# Sustainable Healthcare at Emory University
Lauren Balotin
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## Introduction

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James Wagner, who served as Emory University's president from 2003 until 2016, recounts that during his time as president, he witnessed Emory accept sustainability as one of its core values:

> The agenda that presented itself was... to move [sustainability] from sort of a moral preference to a moral obligation—that is, to incorporate sustainability as one of the principles of the university… That was one of the accomplishments that I hope sticks around—moving sustainability from an aspiration to a commitment, if you will. And you have to understand something… Value means that we are willing to pursue something at some cost, right?.... [We could say that] after we've gotten the best price to construct our new Campus Life Center, then we'll think about sustainability second. But to say instead that sustainability is one of the values that gets incorporated up front says [that sustainability is] worth investing in... One of the big things that grew at Emory was the inclusion of sustainability in this set of values that we bring to a decision (Wagner 2017).

Within this vision is also a commitment to sustainable healthcare. In a passage from the book *Sustainability on Campus: Stories and Strategies for Change*, Polly Walker and Robert S. Lawrence emphasize the need for healthcare faculty and administration to realize the connection between health and the environment. They suggest that it is the role of health professionals as well as universities to take a stand in support of sustainability programming and to lead others in a similar direction. Walker and Lawrence, both from Johns Hopkins University, wrote that "the vital connection [between health and the environment]… is important for both greening a university and for informed decisions by health professionals," to emphasize the need for sustainability in healthcare industries, adding that "many health professionals working on specific disease entities may not be aware of either the enormous health implications of environmental degradation or how important their voices are in the debate" (Walker and Lawrence 2004:259).

Similarly, according to Emory's 2010 State of Sustainability for Emory Health Sciences, healthcare facilities make up the second largest energy consumer of all US industries, and if the US health system were a country, its emissions would rank 10th in the world. In a 2013 assessment, Emory found that its hospitals exhibit similarly high rankings; Emory hospitals make up 32% of the total energy use of Emory Healthcare (EHC) and Emory University (SHSTF Minutes 2013). The hospitals also use high levels of water and dispose of high levels of waste.

The effects of healthcare on the environment can be seen nationally as well. Health Care Without Harm is an international coalition of organizations committed to sustainable healthcare through restorative healthcare practices, healthy food, attention to climate and health, reductions in toxic materials, safer chemicals, green buildings and energy, environmentally preferable purchasing,

and waste management. Health Care Without Harm's [website](#) provides the following reasons for its beginning:

> Health Care Without Harm began in 1996 after the U.S. Environmental Protection Agency identified medical waste incineration as the leading source of dioxin emissions, one of the most potent carcinogens, as well as responsible for a large percentage of mercury pollution. At that time, emerging environmental health research was documenting that low doses of persistent chemicals could damage the health of the developing child both in the womb and in first critical few years of childhood.

Similarly, in *Green Healthcare Institutions: Health, Environment, and Economics*, a book documenting the ideas established during a series of workshops sponsored by the Roundtable on Environmental Health Sciences, Research, and Medicine, Howard Frumkin and Christine Coussens state the importance of environmental health as an innovative concept:

> For health professionals..., green health care is likely to be most compelling because of its potential to protect and promote health, both directly and indirectly. These health benefits may operate on at least three scales: local, community, and global. On the local scale, within the walls of a hospital, research facility, or clinic, green construction and operation can protect patients, workers, and visitors. For example, choosing safe cleaning agents or limiting the use of pesticides can reduce the potential for toxicity among those exposed. On the community scale, reducing the ecological footprint of a hospital reduces environmental hazards and protects natural resources… On the global scale, green practices help steward scarce resources and reduce environmental degradation (Frumkin and Coussens 2004:1-2).

These ideas hold especially true for Emory, as a leader in healthcare. Emory Healthcare is the largest healthcare system in the state of Georgia with seven hospitals, the Emory Clinic and more than 200 provider locations throughout the Atlanta region, according to its [website.](#) With such a large hospital system, EHC has the ability to make a large impact, and now, it has begun to take its place as a leader in healthcare sustainability.

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## Methodology

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Over the last few years, Emory University has become a leader in sustainability for higher education. These reports detailing the history of sustainability at Emory were compiled in the Spring of 2017 as part of the course Writing Emory's Sustainability History (ANT 385W) taught by Dr. Peggy Barlett. It builds on four Reports completed in 2008:

- The Sparks of Sustainable Energy: Sustainable History at Emory (Mona Patel)
- Constructing a Movement, One Building at a Time: The History of Green Buildings at Emory University (Micah Hahn)
- Alternative Transportation (Andrew M. Foote)
- "Going Into a Place of Beauty": Forest Preservation and Restoration (Whitney Easton)

The reports were created with the intention of being archived at Emory and posted on Emory's Office of Sustainability website. Reports were compiled regarding eight areas.

The seven other topics are:
- Institutionalization of Change: A History of Emory's Office of Sustainability Initiatives (Kristen Kaufman)
- Teaching the Future: Academic Infusion of Sustainability at Emory (Meggie Stewart)
- Carbon, Climate and Co-Generation: A History of Emory's Energy and Climate Commitments (Katelyn Boisvert)
- Greenspace at Emory: Finding the Balance (Orli Hendler)
- Sustainability in Campus Life: The Changing of Behavior (Jamie Nadler)
- Emory's History of Waste Diversion and Recycling (Amelia Howell)
- Stormwater Management and Water Conservation at Emory University (Kelly Endres)

This report studies the history of sustainability hospitals and healthcare at Emory. It is based on written materials, available quantitative and qualitative data, and interviews. Background

information was obtained from the Emory Report and the Emory Office of Sustainability website. Additional research was conducted through access to view the minutes, presentations, and reports of the Sustainability in Health Sciences Task Force at Emory.

Interviewees gave consent for the interview through email. Before the interview, the purpose of the study as well as the publication plans for the report were explained. Interviewees learned that these histories would be used to discuss trends in sustainability and to determine what led to successes or failures. Interviews were scheduled via email, and in the revision process, interviewees were given the chance to review the document and provide feedback.  We are especially grateful to interviewees for sharing their time and insights with us, and also to Ciannat Howett and other members of the Office of Sustainability for their generous help in constructing these histories. The following interviews, with the date of the interview, were conducted either in person or by phone with the exception of Mallard Benton, whose interview was conducted via email:

- **Kelly Weisinger**, Assistant Director of Sustainability Initiatives at Emory (2/10/17)
- **Ciannat Howett**, Emory's first and current Director of Sustainability Initiatives (2/10/17)
    - *Note: "Howett" refers to Ciannat Howett unless otherwise specified.
- **Michael Bacha**, Executive Chef at Emory University Hospital (3/21/17)
- **Mallard Benton**, Senior Business Manager of Ophthalmology at Emory University (3/20/17)
- **Sindy Charles**, Assistant Director of Emory University Hospital Laundry and Linens (2/27/17)
- **Howard Chiou**, MD-PhD student in anthropology at Emory University who helped to plan the "First, Do Earth No Harm" symposium on environmental sustainability in healthcare (3/17/17)
- **Kip Hardy,** Assistant Director of Food and Nutrition Services at Emory University Hospital (3/21/17)
- **J. William Eley**, School of Medicine Executive Associate Dean for Medical Education and Student Affairs, Graduate Medical Education, and Continuing Medical Education (4/20/17)
- **Jeremy Hess**, Current Associate Professor at the University of Washington and Former Associate Professor at Emory University (3/30/17)
- **John Horan**, Associate Professor at the Emory University School of Medicine (3/28/17)
- **Maeve Howett,** Current Assistant Dean for Undergraduate Nursing Education at the University of Massachusetts Amherst and Former Clinical Professor at the Emory University School Nell Hodgson Woodruff School of Nursing (2/13/17)
- **Catherine Maloney,** Associate Administrator of Emory University Hospital (4/28/17)
- **Mike Mandl**, Former Emory Executive Vice President for Business and Administration (3/29/17)
- **Sarah Peek,** Director of Facilities Management and oversees Sustainability Initiatives at Emory University Hospital Midtown (2/13/17)
- **David Pugh,** Vice President of Space Planning and Construction for Emory Healthcare (2/28/17)
- **James Wagner**, Emory University President Emeritus (3/27/17)

- **Demetrius Wood,** Assistant Professor at Emory University School of Medicine and member of Emory's Sustainability and Health Sciences Task Force (2/24/17)

The main limit to research included the difficulties in reaching faculty and staff members who no longer work at Emory, leaving some information out of the report.

**Emory University Healthcare Overview**

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In the Atlanta area, Emory Healthcare is made up of 7 hospital locations, 109 primary care locations, 259 specialty care locations, 234 primary physicians, 1760 specialists in network, and 1994 total network physicians, making it the largest and most comprehensive healthcare system in Georgia, according to its website. Figure 1 provides a map of the Druid Hills campus for Emory University in Atlanta, GA, and Figure 2 provides a map of Emory University Hospital Midtown.

Figure 1. Map of Emory University. This map does not include all of Emory University's off-campus hospitals and clinics (Campus Services).

Located on Figure 1 are:

  200 - Emory Clinic Building A
1340 - Emory Rehabilitation Hospital
1525 - The Emory Clinic at 1525
1600 - Emory University Hospital
1614 - Emory University Hospital Tower
1751 - Winship Cancer Institute
1941 - Whitehead Biomedical Research Building
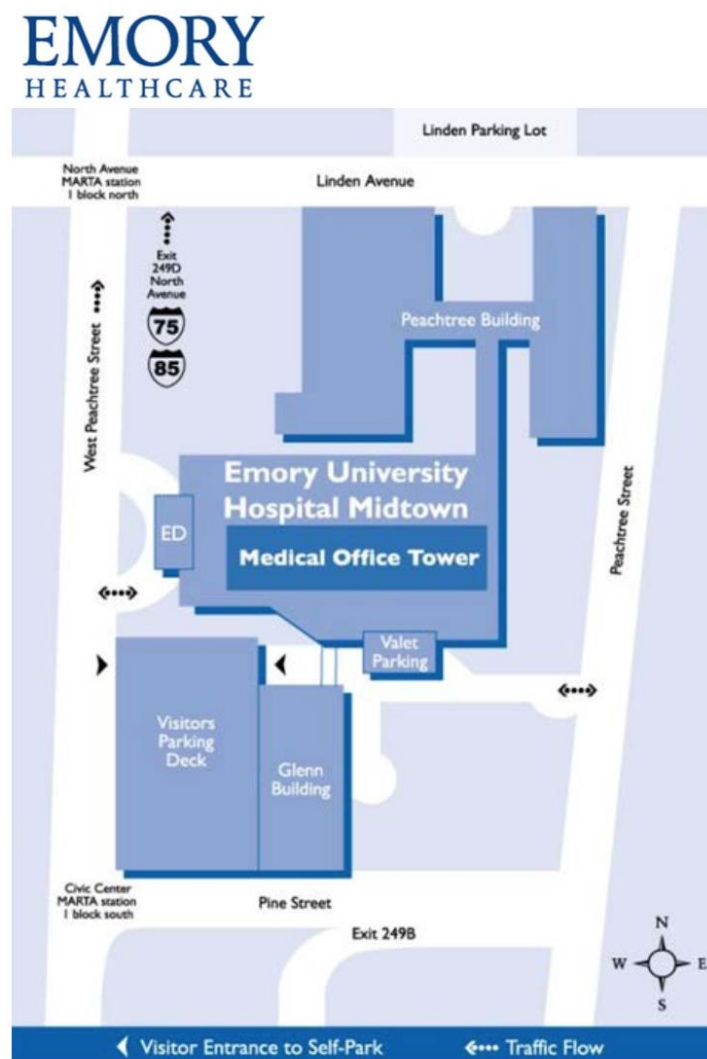1990 - Emory University Hospital Education Annex
2260 - Emory Clinic Building B



Figure 2. Map of Emory University Midtown Hospital (Peek 2017)

**Beginning of Sustainable Healthcare and the Task Force at Emory**

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In her book *Greening the Ivory Tower,* Sarah Hammond Creighton writes, "Five ingredients are key to successful university environmental action: (1) understanding how the institution works, its players, and its decision making; (2) university commitment and demonstrated support for environmental action, often articulated in an environmental policy; (3) a university-wide environmental planning committee or smaller issue-specific committees; (4) individual leaders; and (5) an understanding of the basic principles of environmental protection" (1999:11). When Emory University began its work with sustainable healthcare, it had to focus upon each of these aspects.

**The Strategic Plan**

According to Director of Sustainability Initiatives, Ciannat Howett, Emory sustainability efforts were born out of the 2005-2015 Strategic Plan, which included guidelines for sustainable healthcare (2017). "Right from the get-go, healthcare was part of our vision for a sustainable university, and part of the mission of the Office of Sustainability Initiatives was to make sure our healthcare practices and policies were supporting sustainability," Howett said (2017).

In the early years of this plan, Michael Johns oversaw EHC as Executive Vice President for health affairs and CEO of the Robert W. Woodruff Health Sciences Center. He envisioned a grassroots movement for sustainability efforts, led by those who worked in clinics and hospitals (Howett 2017). Please see Kristen Kaufman's report, "The Institutionalization of Change: A History of Emory's Office of Sustainability Initiatives" to learn more about the Strategic Plan.

**Sustainable Healthcare at Emory (SHE)**

Ciannat Howett and her sister Maeve Howett both joined Emory's faculty in 2006. Upon her start at Emory in Nursing, Maeve Howett began considering simple ways to implement sustainability into healthcare, such as providing recycling bins in clinics and eliminating Styrofoam cups from waiting rooms (Maeve Howett 2017). In July of 2007, Maureen Kelly, Ann Connor, and Maeve Howett—all faculty in the Nell Hodgson Woodruff School of Nursing— wanted to create a program for nursing students and faculty. For the School of Medicine as well as Emory Healthcare hospitals and clinics, Dr. John Horan, an associate professor of pediatrics, was extremely influential. Horan joined Emory in 2004, and was convinced to join SHE by Dr. Peggy Barlett, a professor of anthropology at Emory and Faculty Liaison to the Office of Sustainability. On July 16, 2007, Sustainable Healthcare at Emory had its first meeting. During the meeting, four representatives from the School of Nursing, four from the School of Medicine, two from Emory College, and one from Rollins School of Public Health were in attendance, and decisions were made to use a top-down approach by seeking sponsorship from healthcare leaders and to focus on recycling as primary concern. Many of the representatives hoped to bring recycling to their units.

Two months later, in September of 2007, SHE's membership increased, with ten members in attendance, including Ciannat Howett. Howett provided an overview of waste management at Emory, and the group displayed interest in a waste audit, which Ellen Spears, a faculty member in the Environmental Studies Department, offered to conduct with her students. Spears resigned shortly after to accept a job elsewhere, and the research was not conducted. However, as a result of this meeting, the group recommended that Emory Healthcare form a standing committee, which ultimately became the Sustainability in Health Sciences Task Force (SHSTF).

SHE celebrated its one-year anniversary in 2008 with eight members in attendance, including Gary Teal, a Woodruff Health Sciences Senior Administrator. During the meeting, Howett provided information on Emory's progress with waste, reduction in greenhouse gas emissions, and water and electricity use in Emory Healthcare. The group identified its plans for the future: to improve sustainable purchasing with a particular focus on toxics and hazardous wastes, expand recycling, and improve sustainable food options. A list of ten simple actions nurses can take to promote a sustainable Emory was distributed, including actions such as using double-sided copying, reusable containers, and unplugging computers overnight.

Despite these efforts towards creating tangible change in healthcare, Horan recalls that the most important goal of SHE was to change attitudes, especially those of leaders in the health sciences at Emory. Horan recounts:

> SHE was really a very loose, grassroots organization. We didn't really have much power to make tangible change… We were really devoted to making leaders in the health sciences think about how they might be able to change an operating room to make it more sustainable, how they might be able to change a hospital cafeteria, or how they might be able to shift towards sustainable laboratory research… and it was interesting to see how even some of the people who were not initially supportive of our cause became much more invested with sustainability (Horan 2017).

Horan credited part of the culture change to the role of sustainability on other parts of campus. "Unlike many other places, Emory's health sciences are mixed right in with the rest of the university," Horan said. "Even ten years ago, you didn't have to go very far out of the hospital to see the evidence of sustainability initiatives and this exposure was very, very helpful."

**Greening Health Care Conference**

Grassroots efforts continued in various departments, but several activities sought to broaden awareness. In 2008, Emory held its first Greening Health Care Conference with the help of Maeve Howett, current Assistant Dean for Undergraduate Nursing Education at the University of Massachusetts Amherst and former Clinical Professor at the Emory University School Nell Hodgson Woodruff School of Nursing (Maeve Howett 2017). Over a day and a half, representatives from different hospitals and clinics came together to listen to lectures given by various practitioners who were working on ways to make their hospitals more sustainable. Over time, the conference transitioned to a broader overview of how the environment relates to public health, ultimately joining with the Breaking the Cycle Conference held annually by Emory's sector of the Pediatric Environmental Health Specialty Unit (Howett 2017).

**Appointment of Kelly Weisinger and the Creation of the Task Force**

According to Maeve Howett, the biggest challenge Emory faced when implementing sustainability programs was finding the time and energy for faculty to commit to such large undertakings. As Emory began to realize that the goals of the first ten year vision plan did not always fit well with healthcare, which posed its own unique challenges, many believed there would need to be a position dedicated specifically to this area. The Vice President of Space Planning and Construction for EHC, David Pugh, worked with Howett to help find the funds for a Sustainability Program Coordinator in the Office of Sustainability Initiatives dedicated, at least part time, to sustainability in Emory Healthcare and to lead a national search for an individual who could fill this position. Pugh said that he felt this was important given that Emory is considered a leader in sustainability, but does not always implement the same sustainability programs in healthcare as it does for the university (2017).

The appointment of Assistant Director of Sustainability Initiatives Kelly Weisinger acted as an impetus to get over this hump, recounted Maeve Howett (2017). When Weisinger was hired in 2012, half of her salary was supported by Emory Healthcare, and as a result, one of the conditions of her employment was that part of her position would be committed to working on developing sustainability specifically in healthcare sectors of Emory. "A huge step forward was when we were able to get Kelly [Weisinger] on board," Howett added (2017). "Prior to her position, sustainable healthcare was more about working on benchmarking, but she enabled an enormous step up in terms of increased attention [on healthcare] and the work we could do."

Weisinger currently leads the Sustainability in Health Sciences Task Force (SHSTF), which Ciannat Howett describes as the "evolution from a very informal cluster of people interested in sustainability" to a "more formal,... institutionalized governance structure" (2017). Then-Vice President for Health Affairs and CEO of Woodruff Health Sciences Center Dr. Fred Sanfilippo founded the task force, and it had its first meeting in September 2009 (SHSTF Minutes 2010). Prior to the creation of the task force, there were groups of professors, faculty members, clinicians, and physicians who cared about sustainability in healthcare; however, the task force was the opportunity needed to formalize and institutionalize their plans, Weisinger said (2017).

According to Horan, who served on the task force until 2011, SHE served as the vehicle for the creation of the task force:

> [SHE] was really about knowing who in the health sciences administration would be really sympathetic towards and supportive of sustainability. Its mission was to get these administrators more involved with Emory's sustainability initiatives….SHE was all about rallying people in positions of authority, and that's what really did it… We [SHE members] finally got it to the point when the Executive Vice President of Health Sciences said "Yes, we're going to have a force for this cause." So we worked together until this task force came into existence, and then we really saw that our work was done… The health sciences had embraced sustainability, so there was no longer any reason for us to keep pushing with SHE when we now had the task force (2017).

To Mike Mandl, Emory Executive Vice president for Business Administration, the task force presented the opportunity to have leaders from within healthcare emerge. He recalls:

> I don't think there are many roadblocks as long as actions are stemming from the individuals within [a unit]... It's not about resistance so much as the fact that there's always a natural barrier between organizations.... When there are ideas that come from outside one's own [group], the visceral reaction is to not give those ideas as much attention [as you would if they were your own.] We had to figure out how to make sustainability in healthcare come from healthcare instead of having them respond to someone else's agenda (2017).

Jeremy Hess has a similar view on the importance of finding the right members for the task force. Hess came to Emory first as a student in 1998, then as a medical resident in emergency medicine in 2003, and finally as an associate professor in 2006, and he joined the task force in its first year. He views the task force as a "huge success," with many tangible achievements, but he recognized the difficulty in having physicians involved:

> [Emory's] environmental footprint had a lot more to do with people in areas like facilities, waste management, food services, and operations than it did with people in clinical care at the time… Over time with the task force, there were fewer physicians because they didn't really see a clear role for themselves. The things the task force was trying to manage were not in their domain, so some physicians stayed, while others started to peel away… In meetings we would talk about how to reduce waste in labs, change air flow through chemical hoods, or change our carbon footprint through food services… These were all things physicians knew were important, but it was not something they managed day to day (2017).

Nevertheless, by October 2010, the task force already had subcommittees:

    a. Food, Energy/Greenhouse Gas Emissions/InfoTech
    b. Recycling/Composting/Waste Minimization
    c. Purchasing/Consumables/Paper
    d. Building Design/Healthy Healing Spaces
    e. Transportation

Other areas of focus included Water Conservation and Green Chemistry/Green Laboratories. This report focuses on subcommittees a, b, and d—the areas of greatest attention and improvement for sustainable healthcare at Emory. In 2010, the task force listed the following as its goals:

- Recommend steps to assess possible savings in resource use throughout Emory Healthcare, focusing particularly on energy and paper use. (Emory's goal is to reduce energy use by 25% per square foot by 2015).
- Recommend steps to expand the recycling program and integrate it further into institutional practices. (Emory's goal is 65% overall waste diversion by 2015 and 100% electronic and 95% food waste diversion)

- Recommend steps to further sustainable food goals. (Emory's goal is 75% of hospital and cafeteria food either locally grown or sustainably grown in 2015).
- Assess current research on sustainable healthcare issues and consider the establishment of a research collaborative to provide justification for health-related sustainability practices.
- Monitor the use of sustainable design recommendations for new health buildings.
- Assess whether healthcare purchasing guidelines are congruent with sustainability goals.
- Recommend improved transportation policies to reduce the greenhouse gas impact of healthcare activities.
- Assess the use of healing spaces as a part of Emory's green space programs, and make recommendations for further additions.
- Assess the current status of understanding of sustainability goals, as well as the commitment to these goals, and recommend steps for culture change and education.
- Assess Emory Healthcare's overall progress on meeting the sustainability goals, and make recommendations for future priorities.

## Waste and Landfill Reduction

Reducing solid waste is one of the most tangible examples of protecting the environment, and as such, it is at the forefront of sustainable change; when others see the effectiveness of recycling and composting systems, there can be an impetus for other types of change as well (Creighton 1999:53). In this way, recycling programs in Emory's hospitals and clinics paved the way for many of the changes that followed.

## Recycling and Composting

As a direct result of the Sustainability in Health Sciences task force, a composting initiative began at Wesley Woods Geriatric Hospital (WWGH) in August 2009. Between August 2008 and December 2010, Emory University Hospital and WWGH diverted more than 25,000 pounds of food waste from landfill to compost, leading to expansion of the program to other areas of EHC (SHSTF Report 2010). Recycling activities also increased. From 2007 to 2008, EHC saw a nearly 20% increase in recycling totals from 813.13 tons to 969.38 tons despite the fact that EHC was smaller at this time because Emory Johns Creek Hospital and Emory St. Joseph's Hospital were not yet part of Emory Healthcare (SHSTF Report 2010). Tables 1 and 2 provide the recycling totals for Emory University Hospital Midtown and Emory University Hospital for the Fiscal Year 2016. This waste diversion was supported by the addition of more than 75 recycling containers throughout hospitals from April 2008 to December 2010. A partnership with the Centers for Disease Control and Prevention initiated a recycling program for non-hazardous lab materials; this program allowed Emory to decrease its regulated medical waste to roughly 5,000 pounds a year by 2010 (SHSTF Report 2010).

| EUH-Midtown | Municipal Solid Waste | Recycle | RCY - HIPAA | Stryker Reprocessing | Regulated Medical Waste | TOTAL |
|---|---|---|---|---|---|---|
| Baseline | 387,157 | 26,770 | 0 | | 30,006 | 443,933 |
| January | 322,720 | 30,000 | 104,194 | 953 | 27,661 | 485,528 |
| February | 339,880 | 27,720 | 105,200 | 2,503 | 27,659 | 502,962 |
| March | 348,520 | 39,820 | 89,500 | 2,941 | 31,522 | 512,303 |
| April | 290,080 | 40,900 | 54,960 | 2,967 | 28,084 | 416,991 |
| May | 321,440 | 38,500 | 64,000 | 2,321 | 27,211 | 453,472 |
| June | 308,220 | 26,100 | 90,330 | 1,070 | 27,312 | 453,032 |
| July | 326,700 | 43,640 | 119,340 | 1,015 | 28,514 | 519,209 |
| August | 340,140 | 54,460 | 64,660 | 939 | 29,598 | 489,797 |
| September | 310,060 | 51,700 | 54,420 | 754 | 28,523 | 445,457 |
| October | 313,260 | 31,920 | 58,320 | 867 | 28,926 | 433,293 |
| November | 302,220 | 23,320 | 64,680 | | 27,306 | 417,526 |
| December | 308,880 | 27,320 | 62,940 | | 30,144 | 429,284 |
| Totals | 3,832,120 | 435,400 | 932,544 | 16,330 | 342,460 | 5,558,854 |

Table 1. Recycling totals for Emory University Hospital Midtown in the Fiscal Year 2016. "RECY-HIPAA" is shredded confidential white paper that is recycled. The "Baseline" is 2013.

| EUH-Hospital | Municipal Solid Waste | Recycle | RCY-HIPPA | Stryker | Regulated Medical Waste | TOTAL |
|---|---|---|---|---|---|---|
| Baseline | 348,060 | 16,484 | 0 | 0 | 36,932 | 401,476 |
| January | 346,080 | 38,460 | 52,000 | 585 | 37,256 | 474,381 |
| February | 380,100 | 39,240 | 114,675 | 831 | 39,566 | 574,412 |
| March | 403,500 | 41,300 | 98,225 | 832 | 42,448 | 586,305 |
| April | 306,680 | 31,260 | 83,900 | 974 | 38,660 | 461,474 |
| May | 347,220 | 37,440 | 72,540 | 652 | 40,435 | 498,287 |
| June | 342,440 | 33,300 | 67,320 | 946 | 27,312 | 471,318 |
| July | 357,540 | 29,380 | 74,940 | 677 | 40,052 | 502,589 |
| August | 369,580 | 33,160 | 78,600 | 730 | 41,991 | 524,061 |
| September | 340,140 | 37,820 | 65,160 | 1,118 | 41,745 | 485,983 |
| October | 326,060 | 24,800 | 49,560 | 735 | 42,833 | 443,988 |
| November | 328,860 | 29,000 | 67,380 | | 40,312 | 465,552 |
| December | 336,500 | 45,100 | 69,210 | | 41,542 | 492,352 |
| Totals | 4,184,700 | 420,260 | 893,510 | 8,080 | 474,152 | 5,980,702 |

Table 2. Recycling totals for Emory University Hospital in the Fiscal Year 2016. "RECY-HIPAA" is shredded confidential white paper that is recycled. The "Baseline" is 2013.

When implementing these programs, EHC faced funding challenges. There were high expenses associated with purchasing recycling bins, paying personnel to handle the materials, and finding space in the facilities for storage (SHSTF Report 2010).

Figure 3. Emory University Hospital Midtown sets up facilities to "green the operating room" (SHSTF 2013).

According to Weisinger, EHC facilities also made efforts to reduce waste in sterile processing units; half of the instrument trays in operating rooms are now reusable rather than disposable (2017). Gowns, too, are now sterilized on site, reducing the amount of waste going to landfill as well as landfill costs. "[This change] had a wonderful co-benefit of patients commenting on how much they preferred the soft cotton gown over the scratchy, disposable ones," Howett said (2017).

Table 3 shows that the total number of pounds of surgical gowns and towels used dropped significantly by 45,064 in Emory University Hospital and by 59,107 in Emory University Hospital Midtown from 2000 to 2010. Other facilities, including the Emory University Orthopedics and Spine Hospital (EUOSH), Emory Clinic at Executive Park (Exec Park), and Emory Ambulatory Surgery Center (ASC) do not yet show declines. Not only are waste reductions significant, but cost savings are as well. Between 2000 and 2010, EHC diverted over 3 million pounds of waste and saved over $700,000 through using reusable rather than disposable surgical gowns and towels (SHSTF 2011).

## Reusable Surgical Gowns and Towels

| | Emory University | Emory Midtown | EUOSH | Exec Park | ASC | System Wide |
|---|---|---|---|---|---|---|
| 2000 | 149,310 | 185,785 | 0 | 0 | 0 | 335,095 |
| 2001 | 165,865 | 187,510 | 0 | 0 | 0 | 353,375 |
| 2002 | 133,488 | 153,258 | 0 | 0 | 0 | 286,746 |
| 2003 | 124,601 | 160,679 | 0 | 0 | 0 | 285,280 |
| 2004 | 147,850 | 192,268 | 0 | 0 | 0 | 340,118 |
| 2005 | 143,786 | 201,898 | 0 | 0 | 0 | 345,684 |
| 2006 | 136,070 | 199,478 | 0 | 0 | 0 | 335,548 |
| 2007 | 141,839 | 196,710 | 0 | 0 | 0 | 338,549 |
| 2008 | 138,352 | 171,762 | 6,026 | 73 | 192 | 316,405 |
| 2009 | 105,607 | 132,699 | 18,149 | 7,081 | 3,266 | 266,802 |
| 2010 | 104,246 | 126,678 | 18,993 | 15,417 | 16,541 | 281,875 |
| Total LBs Saved | 1,491,014 | 1,908,725 | 43,168 | 22,571 | 19,999 | 3,485,477 |
| Total Red/White Bag Savings @ $.21 lb | $313,113 | $400,832 | $9,065 | $4,740 | $4,200 | $731,950 |

Table 3. Total pounds of surgical gowns and towels saved through reuse in five sectors of Emory University Healthcare and system wide from 2000 to 2010 (SHSTF 2011)

## Partnerships

In 2012, Weisinger began to assist EHC in waste reduction. One of Weisinger's first roles when she began working at Emory was to strengthen the university's relationship with MedShare, a nonprofit that accepts donated, unused, unexpired medical supplies and equipment to deliver to underserved hospitals and clinics (Weisinger 2017). According to Weisinger, Emory has had a strong relationship with the company since 2007. Anne Connor, a faculty member in the Nell Hodgson Woodruff School of Nursing who helped to start Sustainable Healthcare at Emory, started MedShare with her husband, and Emory was one of its first customers. By 2012, EHC had donated 159,000 pounds of supplies for the program (SHSTF Minutes 2012). Collection containers are located throughout EHC facilities for staff to deposit extra supplies, and volunteers from Emory also help with the operations aspects of MedShare on a regular basis. Table 4 shows that Emory's partnership with MedShare resulted in 28,715 pounds of donations with a value of $366,950 for just the Fiscal Year 2016. Table 5 provides data on donations that contributed to these values specifically from donor sites from Emory Specialty Associates, which is made up of Emory Healthcare outpatient care sites throughout Georgia.

| Emory Healthcare GIK Donor Sites | Pickups | Weight | MedShare Value |
|---|---|---|---|
| Emory Center for Rehabilitation Medicine | 1 | 217 | $ 1,050 |
| Emory Clinic | 8 | 3911 | $ 20,295 |
| Emory Clinic Executive Park | 4 | 69 | $ 1,539 |
| Emory Pain Center | 1 | 760 | $ 1,800 |
| Emory Saint Joseph's Hospital | 18 | 1,162 | $ 25,913 |
| Emory Surplus | 4 | 4655 | $ 30,058 |
| Emory University Hospital | 30 | 3,598 | $ 80,235 |
| Emory University Hospital Midtown | 40 | 5153 | $ 125,399 |
| Emory University Orthopedics and Spine Hospital | 15 | 819 | $ 18,264 |
| Emory Specialty Associates | 7 | 8100 | $ 56,354 |
| Winship Cancer Institute | 14 | 271 | $ 6,043 |
| **Grand Totals** | **142** | **28,715** | **$ 366,950** |

Table 4. Total donations from Emory Healthcare to MedShare for the Fiscal Year 2016 (Weisinger 2017).

| Emory Specialty Associates GIK Donor Sites | Pickups | Weight | MedShare Value |
|---|---|---|---|
| Emory at Acworth | 1 | 102 | $ 2,275 |
| Emory Heart & Vascular Center at St. Joseph's | 1 | 593 | $ 4,431 |
| Emory Lifesigns Atlanta | 2 | 2,115 | $ 19,323 |
| MetroDerm, P.C. | 1 | 2,561 | $ 5,079 |
| St. Joseph's Medical Group | 1 | 223 | $ 4,234 |
| The Heart Clinic | 1 | 2,506 | $ 21,012 |
| **Grand Totals** | **7** | **8,100** | **$ 56,354** |

Table 5. Donations from Emory Healthcare Specialty Associates donor sites to MedShare for the Fiscal Year 2016 (Weisinger 2017).



Figure 4. Emory physicians and nurses packing MedShare donations (SHSTF 2012)

Emory University Hospital and Emory University Hospital Midtown also joined the Healthier Hospitals Initiative Less Waste Challenge, a national challenge to green hospital operations. EHC aligned itself with other companies, such as Stryker and Stericycle. Associate Administrator of Emory University Hospital, Catherine Maloney, made the decision to partner with these companies in 2014 to evolve the landfill diversion program from an ad-hoc implementation across various facilities to a more focused implementation at Emory University Hospital and Emory University Hospital Midtown (Weisinger 2017). According to Maloney, EUH and EUHM use a large amount of instrumentation in operating rooms and procedural areas which can be reprocessed given that the instruments are cleaned thoroughly and properly. "Being in a healthcare environment, we want to make sure we divert waste in ways that are safe for our patients and safe for our staff," Maloney said. "When waste is removed, we want to make sure that no one is exposed to something [he or she] shouldn't be exposed to. We want to be good stewards of all the resources that come to us by making sure that they don't go into landfill waste, but we also need to make sure that everyone is safe," Maloney said (2017).

Stryker puts recycling collection bins in every operating room for laparoscopic, arthroscopic/orthopedic, and energy devices in EUH and EUHM. Stryker has clients across the country that are able to buy these reprocessed devices.  Though EUH and EUHM have not yet purchased any of these devices from Stryker, it regularly contributes to the stockpile of instruments that are repurposed (Maloney 2017). Stericycle, too, assists the hospitals and clinics in recycling. EUH and EUHM work with Stericycle for multiple types of waste removal, including regulated medical waste/red bag trash for biomedical and hazardous materials, sharps containers which hold sharp objects such as needles, municipal waste that goes to landfill, cardboard materials which are often used to package medical equipment, paper, and plastic. EUH and EUHM's decision to sign the contracts with these companies was also made with the intent of conducting outreach and education on the operational training and pickup of recyclables through an on-site liaison who visits EHC facilities. Before Stericycle, EUH and EUHM had multi-stream containers, meaning that waste would have to be sorted into separate containers for plastic, white paper, aluminum, and other forms of waste. However, the facilities did not have enough space for these containers. When Stericycle partnered with EHC, it brought a single stream recycling program through which all forms of waste could be disposed of in the same container, saving space and saving staff members the effort of remembering which forms of waste needed to be put into each container (Maloney 2017). She added that EHC's decision to partner with these companies was both environmentally-friendly and cost-efficient:

> Across the country, it's standard practice to recycle cardboard and we were an early partner with Stericycle to utilize the single stream recycling.  EUH and EUHM were both one of the earlier groups to partner with Stryker for reprocessing surgical equipment. From a sustainability perspective, [EHC] wants to divert as much waste away from landfill as it can. And right now, in the healthcare environment we're all looking for ways to cut costs, and we can do that in a lot of different ways, including how we handle waste streams. With companies like Stericycle and Stryker, we have saved thousands of dollars over the lifetime of our contracts (Maloney 2017).

EHC negotiated a three year contract with both Stryker and Stericycle and is due to renegotiate a contract in 2017. In the Fiscal Year 2016, Emory University Hospital Midtown provided 16,330

pounds and Emory University Hospital provided 8,080 pounds of collections to Stryker for reprocessing (Weisinger 2017).
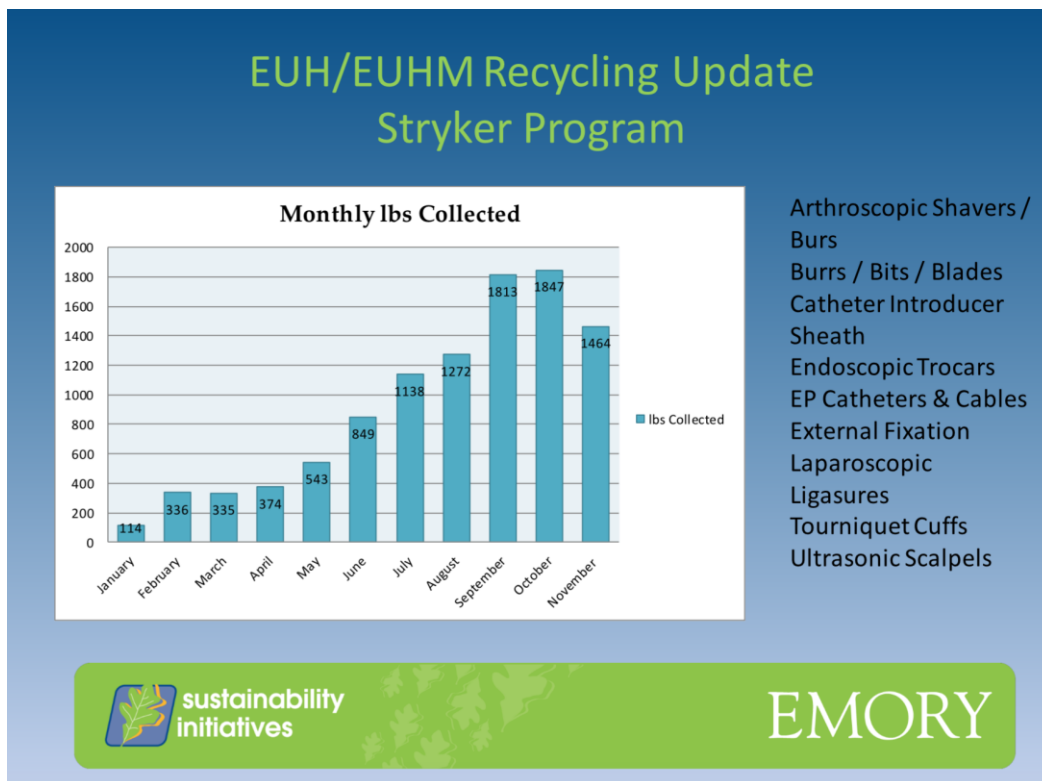


Figure 5. Emory University Hospital and Emory University Hospital Midtown's partnership with the Stryker Program diverted thousands of pounds of waste through operating room equipment (SHSTF 2014)

According to a July 2014 press release, Emory Saint Joseph's Hospital has its own waste conversion system on site—the Chem Clav, which "sterilizes and converts [regulated] medical waste to landfill waste." Emory has now had this technology for over 20 years. In addition, Emory began to utilize reusable sharps containers—containers used to hold medical needles— rather than disposable ones. In 2010, Emory's commitment to the Stericycle Sharps Management Service prevented 10,694 pounds of $CO_2$ emissions, 18,292 pounds of plastic, and 883 pounds of cardboard (SHSTF Report 2010). Maloney also described other waste diversion efforts at EHC:

> We wanted to find a way to get our waste out of landfill and to get it recycled and repurposed—even with something as simple as K-Cups in patient and family waiting rooms and staff break rooms. We don't use K-Cups anymore. We now use Flavia for coffee, which is like a K-Cup, but the packets are recyclable and can be repurposed for bicycles, tires, and other products… Waste diversion is also tied in with linen. If scrubs, gowns, sheets, or other linens become soiled, staff sometimes incorrectly put them in biomedical waste when these can be safely and properly cleaned to be reused… Through EHC's partnerships [with Stryker and Stericycle], our staff has evolved to be better stewards of the environment (2017).

Maloney added that EHC's facilities are beginning to repurpose blue wrap, a material used to cover sterilized hospital instruments before procedures. According to the Report of the Sustainability in Health Sciences Task Force for 2010:

> With regard to medical waste volumes, Emory saw a 31% decrease in the number of medical waste sharps containers collected per month, a 26% decrease in the pounds of medical waste picked up per month, and a 24% decrease in the medical waste costs per month from April through June of the 2009-2010 Fiscal Year (FY) when compared to the previous FY.

By 2012, these programs were saving Emory University Hospital $7,000 per month and eliminating 40,000 pounds of plastic waste in 2012 (SHSTF 2012). Various laboratories at Emory also now recycle discarded research solvents instead of sending them to chemical disposal facilities, which decreases the quantity of disposed chemicals in EHC and saves costs for the laboratories (SHSTF Report 2010). Figure 6 demonstrates that Emory University Hospital's municipal solid waste and regulated medical waste were lower than industry averages in 2016 and show decreases since 2013 (the baseline year). In 2016, for Emory University Hospital, 22% of waste was recycled, 8% was regulated medical waste that could not be recycled, and 70% was municipal solid waste (landfill waste). In 2016, for Emory University Hospital Midtown, 25% of waste was recycled, 6% was regulated medical waste that could not be recycled, and 69% was municipal solid waste (landfill waste). Despite these important projects and the behavior and attitude changes they reflect, Figure 7 from Emory University Hospital and Figure 8 from Emory University Hospital Midtown illustrate that landfill waste still makes up a significant percentage of total waste. Please see Amelia Howell's report, "Emory's History of Waste Diversion and Water Conservation at Emory," to learn more about waste sustainability at other parts of Emory University.

## EUH Hospital Baseline



4%
9%
87%

MSW
RCY
RMW

## EUH Hospital YTD Total



0%
8%
22%
70%

MSW
RCY
RMW
Reprocess

## EUH Midtown Baseline



6%
7%
87%

MSW
RCY
RMW

## EUH Midtown YTD Total



0%
6%
25%
69%

MSW
RCY
RMW
Reprocess

## Industry Average
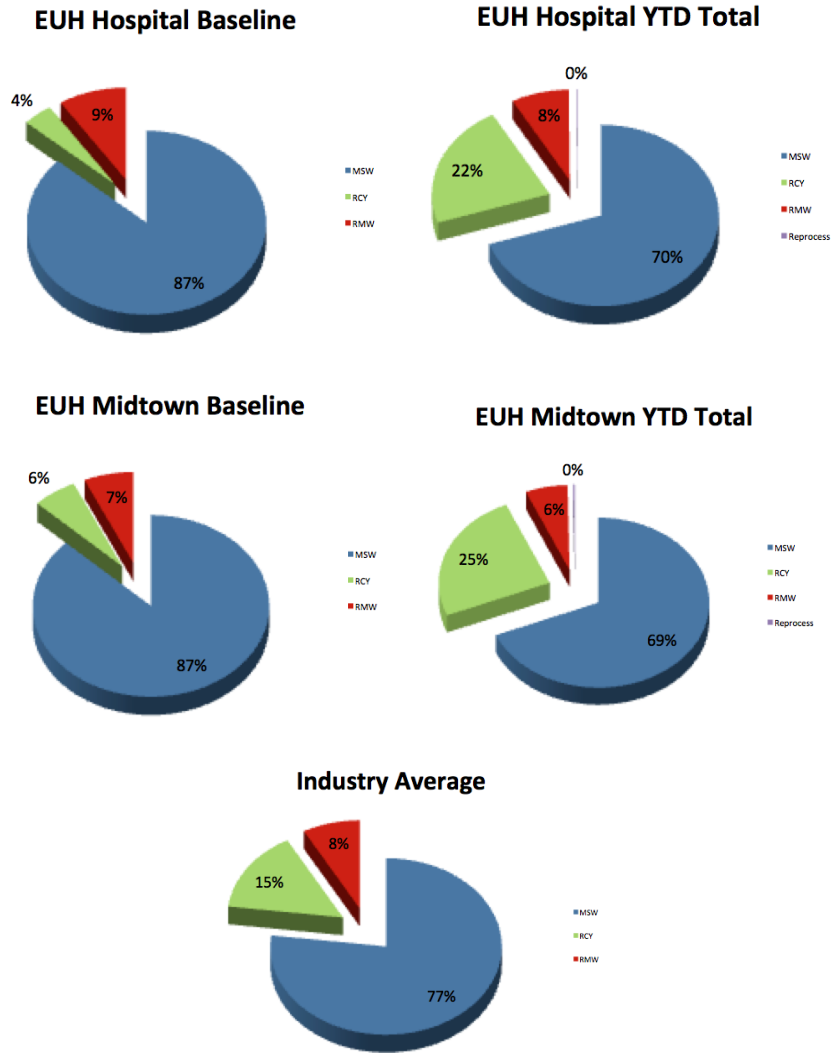


8%
15%
77%

MSW
RCY
RMW

Figure 6. Waste totals for Emory University Hospital in 2013 (EUH Hospital Baseline), Emory University Hospital Midtown in 2016 (EUH Hospital YTD Total), Emory University Hospital Midtown in 2013 (EUH Midtown Baseline), Emory University Hospital Midtown in 2016 (EUH Midtown YTD Total), and the healthcare industry. The green portion represents recycled waste, the red portion represents regulated medical waste, and the blue section represents municipal solid waste (Weisinger 2017).

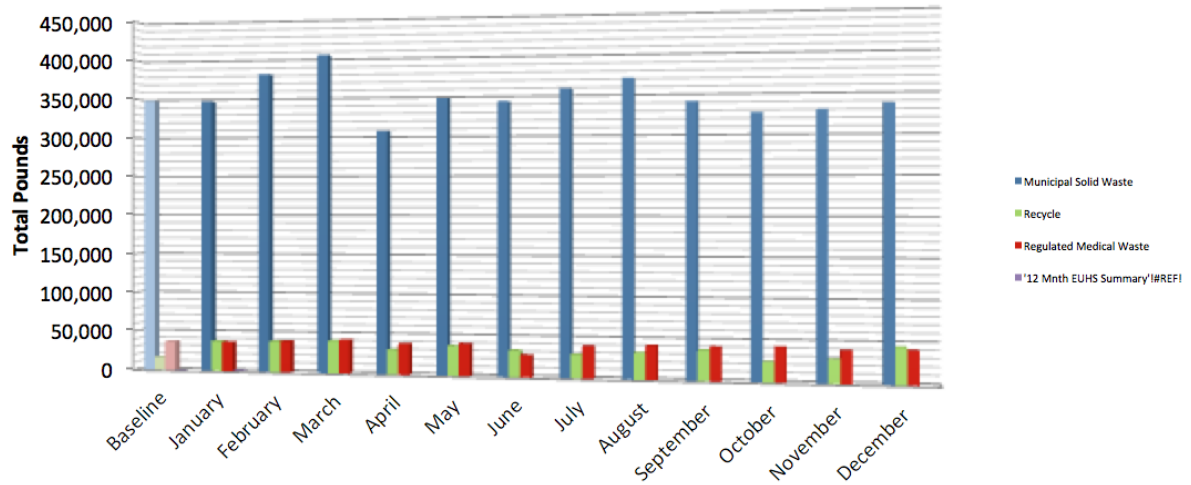## EUH Hospital Waste Totals



Figure 7. Emory University Hospital Waste Totals for 2016 (Weisinger 2017)

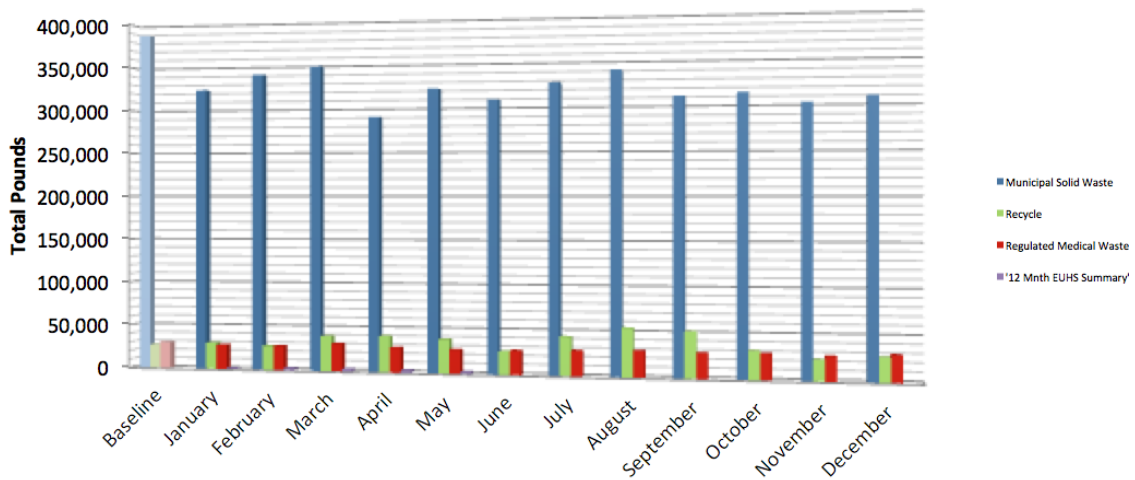## EUH Midtown Waste Totals



Figure 8. Emory University Hospital Midtown Waste Totals for 2016 (Weisinger 2017)

## Energy and Water Reduction

In *Green Healthcare Institutions: Health, Environment, and Economics*, Howard Frumkin and Christine Coussens note that the goal of hospitals is to care for the ill to return them to a more positive state of health, and the physical hospital setting is essential to this because "positive design integrates risk reduction with experiences that promote emotional, psychological, and social well-being," (2007: 71). Along these lines, though both energy and water have some of the most "adverse environmental impacts" due to their high use in buildings, they are also some of the best ways that sustainability programs can have both positive financial and environmental

effects (Creighton 1999:63). Overuse of energy and water can lead to enormous costs, and by implementing programs to limit the use of these resources, Emory hospitals and clinics have become more environmentally friendly and cost effective.

**Energy: Energy Wheels and the Atlanta Better Buildings Challenge**

According to the task force's 2010 State of Sustainability in Emory Health Sciences Report, EHC operations are large enough to have their own heating and cooling systems. In terms of air-conditioning and ventilation, several hospitals, including Emory University Hospital Midtown and the Winship Cancer Institute, installed enthalpy energy wheels. In winter, this system exhausts air from the building through the wheel, transfering heat to the incoming cold air, and in the summer, it pre-cools the outside air. The enthalpy wheels can cost half a million dollars, but Emory Healthcare found them to be a good investment, returning their cost in roughly five years.

To improve upon energy and water reduction even further, Emory University Hospital Midtown joined the Atlanta Better Buildings Challenge shortly after the program launched in 2011. The goal of the project was to provide a designated and quantitatively structured path towards improvement (Peek 2017). According to Director of Facilities Management Sarah Peek, who oversees Sustainability Initiatives at Emory University Hospital Midtown, this program provided free assessments—conducted in 2013—for Emory to receive recommendations on how to prioritize energy and water consumption reduction in buildings that were "energy hogs" (2017). The assessment found that Emory's hospitals and clinics make up 32% of the total energy use of Emory University and EHC, and Emory began implementing these recommendations to change this measurement by 2014 (SHSTF Minutes 2013). Figure 9 provides a comparison between four sectors of Emory, showing that clinics and hospitals make up the sector with the second highest square footage and the second highest percentage of total energy use across Emory. In 2016, its staff was able to look back at the data from 2014 and 2015 to refine their plans (Peek 2017).
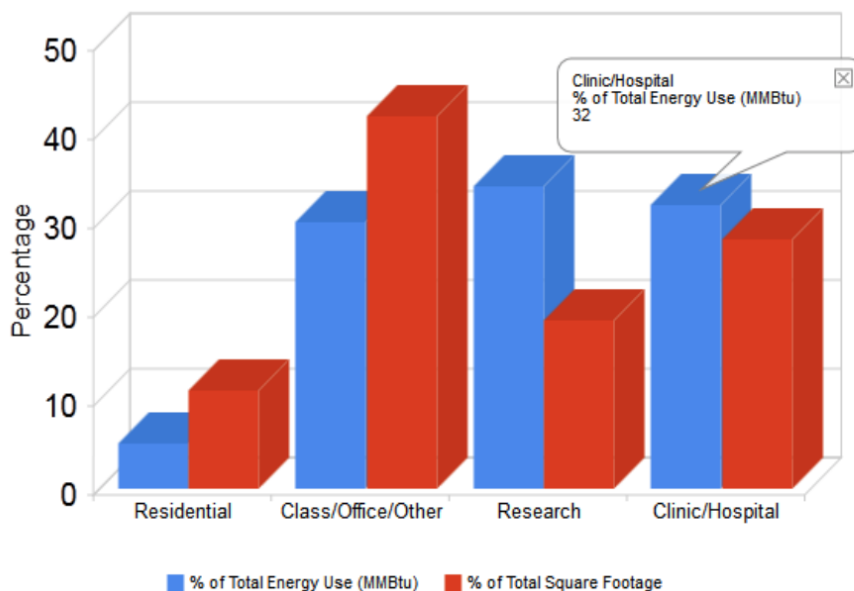


Figure 9. Total Energy Use and Total Square Footage for Four Sectors of Emory in 2013 (SHSTF 2013)

The assessment found that Emory was using unnecessary amounts of energy during hours in which the hospitals were not heavily used, and based on these results, Emory was able to make recommendations for change. For instance, Peek noted that Emory installed timers in various buildings to shut down lights and energy when the buildings were not being used during evenings, weekends, and holidays (2017). Despite an initial concern that hospitals must be in service during all hours every day for emergency care of patients and overnight patients, Peek found that this was unnecessary; many of the buildings contributing to high energy consumption in healthcare were purely administrative. "Employees would come into some of the administrative buildings at 7:00 a.m. and leave at 5:00 p.m., yet these facilities were still being run as if they were used 24/7," Peek said (2017).

In addition, Emory clinics remodeled in the past seven years use motion detectors to manage lights, not only in hallways and common areas, but in examination rooms, according to Senior Business Manager of Ophthalmology at Emory University, Mallard Benton (Benton 2017). Conversely, Clinic B temperature controls have not been efficient enough to allow for the removal of space heaters, he added. While clinical areas still use energy during all hours of the day, shutting down these areas of the healthcare system reduced energy consumption "tremendously," according to Peek (2017). By 2014, Emory University Hospital Midtown estimated $365,000 in annual savings through the Atlanta Better Buildings Challenge (SHSTF Minutes 2015).

According to the Emory Office of Sustainability Initiatives website, the following health sciences and healthcare buildings have received a LEED Silver rating as of March 2017:

- Whitehead Institute for Biomedical Research, 2002
- Yerkes Neuroscience, 2009
- James B. Williams Medical Education Building, 2011
- Health Sciences Research Building, 2015

In addition, Winship Cancer Institute received a LEED Certified rating in 2005 and the Pediatrics buildings was rated LEED Certified in 2009. The Emory University Hospital Tower will be completed in 2017 and is expected to achieve LEED Silver certification (Weisinger 2017). Emory University Hospital Midtown is also enrolled in the Leaner Energy Challenge of the Healthier Hospital Initiative, which provides support to healthcare institutions in increasing energy efficiency and finding environmentally-friendly energy alternatives (Weisinger 2017).

**Energy: Retrocommissioning**

According to David Pugh, building designers and engineers want to be on the forefront of sustainability; in this sense, they use the knowledge they gain from retrocomissioning, the fixing of aged equipment and buildings for higher efficiency. This knowledge is used to develop plans for energy management for future construction projects (2017). Pugh added that some of Emory's hospitals were built as far back as the 1970s, and these buildings do not recirculate air through closed spaces more than once, making energy use less efficient.

In contrast, EHC is adding a Tower to Emory University Hospital, which will include diagnostic and treatment spaces, anesthesia pre-operative services and radiology in addition to a food court and underground parking deck. The Tower is set to open in 2017, according to an Emory News Center press release. Emory expects this building to achieve a LEED Silver rating. "So while we have older buildings that can't always be fixed and made as efficient as some of our other buildings, we make sure that all of [Emory's] newer buildings are carefully planned and thought out," Pugh said (2017).

Pugh emphasized the large size of hospitals and the fact that Emory University Hospital is over one million square feet in area, and he noted that this large size contributes to easy opportunities for energy waste (2017). Air filtration systems, in particular, contribute to energy consumption because hospitals need fresh air in patient and procedure rooms to ensure that bacteria and germs that patients may have are not circulated into other rooms. To combat these potential issues, EHC engages in retrocomissioning to fine tune systems and ensure that they are as efficient as possible and to save as much money as possible.

In an October 2014 press release, Emory announced that its retrocommissioning of Emory University Hospital Midtown saves nearly $350,000 each year. In a follow-up December 2014 press release, Emory noted that it saved nearly $186,000 in energy reduction savings for its Translational Testing and Training (T3) Labs facility in Atlanta in 2013 due to enrollment in the Atlanta Better Buildings Challenge. Emory University Hospital Midtown's Summit Parking Deck and T3 Labs also received top performer recognition for energy savings in 2014, according to the Atlanta Better Buildings Challenge's website. According to Howett, the most important aspect of Emory University Hospital Midtown being the first building at Emory to join the Atlanta Better Buildings Challenge was that it acted as a pilot for the program, and its success set the stage for other Emory hospitals to join the Challenge (2017). Please see Katelyn Boisvert's report, "Carbon, Climate and Co-Generation: A History of Emory's Energy and Climate Commitments" to learn more about energy sustainability in other parts of Emory University.

**Water**

According to Peek, Emory has had success in reducing energy consumption, but its next goal is to become more efficient in water consumption (2017). In its 2010 State of Sustainability for Emory Health Sciences Report, the task force noted that Emory Healthcare's facilities have taken a number of measures to conserve water. For example, Whitehead Biomedical Research Building and Emory Children's Center extract humidity out of the atmosphere and link it to a chiller plant, saving nearly 4 million gallons of water. In addition, many of Emory University Hospital's LEED-certified buildings use low flow water fixtures that limit the amount of water per minute flowing through faucets, shower heads, toilets, and other fixtures. However, these actions were just a start to water conservation.

"We are just on the cusp of working with water reduction because of the sensitivity to the use of water in a hospital," Peek said (2017). Peek also noted that there is a general belief that hot water is associated with being clean and killing germs, making it difficult for Emory to reduce the flow and temperature of the water (2017). Emory had to "step back and rethink" how it could convince clinicians that being sustainable does not come at the cost of the patients' safety and

health, she said (2017). Peek noted that finding these solutions required a "delicate balance" because "not only [is Emory Healthcare] trying to save energy and be more sustainable, but [it is] are also trying to save lives," (2017).

In spite of these unique challenges, Emory began to work with clinicians to agree upon standards. In 2015, Weisinger supported the development and launch of new Linen Utilization Guidelines, a project borne out of Emory Healthcare's Value Acceleration Program (VAP) to decrease water usage and utilize clinical staff time more efficiently. Prior to the new guidelines, bed linens were changed daily regardless of need. Under the new guidelines, when Emory Healthcare patients have a short-term stay of three days or fewer, nurses assess the linens and only change them if necessary or requested by the patient (Weisinger 2017). In conjunction with the new guidelines, Emory Healthcare also began working with Standard Textile to buy pre-laundered linens, and in the fiscal year 2016, Emory's partnership with Standard Textile conserved 80,087 gallons of potable water and $54,379 (Charles 2017).

The Guidelines also limit the number of sheets, towels, and washcloths brought into patient quarters, so nurses only bring one set into each room unless they are requested to bring more. "Nurses usually like to be prepared, so they would bring stacks of towels and washcloths to patient rooms just in case," Weisinger said (2017). "But as soon as those previously sterile pieces of linen came into the room, they were not considered sterile anymore, so even if they were not used, they would have to be laundered." Please see Kelly Endres' report on Stormwater Management and Water Conservation at Emory to learn more about water sustainability at Emory University.

Additionally, the new Tower, which is set to open in 2017, will contain three bioswales, or landscape features that remove pollution from surface runoff water. This feature will allow the Tower to store 41,000 gallons of water, and the Tower itself will use 30 percent less water than a typical hospital would, according to an Emory University Hospital expansion newsletter.


**Food and Nutrition**

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When considering how to make healthcare a more sustainable field, dining options are not typically the first thought to come to mind. However, they are extremely interconnected; selecting foods with reduced environmental impact, such as low use of pesticides, intensive land use, and fertilizers, can also improve health and nutrition for patients (Creighton 1999:196).

**Pledges and Beginnings**

In its 2010 State of Sustainability for Emory Health Sciences, Emory's Sustainability in Health Sciences Task Force announced its commitment to the Healthy Food in Health Care Pledge and the Balanced Menu Initiative:

> _Healthy Food in Health Care Pledge:_
> Emory recently signed the Healthy Food in Health Care Pledge, established by Health Care without Harm. The Pledge is for fresh, local, and sustainable food, and demonstrates

a commitment to treating food's production and distribution as preventive medicine that protects the health of patients, staff, and communities. The Pledge includes a promise to minimize waste, educate the community about sustainable food, encourage vendors to supply food produced without pesticides, antibiotics or hormones, and use sustainable forms of agriculture. It additionally requires that signatories report annually on the implementation of the Pledge.

*Balanced Menu Initiative:*
This initiative is a partnership between Healthcare Without Harm (HCWH) and the Hunger and Environmental Nutrition (HEN) Dietetic Practice Group (DPG) of the American Dietetic Association (ADA). This initiative focuses on reducing total meat and poultry purchases by 20% over a year, [motivated by an understanding that] Americans consume more protein than is needed. [The initiative hopes] to offer more vegetarian options and use the savings from purchasing less protein to offset the higher cost of purchasing sustainable sources of meat, poultry, and fish. The hospitals are working to support this initiative.

According to Kip Hardy, Assistant Director of Food and Nutrition Services at Emory University Hospital, the beginning of sustainable food in Emory Healthcare began when the Sustainable Food Committee was founded in 2007 as part of the enterprise-wide sustainability initiative, and Lynne Ometer, Director of Food and Nutrition Services at Emory Healthcare, served as a founding member of the committee (Hardy 2017). Hardy joined the committee in late 2008 when she arrived at Emory. She noted that when she first began her job at Emory, there was very little intersection between sustainability and healthcare, but part of her position was to help Emory Healthcare source and promote more sustainable food options. To begin, she worked with Emory's food vendors to find information on where the food was coming from, leading Emory Healthcare to partner with Destiny Organics, the only certified organic food distributor in Georgia that could provide the hospital with sustainable foods in high enough quantity. Destiny Organics provided mostly packaged products, such as granola and Arden's Garden juices, with little attention to fresh produce. Most of these products were provided to retail dining facilities in the hospitals because the food could be priced at higher costs to accommodate the higher prices required to purchase them. However, Emory Healthcare had not yet determined how to make foods served directly to patients more sustainable.

Then, in the fall of 2012, Emory University Hospital began to use room service for patient meals, which led to drastic changes in its menus. Previously, the hospital had used a cycle menu for patients, Hardy said. Food would be cooked, chilled, and stored on carts that reheated or cooled right before meals. All of the patients in a unit ordered the food several meals in advance and received their food at a specified time. Following the shift to room service, patients were able to call the dining system and receive food made to order. The menu offers a higher variety of options on a single day, but has fewer options long-term because the menu remains the same. This provided the hospital with more volume buying power to buy foods for a month rather than for a single day. It also decreased waste because pre-made trays were not thrown out when patients did not want them. This saved money, which, in turn, allowed the hospital to afford higher quality items. Emory Healthcare systematically used this strategy of saving costs in one area to better invest into sustainable foods. Hardy also noted that the switch from a name brand

to a generic brand of cereal saved $8,000 in a single year, allowing Emory University Hospital to invest the savings into grass-fed beef in a cost-neutral endeavor.

"Overall, the process [to bring more sustainable food to Emory Healthcare] has been a slow process because every choice must be cost-effective," Michael Bacha, Executive Chef at Emory University Hospital, said. "Looking back, we've accomplished a lot, but during the process, we are just grinding away. The process never really picked up quickly, but the biggest impetus was probably the switch to room service for patient meals."

Now, Bacha notes that Emory University Hospital works with Common Market, a company that buys products from local farms. These products, such as lettuce which is grown hydroponically in Atlanta, are given to the patients. Common Market provides information on exactly which farm each food came from. The availability of this "food hub" strengthens Emory Healthcare's ability to offer fresh, local vegetables.

**Gardens**

By 2011, Bacha and David Horning, Assistant Director of Food & Nutrition Services at Emory University Hospital, began gardens on Emory's grounds to provide fruits and vegetables directly to patients for their meals, according to Hardy. In 2010, they had begun discussions to scout out spaces they could use. They ultimately began in the courtyard at the Emory University Hospital Education Annex before moving to courtyards in nearby research buildings. Now, the gardens are located on one-fourth of an acre of land behind Emory University Orthopedics and Spine Hospital. In 2016, over 400 pounds of tomatoes were harvested through these plots of land, Bacha said. He estimates that at least 95 percent of the food grown in the gardens goes straight to patients instead of to retail customers:

> Not much of the food we grow in our gardens goes to retail because it mostly goes straight to patients. That's how I prefer it. I feel like patients benefit the most…. This year, I heard one of our servers say "So and so is back and wants to know if you have any ripe tomatoes right now." Patients remember things like homegrown tomatoes… There's meaning behind it (2017).

Bacha and Hardy noted that to support sustainable food in Emory Healthcare, they had to take as many minor opportunities as they could, beginning by growing herbs through hydroponics in their offices and on filing cabinets in their departments. They also expend time and money that were not officially required of their employment. While they receive a small portion of grant money from the Emory Office of Sustainability Initiatives and minor funds from their departments in healthcare for the gardens, they often found themselves purchasing seeds and other products without reimbursing themselves in order to give the project the impetus it needed to continue.

Besides funding difficulties, Bacha, Horning, and Hardy also struggled to find labor support for the project. In addition to sporadic assistance from volunteers, they do most of the labor in the gardens on their own time as it is not a direct responsibility of their jobs. They have had hopes to put a greenhouse on the Emory University Hospital roof to grow more food, but they are struggling to determine who would do the labor needed for it if it were to come to fruition. At the

moment, the idea is on the backburner. In addition to the labor-intensive efforts needed to work in the gardens and produce vegetables and herbs, extra work is necessary to process the foods. For instance, onions purchased from outside sources may be pre-processed and diced, but the cooks in Emory's hospitals must put in extra work to complete these tasks when food is grown locally, Bacha said. Food such as lettuce, sweet potatoes, and cherry tomatoes are grown for this reason; they are not as labor intensive. "We don't really always have enough labor to manage," Bacha said. "That's why we chose to grow cherry tomatoes in our garden. We can pick them, wash them, and put them on a salad without putting other forms of labor into their production."



Figure 10. The gardens behind Emory University Orthopaedics and Spine Hospital (Emory Report 2016)


**Local Food Purchases and Education**

Emory also emphasizes the importance of sustainable foods, such as foods that meet US Department of Agriculture organic certifications, coffee that is shade grown and fair trade, and grass-fed beef from White Oak Pastures, a source of local food products. Emory Healthcare has used Springer Mountain chicken, which is grown without antibiotics, thereby lowering the risk of generating antibiotic resistance. Ninety percent of seafood met the Monterrey Bay Aquarium Seafood Watch requirements (SHSTF Minutes 2012). However, Bacha noted that Emory University Hospital has struggled to find free range eggs to serve. The eggs must be pasteurized, which is not generally done in a reasonable price range for the hospital.

From 2010-2011, sustainable and local food purchases for Emory hospitals reached eight percent of all purchases, and from 2015-2016, the hospitals reached a system-wide average of 10.7% with a breakdown of Emory University Hospital with 16%, Emory University Hospital Midtown with 9.8%, and Emory Johns Creek Hospital with 9.0%. The other three hospitals, Emory Saint Joseph's, Emory Orthopedics and Spine, and Emory Wesley Woods, all reported from 6.0 to 6.3%. The focus on local foods also extends to local vendors, such as coffee roasted locally in Decatur and dairy products from Pearson Farms, Atlanta Fresh Greek Yogurt, and Dreaming Cow Creamery, which decreases the environmental impact of transportation costs. By 2012, 20% of EHC hospital cafés produce came from local (produced in Georgia) and/or regional (produced in seven states surrounding Georgia) farms (SHSTF Minutes 2012).

Soon after, Emory's hospitals furthered their commitment to sustainability through food and nutrition by beginning to provide patients with whole foods, which naturally support the digestive process—a process that generally slows down when a patient lies in bed for a long period of time (Howett 2017). By replacing supplementary fibers with whole foods and using fresh fruits and vegetables, Emory also improved its standards for food in healthcare settings, which are typically associated with processed, frozen foods that are easy to prepare. Much of the hospital's soup stocks are also homemade to ensure low sodium and high nutrient and mineral contents. "It's ironic to have unhealthy foods in hospitals," Howett said (2017). "Patients need healthy, healing foods."

In the new Emory University Hospital Tower, which is set to open in July 2017, Emory plans to host a kitchen space for cooking demonstrations and classes on healthy eating to educate patients, family members, and other hospital visitors, according to Bacha. The curriculum for the space will begin in September or October of 2017, Hardy said.

**Waste and Composting**

Emory hospital dining facilities began to use compostable containers instead of Styrofoam in 2010, Bacha said. He added that this was a long process that was budgeted to change over the course of several years because Styrofoam is cheap, and its removal highly altered the hospitals' budgets. Hardy also attempted to find compostable straws for patient meals, but noted this was not an option. The compostable straw options produced are not bendable, and patients require bendable straws to assist them in picking up their drinks and getting it to their mouths. The hospitals also reduce waste as much as possible through using bulk condiment containers rather than individual packages. However, this process is difficult because patient meals are served to them individually on trays. Hardy hopes that future ideas will solve these issues through innovative intersections between healthcare and food.

"At this point, we have picked most of the low-hanging fruit, and we need to get more creative," Hardy said.

Please see Dr. Peggy Barlett's report to learn more about sustainable food in other parts of Emory University.

**Changing Attitudes, Curriculum, and the Future**

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The Ponderosa Project at Northern Arizona University integrates issues of environmental sustainability into 120 courses across the school's curriculum, including many wide-ranging and interdisciplinary fields (Chase, Rowland 92). These courses aim to educate students through a shifting curriculum in order to develop their attitudes into a more positive outlook on sustainability, allowing them to make change for future generations. Emory University has also begun to change its curriculum; the Piedmont Project was modelled after the Ponderosa Project and began at Emory to educate faculty and integrate sustainability challenges into course

curriculums. In terms of healthcare, steps have been taken in a similar direction, beginning in the Emory University School of Medicine.

**Changing Attitudes**

There has been considerable interest in the intersection between the environment and health for a significant period of time. A study in the *Journal of the American Medical Association* found that traffic controls put in place during the Atlanta Olympics reduced the number of asthma emergency care visits and hospitalizations by 41.6 percent in children of ages 16 or younger, due to limitation on air pollution (Friedman *et. al* 2011). Emory Healthcare's response to such interest in environmental health was delayed, partially due to the challenges it faced in implementing sustainability. At the beginning of the initiative, there was pushback. Howett describes:

> When I started working at Emory, we did not have much recycling. There was a strange perception that bringing recycling into a healthcare space was bringing something really dirty… We were eventually able to work through that, but it took time. It was all about culture change… We just had to engage the rest of our healthcare system and prepare everyone for the necessary changes (2017).

Pugh agreed that not everyone is always on board with changes toward sustainability. He noted that separating trash for recycling and compost takes time, energy and effort that not everyone is willing to put in, adding that it was the job of others to make these tasks more simple so others could be more accepting of the changes (2017).

With time, culture change began to occur and attitudes began to change to the point where very few people give recycling bins in hospitals a second thought. As recycling became more common in other industries and locations, people became more accepting of sustainability in healthcare as well, Pugh said. He added that during the time he has been at Emory, healthcare staff have requested advances in sustainability because they would see recycling facilities in their homes and other buildings and expected similar efforts from healthcare industries (2017). Sarah Peek added that hospitals and clinics should be leaders in the sustainability movement, adding that doing so can bode well for both the environment and the hospital's reputation as an establishment that acts as a good steward of the money given to it (2017). "I see us [healthcare workers] becoming partners with sustainability because the more efficient the hospital becomes, the more we are seen as not just stewards of our patients, but also stewards of the energy that serves our patients," Peek said (2017).

To Mike Mandl, acclimation of healthcare workers and administrators to sustainability occurs when they begin to realize that the health of people plays a role in addition to the Triple Bottom Line of sustainability:

> I was talking to Ciannat [Howett] about wanting people over time to start thinking about the health of people as a critical element of sustainability. We're often concerned with sustainability in financial, social, and environmental terms, but what about the sustainability of people? A big element of a community is how healthy people feel both

mentally and physically…. I didn't have as broad of a perspective about this [when I came to Emory] as I had when I left [Emory]. I have a lot of interest in thinking about the Emory community as a microcosm for new healthcare approaches, and I am thinking a lot about healthcare's role in facilitating a healthy Emory community… Healthy food is a big part of that. Exercise is a big part of that… To me, all of these things are about sustainability (Mandl 2017).

**Curriculum and Student Input**

Many of Emory's faculty members believed that in order to change attitudes of students so that they would see sustainability in healthcare in a more positive light, they must first educate them on the importance of sustainability, particularly through environmental health. To do so, Emory University's School of Medicine took a similar approach. J. William Eley led the revision of the school's curriculum, which was completed in 2007 and took three years to create. Eley, who serves as Emory's School of Medicine Executive Associate Dean for Medical Education and Student Affairs, Graduate Medical Education, and Continuing Medical Education, noted why he believes it is important to consider environmental health in the context of a medical student's education:

> My whole life, I've been an ecological radical, if you will. [Through the School of Medicine's curriculum], I just gave Emory the opportunity to think about health in the context of culture and the environment. [Health] is larger than just what goes on between a doctor and a patient. We don't expect our students to all become ecologists, but we do hope they become advocates for a healthy environment and have a big picture of what factors into health… It's great for our students to hear that there are social determinants of health, and those can even cause more damage than not having healthcare (2017).

Through the curriculum, students in the School of Medicine are introduced to environmental and social determinants of health from their first week in the school through lectures about medical anthropology, air pollution, urbanization, neighborhood geography, water issues, poverty, and violence (Eley 2017). This week particularly guides students to reflect on their culture and how it relates to healing. This focus is then integrated into the school's courses and experiential learning, including a community service project that allows students to look at social factors, such as poverty, that influence health. The School of Medicine also has thread leaders, who consider the attitudes, knowledge, and behaviors that Emory ultimately wants it students to have by their graduation and shape these considerations into curriculums and assignments that guide students to these outcomes. Emory currently has two thread leaders for social medicine to ensure that students are introduced to a wide variety of factors that influence one's well-being.

Soon after these changes, Emory's Nell Hodgson Woodruff School of Nursing redesigned its curriculum in 2010, beginning with its Master's Program (Maeve Howett 2017). The curriculum focused on wellness and added lectures in environmental health, how to conduct environmental health screenings, and the adverse effects of an unhealthy environment on the poor. In these lectures, students learned to consider the environment when working with both chronic and acute illnesses, and shortly after the master's program was adjusted, the undergraduate curriculum followed.

The Emory University Department of Physical Therapy also followed suit. A committee of students won a Sustainability Incentives Fund Award from the Emory's Office of Sustainability Initiatives in 2014 for their "Greening Physical Therapy" proposal to develop a website promoting the cause and educating others (Goldman 2015). In an Emory University [press release](), Emory Associate Professor of Physical Therapy, Sarah Blanton, said that she often had to consider environmental issues while making recommendations for her patients, such as considering that they may not have any safe sidewalks to carry out a prescribed walking plan.

Besides curriculum changes, students also became involved with sustainability due to their own personal interests in it. In August 2012, Brandi Gunn, a student at Emory, and Dr. Jeremy Hess, surveyed patients at Emory University Hospital, ultimately finding that a majority of patients do care about Emory's commitment to sustainability (Weisinger 2017). Convincing administrators, who believed patients were too concerned with their own health to care about even the smallest sustainability efforts was a challenge for Emory's Office of Sustainability Initiatives. Weisinger recounts:

> Patients do care about whether a healthcare facility is conscious of efficiency, cost-savings, and impact on the environment… So it was really validating when we were really able to prove to the healthcare administration that patients care… But we do still get some pushback from administrators who are used to the old way of thinking. A lot of the feedback we get from them is that patients are much too concerned with their health to care about where they put their plastic water bottles. But they do care, they do want to recycle, and they do want to know that our hospitals are being energy and water efficient… So there's still some tension, but this data was helpful in helping us convince administrators to at least give patients the opportunity to make sustainable choices (2017).

Hess, who worked as Gunn's advisor for the study, said that while most patients would not choose a healthcare provider solely based on its commitment to environmental sustainability, it was still of concern to them, and most respondents did not believe that commitment to sustainability is linked to a detraction from a focus on clinical care. Though the research results were never published, Weisinger saw their findings as an impetus for Emory Healthcare's road towards sustainability (2017).

On April 30, 2013, Emory graduate students, including Rebecca Philipsborn and Howard Chiou planned a symposium on environmental sustainability in healthcare entitled "First, Do Earth No Harm," which had 96 audience members in attendance (Chiou 2017). According to Chiou, the symposium had the following goals:

- Educate students in medicine, nursing, allied health, global health, other interested graduate students, and the Pediatric Environmental Health Specialty Unit's Break the Cycle 8 conference members on fundamental issues within environmental sustainability in healthcare.
- Provide a forum of discussion to connect broader issues with sustainability with practices at Emory University.

- Increase awareness of initiatives at other institutions that may act as potential models for environmental sustainability in healthcare.
- Model environmentally sustainable practices through a sustainable lunch, composting, and through teleconference with a Kaiser Permanente representative (rather than increasing carbon emissions by flying the guest speaker here).
- Inspire future discussion or action by session participants.

"The conference's basic goal was to understand the challenges to sustainability in healthcare as well as possible solutions," Chiou said. "This sounds incredibly simple, but we did not talk about these issues in medical school, and I felt like this was an important topic for us [Emory] to discuss in our community."

Four panelists spoke at the event:

- Dr. Ted Eytan, MD – Physician Director, Kaiser Permanente Center for Total Health
- Dr. Jeremy J. Hess, MD, MPH – Faculty, Emory University School of Medicine Emergency Medicine, Rollins School of Public Health Environmental Health
- Dr. Maeve Howett, PhD, RN – Co-Director, Southeast Pediatric Environmental Health Specialty Unit, Nell Hodgson Woodruff School of Nursing
- Brandi Gunn, MS4 – Medical Student Researcher, Emory University School of Medicine

Chiou noted that the event "generated considerable interest" and "highlighted how much student interest there [was] around the topic," but added that audience members wished the session could have been longer with more opportunities for discussion. However, he believed that the conference met its goal of raising awareness for issues and getting students more involved. He recounts:

> I think when I helped to put this conference together, I was really hoping there would be tangible impacts down the line. I'm not sure if there were any, but as far as I can tell, it may have helped to facilitate some discussion. For me, the conference was a way of singling out what the issues actually were and in which domains we [healthcare providers] could actually have influence… We also had a lot of student support. One thing that students may have that faculty do not is time and energy… Faculty can often be very busy with their own research or teaching, but students have more flexibility and can make a big difference (Chiou 2017).

As an example, Chiou noted that he, personally, was not studying environmental sustainability, but that it was a personal interest of his that he wanted to learn more about. Please see Meggie Stewart's report, Teaching the Future: Academic Infusion of Sustainability at Emory, to learn more about curriculum changes towards sustainability at Emory University and Jamie Nadler's report, "Emory Sustainability History Report: Campus Life," to learn more about student input.

**Challenges and the Future**

Paul Faulstich from Claremont College stated that "successful partnerships should not be measured by the absence of conflict, for this may simply be an indicator that difficult issues are

not being addressed" (2004: 222). In other words, if Emory Healthcare does not face conflicts in its journey towards sustainability, it is unlikely that significant strides have truly been made. Rather, it is through this conflicts that great achievements are reached. Emory Healthcare has faced challenges in implementing sustainability, particularly due to unchanging attitudes and a delayed start when compared with the university side of Emory.

Pugh noted that he thinks EHC became a leader in sustainability when its employees realized and "latched onto" the link between healthy patients and a healthy environment (2017). "[Healthcare is] not just about trying to make a person healthy," Pugh said. "[Patients] need to have a healthy lifestyle, and the environment has to be healthy for them to have a healthy lifestyle."

This recognition was also important to Hess, who felt that even though Emory University trustees were committed to reducing carbon footprint for Emory as an entire enterprise, there was much more traction for this to happen on the university side. He recognized the delay in bringing sustainability efforts into healthcare, noting that it "just wasn't the fire that [Emory] needed to put out at that time."

This delay may be partially due the geographical distance between EHC facilities and Emory University. Maloney said that the EHC's connections with Kelly Weisinger and Emory's Office of Sustainability Initiatives is critical (2017). Because EUH is located geographically close to Emory University's campus, she and Weisinger initially promote many sustainability initiatives in EUH with the intention of spreading these initiatives to EHC's hospitals and clinics located farther away in order to provide those facilities with the "opportunity and avenues to be a part of the broader sustainability programs," (Maloney 2017).

Assistant Professor at Emory University School of Medicine and member of the task force Demetrius Woods noted that in his opinion, the biggest challenge the task force faced was "getting people from different backgrounds in terms of professional work to speak the same language" (2017). With varying levels of experience with sustainability and different positions in the medical field, it can be difficult to have everyone agree on common methods of reaching a goal. He noted that as attitudes began to change, the group began to see a common mission and the overlap between their different healthcare fields and positions (2017).

In the future, EHC hopes to further its efforts towards sustainability. By continuing to expand on already existing projects and by continuing to work with the various hospitals and clinics and create planned sustainability programming, Emory Healthcare will limit its negative impact on the environment and change attitudes so that other students, faculty, and staff will see reason to support sustainability in healthcare efforts in the future. "We are always looking to do more because we know that more can always be done," Peek said (2017).

The 2015-2025 Emory Sustainability Vision and Strategic Plan now directly identifies Emory Healthcare as a critical unit in advancing sustainability alongside Emory University. Though the first Vision applied to Emory Healthcare, it did not include Vision goals tailored specifically to Emory Healthcare. The second Vision plan outlines detailed goals and new commitments for sustainability in healthcare and emphasizes the importance of sustainable healthcare units and a

commitment of healthcare professionals towards sustainability—a significant and striking step forward since Emory's first Sustainability Vision and Strategic Plan in 2005.


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