

Hospitales que curan el planeta



Informe sobre el trabajo de los miembros de la Red Global de Hospitales Verdes y Saludables en América Latina 2018



Introduction

This is the second edition of the Hospitals that Heal the Planet report, presenting the reader with much of the work being done by the members of the Global Green and Healthy Hospitals (GGHH) network in Latin America to reduce their environmental impact and to promote environmental health in their communities. This time, besides documenting the work done by the winners of the 2017 edition of the Menos huella, más salud (Less footprint, more health) awards, we have given priority to those cases related to climate change and sustainable procurement, two goals that beyond doubt cut across the Global Green and Healthy Hospitals Agenda.

Health Care Without Harm is an international non-governmental organization working to transform health care worldwide so that it reduces its environmental footprint, becomes a community anchor for sustainability and a leader in the global movement for environmental health and justice.

In 2011, HCWH created the Global Green and Healthy Hospitals network¹ and called on health care institutions worldwide to commit to and work in the implementation of the Global Agenda², a comprehensive environmental health framework with the aim of promoting greater sustainability in the health care sector to strengthen health systems worldwide. The Global Agenda is comprised of ten interconnected goals. Each of these goals includes a series of action items that hospitals and health systems can implement.

The ten goals of the Global Agenda are:



Leadership: Prioritize environmental health



Chemicals: Substitute harmful chemicals with safer alternatives



Waste: Reduce, treat and safely dispose of healthcare waste



Energy: Implement energy efficiency and clean, renewable energy generation



Water: Reduce hospital water consumption and supply potable water



Transportation: Improve transportation strategies for patients and staff



Food: Purchase and serve sustainably grown, healthy food



Pharmaceuticals: Safely manage and dispose of pharmaceuticals



Buildings: Support green and healthy hospital design and construction



Green purchasing: Buy safer and more sustainable products and materials

1. www.hospitalesporlasaludambiental.net

2. www.saludsindanio.org/americalatina/temas/agenda-global

GGHH members record their progress through observable results, share their experience by means of case studies, and have access to an online training program. Membership in GGHH is free of charge.

Case selection methodology

The Hospitals that Heal the Planet report summarizes highlighted environmental health experiences and activities implemented by GGHH member hospitals and health systems.

In order to identify and select the cases presented in this edition, in late 2017 HCWH called on GGHH members in Latin America to share their greatest achievements during the last three years. In a second stage, representatives of the institutions that responded to the call were interviewed, allowing the selection of the best cases for publication.

Additionally, those who won an award under the program *Menos huella, más salud* in the Leaders and Trajectory categories had their place guaranteed in this report as part of the recognition received³.

The cases presented in this report are organized in four chapters:

- *Winners of the Menos huella, más salud awards*
- *Climate change and health*
- *Environmentally preferable purchasing*
- *Progress in the implementation of the Global Agenda*

It is worth mentioning that the work documented in sections "Climate change and health", "Environmentally preferable purchasing" and "Progress" many times is cross-cutting and carried out in parallel to the implementation of all or many of the Agenda goals.

Finally, we would like to highlight that this report is just a sample of the achievements and progress made by GGHH members in Latin America. It includes examples of public and private hospitals and health systems of varying complexity in five countries, which we expect to be a source of inspiration and replicated elsewhere with the aim of building environmentally sustainable communities. We know there are still lots of experiences to be shared. We invite you to participate in the different GGHH initiatives and to stay tuned for the next call by the end of 2018.

For more information please visit:

www.hospitalesporlasaludambiental.net

3. 2017 winners of the *Menos huella, más salud awards*:
<https://www.hospitalesporlasaludambiental.net/ganadores-2017/>

Área de Salud Catedral Noreste (Costa Rica) - Progress in Environmental Footprint Reduction Special Mention: Energy, 2017



The Área de Salud Catedral Noreste hospital is located in the neighborhood of Aranjuez, at 100 meters from the National Library, in San José de Costa Rica. It is a medium-complexity clinic that provides specialized services, minor surgeries, low-complexity surgeries, and emergency services. On average, it provides care to 61,391 patients per year, and it only has an observation unit with a total of two beds and a nebulization area.

In 2010, the hospital started working with the local Environmental Management Plan through the recording forms made available by the Costa Rican Ministry of Environment and Energy. These forms—very similar to HCWH tools—allowed them to establish a baseline and then launch a series of programs.

Energy use was their first greatest challenge. With the participation of all hospital areas—Occupational Health, Nursing, Dentistry, Maintenance, and General Services—working groups were created, as well as an Environmental Management Committee that developed an action plan to advance different strategies to save energy costs.

In 2016, the hospital joined the Global Green and Healthy Hospitals network, a highly motivating initiative for the work group providing lots of benefits. “The fact that it is a Latin American network implies an additional commitment, and the information in GGHH tools is easier to use and work with, for instance, for data recording”, explains Milady Hernández, team representative.

After all these years gathering and registering information, we realized we had an issue of high energy use.

Milady Hernández, Área de Salud Catedral Noreste

Implemented actions

- Energy efficiency:

1. **Lighting:** An inventory of lamps in the main building was made, together with a study to analyze light level per area.

Relevant results:

- a. Progress made in the replacement of lamps with LED technology.
- b. Installation of lamps over work areas (for instance, in the case of doctors' offices, lamps must be placed over the examination table and desk).
- c. Adjustment of the number of lamps on a workstation basis, in line with the results from the zonal cavity method. This reduces the number of lamps.
- d. Independent switches for each workstation, so that no lights are on in empty stations. Thus, energy is saved while lighting can be provided to offices that need it.



Luminaire replacement

More than 70 LED lamps were installed. Priorities were established on a floor basis, starting with Emergencies—the busiest as far as care giving is concerned—and the Archive area, for safety reasons (the electromagnetic ballasts installed as part of the fluorescent tube lighting layout often present warming and electrical issues, and have even started fires in warehouses).

Over the last years, energy use has decreased from 133,520 kW in 2013 to 119,109 kW in 2016. Although the investment has not been that big (USD2,654.38 for the purchase of 70 lamps), the efforts made are reflected in the results. In 2016, the hospital used 19,491 kW less than in 2011, reducing in turn carbon dioxide emissions by 6,236 tons (from 44,352 in 2011 to 38,116 in 2016). This reduction in electricity consumption translates into a savings of USD4,450.79, which takes into account the 25% increase of the kilowatt cost in 2016 and a 24/7 work schedule during a six-month period.

CO ₂ tons released					
	Year	Electricity consumption in kW	CO ₂ tons	kW cost	Saving (US dollars)
	2011	138,600	44,352	104.25	
	2016	119,109	38,116	130.16	
Energy savings in kW and CO₂ tons			6,236		4,450.79

2. Technological equipment:

Work was done together with the Systems area to turn off or keep in sleep mode the equipment not being used.

3. Awareness campaigns:

Stickers were put up near each switch to remind users to turn off equipment.



Stickers to promote energy rational use habits

On-demand purchasing:

On-demand purchasing allows the replacement of existing T8 lamps with LED technology once the old luminaire gets damaged or needs to be replaced for any other reason. This ensures the change of technology.

Lessons learned

- The unity of the environmental management group is very important.
- The incorporation of a co-worker from the Maintenance area was beneficial for the work being done, enabling the inclusion of the Environmental Management Committee's proposals into the clinic's budget.
- The authorities' commitment was key. They also benefited from the measures implemented, for instance, from energy use reduction.

Sometimes we believe we need a lot of money. Investment is important, but many times we can start simply by making small efforts.

Milady Hernández, Área de Salud Catedral Noreste

Challenges and strategy

- Planning needed to take place within a reasonable limited time frame in order to include the proposals into the following year's budget.
 - Initially, only remaining resources from existing budget items could be used. Afterwards, thanks to the enhancement of planning by the Environmental Management Committee, the process was more straightforward.

Why must a hospital take care of its environmental footprint?

Since we are a health care institution caring for health, the right thing to do is that we ourselves start with prevention. We can save resources to invest in health itself, since generally health services spend lots of resources in areas like energy and water consumption. Health and environment go hand in hand. Everything we do has an impact on the environment.

Milady Hernández, Área de Salud Catedral Noreste

Green purchasing

In the Purchasing area, we have implemented technical aspects and rating parameters to arrive at a set of better criteria for the procurement of products and supplies.

1. Environmental criteria

- Environmentally sustainable criteria: 5 points will be granted for each environmental certification demonstrating that the organization implements activities to enhance the environment. The certification must be granted by a duly-certified assessment body or by someone accredited by the Costa Rican Accreditation Entity.
- To establish environmental parameters for cleaning contracts. For example, to use environmentally-friendly (biodegradable) cleaning products. If the institution changes to this kind of products, the supplier must adapt and start providing them.
- To implement, additionally, the environmental criteria established in the Green Purchasing Manual of the Comptroller-General of the Republic.

2. Purchase implementation

- The Environmental Management Commission establishes recommendations applicable to all purchases. In the case of General Services, Maintenance, Dentistry, and the Occupational Safety Office, it is important to provide recommendations for purchases of each of their services. Since 2018, recommendations are issued together with the Procurement Officer, in order to include all purchases. For example, when buying the radiovisiograph for the Dentistry department, it was specified from the very beginning that it had to be a digital device, with no developing chemicals or radioactive sources.
- Technical specifications criteria: each head office is responsible for issuing the corresponding technical specifications, including the items established in the environmental criteria.
- Assessment tables: a 20% positive rating will be granted to suppliers offering environmentally-friendly products.

3. Some technical criteria selected by the hospital

- Use of products free from chemicals like mercury, PVC, and others.
- Use of low-energy products.
- Supplier's responsibility for waste management: when waste will be generated as a result of equipment installation or refrigerant gas replacement (in the case of air conditioning), the supplier must indicate that they will take care of waste disposal and which treatment they will apply.
- Use of reusable-packaging products.
- Prohibition to buy the *estereofón* (expanded polystyrene) compound, also called *icopor*, *tecnopor* or *unicel* in other countries. It is not recyclable but much used in food and product packaging.

Purchases made in 2017 based on environmental criteria

Product purchased (item description)

Foaming hand soap
Hand towels
Toilet paper
Maintenance of ophthalmology equipment
Maintenance of medical devices
Maintenance of air conditioning and cooling equipment
Maintenance of elevator
Maintenance of dental equipment
Maintenance of UPS
Purchase of UPS
Lightning protection system
First floor painting

12 out of 27 purchases were based on environmental criteria.

CHAPTER 5

Environmentally Preferable Purchasing in the Health Sector

Waste generation in a hospital has a clear starting point: it all comes down to a purchase decision. Likewise, the type of energy used in the facility, the fuel used by vehicles for service delivering, and the food both patients and staff are served, among other things, are also related to the hospital purchase policy. This is why environmentally preferable purchasing is one of the goals in the GGHH Agenda: it cuts across the whole agenda and involves all workers in a health center, whether they have purpose driven goals or not.

In 2018, HCWH started implementing the Sustainable Health in Procurement Project (SHiPP), an initiative developed by the United Nations Development Programme (UNDP) and funded by the Swedish International Development Cooperation Agency, with the aim of reducing harm to people and the environment caused by the manufacture, use and disposal of medical products and by implementation of health programs.

SHiPP is a four-year project to promote sustainable procurement in the health sector, in United Nations Agencies, and in key project countries through the reduction of toxicity of chemicals and materials in healthcare products, the reduction of greenhouse gases in the supply chain, and the conservation of natural resources. In Latin America, the project was launched in Chile, Colombia and Costa Rica, and in 2019 it will be also implemented in Brazil with the aim of gradually expanding the results and reaching out the whole region where HCWH has GGHH members.

This section presents a sample of the progress being made by GGHH members as regards the implementation of the Purchasing goal in the project prioritized countries. We encourage you to replicate these experiences and adapt them to your work context.

Ushuaia Regional Hospital “Gobernador Ernesto Campos” (Argentina)

In 2010, the Ushuaia Regional Hospital created the Committee for Waste in Health Centers, therefore extending its functions with the aim of minimizing environmental impacts, and setting off, in turn, the internal reorganization of the processes interrelated with procurement management.

Given the geographic location of the institution (a southern island), with none or few pharmaceutical manufacturers of some products, and lack of vendors of medical supplies, chemicals and drugs, strategic planning became a must in order to have supplies available for delivering the required prevention, diagnosis and treatment services. Planning was based on safety and efficiency, enhancing times and costs, with an emphasis on communication and continuous rating of suppliers.

Diagnosis

Based on the diagnosed procurement issues and the problems from previous years (many supplies did not get to the hospital, hindering compliance with management policies), a cause analysis was made in order to feed back into the processes and embark on continuous improvement. This analysis gave birth to several lines of action.

Diagnosis: environmentally preferable purchasing	
Before	After
Decentralized procurement: each chief of service took care of purchases.	New process: centralized procurement with the assistance of technical staff. Unification of purchases on a product basis. Joint work with suppliers.
Disorganized procedures and overuse of human and economic resources.	One single criterion: creation of a Pre-Adjudication Committee for Green Procurement, with a technical pre-feasibility study for each product.
Higher expenses. Expensive transportation.	Cost saving through procurement unification and consensus with suppliers.
Duplicated procedures.	Strategic planning of procurement.
Contract adjudication to the lowest quotation.	Technical specifications. Environmental considerations and assessment of quotations.
Lack of technical knowledge in the Procurement area.	Audits are carried out to observe the different departments' processes and to feed back into the Procurement area.

The medical and pharmaceutical supplies procurement process is one of the most important, using a large number of human and economic resources. The bases of strategic procurement planning used in the Pharmacy department served as a guide.

General goal of strategic planning:

- To improve procurement management at Ushuaia Regional Hospital: get the same quality at a lower cost and with less environmental impact.

Specific goals:

- To strengthen coordination with the technical, administrative and accounting areas by implementing interaction programs and reporting.
- To improve processes in the accounting areas: assessment, analysis and corrective actions.
- To promote joint work with the hospital management to improve communication on issues related to the institution's economic and financial resources, in order to make the appropriate decisions.
- To improve the Pharmacy department's procurement processes through the use of the Hospital Management System software.
- To narrow down the supplies to be bought through technical specifications issued in collaboration with the Procurement and the Pharmacy and Therapeutics Committees.
- To improve the processes that directly or indirectly involve supplies, training and evaluation of staff in charge (Reception and Storage Management, etc.).

Developing strategic planning:

1. Establish the duration of procurement procedures.
2. Establish a schedule for departments to manage their purchases on a quarterly, semi-annual, or annual basis, based on purchasing volume.
3. Create pre-adjudication committees, considering the corresponding technical areas based on the required supplies.
4. Promote interdisciplinary meetings between the accounting area and relevant departments, including training sessions, continuous evaluation, and the production of joint documents to rate vendors and supplies.
5. Purchase order: use of purchase patterns for issuing purchase orders, specifying the product in a clear and comprehensive manner, including both its characteristics and the expiration date at the time of reception.

All three PURCHASE stages are considered: request, quotation, and verification.

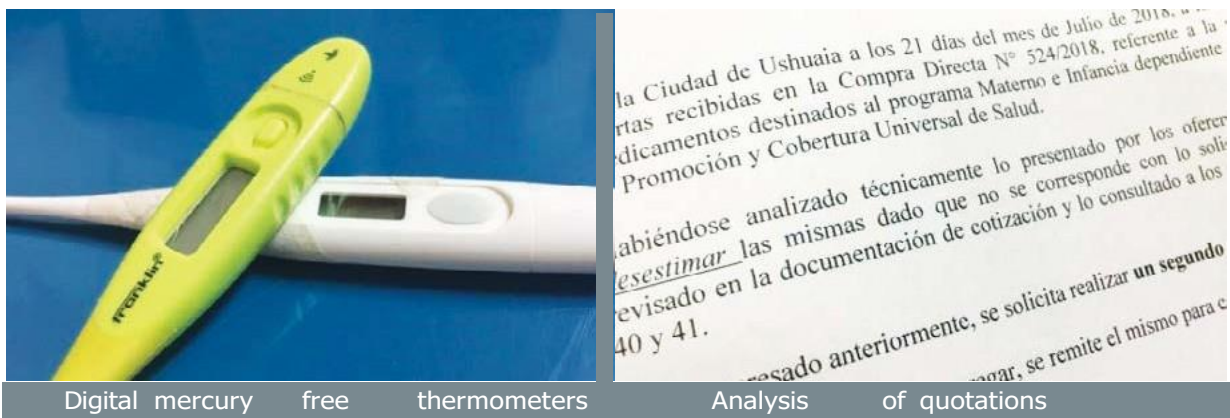
As regards quotation acceptance or pre-adjudication, the quote is evaluated and verified against the request, double-checking it with previous technical reports. Finally, the order is checked when received, verifying it is in compliance with the specifications and/or previously made observations. If necessary, the product is rejected, keeping in mind that non-compliant items are not used and thus generate waste, resulting in more expenses for the hospital and a higher environmental impact.

Environmentally preferable purchasing: criteria and actions

- The Drug Formulary and the Hospital Supplies Catalog are being drafted.
- Procurement management software is under development.
- When a new chemical is available, the following procedures take place:
 - a) Development of an internal fact sheet for product incorporation.
 - b) Analysis of handling protocol: disposal method of generated waste as stated in the product or vendor safety data sheet, and applicable regulations.
 - c) Evaluation of the disposal method by the Committee for Waste in Health Centers through its Chemicals Sub-Committee, and feasibility of treatment in the province and/or lower environmental impact alternatives.
- New technological equipment
 - a) Incorporation of a technical sheet for new medical technology, containing information for evaluation by the Medical Technology Office, including building reforms, procurement conditions, and observations to take into account.
 - b) Products with spare parts available in Argentina are preferred. Priority is given to supplies with technical support available in the region, able to deliver maintenance and support services nearby the hospital.
- Expiration dates: purchase specifications must consider the expiration date based on storage and use within the institution, with subsequent replenishment and rotation planning.

A significant improvement was the ISO 9001/15 certification of emergency purchases and purchases made through the permanent fund, and of the delivery of medication through stock or drug kits in the Pharmacy department. Work was coordinated among the different departments, reaching consensus on what medication was to be delivered to each area and in what quantity. Medication use was recorded, feeding back into the procurement system.

In 2016, 20% of the hospital budget was used in emergency or permanent fund purchases. In 2017, after the new processes were implemented, this budget item reached only 1%.



Goals: Our goal is to continue working on supplies identified in the market as PVC free. Also, we will keep on working on each of the specific goals established, ensuring a procurement system of quality but at a lower price and with less environmental impact.

- Achievements | Environmentally Preferable Purchasing**
- Purchase of mercury-free supplies, like dental fillings, thermometers, blood pressure devices, LED lamps, and thimerosal-free products.
 - Replacement of fluorescent tubes with LED lamps, with a significant impact not only on the elimination of mercury but also on energy use, considering the number of daylight hours in winter due to geographic location.
 - Procurement of an alternative to treat selenite cystine agar in the province.
 - Procurement of quaternary ammoniums to replace bleach, with an interdisciplinary study by the Committees for the Control of Infections Associated to Health Care and the Committee for Waste in Health Centers, giving preference to formulas with lower environmental impact and companies with environmental protection policies.
 - Use of triple enzyme detergent, ensuring proper cleaning of products/supplies for subsequent sterilization. Analysis of product use specifications and cost-effectiveness to ensure lower cost processes.
 - Purchase of PVC-free medical supplies for Neonatology, specifying "100% silicone" in the product description.

Fundación Valle del Lili (Colombia)



Fundación Valle del Lili

Fundación Valle del Lili is a Colombian non-profit institution providing high-complexity health services. It has a floor area of 103,000 m², a total of 530 beds and more than 5,000 employees, serving an average of 251,000 patients a year.

Its origins date back to 1994, when the business persons from local industries identified the need to have a high-complexity health center where the nearby communities could get medical care and diagnostic tests.

In line with established standards, the institution's environmental management system seeks to control the environmental aspects and impacts derived from high-complexity procedures, promoting sustainable procurement policies together with a comprehensive waste management framework based on cleaner production processes, among others¹².

As part of corporate social responsibility, the environmental management system of Fundación Valle del Lili is rooted in the standards of the Healthcare Accreditation System's Physical Environment Administration and the Colombian technical Standard ISO14001:04, pervading all processes and ensuring procedures to identify, evaluate and improve environmental management under the following criteria:

- Promotion of a green culture
- Rational use of natural resources
- Recycling
- Environmental pollution risks
- Organization's contribution to the preservation of the environment
- Environmental impact assessment based on organization's management

¹² For more information on the work of Fundación Valle del Lili, watch the webinar on environmentally preferable purchasing at: bit.ly/webinarcompras

Environmentally preferable purchasing

Diagnosis

From the beginning, the hospital incorporated environmental criteria. Culturally, the environment was part of the industrial sector's agenda. Since the 1990s, for instance, the hospital heats water through solar panels. Years later, with the assistance of a consulting firm, the first steps were taken towards ISO9001 and ISO14001 certification, and many processes were standardized. The hospital started working on the implementation of several environmental programs, like appropriate handling of effluents, wastewater evaluation and measurement, and reduction of air emissions and noise.

First steps

The first initiative in the environmental agenda was to eliminate the use of haematoxylin for mercury activation in the Pathology area. In 2005 and 2006, in the context of the international campaign for the elimination of mercury, we started replacing mercury-containing supplies after finding this chemical in wastewater.

For that purpose, the areas of Pathology, Environmental Management, and Procurement worked together to find an alternative: mercury-free haematoxylin.

Since then, it is an institutional policy and the Administration's belief that the Procurement and the Environmental Management areas must work hand in hand. Over time, after the adjustment of some processes, environmental assessment was also incorporated into the Supplies, Technology, and Lab Chemicals and Reagents committees. The management of the hospital's Financial area also participates.

Program implementation

Since 2005, supporting the implementation of ISO14001, various environmental programs have gradually been created to evaluate significant impacts the hospital had on the environment.

1. PARE (Energy Resources Saving Plan) Program

Created in 2000 by the Maintenance Department, this program promotes the rational use of water, energy, and natural gas, the latter of which is used for vapor generation.

2. IMPRIMITO Program

Led by the Information Technology Department since 2000, the IMPRIMITO Program promotes the efficient use of printing resources, by raising awareness on the use of reusable paper, previewing, multi-page printing, and the use of watermarks in documents. The program has resulted in a ream savings of more than COL\$43 million (USD15,000) a year, and we are currently transitioning from white paper to natural unbleached paper.

3. Hospital Verde (Green Hospital) Program

Created in 2002, this program focuses on comprehensive waste management. The name came up from a contest organized by the hospital together with students from the Occupational Health training course of the Colombian National Learning Service (SENA), who designed the logo and named the program for effective implementation. One of the program contributions was the change made in the mechanism for final disposal of hazardous waste like xylene (a solvent used in Pathology), which is now sent to a third-party operator for distillation and subsequent recycling or use in the paint industry.

4. COECO Program: green procurement

This program, that started developing in 2012, also got its name and logo thanks to a contest. The strengthened evaluation process implemented for the purchase of new supplies and equipment, an effort carried out jointly by the Supplies, Maintenance, and Environment departments, serves as an environmental filter

at the beginning of the purchase process, which has allowed, among other things, a water consumption savings (rinse-free bathing cloth) of approximately 90,000 L/year. Likewise, a contribution was made to the protection of the ozone layer through the acquisition of a piece of equipment for recovering waste refrigerant gases resulting from air conditioning maintenance.

5. Environmental Watchers Program

This is an environmental education program based on the action of a group of hospital volunteers. They deliver a four-module online training course on environmental criteria and the correct use and way of working with different elements, like air, water, and waste. By means of educational activities, they train hospital staff.

The program has resulted in numerous improvements for the institution, like the creation of the Green Procurement Program, started in 2012 and fully executed in 2015-2016. Thanks to the group of Environmental Watchers, educational activities for users are carried out in waiting rooms on subjects like waste separation and water protection (effluents). Also, the Green Art and/or Green Nativity Scene Contest helps value recyclable materials and demonstrates different possible uses, like more environmentally friendly Christmas decorations.

6. ECOLAV Program

Created in 2013, this program focuses on the comprehensive management of hospital clothing, from the correct use of garments to the enhancement of the washing process. By raising awareness among users, the volume of clothing washed has been reduced.

7. Effluents Program

The purpose of this program is to properly handle effluents and liquid waste. Initially, the focus was on the elimination of mercury from effluents. Nowadays, measurements

of physical-chemical parameters, among other variables, are also evaluated. An improvement resulting from the program was the deployment of the Electrochemical Treatment System (a technology that replaces incineration) to treat liquid waste generated in the Clinical Lab, the Blood Bank, and Pathology; or, in other cases, to confine heavy metals in landfill cells, allowing in situ decontamination of substances like formaldehyde, dyes, silver nitrate, and cadmium, among other compounds.

Why implementing programs?

Environmental management in a hospital is made easier through the design and implementation of programs, which must have:

- A plan
- A logo and image recognized by all hospital staff
- Personality: if told to an employee, the program name should be easily visualized
- Identity
- A purpose or scope: it must be brief, accurate, and feasible; information needs to be available in programs
- Clear indicators and goals, clear and accurate methodology

Information provided by Environmental Manager Ms. Mónica Lisett Castaño Tovar

8. GeDo Program

The GeDo (document management) Program, led by the Admissions and Statistics area, seeks to generate a paper-free office culture to rationalize and control document production. Through this program, the hospital has reduced the number of photocopies (average monthly reduction: 16,000 approximately) by eliminating the file copy in billing processes with insurance companies, sent and received correspondence, and medical records, among others.

As work with the Environmental Management System matures, we are able to identify the programs that need to be created and design and implement them in an interdisciplinary manner with the collaboration of different hospital areas,

PROGRAMA DE GESTIÓN AMBIENTAL INSTITUCIONAL



Program communication

Through the Communication area, information is shared using the hospital communication channels, i.e. email, the intranet page, posters, and presentation of programs in the auditorium.

Closure of the cycle: control

The closure of the cycle is of vital importance to the Environmental Management area as far as program implementation is concerned, since, if no controls are carried out, the efforts made in previous steps are lost. In this sense, the following items are checked:

- o Adherence: everyone, both employees and users, has rules to comply with.
- o Daily visits by area: schedule and eco-maps. Two staff members from Environmental Management are in charge of visiting all areas of the institution in order to verify adherence to the environmental standards established by each program.
- o Implementation of indicators: for program application there exists a series of variables to rate the level of compliance. The measurements of each area are related to the performance goals of each worker, and, in turn, to the strategic plan results of the area where the employee belongs. Thus, environmental protection is measured at the employee level, significantly enhancing the worker's sense of ownership and environmental responsibility.

Lessons learned

- Environmental aspects must be handled through the implementation of structured programs that facilitate control through tracking indicators.
- It is important to incorporate the environmental indicators results into the strategic goals of the organization.
- Ecomap implementation facilitates the organization's environmental inventory and the control of pollution.
- The implementation of environmentally preferable purchasing drives all hospital processes towards working as a team on the culture of responsible consumption and the optimization of processes.

Environmentally preferable purchasing criteria

- Products free from chemicals like mercury, PVC, and others.
- Work with suppliers on packaging aspects. For example, the laundry supplier facilitated the automatic dosing of all washing chemicals in liquid form. Dosing used to be made with disposable containers, but now we use returnable packaging manufactured by the supplier. Containers are reused and no waste is generated.
- Low-energy products.
- Supplier's responsibility for waste management: toner logistics and carbon footprint offset through planting.
- Reusable packaging.
- Local or regional production.
- Other strategies: avoid the use of non-woven fabric, choose sterilizable medical equipment, and avoid disposable products.

What differentiates us is that we are a non-profit organization that invests in technology, medical equipment, education, and social action. We facilitate the delivery of high-complexity services for the disadvantaged and the poor through free-of-charge health care for spine surgery, oral cleft, heart conditions in children, etc.

Mónica Lisett Castaño Trovar, hospital
Environmental Manager

FOSCAL Clinic (Colombia)

The FOSCAL Clinic is a high-complexity institution located in the city of Bucaramanga, Colombia. It is a member of the Global Green and Healthy Hospitals network since 1993 and it has been working for five years now on the Green Purchasing, Chemicals, and Food goals.

Environmentally preferable purchasing

The main goal behind the design and implementation of this policy is to achieve efficiency in the evaluation, selection, contracting, and purchasing processes involving vendors of medications, medical devices, and supplies, while controlling the negative aspects that may impact the environment, with the aim of optimizing and promoting a culture of sustainable use of natural, energy, and technological resources.

Implementation

This has been achieved through different strategies:

1. Training and awareness-raising on the environmentally preferable purchasing policy, targeted at staff involved in the evaluation, selection, contracting, and purchasing of medications, medical devices, and supplies.
2. Development and update of the Environmentally Preferable Purchasing Manual as a set of tools allowing the strengthening of environmental management in the institution.
3. Strengthening of the procedures established for the procurement of medications, medical devices, and supplies.
4. Identification of the sustainable consumption criteria established in the goods and services procurement policy.
5. Socialization of tax benefits in the procurement of clean technology.
6. Incorporation in the contracts of a clear provision stating that it is part of the contractor's

responsibility to support the hospital's environmentally preferable purchasing policy.

7. Strengthening of business relationships with those suppliers that demonstrate, by means of ecolabelling, their commitment to the environment in the manufacturing of their products.

Products incorporated

The criteria chosen are included in the solicitation documentation:

- o Medications
- o Medical devices
- o Paper supplies
- o Products for reducing packaging

Green procurement and chemicals



	FUNDACIÓN POSUNAR - CLÍNICA FOSCAL INTERNACIONAL	Código
	POLÍTICA INSTITUCIONAL	9-000
	POLÍTICA DE COMPRAS ECOLÓGICAS	Foja 1 de 1
		Versión: 1 UNO
<p>Lograr la eficiencia en la ejecución de los procesos de selección, adquisición, evaluación y contratación con Proveedores de medicamentos, dispositivos médicos e insumos necesarios, para la prestación de los servicios de salud en Foscál Internacional, considerando los aspectos negativos que pueden producir impactos en el medio ambiente, a fin de optimizar y promover la cultura del consumo sostenible de los recursos naturales, energéticos y tecnológicos en la institución.</p> <p>ESTRATEGIAS</p> <ul style="list-style-type: none"> • Capacitación y sensibilización sobre la política de compras ecológicas al talento humano responsable de la selección, adquisición, evaluación y contratación de dispositivos médicos, medicamentos e insumos. • Elaboración y actualización de manual de compras ecológicas para brindar herramientas que permitan el fortalecimiento de la gestión ambiental de la institución. • Fortalecimiento de los procedimientos establecidos para la inclusión de dispositivos médicos, medicamentos e insumos de la institución. • Identificar los criterios de consumo sostenible establecidos en la política para la adquisición de bienes o servicios de la entidad. • Socialización de los beneficios fiscales en la adquisición de tecnologías limpias. • Establecer claramente dentro de los contratos una cláusula que permita dar a conocer al contratista la responsabilidad de apoyar la política de compras ecológicas establecida. • Fortalecimiento de la relación comercial con sus proveedores que demuestren con "etiquetado ecológico" la responsabilidad con el medio ambiente en la elaboración de sus productos. 		

Through the implementation of more sustainable criteria in procurement bids, alternatives to toxic chemicals have been incorporated.

Anesthetic gases program: the FOSCAL Clinic has successfully reduced its use of anesthetic gases containing nitrous oxide by 98%. Some of the substances used are part of an inverse logistics program.

Mercury: replacement of 50% of halogen lamps with LED lamps, and all thermometers in the institution are digital now.

Lead and others: use of rigid-wall, heavy-metal-free containers.

Fluorocarbons: use on non-fluorocarbon containers for food packaging in the kitchen department.

Quaternary germicides: use of neutral germicides for the second cleaning, and pH control to validate effluent discharge into the sewage system. In some areas under epidemiologic surveillance control, hypochlorite use is replaced with a neutral germicide.

Benefits
These activities have been under the permanent surveillance of FOSCAL's Environmental Management Unit, and have resulted in numerous improvements in the condition of water discharged into the sewage system.

Food

The institution offers healthy food options like natural juices, fruits, sandwiches, whole-grain products, and a vegetarian menu. If a user requires a diet that is different from that of a patient, food is prepared upon prior request.

- Since this is a health institution, we work for the wellbeing of users by encouraging healthy diet habits. In this sense, we have increased the availability of healthy food in sales points.

- As regards patients, therapeutic diets are offered based on the patient's condition and the Diet Manual. Education is also provided on an ongoing basis during nutritional visits.
- Users' health status has improved, as they are more aware of changes needed in eating habits.
- Users with nutritional risk factors (cardiovascular, obesity, diabetes, hypertension, undernutrition) are identified and worked with.
- In the coffee-shops, healthy food options are offered and nutritional tips are given.

Menu development: Menus are developed by the Food service (a nutrition specialist and a chef) and reviewed by the nutrition auditor. Each menu cycle must comply with the meal pattern established in the service contract.

According to requested conditions, the following must be taken into account:

1. Nutrient contribution
2. Quantities
3. Presentation
4. Variety

Agroecological food: Food supplies are purchased at the local central provision market based on procurement specifications and taking into account each food item and in-season product data sheet. Purchases are made twice a week (Tuesdays and Saturdays) in order to ensure quality and product variety, all in compliance with the established standards. Products are purchased based on the same specifications, both for patients and for the coffee shops, although preparation and meal patterns vary.

Hospital nutrition: the hospital Food service offers nutrition plans tailored to each patient's or individual's characteristics, with servings and nutrients helping improve health status and generating well-being.



Secretariat of Health of Cundinamarca Department (Colombia)

The Secretariat of Health of Cundinamarca Department in Colombia comprises a network of 53 health care institutions, of which 32 are directly under the Department's administration and 21 are under municipal administration.

Leadership

In late 2016, upon request of Cundinamarca's governor for cross-sectoral work, a proposal was developed to create an interdisciplinary team—the Green Hospital Without Harm—to work in collaboration with the Department's Secretariat of Environment and hospital managers. The proposal called for coordinated and synergic work targeted at achieving the GGHH goals, with the intention of developing work lines associated to the GGHH Agenda.



The Green Hospital Without Harm team (Cundinamarca, Colombia)

Cundinamarca's Green Hospital Without Harm team is comprised of contract and payroll staff that has been working on the Leadership and Green Procurement goals of the GGHH Agenda for more than two years now. Their working scheme has been defined as part of a strategic plan. Although 32 of the 53 hospitals are centralized (their managers are appointed by Cundinamarca's governor instead of the municipality), work has been done on an equal basis following four technical lines:

1. Incorporation of environmental leading experts into hospitals and state-owned social welfare corporations (ESE, by its acronym in Spanish)
2. Hospital membership in the Global Green and Healthy Hospitals network
3. Carbon footprint measurement at institutions using the calculator made available by the Department's Secretary of Environment
4. Green procurement criteria incorporation

Implementation of the GGHH Agenda

The interdisciplinary working group holds regular meetings in which information is shared and strategies are developed in collaboration with each area of the Secretariat of Health: Secretariat's Office; Assurance Directorate; Service Development Directorate; Consulting Office for Sectoral Planning; Citizens Participation and Advice Office; Public Health Directorate; and Inspection, Surveillance and Control Directorate.

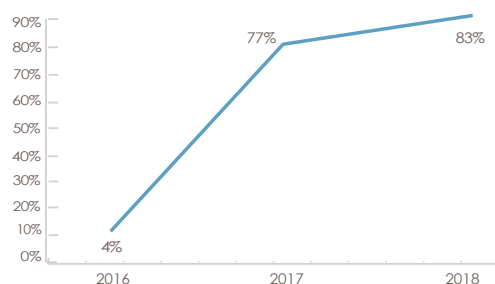
Thanks to the integrated work done, the following achievements were possible:

1. Incorporation of environmental leading experts

The Green Hospital Without Harm team has encouraged hospital network (health care institutions that manage their budgets independently) managers to hire collaborators to assist in the area of technical-environmental management. Given the positive experience of some hospitals, not only in the improvement of processes to be greener and healthier but also as regards savings in consumption and economic resources, many institutions agreed to the proposal and decided to hire a person to lead the incorporation of the hospital into the Global Green and Healthy Hospitals network to work on the Global Agenda.

On the other hand, this initiative has improved hospital submission of mandatory reports before control authorities, and enhanced compliance with local regulations requiring reporting the volume of hazardous waste generated. Additionally, in some cases the working strategy was combined with quality systems.

Environmental leading experts in Cundinamarca's hospitals



2. Awareness meetings

In the meetings of leading experts, held semi-annually to socialize experiences and strategies implemented in hospitals, it was possible not only to share information about benefits gained and savings achieved, but also to establish different technical lines of work. Furthermore, these meetings were a propitious setting to introduce the Department's environmental calculator and the carbon footprint program, a very motivating proposal coordinating efforts of both the Health and the Environment Secretariats.

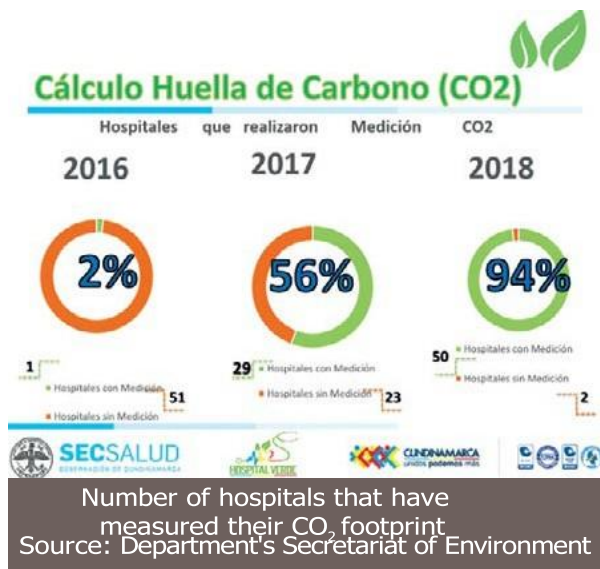


3. Role of Cundinamarca Secretariat of Health

The leading role played by the Secretariat of Health is essential. It holds working sessions to better communicate with managers and leading experts, it organizes visits to the hospitals of the Department's network, and it follows up actions implemented through the Mission Health strategy. Among these, the greatest achievement was the incorporation of actions and activities from the environmental agenda (proposing, for example, energy use reduction) into the Integrated Action Plan on Health.

4. Environmental calculator

Cundinamarca Secretariat of Environment has a tool designed to measure the consumption of energy, water, paper supplies, and fuel. The environmental calculator is used by Nemocón Hospital since 2013, and other institutions have also started to use it (29 in 2017 and 50 in 2018), which as of today amounts to a level of consumption data reporting of 94%.



Carbon offsets

- Planting native species

Based on the public hospitals' carbon footprint measured with the Department's environmental calculator, carbon dioxide (CO₂) emitted in 2016 was offset by planting native trees. Thanks to the joint effort of the Secretariat of Environment, the local governments and the Municipal Units for Technical Agricultural Assistance (UMATA, by its acronym in Spanish), more than 15,000 native species have been planted as of July 2018.



Strategy "Celebrate life planting life"
- Plant a tree for each newborn at San Rafael Fusagasugá Hospital

- **Celebration of the International Day of Forests and Water**

The community is invited to celebrate environment-related days by planting trees and attending hospital-led workshops, including educational talks on the protection of forests and water. Clean out days in state-owned social welfare corporations (ESE) are also organized, as well as clean-out and maintenance days of riparian corridors belonging to each municipality's water resources wealth.



Talks in different hospitals during the International Day of Forests and Water - In the picture, Tocaima Hospital

Challenge for 2018: Get 90% of hospitals in Cundinamarca's network to use the environmental calculator, by working in collaboration with local secretariats of environment so that their representatives get to know the tool and measurement parameters.

Telemedicine

With the aim of technologically strengthening the regional hospital infrastructure and eliminating barriers preventing patients from accessing specialized medical services, Telemedicine was implemented, an initiative of Cundinamarca Secretariat of Health. By means of specialized equipment and information and communication technology tools, health care protocols and procedures were developed, as well as remote consultation between patients and health professionals through technological platforms.

Benefits:

a) As of today, 292,784 teleradiology exams have been performed, reducing the environmental impact by completely eliminating the use of radiographic plates, developers and acetates; directly benefiting inhabitants of remote, scattered populations away from municipal seats, and also reducing fuel used for user transportation.

Telemedicine referral centers were created in the following hospitals: San Rafael de Facatativá, which incorporated the teleradiology service; Nuestra Señora de las Mercedes de Funza, which made teleconsultation available for patients; and Samaritana University Hospital, which has also implemented teleconsultation and remote assistance to support the areas of promotion, prevention, diagnosis, disease treatment and rehabilitation, services required by referring hospitals for its timeliness and safety.

This project will benefit 116 municipalities in Cundinamarca Department, since the public hospital network will have its own referral centers for hiring telemedicine services at a low cost, thus being able to incorporate data into the Unified Information System on Health (SIUS, by its acronym in Spanish).



Teleconsultation stations, Nuestra Señora de las Mercedes de Funza Hospital, Cundinamarca

Positive impact of telemedicine on the community: it improves timeliness of health care provision and diagnosis accuracy, and reduces transportation and costs for patients.

Environmentally preferable purchasing

- o Procurement studies carried out with the aim of reducing mercury-containing medical devices.

- o Use of government business platform SECOP II, which includes environmental criteria.

- o Participation together with the Ministry of Health in a national study for the reduction of mercury-containing technologies and medical devices.

- o Incorporation (in progress) of an environmental risk matrix for including environmental terms and conditions in vendor contacts.

- o Development and incorporation (in progress) of a drug monitoring manual and a medical devices monitoring manual, including an Environmentally Preferable Purchasing section stating the vendor's responsibility for medical devices from purchase through final disposal.

- o Some of the hospitals, like Nuestra Señora del Carmen de Tabio ESE Hospital, have carried out an economic study and replaced chemicals that have environmental impacts.

Clínica Bíblica Hospital (Costa Rica)

The Clínica Bíblica Hospital is a Costa Rican private health care institution. It is located in the province of San José and has 67 beds and 10 operating rooms. It was founded in 1929 by missionaries Enrique and Susana Strachan, who advocated their service in support of the neediest by delivering free-of-charge medical care. Nowadays, with the support of the Tree of Life Ministry, programs of social assistance for the disadvantaged are maintained.

Chemicals

As part of the work being done regarding the Chemicals goal and the replacement of substances with safer alternatives, the hospital set out to reduce environmental and occupational risks by changing the technology used in the Sterilization area.

Background

The hospital has used sterilizers for medical instruments, both vapor and ethylene oxide equipment. The latter type was used during many years for sterilizing thermosensitive materials, since not all instruments can be sterilized in autoclaves. In 2007, as part of the first certification process with the Joint Commission¹³ standard, the hospital started to transform its services seeking to deliver higher quality and safety.

Initiatives

- In 2010, a risk assessment was performed: the Failure Mode and Effects Analysis (FMEA). This study identified a series of failure modes and effects during sterilization cycles with ethylene oxide, which allowed designing a work plan to reduce these risks.
- In 2012, the use of ethylene oxide was completely replaced. Instead, the hospital purchased a hydrogen peroxide sterilizer, which can sterilize thermosensitive materials that cannot stand temperatures higher than 53.4 C°. The equipment can sterilize stainless steel, cannulated (tubular) and non-cannulated (scissors, lenses, heart probes) instruments, and plastic materials used in heart surgeries, among others. The material to be sterilized has to be completely dry and free of fabric.

¹³. The most experienced organization in the world in health care certification.

The following table shows some of the hydrogen peroxide sterilizer features. At the procurement level, this change of equipment translated into the hospital purchasing the following supplies:

Supplies used in the hydrogen peroxide sterilizer
Description
Hydrogen peroxide cartridge: it is safely introduced into the sterilizer using appropriate protection gloves. Since it is an automatic and "closed" process, the operator is free from hydrogen peroxide contact risk, except when he/she introduces the cartridge (which is sealed) into the equipment. The sterilization process takes place at approximately 53 °C.
Tyvek® bags and rolls: wrapping used in the sterilization process. It is made up of high-density polyethylene (HDPE) filaments spun by evaporation and bonded together with heat and pressure.
Indicator tape: another control method used to verify the sterilization process result. Process success is determined by the resulting color. If after sterilization the tape gets purple, the sterilization process failed; if it is yellow the process was successful.
Chemical indicator: another control method used to verify the sterilization process result. If the resulting color is purple, the process failed; if it is yellow, it was successful.
Biological indicator: use of vials to verify if the sterilization process was successful. After each cycle, the vial is put in an incubator in order to determine if the sterilization was correct or not.
Automated process control: by means of a touch screen, the operator can control the whole sterilization process. For instruments with a length of more than 1 meter and a diameter lesser than 1 mm, the lumen cycle is used. For instruments outside this specification, the non-lumen cycle is used.



Hydrogen peroxide sterilizer

The use of this technology allows shorter sterilization processes with less risk for staff.

Mayra Valverde – Head of Central Service

Strategy selected

FMEA risk assessment: Every year, as part of the facility safety plans, the Clínica Bíblica Hospital performs a risk assessment.

Implementation process

- A hospital critical service is chosen for the FMEA, taking into account potential risks and impacts on patients, visitors, and staff. Ideally, the analysis is performed before service operations begin, in order to prevent risks before incidents occur. Nonetheless, the analysis can be carried out in critical services already in operation.

- Once the service is chosen, an interdisciplinary work group is assembled to carry out the analysis. This allows a variety of technical and clinical criteria to perform a broad and comprehensive risk assessment, with the participation of staff working in the service chosen being key.

- Then, process functions are identified and the different activities in the service chosen are mapped.

- Afterwards, sub-processes, potential failure modes, their effects, and shutdown method are identified. In order to carry out a comprehensive and complete analysis, the different process stages must be considered.

- The next step is to perform the risk assessment. The FMEA team members evaluate each of the failure modes and their effects, taking into account the following variables:

- Severity: seriousness of risk in case failure occurs.

- Occurrence: probability of failure occurrence.

- Detection: detection range of a potential failure.

- Then, risk priority numbers (RPN) are calculated by multiplying the three variables above mentioned.

- RPNs are sorted from highest to lowest, and those which are contributing to 80% of sum of RPNs are selected. Based on this prioritization, a work schedule is created, assigning deadlines and tasks, with the aim of preventing potential failures. This preventive work allows the reduction of risks for patients, visitors, and staff.

- Finally, actions or tasks on the schedule must be followed up to ensure completion. The ultimate goal must be to eliminate, to the degree possible, the cause of each failure before it occurs, reducing severity and occurrence and increasing the probability of detection.

Comparison between ethylene oxide and hydrogen peroxide

To consider	Ethylene oxide	Hydrogen peroxide
State	Compound liquefied by pressure that, after sterilization, transforms into a gas.	Light-color transparent liquid that transforms into a gas.
Effect when inhaled	Toxic and irritant	Irritant
Effect when ingested		Irritant
Effect on eyes	Irritant	Corrosive
Effect on skin	Irritant	Irritant
Carcinogenicity	May have carcinogenic effects	
Mutagenicity	May cause hereditary genetic alterations	
Personal protective equipment for daily use	Goggles, mask and chemical-resistant gloves. Also scrubs, boots or other resistant protective clothing. Eyewash and safety shower.	Chemical resistant gloves, only for introducing the hydrogen peroxide cartridge.
Duration of each cycle	24 hours: 1 hour plus 23 hours for airing	Maximum 1 hour
Other risks	Flammable	
Additional considerations	<ol style="list-style-type: none"> 1. Consider safety measures regarding reception, storage and transportation of pressurized cylinders. 2. Consider immediate controls in case of leaks (immediate extraction and alert system), as well as correct use of the equipment. 3. Consider the use of personal protective equipment for spills, as well as medical follow-up as applicable. 4. Since it is a flammable material, safety measures must be reinforced. 	<ol style="list-style-type: none"> 1. The process is much safer. The only task to perform is to introduce the hydrogen peroxide cartridge, which is automatically perforated and emptied once within the equipment, taking the sterilizing liquid to a vaporizer that transforms it into a gas and injects it into the chamber. It is completely vaporized. Each cycle can last an average of 55 minutes. No release of toxic waste; only water vapor and oxygen are released. 2. The cartridge has two protective membranes preventing staff contact with the chemical. 3. The level of sterilant is automatically detected, warning the user when level is low. With 15 cycles per cartridge, more cycles can be run with the same chemical compound. 4. It is equipped with an easy-to-read color-coded touch screen that shows the different cycle stages and the remaining time, facilitating controls in a safely manner.

Failure modes, causes and effects resulting from FMEA of ethylene oxide use			
Process	Mode	Cause	Effects
Transportation and installation of cylinders	Deterioration of valves and hoses at ethylene dioxide cylinder connection.	Deficient preventive maintenance of valves, pressure gauges, and others.	Potential leak of ethylene oxide
	Carts and/or trolleys to transport cylinders in poor condition.	Deficient preventive maintenance regarding cylinders transportation.	
	Lack of technical knowledge for correct installation of cylinders.	Incorrect training of staff.	

Challenges and lessons learned

- The Failure Mode and Effects Analysis is an extremely necessary and important tool allowing the hospital to foresee or correct potential operational risks. Thus, following its quality and safety strategy, the hospital decided to replace ethylene oxide with hydrogen peroxide.
- Although the hydrogen peroxide sterilizer uses very specific supplies that are unique to this technology, the level of safety and protection delivered by this equipment warrants its use from a quality and safety point of view.



Over the last years, the FMEA has allowed us to identify a series of failure modes and effects in critical hospital operational processes, which helped us deliver much safer services, both for patients and staff, evaluating for that purpose environmental, occupational health, and safety risks.



Andrés Alvarado – Facility and Environment Manager