Quality & Accreditation Institute

Centre for Accreditation of Health & Social Care

Accreditation Standards for

Green Hospitals

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I Introduction

The damage caused by Climate change is not limited to human health today and is projected to have a greater and wider impact in the foreseeable future. The cumulative threats of Climate change to health have been extensively discussed for decades now and understanding on the issues has evolved and, in the meanwhile, so have the impacts. By 2030, Climate change could cause irreversible negative impacts on health which, it is estimated, could push more than 100 million people back to extreme poverty. Cardiovascular diseases, respiratory illnesses, etc. have direct correlation with air pollution and rise in emissions that drive Climate change will further increase these health issues. Rising sea levels and temperatures, different patterns of precipitation, and more frequent extreme weather conditions are the predominant causes leading to negative health outcomes (World Bank, 2017). To remain operational during extreme weather events, health systems must enable their facilities to be resilient to the impacts of Climate change and respond to the long-term, climate-induced changes in disease patterns, while also responding to the respiratory and cardiovascular disease caused by air pollution. As a large consumer of energy, and products, paradoxically the health sector also contributes to these environmental health problems, even as it attempts to address their impacts. Responding to these issues, there is a growing movement towards Climate-Smart, low-carbon healthcare. Key elements of Climate-Smart, low-carbon healthcare include:

- Health system design and models of care based on appropriate technology, coordinated care, emphasis on local providers, and driven by public health needs
- Building design and construction based on low carbon approaches
- Investment programs in renewable energy and energy efficiency
- Waste minimization and sustainable healthcare waste management
- Sustainable transport and water consumption policies
- Low-carbon procurement policies for pharmaceuticals, medical devices, food, and other products
- Resilience strategies to withstand extreme weather events (World Bank 2017)
- These low-carbon approaches also provide numerous co-benefits, these include:
    - ✓ Improved health status by reduction in environmental pollution and Climate change
    - ✓ Improved health system efficiency and cost savings

- ✓ Decreased escalation of costs through molding technology and models of care to the environment and disease burden
- ✓ Stimulated and anchored local economies

The health sector is already responding to these challenges in many countries throughout the world. Participants in Healthcare Without Harm's 2020 Healthcare Climate Challenge have already represented the interest of more than 10,000 hospitals and health centres in 23 countries, working to reduce greenhouse gas emission, improve resilience to Climate change and encourage physicians, staff and communities, through leadership efforts, to understand and respond to the health impacts of Climate change.

Why do we need Green Buildings?

Cities have often been blamed for causing an alarming increase in the ecological footprint since the dawn of industrial revolution (Satterthwaite, 1999). Recently, rampant urbanization has also been blamed for world's GHG emissions and disproportionately contributing towards global Climate change (Sánchez-Rodríguez, 2005). According to estimates by the United Nations Environment Program, incessant growth in the construction sector could double the emissions by 2050, Considering how compelling amounts of GHG emissions are generated through construction materials, especially insulation materials, and refrigeration and cooling systems (Brown, Marilyn A, 2008) adopting green buildings is thus more vital now than ever before. Green Buildings give a wide range of economic and environmental benefits to sustainable design, often achieved through the use of global and regional standards and systems available (Omer, 2008). According to a study by ECB, a certified green building can save energy, carbon, water, and waste, resulting in savings from 30 to 97%. Many sustainable buildings have also seen increase of up to 6.6% as return on investment, 3.5% increase in occupancy, and increase of 3% in rent. Further, increased productivity, ambience, occupant health, better indoor air quality, are some of the other benefits of green buildings (Miller, 2008).

Increasing burden on the Health sector

Hospitals energy consumption and waste generation affects the environmental health and the health of every person in that surrounding area. However, hospital owners can be responsible for treatment within their limitations of the hospital area, but they are also responsible for the hospital buildings' environmental performance, health promotion of customers, and employees. The figure 1 below shows

how environmental impact caused by the hospital can increase the need for medical services, and this, in turn can lead to the increased contamination (Azmal, 2014).

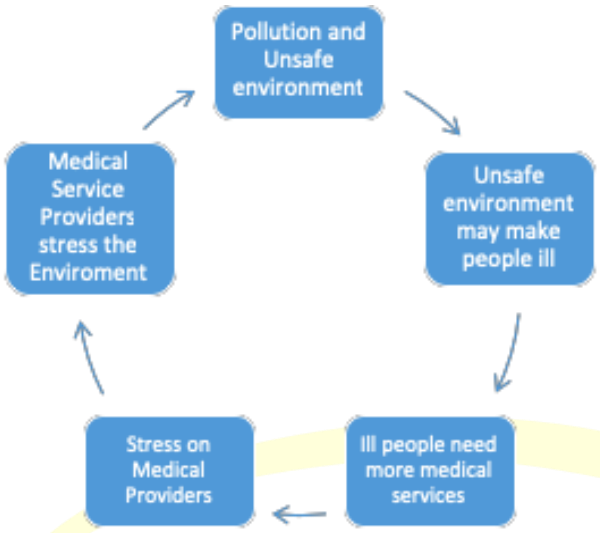

Figure 1. Relationship of environmental damage, increased illness, and environmental impacts of healthcare services. (source: Reller, 2000).

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Chapter 1
Governance and Leadership (GAL)

Introduction

Each hospital requires a governance structure that is ultimately responsible for ensuring all applicable requirements are known and implemented. This responsibility is derived from its legal identity and operational authority for all activities undertaken by the hospital within the ambit of applicable laws and regulations. Each hospital, regardless of its complexity, also has a formal structure. Leaders ensure that a system exists that promotes sustainability and safety. A Green Hospital vision and program should be formulated with a system to achieve its goals and shared internally and externally. Each green hospital program manager's roles and responsibilities should be clearly defined, and regular performance reporting and improvement activities should be implemented. In addition, green hospital education and training programs should be regularly formed for all staff.

STANDARDS AND CRITERIA		
Standard	**GAL.1:**	**The management of the hospital is committed to implement the concept of green healthcare.**
Criterion	**a.**	The management document its vision, mission and values that demonstrate the parallels between health and the environment.
	b.	Expectations and outcomes of management and senior leaders to create and maintain a culture of green healthcare is documented.
Standard	**GAL.2:**	**The management is accountable for consistent compliance of applicable regulatory/ statutory/ legal requirements.**
Criterion	**a.**	The management ensures at least compliance of applicable legal provisions related to environmental safety and also exceeds those provisions when it can improve health.
	b.	The Management ensures that there is a plan, along with education and training programs in place to monitor and address legal compliances.

Standard	**GAL.3:**	**The management receives reports on the compliance with the requirements of this standard on a scheduled basis.**
Criterion	**a.**	The management receives timely reports on compliance with this standard from responsible teams.
	b.	Management ensures regular audits are conducted by trained personnel to verify implementation of the requirements of this standard.
	c.	Report made available to all staff and the public to include all requirements and measurements of this standard.

Chapter 2
Site Selection (SS)

Introduction

Site selection and construction planning are the first building blocks in a Green Healthcare system. The decision made at this stage would have some of the biggest impact and would also pave way for a healthy green building. The choice of site location thus will influence access, resource consumption, other related impacts on the natural health system and resilience to the impacts of climate change. Hospitals unlike development of other kinds, must serve people from all social classes. Thus, hospitals must prioritize developed areas and previously developed sites in order to refrain from contributing to a continued "urban sprawl"- a global, multifaceted concept centered on expansion on auto-orientated, low-density development. Research suggest that residents of sprawling neighborhood tend to emit more pollution and suffer from traffic fatalities; continuous urban sprawling may contribute to more pollution of air, water, and natural habitat.

STANDARDS AND CRITERIA		
Standard	**SS.1:**	**Hospital shall have a defined criterion for construction requirement**
Criterion	**a.**	Hospital has fulfilled the norms of local statutory bodies, towards environment protection and safety.
	b.	Hospital has fulfilled norms of this site to not create any adverse environmental impact. These shall include greenfield, brownfield and grey field sites as defined below: • Greenfield sites are places that have never been built on before. • Brownfield sites are places that have been built on before but now are disused.

		• Grey field (are similar to brown field) sites are economically obsolescent, outdated, failing, moribund and/or underused real estate land.
Standard	**SS.2:**	**Hospital shall ensure conservation and preservation of available natural resources and resilience to flooding and other impacts of climate change.**
Criterion	**a.**	Hospital has ensured conservation and preservation of available natural resources.
	b.	Hospital has ensured optimization of the use of natural resources (water, land, soil etc.) during construction
	c.	Efforts have been made to plan for rainwater harvesting at the hospital site
	d.	Hospital has ensured optimal natural open space for the patients, families and staff members.
	e.	Hospital has a disaster management plan and includes experts' advice incorporating the topography, flood history and climate of the region in the planning of building construction and remodeling of hospitals
Standard	**SS.3:**	**Hospital shall have a plan & monitoring mechanism during construction to reduce noise pollution, air pollution, soil erosion and airborne dust generation**
Criterion	**a.**	Hospital have a plan & monitoring mechanism during construction to reduce noise pollution, air pollution, soil erosion and airborne dust generation.
	b.	Hospital management has ensured that environmental aspect impact studies shall be carried out for hazard identification & risk assessment (HIRA) for material usage in construction.
	c.	Hospital management had ensured that the material used for construction is not harmful for the occupants, environment and neighbors.

Standard	**SS.4:**	**Hospital shall adhere to applicable statutory norms to ensure patient, visitor and staff safety in all areas.**
Criterion	**a.**	Objective of hospital safety is to provide employees with a safe and healthy workplace.
	b.	Hospital lists and adhere to all applicable statutory norms related to hospital, patient and staff safety. Ensure that the building design caters to differently abled and senior citizens
Standard	**SS.5:**	**Hospital adopts best practices to reduce harm to environment and community.**
Criterion	**a.**	Encourage use of public transport, hospital provided transport, and active transport, such as biking and walking, so as to reduce negative impacts caused from automobile use.
	b.	Encourage the use of non-fossil fuel vehicles, thereby reducing negative impacts resulting from fossil fuel based automobiles.
	c.	Control soil erosion and sedimentation, thereby, reducing negative impacts to the site and surroundings.

Chapter 3
Indoor Air Quality (IAQ)

Introduction

Indoor pollutants originate from both indoor and outdoor sources. Indoor sources include – office equipment such as printers, fax machines, and photocopiers; cleaning products, and equipment; and the ventilation system. Although most healthcare facilities (hospitals) are smoke-free zones, the location of the hospitals decides the level of pollutants it receives from the outdoor environment. As restoring and safeguarding health is the main purpose of hospitals, maintaining good indoor air quality becomes critical and imperative for a green hospital. Hospitals should therefore give utmost importance to indoor air quality as prolonged exposure to high levels of pollutants may easily affect the vulnerable group and also cause illness to the healthcare workers.

STANDARDS AND CRITERIA		
Standard	**IAQ.1:**	**The organization has a documented process for maintaining the indoor air quality standards according to National/International Health Standards.**
Criterion	**a.**	The organization comply with National/International indoor air quality standards
	b.	The process should include the monitoring of indoor environmental standards like, temperature, humidity, VOC's, TVOC's, SVOC's particulate matter, COx, NOx, SOx, and Ozone
	c.	Hospital shall ensure use of low pollutant emitting materials.
Standard	**IAQ.2:**	**Conduct indoor air quality testing on a monthly basis in critical zones to determine the level of pollutants.**
Criterion	**a.**	The organization defines its critical zones such as Intensive Care Units, Neonatal Care Units etc.

	b.	Conduct Indoor Air Quality testing in all critical zones to quantitate air quality levels
	c.	Contaminant, PM 2.5 should not exceed 10 micrograms per cubic meter
	d.	Contaminant, TVOC should not exceed 500 micrograms per cubic meter
	e.	Indoor Air Quality Index levels should comply with National/International Health Standards
	f.	A list of all equipment used for air monitoring/ testing is maintained and, equipment are properly maintained and calibrated
Standard	**IAQ.3:**	**Ensure all occupied spaces including administrative and recreational areas have proper ventilation, thereby improving health and well-being of all patients, visitors and hospital staff.**
Criterion	**a.**	Maintain mechanical ventilated spaces to facilitate fresh air ventilation in all regularly occupied areas to meet minimum ventilation rates, as prescribed in ASHRAE 170-2013 ''Ventilation of Health Care' – Table 7 'Design Parameter'.
	b.	Ensure at least 50% of the occupied spaces shall have an opening (door/ ventilators/ windows) to the outdoor environment.
	c.	Prohibit tobacco smoking within the campus to minimize the exposure of pollution sources and adverse health impacts.
	d.	A 'No Smoking' sign or a message to demonstrate that smoking is prohibited in the hospital campus should be displayed at the entrance of the hospital.
Standard	**IAQ.4:**	**Avoid the use of fossil fuel in artificial power generation**
Criterion	**a.**	As an energy back up use some form of renewable energy with backup batteries or a grid system to avoid emissions from fossil fuel generators within the hospital.

Chapter 4
Energy and Ambience (EA)

Introduction

A good hospital design should maximize on natural daylight. Use of natural light helps the patients and members of the staff. Exposing the skin to sunlight helps them enhance their health and wellbeing, and reduce stress level, thus improving quality of care. A good lighting structure helps eliminates Sick Building Syndrome for both patients and staff members (Rashid, 2008). Natural light also combats seasonal affective disorder or winter depression through view connectivity of natural vistas. Artificial lighting should not be compromised in light sensitive areas like operation theatre, medical dispensaries, and other important areas. Maximizing on natural light can also be beneficial in saving energy. To reduce the hospital's impact on climate change, greenhouse gas (GHG) emissions from energy consumption should be managed systematically and continuously, by establishing a baseline, setting emissions reduction targets and implementing energy management and reduction plans. GHG emissions reductions can be achieved by adopting using new renewable energy such as small-scale cogeneration, solar power generation, wind power generation, geothermal energy and energy efficiency improvements.

STANDARDS AND CRITERIA		
Standard	**EA.1:**	**Requirements for new health facilities**
Criterion	**a.**	Maximize the access to daylight in patient and staff areas.
	b.	New electrical appliances shall have a minimum 3-star rating from Bureau of Energy Efficiency or equivalent recognized organization to minimize the energy input
	c.	Demonstrate that refrigerants used in Heating, Ventilation & Air-conditioning (HVAC) equipment are CFC (Chloro Fluoro Carbon) free, with a low Greenhouse Warming Potential (GWP) when available.
	d.	Hospital shall have a plan for installation of energy system

		compliant to statutory norms.
	e.	Demonstrate that refrigerants used in cooling equipment have the lower GHP (greenhouse power) or GWP available in the market.
Standard	**EA.2:**	**Incorporate optimized energy consumption devices**
Criterion	**a.**	Use of occupancy sensors in passageways, storage rooms, labs, and in places where the occupancy is minimal
	b.	Use of low-energy LED lighting to save indoor lighting energy cost
	c.	Use task lights to provide illumination in areas like consulting rooms, labs, and wards.
	d.	Installation of equipment like air-conditioners, heating systems, fans, motors, and pumps shall have appliances which have a minimum 3-star rating from Bureau of Energy Efficiency or equivalent recognized organization to minimize the energy input
	e.	Confirm that controls for heating and cooling systems are calibrated properly through retro-commissioning or other means and that temperature set points are optimized for occupant comfort and energy conservation.
Standard	**EA.3:**	**Ensure the hospital has a strategy for optimization of energy usage and saving.**
Criterion	**a.**	Demonstrate that the annual energy consumption in the hospital is within the Energy Performance Index (EPI) limits as mentioned in the table (appendix)
	b.	Demonstrate that the hospital shall have proper accountability for measurement and verification of all energy usage
	c.	Demonstrate that the hospital has a plan for usage of renewable energy with battery backup or a grid system as an alternative to fossil fuel back up.
	d.	Demonstrate that the hospital has a formal plan and has set goals on energy efficiency and renewable energy.
Standard	**EA.4:**	**Ensure regularly occupied spaces are adequately ventilated, thereby improving health and well-being of the occupants**

Criterion	**a.**	Organization makes provisions to ensure adequate ventilation and air filtration in regularly occupied spaces
	b.	Incorporate principle of healing architecture by connecting indoor environment with outdoors, thereby facilitating faster recovery. The hospital occupants must have direct visual access either to sky or flora or fauna and shall not have any obstruction views of at least 8 meters
	c.	Incorporate a green corridor that demonstrates at least 15% of the project area is covered with green open spaces.
	d.	Demonstrate that at least 10% of the green open spaces are designed as patient centric healing garden

Chapter 5
Water Use (WU)

Introduction

Hospitals are one of the largest customers for municipal water and sewer. Water is a crucial resource for patient care, infection control etc. The resilience of water management systems in emergencies, such as floods and drought, which are amplified by climate change, is essential to the hospital remaining operational during emergencies. The design of a hospital building landscape and site has a significant impact on community water resources. And therefore given this extensive use, to most extent, facilities should decrease their dependence on water. Hospitals should use water saving products, such as sinks, toilets, showers, kitchens, etc. and reuse treated water, where possible. Installation of rainwater harvesting system will help reduce the municipal water demand and enhance the groundwater table. The aim should be to manage rainwater on site through a range of devices, such as planting, green roofs, rainwater cisterns or bio-retention facilities that capture rainfall at or near the source. For an effective use of the water resource, first there needs to be proper awareness on part of the patients and the hospital staff in order to make efficient use of the water resources.

STANDARDS AND CRITERIA		
Standard	**WU.1:**	**Enhance efficiency of plumbing fixtures by design**
Criterion	**a.**	Hospital uses water efficient fixtures which complies with the national/ international plumbing code like Uniform Plumbing Code – India
	b.	Hospital demonstrates that there are no drips, leaks and unnecessary flows in bathroom, laundry, kitchen, labs, green cover (garden/ plantation sites) etc.
	c.	Hospital demonstrates that has a maintenance plan to prevent water leaks and drips.

Standard	**WU.2:**	**Hospital treats waste water generated on-site, so as to avoid polluting the receiving streams by safe disposal**
Criterion	**a.**	Hospital demonstrates that waste water generated on-site is treated inside the hospital as per certified national or international standard
	b.	Hospital uses treated wastewater for irrigation, toilet flushing etc. to reduce consumption of potable water.
	c.	Policies and procedures for treatment of waste water and use of treated water are documented and are made available to each staff responsible for the activity.
	d.	Hospital ensures compliance to applicable laws/ regulations.
Standard	**WU.3:**	**Hospital demonstrates efficient management of water saving**
Criterion	**a.**	Hospital encourages use of safe clean rainwater harvesting system to help reduce the municipal water demand and enhance ground water table.
	b.	Hospital uses pervious, porous, or permeable paving systems that allow rainwater to filter into the ground
	c.	Hospital demonstrates the use of metrics per patient, bed and area to monitor water usage
	d.	Hospital minimizes use of process water, in air conditioning, other equipment that uses water for cooling, and x-ray film processing.
Standard	**WU.4:**	**Hospital use sub-metering to improve water performance of the hospitals, and thereby save potable water**
Criterion	**a.**	Hospital demonstrates sub-metering of water
	b.	Hospital demonstrates sub-metering of water of municipal supply
	c.	Hospital demonstrates sub-metering of water of ground water supply
	d.	Hospital demonstrates sub-metering of water from treated waste water
	e.	Hospital demonstrates sub-metering of water consumption for air-conditioning cooling tower makeup

	f.	Hospital demonstrates sub-metering of process water for major equipment, such as x-ray film processing
Standard	**WU.5:**	**Hospital works on action items for new buildings and construction**
Criterion	**a.**	Minimize or eliminate the need for potable water for irrigation through the use of native, drought-tolerant landscape materials.
	b.	Use recycled grey water for irrigation and toilet flushing
	c.	Installation of water efficient faucets and toilet equipment
	d.	Ensure water management system/supply is resilient to emergencies, flooding, or any natural disaster

Chapter 6

Bio-Medical Waste Management (BMWM)

Introduction

Hospitals waste management has been a matter of concern with health and environmental hazards linked to the improper management of its waste. India promulgated the Bio-Medical Waste (Management and Handling) Rules in 1998 and revised in 2016. The Rules make it mandatory for the healthcare establishment to segregate, disinfect and dispose their waste in an eco-friendly manner. Improperly segregated contaminated sharps or any infected disposal pose great health risk associated with hospital waste. This improper handling and disposal of bio-medical waste can increase risk of nosocomial infections in patients as well as health workers and the broader community surrounding the hospital. Poor waste management in hospitals can lead to change in the microbial ecology and spread of antibiotic resistance. Therefore, it is important that someone in a leadership position in the hospital maintain oversight of the waste management process.

Waste segregation in hospitals takes place at different points and in phases. The waste needs to be segregated at point source. Without source separation, recycling and composting of uncontaminated food waste activities in place, biomedical waste may get disposed with general waste. Thus, the first step is to adopt a source segregation method. Normally, many hospitals around the world apply for segregation into, general waste, infectious waste and sharps. Increasingly hospitals are also segregating food waste for composting. Among healthcare waste, sharps are a major concern for all healthcare workers– doctors, nurses, midwives, healthcare workers, recycler and community–alike. Proper precautions and trainings need to be conducted to prevent occupational hazards while handling bio-medical waste, especially while handling sharps.

Segregated bio-medical waste further needs to be transported, handled, treated and disposed regularly. The collected waste would then be handed over to a common bio-medical waste management facility for treatment, processing and final disposal.

STANDARDS AND CRITERIA		
Standard	**BMWM.1:**	**Hospital demonstrates segregation of general waste generated at source.**
Criterion	**a.**	Hospital ensures availability of separate bins to collect dry and wet general waste, at all floors and common areas of the hospital, as applicable.
	b.	Hospital has a system to transport the collected waste to a centralised facility.
	c.	Hospital implements a documented system of safe disposal of the waste including e-waste.
	d.	Hospital tracks the total amount of waste produced by occupied bed per month and day
	e.	Hospital implements a documented system of safe disposal of e-waste.
Standard	**BMWM.2:**	**Hospital demonstrates proper segregation of bio-medical waste at source of generation.**
Criterion	**a.**	Hospital comply with applicable laws for bio-medical waste generation, handling and disposal.
	b.	Hospital demonstrates segregation of bio-medical waste at source, so as to prevent direct exposure, improving sanitation & hygiene
	c.	Hospital ensures availability of adequate resources including separate bins and hub cutters at all floor levels/ points of waste generation to collect biomedical waste.
	d.	Provide separate collection system (at lab & centralized level) to carry infectious and chemical liquid waste leading to effluent treatment system (ETP)
	e.	Hospitals tracks the amount of biomedical waste produced per occupied bed or patient per day and month
	f.	Hospital tracks amounts of chemical, e-waste and other wastes produced each month

	g.	Implements emergency kits to contain accidental spills of hazardous chemicals
Standard	**BMWM.3:**	**Establishment of Bio-medical waste management system.**
Criterion	**a.**	Set up a waste management committee
	b.	Have a written policy for collection, treatment and disposal of waste • Defined roles and responsibilities and management authority
	c.	Establish procedures, inspection protocols and materials for safe handling of waste including personal protective equipment (PPE)
	d.	Train and educate healthcare workers regularly about the importance of bio-medical waste and also its hazardous impacts if not handled with care
	e.	Train all staff depending on their responsibility on waste generation, segregation and management
	f.	Additional Note: Sustainable health care waste treatment technologies. If waste treatment is contracted out, include non-incineration technology to treat biomedical waste in the contract. If on-site waste treatment, avoid incineration and use autoclaves and other technologies with lower emissions and pollutants.
Standard	**BMWM.4:**	**A documented policy exists to address health and safety needs of staff**
Criterion	**a.**	Provide appropriate infection control measures & systems in hospitals, thereby reducing occupational exposure to blood-borne the hospital acquired infections
	b.	Ensure adequate & well designed isolation rooms, thereby eliminate the risk of Hospital Acquired Infections (HAI)
	c.	Ensure good sanitation & hygiene, design & maintenance practices, to reduce cross infections, thereby reducing risk of Hospital Acquired Infections
	d.	Ensure effective organic waste management, so as to avoid this from being sent to landfills

Chapter 7
Green Housekeeping (GHK)

Introduction

The consequences of poor housekeeping facilities can cause WASH-related illness within the hospital. An estimated 15% of patients get affected by illness related to healthcare and develop infections during their stay in hospitals. Thus, maintaining high level of hygiene and sanitation is essential for a green hospital. Accumulation of dust, soil and microbial contaminants on surface is a potential source of hospital acquired infections. Effective and efficient cleaning methods and schedules are therefore necessary to maintain a clean and healthy environment in healthcare buildings. Use of cleaning products which are not toxic and have no carcinogen agents must be encouraged and provision of personnel training for safe handling and disposal of hospital waste, and consideration must be given to install waste water treatment system within the hospital vicinity will also be helpful in containing the spread of disease and infection which may arise from the hospitals.

STANDARDS AND CRITERIA		
Standard	**GHK.1:**	**Hospital shall ensure use of certified low-VOC emitting and least toxic emitting chemicals and materials**
Criterion	**a.**	The hospital prepares a list of chemicals and products used for housekeeping (maintaining cleanliness of the hospital) and a cleaning protocol for how and where they are used that minimizes the use of toxic chemicals
	b.	The hospital ensures that the list contains certified low-VOC emitting and least emitting materials.
	c.	The hospital conducts an inventory of all products used for cleaning and disinfection of surfaces
Standard	**GHK.2:**	**Hospital shall have a protocol for procuring of Products, Materials and Equipment used for house-keeping (environmental friendly Preferable)**

Criterion	**a.**	Cleaning products and materials that are procured are environmentally benign or least toxic while still maintaining the high level of cleanliness required in the hospital.
	b.	Products that are manufactured with carcinogens, mutagens, reproductive toxicants and teratogens, asthma-causing agents (asthmagens), respiratory irritants, and chemicals that aggravate existing respiratory conditions are not procured
	c.	Usage of aldehyde products for fumigation and fogging are banned at the hospital
	d.	Hospital shall have an ongoing induction training program for all the housekeeping staff for the cleaning of all the areas in the hospital.
	e.	Provide ongoing and regular staff training and communication on safe handling, storage and disposal of chemicals and materials
Standard	**GHK.3:**	**Provide appropriate infection control parameters & systems in hospitals, thereby reducing the nosocomial infection**
Criterion	**a.**	Demonstrate that the minimum efficiency reporting values in all spaces to meet ASHRAE 170 – 2013 'Ventilation of Health Care'
	b.	Demonstrate that the pressurization methodology in all regularly occupied spaces shall meet the pressure relationship to the adjacent areas, as prescribed in ASHRAE 170-2013 'Ventilation of Health Care'
Standard	**GHK.4:**	**Hospital has properly identified critical and noncritical disinfection areas in the hospital in order to assure appropriate levels of cleaning in each area.**
Criterion	**a.**	Hospital has identified critical and non-critical disinfected areas
	b.	Hospital (including Environmental Services and Infection Control) has identified areas where use of disinfectants can safely be minimized or eliminated
Standard	**GHK.5:**	**Hospital shall have a policy for correctly labelling and properly storing all chemicals as per manufacturers' recommendations.**
Criterion	**a.**	All the chemicals and drugs used in the hospital are correctly labelled.

	b.	All the chemicals used in cleaning and sanitation are properly labelled and stored.
	c.	The professionals handling the chemicals are trained. The professionals are provided with adequate personal protective gears while handling chemicals for cleaning and disinfection.
Standard	**GHK.6:**	**Organization shall have a process for housekeeping and cleaning agents with defined criteria considering performance / people / planet and pricing**
Criterion	**a.**	Hospital has housekeeping and cleaning policies and procedures in accordance with the size and complexity of the services
	b.	Hospital has a selection procurement committee which gets guidance from Infection Control Committee.
	c.	Hospital has defined criteria for selection of housekeeping and laundry products. Criteria for selection shall refer to use of Least toxic cleaning agents. These are agents that reduce environmental pollutants and protect human health;
	d.	Hospital doesn't use formalin products for cleaning or disinfection.
	e.	Hospital has ensured the reduction of products that can release Volatile Organic Compound (VOC) inside and outside buildings
	f.	The hospital has procedures to assist the housekeeping personnel to carry out their assigned duties while practicing infection control activities.

Chapter 8

Procurement of Materials and Resources (PMR)

Introduction

An effective sustainable strategy for greener practices in hospitals is to adopt Sustainable Procurement practices such as Environmentally Preferred Purchasing (EPP). It is defined as purchasing products or services which have less damaging impact to the environment and human health.

While considering building material and resources for a green hospital should be prioritized according to health impacts associated with them. Every stage of material extraction, transport, use, and disposal has impacts on the ecosystem and human health. This can be reduced by choosing methods and procurements which don't have implications on the environment. Some examples of sustainable procurement include, supporting the use of local and regional materials, avoiding hazardous chemicals and materials such as asbestos, and metals such as mercury, lead and cadmium. Procurement of materials that are known or suspected to cause cancer or other serious health effects should be avoided. Further, as the staff have a greater chance of exposure from the purchased products, the products l used by them should also be reviewed before procurement. Thus, products which give out pollutants such as air toxins, which include dioxin and asbestos, and heavy metals such as cadmium, mercury, chromium, and lead compounds and other products or chemicals of concern which has the possibility of causing cancer, respiratory problems, any reproductive effects or birth effects or any health impacts should be avoided. In addition to the direct exposure from breathing air toxics, some air toxic pollutants such as mercury can deposit onto soils or surface waters, where they are taken up by plants and ingested by animals and eventually magnified up through the food chain. Other products can expose people to chemicals of concern through direct contact with the product, or as a result of the life cycle of the product Thus, paints and coatings that are 100% lead and cadmium-free, medical equipment that are phthalates and DEHP free should be actively advocated and promoted. The existing inventory should be reviewed for all interior and exterior equipment, and instruments should be inspected for manufacturer, model, and technical specifications, including the mercury content in them. The products capable of causing any health impact should be avoided and eventually eliminated altogether.

Phasing out all mercury-based electrical devices and switching to LED lighting sources should be considered. Also, the elimination of mercury-based measuring devices and products was ratified in 2018 in accordance with the Minamata Convention on Mercury. Another method for greening is recycling. Hospital managers must decide about items which are to be recycled. A good waste segregation plan with segregation on point source would help. Recyclable materials must be collected in using sources (for example: stores, kitchens, laundries, pharmacies and workshops) and then to be delivered to the central storage area for transportation purposes.

STANDARDS AND CRITERIA		
Standard	**PMR.1:**	**The organization shall have a process for the purchase and procurement of more sustainable materials**
Criterion	**a.**	Hospital document a policy to ensure Sustainable Procurement to include Environmentally Preferred Purchasing
	b.	Hospital establishes a team responsible to ensure that purchase and procurement is as per defined policy.
	c.	Established a documented procurement plan which highlights the importance for sustainable procurement and products.
	d.	Hospital has an evaluation criterion of the supply chain with regards environment performance
	e.	Hospital has ensured procurement of environment friendly products. The product purchased shall be less toxic, minimally polluting, more energy efficient, safer and healthier for patients, workers, and the environment. The product shall contain higher recycled content, have less packaging and be fragrance-free.
Standard	**PMR.2:**	**Use certified green building materials, products, and equipment, so as to reduce dependence on materials that have associated negative environmental impacts.**
Criterion	**a.**	Products purchased have proper green certification
	b.	Products and equipment purchased have no associated negative environmental or health impacts

	c.	There is a documented policy to encourage procurement of eco-certified interior products that have a longer life period and lower environmental impacts
	d.	Hospital prepares a list of such eco-certified interior products using a collaborative approach.

Appendix:

Ventilation of Health Care

Type of space	Minimum out air change per hour
Recovery Room	2
Critical & Intensive care	2
Trauma room	3
Laboratory & Sterilizing	2
Medication room	2

Source: ASHRAE 170-2013 'Ventilation of Health Care' – 'Design Parameter'

Energy Performance Index

Climatic Zone	EPI range
Warm & Humid	275
Composite	264
Hot & Dry	261
Moderate	247

Source: Implementing Energy Efficiency in Buildings (A report by UNDP, BEE)

Demonstrate the Minimum Efficiency Reporting Values (MERV) In All Spaces to Meet ASHRAE 170 - 2013 'Ventilation of Health Care

Sl. No:	Space Designation (According to Function)	Filter Bank No. 1 (MERV)[a]	Filter Bank No. 2 (MERV)[a]
1	Operating rooms (Class B and C surgery); inpatient and ambulatory diagnostic and therapeutic radiology; inpatient delivery and recovery spaces	7	14
2	Inpatient care, treatment, and diagnosis, and those spaces providing direct service or clean supplies and clean processing (except as noted below); AII (rooms)	7	14

3	Protective environment (PE) rooms	7	HEPA
4	Laboratories; Procedure rooms (Class A surgery), and associated semi restricted spaces	13	NR
5	Administrative; bulk storage; soiled holding spaces; food preparation spaces; and laundries	7	NR
6	All other outpatient spaces	7	NR
7	Nursing facilities	13	NR
8	Psychiatric hospitals	7	NR
9	Resident care, treatment, and support areas in inpatient hospice facilities	13	NR
10	Resident care, treatment, and support areas in assisted living facilities	7	NR