

Green Hospitals in Healthcare: Are they needed?

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ABSTRACT

The green hospital concept in the healthcare sector responds to increasing customer expectations and minimizing the total cost of by using the available resources efficiently. The concept of the green hospital allows designing and implementing environment-friendly buildings that can overcome the challenges such as reducing footprint of the healthcare sector. In this paper, we review the global green and health hospitals organization as well as reviewing some of the greenest hospitals in the United States. We discussed the advantages of healthcare organizations to use greener hospitals to better serve patients and their relatives, protect nature and prevent environmental pollution for future generations.

Keywords: Green Hospital, Green Building, Sustainability

1. INTRODUCTION

The medical institutions such as hospitals in health sector industry essentially provide services to patients and their relatives. The provided services are 24 hours a day and 7 days a week with a team consisting of medical, administrative and support staff. The global green and healthy hospitals community includes more than 1200 members in total from 60 countries representing 36,000 hospitals and health centers [1].

Global Green and Healthy Hospitals (GGHH) organization brings health organizations and hospitals from around the globe with the shared goals of minimizing the environmental footprint of the health sector, thus enhancing the public health in general. The ten goals of the GGHH is given below [1].

- Leadership: put environmental health first
- Chemicals: aim for safer alternatives of the chemicals
- Waste: use safe disposal techniques for healthcare waste
- Energy: emphasize the use of clean and renewable energy generation
- Water: minimize the water consumption of the hospitals
- Transportation: enhance transportation methods for patients and hospital staff
- Food: serve healthy food
- Pharmaceuticals: safe disposal of pharmaceuticals
- Buildings: Support green and healthy hospital design and construction
- Purchasing: Aim to buy more sustainable products and materials

Leadership in Energy and Environmental Design (LEED)[2] is one of the most well-known International Green Building certification systems used in the world. LEED was developed by the U.S. Green Building Council (USGBC). The LEED certification essentially means that the savings in electricity costs, lower carbon emissions resulting in healthier environments. LEED certified buildings ensure that the cycle from construction to operations of the building is highly sustainable due to materials used and procedures in place. LEED is flexible in the sense that it allows any building type (e.g., office buildings, homes, hospitals, etc.) to work towards certification. The customized LEED rating system also allows projects to obtain certification for existing buildings, interiors of the buildings, new constructions, and so on. In the United States, multiple cities within the majority of states have achieved LEED certification.

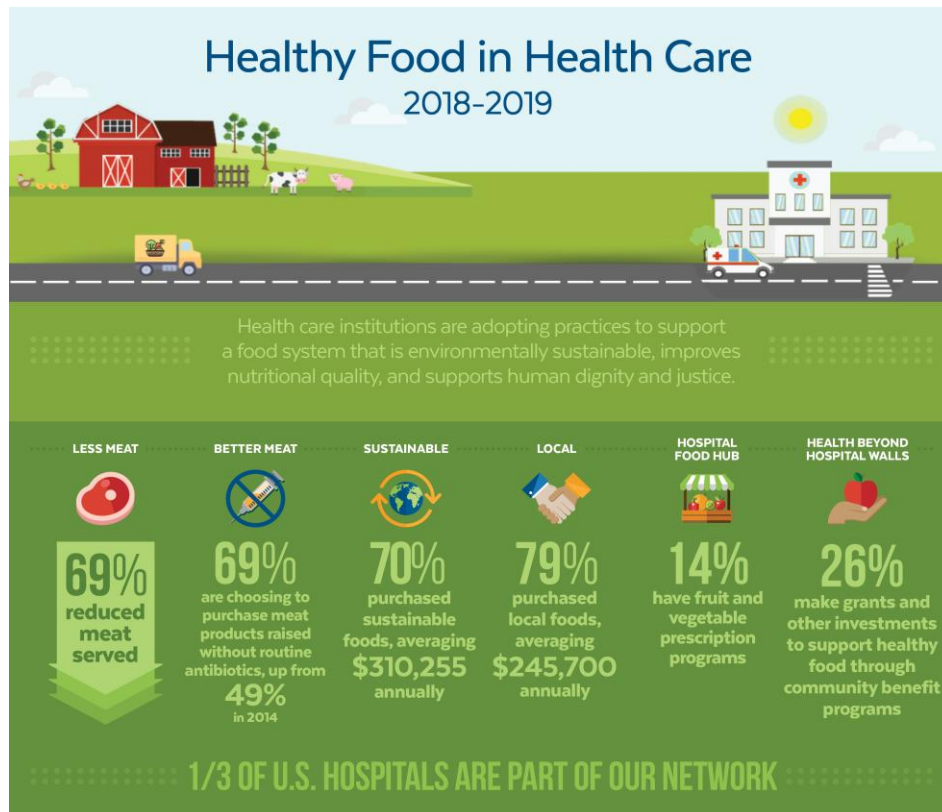


Figure 1: Healthy food in healthcare [3].

2. ADAPTATION Vs. BUILDING FROM GROUND UP

Although our main focus in this work is to answer the question of whether green hospitals are needed, we believe that it is worth mentioning the subject of monetary issues that can play a major role in the process. The cost associated with adapting green hospitals is one of the most concerning factors for the administrators. This brings up the issue of whether it is better for existing institutions to adapt to the green methods or to build new healthcare establishments from ground up altogether. In order to answer this broad question, in below we have studied and presented what it takes to be classified as green. By understanding each of these different attributes, individual entities across the nations can make an informed decision as to what is the best way for them to proceed. In turn, understanding what is involved in this process can also aid in determining whether there is indeed a need for green hospitals or not.

Here are couple of the major issues to be considered, first being the decision to whether implement all or some of the features of being green. For instance, a project involving tremendous number of changes on an existing infrastructure could prove to be more costly, then building the entire institution from ground up. If portion of the features set is to be implemented, then one has to determine how to prioritize these items. The idea is to optimize the cost savings by minimizing the number of features to be adapted while picking the features most effectively. One way of going about this, would be to pair the cost of implementing a feature with its respective footprint on the environment. An optimal list would have features in the order of increasing cost with small impact on environment. In other words, putting in place a feature that is so high in cost but has very small footprint in the environment would not be ideal. The notion is to determine how to be green with the least about of financial burden.

The second matter is to consider the location of the hospital since calculating costs could highly depend on local resources. For example, in a country such as Belgium, where it is common practice to use wind turbines to generate electricity, it would be less costly to tap into this technology as oppose to trying to find an alternative energy source that is not already in place. Having a type of resource already in place will vary based on the different countries, or perhaps even within the same borders as not all regions might have the same developmental setup.

In the next section, we will go through these features that make up a green hospital. Considering the financial strains, location factor and so forth are all part of the process of customizing these features to meet the needs of individual institution in the best possible way. In return, if we can understand how green hospital concept fits in implementation, then we can better understand the need for them.

3. HOW TO BECOME A GREEN HOSPITAL

The following presents the features of LEED certified green hospitals.

- Lead the positive change of corporate culture for environment and green hospital
- Find and replace harmful chemicals with safer alternatives
- Establish waste management practices and techniques that are environmentally friendly and safe. One of the ways in which to accomplish this is to reduce the toxicity and amount of hospital wastes for public health
- Contributing to a cleaner environment by building energy efficient hospital buildings to reduce fossil fuel use, reduce greenhouse gas emissions and contribute to the fight against global climate change, and take advantage of economic benefits from alternative energy sources. At the same time, by reducing the energy costs of the building and reducing operating costs, it is possible to reduce the profit / loss pressure on the health sector
- Reducing water consumption by implementing strategies such as efficient water faucets and rainwater reclamation and reducing the pressure on limited freshwater resources
- Reducing the hospital's carbon footprint and reducing air pollution contribution by developing transportation strategies for both patients and health personnel
- Use materials and products provided from sustainable sources or from the supply chain
- Use energy efficient medical equipment and devices
- To shorten the healing time of patients by creating cleaner, hygienic, safe and comfortable areas by providing the highest level of indoor air quality in the hospital [4]

Hospitals and care systems increasingly are looking for ways to improve efficiency and reduce overall costs while also improving the overall patient experience. One often-overlooked opportunity is environmental sustainability. Making an active commitment to sustainability and aggressively pursuing goals provides multiple strategic benefits that can help hospitals and care systems thrive.

Hospitals and care systems pursue sustainability efforts for a wide range of reasons and in a variety of ways, with leaders seeking solutions that work best for their organizations. Those who commit to sustainability reap the rewards, as illustrated by examples in this guide. Below are few of the examples from a pool of 50+ green hospitals that are currently operating in the United States whose collective efforts is to reduce the waste that is estimated to be in excess of 5.9 million ton annually.

Province Newberg Medical Centre, Oregon was the first gold rated hospital and has report shown 26 percent in energy, and 50 percent in outdoor water usage reduction to list a few. Kohinoor Hospital, Mumbai was the first LEED platinum rated hospital and has achieved 35 percent in energy savings [5].

Memorial Hermann Health System saved \$47 million over five years by implementing energy efficiencies. The University of Arkansas for Medical Sciences saved enough through efficiency efforts from one project that it was able to create 60 new beds, remodel five operating suites, build out a floor of a cancer institute, and buy seven acres of land.

Kaiser Permanente saved \$4 million a year by purchasing energy-efficient, environmentally responsible computers. Peace Health, a nine-hospital system serving Washington, Oregon and Alaska, created a strategic energy management plan that cut energy use by 10 percent over three years, generating \$800,000 in savings annually [6]. Gundersen Health System, which serves Wisconsin, Iowa and Minnesota, made energy reduction a priority in 2007, and by 2009 had achieved a 25 percent improvement in energy efficiency and more than \$1 million in annual savings [6].

As we mentioned earlier, the cost is a major issue, in fact most hospital CEOs rank financial pressures as their top concern [7]. In the current health care climate, sustainability efforts must be financially viable to succeed long term. Hospitals and care systems around the country are already saving resources by adopting sustainability measures. Overall benefits, which will vary among different institutions are between 20 to 40 percent in energy savings, 35 to 40 percent reduction in water usage as well as improvements in air quality and decrease in patient recovery times [5]. Based on these results, it can be concluded that more institutes would show initiatives towards green features. For instance, Figure 2 [8] below shows the hospital's efforts with respect to pharmaceuticals purchases.

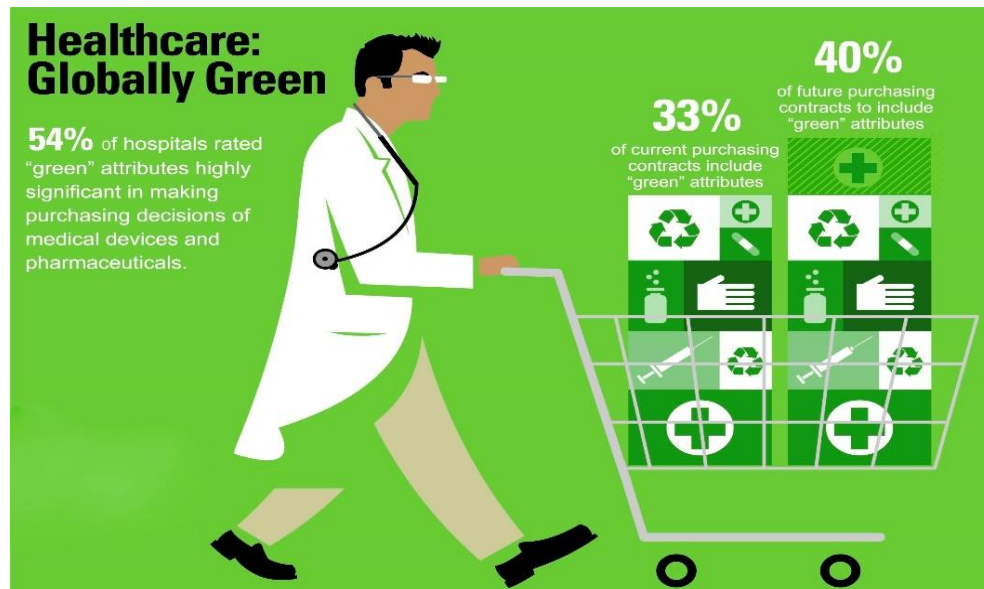


Figure 2: Healthcare: Globally Green [8].

4. GREENHOSPITALS

In this section, we summarize a few of the greenest hospitals within the United States [9].

Advocate Good Samaritan Hospital (Downers Grove, IL): This hospital has been serving patients for the last 40 years. In 2016, it has received Practice Green health's Top 25 Environmental Excellence Award and placed in Practice Green health's Leadership Circle and its Chemicals Circle. This means that the hospital has solid infrastructure to support and sustain long-term commitment to achieve much more healthier surroundings for everyone as well as having established chemical reduction policies and corresponding practices.

Beaumont Hospital, Royal Oak (Michigan): Beaumont hospital has received the Top 25 Environmental Excellence Award from Practice Greenhealth in 2016 and Detroit Free Press Michigan Green Leader Award in 2012. The hospital's "green team" includes more than 700 members in which they have achieved several initiatives such as conducting fund raising for speech and language therapy scholarships for children through selling recycled electronics, initiating community garden project, and so on. In order to become more environment friendly, LED lighting has replaced existing fluorescent lighting systems

Children's Health (Dallas): This hospital will soon become one of the leading pediatric healthcare in terms of renewable electricity usage which consist of mixture of solar and wind power. Children's Health Sustainability Council aims to concentrate on the long term environmental sustainability plan. The most recent awards include being named Environmental Services Department of the Year by the Association for the Healthcare Environment in 2018. It also received a Plano Environmental Community Award in 2017.

Erie (Pa.) VA Medical Center: Erie VA Medical Center is placed within the Practice Greenhealth's 2018 Top 25 Environmental Excellence Award winners. The hospital is in the 90th percentile for water use savings and its partnership with the U.S.-Canada binational Great Lakes allows them reduce pollutions in Lake Erie through water quality agreement. Additionally, the medical center also designed a rain garden for further reduction of the pollutants while allowing patients enjoy the garden.

Good Samaritan Hospital (Puyallup, Wash.): Good Samaritan Hospital Dally Tower is considered the first green hospital in Washington state. The tower was built by using local construction materials and green roofs containing plants in order to soak up energy. The tower also has rain gardens, relaxing labyrinth and walking paths. Through various energy minimization techniques, Good Samaritan has received LEED Gold Certification.

Johns Hopkins Hospital (Baltimore): John Hopkins Hospital has received Green health Emerald Award, Partner for Change and Making Medicine Mercury Free awards since 2014. The hospital has 39 green-certified offices and 65,000-square-foot green roof. Due to the solar farm installation, the hospital helps reduction of 30,000 metric tons of carbon dioxide per year. In the last few years, the recycling has been increased while the medical waste has been reduced.

Lakeview Hospital (Stillwater, Minn.): Lakeview Hospital has earned 2018 Practice Green health Top 25 Environmental Excellence Award as a result of several initiatives. The hospital reduced its water use through recycling program and participates in the Stillwater community's solar program. About one third of the hospital's energy is supplied through renewable energy sources. Additionally, a portion of its vehicular fleet is currently being converted into eco-friendly versions.

New York-Presbyterian Hospital / Weill Cornell Medical Center (New York City): New York-Presbyterian Hospital / Weill Cornell Medical Center supports its sustainability plan through the NYP green initiative. The sustainability committee provides guidance on green initiatives at all six New York-Presbyterian locations. The hospital targets several conservation areas, including waste minimization, sustainable food, employee engagement, supply donations and energy use to boost its environmental initiatives. In 2018, Practice Green health has rewarded New York-Presbyterian Hospital / Weill Cornell Medical Center Practice Green health Partner Recognition Award.

Yale New Haven (Conn.) Hospital: Yale New Haven Hospital has redesigned processes to reduce the use hazardous materials. In terms food sustainability, the hospital partners with local farmers and the operating rooms are equipped to conserve energy. The hospital was recognized with two Circle of Excellence awards and the Emerald Partner for Change Award by Practice Green health. The hospital also received Sustainability Award from VHA, a network of nonprofit healthcare organizations.

CONCLUSION

The green hospitals aim to use the resources more efficiently resulting in prolong environmental sustainability. Global Green and Healthy Hospitals (GGHH) organization have several goals: safer alternatives of the chemicals, safe disposal techniques for healthcare waste, the use of clean and renewable energy generation, reduction in the water consumption of the hospitals, enhanced transportation methods for patients and hospital staff, serving healthy food options, safe disposal of pharmaceuticals, and building the hospitals using sustainable materials. In this paper, we reviewed the global green and health hospitals organization as well as a few of the greenest hospitals in the United States. We discussed the advantages of healthcare organizations to use greener hospitals to better serve patients and their relatives, protect nature and prevent environmental pollution for future generations.

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