent use autoclaves
- 7.3 percent use rotoclaves
- 4.9 percent use chemical disinfection
- 2.4 percent use incineration
- 9.8 percent use another method
- None use microwave

The RMW generation data for those treating onsite and offsite is not significantly different—though facilities onsite generated slightly more RMW and had slightly lower RMW costs (as a percent of total). This reflects a historical trend of onsite technologies costing a bit less to operate than sending waste offsite, in part because labor costs are not always included.

REUSABLE SHARPS CONTAINERS

In May of 2015, a poster session at the APIC annual conference raised questions about the potential risk of transmission of C-difficile infections from reusable sharps containers. An accompanying press release led to the study being quoted in several mainstream publications. A closer inspection of the study upon which the poster session was based reveals that there was an "overall lack of proper scientific methodology" ranging from "small sample size" to "failure to report bacterial loads or viral viability" to "failure to obtain separate samples from the interior vs. the exterior of the containers."[1] Hospitals should be careful to do their due diligence before any consideration of changing back to disposable sharps containers. Learn more at: Reusable Sharps Containers: An epidemiologic perspective for the infection control professional.

1 Garcia, R and Olmsted, R. Reusable Sharps Containers: An epidemiologic perspective for the infection control professional. Stericycle 2015. Available at: https://www.stericycle.com/filebase/en/src/Files/SMSWhite-Paper_ReusableContainers_0515.pdf)

RMW Reduction

Award-winning hospitals are doing an outstanding job at tackling the most important elements in an RMW reduction program—as evidenced by the implementation rates noted in Table 11 below. Hospitals looking to drive down their RMW numbers should focus on these strategies as a starting point to achieve the largest reductions.

TABLE 11: RMW REDUCTION STRATEGIES

Implementation Rates	All	Small	Large	Top 25	Your Data
Has the facility removed red bags from patient rooms?	**81.3**	82.4	81.0	88.0	
Does the facility have a reusable sharps container program?	**84.5**	81.6	87.6	80.0	
Does the facility purchase and use reprocessed single-use medical devices (SUDs) from an FDA-approved third-party reprocessor in areas other than the OR?	**77.5**	72.5	82.7	95.8	
Does the facility collect FDA-approved single-use medical devices (SUDs) for reprocessing beyond the OR?	**82.7**	80.6	85.7	92.0	

Pharmaceutical Waste

Pharmaceutical waste is an important focus area for hospitals. The hazardous waste regulations in the United States were not designed with health care in mind—and many of the requirements are challenging to comply within a health care setting. The federal regulations also overlook a number of pharmaceuticals that are now showing up in our waterways—through flushing, drain disposal and human excretion. Recognizing this loophole, some hospitals go beyond compliance and either

incinerate a certain portion of pharmaceuticals, or handle more of their formulary as hazardous than the law requires. Table 12 highlights the percentage of award-winning hospitals that are taking proactive measures to protect human health and the environment by going beyond compliance on pharmaceuticals. The percentage of facilities incinerating non-RCRA pharmaceutical wastes jumped by five percent this year to 70 percent with large hospitals jumping by seven percent to 75 percent.

TABLE 12: PHARMACEUTICAL WASTE

Pharmaceutical Waste	All	Small	Large	Top 25	Your Data
Is the facility's non-RCRA pharmaceutical waste being incinerated?	**70**	65	75	88	
Is the facility treating non-RCRA regulated pharmaceutical wastes as RCRA waste?	**55**	55	56	76	

SPECTRUM BLODGETT

Spectrum Blodgett Hospital utilizes Lean strategy to support continuous improvement across the organization. The hospital has a process improvement coach embedded in the pharmacy department. The coach works closely with the hospital's green team to monitor and reduce pharmacy waste, and includes their progress on their MDI board so everyone can take ownership of the project.

The management (and "overmanagement") of pharmaceutical waste is a relatively new cost for many hospitals.

- The median level of pharmaceutical waste (RCRA and non-RCRA combined) is 3.8 tons per year.
- The median cost per year for management of pharmaceutical waste jumped by $5,000 per year to $17,710—with large hospitals topping $35,000 per year.

Table 13 highlights the waste generation rates for pharmaceutical waste as well as the relative costs. It is important to note that the variation in approaches for pharmaceutical waste management can lead to significantly different cost structures for this waste stream. Because not all hospitals manage this waste stream aggressively, the numbers for cost can vary fairly dramatically, making this median less accurate than other metrics.

TABLE 13: PHARMACEUTICAL WASTE AND COSTS

Pharmaceutical Waste and Costs	All	Small	Large	Top 25	Your Data
Pharm waste (RCRA/nonRCRA) tons	**3.80**	2.06	13.60	10.23	
Pharm waste (RCRA/nonRCRA) cost	**$17,709**	$8,852	$35,961	$35,113	
Pharm waste (RCRA/non-RCRA) pounds per square foot	**0.02**	0.02	0.02	0.02	
Pharm waste cost per square foot	**0.03**	0.03	0.04	0.03	

Beyond end-of-life management of pharmaceuticals, hospitals are also using a variety of methods to reduce pharmaceutical waste at the source—including stock rotation to avoid expiration, alternate packaging, and inventory management. To learn more about managing pharmaceutical waste, look at Practice Greenhealth's 10-Step Blueprint, funded by the U.S. Environmental Protection Agency.

Hazardous Waste

Hazardous wastes are those materials that meet the definition in the Federal Resource Conservation and Recovery Act (RCRA) or other state-level statutes. It is also the most expensive waste stream to manage. While many award-winning hospitals have made tremendous strides in reducing their hazardous waste, all hospitals will generate some hazardous waste. As institutions pay more attention to the proper management of RCRA-hazardous pharmaceutical waste, some hospitals find that their hazardous waste volume and costs increase despite strong hazardous waste minimization programs. Hazardous waste typically remains less than one percent of total waste in award-winning hospitals, and includes alcohols, xylenes, some waste pharmaceuticals, heavy metals and other chemical processes.

TABLE 14: HAZARDOUS WASTE

Hazardous Waste	All	Small	Large	Top 25	90th %	Your Data
Percent hazardous waste	**0.5**	0.4	0.6	0.7	0.1	
Percent hazardous waste costs	**11.9**	11.7	12.3	13.0	N/A	

Because it is such an expensive waste stream and comes with complex compliance requirements, hospitals have worked hard to reduce the generation of hazardous waste. Solvent distillation continues to provide a relatively simple project with a quick payback that reduces the purchase of expensive solvents and hazardous waste disposal costs simultaneously. Of the 199 facilities (90 percent) who reported having onsite labs, 39 percent reported having solvent distillation programs. Table 15 shows the cumulative savings from solvent distillation/reprocessing.

TABLE 15: SOLVENT DISTILLATION/REPROCESSING

Solvent Distillation/Reprocessing	All	Small	Large	Top 25	Your Data
Total gallons of solvents reprocessed	**39,005**	9,796	29,206	12,800	
Total annual savings from avoided virgin solvent purchase	**$431,685**	$37,243	$394,442	$187,617	
Total annual savings from avoided dispotal costs	**$207,944**	$8,985	$198,959	$61,261	
Median savings per hospital	**$11,737**	$5,644	$14,708	$11,912	
Total Savings from Solvents	**$639,629**	$46,228	$593,401	$248,878	

Total Waste Generation

The ultimate goal in waste data tracking is reduction. Increasingly, hospitals are tracking total waste per APD (or per patient day) as a way to capture waste prevention success. Using a normalizer related to patient volume ensures that any increase in waste is balanced by patient census. Total waste includes solid waste, recycling (but not reuse or diversion), RMW and hazardous waste. The overall goal is to reduce total waste tonnage by transitioning to products and processes that minimize or avoid waste creation. If a facility has implemented source reduction, reuse and diversion, those efforts will show up in the total waste number. If a hospital is advanced in these efforts, their recycling numbers may actually decrease over time—as waste is prevented before it can require recycling. Table 16 demonstrates that total waste continued to drop in 2014 from 91.6 tons per operating room (the best normalizer) to 86 tons.

TABLE 16: NORMALIZED TOTAL WASTE GENERATION

Normalized Total Waste Metrics	All	Small	Large	Top 25	90th %	Your Data
Total waste tonnage per OR	**86.00**	75.30	98.10	100.30	50.10	
Total waste tonnage per staffed bed	**5.26**	5.33	5.22	5.84	3.23	
Total waste pounds per square foot	**3.20**	3.20	3.20	3.00	2.00	
Total waste pounds per patient day	**42.00**	46.10	38.60	39.90	27.10	
Total waste tonnage per FTE	**0.69**	0.72	0.67	0.63	0.39	
Total waste pounds per APD	**20.50**	19.70	21.70	22.50	13.10	
Total pounds per staffed bed per day	**28.85**	29.22	28.58	31.99	17.72	

Award-winning hospitals are making great strides in reducing waste generation rates and costs through prevention, recycling and better management and contracting techniques. Waste costs and revenues vary over time, particularly recycling revenues. Waste cost data from 2015 award-winning hospitals in Table 17 indicate the following:

TABLE 17: MEDIAN WASTE COSTS

Median Waste Costs 2014	All	Small	Large	Top 25	Your Data
Solid waste average cost per ton	**$98**	$107	$98	$93	
Recycling waste average cost per ton	**$81**	$87	$80	$76	
RMW waste average cost per ton	**$1,141**	$1,346	$1,050	$1,455	
Hazardous waste average cost per ton	**$4,433**	$4,732	$4,000	$3,794	
Total waste cost per ton	**$200**	**$205**	**$206**	**$211**	

Recycling is the most inexpensive waste stream to manage, followed by solid waste. Waste costs then increase exponentially for RMW, pharmaceutical waste and hazardous waste. Waste disposal fees vary regionally. Waste fees per ton are less for large generators, which speaks to the value of system contracts that can improve unit pricing for smaller facilities. Bundling of services—such as using one hauler to manage multiple waste streams can also drive down prices for individual waste stream management.

BEAUMONT HEALTH SYSTEM-ROYAL OAK

Beaumont Health System-Royal Oak recycled or repurposed over three million pounds of waste equaling 29.03 percent of the total waste stream in 2014, more than doubling the amount from 2009. The hospital earned $211,000 in rebates and avoided $170,600 in disposal costs, for a total combined savings of $382,000, due to the hospital's waste management programs in 2014. Over the last five years, Beaumont collected more than $866,000 in recycling rebates and diverted more than nearly 13 million pounds of waste from landfills—enough to fill 6.5 NFL football stadiums five feet deep with recycling. They also finalized a solid waste management policy establishing criteria for construction and demolition waste disposal with an emphasis on recycling over 80 percent of all materials.

Historical Waste Costs

Health care waste cost trends over the last few years are presented in Table 18, but it should be noted that prior to the 2014 report, the data was presented as an average, while in 2014 and 2015, the data is presented as a median value. It should also be noted that diversion was allowed in earlier years, which included significant savings for SUD reprocessing for some facilities.

TABLE 18: HISTORICAL WASTE COSTS

Historical Waste Costs	All 2014	All 2013	All 2012	All 2011	
Solid waste cost per ton	**$98**	$103	$110	$105	
RMW waste cost per ton	**$971**	$949	$905	$1,015	
Hazardous waste cost per ton	**$5,021**	$6,800	$6,400	$6,200	

Note: The year above reflects the year in which the data was collected vs. the awards cycle year. (2014 data was collected in the 2015 awards cycle.) Recycling data was excluded because it was accounted for differently before 2013.

"Shredded mountain" at Bon Secours St. Francis Health System - Eastside, Greenville, South Carolina

Safer Chemicals

Hospitals use an array of chemicals every day to serve and protect their patients. At the same time, we know that many of these chemicals can have a negative impact on health and the environment during use and disposal. The identification of chemicals of concern and efforts to minimize the use of these chemicals in products and processes is an important component of a hospital environmental stewardship program.

The data below demonstrates how Practice Greenhealth award-winning hospitals are integrating an array of innovative programs to decrease patient and staff exposure to potentially hazardous and toxic substances during the provision of care. Award-winning hospitals routinely go beyond regulatory compliance to choose safer, less toxic chemicals where possible.

This year's highlights include:

- Eighty-two percent of all hospital winners have chemical or purchasing policies that identify specific chemicals of concern to human health and the environment.
- Ninety percent of award winners purchase third-party certified green cleaning chemicals for at least one product category.
- Sixty-one percent of award-winning institutions have an integrated pest management (IPM) policy or plan that minimizes or eliminates the use of pesticides on hospital grounds.
- Sixty-three percent have earned the Making Medicine Mercury Free Award.
- Seventy percent purchase DEHP-free products in the NICU, while 64 percent of facilities have a DEHP and/or PVC reduction program.

Getting Started on Chemicals

Before hospitals can focus on transitioning to safer chemicals there is a need to ensure that the hospital is meeting its basic environmental compliance obligations. One of the first steps is understanding what chemicals you are using onsite and how to properly manage those chemicals while they are in use and during disposal. Leading hospitals conduct hazardous material audits annually to ensure they know what hazardous materials are being used across the organization. Mercury elimination is one of the first programs many hospitals initiate on the chemical front. While 62.7 percent of award winners had already won the Making Medicine Mercury Free award, the vast majority have phased out mercury-containing clinical devices as well but haven't yet managed to check all mercury-containing items off the list.

TABLE 1: GETTING STARTED ON CHEMICALS

Getting Started on Chemicals	All	Small	Large	Top 25	Your Data
Does the facility contract for, or perform internally, a hazardous chemical/material audit by hospital department and update at least annually?	**93.0**	91.8	93.3	100.0	
Has the facility won the Making Medicine Mercury Free Award (MMMF)?	**62.7**	58.4	68.3	72.0	

Chemical Policies

Leading hospitals are taking steps to minimize the use of chemicals of concern by creating policies that require supply chain or suppliers to identify and minimize the purchase of products containing these chemicals. The list of chemicals may include PVC and DEHP, but also includes halogenated, chlorinated or brominated flame retardants, other phthalates, bisphenol A, perfluorinated compounds, latex, carcinogens, mutagens or reproductive toxicants and volatile organic compounds (VOCs).

TABLE 2: CHEMICAL POLICIES

Chemical Policies	All	Small	Large	Top 25	Your Data
Does the facility have chemical or purchasing policies that identify specific chemicals of concern to human health and the environment?	**81.6**	83.2	83.8	96.0	
Has the facility developed a fragrance-free policy for staff?	**57.4**	62.0	56.2	56.0	
Does the facility use powered cleaning equipment (scrubbers, burnishers, extractors, vacuums, power washers) that is tested by the CRI Green Label Plus program?	**60.4**	53.5	70.5	92.0	

METRO HEALTH HOSPITAL

Metro Health Hospital earned a LEED credit and accolades for its comprehensive green cleaning program. The hospital's program includes a microfiber mop system that cuts annual water use by 483,000 gallons and led to a 90 percent reduction in chemical use, use of Green Seal certified cleaning products (hydrogen peroxide based) in place of harmful disinfection chemicals, and ULPA filtered daily vacuuming of all patient rooms that significantly improves indoor air quality. The hospital also reduced the number of different cleaning products being purchasing and implemented a Ready-to-Dispense process to ensure accurate concentrations, saving approximately $11,600 per year. Metro was also one of the first hospitals to begin using UVGI cleaning technology.

Of the 177 facilities that indicated "yes" to having a policy in place, the following chemicals were targeted in the policy:

TABLE 3: CHEMICALS IDENTIFIED

Chemicals Identified	All	Small	Large	Top 25	Your Data
Mercury	**91.0**	92.9	88.6	96	
Latex	**67.8**	66.7	67.1	87.5	
VOCs (volatile organic compounds)	**59.9**	56.0	62.5	87.5	
PVC (polyvinyl chloride, or PVC-plastics)	**57.1**	54.8	60.2	83.3	
Lead	**55.9**	48.8	62.5	75.0	
DEHP (a plasticizer found in soft plastics)	**54.8**	52.4	58.0	87.5	
Carcinogens, mutagens or reproductive toxins	**51.4**	48.8	54.6	70.8	
Persistent Bioaccumulative Toxic substances (PBTs)	**46.9**	39.3	53.4	83.3	
Halogenated, chlorinated or brominated flame retardants	**45.2**	47.6	42.1	70.8	
Bisphenol-A	**42.4**	41.7	44.3	66.7	
Other phthalates (found in soft plastics)	**31.1**	31.0	31.8	41.7	
Halogenated plastics	**27.1**	26.2	27.3	45.8	
Perfluorinated compounds	**26.0**	23.8	27.3	54.2	
Other chemical constituents	**19.2**	16.7	22.7	29.2	

The Top 25 award winners included these chemicals in their policies at significantly higher rates than other hospitals—demonstrating the leadership position they have taken in driving the market for safer chemical products. Another 57.4 percent of the data set reported a fragrance-free policy for staff, recognizing the EPA and other health agencies have acknowledged a range of health problems associated with exposure to fragrance chemicals.

Green Cleaning

Hospitals use a variety of cleaning chemicals and disinfectants every day to keep the hospital environment safe from pathogens for patients. Unfortunately, many of the cleaning and maintenance products also negatively impact the health of both housekeeping personnel and nursing staff. According to *The Lancet*, cleaning staff and nurses have some of the highest rates of work-related asthma[1]. Green cleaning is the process of selecting cleaning products and disinfectants that maintain efficacy while decreasing the impact on worker health and the environment.

1 Kogevinas M. et al. Exposure to substances in the workplace and new-onset asthma: an international prospective population-based study (ECRHS-II) *Lancet*. Vol. 370, No. 9584, p. 336-341. July 28, 2007. Accessed on July 11, 2015. Available at http://www.thelancet.com/journals/lancet/article/PIIS0140673607611647/fulltext.

Award-winning hospitals spent nearly $4.46 million on green cleaning chemicals, nearly doubling the amount they reported spending last year. While the number of award-winning hospitals using green cleaning products rose by more than six percent to 89.9 percent this year, the substantial increase in spend is also likely a result of better tracking of this data by hospitals in 2014. Green cleaning chemicals are defined as those chemicals certified by either Green Seal or UL/EcoLogo. Virtually all award-winning hospitals are using microfiber mops, and 85.2 percent of hospitals are now using automatic scrubbing machines that use only water for some portion of their cleaning—reducing the need for harsher detergents.

TABLE 4: GREEN CLEANING

Green Cleaning	All	Small	Large	Top 25	Your Data
Does the facility use Green Seal or UL/EcoLogo-certified cleaners?	**89.9**	91.0	90.5	100.0	
Has environmental services collaborated with the infection control committee to identify areas where use of disinfectants can be minimized or eliminated?	**51.2**	47.0	56.2	72.0	
Does the facility limit the use of hand soaps containing antimicrobials to areas defined as necessary by the infection prevention and control committee?	**49.3**	46.0	51.5	64.0	
Does the facility utilize automatic scrubbing machines that use only water for floor cleaning?	**85.1**	83.2	87.4	100.0	
Does the facility utilize microfiber mops and cleaning cloths as a mechanism to reduce water and chemical use, reduce cross contamination and ergonomic stress?	**97.7**	97.0	98.1	100.0	

Overuse of antimicrobials and the increasing rate of antibiotic resistance is of growing concern to the health care community. Learn more about how chemicals in certain antimicrobial hand soap can actually contribute to antibiotic resistance. (*see sidebar: Why should hospitals avoid antimicrobial hand soaps with Triclosan*)

WHY SHOULD HOSPITALS AVOID ANTIMICROBIAL HAND SOAPS WITH TRICLOSAN?

Hospital-acquired infections continue to be a major concern for patient safety in health care. Hospitals use a range of different strategies to address HAIs, with hand hygiene taking priority. Many institutions use both alcohol-based hand rubs (ABHRs) and antimicrobial soaps to address hand hygiene. Some of the antimicrobial soaps however, contain a chemical called triclosan. Recent studies suggest that triclosan can lead to antibiotic resistance, particularly with *Pseudomonas aeruginosa.*[1] [2] Triclosan is also thought to be a potential endocrine disruptor and can interfere with thyroid hormone metabolism—as well as being a known water contaminant. Learn more about why the use of Triclosan is no longer recommended in health care settings with this July 2014 peer-reviewed article from the Society for Hospital Epidemiology in America (SHEA) in collaboration with APIC, the AHA, IDSA and the Joint Commission. Strategies to Prevent Healthcare-Associated Infections through Hand Hygiene. See Section H.

1 Drury B, Scott J, Rosi-Marshall EJ, Kelly JJ. Triclosan exposure increases triclosan resistance and influences taxonomic composition of benthic bacterial communities. Environ Sci Technol 2013;47:8923–8930.

2 D'Arezzo S, Lanini S, Puro V, Ippolito G, Visca P. High-level tolerance to triclosan may play a role in pseudomonas aeruginosa antibiotic resistance in immunocompromised hosts: evidence from outbreak investigation. BMC Res Notes 2012; 5:43.

Table 5 highlights the percent of hospitals who are using different green-certified cleaning chemicals (of the 195 hospitals who responded that they purchase green cleaning products). Green-certified general purpose, window and floor cleaners were used the most, with bathroom cleaners close behind. Large hospitals were slightly more likely to use green chemicals than their smaller counterparts. This could be a reflection of more outsourcing for environmental services in larger institutions, where the leading outsourced environmental services (EVS) companies mandate the use of green-certified cleaning chemical in some categories.

TABLE 5: GREEN CLEANING CHEMICAL USAGE

Cleaners Identified	All	Small	Large	Top 25	Your Data
General purpose (hard surface) cleaners	**89.2**	89.0	92.6	100.0	
Window/glass cleaners	**80.5**	76.9	87.4	92.0	
Carpet and upholstery cleaners	**40.5**	36.3	46.3	64.0	
Bathroom/restroom cleaner	**64.6**	59.3	70.5	68.0	
Floor cleaners	**72.3**	73.6	76.8	80.0	
Floor strippers	**28.7**	27.5	31.6	32.0	
Floor finishes	**25.6**	28.6	25.3	32.0	
Laundry soaps/cleaners	**20.5**	23.1	20.0	36.0	
Liquid and foam handsoap	**24.6**	22.0	27.4	28.0	

Note: Hospitals reported on the use of third-party certified (Green Seal/UL Eco-Logo green cleaning)

Integrated Pest Management

Ninety percent of award-winning hospitals report they have an integrated pest management (IPM) program in place. IPM is an effective and environmentally sensitive approach to pest management that relies on a combination of common sense practices to minimize the use of toxic chemical pesticides while still eradicating pest populations. This includes looking at the lifecycle of the pest and addressing the factors that determine pest survival (food, water, habitat). Table 6 demonstrates hospital progress on IPM.

TABLE 6: INTEGRATED PEST MANAGEMENT (IPM)

Integrated Pest Management (IPM)	All	Small	Large	Top 25	Your Data
Has the facility reduced or eliminated the use of chemical pesticides by implementing an IPM program?	**89.8**	86.9	92.4	100.0	
Has the facility developed a written IPM plan/policy for the facility that includes attention to both indoor and outdoor (buildings and grounds) pest habitats and issues?	**61.0**	55.6	65.7	84.0	
Does the facility use a pest control company that is third-party certified as an integrated pest management (IPM) provider and request certified IPM services?	**60.3**	58.0	62.1	75.0	

While the number of hospitals reporting they use IPM has continued to increase, it is important to continue due diligence with your pesticide contractors to ensure they are maintaining an IPM approach. Leading hospitals are writing an IPM clause into contract specifications and are checking in during business reviews with these service providers.

Sterilization and Disinfection

The proper sterilization and disinfection of medical devices is mission critical from a patient safety standpoint—as illustrated by the scope disinfection issues experienced in California hospitals in 2014. At the same time, sterilization and disinfection processes can use a number of chemicals that can negatively impact the health of employees and impact water quality. The sterilant ethylene oxide (EtO) is a known human carcinogen. Glutaraldehyde is a known sensitizer and can cause asthma and other respiratory impacts. Nearly every award-winning hospital (94 percent) has switched to safer alternatives than glutaraldehyde and ethylene oxide.

In addition, 82 percent of the data set have minimized staff exposure to liquid high-level disinfectants by purchasing automatic machine washers /disinfectors.

TABLE 7: STERILIZATION AND DISINFECTION

Sterilization and Disinfection	All	Small	Large	Top 25	Your Data
Have eliminated the high-level disinfectant glutaraldehyde where possible for safer alternatives (as defined by the ICRA process involving infection prevention and control and employee health)	**94.0**	94.0	96.2	100.0	
Have eliminated where possible the use of the sterilant ethylene oxide (EtO) onsite while maintaining compliance with regulatory requirements	**94.0**	92.0	96.2	96.0	

Of the facilities indicating they are using alternatives to glutaraldehyde and ethylene oxide, these are the alternatives being used:

TABLE 8: ALTERNATIVES TO GLUTARALDEHYDE

Alternatives to Glutaraldehyde	All	Small	Large	Top 25	Your Data
OPA (ASP Cidex OPA, Metrex Metricide OPA)	**82.3**	77.7	86.0	88.0	
Hydrogen peroxide	**62.1**	62.8	63.0	80.0	
Other	**11.3**	7.5	15.0	16.0	

TABLE 9: ALTERNATIVES TO ETHYLENE OXIDE (ETO)

Alternatives to Ethylene Oxide (EtO)	All	Small	Large	Top 25	Your Data
Steam sterilization	**81.2**	81.5	81.0	83.3	
Ozone plasma (3M Optreoz with TSO3 Sterizone technology)	**14.9**	9.8	21.0	25.0	
Low temperature hydrogen peroxide gas plasma (Sterrad)	**65.4**	65.2	67.0	79.2	
Peracetic acid (Steris 1 or 1E)	**39.6**	35.9	44.0	54.2	
Other	**4.0**	0.0	8.0	8.3	

Di-2-ethylhexyl Phthalate (DEHP) and Polyvinyl Chloride (PVC)

DEHP is a chemical used to make rigid plastics soft and flexible, and is used in a variety of medical plastic applications. An FDA public health advisory recommends that hospitals limit the use of DEHP-containing medical products with sensitive patient populations—particularly male infants in the NICU. Table 10 demonstrates the progress that award-winning hospitals are making in reducing the use of DEHP and PVC in medical products. The number of hospitals that reported they are addressing DEHP in the NICU jumped from 59 percent in 2012 to 86.8 percent in 2013—and is down again this year to 70.4 percent. The jump may be attributable in part of the switch from average to median in the 2014 report, but there is also likely a data error. But at 70.4 percent this year, hospitals are still clearly making this a priority.

TABLE 10: DEHP/PVC REDUCTION

DEHP/PVC Reduction	All	Small	Large	Top 25	Your Data
Does the facility have a DEHP and/or PVC reduction program?	**63.9**	54.5	73.3	84.0	
Does the facility purchase DEHP-free products in the NICU?	**70.4**	55.2	84.2	87.0	

Over 71 percent of this year's data set have eliminated DEHP and/or PVC from at least one product line.

The top product lines were:

- Parenteral Infusion devices and sets at 51 percent
- Breast pumps at 50.3 percent
- Enteral nutrition products at 49.0 percent
- Exam gloves at 49.0 percent

Areas of opportunity included:

- General urological at 30.6 percent
- Vascular catheters at 31.2 percent
- Umbilical vessel catheters at 28.0 percent

Learn more about the risks related to DEHP in medical devices: https://noharm-uscanada.org/issues/us-canada/scientific-reports-phthalates.

Other Chemical Reduction Activities

One big new focus area for hospitals is to reduce chemicals of concern in furnishings such as casework, seating, workstations and more. Hospitals are working with suppliers to address the use of chemicals of concerns in a range of different products, including furniture and furnishings. Many institutions are using their chemical policies to help guide this transition but other facilities are taking the next step and specifying products in this category that achieve third-party certification. Practice Greenhealth's Healthier Hospitals program has targeted healthier interiors through its Safer Chemicals Challenge. Learn more about the healthier interiors work here: http://healthierhospitals.org/hhi-challenges/safer-chemicals

CLEVELAND CLINIC

In 2014, 50 percent of Cleveland Clinic's furniture spend ($3,000,000) was free of identified chemicals of concern—including mercury, PBTs, PVC, carcinogens, mutagens and reproductive toxicants, VOCs, latex and perfluorinated compounds. Additionally, this spend supports our LEED certification process for new construction and our focus on indoor air quality.

TABLE 11: CHEMICAL REDUCTION ACTIVITIES

Chemical Reduction Activities	All	Small	Large	Top 25	Your Data
Does the facility purchase furniture that has an environmental certification or achieves LEED health care credit?	**50.9**	39.6	61.0	84.0	

Hospitals that reported purchasing furniture/furnishings that met an environmental certification identified using the following certifications:

TABLE 12: ENVIRONMENTAL CERTIFICATIONS FOR FURNITURE

Environmental Certifications for Furniture	All	Small	Large	Top 25	Your Data
UL/Greenguard	**65.8**	62.5	68.8	71.4	
LEED HC credit	**53.2**	52.5	54.7	61.9	
BIFMA level	**51.4**	47.5	56.3	61.9	
C2C, SMaRT	**25.2**	32.5	21.9	14.3	
Scientific certification systems	**12.6**	10.0	15.6	10.0	
Other	**2.7**	0.0	4.7	0.0	
Oeko-tex	**0.0**	0.0	0.0	0.0	
GOTS	**0.0**	0.0	0.0	0.0	

Overall, hospitals are making inroads on addressing chemicals of concern, but there is still considerable opportunity for hospitals to address this issue more comprehensively—through purchasing policies, commitment statements and integration of chemical considerations into purchasing policies.

Operating Room

Practice Greenhealth launched the Greening the OR initiative due to the OR's significant environmental footprint relative to the rest of the organization. The Greening the OR section pulls together a range of programs that are centered in an operating room setting but are tied to other content areas such as purchasing, waste reduction, energy use and climate. The potential cost savings from OR-specific sustainability initiatives is significant— which has been a primary driver in the continued growth of these programs in the surgical departments.

The average savings resulting from sustainable programs in the OR for award-winning hospitals was $177,177 in 2014—$77,236 higher per typical hospital than in 2013. While hospitals are getting better at tracking the savings associated with these initiatives, it is important to note that many of the savings were still underreported in this section. As hospitals try to gain momentum in the OR, better capture of data can support the business case for continued greening of surgical suites.

The Greening the OR section of the award application has provided the impetus for many hospitals (74 percent of award winners) to identify a leader or champion in surgical services. Much of the data requested is not easily accessible without an OR-specific contact. Practice Greenhealth also works in collaboration with clinician colleagues and the green task force of the American Society of Anesthesiologists to identify a set of best practices and a corresponding data set for anesthesia teams.

Highlights

- Practice Greenhealth award winners reported more than $22 million in combined savings on Greening the OR programs in 2014.
- Eighty-five percent of facilities have implemented a reprocessing collection program, and eighty percent purchase back reprocessed single-use devices.
- Total reprocessing savings inside and outside the OR exceeded $29.2 million. Inside and outside the OR, 873 tons of devices were collected for a combined savings of $337,643 in avoided disposal costs.

- Eighty-four percent of award-winning hospitals are now recycling clinical/medical plastics in the OR, reflecting a huge shift across the sector as more haulers are willing to consider this recycling stream.
- Eighty percent are reviewing and reformulating OR kits to reduce excess waste and drive down both supply and disposal costs.
- Only 36.8 percent of hospitals are reducing air changes in their surgical suites during unoccupied hours and only 64 percent utilize LED surgical lights, pointing to untapped opportunities for energy savings.

Bethesda North Hospital OR nurses recycle

Waste in the OR

Operating rooms are a huge source of both solid waste and regulated medical waste—estimated to account for 30 percent of a facility's total waste[1] and generate up to 60 percent of the organization's regulated medical waste (RMW).[2] Hospitals are making strong progress on reducing RMW with the median rate hovering at around 6.5 percent of total waste for award winners or an average of 5.41 tons of RMW per OR annually (down from 5.6 tons in 2013). Table 1 highlights strategies for reducing RMW in the OR setting.

TABLE 1: WASTE SEGREGATION AND MANAGEMENT

Waste Segregation and Management	All	Small	Large	Top 25	Your Data
Does the facility have a process to divert pre-incision (prior to the case) non-pharmaceutical waste from the regulated medical waste stream into the solid waste stream for non-infectious waste disposal?	**93.5**	92.9	94.2	100.0	
Does the facility have a process to segregate non-infectious solid waste from the regulated medical waste stream during and after the procedure?	**93.5**	96.0	91.4	92.0	
Does the facility utilize a fluid management system that empties directly into the sanitary sewer as a means to reduce exposure to bloodborne pathogens and reduce waste?	**80.5**	79.6	81.9	88.0	
Does the facility utilize a reusable canister fluid management system?	**61.9**	68.4	58.6	71.4	

Fluid management systems hold huge potential for waste reduction—as blood and body fluids are diverted to the sanitary sewer instead of the regulated medical waste stream. There are two kinds of fluid management systems—the first automatically empties the disposable suction canister into the sanitary sewer, reducing employee exposure risks and leaving containers empty for disposal, avoiding the need for chemical solidifiers and/or disposal as RMW (in some states). The second set of systems utilizes a reusable canister system—eliminating the suction canister waste altogether, and only requires a small disposable manifold for each procedure. The reusable canister systems offer a clear advantage—decreasing

1 Esaki, Roy K., and Alex Macario. "Wastage of Supplies and Drugs in the Operating Room." Medscape Anesthesiology. WebMD LLC, 21 Oct. 2009. http://www.medscape.com/anesthesiology.

2 United States Air Force IERA. Medical Waste Incinerator Waste Management Plan-Malcolm Grow Medical Center,Building 1056, Andrews Air Force Base, MD. June 2001. Available at: http://airforcemedicine.afms.mil/idc/groups/public/documents/afms/ctb_033957.pdf.

both front-end purchasing costs for suction canisters and solidifiers, as well as significantly decreasing waste volumes and avoiding employee exposure risks.

Of the 109 award-winning facilities that indicated they utilize a reusable canister fluid management system, only 20 had collected the data necessary to report cost savings. These 20 facilities reported more than $1.5 million in combined savings in 2014 from reusable canister fluid management systems—a significant underrepresentation of the aggregate cost-savings potential.

Clinical Plastics Recycling in the OR

Plastics are abundant in the OR, including packaging, disposable sterile wrap, trays, saline bottles, tubing and more. The majority of these plastics are generated during set up—before a patient even enters the room—and can safely be recycled. Ninety-six percent of the Top 25 and 83.6 percent of award applicants (up from 78 percent in 2013) are working with their vendors to establish and maintain programs to recycle clinical plastics in the OR.

TABLE 2: CLINICAL PLASTICS RECYCLING

Clinical Plastics Recycling	All	Small	Large	Top 25	Your Data
Does the facility recycle clinical/medical plastics in the OR?	**83.6**	78.6	90.5	96	

Of the 184 facilities (83.6 percent) who reported recycling clinical plastics in the OR, the types of plastics being recycled include:

TABLE 3: TYPES OF RECYCLED PLASTICS

Types of Recycled Plastics	All
Irrigation bottles	84.8
Blue wrap	75.5
Trays	66.3
Rigid inserts	61.4
Overwraps	60.9
Basins	55.4
Skin prep solution bottles	50.0
Urinals/bedpans	26.1
Tyvek	23.9
Other	15.2

DARTMOUTH HITCHCOCK MEDICAL CENTER

Dartmouth Hitchcock Medical Center (DHMC) has a comprehensive waste minimization program throughout its operating rooms. In 2014, DHMC recycled 33,118 pounds of clean, empty rigids and 8,698 pounds of low density polyethylene (LDPE) films for a total of over 20 tons of recycling in the OR. The organization implemented rigid sterilization containers in 50 percent of its OR kits to save over $122,000 from the avoided purchase of sterile wrap and disposal, and avoided generating 20 tons of waste.

Single-use Device Reprocessing

Single-use device (SUD) reprocessing in the operating room hit a plateau in 2014, with 85.2 percent of award winners currently collecting and reprocessing 484.72 tons of devices in the OR for avoided waste disposal costs of $215,912. Data shows 79.6 percent of award winners reported purchasing back reprocessed devices in the OR for a combined savings of $29.2 million. The OR makes up about 67.2 percent of the reprocessing collection at award-winning hospitals. Hospitals also routinely reprocess pulse oximetry probes, DVT compression sleeves, EP catheters and other devices in the EP/cath labs and other patient care areas. Altogether, hospitals collected an additional 388.4 tons of reprocessing in 2014 from other areas, avoiding an additional $121,731 in waste disposal costs—for a total of $337,643 in avoided waste disposal fees.

TABLE 4: SINGLE-USE DEVICE REPROCESSING

Single-use Device Reprocessing	All	Small	Large	Top 25	Your Data
Does the OR collect FDA-approved single-use medical devices for reprocessing with an FDA-approved third-party reprocessor?	**85.2**	83.8	87.6	92.0	
Does the OR purchase and use reprocessed single-use medical devices from an FDA-approved third-party reprocessor?	**79.6**	76.8	81.9	92.0	

Table 5 shows the progress on reprocessing collection and avoided waste tonnage and cost over the past five years. Although the increase in reprocessing of SUDs has been impressive and aligns with industry-reported trends of growth, there is some question on the accuracy/integrity of the data on SUD reprocessing gathered through the Environmental Excellence Awards process and analyzed in this report. While data was requested in tons, some hospitals entered pounds, which were then converted. Some facilities broke out reprocessing by department as requested while others may have double-counted data or entered it in multiple places. Practice Greenhealth strives to provide the most accurate data possible but this data point deserves scrutiny, especially considering the significant increase in savings between 2012 and 2013. Contract limitations on purchasing reprocessed devices and/or more competitive pricing or discounts for original equipment might also play a role in the decreased savings.

Single-use Device Reprocessing Yearly Growth

TABLE 5: SINGLE-USE DEVICE REPROCESSING YEARLY GROWTH

Year	Tonnage	$ Savings	% Award Winners
2009	79.00	10.8 million	68% (41/60)
2010	321.00	11.8 million	77% (106/138)
2011	321.00	18.3 million	82% (115/141)
2012	680.00	20.5 million	82% (162/198)
2013	847.00	49.2 million	88% (196/223)
2014	873.05	29.2 million	85.2% (182/220)

Note: the year column above corresponds to the year in which the data was collected, not the awards year (2014 data noted above was collected in the 2015 awards cycle).

2014 Single-use Device Reprocessing by Department

The Environmental Excellence Partner for Change award application breaks out reprocessing data into the main departments where these devices are collected and/or bought back. The OR was again the leading area for reprocessing, generating 67.2 percent of the reprocessing totals and 85.3 percent of the savings. Table 6 highlights the tonnages collected for all award winners in four different areas—and the associated cost savings. Table 7 highlights a different number—the average savings from reprocessing (both avoided waste costs and cost-savings from purchasing reprocessed versus new devices for award-winning hospitals in each cohort).

TABLE 6: 2014 SINGLE-USE DEVICE REPROCESSING SAVINGS

Department	Tonnage for All Award Applicants	Savings for All Award Applicants
OR	484.72	$15.8 million
Patient care	173.52	$5.0 million
EP/cath labs	168.74	$5.9 million
Other	46.12	$2.4 million
Total	**873.05**	**$29.2 million**

Note: 2014 is the year in which the data was collected. It was gathered for the 2015 awards cycle.

TABLE 7: SINGLE-USE DEVICE REPROCESSING SAVINGS PER HOSPITAL

Single-use Device Reprocessing Savings	All	Small	Large	90th%	Your Data
Average reprocessing savings per hospital	**$130,286**	$54,710	$184,794	$186,929	

Reprocessing Compliance

Reprocessing continues to be a significant area of opportunity for hospitals—at a time when cost pressures continue to mount. Despite the benefits, the program can sometimes be challenging to grow and maintain, as it requires a fair amount of education for nurses and surgeons as well as the supply chain staff. It is important to help these clinicians understand the extensive safety record of reprocessed devices, especially in the early phases of the program. Having a surgeon or chief medical officer who can champion the program can drive implementation efforts. Ensuring that supply chain staff are aware of the financial benefits of purchasing back reprocessed devices can help ensure purchasing contracts are structured to maximize value.

To help familiarize hospitals with the remaining potential for growing these programs, Practice Greenhealth asked facilities to report their reprocessing compliance level (also referred to as 'variance' rate or 'opportunity lost' on vendor reports). This metric looks first at the number of devices a facility has sent out for reprocessing and then calculates the percentage being bought back (of those reprocessed and available for repurchase).

This metric provides some information on how hospitals are performing on reprocessing compared to their potential. But the metric can be misleading. It is not a completely accurate reflection of the opportunity for reprocessing—as it is only

measuring buy-back potential for those devices already being collected and made available for repurchase. Not every device collected can be re-purchased—a device can only be reprocessed a specified number of times and some devices don't pass inspection for reuse. Additionally, a facility could be collecting only one or two device types, and re-purchasing that device fairly well (such as pulse oximetry probes). This could skew the 'compliance' however, because it wouldn't reflect that the hospital is not even reprocessing a range of other devices available for reprocessing. Table 8 highlights the reprocessing compliance levels for each cohort in 2014. Practice Greenhealth is continuing its dialogue with SUD reprocessors as a means to find a better metric for measuring reprocessing performance.

TABLE 8: REPROCESSING COMPLIANCE LEVEL[3]

Reprocessing Compliance Level	All	Small	Large	Top 25	90th %	Your Data
Reprocessing compliance level	**69.0**	63.0	70.0	54.5	93.8	

OR Kit Reformulation

Most award-winning hospitals are conducting annual reviews of the contents of their OR kits. The process involves reviewing each of the OR kit types, and determining which supplies are routinely being used, and which supplies are unnecessary, and are frequently thrown out without being used. Another consideration for facilities is the kit types themselves. Are supplies frequently being added to existing kits to use for other procedure types? Is consolidation or streamlining of existing kits possible? Reviewing OR kits is an excellent process for efficiency and continuous improvement practices, evidenced by the fact that eighty percent of award winners are reviewing their OR kits, with the Top 25 hospitals at 100 percent. Most hospitals that reported reviewing their kits indicated they had reviewed 100 percent of their kit types, resulting in $2.9 million in reported savings in 2014.

UNIVERSITY OF MARYLAND MEDICAL CENTER

University of Maryland Medical Center established an item return threshold of 1.5 percent from custom OR kits. If returns exceeded this threshold, OR kits were evaluated and reformulated until the return rate once again fell below the threshold. When totes were initially rolled out, the return rate was over 10 percent. In 2013, the return percentage was 1.5 percent, and in 2014 it was reduced to 1.2 percent.

It's important to point out that although 2013 saw almost $4 million in savings from OR kit review projects, savings from these programs can vary significantly year to year due to remaining kit inventory, purchasing contracts, and other supply limitations. Additionally, as kits become more refined, opportunity for savings may decrease at some organizations as the big wins have already been achieved.

TABLE 9: OR KIT REFORMULATION

OR Kit Reformulation	All	Small	Large	90th%	Your Data
Review and update OR kits annually	**80**	72.7	87.5	100	

3 In this context, compliance level refers to variance rate or opportunity lost on reprocessing—not contract compliance.

Table 10 highlights the breakdown of the cost savings derived from the kit review process—with avoided purchase of unnecessary supplies being the dominant cost-savings factor. It should be noted that these savings are a conservative estimate, given that only 38.4 percent of facilities reporting they were reformulating kits were able to quantify any cost savings, and many hospitals weren't able to quantify their avoided waste disposal costs.

TABLE 10: OR KIT COST SAVINGS

OR Kit Cost Savings	Savings
Avoided waste disposal fees from eliminating unnecessary supplies	$110,447
Cost savings from avoided purchase of unnecessary supplies	$2,754,662
Total OR kit review cost savings	**$2,865,109**

Rigid Sterilization Containers

In an effort to reduce the use of disposable blue sterile wrap and move toward leaner practices, hospitals are utilizing rigid sterilization containers for surgical instrumentation. In 2014, 79.1 percent of award applicants and 88 percent of the Top 25 reported using rigid sterilization containers for some portion of their kits. The rigid containers eliminate the need to purchase and dispose of single-use blue sterile wrap and can also help facilities retain and keep track of instrumentation. The median hospital had transitioned to reusable sterilization containers for around 54 percent of their kits in 2014. Of those that tracked and reported savings, hospitals saw a combined savings of $1.2 million.

TABLE 11: RIGID STERILIZATION CONTAINERS

Rigid Sterilization Containers	All	Small	Large	Top 25	Your Data
Utilizes reusable hard cases for sterilization of surgical instrumentation and reduction of disposable sterile wrap	**79.1**	79.8	81.7	88.0	

TABLE 12: RIGID STERILIZATION CONTAINER SAVINGS

Rigid Sterilization Container Savings	Savings
Avoided waste disposal fees from eliminating unnecessary supplies	$21,877
Cost savings from avoided purchase of unnecessary supplies	$1,180,912
Total rigid sterilization container cost savings	**$1,202,789**

Reusable Surgical Items

Many hospitals are making the switch back to reusables in the OR—albeit a new generation of reusables that meet today's standards for efficacy and infection prevention. Table 13 highlights the percent of award winners who are using reusable surgical products in their surgical suites.

TABLE 13: REUSABLE SURGICAL ITEMS

Reusable Surgical Items	All	Small	Large	Top 25	Your Data
Does the facility utilize reusable surgical items where environmentally and clinically preferable?	**80.9**	82.8	81.7	88.0	

One of the challenges of reusables is the cleaning and disinfection protocol. While some hospitals would like to transition to reusable supplies, there are concerns about trying to put the proper cleaning and disinfection practices into place. In 2014, reusable positioning devices and surgical towels were the most commonly reusable products currently in the OR in award-winning hospitals. Many hospitals utilize a service for reusable surgical towels. Despite reusable positioning devices having many of the same cleaning and disinfection protocols as reusable grounding pads, only 16.1 percent had taken advantage of this reusable product—a real opportunity. The use of products such as reusable endotracheal tubes and laryngeal mask airways is largely dependent on having an enlightened champion on the anesthesia team to advocate for them and vet the peer-reviewed literature.

Reusable surgical gowns continue to be an area of opportunity—as they eliminate a significant waste stream in addition to offering increased clinician comfort. A 2010 study in the *AORN Journal*[4] found that surgeons preferred the reusable to the disposable gowns by a substantial margin for comfort, ease of use and protective properties. Improved thermal comfort for clinicians can also play a role in reducing patient hypothermia and OR energy use, as the reusable gowns may allow ORs to keep their temperature set points slightly higher. Anecdotal reports from award winners also detail the cost-savings from recovered instruments when using reusable back table and mayo stand covers. Despite these savings and the environmental benefits, this continues to be an area of opportunity for many facilities. Table 14 highlights which reusable items award-winning hospitals are using most often.

TABLE 14: COMMONLY USED REUSABLE SURGICAL ITEMS

Reusable surgical items in the OR	Utilized >75% of the time
Reusable patient positioning devices	73.60%
Reusable surgical towels	62.60%
Reusable surgical basins and pitchers	46.00%
Reusable trocars	43.10%
Reusable surgical gowns	28.20%
Reusable laryngeal mask airways (LMA)	23.00%
Reusable sterilization wrap	16.70%
Reusable surgical drapes	16.70%
Reusable grounding pads	16.10%
Reusable back table covers	14.90%
Reusable mayo stand covers	14.40%
Reusable anesthesia circuit	10.30%
Reusable endotracheal tubes (ETT)	6.3%

4 Conrardy, J., Hillenbrand, M., Myers S., and Nussbaum, G. Reducing Medical Waste. AORN Journal. Vol 91. No. 6. June 2010. Available at: http://www.aornjournal.org/article/S0001-2092(10)00332-7/pdf.

MEMORIAL-SLOAN KETTERING CANCER CENTER

Memorial-Sloan Kettering Cancer Center implemented an air acuity and HVAC setback system throughout all of its 28 operating rooms, setting the system from 25 air exchanges per hour down to 12 when unoccupied. This project alone resulted in 652,150 kWh saved, steam reduction of 39,741 therms, and $91,933 savings annually in avoided energy expenditures.

Energy Management in the OR

The OR contributes significantly to a hospital's overall energy consumption, requiring high air exchange rates, stringent temperature and humidity requirements, significant plug and lighting loads. Focusing efforts on energy reduction in the OR is a great opportunity for many hospitals. Only 36.8 percent of award winners had an HVAC setback program in place in 2014. LED surgical lighting increased from just 57.6 percent of award-winning hospitals in 2013 to 64.2 percent in 2014. Only 20.6 percent utilize occupancy sensors to automate and reduce energy consumption from lighting. These numbers speak to the challenge of securing funding (CAPEX or other) for energy improvements despite clear evidence of return on investment. When these programs are in place, savings can add up.

TABLE 15: ENERGY MANAGEMENT IN THE OR

Energy Management in the OR	All	Small	Large	Top 25	Your Data
Did the facility program the HVAC system to reduce air changes per hour (ACH) when the ORs are unoccupied to reduce energy consumption?	**36.8**	30.5	40.8	44.0	
Does the facility utilize LED surgical lighting?	**64.2**	52.6	74.8	92.0	
Does the facility utilize occupancy sensors for lighting to reduce energy consumption when the OR is unoccupied?	**20.6**	25.0	17.6	24.0	

HVAC setback in particular can be a low-cost program to implement and has been estimated to save around $2,000 to $3,200 per OR per year.[5] LED surgical lighting consumes less energy than halogen, generates significantly less heat in the surgical field than the older alternatives, and can improve clinician comfort and the visual field while also allowing higher temperature set points in the OR. Higher temperature set points may also reduce the need for warming devices to maintain patient normothermia. LED surgical lighting can also yield significant maintenance savings from fewer bulb replacements, and reduced labor required to change out the bulbs.

Hospitals reported combined energy cost savings in the OR of $653,896 in 2014—a vast underestimation—as only 23.4 percent of hospitals tracked HVAC cost savings and 19.9 percent of hospitals tracked LED savings (of hospitals who had these programs in place).

5 Doyle, D., Villani, J. and Chan, Y. Energy Efficiency Opportunities in the OR presentation. Greening the OR Symposium. September 11, 2014.

TABLE 16: OR ENERGY SAVINGS

Energy Savings in the OR	Savings	Your Data
Energy savings $ from HVAC setback	$346,927	
LED ($) savings from reduced energy consumption	$282,918	
LED lighting supply cost savings	$7,135	
LED lighting avoided labor savings	$16,916	
Total HVAC + LED savings	$653,896	

Anesthesia Usage

As the focus around greenhouse gas emissions and health care's carbon footprint continues to grow, facilities again were asked to submit data on anesthesia usage at their facility. The questions were asked in part to establish a baseline for greening anesthesia care, but also to help facilities begin to understand the impact their current anesthesia practices may have relative to greenhouse gas emissions. Most hospitals vent waste anesthetic gases into the atmosphere with little understanding of how these gases impact the carbon footprint of the organization. Practice Greenhealth hopes to shine a light on current practice, while collaborating with anesthesiology colleagues to identify an improved set of best practices that align with clinical excellence and impact the facility's overall bottom line.

The data supplied on specific anesthetic agent usage is currently being reviewed and analyzed as many hospital data sets collected in 2015 (2014 data) required clarification or correction. Many hospitals with champions in the anesthesia department are reexamining their usage of different types of anesthesia. The primary types of anesthetic gas include isoflurane, sevoflurane and desflurane as well as nitrous oxide (N_2O). Peer-reviewed studies[6] have demonstrated that desflurane has a significantly higher global warming potential (GWP) than the other two anesthetics, while N_2O also has a significant carbon footprint. Leading anesthesia practitioners are taking a second look at how they make choices about the usage of different anesthesia combinations, and are exploring clinically sound treatment scenarios that minimize the use of the most impactful anesthetics for appropriate patient populations. Practice Greenhealth hopes to share more information on this topic in early 2016.

It's interesting to note that the percentage of facilities that reported using a supplemental waste anesthetic gas (WAG) capture system decreased almost in half—from 51.7 percent in 2013 to 21.3 percent in 2014. This was likely due to significant overreporting in 2013, when many hospitals did not understand the difference between a WAG capture system that protects staff from fugitive anesthetic emissions (attached to most anesthesia machines), and a capture system that prevents those WAGs from being emitted to outside air. After further education and clarification efforts, the number of hospitals reporting capture systems dropped in 2014. Because the practice is so new and can be expensive, Practice Greenhealth is reaching out to each of the hospitals who reported having a capture system to ensure they truly understand the question. To Practice Greenhealth's knowledge, only one or two hospitals in the U.S. utilize these systems. The numbers are higher in Canada, where hospitals must reduce greenhouse gas emissions from all sources or pay huge carbon offset fees.

6 Ryan, S. and Nielsen, C. Global Warming Potential of Inhaled Anesthetics: Application to Clinical Use. Anesthesia & Analgesia: July 2010 - Volume 111 - Issue 1 - p 92–98. doi: 10.1213/ANE.0b013e3181e058d7 Anesthetic Pharmacology: Research Reports. Available at: http://journals.lww.com/anesthesia-analgesia/toc/2010/07000.

TABLE 17: ANESTHESIA USAGE

Anesthesia Usage	All	Small	Large	Top 25	Your Data
Does the facility purchase or does in-house pharmacy prepare pre-filled syringes to minimize wastage of unneeded pharmaceuticals?	**76.1**	73.4	77.6	88.0	
Does the facility purchases the smallest pharmaceutical vials possible to minimize pharmaceutical wastage?	**84.8**	80.9	88.7	100.0	
Does the facility utilize a supplemental waste anesthetic gas capture system to prevent waste anesthetic gases from venting to the outside air?	**21.3**	20.5	21.6	20.0	

The data set indicated that 69.5 percent purchase or have in-house pharmacy prepare pre-filled syringes to minimize waste of unneeded . Table 18 highlights the percentage of facilities reporting they utilize each type of pre-filled syringe.

TABLE 18: PRE-FILLED SYRINGES

Pre-filled ephedrine	47.7
Pre-filled phenylephrine	44.1
Pre-filled succinylcholine	29.5
Pre-filled propofol	13.6
Other	27.3

In 2015 and 2016, Practice Greenhealth hopes to identify a new set of innovations in the OR space to share with our members. If you have a greening the OR innovation or case study to share, contact Kaeleigh Sheehan, Greening the OR Project Manager, at ksheehan@practicegreenhealth.org.

Healthy Food

The food system in the U.S. is incredibly environmentally intensive. Today the typical American meal contains, on average, ingredients from at least five countries outside the United States. According to research at the Leopold Center for Sustainable Agriculture at Iowa State University, the typical piece of produce travels an average of 1,518 miles before it hits consumers' plates, generating considerable greenhouse gases and other air pollutants in the process. The eating habits of U.S. consumers continue to drive up rates of obesity, diabetes and heart disease. By purchasing foods that are produced, processed and transported in ways that are protective of public and environmental health, hospitals can make a profound difference in the food system and in their own food environments. Many health care institutions have begun to adopt practices and policies to support a healthy food system—one that is environmentally sustainable, improves nutritional quality and supports human dignity and justice.

Though sustainable food programs are still in their infancy compared to waste and energy reduction programs, there is a rapidly growing consensus within the medical community that food is the next frontier. Award-winning hospitals reported serving nearly 112 million meals last year (a conservative estimate since many hospitals did not provide this number), demonstrating the substantive impact that sustainable food initiatives can have in influencing and affecting patients, staff and visitors. Practice Greenhealth award-winning hospitals are demonstrating a myriad of creative methods to rethink menus, offer employees, patients and the community better access to local, sustainable and nutritious produce, decrease food waste headed to landfills, and support the market for meat and poultry raised without the routine use of antibiotics.

Highlights

- Award winners spent 53.4 percent of their beverage budget on healthy beverages in 2014 totalling over $21.5 million.
- Award winners spent 14.7 percent of their budget on local and sustainably produced food in 2013, totaling nearly $42.7 million.
- Award winners decreased their percentage of meat use by 5.7 percent from baseline.

Dominican Hospital's farmer's market

Sustainable Food Policies

Central to a focus on creating more sustainable food systems is crafting the vision for the hospital's efforts.

TABLE 1. SUSTAINABLE FOOD POLICY

Sustainable Food Policy	All	Small	Large	Top 25	Your Data
Has the facility developed and adopted a sustainable food service policy?	**55.7**	51.5	61.5	92.0	

Sustainable Food Programs

The metrics data from the 2015 awards cycle (2014 data) continues to grow and improve. In last year's awards cycle (2014), Practice Greenhealth introduced a range of new data points. In the second year of the new application, more hospitals were able to contribute data points for newer metrics.

Question	Number of 2014 Hospitals Responding	Number of 2015 Hospitals Responding
Meat reduction	56	68
Healthier beverages	134	141
Local/sustainable food	117	119

In 2015, Practice Greenhealth specifically looked at hospital performance in three key areas:

MEAT REDUCTION

This focus relates to reducing the risk of cardiovascular disease and obesity through healthier eating, and the use of less environmentally intensive food sources.

HEALTHIER BEVERAGES

This focus is on minimizing the purchase of sugar-sweetened beverages as a means of reducing the risk of obesity and diabetes while also mitigating risks related to high-fructose corn syrup production.

LOCAL AND/OR SUSTAINABLY PRODUCED FOOD:

This focus is on reducing the transportation miles that food travels while strengthening local economies, moving away from the use of toxic pesticides, additives and growth hormones, and promoting an equitable farming system that supports workers.

Table 2 highlights the percentage of hospitals who have put programs into place in these three areas.

TABLE 2: SUSTAINABLE FOOD PROGRAMS

Sustainable Food Programs	All	Small	Large	Top 25	Your Data
Has the facility reduced meat options and/or serving sizes on the menu for cafeteria/retail and patient service?	**76.1**	71.8	78.8	100.0	
Has the facility increased healthy beverage options in at least three of the following: cafeteria/retail, patient, vending and catering?	**87.6**	81.2	93.3	100.0	
Has the facility purchased locally and/or sustainably grown and produced foods?	**83.1**	75.7	89.4	96.0	

The number of hospitals pursuing meat reduction programs grew a respectable 7 percent in 2014--reflecting a better understanding on the part of facilities for how this program contributes to their core goals of healthier employees and patients. Practice Greenhealth has identified three corresponding food-related metrics by which it would measure award applicants on these focus areas. The measures are highlighted below:

- **Percent meat reduction:** Current pounds of meat per meal/baseline pounds of meat per meal.
- **Percent spend on healthy beverages:** Spend on healthy beverages/total spend on all beverages.
- **Percent spend on local/sustainably produced foods:** Spend on foods and beverages meeting the definition of local or sustainable/total spend on all foods.

Table 3 highlights the median metric value for each cohort.

TABLE 3: FOOD METRICS

Food Metrics	All	Small	Large	Top 25	90th %	Your Data
Percent meat reduction (by weight)	**5.7**	5.7	8.1	16.1	32.7	
Percent healthy beverage spend	**53.4**	51.0	54.0	55.5	84.8	
Percent spend on local/sustainable	**14.7**	14.3	15.9	25.5	34.2	

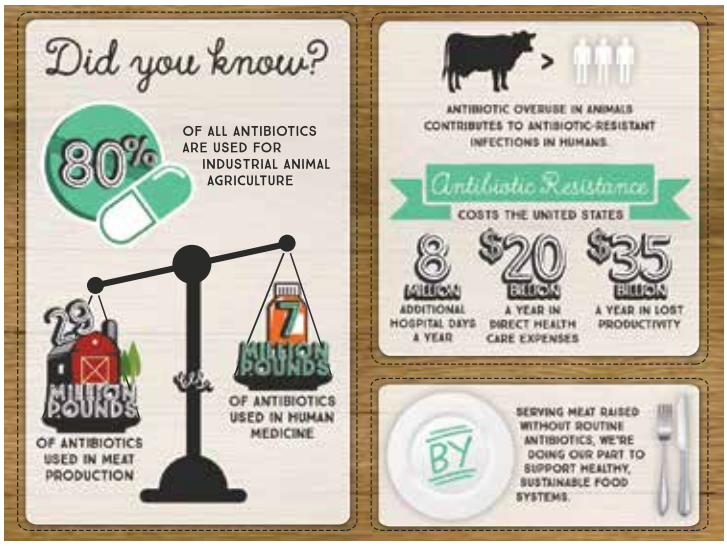
Note: These metrics are identical to those collected by Practice Greenhealth's Healthier Hospitals program.

Hospitals are making the most progress in reducing sugar-sweetened beverages, with award-winning hospitals achieving a median of 53.6 percent of spend on healthier beverages. The local/sustainable work proceeds more slowly—as it requires a commitment to working with broadline distributors, local farmers and other vendors. Food hubs focused on this relationship development are emerging in cities around the country. Practice Greenhealth works in collaboration with Health Care Without Harm's Healthy Food in Health Care campaign to support hospitals in developing these food networks and building sustainable food programs. Leading suppliers, distribu-

Johns Hopkins Hospital

tors and contracted food service vendors are at the table, and want to be part of revolutionizing health care food service.

Award-winning hospitals spent more than $42.7 million in 2014 to support healthier and more environmentally preferable foods and beverages in 2014. Just 54 percent of award applicants provided dollars spent on local/sustainable foods in 2014—a likely indicator that the actual spend is significantly higher. And while this spend doesn't yet tell us anything about the benefits derived, it does tell us the market demand for sustainable foods is growing rapidly.



Antibiotic Use in Meat and Poultry

Hand-in-hand with the attention to meat reduction is the newer (and equally if not more important) focus on purchasing meats and poultry raised without the routine use of antibiotics. In the growing fight to keep antibiotics effective in the face of antibiotic resistance, the overuse of antibiotics in animal agriculture is a major culprit. While many hospitals now have an antibiotic stewardship program based in clinical areas and the pharmacy, the focus on the use of antibiotics in food is newer for many institutions. Leading hospitals, however, are making this a central priority—even the cornerstone—of their sustainable food programs. In the first year Practice Greenhealth asked about purchasing meat and poultry raised without the routine use of antibiotics, an impressive 51.4 percent responded they are working on this issue. (*see sidebar: How the Overuse of Antibiotics in Meat & Poultry Production is Impacting Antibiotic Resistance*)

HOW THE OVERUSE OF ANTIBIOTICS IN MEAT AND POULTRY PRODUCTION IS IMPACTING ANTIBIOTIC RESISTANCE

Close to 30 million pounds of the antibiotics sold in the United States are used in animal agriculture. Most of these are used for non-therapeutic purposes like promoting growth and compensating for overcrowded and unsanitary living conditions. Many of these antibiotics are also medically important, and used to treat illnesses in humans.

"There is overwhelming scientific consensus that overuse of antibiotics in livestock is a health hazard to people," says Thomas Newman, MD, a member of the faculty at the School of Medicine at University of California at San Francisco Medical Center. More than 300 leading medical organizations, including the American Medical Association, the American Public Health Association, and the American Academy of Pediatrics have advocated ending the non-therapeutic use of antibiotics as feed additives.

"The antibiotic resistance crisis is growing worse each day. Physicians are seeing more and more patients with antibiotic resistant infections in hospitals, and we can clean up our own act by curbing the overuse of antibiotics in clinical practice," states Robert Gould, MD, President of San Francisco Bay Area Physicians for Social Responsibility. "But this is not enough. We now recognize that feeding healthy animals [non-therapeutic] antibiotics contributes enormously to this problem." The health care sector, with both its procurement power and moral authority, can contribute greatly to the end goal of eliminating the misuse and overuse of such important medicines in agriculture.

TABLE 4: MEAT AND POULTRY RAISED WITHOUT THE ROUTINE USE OF ANTIBIOTICS

Meat and Poultry Raised Without the Routine Use of Antibiotic	All	Small	Large	Top 25	Your Data
Purchase meat and poultry raised without the routine use of antibiotics	**51.4**	19.0	55.0	54.0	

Hospital-Supported Agriculture

Table 5 highlights hospitals' commitment to relationships with local farmers. Local food networks support environmental stewardship from the seed and soil to the plate with fewer pesticides, natural fertilization, local distribution, open-space preservation, water pollution controls and—of course—tastier, healthier foods. Just over 65 percent of award-winning hospitals now have farmer's markets onsite during the growing season. Farmer's markets have been an incredibly successful way for hospitals to publicize their commitment to healthier, local food while engaging employees, patients and visitors. Nearly 30 percent have on-campus gardens, which provide produce for their own cafeterias and patient meals, in addition to local food pantries. And an impressive 48 percent of the Top 25 have onsite food-producing gardens.

TABLE 5: FOOD WASTE REDUCTION

Hospital Supported Agriculture: Food and Farm Linkages	All	Small	Large	Top 25	Your Data
Host a farmers market during the growing season	**65.5**	54.4	78.1	84.0	
Actively promote community supported agriculture (CSA) food subscription programs onsite	**38.6**	39.8	40.0	56.0	
Have on-site or off-site food producing garden(s) and/or farm(s)	**29.5**	27.2	32.4	48.0	
Provide direct or in-kind support for urban food-producing community garden	**21.0**	15.5	28.6	44.0	
Plan with local farms to match planting decisions with purchasing intentions prior to growing season in 2014	**21.0**	13.6	26.0	36.0	
Work with farmer cooperatives, food hubs, and other regional aggregators, processors, and distributors to source local and regional foods.	**48.6**	41.2	54.8	68.0	
Communicate with GPOs/distributors on tracking and traceability of sustainable foods in their ordering, invoicing, and reporting systems.	**73.4**	68.0	79.0	92.0	

The Farm at St. Joe's - St. Joseph Mercy Ann Arbor

Food Recovery Hierarchy

Nearly a quarter of the waste produced by hospitals can be attributed to food and food services, according to hospital data. The EPA highlights food waste minimization strategies in Figure 1. Award-winning hospitals are taking on virtually all of these strategies to avoid landfilling food waste.

Source reduction efforts include the development of food waste reduction plans, room-service options for patient meals and reusable versus disposable food serviceware.

FIGURE 1: EPA FOOD RECOVERY HIERARCHY

TABLE 6: SOURCE REDUCTION OF FOOD WASTE

Source Reduction of Food Waste	All	Small	Large	Top 25	Your Data
Does the hospital have a food waste reduction plan that is being implemented and tracked?	**53.0**	51.5	52.4	76.0	
Does the hospital purchase reusable food serviceware for cafeteria/retail and patient meals wherever possible?	**79.9**	84.3	76.2	92.0	
Has the hospital eliminated single-use bottled water sales and use in food services?	**12.4**	9.8	15.4	40.0	
Has the hospital eliminated polystyrene (Styrofoam) purchase and usage in food service?	**46.6**	46.1	46.7	76.0	

Efforts to eliminate the sale of bottled water are complicated—as evidenced by just a 12.4 percent implementation rate. As hospitals transition away from the sale of sugar-sweetened beverages, bottled water may take the place of high sugar drink options. To address this challenge, many hospitals are setting up filtered water stations where employees can refill reusable drink containers for patients or themselves. Other hospital efforts include the use of flavored water stations where patients, visitors and staff can access water containing fresh fruit, cucumbers or mint.

Elimination of polystyrene (Styrofoam) in cafeterias and food services has plateaued—as food services departments continue to struggle with the cost premium for more recyclable or compostable options. Polystyrene is typically considered a contaminant in single-stream recycling, and has to be recycled separately with a different piece of equipment—often onsite. Additionally, many hospitals have struggled to find cost-comparable recyclable or compostable substitutes for hot beverage cups that can convey the same attributes (protection from heat, non-melting).

Food Waste Recovery

When food waste cannot be prevented, the next step in the hierarchy is to explore if there is a way to repurpose food before sending it for disposal. Food donation programs are one way to repurpose hospital food that is unable to be used. Repurposing fats, oil and grease as a fuel source is another option. A growing number of hospitals (52.3 percent of the data set in 2014) are recycling cooking oil. Table 7 highlights food donation efforts.

TABLE 7: FOOD WASTE RECOVERY

Food Waste Recovery	All	Small	Large	Top 25	Your Data
Does the hospital have a food waste donation plan that is being implemented and tracked?	**16.1**	11.7	20.0	28.0	

Composting

Food waste that goes to the landfill generates methane, a powerful greenhouse gas that impacts climate change. Landfill waste breaks down in anaerobic conditions (without oxygen), forming methane. Composting (when done correctly) breaks organic waste down in aerobic conditions (with oxygen), forming carbon dioxide. While both methane and carbon dioxide are greenhouse gases, methane has 21 times the global warming potential (GWP) of carbon dioxide. Composting food waste also creates a valuable soil amendment—reducing the need for artificial fertilizers and chemicals. The data shows 45.4 percent of award winners had a composting program in place in 2014—with 84 percent of those hospitals tracking and providing their composting tonnage for a total of 5,244 tons of compost in 2014 and avoidance of 4,539 metric tons of carbon dioxide equivalents (MtCO2e).

TABLE 8: COMPOSTING

Composting	All	Small	Large	Top 25	Your Data
Does the hospital have a food waste composting program and tracking system?	**45.4**	36.9	52.9	72.0	
Does the hospital purchase certified commercially compostable food service ware (such as certified by Biodegradable Products Institute (BPI) where single-use/ disposable items are necessary?	**53.6**	44.7	63.8	76.0	

Larger hospitals continue to outpace smaller hospitals in the composting arena, with a nearly 20 percent higher rate of implementation. One likely factor is accessibility to composting vendors, with larger hospitals tending to be in more urban settings where there are more vendors available to compete for service contracts. Larger hospitals also generate a larger volume of composting material, which can improve bargaining with existing vendors for lower prices or transport fees. More hospitals are also now purchasing compostable food serviceware (53.6 percent), such as clamshells, plates, cups and even silverware.

Farmers market at Advocate Illinois Masonic Medical Center

Partners Healthcare - Cooley-Dickinson Hospital, Northampton, MA

TABLE 9: COMPOSTING EFFORTS

Of the facilities indicating "yes" to composting, these areas were included in composting efforts:	All	Small	Large	Your Data
Food preparation areas	**98.0**	97.0	98.2	100.0
Patient meals	**70.7**	63.2	72.7	83.3
Cafeteria/retail	**66.7**	60.5	72.7	83.3
Catering	**64.7**	63.2	61.8	77.8

Practice Greenhealth began tracking normalized composting data in the 2014 report (based on 2013 data). The 2014 data can be found in Table 10 below. New in the 2015 Sustainability Benchmark Report is the metric for pounds of composting per meal served. While this new metric provides a closer look at how composting corresponds with meals served, complicating factors include the fact that some hospitals compost more than food waste such as yard clippings—and this tonnage may be counted in composting totals, skewing the metric. Another factor is that this metric will give more credit to hospitals who generate more food waste rather than to those who have robust food waste reduction programs in place. The factor that correlated best with compost tonnage in 2014 was the square footage (gross floor area) of the institution. Composting per FTE is reported but it should be noted that the correlation for this metric was very poor (R-squared = 0.62 where 1.0 is a perfect correlation).

- Fifty-four facilities provided data for both compost tonnage and the number of meals served in 2014. The median value was 0.11 pounds composted per meal served. The top performers distinguished themselves by composting between 0.41 and 1.29 pounds per meal.
- While composting per FTE does not appear to be the metric with the best correlation, it did increase significantly (by more than six lbs.) per FTE per year as compared to 2013 data.

TABLE 10: NORMALIZED COMPOSTING METRICS

Normalized Composting Metrics	All
Annual pounds of composting per meal served	**0.11**
Annual pounds of composting per FTE	**0.09**
Annual pounds of composting per square foot	**36.40**

Food Purchasing

The majority of hospital food service programs used to be self-operated, but that balance is shifting, as hospitals zero in on perceived opportunities to standardize, build economies of scale, and identify new revenue sources. Today, 57.7 percent of award-winning hospitals are outsourcing their food services departments. When hospitals/health systems choose to outsource their food service operations, it is imperative to consider what the hospital's priorities are for sustainable food systems and build these expectations into the RFP or contract language so the vendor can be held accountable. As more hospitals begin to track sustainable food metrics for Practice Greenhealth awards, the Healthier Hospitals program or other sustainability reporting, it is important to ensure contractors are aware of these tracking expectations early in the roll-out process or during contract renegotiation. The percentage of award-winning hospitals that included sustainable attributes in their RFP or contract language continues to rise this year to 57.9 percent of award-winning hospitals.

TABLE 11. OUTSOURCED FOOD SERVICES

Outsourced Food Services	All	Small	Large	Top 25	Your Data
Outsource its food services department or management	**57.7**	53.4	61.0	36.0	
Developed and implemented a policy, contract and/or RFP language that includes local/sustainable food purchasing and other environmental stewardship goals with food vendors	**57.9**	49.0	65.4	72.0	

Whether a hospital uses self-op or outsourced food services, one theme is consistent: healthier food systems and eating patterns are critical to population health and wellness. Health care organizations should also have an expectation that their food services partner will draw on innovation from other sites and will build lasting partnerships with local and sustainable food producers and distributors. Practice Greenhealth predicts that the focus on sustainable food systems will be transformative in the next few years—with health care systems leading the charge.

Environmentally Preferable Purchasing

With an annual spend of over $200 billion, the health care sector has an opportunity to leverage its purchasing power to drive the market for environmentally preferable products that better protect human health and the environment. Environmentally preferable purchasing (EPP) involves identifying products and services that avoid chemicals of concern, generate less waste, use less energy or water—to name a few. In many instances, selecting these products can actually help the organization reduce costs and increase operational efficiency.

By including procurement as part of a sustainability strategy, hospitals and health systems can reduce impacts in product use as well as impacts from raw material extraction, production, manufacturing and distribution. According to the U.S. General Services Agency (GSA), the supply chain impacts of their goods and services purchased creates a carbon footprint nine times that of their operational impacts of their building and fleet combined.[1] Health care organizations are taking steps to purchase products and services that minimize the lifecycle impacts and improves environmental and human health.

Highlights

- More than 90 percent of award-winning hospitals have engaged with their supply chain leadership around sustainability.
- 76.5 percent of award winners have reviewed upcoming contracts to identify EPP opportunities or savings.
- Nearly 72 percent have an EPP policy and /or procedural manual that identifies specific environmental attributes of concern.

1 SPLC Guidance for Leadership in Sustainable Purchasing, V1.0, Feb 2015, pg 6.

Getting supply chain leadership interested and engaged in sustainability can be one of biggest challenges, especially given the perception that environmentally preferable products cost more and many in supply chain are being asked to drive down costs for the organization. The good news is that these conversations are happening, and supply chain leaders are now some of the biggest champions of this work in leading organizations. Table 1 presents data on the infrastructure for EPP among the 2015 award winners. More than 90 percent of hospitals have now engaged their supply chain on EPP. More than 75 percent of the leaders in the Top 25 have signed the EPP pledge, with 88 percent encoding that commitment in policy, demonstrating that a commitment to sustainable purchasing is imperative in order to achieve Top 25 status.

TABLE 1. INFRASTRUCTURE FOR EPP

Infrastructure for EPP	All	Small	Large	Top 25	Your Data
Has the facility engaged supply chain leadership in sustainability activities?	**90.8**	89.3	93.3	96.0	
Has the facility signed Practice Greenhealth's Environmentally Preferable Purchasing (EPP) Pledge?	**48.8**	49.0	53.4	76.0	
Does the facility have an EPP policy and /or procedural manual that identifies specific environmental attributes of concern to be considered when making purchasing decisions?	**71.8**	79.4	66.7	88.0	
Does the facility have an EPP policy or procedural manual that considers specific environmental attributes of concern during purchasing decisions?	**68.5**	73.8	63.8	96.0	

Nearly 72 percent of award winners reported having an EPP policy. Table 2 below highlights which environmental attributes are included in EPP policies—with the most prevalent environmental considerations at the top of the table. Avoiding chemicals of concern and energy efficiency appear to be the highest priorities, with waste and water considerations following closely.

TABLE 2: EPP ENVIRONMENTAL CONSIDERATIONS

Attribute	All	Small	Large	Top 25	Your Data
Avoiding chemicals of concern	**88.9**	88.9	89.7	100.0	
Energy efficiency	**84.3**	84.0	85.3	90.9	
Recyclability	**77.8**	75.3	82.4	90.9	
Waste minimization	**76.5**	72.8	80.9	90.9	
Water efficiency	**75.2**	75.3	75.0	77.3	
Recycled content of product	**75.2**	72.8	79.4	86.4	
Excessive packaging	**69.3**	61.7	79.4	90.9	
Whether the product becomes or generates hazardous waste	**64.7**	63.0	67.7	68.2	
Reusable (vs. single-use) products	**62.8**	64.2	63.2	72.7	
Green building products	**66.0**	65.4	67.7	72.7	
End of life product management (such as take-back programs)	**60.8**	58.0	66.2	77.3	
Other	**19.6**	21.0	19.1	18.2	

BETH ISRAEL DEACONESS

Through its EPEAT purchasing initiatives, Beth Israel Deaconess Medical Center (BIDMC) buys products from Dell, HP and Lenovo—all suppliers who have been proactive in the EPEAT certification process. The hospital has been aware of EPEAT for many years, and as EPEAT gained momentum, they selected EPEAT-registered products as well as ENERGY STAR certified. EPEAT registration and ENERGY STAR qualifications are included in manufacturer specifications, which are identified by the IS department purchasing team. BIDMC's Desktop Hardware Standards now include these environmental certifications.

Contracting for Environmentally Preferable Products

In order to transform the market for health care products to safer, more environmentally preferable products, suppliers and group purchasing organizations (GPOs) need to see that there is demand for these products. Practice Greenhealth has been working with its member hospitals in a range of ways to help them connect with suppliers and GPOs and communicate their desire for increasing the availability of cost-effective, environmentally preferable products. More than 88 percent of all award-winning hospitals have reached out to their GPO to communicate their support for environmentally preferable products, up from 82.5 percent in 2013. More than 75 percent of hospitals actively reviewed their upcoming contracts to assess EPP opportunities and 80.8 percent set EPP priorities in 2014. Across the board, hospitals made improvements in building EPP considerations into their purchasing decision-making structure.

TABLE 3. CONTRACTING FOR ENVIRONMENTALLY PREFERABLE PRODUCTS

Contracting For Environmentally Preferable Products	All	Small	Large	Top 25	Your Data
Has the facility communicated with their GPO regarding support for environmentally preferable products?	**88.6**	84.2	93.2	100.0	
Has the facility reviewed upcoming contracts (that will expire or be renewed in the next 6 -12 months) to identify EPP opportunities or savings?	**76.5**	75.2	77.2	92.0	
Has the facility set priorities for purchasing environmentally preferable products?	**80.8**	78.4	82.5	96.0	
Does the facility have a process to include environmental specifications or RFP questions in bids or utilize GPO-provided environmental information?	**71.4**	67.6	75.2	96.0	
Has the facility specified in contract templates and other supplier outreach materials the organization's commitment to EPP?	**58.2**	56.4	60.8	72.0	
Does the facility track and report metrics regarding green spend (what is spent for environmentally preferable products)?	**58.7**	54.9	61.8	84.0	
Has the facility introduced supply chain staff to the Standardized Environmental Questions for Medical Products?	**54.0**	51.0	56.3	72.0	

While hospitals have done well at beginning the dialogue with suppliers and GPOs, there is still opportunity to really build EPP into the way hospitals purchase supplies. Utilization of the Standardized Environmental Questions for Medical Products and better integration of EPP attributes in contract language are both important elements in driving suppliers to offer more sustainable products and services. When it comes to tracking spend for more sustainable products, hospitals are beginning this complex process. There are hosts of complicating factors, which can include availability of the data from the supplier or GPO, availability of the data at the individual hospital level versus the system level, and the tracking of spend on products with certain attributes (such as avoided chemicals like PVC) where those products are not currently labeled or differentiated in existing electronic purchasing systems. Complexities aside, a growing number of hospitals are interested in tracking green spend and are working alongside Practice Greenhealth to help sort through the best strategies for accessing this information.

One of the questions tracking EPP spend on the application refers to hospitals' spending on EPEAT-registered electronics. EPEAT is a third-party certifier who evaluates electronic products for environmental attributes during their lifecycle. EPEAT spending was down by about nine percent for computers and monitors, but nearly doubled in the category of imaging equipment and more than doubled in the purchase of EPEAT-registered televisions.

TABLE 4. EPEAT CATEGORY

EPEAT Category	2014	2015
Computers, monitors and laptops	$102,321,811	$90,062,526
Imaging equipment	$5,480,230	$10,273,698
Televisions	$384,120	$1,000,232
Total	**$108,186,161**	**$101,336,456**

HARBORVIEW MEDICAL CENTER

Harborview Medical Center is in the process of switching to paper towels and toilet tissue that are made with recycled fiber. In 2014, 51 percent of the total spend for janitorial paper products was for items made with recycled fiber. Products made with 100 percent recycled fiber represented 46 percent of the total spend.

Purchasing Across Sustainability Categories

While this chapter of the report covers policies, priorities and strategies related to EPP, purchasing is an integral component in the success of almost every other sustainability focus area. The purchasing of environmentally products and services is the heart of any environmental stewardship commitment—a focus on making purchases that will not negatively impact human or environmental health. Table 5 highlights questions from across the different sustainability categories that demonstrate this dependency on purchasing.

TABLE 5: PURCHASING ACROSS SUSTAINABILITY CATEGORIES

Category	Purchasing-Related Question	All	Small	Large	Top 25
Waste	Has this facility implemented a reusable sharps container program?	**84.5**	81.6	87.6	80.0
Waste	Does your facility re-purchase (buy back) and use reprocessed single use medical devices (SUDs) from an FDA-approved, third-party reprocessor?	**77.5**	72.5	82.7	95.8
Waste	Has the facility established a contract with a certified electronics waste recycling vendor that is certified to e-Stewards for legal and environmentally responsible electronic (or e-waste) management and recycling?	**93.0**	95.0	91.0	100.0
Chemicals	Does the facility have chemical or purchasing policies that identify specific chemicals of concern to human health and the environment?	**81.6**	83.2	83.8	96.0
Chemicals	Does the facility use Green Seal or UL/ECOLOGO certified cleaners	**89.9**	91.0	90.5	100.0
Chemicals	Does the facility use a pest control company that is third-party certified as an integrated pest management (IPM) provider?	**60.3**	58.0	62.1	75.0
Chemicals	Does the facility purchase DEHP-free products in the NICU?	**70.4**	55.2	84.2	87.0
Chemicals	Does this facility have a furniture standard that requires an environmental certification or LEED HC credit?	**50.9**	39.6	61.0	84.0
Food	Does the facility purchase meat and poultry produced without the routine use of antibiotics?	**51.4**	55.0	54.0	119.0
Food	Has the facility increased healthy beverage options in at least three of the following: cafeteria/retail, patient, vending and catering?	**87.6**	81.2	93.3	100.0
Food	Has the facility purchased locally and/or sustainably grown and produced foods?	**83.1**	75.7	89.4	96.0
Food	Does the facility purchase certified commercially compostable food service ware (such as certified by Biodegradable Products Institute (BPI) where single-use/disposable items are necessary)?	**53.6**	44.7	63.8	76.0
Energy	Does the facility generate or purchase renewable energy?	**30.6**	25.2	35.6	56.0
Energy	Does the facility purchase energy-efficient equipment that is ENERGY STAR or EPEAT certified (where applicable)?	**86.1**	82.5	91.3	100.0
Water	Does the facility utilize US EPA WaterSense criteria during the procurement of water using devices/equipment?	**33.8**	29.7	37.0	56.0
Climate	Does the facility purchase alternative-fueled vehicles for transportation purposes?	**32.9**	27.7	33.7	48.0
Climate	Does your facility purchase low-emitting and fuel-efficient vehicles for fleet transportation?	**34.1**	28.4	37.6	56.0
Green Building	Has the organization integrated any green/sustainable aspects into master specifications for all new buildings/renovations?	**63.4**	59.8	66.0	84.0
Green Building	Does the organization require its designers, builders and contractors to have experience with LEED or other green building rating systems?		61.0	58.0	18.0
Green Building	Has the organization added language to contract specifications that building contractors will follow LEED or GGHC requirements and provide documentation?	**50.9**	50.0	50.0	68.0
Green Building	Has the facility consciously selected flooring, wall coverings, paints, materials, finishes, furniture or exterior materials that avoid chemicals of concern?	**83.4**	82.5	84.6	96.0

Aggregating the voice of health care facilities around specific EPP priorities is an effective communication tool to increase availability of cost-effective and environmentally preferable products. For example, several health care organizations announced in 2014 their concern about the presence of flame retardants in furniture and their intent to no longer purchase furniture containing these chemicals.[2] Setting specific priorities like this sends a clear market signal.

In the 2015 awards cycle, 34.5 percent of hospitals reported they were spending more than 25 percent of their spend on freestanding furniture and medical furnishings made without certain chemicals of concern. The chemicals include: the intentional use of halogenated flame retardants, formaldehyde, perfluorinated compounds, and PVC (also known as vinyl).

> *"Furniture" is defined as any fixtures, such as seating, desks/workstations/systems furniture, tables, storage units, shelving, casework, and literature racks, purchased as a free standing or modular unit, regardless of where the assembly takes place.*
>
> *"Medical furnishings" include mattresses, foams, panel fabrics, cubicle curtains, window coverings, and other textiles.*

The electronic components of furniture are exempt. Learn more about the Healthier Interiors Challenge of Practice Greenhealth's Healthier Hospitals program.

Energy

The health care sector utilizes huge amounts of energy in providing U.S. health care—and is the second largest commercial user of energy in the United States. Likewise, it is a significant source of greenhouse gas emissions, estimated at eight percent of U.S. totals. With its strict air change, temperature, pressure and humidification requirements, it is not surprising that health care uses a significant amount of energy. And that doesn't take into account all of the major diagnostic equipment—like MRIs and CAT scans that produce heat while also utilizing energy. U.S. hospitals use considerably more energy than their European counterparts—without significantly better outcomes to justify that excess energy use.

Energy from coal-fired power plants—the dominant source of electricity in the U.S.—are a primary contributor to respiratory disease, asthma and premature death. And with the growing focus on population health and the prevention (rather than treatment) of disease, hospitals cannot afford to ignore the obvious linkages between the burning of fossil fuels and the corresponding health impacts. Energy reduction has become an expectation for many hospitals. Not only can it drive down environmental impact, it can also generate considerable ongoing cost savings with a short payback period. Many large organizations have begun to hire energy managers—in addition to hiring a sustainability leader. Hospital administrators are also now seeing weather-normalized energy use intensity (EUI) make its way onto the executive dashboard. Hospitals continue to make strong (if gradual) progress on the energy front.

Highlights

- Award-winning hospitals used over 51 billion kBtus but reduced energy through efficiency projects totaling over 1.35 billion kBtus in this awards cycle, achieving a 2.6 percent reduction in aggregate.
- Award-winning hospitals saved $22.1 million from energy reduction projects.
- Despite good energy savings data, the median energy use intensity for award winners rose from 233 to 237 kBtus per ft^2 in 2014.

Table 1 highlights the overarching energy use and savings achieved by the 2015 award-winning hospitals.

TABLE 1: ENERGY USE AND SAVINGS

Energy Use and Savings	2014 All Winners
Consumption	
Total energy use (sum of all facilities)	**47,195,538,523 kBtus**
Median energy use intensity (EDI)	**237 kBtus/ft²**
Savings	
Total energy saved (through energy efficiency projects)	**1,349,422,207 kBtus**
Total energy savings (through energy efficiency projects)	**$22,106,321**

Median energy use intensity (EUI) for award-winning hospitals went up in 2014, from a median of 231 to 237 kBtus/ft². It is important to note that this value is not weather-normalized, and likely reflects some of the intensity of the past winter. Cost savings from energy reduction projects fell slightly. At the same time, reported energy reductions increased by 35.4 percent in 2014 from 871 million kBtus saved in 2013 to 1.35 billion kBtus saved. While some of this increase is likely attributable to better reporting of energy projects, it still demonstrates impressive progress.

Table 2 lays out the percent of energy reduction from baseline year and the percent reduction from the previous year for award-winning hospitals. Reduction from baseline is up this year from 0.7 percent to 2.6 percent. The Top 25 hospitals again demonstrated their leadership, nearly doubling the energy reduction of the larger data set from both baseline and previous year. And the top performers reduced their energy by more than 18 percent from baseline year.

TABLE 2: CHANGE IN ENERGY USE INTENSITY (EUI)

Change in Energy Use Intensity	All	Small	Large	Top 25	90th %
Change in EUI from baseline year	**2.60%**	3.10%	2.60%	4.30%	18.10%
Change in EUI from previous year	**0.10%**	-0.40%	1.00%	1.50%	13.40%

GUNDERSEN HEALTH SYSTEM

As a health system, Gundersen first achieved Energy Independence (producing more clean energy than consumed from fossil fuels) on October 14, 2014. This journey took six years, beginning in 2008, with intensive energy efficiency audits and projects followed by the development of a comprehensive renewable energy portfolio which includes both onsite and offsite production. These sources include solar photovoltaics, solar thermal, two commercial wind turbine projects, biomass combined heat and power (CHP), landfill gas CHP, geothermal heat pump, and two dairy manure digester biogas projects. Not only does this portfolio of projects make the environment more sustainable, it reduces emissions and improves health in the region, while making health care more affordable to their patients and boosting the local economy.

Normalized Energy Use

Because energy use can vary so radically depending on the size or patient volume of the building, we typically discuss energy using normalized data. Energy use intensity (EUI) or energy use (in kBtus) per square foot is the most common metric utilized for tracking energy use—followed closely by weather-normalized EUI. Practice Greenhealth also highlights how energy can be evaluated using patient volumes such as adjusted patient day (APD) or patient day. While APDs and patient days tend to not correlate with energy use very well (they showed the least correlation out of the five normalizers selected), many hospitals continue to use this metric. Table 3 highlights the best indicators for energy performance in the 2015 awards cycle, starting with highest correlation.

TABLE 3: NORMALIZED ENERGY USE

Normalized Energy Use	All	Small	Large	Your Data
Total kBtus per square foot[1]	237	248	233	
Total kBtus per OR	12,456,484	11,416,820	13,544,678	
Total kBtus per FTE	101,995	112,258	95,081	
Total kBtus per APD	1,512	1,595	1,454	
Total kBtus per patient day	3,127	3,846	2,708	

[1] Total kBtus per square foot of gross floor area, same definition used by ENERGY STAR Portfolio Manager.

Regression analysis of the energy data showed that square footage can explain 94 percent of the variation in energy use between hospitals—making it the best indicator by far.

Energy Benchmarking

Practice Greenhealth uses a range of benchmark comparisons to demonstrate the progress of award-winning hospitals on the energy front. Many hospitals utilize ENERGY STAR Portfolio Manager to benchmark energy usage. Award-winning hospitals reported the following involvement in ENERGY STAR.

TABLE 4: ENERGY STAR PARTICIPATION

ENERGY STAR Participation	All	Small	Large	Top 25	Your Data
Does the facility use ENERGY STAR Portfolio Manager?	**68.9**	66.0	71.2	76.0	
Has the facility benchmarked your hospital using ENERGY STAR's Portfolio Manager?	**74.8**	78.6	74.8	92.0	
What is the median ENERGY STAR score?	**46.0**	43.0	50.0	43.0	

There was a significant increase in the number of award-winning hospitals using ENERGY STAR Portfolio Manager in 2014—up 16 percent from 52.9 percent in 2013. Award winners reported that 74.8 percent had benchmarked their energy use in Portfolio Manager. And ENERGY STAR scores rose slightly in 2014. Many health systems are now outsourcing their utility bill management and tracking component to outside companies who are responsible for populating both Portfolio Manager and other utility dashboards at the system level. In order to really utilize energy benchmarking effectively, it needs to be monitored monthly and weather-normalized, so that any spikes in energy use can be identified and correlated with other activity at the institution—to prevent future spikes. It is also important to compare energy performance year-to-year in the same month, when weather patterns are similar.

Energy Benchmarking by Building Size

The U.S. Energy Information Administration collects energy information from commercial buildings every five years through its Commercial Buildings Energy Consumption Survey—better known as CBECS. At the time of publication, the CBECS data for 2012 was still unavailable (due out Winter of 2016). But a comparison to CBECS data from its 2007 survey shows award-winning hospitals are making great progress in driving down energy use.

TABLE 5: ENERGY USE INTENSITY

Energy Use Intensity (kBtus/ft^2)	CBECS 2007 EUI (average)	2015 Award Winners (median)
Hospitals with <100,000 ft^2	N/A[1]	198.3
Hospitals with 100,001- 200,000 ft^2	N/A[1]	276.1
All large hospitals[2]	234.1	235.5
Hospitals with 200,001-500,000 ft^2	270.1	249.7
Hospitals with 500,000- 1,000,000 ft^2	233.4	227.2
Hospitals with > 1,000,000 ft^2	212.8	230.6

1) CBECs only includes hospitals with over 200,000 ft^2 of gross floor area.
2) All large hospitals with >200,000ft^2
3) 2015 is the awards cycle year. Data is from 2014.

Award-winning hospitals performed better than the CBECS data set in every category except those facilities over one million square feet. Table 6 provides a more detailed set of metrics based on facility size.

ADVOCATE CHRIST MEDICAL CENTER

Advocate Christ Medical Center currently has a new bed tower under construction. All major equipment purchases are determined using a full life cycle cost analysis. The energy consumption/cost is a significant part of this analysis and often results in more expensive yet more efficient equipment being selected. In 2014 new chillers were designed and all decisions on the equipment selections were based on a total life cycle cost and not simply first cost. This resulted in purchasing more expensive chillers in terms of first cost but it resulted in a better IRR. Other purchasing decisions included low pressure drop air handling units, LED lighting, and a range of other energy efficient decisions.

TABLE 6: ENERGY METRICS FOR 2015 AWARD WINNERS

Energy Metrics for 2014 Award Winners (Median)	Energy Use Intensity (kBtus/ft²)	ENERGY STAR Score	Percent Change in EUI from Baseline	Percent Change in EUI from Previous	% Onsite Renewable Energy	% Offsite Renewable Energy
All hospitals	237.0	46	2.6%	-1.4%	1.2%	4.6%
Hospitals with <100,000 ft²	198.3	33	10.7%	8.3%	N/A[1]	N/A[2]
Hospitals with 100,001-200,000 ft²	276.1	45	-3.3%	0.1%	N/A	4.6%
Hospitals with 200,001-500,000 ft²	249.7	47	3.7%	-1.1%	14.3%	4.0%
Hospitals with 500,000-1,000,000 ft²	227.3	37	0.2%	0.1%	1.8%	5.5%
Hospitals with > 1,000,000 ft²	230.6	50	3.4%	0.9%	15.2%	4.4%

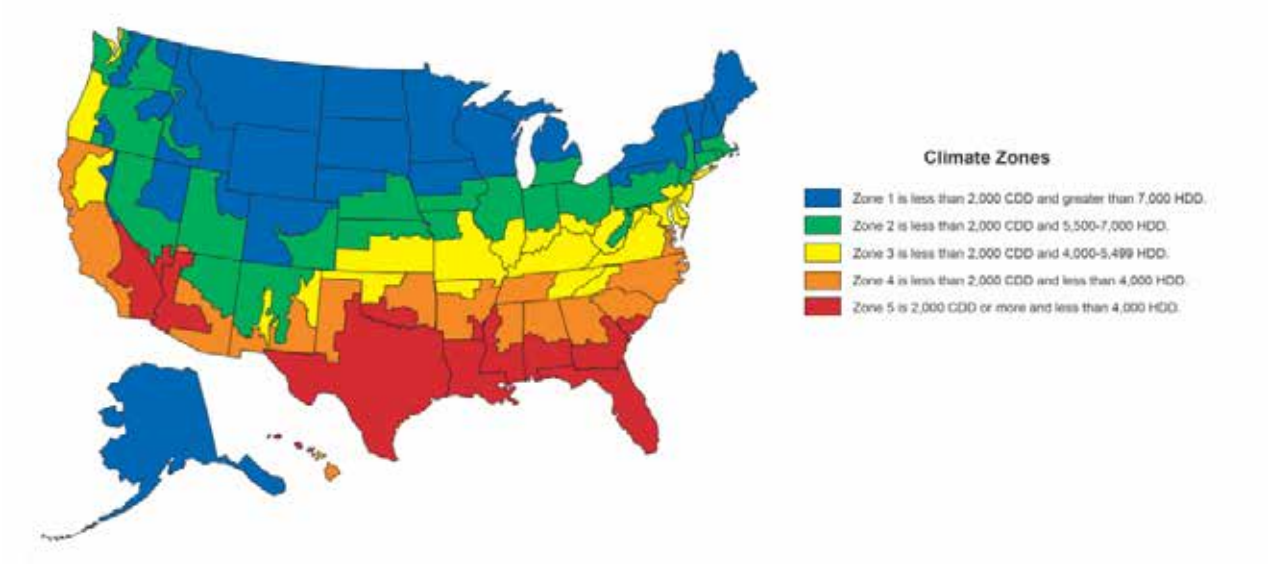
1) No hospitals in the data set had onsite renewable energy.

2) No hospitals in the data set had offsite renewable energy.

Energy Benchmarking by Climate Zone

Another way to compare the awards data set is look at energy use as a function of geographic location and climate. CBECS designates five different climate zones—related to the number of heating degree days (HDD) and cooling degree days (CDD), a measure of when the temperature is above or below 65 degrees Fahrenheit and the building must be either heated or cooled to achieve a 65 degree temperature. Figure 1 illustrates the U.S. climate zones for CBECS.

FIGURE 1: ENERGY USE AND COST BY TEMPERATURE ZONES: CBECS, 2003

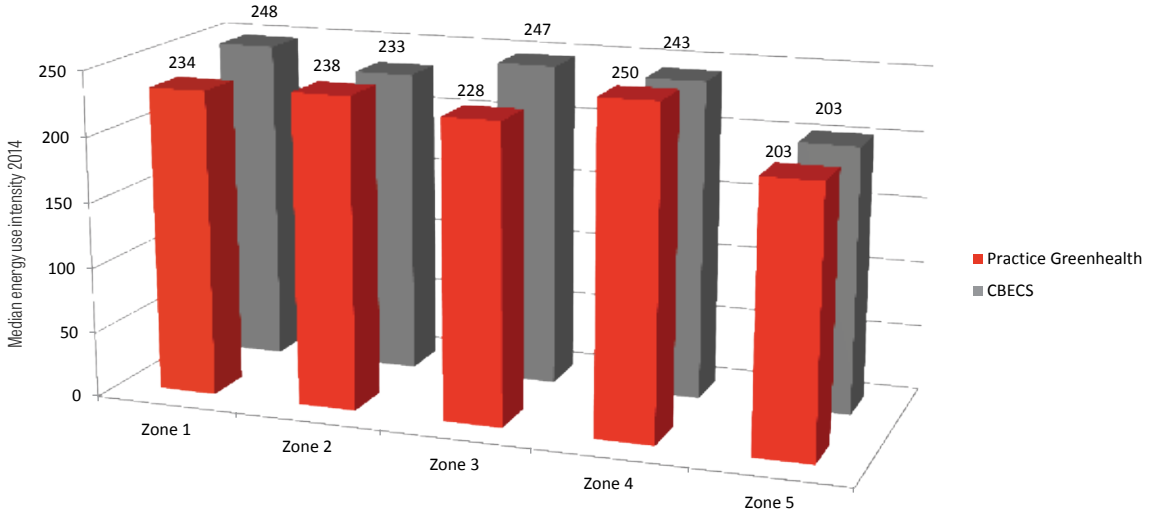


Each building in the CBECS is assigned a CBECS climate zone based on the 30-year average (1971-2000) HDD and CDD (base 65 degrees Fahrenheit) for the NOAA climate division in which the weather station closest to the sampled building is located. For more information on climate zones see: http://www.eia.gov/consumption/commercial/census-maps.cfm#defined.

TABLE 7: CLIMATE ZONES

Climate Zone	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
Cooling degree days	<2,000	<2,000	<2,000	<2,000	>2,000
Heating degree days	>7,000	5,500 to 7,000	4,000 to 5,499	<4,000	<4,000
Climate Zone	**Zone 1**	**Zone 2**	**Zone 3**	**Zone 4**	**Zone 5**
Number of hospitals in each zone reporting data	48	77	46	28	9
Median energy use intensity 2014	234	238	228	250	203
% kBtus saved (from baseline)	1.85	3.50	2.15	-0.40	1.70

FIGURE 2: WEATHER-NORMALIZED EUI



With the severe winters the northeast has seen in the past few years, the most useful energy metric may be one that Practice Greenhealth does not yet compute for its award winners—weather-normalized EUI. This metric takes into account the number of heating and cooling degree days in a particular region that year and adjusts the EUI accordingly. Practice Greenhealth is looking into the most effective way to assist hospitals in tracking this metric in the 2016 awards year.

Renewable Energy Use

The push for renewable energy is increasing in U.S. hospitals. Conventional fossil-fuel based energy production generates a myriad of pollutants that negatively impact health—causing asthma and respiratory disease and a range of other health impacts. The burning of fossil fuels—such as coal for electricity use—is also a major contributor to the greenhouse gas emissions driving climate change, which brings in another set of health concerns including a rise in infectious disease, vector-borne illnesses, allergies, asthma, heat waves and food shortages. Increasing concerns about resiliency, emergency preparedness and severe weather events is another driving factor. Health care organizations trying to operate in alignment with their mission to first do no harm are exploring new ways to generate alternative energy sources in a fossil fuel-based economy.

For the fourth year, Practice Greenhealth presents data on renewable energy use by award-winning hospitals:

- Nearly 31 percent of award-winning hospitals reported purchasing or generating renewable energy as some portion of their energy portfolio in 2014.
- More than six percent of hospitals reported putting a combined heat and power/cogeneration project in place.

In some areas of the country, offsite renewable energy options are a lot more plentiful—such as low-impact hydropower in the northwest or wind power on the east coast. Purchased renewable energy (offsite) is an entry-level way for hospitals to start mitigating their greenhouse gas impact. The next step is to start exploring opportunities to generate a portion of the facility's energy onsite—moving toward eventual energy independence. Hospitals are approaching this through both power purchase agreements—where energy providers build out onsite renewables and hospitals buy back that power, or through the funding of new technologies such as ground source heat pumps or cogeneration. Table 8 highlights renewable energy use at award-winning hospitals in 2014.

TABLE 8: MEDIAN RENEWABLE ENERGY USE

Median Renewable Energy Use 2014	All	Small	Large	Top 25	Your Data
Onsite renewable energy (as a percent of total energy use)	**2.8**	3.7	3.4	7.7	
Offsite renewable energy (as a percent of total energy use)	**4.6**	3.6	5.0	7.9	
Total renewable energy use (as a percent of total energy use)	**4.6**	3.8	4.6	10.3	

Onsite renewable energy is going up slowly in award-winning hospitals, with slight increases (two to three percentage points) across the board. Onsite energy use fell slightly for Top 25 hospitals, likely a reflection of different hospitals achieving the honor in 2015 rather than any real decrease in renewable energy use. The purchase of offsite renewable energy stayed constant in 2014. Table 9 demonstrates that an increasing number of award-winning hospitals are purchasing some kind of renewable energy within their energy portfolios, with 21 additional hospitals reporting some renewable energy use in 2014.

TABLE 9: RENEWABLE ENERGY USE BY ENERGY TYPE

Type of Alternative Energy	Number of Facilities Reporting Onsite Renewable Energy	Number of Facilities Reporting Offsite Renewable Energy or Purchasing RECs	Total Number of Facilities Reporting Renewable Energy
Solar	12	1	**12**
Photovoltaic	11	1	**12**
Wind	1	30	**26**
Geothermal	1	0	**1**
Biomass	1	2	**3**
Biogas	1	3	**4**
Low-impact hydropower	2	8	**9**
Total	**29**	**45**	**67**

Energy Efficiency Planning and Strategy

While benchmarking is important—especially comparing to one's own baseline, focusing on how to achieve reductions is top priority. In the current health care environment, any mechanism to reduce cost is appreciated—especially when it does not involve cutting a service line or reducing staff. Energy reduction can provide long-term operational savings that benefit the bottom line. Table 10 highlights the components hospitals are using to plan for energy efficiency measures. Audits, retrocommissioning and submeters are all mechanisms to establish where energy use is outside of expected ranges—so that the facility can optimize.

Consistently, the Top 25 winners show an elevated aptitude for energy conservation—owing in part to committed leadership, and often—a sustainability director or energy manager who is taking the lead on energy. In general, larger hospitals have made more progress on energy efficiency than smaller hospitals, likely also related to dedicated leadership or availability of funding. Retrocommissioning remains an area of huge opportunity for hospitals in identifying potential inefficiencies. Both energy audits and retrocommissioning are foundational steps in any energy management plan.

TABLE 10: ENERGY EFFICIENCY PLANNING AND STRATEGY

Energy Efficiency Planning and Strategy	All	Small	Large	Top 25	Your Data
Does the facility have a written plan to reduce energy use over time with timelines and goals?	**62.4**	60.2	63.5	84.0	
Does the facility have a strategic energy master plan (SEMP)?	**33.0**	34.0	30.1	52.0	
Did the facility conduct a baseline energy audit for the institution in the past five years?	**70.5**	66.0	73.1	80.0	
Has the facility engaged a retrocommissioning firm to optimize building performance?	**50.5**	48.5	51.0	72.0	
Does the facility utilize submeters to better monitor energy efficiency opportunities?	**25.1**	16.5	31.1	48.0	

Earth day efforts at Coral Gables Hospital's encourage staff to turn the lights off

Energy Efficiency in Information Technology

In addition to using electricity through plug load, information technology (IT) also generates a significant amount of heat that requires special space cooling to ensure its proper functioning. There are a number of energy efficiency measures aimed specifically at reducing plug load and creating more sustainable data centers. A growing number of hospitals are working with the IT department to explore these programs. Just over 30 percent of award-winning hospitals had onsite data centers in 2014—with large hospitals topping small hospitals by more than a two-to-one margin. Virtual servers, power PC management and the purchase of more energy-efficient equipment are all proven strategies. Table 11 identifies the strategies that award winners are using to drive down energy usage from information technology.

TABLE 11: ENERGY EFFICIENCY IN INFORMATION TECHNOLOGY

Energy Efficiency in Information Technology 2014	All	Small	Large	Top 25	Your Data
Does the facility have an onsite data center that requires a constant power load of 75 kW or more?	**30.2**	18.0	40.8	48.0	
Has the facility collaborated with the information technology (IT) department to integrate energy efficiency measures?	**59.7**	54.9	63.5	76.0	
Does the facility purchase energy-efficient equipment that is ENERGY STAR labeled or EPEAT registered (where applicable)?	**86.1**	82.5	91.3	100.0	

In 2014, there was a three to five percent increase in the percentage of facilities collaborating with IT on energy reduction measures and sustainable programs. There was also a six to 10 percent increase in the percentage of hospitals utilizing ENERGY STAR labeled or EPEAT-registered equipment—with the largest gains in large hospitals. One hundred percent of the Top 25 had made these third-party certifications a priority in IT purchasing or leasing decisions.

Energy Efficiency Savings

Hospital award winners reported savings of 1,349,422,207 kBtus in 2014 from energy efficiency projects implemented in the last two years. These projects totaled more than $22 million in cost-savings for hospitals in the data set. While impressive, there remains a significant opportunity for hospitals and health systems to address energy conservation more methodically. Benchmarking is key. And the ability to create and a compelling business case for these kinds of investments is critical. Starting with low-cost and no-cost energy conservation measures has been a smart strategy for many hospitals—as it can build momentum and demonstrate results. This can increase the level of support for larger projects that may require additional investment.

BON SECOURS BALTIMORE HEALTH SYSTEM

Energy reduction has been a big focus at Bon Secours Baltimore Health System. The year 2014 included projects estimated to reduce their energy footprint by over 18 percent. Projects included a cooling tower replacement and plate and frame heat exchanger installation project that is estimated to provide an annual reduction in consumption of 782,175 kWhs—equivalent to 8.7 percent of their total energy use. A retrocommissioning project of their main AHU included installation of VFDs on the return fans, and is estimated to provide 870,255 kWhs of reduction in consumption and an annual savings of 9.6 percent of their total energy use.

Water

Water is a critical natural resource and challenges continue to grow. A 2013 survey by the Government Accountability Office (GAO) highlighted that California is not alone in its water challenges. Forty of 50 states expect water shortages in the next ten years[1]. Despite impending water shortages, water is undervalued as a commodity and is underpriced—making the financial case for water infrastructure improvements challenging. In a health care setting, water is imperative for everything from environmental surface cleaning to handwashing to sterilizers for medical equipment—all of which protect patients from dangerous and deadly pathogens. The opportunities for water reduction in health care are plentiful. The data below highlights how award-winning hospitals are making inroads, but much opportunity for improvement still exists.

Because water is a fundamental determinant of health and because climate change brings with it the very real potential for severe droughts and water shortages in the years ahead, health care needs to consider water reduction a priority. Sustainability is not just about environmental stewardship—it is also about resiliency and disaster preparedness in the face of unknown future risks. The water data from Practice Greenhealth continues to highlight how few hospitals have made significant gains in this area:

- The percent of award-winning hospitals with a written plan to reduce water use increased by twelve percent in 2014 to 24.8 percent.
- Only 29.9 percent of award-winning hospitals had conducted a water audit.
- While 45.5 percent of award winners benchmark water usage—only 40.9 percent were able to share any water reduction project data at all.

1 Government Accountability Office (GAO). Freshwater: Supply concerns continue, and uncertainties complicate planning. GAO Report: GAO-14-430. May 2014. Available at: http://www.gao.gov/assets/670/663343.pdf.

The good news is that there is still a lot of progress to celebrate. Award-winning hospitals have continued to make incremental but steady progress on water reduction—achieving a five percent reduction over last year.

TABLE 1: WATER USE

Water Use and Savings	2014 All Winners
Consumption	
Total water use (sum of all facilities)	7.7 billion gallons
Median water use intensity	42.9 gallons per square foot (5 percent reduction since last year)
Savings	
Total water saved (through conservation projects)	145,073,693 gallons
Total water savings (through conservation projects)	$1,938,432

While hospitals reported less total water savings (via reduction projects) in 2014 (145 million gallons vs. 275 million gallons), cost savings from water projects increased by more than $800,000. This is likely a reflection of better tracking of associated cost savings in 2014. Water consumption statistics for this data set are presented in the following tables.

Highlights of the Data

- Square footage was again the best predictor of water consumption.
- Median annual water consumption improved by five percent from 45.3 gallons per square foot in 2013 to 42.9 gallons per square foot in 2014.
- Median annual water consumption improved from 57.6 to 47.9 gallons per cleanable square foot—a 17 percent improvement.
- Best performers (90th percentile) used 22.5 gallons per square foot or less.

Normalized Water Use

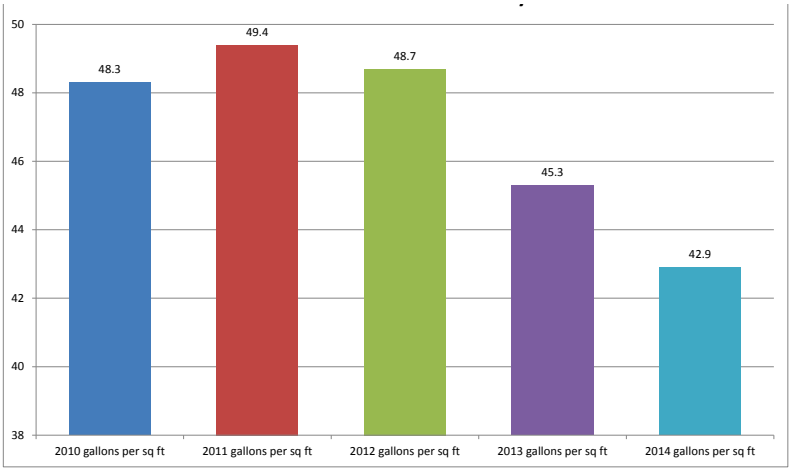
Practice Greenhealth uses several normalizers to compare water use in hospitals. Water-use intensity is typically measured in gallons per square foot and regression analysis shows that 79 percent of the variation in water use between sites can be explained by square footage—making it the most reliable normalizer. Practice Greenhealth also measures water use per cleanable square foot, which decreased this year from 58 to 47.9 gallons per cleanable square foot. Practice Greenhealth also encourages hospitals to correlate their water usage with a denominator associated with patient volumes such as adjusted patient day or patient day. While the correlation between patient volume and water usage is not strong, it can provide some guidance on how this number shifts year-to-year for your organization. Table 2 highlights the best median indicators for water performance in the 2015 awards cycle.

TABLE 2: WATER CONSUMPTION

Water Consumption	All	Small	Large	Top 25
Gallons per square foot	**42.9**	41.8	44.0	44.0
Gallons per cleanable square foot	**47.9**	44.4	53	52.3
Gallons per patient day	**559**	635	523	512
Gallons per OR	**2.2 mil.**	1.9 mil.	2.6 mil.	2.6 mil.
Gallons per APD	**282**	271	291	291

The median water performance for all hospitals improved for both gallons/ft^2 and gallons/cleanable ft^2, while the metrics for the Top 25 and large hospitals actually dropped slightly—demonstrating again that even the leaders have room for opportunity in the water arena. The reduction trend for award winners has been consistent, as shown by Figure 1.

FIGURE 1: MEDIAN WATER USE INTENSITY



Water Benchmarking by Building Size

The U.S. Energy Information Administration collects energy information from commercial buildings every five years through its Commercial Buildings Energy Consumption Survey—better known as CBECS. In 2007, for the first time, CBECS began collecting water data for large hospitals—those over 200,000 ft^2. At the time of publication, the CBECS data for 2012 was still unavailable. This report references CBECS' *Consumption Information for Large Hospitals*[2] which uses 2007 data and was published in August 2012. A comparison in Table 3 of award winners' water usage to CBECS data shows Practice Greenhealth award-winning hospitals consumed less water per square foot for every size category listed below. Practice Greenhealth hospitals bettered CBECS hospitals by a range of 32 to 38 percent and decreased water use slightly in every size facility in 2014.

2 CBECS. Water Consumption Information for Large Hospitals, 2007-Table H8. Aug 2012. Available at: http://www.eia.gov/consumption/commercial/reports/2007/xls/hospital/H8%20Water%20Consumption_v4.xls.

TABLE 3: WATER CONSUMPTION DATA BY HOSPITAL AREA

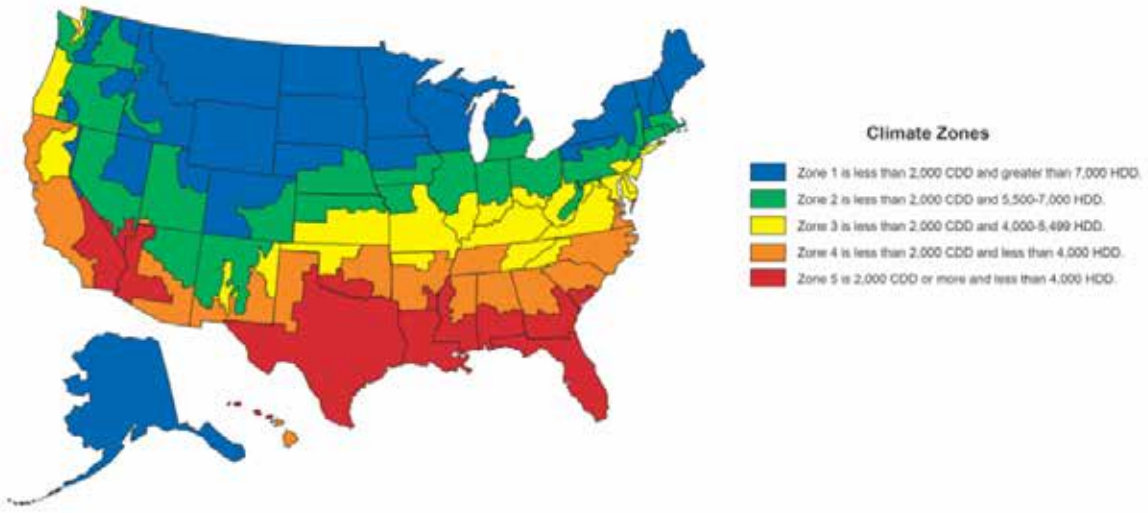
Gross Square Feet	Gallons Per Square Foot CBECS[1] (average)	Gallons Per Square Foot Practice Greenhealth (median)	% Less Consumption by Practice Greenhealth
<100,000	N/A [1]	36.6	--
100,001 to 200,000	N/A [1]	43.0	--
200,001 to 500,000	78.0	48.1	38.3%
501,000 to 1,000,000	69.1	43.6	36.9%
> 1,000,000	60.0	40.7	32.2%

CBECS only benchmarked for hospitals with >200,000 ft^2.

Water Benchmarking by Climate Zone

While size is one variable that may affect water consumption, geographic location also may have a strong affect. Another way to compare the awards data set is to look at water use as a function of geographic location and climate. Water consumption data was compared between Practice Greenhealth award-winning hospitals and CBECS data. CBECs designates five different climate zones—related to the number of heating and cooling-degree days, a measure of when the temperature is above or below 65 degrees Fahrenheit. Figure 2 illustrates the U.S. climate zones for CBECS.

FIGURE 2: ENERGY USE AND COST BY TEMPERATURE ZONES: CBECS, 2003



Each building in the CBECS is assigned a CBECS climate zone based on the 30-year average (1971-2000) HDD and CDD (base 65 degrees Fahrenheit) for the NOAA climate division in which the weather station closest to the sampled building is located. For more information on climate zones see: http://www.eia.gov/consumption/commercial/census-maps.cfm#defined

It should be noted that the CBECS data set (3,040 facilities) is much larger than the awards data set (220 hospitals) and includes data only for hospitals larger than 200,000 square feet. The Practice Greenhealth data set includes 27 hospitals with 200,000 square feet or less.

When compared to CBECS data by climate zones, Practice Greenhealth award-winning hospitals consumed less water per square foot in all five zones. Practice Greenhealth hospitals bettered CBECS hospitals by a range of 23 to 43 percent across all zones, demonstrating that a commitment to sustainability principles can significantly improve operational performance.

TABLE 4: WATER CONSUMPTION DATA BY CLIMATE ZONE

Climate Zone	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5
Practice Greenhealth gallons per square foot (gross floor area)	40.9	42.7	44.0	54.5	37.8
Hospitals in Practice Greenhealth data set by zone	44.0	70.0	42.0	28.0	8.0
CBECS[1] data set gallons per square foot	68.7	63.5	77.1	70.9	61.5
Hospitals in CBECS data set by zone	517.0	818.0	501.0	794.0	410.0
% Improvement over CBECS	40.5%	32.8%	42.9%	23.1%	38.5%

1) Table H8. Water Consumption Information for Large Hospitals, 2007, published August 2012

2) Note: Only five facilities reported in the Practice Greenhealth data set for Zone 5, making the data set too small to be statistically significant.

Water Reduction Planning and Strategy

The data in Table 5 represents basic actions taken by facilities to plan for and achieve water conservation. While water reduction efforts increased marginally, the efforts are still lacking in this critical category of sustainability. Water benchmarking is becoming more common practice. The Top 25 saw the biggest jump in benchmarking water usage. All hospitals committed to sustainability should begin by benchmarking water use and then zero in on opportunities that reduce the largest volumes of water for the least cost. Water audits and submetering are both key strategies in identifying water inefficiencies, and fundamental to developing a water reduction plan.

TABLE 5: WATER REDUCTION PLANNING AND STRATEGY

Water Reduction Planning and Strategy	All	Small	Large	Top 25	Your Data
Contracted with a third-party to conduct water audits	29.9	22.0	39.6	44.0	
Benchmarks water usage	45.5	44.6	46.5	76.0	
Has a written plan to reduce water use over time with timelines and goals	24.8	26.5	22.8	28.0	
Utilizes submeters	28.2	28.2	30.4	60.0	

Data showed that 45.4 percent of award winners are benchmarking their water use, and 47.6 percent of award winners are using alternative landscaping methods.

MAYO CLINIC HEALTH SYSTEM, EAU CLAIRE, WISCONSIN

Mayo Clinic Health System, Eau Claire, Wisconsin has a deep commitment to water conservation. A comprehensive submetering system allows them to pinpoint areas of high consumption and focus water conservation methods in those areas. The hospital has five separate meters that account for 100 percent of their water consumption. Water reduction goals at the hospital align with the overall organizational goal of reducing water consumption annually by three percent. In the past two years, Mayo increased their cooling tower cycles (4x) as opposed to one time and saved approximately 2.5 million gallons of water annually as a result.

Water Efficiency Measures

Award winners used a range of strategies to achieve water reductions—showcased in Table 6. This list of qualitative actions should be part of the foundation for a strategic plan for water efficiency. Increasing the number of cooling tower cycles and reducing make-up water, using circulator devices on sterilizers and smart irrigation technologies can all have a short payback and reduce water by millions of gallons per year. Steam trap maintenance is another strategy that reduces both water and energy. While the percentage of facilities using EPA WaterSense criteria during purchasing went up by five percent in 2014, generally performance stayed steady in water efficiency measures. With the current drought in California and new commercial water use restrictions, it will be interesting to see how these numbers shift in the next awards cycle.

TABLE 6: WATER REDUCTION STRATEGIES

Water Reduction Strategies	All	Small	Large	Top 25	Your Data
Use alternative landscaping methods that reduce the need for irrigation	**47.6**	42.6	52.3	56.0	
Utilizes US EPA WaterSense criteria during procurement	**28.2**	24.2	31.8	41.7	
Made any efforts to reuse non-potable water	**22.1**	14.6	28.6	24.0	
Determined how much energy it takes to deliver water	**1.4**	0.0	2.6	8.0	

Water Savings

Hospitals continue to provide incomplete data on water reduction efforts. In 2014, hospitals reported 145 million gallons of water saved as compared to 275 million gallons of savings reported last year. At the same time, reported savings from water reduction projects increased from $800,000 to $1.9 million. Some hospitals are reporting dollars saved without gallons avoided or vice versa. Savings in both gallons and dollars amongst award winners are larger than reported below, due to this incomplete data submission.

- Hospitals saved over 145 million gallons through water reduction projects.
- Hospitals saved over $1.9 million through water reduction projects.

RIDGEVIEW MEDICAL CENTER

Within the last two years, Ridgeview has saved nearly 600,000 gallons annually from two water conservation projects on their irrigation system:

- Installation of a water booster pump on their irrigation system to distribute water at a longer distance to cover landscaped areas that previously could only be reached by over-watering other areas.
- Installation of rain sensors.

Ridgeview also uses submeters to help track their water use, including submetering their cooling tower and their irrigation system which account for 26 percent of their water use.

TABLE 7: NORMALIZED GALLONS SAVED THROUGH WATER CONSERVATION PROJECTS

Water Conservation	All	Small	Large	Top 25	Your Data
Total gallons saved per square foot through reduction programs	**145,073,693**	41,325,833	102,971,860	41,407,880	
Median gallons of water saved through reduction programs	**891,250**	844,775	1,121,400	590,140	
Median cost savings from water reduction projects	**$15,065**	$11,259	$30,000	$9,113	

Practice Greenhealth also calculated the percent reduction in water from baseline year, shown in Table 8 below. In the 2014 application, there was no ability for hospital applicants to denote a significant difference in square footage between baseline year and current year. In 2015, hospitals could denote a different square footage if there was a major renovation.

TABLE 8: WATER REDUCTION METRICS

Water Reduction Metric	All	Small	Large	Top 25	Your Data
Percent change in water use (gallons/ft^2)	**9.0**	9.1	8.7	9.3	

The 2015 data set demonstrates that award-winning hospitals continue to make progress on water reduction—but need more from Practice Greenhealth in terms of strengthening the business case, identifying low-cost/no-cost water savings opportunities and helping hospitals understand the imperative to reduce water for health and resiliency factors, despite low-cost incentives.

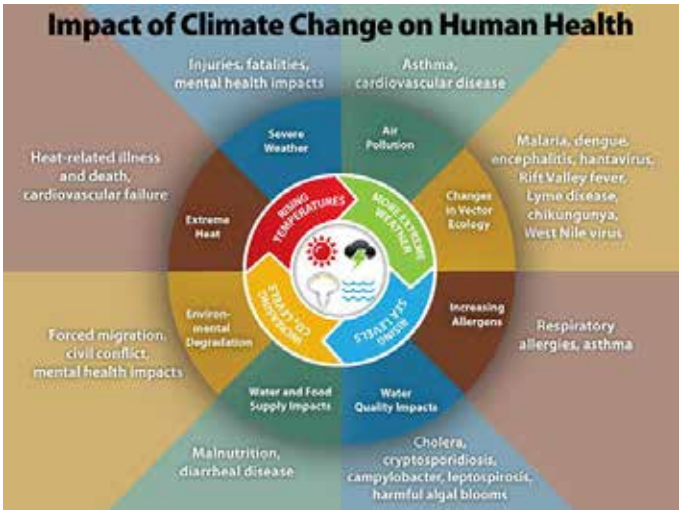
Bon Secours Maryview Medical Center, Portsmouth, Virginia

Climate

Despite a large body of scientific evidence that demonstrates that the threat of climate change is real, doubt persists in some circles. Health authorities ranging from the World Health Organization to the American Medical Association to the Centers for Disease Control and Prevention agree that there are very real threats to human health as a result of climate change—including increased allergies, asthma, heat-related illness, cardiovascular disease and vector-borne illnesses such as Lyme disease—to name a few (*see Figure 1*). Health care providers need to not only understand the nature of the threats that climate change brings, but must also prepare to meet those challenges as the primary protectors of health in most communities.

A 2009 piece in the Journal of the American Medical Association (JAMA) laid out data demonstrating that hospitals contribute approximately eight percent of the total U.S. greenhouse gas emissions—their large-scale energy use a dominant factor. Most health care facilities still have a limited understanding of climate change and the primary ways in which their organizations contribute to the problem. Award applicants said 58.2 percent were able to provide some portion of data on greenhouse gas emissions, but very few could share a comprehensive picture of their emissions.

FIGURE 1: CLIMATE CHANGE AND HEALTH



Source: Centers for Disease Control and Prevention, Climate Effects on Health, Webpage. Available at: http://www.cdc.gov/climateandhealth/effects/default.htm.


CO_2

Some award-winning hospitals are actually making significant inroads on climate impact by addressing a host of contributors, even if their awareness levels of those contributions are low. Energy use from fossil fuels is the primary contributor to greenhouse gas emissions, but landfill waste, food production, supply transport, and even anesthetic gas usage contributes significantly to health care organizations' carbon footprints. Award-winning hospitals are consistently driving down their energy use, creating programs that divert waste from landfills through recycling and source reduction, and driving down food miles by buying more locally and reducing meat use—to name a few. Practice Greenhealth is working hard to help health care organizations connect the dots.

In early 2015, the Health Care Climate Council was launched with representation from leading health systems beginning a public dialogue about the role of hospitals in addressing the causes of climate change. Pope Francis also published his Encyclical on Climate Change, calling on faith-based groups to step up and take action to protect human health and well-being. Climate is still a very difficult topic to broach in certain executive settings, due to political allegiances or belief frameworks. But the science is unequivocal. Climate change is impacting public health and that impact will only increase. And health care organizations are major contributors. It may also be helpful to frame climate change mitigation work through a public health lens or from a resiliency standpoint—helping the organization align with its mission to protect and improve population health and prepare for catastrophic weather conditions—should they arise.

Highlights

- Data showed 27.3 percent of award-winning facilities and 64 percent of the Top 25 reported they had signed onto a climate challenge of some sort.
- It was reported that 19.8 percent have conducted a greenhouse gas emissions audit, led by two large health systems and a few academically affiliated medical centers.

Climate Change Commitments

Table 1 lists the percentage of award-winning institutions committing to a climate change challenge or commitment, and highlights the different kinds of commitments made. A number of the initiatives and organizations iterating these challenges also provide valuable resources and tools for a hospital to consider in its greenhouse gas reduction efforts.

TABLE 1: CLIMATE CHANGE COMMITMENTS

Climate Change Commitments	All	Small	Large	Top 25	Your Data
Has the facility signed on to any of these climate change challenges or commitments?	**27.3%**	21.4%	33.3%	64.0%	
American College & University Presidents' Climate Commitment (ACUPCC)	**4**	9	4	3	
Climate registry	**19**	0	10	1	
Local/state/regional commitment	**32**	13	17	9	
Other	**45**	19	23	7	

Mitigation Strategies

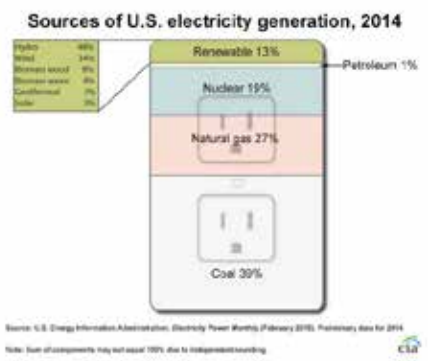
Conducting a greenhouse gas (GHG) emissions audit and developing a climate change mitigation plan are important steps in beginning this work. They ensure the organization has a clear idea of its baseline emissions and activities, and that it has a basic understanding of how other sustainability strategies contribute to its carbon footprint.

Table 2 demonstrates how award-winning hospitals are doing at getting these fundamental building blocks into place. Only 19.8 percent reported having done a greenhouse gas emissions audit, even though 78.4 percent reported benchmarking with ENERGY STAR Portfolio Manager which provides a GHG report for Scope I and II emissions. While a true GHG audit encompasses Scope III emissions as well, the responses are an indicator that many hospitals are likely unaware of or do not yet utilize the GHG reporting function of Portfolio Manager.

TABLE 2: CLIMATE CHANGE STRATEGIES

Climate Change Strategies	All	Small	Large	Top 25	Your Data
Has the organization performed a (GHG) emissions audit?	**19.8**	15.2	25.3	32.0	
Does the facility have a written plan to address climate change mitigation over time with time lines and goals?	**18.3**	16.3	20.0	29.2	
Has the organization calculated the carbon footprint of its anesthetic gas emissions?	**9.2**	8.3	10.9	24.0	

The Top 25 hospitals, while leading the pack, still have obvious opportunities for improvement. And there is clearly an opportunity for Practice Greenhealth to better educate members about how waste anesthetic gases contribute to the organization's carbon footprint. Waste anesthetic gases are considered a Scope I (direct) GHG emission. Currently, hospitals vent their waste anesthetic gases to outside air—directly contributing to their carbon footprint. Some anesthetic gases, such as desflurane and nitrous oxide have a significant carbon footprint, or global warming potential (GWP). To put it in perspective, eight hours of use of just one anesthetic—desflurane, is equivalent to 58 to 116 days of average auto emissions.[1]



Renewable Energy Use

Electricity production alone was responsible for 31 percent of U.S. greenhouse gas emissions in 2013[2]—39 percent of which came from coal-fired power plants and another 27 percent of which came from burning natural gas (see Figure 2. Sources of Electricity 2014). These plants also generate pollutants that contribute to respiratory disease, asthma and acid rain. Hospitals are slowly recognizing that there are alternate means to generate electricity that have less impact on human and environmental health. Award-winning hospitals report 30.6 percent used or generated renewable energy for some portion of their energy portfolio in 2014. The median percentage of renewable energy use was 4.6 percent.

1 "8 MAC-hours of desflurane delivery at 1 to 2 L FGF would equal 58 to 116 days of average auto emissions." from Ryan, S and Nielsen, C. Global Warming Potential of Inhaled Anesthetics: Application to Clinical Use. Anesthesia & Analgesia: July 2010 - Volume 111 - Issue 1 - p 92–98. doi: 10.1213/ANE.0b013e3181e058d7. Available at: http://journals.lww.com/anesthesia-analgesia/Fulltext/2010/07000/Global_Warming_Potential_of_Inhaled_Anesthetics__21.aspx.

2 U.S. Environmental Protection Agency. Sources of Greenhouse Gas Emissions: Electricity Sector Emissions. Webpage. Available at: http://www.epa.gov/climatechange/ghgemissions/sources/electricity.html.

TABLE 3: CLIMATE CHANGE STRATEGIES

Renewable Energy Use	All	Small	Large	Top 25	90th%	Your Data
Median percentage of the facility's energy portfolio (energy use) from renewable sources	**4.6**	3.8	4.6	10.3	22.9	

Table 4 highlights the hospitals with the highest rates of renewable energy usage for this awards season. An in-depth analysis of energy usage is available in the energy section of the *Sustainability Benchmark Report*.

TABLE 4: HOSPITALS WITH THE HIGHEST RENEWABLE ENERGY

Facility Name	Percent Renewable Energy	City	State
Cooley-Dickinson Hospital	80.6	Northampton	MA
Virginia Mason Medical Center	44.9	Seattle	WA
Gundersen Lutheran	26.7	La Crosse	WI
Marian Medical Center	23.3	Santa Maria	CA
Harborview Medical Center	21.7	Seattle	WA
Sonoma Valley Hospital	19.2	Sonoma	CA

Alternative Transportation

Transportation comprised 27 percent of U.S. GHG emissions in 2013. The majority of GHG emissions from transportation are CO_2 emissions, a result of combustion of petroleum-based products, like gasoline, in internal combustion engines. Hospitals have a huge workforce—the median number of FTEs for award-winning hospitals was 1,414—many of whom use single passenger vehicles to get to and from the hospital each day. Hospitals also typically have fleet vehicles, from ambulances and supply trucks, to home health care vehicles and shuttle buses. Table 5 demonstrates that award-winning hospitals continue to make slow but steady progress in this area. The percent of facilities purchasing low-emitting and fuel-efficient vehicles rose from 28.6 to 34.1 percent this year, demonstrating that these more sustainable vehicle models are becoming more available and are being more commonly purchased.

BOSTON MEDICAL CENTER

Boston Medical Center (BMC) participates in Boston's Green Ribbon Commission which is leading Boston in understanding and responding to the many health benefits of climate action. BMC is on track for a 45 percent reduction in greenhouse gas (GHG emissions) by 2020 with its laser-like focus on energy efficiency measures. The Yawkey Building is a 265,000 SF clinical building at BMC that was constructed in the early 1970s. The building was constructed with a central all-air ventilation system that required extremely high fan horsepower to deliver conditioned air to the occupied space. BMC, with the assistance of their engineer, developed a comprehensive project that would result in a 60 percent reduction of energy consumption in this building and approximately 5,100 metric tons of CO^2e reduction. The project also won an award for best health care energy efficiency project in New England from the Association of Energy Engineers in 2014.

TABLE 5: ALTERNATIVE TRANSPORTATION STRATEGIES

Alternative Transportation Strategies	All	Small	Large	Top 25	Your Data
Does the facility purchase alternative-fueled vehicles for transportation purposes?	**32.9**	27.7	33.7	48.0	
Does your facility purchase low-emitting and fuel-efficient vehicles for fleet transportation?	**34.1**	28.4	37.6	56.0	

Of the 68 facilities reporting the use of alternative-fueled vehicles, fleet vehicles used the following kinds of fuel:

TABLE 6: TYPE OF FUEL

Type of Fuel	All	Small	Large	Top 25	Your Data
Biodiesel B20-B100	**33.8**	38.5	35.3	50.0	
Electricity	**63.2**	57.7	70.6	75.0	
E8 ethanol	**33.8**	34.6	35.3	33.3	
Hydrogen	**1.5**	0.0	0.0	0.0	
Natural gas	**14.7**	3.9	14.7	25.0	
Propane	**13.2**	15.0	14.7	16.7	

Alternative transportation strategies are a critical part of any comprehensive environmental stewardship program, and integral to any climate mitigation strategy. In 2016, Practice Greenhealth is introducing a new focus on sustainable transportation.

Tracking Greenhouse Gas Emissions

Greenhouse Gas (GHG) emissions are typically divided into three classes: Scope I, Scope II and Scope III. Figure 1 differentiates between the three different classes of emissions.

Practice Greenhealth collects GHG emissions from award applicants—and encourages hospitals to utilize ENERGY STAR Portfolio Manager to track at least their Scope I and Scope II emissions. Practice Greenhealth also evaluated hospitals on one climate metric in 2014: the total percentage of renewable energy usage within hospitals' energy portfolio. Table 7 shows the percentage of award-winning hospitals reporting GHG emissions for the different scopes. These numbers have increased dramatically since last year—with nearly 65 new hospitals reporting both Scope I and Scope II emissions.

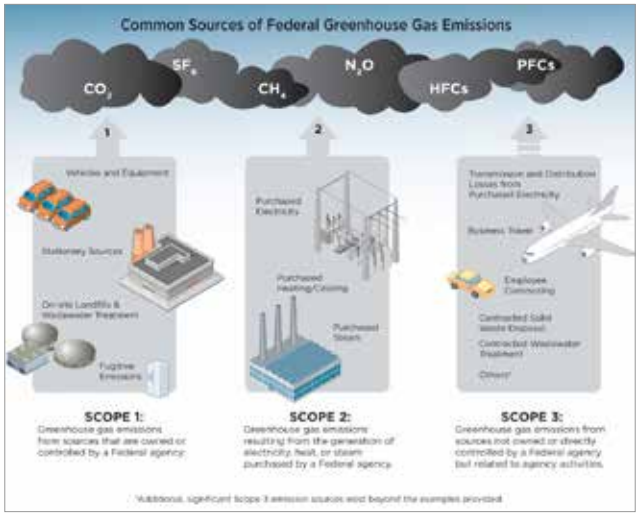


FIGURE 1: COMMON SOURCES OF FEDERAL GREENHOUSE EMISSIONS

Scope II still had the highest reporting rate—as these emissions are the easiest to quantify. Scope II is comprised of purchased energy. Scope I and II emissions are primarily attributed to the burning of fossil fuels—with a few exceptions. Not surprisingly, Scope III again had the fewest respondents. Scope III includes employee commute, waste management, business travel and

DELL CHILDREN'S MEDICAL CENTER OF CENTRAL TEXAS

Dell Children's Medical Center of Central Texas is part of the newly formed Health Care Climate Council--an effort to bring together leading hospitals to help educate the sector on the health impacts of climate change and the need for climate resiliency. Dell Children's is owned and operated by Seton Healthcare Family, a member of Ascension Health, a founding member of the Health Care Climate Council. The double LEED platinum-certified hospital has an onsite 4.3 MW natural gas-fired combined heat and power (CHP) system that provides the hospital with power, chilled water and steam--and is 60 to 75 percent more efficient than using energy from a coal-fired power plant. Dell Children's also installed a 50kW roof-top photovoltaic solar power array to generate electricity and a 300 million Btu solar hot water array. This renewable energy project saves approximately $27,000/year in electricity and steam costs while significantly reducing greenhouse gas emissions and fossil fuel use, placing less burden on our municipal electricity grid and supporting cleaner air for the local community.

supply chain impact. Of these, we know that the products purchased by the health care sector are a major—if somewhat unknown—contributor to organizational climate impact. Tracking for business travel miles, employee commute and waste management practices are all an area of opportunity for hospitals to start tracking Scope III emissions.

TABLE 7: PERCENT OF HOSPITALS REPORTING GHG EMISSIONS

Percent of Hospitals Reporting GHG Emissions	All Hospitals
Scope I	102
Scope II	110
Scope III	15

Table 8 highlights the aggregate greenhouse gas emissions for Scopes I, II and III.

TABLE 8: AGGREGATE GREENHOUSE GAS EMISSIONS

Emission Totals	Metric Tons of CO_2e	Percent of Emissions per Scope
Scope I Emissions	986,761	30
Scope II Emissions	2,141,451	65
Scope III Emissions	165,641	5

While Practice Greenhealth is able to share the cumulative carbon emissions for award-winning hospitals, it is important to note that for most hospital applicants this data was incomplete—meaning the estimate is far lower than the actual GHG emissions of these facilities combined. As you can see in Table 8 above, only 15 hospitals actually reported any Scope III emissions.

TABLE 9: CLIMATE DATA

Climate Data Summary	All (in $MTCO_2E$)	Small	Large	Top 25	Your Data
Total GHG emissions in CO_2e (metric tons)	**3,293,853**	565,901	2,584,408	966,643	
CO_2e savings(metric tons) from GHG emission reduction projects	**304,058**	92,632	204,325	135,600	
Savings (dollars) from GHG emission reduction projects	**$16,594,811**	$426,054	$15,960,186	$4,728,144	

$MTCO_2e$ stands for metric tons of carbon dioxide equivalents. Because there are a myriad of gases that contribute to climate change, it is easiest to understand relative impact by comparing them in terms of carbon dioxide equivalents.

Practice Greenhealth asks award applicants to provide examples of how they are addressing climate change mitigation. Despite making substantive progress in driving down GHG emissions through other environmental stewardship programs such as energy and waste reduction, hospitals continue to have little awareness of how these programs relate to reductions in greenhouse gas emissions. Overall, Practice Greenhealth award applicants had a considerable impact on carbon emissions and should strongly consider highlighting this work more thoroughly in the years ahead.

TABLE 10: CARBON MITIGATION

Sample Programs that Contribute to Carbon Mitigation	Scope	Amount Reduced by Award Winners	Metric Tons of CO_2e Reduced
Recycling	III	99,466 tons	318,113
Composting	III	4,762	4,320

(1) Carbon mitigation from recycling is a conservative estimate of savings - if all materials were previously going to landfill, not incinerated.

(2) $MTCO_2e$ estimates from using the EPA WARM and energy calculator tools.

While climate mitigation work is still in its infancy in health care, the growing evidence that climate change will have significant impacts on human health will be a huge driver for hospitals to become more engaged. The data set from the 2015 awards (2014 data) demonstrates that there is a small but growing awareness and commitment to climate change mitigation. Practice Greenhealth continues to develop new education and training in this important arena.

Green Building

There is a growing understanding in health care that the built environment plays a critical role in the health and well-being of both patients and staff. The vision includes cancer centers built without the use of carcinogens, the avoidance of materials, adhesives and paints that off-gas volatile organic compounds (VOCs), the selection of flooring that doesn't require chemically-intensive strippers and waxes to energy-efficient buildings that utilize renewable energy sources that don't cause asthma and respiratory disease. The hospital of the future is looking to the US Green Building Council's Leadership in Energy and Environmental Design (LEED) certification, the WELL Building Standard, and other green building rating systems to provide guidance on how to design health care facilities that foster and support health.

There is strong evidence that green buildings can add value to organizations—through reputation, operational cost savings, worker productivity and reduced absenteeism, and even worker recruitment and retention. The perception remains, however, that green buildings cost considerably more to build. The reality is that owners with a strong vision of a healthy, healing environment are finding that the premium is low[1] and the return on investment is high—as these buildings save considerable energy and water over the life of the building, and increase daylighting and views of nature which contribute to patient recovery times and reduce patient and staff stress levels—among other benefits.

And while the utilization of green building rating systems is one measure of a healthy building, it doesn't mean all facilities designated "green" are actually more sustainable. A "green" building can achieve certification and still have vinyl floors, and use toxic flame retardants and formaldehyde in its components. A "green" building can be built to achieve outstanding energy

1 Guenther, R., Glazer, B., and Vittori, G. LEED Certified Hospitals: Perspectives on Capital Cost Premiums and Operational Benefits. 2013. See more at: http://perkinswill.com/news/study-contradicts-belief-sustainable-hospital-design-costly.html.

Geothermal Lake, Advocate Sherman Hospital, Elgin, Illinois

performance—but is then operated improperly, rendering those investments moot. A "green" building can open its doors and have zero recycling and no focus on healthy and sustainable food systems. Building a green facility and operating it as a sustainable organization are often two separate things, when they should go hand-in-hand.

Regardless of whether the facility is utilizing a green building rating system, there are a range of actions an organization can take to ensure that major additions, renovations or hospital replacement projects incorporate as many sustainable design elements as possible. The Practice Greenhealth awards program focuses the majority of its assessment process on *sustainable operations*, but this category focuses on the innovation in green building design and construction. Some highlights of this year's award winners:

- Data showed 42.3 percent of all award-winning hospitals undertook green building projects in the past five years.
- Another 54.2 percent of award-winning hospitals have implemented a policy or commitment to construct all new buildings/renovations to LEED or another green building standard.
- Green building projects totaled 21.1 million square feet for award-winning hospitals, with 13.7 million square feet achieving some level of LEED certification.

Table 1 highlights the number of facilities reporting LEED certified projects, what level certification they achieved and how many total square feet the projects comprised. Many cities and municipalities have begun to build in requirements to "design to LEED certifiable" standards or achieve certification, including Boston and Washington, D.C.

TABLE 1: LEED CATEGORIES

LEED Category	Area, in square feet	# of facilities
LEED Platinum	747,848	3
LEED Gold	3,347,858	25
LEED Silver	8,226,140	30
LEED Certified	722,158	6
Total LEED	**13,044,004**	**64**

Frankel Cardiovascular Center, University of Michigan Health System

ADVOCATE SHERMAN HOSPITAL, ELGIN, ILLINOIS

The temperature at the bottom of the lake—35 to 85 degrees Fahrenheit—is the heating and cooling source for the hospital. The energy for the hospital is harnessed by a lake loop-heat pump system under the water. The manifold houses pressure gauges connected to over 155 miles of pipes. Advocate Sherman Hospital's geothermal lake is one of the largest—if not the largest—lake loop heat-pump systems in the world. The geothermal lake is projected to decrease Advocate Sherman Hospital's gas and electric costs by nearly $1 million annually, compared to the energy costs of the old campus. The system cost 13 percent more to install than traditional energy sources, but the investment more than pays for itself in just a few short years. The geothermal lake also supports Advocate Sherman's flexibility to grow. It is easy to expand the geothermal system should the hospital need to. The lake is surrounded by a one-half to three-quarter walking path for visitors to get exercise while enjoying the views of the lake and prairie restoration areas nearby.

Standardizing Green Design

Table 2 highlights the commitments that award-winning hospitals are making to the design and construction of sustainable buildings. By building these design principles into the master specifications or contract language, the organization can ensure that these pieces do not get value-engineered out of the project in the design phase.

TABLE 2: GREEN DESIGN AND CONSTRUCTION

Green Design and Construction	All	Small	Large	Top 25	Your Data
Has the facility designed and built any green building projects in the past five years?	**38.4**	24.5	50.4	68.0	
Has the organization integrated any green/sustainable aspects into master specifications for all new buildings/renovations?	**63.4**	59.8	66.0	84.0	
Has the organization implemented a facility policy or commitment to design and construct all new buildings and/or major renovations to LEED (or another green building) design standard?	**54.2**	53.9	52.4	68.0	
Has the organization added language to contract specifications that building contractors will follow LEED or GGHC requirements and provide documentation?	**50.9**	50.0	50.0	68.0	

In 2014, there was a nearly 10 percent increase in the number of organizations integrating sustainable aspects into the organization's master specifications. The number of facilities with green building policies also increased slightly and the number adding language to contract specs increased by an impressive nine percent.

TABLE 3: AVOIDING CHEMICALS OF CONCERN

Innovative Green Building Elements	All	Small	Large	Top 25	Your Data
Has the facility consciously selected flooring, wall coverings, paints, materials, finishes, furniture or exterior materials that avoid chemicals of concern?	**83.4**	82.5	84.6	96.0	

UCSF MEDICAL CENTER

The UCSF Medical Center at Mission Bay campus hosts three hospitals that each achieved LEED gold certification when it opened February 2015. The hospitals are among the greenest urban hospitals in the nation with 4.3 acres of green space, including one acre of rooftop gardens. The project selected materials for flooring, walls, paint, ceilings and trim that seek to eliminate chemicals associated with cancer, endocrine interference, birth defects and reduced fertility. They bypassed toxic flame retardants in favor of smolder-resistant fabrics that do not need to be chemically treated, and chose rubber flooring instead of vinyl floors that require periodic stripping and waxing with harsh chemicals. UCSF Mission Bay will use 50 percent less power than the average U.S. hospital, thanks to initiatives like heat recovery ventilators that reclaim energy from exhaust overflows. These various energy-saving projects resulted in a rebate from the local utility company of over $800,000 through a strategic energy partnership. They adopted a smart irrigation system that automatically adjusts water output according to weather fluctuations, and are using dual-flush toilets and low-flow, high-efficiency showers and basins. These together with other water conservation innovations are expected to save four million gallons of potable water a year. They've minimized their carbon footprint by designing the hospitals to maximize natural light and plans are in place to install by using a 1 MW photovoltaic system that converts solar energy into electricity when a new outpatient building adjacent to the site is completed. This accomplishment culminates years of planning and implementation. The hospitals include:

- UCSF Ron Conway Family Gateway Medical Building
- UCSF Betty Irene Moore Women's Hospital
- UCSF Bakar Cancer Hospital
- UCSF Benioff Children's Hospital San Francisco

UCSF Medical Center at Mission Bay

Although 83.4 percent of hospitals reported avoiding "chemicals of concern" in construction, it is clear from the examples provided by award winners that there is still some opportunity for a better understanding of the different kinds of chemicals of concern beyond VOCs—the dominant answer. Avoiding chemicals of concern in building materials, flooring,[2] finishes, cabinetry, casework and furniture[3] is still an emerging area. And the chemicals of concern can be very different when talking about flooring versus paints versus furniture. Practice Greenhealth continues to have an opportunity to work with its members to better understand chemical toxicity and the resulting potential health impacts.

Table 4 identifies how award-winning hospitals are incorporating the use of nature into their buildings and sites. As the technology improves and becomes more familiar, an increasing number of hospitals are installing green roofs. In 2014, the percentage of hospitals with green roofs increased from 15.7 percent to 24.1 percent. A large body of research has demonstrated that views of and access to nature has proven benefits in helping patients heal more quickly and reduce stress.[4]

TABLE 4: ACCESS TO NATURE

Access to Nature	All	Small	Large	Top 25	Your Data
Has the facility installed a green or living roof or wall?	**24.1**	15.7	33.0	56.0	
Has the facility created a healing garden for patients, visitors or staff?	**63.3**	50.0	75.7	96.0	
Does the organization have a food or flower-producing garden onsite?	**41.4**	34.3	47.6	72.0	

There are clearly still opportunities for hospitals to increase efficiency on the energy and water side. Only 35 percent of winners reported building energy systems that meet or exceed ASHRAE 90.1. Yet LEED's Energy and Atmosphere Credit 1 requires at least a 14 percent improvement over 90.1-2004 for new construction and 7 percent improvement for renovation projects. While Practice Greenhealth references ASHRAE 90.1-2007 versus 2004, hospitals should be consistently trying to improve energy performance by more than 10 percent over 90.1-2007 at a minimum if they want to gain any real points in the EA credits of the LEED-rating system. Only 34.9 percent of facilities had made it a priority to use design elements to reduce or reuse processed water. With the emerging water crisis, the business case for these kinds of improvements is strengthened. Water-saving equipment and processes need to be central to new hospital building design.

TABLE 5: ENERGY AND WATER-SAVING ELEMENTS

Energy and Water-Saving Elements	All	Small	Large	Top 25	Your Data
Has the facility installed energy systems that exceed ANSI/ASHRAE/IESNA Standard 90.1-2007?	**35.0**	31.6	38.0	52.0	
Has the facility integrated design elements that will reduce or reuse processed water?	**34.9**	29.3	42.0	72.0	

2 Dubose, J. and Labrador, A. Sustainable Resilient Flooring Choices for Hospitals Perceptions and Experiences of Users, Specifiers and Installers. Health Care Research Collaborative. December 2010. Available at: https://noharm-uscanada.org/sites/default/files/documents-files/48/Sustainable_Resilient_Flooring.pdf.

3 List of Furniture and Materials that Meet the HHI Healthy Interiors Goal. Healthier Hospitals Program of Practice Greenhealth. November 2014. Available at: http://healthierhospitals.org/hhi-challenges/safer-chemicals/list-furniture-and-materials-meet-hhi-healthy-interiors-goal.

4 Franklin, D. How Hospital Gardens Help Patients Heal. Scientific American. Mar 1 2012. Available at: http://www.scientificamerican.com/article/nature-that-nurtures/.

Johns Hopkins Bayview green roof installation.

Construction and Demolition Waste

Construction and demolition (C&D) debris accounts for a major portion of the commercial waste stream. A dated estimate from Massachusetts showed that 50 percent of the commercial waste stream was comprised of C&D waste in 2002. What we know now is that the vast majority of that waste can be diverted from the landfill and recycled, or even reused in the building project itself.

- Hospitals reported 81.4 percent recycled C&D waste in 2014.
- Only 44.8 percent reported recycling more than 75 percent of C&D waste.

Thirty-four award-winning hospitals reported C&D recycling rates of more than 90 percent in 2014—with many of those close to 100 percent recycling.

Additionally, hospitals need to be sure they are building language into their contracts that all rebates and revenue from recyclable C&D waste comes back to the organization or offsets the hauling fees. Because of the market value of some demolition materials, haulers may be generating revenue that would otherwise be lost to the organization. Despite limited space for onsite segregation of building materials like bricks, cement, wood, metal and ceiling tiles, this cost-effective strategy for reducing landfill waste makes sense for any waste-conscious organization, and should be built into contractor specification language.

TABLE 6: CONSTRUCTION AND DEMOLITION DEBRIS

Construction and Demolition Debris	All	Small	Large	Top 25	Your Data
Does the facility recycle construction and demolition debris (C&D)?	**81.4**	78.4	84.5	88.0	
Percent of facilities achieving at least a 75 percent recycling rate for C&D waste	**44.8**	34.6	51.6	71.4	

The number of LEED-certified or LEED health care-certified facilities continues to rise—evidence that many are understanding the value proposition for greener health care buildings. Despite marginal improvements in nearly all areas of the green building portion of the 2015 award application, green building continues to be an area of opportunity for many hospitals. Hospitals with a major renovation or replacement project in the near future need to learn how other facilities have achieved LEED certification with little impact on first cost and considerable impact on long-term operational savings.

Martha's Vineyard Hospital roof garden provides a restful place to sit and look out over the Lagoon.

Conclusion

Summary of Savings

In 2015, award-winning hospitals continue to build out their vast portfolio of environmental stewardship programs, demonstrating in a myriad of ways how this work aligns with health care's mission to first, do no harm. The vision for the future is hospitals that avoid the use of carcinogens while trying to heal cancer, hospitals that support healthier and more sustainable food systems while preventing heart disease, diabetes, obesity and antibiotic-resistant infections; and hospitals that drive down energy use and move to renewable energy sources as they battle asthma and respiratory disease. The 2015 *Sustainability Benchmark Report* shows clearly how this vision is becoming a reality at leading hospitals—and that it aligns with other critical drivers such as cost reduction, employee engagement and retention, and community health. The rapidly changing health care landscape is creating immense pressure for change. Practice Greenhealth provides the health care sector with the data to demonstrate that sustainability programs can add significant value to these discussions, and offers the tools and support to help hospitals bring programs from concept to reality.

> "Never doubt that a small group of thoughtful, committed citizens can **CHANGE the WORLD**; indeed, it's the only thing that ever has."
>
> - Margaret Mead

Beyond individual program implementation, hospitals and health systems are coming together to leverage their aggregate buying power to transform the health care supply chain. In 2014, award-winning hospitals spent more than $260 million on green products and services. That total doesn't begin to reflect the incredible influence these hospitals are having in driving the market to offer smarter, safer, healthier products and services. Major hospitals and health systems also collaborated with Practice Greenhealth and its allies to bring together leading food service distributors, suppliers and service providers

to support healthier food purchasing goals, and gathered major manufacturers of furniture and interiors to begin a dialogue around chemicals of concern.

Practice Greenhealth documented more than $76.7 million dollars in savings last year through the sustainability activities at award-winning hospitals. Table 1 presents a summary of savings achieved by the combined 2015 award winners.

TABLE 1: SUMMARY OF SAVINGS

Environmental Program	Aggregate Cost-Savings for Award Winners	Environmental Benefit
Recycling	$16,545,710	92,205 tons diverted from landfiill
Energy reduction	$22,106,321	1.35 billion kBtus saved or 2.6% of total energy
Solvent reprocessing	$639,629	39,005 gallons diverted from hazardous waste
Single-use device (SUD) reprocessing and other OR programs (kit reformulation, rigid sterilization containers, LED lighting, and more)	$22,121,587	485 tons diverted from medical waste
Single use device reprocessing (beyond the OR)	$13,347,783	388 tons diverted from medical waste
Water reduction	$1,938,432	145,073,693 gallons of water saved
Total	**$76,714,344**	

Practice Greenhealth is proud to be able to share the 2015 awards data set and provide a bird's eye view of the progress the health care sector is making in addressing its environmental impact as a fundamental determinant of health. To learn more about how your organization can assess your sustainability progress, evaluate the success of your environmental stewardship program or gain access to Practice Greenhealth's sustainability performance reports, contact our sector performance team at cbodkin@practicegreenhealth.org.

Centerpoint Medical Center, Independence, Missouri

2015 Environmental Excellence Awards Circles of Excellence Winners

The coveted Circles of Excellence recognize outstanding achievers that excel in a given sustainability category, including Climate, Chemicals, Energy, Environmentally Preferable Purchasing, Food, Green Building, Greening the OR, Leadership, Waste, and Water. These awards are given each year to honor the top 10 health care institutions in each category for outstanding programs that reduce the facility's environmental footprint. Award winners were chosen using Practice Greenhealth's thorough scoring and evaluation system, based on the data each facility submitted for the 2015 Partner for Change Award.

Leadership

Advocate Good Samaritan Hospital
Beaumont Hospital, Royal Oak
Bon Secours Baltimore Hospital, Inc.
Gundersen Health System
HackensackUMC
Magee-Womens Hospital of UPMC
Spectrum Health Blodgett Hospital
The University of Vermont Medical Center
UCSF Medical Center/UCSF Benioff Children's Hospital
University Hospitals Richmond Medical Center

Waste

Beaumont Hospital, Royal Oak
Beaumont Hospital, Troy
Bon Secours Good Samaritan Hospital
Dartmouth-Hitchcock Medical Center
Gundersen Health System
Littleton Adventist Hospital
Metro Health Hospital
Ridgeview Medical Center
The University of Vermont Medical Center
Virginia Mason Hospital & Seattle Medical Center

Chemicals

Advocate Trinity Hospital
Beaumont Hospital, Royal Oak
Cleveland Clinic
HackensackUMC
Harborview Medical Center
Magee-Womens Hospital of UPMC
Medstar Good Samaritan Hospital
Metro Health Hospital
The University of Vermont Medical Center
University of Washington Medical Center

Greening the OR

Cleveland Clinic
Dartmouth-Hitchcock Medical Center
Harborview Medical Center
Johns Hopkins Hospital
Memorial Sloan Kettering Cancer Center
Ridgeview Medical Center
The University of Vermont Medical Center
University of Maryland Medical Center
Virginia Mason Hospital & Seattle Medical Center
Yale-New Haven Hospital

Healthy Food

Harborview Medical Center
Kaiser Permanente San Jose Medical Center
Littleton Adventist Hospital
Memorial Sloan Kettering Cancer Center
Bon Secours – Our Lady of Bellefonte Hospital
Ronald Reagan UCLA Medical Center
The University of Vermont Medical Center and Fanny Allen Campus
University of Washington Medical Center
Virginia Mason Hospital & Seattle Medical Center
Yale-New Haven Hospital

Environmentally Preferable Purchasing

Advocate Good Samaritan Hospital
Beaumont Hospital, Royal Oak
Bon Secours Health System Inc.
HackensackUMC
Harborview Medical Center
Magee-Womens Hospital of UPMC
Metro Health Hospital
Ridgeview Medical Center
University Hospitals Geauga Medical Center
University of Maryland Medical Center

Energy

Advocate Christ Medical Center & Advocate Children's Hospital – Oak Lawn
Advocate Good Samaritan Hospital
Advocate Illinois Masonic Medical Center
Bassett Army Community Hospital
Bon Secours St. Francis, Eastside
Dell Children's Medical Center of Central Texas
Erie Veteran's Affairs Medical Center
Gundersen Health System
VA Portland Healthcare System
Virginia Mason Hospital & Seattle Medical Center

Water

Dell Children's Medical Center of Central Texas
Erie Veteran's Affairs Medical Center
Hudson Hospital & Clinics
James E. VanZandt VA Medical Center
Littleton Adventist Hospital
Mayo Clinic Health System – Eau Claire
Ridgeview Medical Center
Tennessee Valley Healthcare System
VA Portland Healthcare System

Climate

Boston Medical Center
Cleveland Clinic
Dartmouth-Hitchcock Medical Center
Gundersen Health System
HackensackUMC
Memorial Sloan Kettering Cancer Center
Minneapolis VA Health Care System
Seattle Children's Hospital
UCSF Medical Center/UCSF Benioff Children's Hospital
Virginia Mason Hospital & Seattle Medical Center

Green Building

Advocate Lutheran General Hospital
Cleveland Clinic
Dell Children's Medical Center of Central Texas
Memorial Sloan Kettering Cancer Center
Oregon Health & Science University
Seattle Children's Hospital
The University of Vermont Medical Center
UCSF Medical Center/UCSF Benioff Children's Hospital
University of Washington Medical Center
VA Portland Healthcare System

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