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Special Report

# INTEGRATING ENVIRONMENTAL AND HUMAN HEALTH



# INTRODUCTION

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## Integrating Environmental and Human Health

Sustainable health care is a work in progress. While virtually everyone recognizes the need for the industry to reduce its considerable impact on the environment, sustainability is rarely a high priority among decision makers at U.S. hospitals. There is so much short-term uncertainty and financial pressure in the industry today that it's hard for many administrators and supply chain managers to focus on what seem to be secondary, long-term issues.

But things are changing. "Perhaps 20% to 30% of health care facilities are really engaged in sustainability initiatives now," says Keith Sutter, senior product director for sustainable brand marketing at Johnson & Johnson. "There's significant interest, but also a lot of room for growth."

According to Practice Greenhealth, a nonprofit focused on environmental solutions for the health care sector, sustainability doesn't have to cost more. A 2012 study sponsored by Healthcare Without Harm and the Healthier Hospitals Initiative projected that savings from green initiatives could exceed \$5.4 billion over five years, and \$15 billion over 10 years. Hospitals, for instance, run energy bills of \$1 million to \$3 million annually, and the low-hanging fruit to cut costs is plentiful and readily available today.

"Too many hospitals are missing the big payoff that comes from investing in energy-saving technologies," reports a 2010 survey commissioned by the Corporate Realty, Design and Management Institute. Utilities, it says, "are sitting on millions of dollars in rebate and incentive funds," and "hospitals are frequently failing to tap this funding source or, worse, they approach the utility too late to receive any money."

What's more, many of these green strategies — from healthier food in American hospitals to combat the second-highest obesity rate in the world to greener buildings that can reduce the toxic chemical load at U.S. health care facilities — have profound benefits for patients.

According to Gary Cohen, a founder of Practice Greenhealth and Healthcare Without Harm, American hospitals "can build cancer centers without carcinogens and pediatric hospitals without chemicals linked to asthma and birth defects. They can eliminate junk food and sugary beverages in their cafeterias and use their purchasing power to detox the supply chain."

As hospitals shift to greater use of repurposed devices, they not only cut their purchase costs in half, they also significantly reduce their medical waste stream.

The process of "greening" health care has many aspects, but the major priorities include:

- **reducing energy consumption** through green building construction and retrofits, smart lighting strategies such as occupancy sensors and use of LEDs, effective energy management, and tapping into renewable sources such as solar and wind;
- **supply-chain management** that includes developing effective sustainability metrics, then implementing them by identifying and prioritizing greener purchases, including energy-efficient medical imaging machines;
- **phasing out toxic and hazardous substances** and cleaning products in health care facilities;
- **reducing waste** through recycling programs, reduced packaging and reuse of medical devices;
- **improving hospital food service** through increased access to locally sourced and sustainably grown meal options. The relationship between eating well and health is clear, since poor nutrition accounts for about \$71 billion in yearly medical costs.

Recognizing the importance of sustainable health care to the well-being of patients, the industry and the environment, Wharton's Initiative for Global Environmental Leadership (IGEL) and Johnson & Johnson co-sponsored a recent conference titled, "Metrics that Matter, Messages that Motivate." Drawing on information gathered at that conference and interviews with Wharton faculty and industry experts, this report focuses on how organizations can find the path to best practices in health care sustainability.

# SPONSORS

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Johnson & Johnson and Knowledge@Wharton have partnered to create this special report on healthcare and the environment.



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How can hospitals weigh going green in their purchasing decisions? When an environmentally preferable product is also less expensive, the decision to go green is simple. Such win-win decisions are plentiful at first. But hospitals that are committed to sustainability eventually have to make a different kind of decision: how to weigh environmental factors among all the others they consider when purchasing a vast array of products. That's becoming easier with standardized sustainability questions for suppliers, and comprehensive green ratings for nearly every product health care facilities use.

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Some critics say going green is of little importance to the bottom line of hospitals because the savings available from sustainability may be small compared with other costs. While the amounts involved may not compare with physicians' salaries, say others, the savings from specific green investments offer quick paybacks and significant additions to the bottom line.

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Some hospitals are embracing best environmental practices because they also save money. Other green choices create more positive patient outcomes, so even when the budget isn't a consideration, they are often considered to be worthwhile investments. Hospitals around the country are going green in ways that honor the essence of the ancient Hippocratic Oath.



## Purchasing and Sustainability: How Hospitals Weigh Going Green

**FORGET WALMART. FORGET AMAZON.** For a truly staggering array of purchases, it's hard to beat America's hospitals. Roof shingles, intravenous tubing, floor cleaners, heart catheters — hospitals purchase them all. According to Practice Greenhealth (PGH), a membership-based organization for health care institutions committed to sustainability, the U.S. health care industry as a whole spends more than \$200 billion annually. And that amount will be increasing as the population ages and grows.

How much all this spending contributes, or fails to contribute, to the health of the American people is a matter of great concern. Less noticed is how these purchases affect the health of the environment. At *Metrics that Matter, Messages that Motivate*, a conference sponsored by Wharton's Initiative for Global Environmental Leadership (IGEL) and Johnson & Johnson, speakers focused on the environmental costs of hospital spending and how they might be reduced. This article includes information gathered at that conference and from interviews with leading experts.

**U.S. hospitals use more energy than any other type of building and contribute 8% to the nation's emission of greenhouse gases.**

—Erol Odabsi

Erol Odabsi, director of sustainability for Johnson & Johnson Medical Devices and Diagnostics, told conference attendees that U.S. hospitals use more energy than any other type of building, contribute 8% to the nation's emission of greenhouse gases and are among the top 10

users of water. And much of what hospitals purchase ends up in the trash — 5.9 million tons of waste every year.

### **PURCHASE PRICE LOOMS LARGE**

The path that leads to all this purchasing begins in most cases with committees of experts in all parts of a hospital. Doctors and nurses who work in surgery, for example, meet to review what they need and how they want to spend their budget. Their requests meet up with the requests of other hospital committees in a central supply chain or purchasing department.

In most cases, the supply chain professionals will search a huge database of products provided by the hospital's group purchasing organization (GPO). These databases include just about every product a hospital might need, as well as information about each product, provided by the suppliers, so that purchasers can make informed decisions from among all the products offered.

Price is generally one of the most important factors, if not the most important, as a hospital considers purchasing a product. Even for many of the hospitals that belong to PGH, cost is a major driver. "For many of our members, as health care reform occurs and reimbursements continue to go down, hospitals have to become more efficient in their internal operations," says Laura Wenger, executive director of PGH. "They're not exactly making more in their revenue so they have to start cutting some of their expenses."

This is the reason 94% of all hospitals belong to a GPO. As the name implies, a group purchasing organization leverages the combined purchasing power of all its members to drive down prices. The GPO's function is to "aggregate and negotiate best prices with suppliers," says Terri Scannell, director of corporate citizenship and sustainability at VHA, Inc., a major player in the GPO space.

While efficacy and patient health take precedence, price looms large throughout every step of this process. “Because everyone is so focused on cost, anything that costs more will get lots of scrutiny,” says Judy Miller, who recently retired from her position as affiliate senior director at Galloway Consulting, a firm that advises health care executives on ways to improve their operations. “If someone wants to make a change for any reason, including sustainability, they would have to put in a request saying why they want to change the product they are using and the cost implications,” she notes. “If it’s more expensive, it’s going to be a challenge to put it through, because you would have to really justify what difference it’s going to make in the environment, and that would probably go all the way to the top, to the senior team.” Miller adds: “Sustainability is not getting a lot of talk at the senior level.”

## BEYOND PRICE

Fortunately, it is becoming increasingly clear that environmentally sustainable choices very often do lower the cost of health care. Sustainability is generally about improving efficiency and reducing waste, and packaging is often a good place to start. Reducing packaging saves resources upfront and helps cut hospital waste as well. And small changes can result in dramatic savings. Johnson & Johnson, for example, said it dramatically reduced the amount of environmentally sourced packaging for Surgicel, a mesh product used to control post-surgical bleeding, simply by rolling rather than folding the mesh, and by identifying and eliminating unneeded instructions.

Such improvements in environmental performance also save money, as Cristina DeVito, support services administrator at Yale New Haven Hospital, discovered. DeVito was a member of her hospital’s Work Smart Committee, chaired by Richard D’Aquila, president and COO of the hospital. The committee “started out just looking for savings and ways to increase efficiency,” DeVito says. But then “we began to see the severe overlap between sustainability, cost savings and efficiency,” and that helped the group expand its mission to include sustainability. “Now we’ve grown to the point where sustainability is right up there with cost savings.”

Many other companies have found the same sweet spot, where what’s good for the environment is also good for the bottom line. As Wenger notes, “If you can do that, cut costs and improve your environmental footprint, that’s a win-win situation.” This may account in part for the growing preference hospitals say they have for green purchases. In a 2012 Johnson & Johnson survey of 307 key decision makers, 54% of hospitals rated green attributes highly in making purchasing decisions of medical devices and

pharmaceuticals. Currently, the survey said, 33% of purchasing contracts include green attributes, and it’s expected that 40% of future contracts will include them.

Some environmental success stories:

- Kaiser Permanente, the managed care consortium, sourced arthroscopy tubing that could be reused, which eliminated 320 pounds of material from the waste stream in the first nine months of the program.
- The nonprofit Fairview Health Services, based in Minneapolis — with eight hospitals and more than 40 primary care clinics — became frustrated with the difficult-to-recycle polystyrene foam coolers it used to transport medications. A task force decided the best alternative was a compostable and biodegradable cooler, and one was located made from cornstarch that degrades in 60 days. The result was the elimination of 40,000 polystyrene coolers from the waste stream each year.
- Intermountain Healthcare, a nonprofit system of more than 400 clinics, labs and medical centers based in Salt Lake City, developed a closed-loop shipping system with reusable transportation packaging materials (including pallets and crates). The results, besides a much-improved carbon footprint, include an overall 20% reduction in cardboard and packaging waste, labor savings, better product protection and a reduced need for storage space.
- Manufacturers, too, are finding ways to reduce costs and environmental impact. Johnson & Johnson established Earthwards, a line of products that have to meet extensive environmental, health and safety standards, and go through a lifecycle impact screening.

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—Laura Wenger

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Reducing energy use is among the most common starting places for energy-intensive hospitals to look for solutions that are green in both senses of the word, and reducing waste is not far behind. Whether it’s changing light bulbs or reprocessing formerly disposable medical devices, the payback on investments in these areas is often short, and the benefits can be substantial.

But as some green advocates in other industries have discovered, the more win-win solutions that hospitals find, the harder it becomes to keep uncovering them. That's the reason interest has been growing in Total Cost of Ownership (TCO). The idea is straightforward: to compare similar products not just based on initial price but rather on the total costs incurred throughout the lives of those products, from purchase (or earlier) to end-of-life.

## **“We began to see the severe overlap between sustainability, cost savings and efficiency...”**

—Cristina DeVito

At the most basic level, a product that costs more upfront may simply last longer and therefore be less expensive in the end. Less obvious, but no less real, are what PGH calls “submerged costs,” such as storage, maintenance and disposal costs. Once these are considered over the lifetime of a product, the value calculation can change. A recyclable product that costs nothing to dispose of may have a higher initial price tag but a lower total cost of ownership.

Given the number of variables that may have to be considered, determining a product's TCO can be complicated, which is why more than one organization is working to develop TCO tools that simplify the process. Both PGH and the Association for Healthcare Resource & Materials Management are working with industry partners to develop TCO tools that will be offered to hospitals nationwide. As PGH noted when announcing its own effort, “Creating that tool requires a standardized method to measure or calculate these submerged environmental costs that is universally recognized.”

A tool of a different sort is available to hospitals in the form of purchasing power. One example that Wenger points to is the case of IV tubing made from PVC, which requires the use of plasticizers for flexibility. “The problem is that all these plasticizers, such as DEHP, are endocrine disrupters and have been shown to be carcinogenic.” At first, however, when a vendor came up with a PVC/DHEP-free product the cost was slightly higher and most hospitals did not adopt it. Wenger says that only a few hospital supply chain officers saw the purchase as a safety issue and were willing to pay the higher price.

But she points out that as more hospitals adopt this practice and demand for the PVC/DEHP-free tubing increases, manufacturers will increase production and drop the unit price. The Healthier Hospitals Initiative

2012 Milestone Report notes that one health care system with 35 hospitals spent more than \$19 million on PVC/DEHP-free devices in just one product category. The report continues: “This presents a significant opportunity for the health care industry to use its purchasing power to push for safer products. If just one health care system's 35 hospitals can show that much of a financial commitment to healthier chemicals in its medical products, the potential impact of the entire health care industry committing to healthier chemicals is astounding.” GPOs are an obvious way for hospitals to pool their purchasing power. VHA's Scannell points out, “As demand increases, we can aggregate that demand and bring prices down.”

## **THE PRICE OF IMPROVEMENT**

As critical as it is, price has always been just one of the many variables hospitals have to factor into their purchasing decisions. Some large health systems, such as Yale-New Haven, have sophisticated scoring programs to help their supply chain staff weigh all of the variables involved in a purchase. And Kaiser Permanente has developed a Sustainability Scorecard to evaluate products. Elsewhere, committees do this difficult work themselves.

To ensure sustainability is among the factors considered in these calculations, hospitals, GPOs and others have been adopting Environmentally Preferable Purchasing (EPP) programs. These programs vary from institution to institution, but they generally include a statement of the environmental principles that the hospital has adopted and a list of its environmental preferences in a number of product categories. These lists are not mandates, but a transparent way to let vendors know their customer will be weighing specific environmental factors when making purchasing decisions.

PGH has published a 10-step process for developing and implementing EPP programs, and offers members assistance at every step. But even the most sophisticated EPP program cannot be effective without the relevant product information. Before 2013, VHA listed environmentally preferable products in a separate EPP catalog. This was where neonatal intensive care units turned to find IV tubing that would not expose premature infants to toxic materials. But by segregating the information in a separate catalog, VHA realized it was preventing others who were not specifically looking for such information from even considering it. So, Scannell says, “rather than have a separate catalog that's just environmentally friendly products, we decided to turn that around. Why shouldn't all the products that go into a hospital be considered for their environmental sustainability?”

Even when product information is available, it can be misleading if manufacturers present the information in different ways that are difficult to compare. This was the case with environmental factors cataloged by GPOs. One GPO might ask whether a product included a particular substance, while another might inquire if the product was free of the substance. A yes in the first instance would mean the opposite of a yes in the second.

To help remedy this situation, PGH worked with the five largest GPOs in the country to “standardize their environmental disclosures and the questions they are asking vendors when they are making contract decisions,” according to Wenger. This not only allows hospitals to compare products’ environmental attributes, but also “makes it easier for suppliers to provide information and meet expectations,” says Scannell.

## BEYOND HOSPITAL WALLS

While a hospital’s EPP program may well make reference to environmental harm outside its walls, it is difficult to find examples of hospitals that consider this larger context when making purchasing decisions. One notable exception, frequently mentioned in conversations about sustainable health care, is Wisconsin-based Gundersen Lutheran Health System. This organization’s enviable environmental record can be traced back to its mission, which according to CEO Jeffrey Thompson, “is to improve the health of the communities we serve, and we cannot accomplish this mission without looking at our organization’s environmental impact and how that contributes to disease.” With this mission in mind, it’s easy to understand Gundersen’s elimination of Styrofoam, which was locally burned, releasing toxic fumes into the community.

Such community-minded decisions are far from commonplace. But the Affordable Care Act may soon change that as it radically alters the way hospitals are paid in the U.S. In the past, compensation for hospitals was largely based on volume. The more medical procedures, medications and diagnostic tests, the more money the hospital earned. In the near future, however, hospitals are likely to be paid a fee based on population, says Miller. Insurers will pay hospitals a fixed amount to care for the population they serve, probably based on a per-community-member/per month formula. It will then be up to the hospitals to use the total amount they are paid as they choose.

Much remains to be worked out, but if something like this approach is adopted, hospitals will be “rewarded for keeping patients healthy, whereas now they are rewarded for keeping patients in the hospital,” explains Miller. At that point, the Gundersen mission will not only seem

admirable, it will seem sensible. Since burning polystyrene is detrimental to the health of community members, using and disposing of the substance to be locally incinerated will mean a hospital is increasing its own costs, a financially irresponsible move.

Still open to question is how this new system will deal with “externalities,” costs generated by a business or organization but borne by society. Consider the case of a traditional blood pressure monitor that uses mercury. According to a Health Care Without Harm report, the

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**“... We cannot accomplish this mission without looking at our organization’s environmental impact and how that contributes to disease.”**

—CEO Jeffrey Thompson

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normalized cost of incinerator environmental control to remove mercury from the device is \$1,009. This cost protects the health of the local hospital’s community members from a chemical used by the hospital. Should the hospital, which is paid to keep its members healthy, bear that cost? If not, will it still be motivated to spend the extra \$50 it costs to purchase a mercury-free monitor?

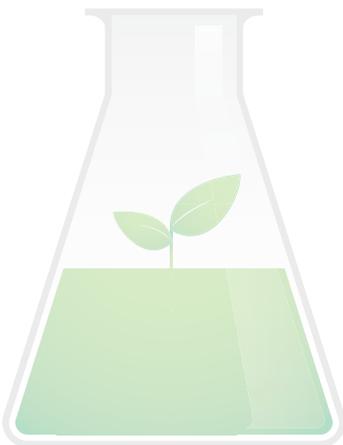
Other externalized costs are borne by the environment itself. TruCost is a London-based research firm that helps organizations understand the true cost of business so they can use resources more efficiently. The company focuses in particular on the concept of “natural capital,” the often-undervalued products and services provided by nature and used by business. According to Libby Bernick, a senior vice president, TruCost has assembled metrics on the environmental performance of 4,600 major companies worldwide, 200 of them in the health care sector. Speaking at the Wharton conference, she said, “Our most striking finding when looking at health care was that for every \$1 trillion in revenue, there is \$28 billion in natural capital costs.

“The second headline is that most of these natural costs, most significantly greenhouse gas emissions, water and air impacts, are embedded in upstream supply chains,” Bernick continued. “Greenhouse gas emissions are not on everyone’s radar in the health care profession. But there is a direct correlation between climate emissions and energy use, and companies are definitely looking to reducing those bills. The real cost savings are along the supply chain, so the conversations are beginning.”

How these conversations progress and how hospitals address externalized costs long-term will say a great deal about how our investment in human health increases or diminishes the health of our environment.

## TAKEAWAYS

1. Increasing efficiency increases the bottom line and sustainability. Top priorities: energy savings and purchasing preferences, reduced packaging, re-usability and reprocessing of medical devices
2. Long-term savings can justify higher upfront prices. Top priorities: Total Cost of Ownership that includes storage, maintenance and disposal costs, among others. [PGH is developing a TOC Tool.](#)
3. New health care rules are likely to mean that hospitals will earn more by keeping people healthy than they will by treating them when they are sick. Priorities: purchasing products that reduce health risks inside and outside the hospital.





## Sustainable Health Care: Protecting Hospitals' Financial Health

**HOSPITALS CONSUME VAST AMOUNTS OF ENERGY and generate huge streams of hazardous waste, so how they approach sustainability is important to environmental health. But the reverse is not necessarily true, at least according to some critics. Environmental sustainability, they say, is not essential to the well-being of the health care industry.**

No one denies that health care in general — and hospitals in particular — need to reduce costs, especially as the Affordable Care Act comes online. But according to Scott D. Ramsey, a physician, health economist and researcher at the Fred Hutchinson Cancer Research Center in Seattle, Wash., “Sustainability is not a primary factor to really bend the curve in terms of reduced care costs for patients.”

He points to expensive new medical technologies and over utilization of tests and drugs as the main factors affecting costs. Victor Fuchs, a Stanford professor of economics and health policy, agrees, pointing out that the U.S. has a two-to-one ratio of specialists to primary-care doctors (it's 50-50 in many other countries), and that these specialists “spend more money and use more exotic interventions and also get paid more per hour of work.” This is the reason, he says, that today, the per-person health care spending for Americans is twice the outlay it is in most of Europe.

“Green technology can help, but it won't fundamentally alter the landscape,” Ramsey concludes. Other experts agree. “Going green is not goal number one or even goal number two,” says Mark Pauly, a professor of health care management at Wharton. “It's not something facilities are going to commit an enormous amount of resources to.” Arnold “Skip” Rosoff, an emeritus professor of legal studies and business ethics at Wharton, goes even further. “Green is pretty far down on the priority list,” he says. “Maybe it's 14th or 27th in terms of the dollar amounts saved compared to something that might be third on the list, like doctors' salaries.”

Pauly believes that hospitals will eventually start to pay attention to sustainability, but only “when there's enough external pressure on the hospitals to make them worry about it.” Rosoff sees the issue in more purely financial terms. “There's certainly a tremendous amount of lip service paid to this, but I would think it's the trustees of nonprofit hospitals or medical groups that are the most likely to be concerned with sustainability. At a for-profit facility, if energy efficiency is going to ultimately make money, that's when the bean counters will decide to spend money on it.”

**“The economic case for waste reduction and energy efficiency is very strong and does not require any commitment to sustainability....”**

—Gary Cohen

Others in the health care community believe it's past time for the bean counters to start paying attention. According to Edward Emmett, a physician who is director of academic programs in occupational medicine at the University of Pennsylvania School of Medicine, “Health care systems lag many other industries both in the adoption of community-friendly goals for sustainable facilities, purchases and processes, and in their record of reaping financial rewards from sustainable practices. Given that health care costs are themselves widely considered unsustainable, this area seems ripe for improvement.”

Seema Wadhwa, director of sustainability at Inova Health Systems (a nonprofit with five hospitals in Virginia), says green “has a seat at our table” — and cost cutting has a lot to do with it. “We've had \$1 million in annual savings

through our sustainable health care initiatives,” she says. “It’s getting beyond just caring about the environment to really being a smart business decision that hospitals can’t afford not to do.”

According to Gary Cohen, a key figure in the creation of both Health Care Without Harm (in 1996) and Practice Greenhealth (in 2008), “The economic case for waste reduction and energy efficiency is very strong and does not require any commitment to sustainability, just a commitment to removing wasteful practices in the system. We produced a paper with the Commonwealth Fund that shows that if all the hospitals in the U.S. were reducing waste, implementing simple energy-efficiency measures and doing device reprocessing, we would save \$10 billion on health care costs. In the constrained environment of health care reform, the economic case is critical.”

Just how important is sustainability to an institution’s success in the health care marketplace? “Can sustainability help capture market share?” asked Libby Bernick, a senior vice president of the Trucost research firm, at a recent Wharton conference titled, *Metrics that Matter, Messages that Motivate*. “The value is greater than zero — it’s significant, and it opens people’s eyes. Integrating sustainability into business models is critical to protect and grow market leadership, but you do need to show there is a financial benefit that affects the bottom line.”

## “We’ve had \$1 million in annual savings through our sustainable health care initiatives.”

—Seema Wadhwa

### START WITH ENERGY

If there is one environmental budget item that seriously impacts the bottom line, it’s energy consumption. Midwest-centered Gundersen Lutheran, probably the greenest hospital chain in the country, estimates that most facilities can save 20% to 30% annually on their utility bills through conservation programs.

Greenwich Hospital in Connecticut received a mediocre Energy Star score of 47 (on a 100-scale), but after a major retrofit with a net cost of \$113,000, it was rated at a passing 88 in 2010 and is now saving 1.7 million kilowatt-hours of electricity and \$303,000 annually. The payback on that work was just six months.

Mary Larsen, environmental stewardship manager at Advocate Lutheran, which owns 11 hospitals in Illinois (and is not affiliated with Gundersen), put its core beliefs into practice by building, in Park Ridge, Ill., the first LEED Gold-certified patient tower in the Midwest. The eight-story, 192-bed facility has a green roof and a porous pavement driveway, reducing storm water runoff, and native plantings to reduce the need for irrigation. The building’s energy efficiency is 25% better than required by code. Forty three percent of the facility was built with recycled materials, and 93% of construction waste was also recycled.

All major Advocate construction projects will now meet at least LEED Silver designation. The 11 Advocate hospitals are known for their waste reduction efforts, and the chain’s Advocate Illinois Masonic Medical Center in Chicago is one of the most energy-efficient health facilities in the U.S.

Larsen says that Advocate is “seeing bottom-line benefits to environmental stewardship. When we conserve resources, we can’t help but save money.” She notes that the chain has realized \$3 million in annual savings since 2008 from energy conservation measures. Energy consumption has been reduced 15%, weather adjusted.

Anne Papageorge is vice president of facilities and real estate services at the University of Pennsylvania. She said at the Wharton conference that the school’s green building program grew out of its Climate Action Plan, adopted in 2009 and calling for (among other things) a 17% cut in campus energy use from the 2007 baseline by 2014.

According to Papageorge, “Waste is very visible, and the challenge to address it is growing as we try to reduce our carbon footprint. We haven’t yet achieved the reductions we initially projected.” She added that buildings are a big source of energy waste, and Penn is well into the process of retrofitting its campus facilities. “If the buildings don’t become more efficient, we’ll pay higher utility rates,” Papageorge said.

Approximately 10% of the university’s emissions are from health care-related and clinical buildings, according to the Climate Action Plan. A hurdle to getting buy-in from faculty and staff was ensuring that any facility energy-efficiency work would not affect research, Papageorge said. Key features in Penn’s environmentally friendly medical buildings include efficient heating and cooling, optimized day lighting and advanced recycling.

Such improvements in energy efficiency are usually among the first steps that hospitals take towards sustainability. Less common but catching on fast is a switch to renewable energy, sometimes generated by the hospital itself.

Gundersen's \$6 million annual utility bill was growing by \$350,000 every year when it set its goal of becoming energy independent in 2014. Considering the chain's consumption footprint and recent 25% expansion, that was an ambitious undertaking. But Gundersen is closing in on its objective, thanks in large part to its own production of clean energy. The health system's in-house grid produced electricity worth \$889,000 in 2013. (As a point of comparison, its savings from recycling, reusing and remanufacturing totaled \$535,000 in 2012, compared to a 2012 baseline.)

The key for Gundersen was building in its own wind, solar, biomass boiler (burning woodchips, it provides more than 60% of the health campus' heat) and hydrokinetic energy facilities.

According to Jeff Rich, executive director of Envision, Gundersen's environmental arm, Gundersen's big investment in renewable energy will pay for itself in seven years. "We're taking some pretty bold steps, but so far our successes outnumber our failures," he says. "We're already saving significant dollars." Rich adds that the chain's management sees the program as "two-sided green," meaning it's both a good investment, reducing costs to patients, and also a human health benefit because it reduces harmful emissions.

That last point is important to Gundersen, a mission-driven non-profit. "In 2008," says Rich, "we did an energy audit and saw the opportunity to be more efficient with a 30% energy improvement in two years. At the same time, we were planning a new hospital that could actually have a net-zero energy balance. From there, we looked at what it would take to have the entire health system offset its energy use. By the end of 2008, we had convinced ourselves it was the right thing to do, both from a mission viewpoint, because fossil fuel combustion is harmful to health, and as a long-term hedge against inflation. Now, as our manure digesters are coming on line, we're very close to achieving our goal."

Gundersen is not alone in its generation of clean power. Johnson & Johnson's Titusville, New Jersey solar installation totals 4.1 megawatts, providing 70% of the power for the health campus there. Worldwide, the company has more than 20 solar facilities, with over 18 megawatts of generating capacity. Johnson & Johnson's total clean energy portfolio includes the following installations: 34 solar, 10 cogeneration, three biomass, three geothermal and two wind. According to the EPA, the company is the seventh-largest purchaser of renewable energy in the U.S.

Brian Boyd, Johnson & Johnson's vice president of environment, health, safety and sustainability, said, "When we began our efforts in renewable energy, the corporate finance team was skeptical about the investment. But the average return from our clean energy investment is 19%, and we're near to exceeding our goal of 50 megawatts of renewable generating capacity by 2015." He made his comments at the Wharton conference, which was sponsored by Wharton's Initiative for Global Environmental Leadership (IGEL) and Johnson & Johnson.

## USE LESS, UNPLUG MORE AND IMPROVE PERFORMANCE

One place that hospitals are looking for energy savings is medical imaging, which harbors some of health care's most expensive and energy-intensive machines. According to the Department of Energy, "plug loads" represent about 16% to 18% of a hospital's total site energy, and the single biggest plug load is imaging equipment. CT and MRI scanners are major energy users. Hugh Zettel, senior director for global marketing operations and Ecomagination leader at GE Healthcare, says that sophisticated MRI and CT scan machines "require significant amounts of energy to fulfill their clinical mission, as well as stringent room temperature requirements to ensure optimum performance."

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**"At the same time, we were planning a new hospital that could actually have a net-zero energy balance."**

— Jeff Rich

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Hospitals can add to their bottom lines by simply unplugging machines that are not in use. Prasanth M. Prasanna, a physician at the University of Maryland Medical Center's radiology department, conducted an efficiency survey in his own department. According to his 2011 account in the *Journal of American Radiology*, if all the equipment were shut down after an eight-hour work day, and electricity were 11 cents a kilowatt-hour, the annual energy savings would be 83,866 kWh, with a value to the department of \$9,225.33.

The machines themselves can help minimize their energy consumption. The latest MRI and CT machines incorporate computerized energy-saving modes that Zettel says "gracefully shuts them down during off-hours and restarts them when appropriate." That not only saves electricity, but

also stops the machines from generating heat — reducing climate control costs. The electricity savings can be more than 20% annually.

Unplugging inactive machines would mean even more if the machines were used less often. And over-utilization of imaging equipment is a growing concern in hospitals. “Expensive new medical technologies are in some ways becoming less efficient,” said Scott Ramsey at the Wharton conference. “We’re conducting more tests and using more drugs in many cases with marginal outcomes.”

Radisphere is a Connecticut-based company that advises hospitals and health care providers on reducing over-utilization. According to Hank Schliessberg, chief strategy officer at the company, “By adopting a value-based radiology model — including following national standards to improve patient care and cut waste — we’ll likely diminish radiology’s current carbon footprint.”

To prove his point, Schliessberg says that CT scan ordering rates “vary by more than 100% at hospitals today, and curtailing this over-utilization will likely save energy by reducing the number of tests performed.”

## MINIMIZE SINGLE-USE, MAXIMIZE REUSE

For many years, single-use devices were considered essential to the practice of modern medicine, the only sure way to guarantee an instrument’s sterility. Disposing of these devices greatly increases a hospital’s waste stream. And since bio-hazardous “red-bag” waste is 10 times more costly to dispose of than regular municipal waste, disposing of single-use devices is an expensive proposition, according to Laura Wenger, executive director Practice Greenhealth (PGH).

Despite the environmental and waste disposal costs, the medical community was wary when companies started recycling these devices by reprocessing them. But as doctors, nurses and hospitals learn more about reprocessing, their resistance is fading. Wenger explains that the reprocessing companies put the devices through extensive sterilization and quality checks. “Every single reprocessed device has to be checked one by one, whereas new devices from original equipment manufacturers only have to be batch tested.”

This level of quality control is helping overcome hospitals’ initial reluctance to use reprocessed devices, says Wenger, as is the fact that “the FDA continues to approve more and more devices for reprocessing all the time.” And it doesn’t hurt that the reprocessed devices are generally priced 50% lower than new equipment.

Driven by reduced waste disposal costs and significantly lower purchasing costs, the market for reprocessed devices has been heating up in recent years. The acquisition of the two major reprocessing companies by large corporations — Sterilmed by Johnson & Johnson in 2011 and Ascent Healthcare Solutions by Stryker Corporation in 2009 — testifies to the vibrancy of the market.

While the market in the U.S. is developing quickly, several concerns are slowing things down in the European Union. One of the primary concerns is over who takes responsibility for the safety of the devices. In the U.S., explains Erol Odabasi, director of sustainability at Johnson & Johnson, this issue has already been resolved. “When we reprocess a device, all the liabilities transfer to Sterilmed. The original manufacturer does not maintain any of those liabilities, even though the device still has their label on it.”

Odabasi adds that these valid concerns demonstrate why device reprocessing needs to be highly regulated. “There’s a lot of risk, and the question of how far out in the future this will become standard procedure is up for debate,” Odabasi says. “But the certainty that reprocessing is part of the future is not up for debate. There are tremendous budgetary pressures in the health care system globally, and economic pressures will force the issue.”

## TAKEAWAYS

1. Sustainability is not the number one priority at health care facilities, but it’s getting a seat at the table. There is ample evidence that “going green” cannot only be beneficial to patients, but also to hospital bottom lines. Savings, according to one recent survey, could total \$15 billion over 10 years. Top priorities: Appoint a sustainability officer and look for savings.
2. Energy savings are low-hanging fruit for health care, but don’t always receive consideration. Conservation programs could result in 20% to 30% reductions in annual bills. Top priorities: Get a handle on your facility’s energy costs, adopt conservation measures and investigate renewable options (such as rooftop solar).
3. There is a booming market in repurposed medical devices, which are not only half the cost of single-use equipment but also reduce medical waste disposal expenses. Further savings can be realized with the use of energy-efficient medical imaging. Top priorities: Use remanufactured devices and efficient machines where feasible.



## Sustainable Health Care: Protecting Human Health

**GIVEN THE FINANCIAL STRESS** hospitals are under, it makes sense that many sustainable solutions are sold to hospitals as moneymakers, or at least money-savers. But some green initiatives are being promoted primarily for their health benefits rather than their impact on the bottom line. Hospitals, after all, exist to care for the health of their communities, and doing so means following one of the most basic tenets of the medical profession: First do no harm.

### **RX: HEALTHIER FOOD**

Poor food choices cause poor health, including obesity, Type 2 diabetes and heart disease. And while poor nutrition accounts for about \$71 billion in yearly medical costs, according to the U.S. Department of Agriculture, hospitals speak almost entirely about patient health when it comes to greening their food service.

The American Medical Association, the American Public Health Association and the California Medical Association have all adopted sustainable food resolutions since 2007. A survey by Health Care without Harm and Physicians for Social Responsibility found that 127 medical facilities in California – a quarter of the total – are now committed to “putting sustainable food at the center of their healing mission.” In 2013, more than 80% of respondents had initiated a “healthy beverage program aimed at getting sugary drinks off the menu, and 70% were increasing their use of the tap to replace bottled water.

In its first year, 2012, enrollees in the three-year Healthier Hospitals Initiative (HHI) spent nearly \$9 million on sustainable food options. Some medical centers stand out. “Fletcher Allen is now offering high-quality, healthy, affordable food,” says Seema Wadhwa, director of sustainability at Inova Health Systems in northern Virginia

and a director of HHI. As a result, “the community now goes to the hospital to eat, rather than people moving away from hospital food.”

Henry Ford Hospital has gone so far as to have a greenhouse on campus, which not only provides fresh produce for the hospital but also helps educate the community about healthy food. The University of Maryland Medical Center has done much the same thing, working in partnership with the University of Maryland at Baltimore and the local community to create a weekly farmers market that provides sustainably farmed, locally grown food for hospital patients as well as the rest of the community.

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**“Fletcher Allen is now offering high-quality, healthy, affordable food. [As a result,] the community now goes to the hospital to eat, rather than people moving away from hospital food.”**

—Seema Wadhwa

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Providence Health & Services, with 32 hospitals in five western states, is another leader in providing sustainably sourced food to its patients. Through relationships with local farmers, it buys local turkeys and chickens, as well as dried beans and other staples from, among others, a Hutterite community in Montana.

Inova, in addition to developing its own sustainable food program, sponsors the Northern Virginia chapter of Buy Fresh, Buy Local, and subsidizes fresh fruit and vegetable purchases by consumers in low-income communities. The result is a 75% increase in the amount of produce those

consumers bought at local farmers' markets, all of which reported sales increases.

Hospitals that have not yet started developing greener approaches to food don't have to start from the beginning. HHI, which was launched by 12 hospital systems in 2010, and now has more than 800 enrolled, is providing health care facilities with the tools they need to "green" their operations, including "how-to" guides in many areas, data collection guidelines, webinars, hospital-to-hospital mentorship programs, case studies and success stories.

"We engage the leadership to talk about healthier food, cleaner energy, safer chemicals, reduced waste and smarter purchasing," Wadhwa said. "We offer specific interventions with dedicated goals and measures."

HHI convened a national meeting in early 2014 to focus on healthier food in hospitals. The meeting, which Wadhwa called "an industry-defining moment," included 40 leaders from all links in the hospital food supply chain: distributors, food service providers, group purchasing organizations and major health systems. "Individually, these health systems, as large as they are, can create some ripples," said Wadhwa. But, working together, the participants in the meeting hope "to create great waves of change in the hospital food supply system."

**"We should eliminate children's exposures to substances that we know can have these impacts by implementing stronger health-based policies requiring safer alternatives."**

—Ted Schettler

## **RX: HEALTHIER BUILDINGS**

Coming Clean, formerly the Environmental Health Fund, is a nonprofit group that works on the intersection between the chemical industry, fossil fuels and environmental health, with a major focus on toxic chemical exposure in health care facilities. Judith Robinson, the group's executive director, notes that the pharmaceuticals administered in hospitals "come under far more regulation and oversight than the chemical industry, which is involved in the making of many medical delivery devices, as well as the hospital wallpaper, the beds and the insulation."

There are more than 100,000 synthetic chemicals registered for use in the U.S., and less than 10% have been

tested for their effects on human health (and very few have been tested in combination with other chemicals). The medical environment is a source of exposure to those chemicals, and we carry many of them with us — a measure known as "body burden." A report by the Environmental Working Group and Commonweal, conducted in U.S. hospitals in 2004, found an average of 200 industrial chemicals in the umbilical blood of children studied. The chemicals included many likely carcinogens, as well as the brominated flame retardants that have been targeted in the health care environment.

A study led by Mount Sinai School of Medicine found 167 synthetic chemicals (76 of which have caused cancer in humans or animals) in the blood and urine of nine volunteers. The Mind, Disrupted Biomonitoring Project tested for toxic chemicals and heavy metals in the bodies of 12 leaders and advocates in the learning and developmental disabilities community, and detectable levels of bisphenol A (BPA), mercury, lead, pesticides were found.

Noting that exposure to certain chemicals can lead to permanent learning and development disorders, Ted Schettler, a physician, who also is science director for the Science and Environmental Health Network, said: "We should eliminate children's exposures to substances that we know can have these impacts by implementing stronger health-based policies requiring safer alternatives."

And, of course, there's a chemical body burden in health care professionals. Physicians for Social Responsibility sponsored a bio-monitoring investigation involving 12 doctors and eight nurses, two in each of 10 states, and tested the volunteers for 62 specific chemicals, including BPA, mercury, phthalates (the category of plasticizers that included DEHP), and others. "Each participant had at least 24 individual chemicals in their body, and two had a high of 39 chemicals detected," the study said.

The green building movement, which has led to many new health care facilities being built to the Green Building Council's LEED standards, has multiple aims, but Robinson said that one of them is to create healthier interiors, with fewer chemical burdens in the medical workplace. That can mean the use of more natural materials, as well as increased fresh airflow to reduce the effects of chemical off gassing.

The Perelman Center for Advanced Medicine at the University of Pennsylvania has made a healthy indoor environment a priority, with low-VOC paints, adhesives, sealants, tiles and carpets used throughout. Non-toxic cleaners are also used. No urea-formaldehyde was used in furniture glues.

Another major issue, studied by Coming Clean and others, is flame retardants, which are widely present in health care furnishings. Some, such as penta, octa-BDE and deca-BDE, have already been phased out, but Coming Clean warns that “research is showing that equally hazardous flame retardants have taken their place.” A 2012 North Carolina State and Duke University study of “Firemaster 550,” widely used in the polyurethane foam of mattresses and infant nursing pillows, among many other uses, found it to be “an endocrine disruptor that causes extreme weight gain, early onset of puberty and cardiovascular health effects in lab animals” and is “capable of crossing the placenta during pregnancy, reaching infants via breast milk, or both.”

## RX: HEALTHIER MEDICAL DEVICES

When PVC plastic is used in medical devices that need to be flexible, such as IV bags, the plasticizer DEHP is often added, but the European Union pointed out in a 2002 opinion paper that DEHP “can leach out of PVC, resulting in exposure to body tissues and fluids.”

Robinson said progress is being made to get plasticizers out of the patient environment, and HHI’s 2012 Milestone Report notes that one of its member health systems, with 35 hospitals, has achieved a 95% rate of purchase for PVC/DEHP-free devices. While one system is “not necessarily reflective of where the industry is,” notes the Milestone Report, “it does show that the elimination of PVC/DEHP from nearly an entire product category is, indeed, achievable.”

Mercury is another dangerous substance hospitals are working to eliminate. At high levels, mercury can damage the brain, heart, kidneys, lungs and immune system. People can be exposed to the element if a medical device containing it breaks and if those devices are incinerated, releasing toxic vapor that ultimately ends up in the fish and shellfish we eat.

Issues like these led Spectrum Health in Michigan to adopt a purchasing policy favoring mercury-free products, such as blood pressure gauges. And it stopped distributing mercury-based thermometers to patients.

There are undoubtedly other chemical dangers that hospitals need to address, but they have not yet been

identified. “HHI is doing good work in respect to disclosure of chemical use,” says Wadhwa. “Because what’s actually in medical products is not currently fully known by vendors, just to have disclosure by manufacturers of what chemicals are being used in place of [plasticizers] is important work.”

Erol Odabasi, director, sustainability at Johnson & Johnson, said that a regulatory push is underway, especially in Europe, to dictate what chemicals can and can’t be in medical products. And being ready for that regulation is definitely an economic driver for health care internationally. “My take is that these trends are in place,” Odabasi noted. “More and more of our customers globally are incorporating sustainable thinking into their business strategies.”

**“More and more of our customers globally are incorporating sustainable thinking into their business strategies.”**

—Erol Odabasi

## TAKEAWAYS

1. Poor nutrition is responsible for some \$71 billion in yearly medical costs, and health care facilities are “walking the talk” by adding more sustainable choices to the menu. Top priorities: Develop a sustainable food program, and locate local sources of fresh produce.
2. Hospitals are working on healthier interior environments for patients, including construction of new green buildings and efforts to reduce patient exposure to toxic chemicals. Top priorities: Conduct an internal study of chemical use at your facility, and eliminate the use of harsh cleaners.
3. In part anticipating new regulations, the push for healthier medical devices includes elimination of harmful DEHP plasticizers in products such as IV bags, plus mercury-free thermometers and blood pressure gauges. Top priorities: Stop using products with DEHP plasticizers and limit the use of devices that contain mercury.



Special Report

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