



Thu Dau Mot University
Journal of Science

ISSN 2615 - 9635

journal homepage: ejs.tdmu.edu.vn



Solutions to remedy meaningful environmental aspects according to Iso 14001:2015 standards at General Van Phuc 2 Hospital

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Article Info: Received Oct. 11th, 2023, Accepted Nov. 11th, 2023, Available online Dec.15th, 2023

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<https://doi.org/10.37550/tdmu.EJS/2023.04.497>

ABSTRACT

Van Phuc 2 General Hospital is one of the hospitals that is always concerned about environmental protection in medical checkups and treatment. However to affirm and enhance the prestige is a regional hospital in the region, step by step approaching the hospitals around the world. Therefore, the subject "Proposing solutions to remedy meaningful environmental aspects at Van Phuc 2 General Hospital" is important to building a sustainable hospital development image.

The subject focuses on the plan to develop the environmental management system by ISO 14001: 2015 based on the current management status of the hospital.

By the 3P and 4T methods, the criteria and methods of analysis and field survey were identified, There were five Environmental aspects at the hospital by followings: smells, dust, exhaustion, wastewater, infectious waste, and clinic waste. In addition, the subject also establishes objectives, environmental criteria, planning, resource-building procedures, communication systems, document systems, etc., to complete the environmental management system by ISO 14001: 2015 for the hospital. At the same time make recommendations to help the hospital comply with all requirements when building an Environmental Management System.

Keywords: *environment; environmental aspects, solution, hospital, ISO 14001:2015*

1. Introduction

In Vietnam today, the population is increasing day by day, and social demand for entertainment, entertainment, and aesthetic equipment is also increasing. However, quality issues are always of concern to the community and society, especially in the field of human health protection. Investment in infrastructure for the increasingly developing health sector has been chosen. More and more private hospitals have been established and have also met part of the people's medical needs. However, until all hospitals have finished, they still do not have a professional environmental management suite.

A hospital is a place to examine and treat patients. Patients' ability to adapt to the environment is much lower than that of healthy people, so the hospital environment plays a very important role in supporting and restoring the patient's health. Hospitals are also very sensitive to the environment, so any small impact on the hospital environment can harm the health and safety of patients. Chemicals used in treatment, X-ray films, as well as radioactive materials in diagnosis and treatment, and even patient excretions can cause contamination. All that waste needs to be treated safely and according to standards. In the world today, the international standard ISO 14001 is being widely used. ISO 14001 is a set of standards that help control and prevent environmental problems. Recognized by the host country, it can replace Vietnam's environmental management system within 5 years. In addition, it is also economically meaningful to help hospital managers identify adverse environmental aspects, manage waste, and use materials well to reduce costs incurred in the process. hospital operations. (TCVN ISO 2015), Hong Tran Le Thi (2008).

Van Phuc 2 General Hospital is a hospital that always cares about environmental protection in its medical examination and treatment activities. However, to protect the clean environment as well as affirm and enhance its reputation as a hospital on par with the region, gradually approaching hospitals around the world, the topic "Proposal to build a hospital system" The environmental management system at Van Phuc 2 General Hospital according to ISO 14001:2015" standards is essential to building a sustainable hospital image.

Address: land plot No. 886 and 872, map sheet No. 112, Binh Phuoc B neighborhood, Binh Chuan ward, Thuan An town, Binh Duong province

The facility began operations in 2013

Geographic location

Van Phuc 2 General Hospital is located at land plots No. 886 and 872, map sheet No. 112, Binh Phuoc B neighborhood, Binh Chuan ward, Thuan An town, Binh Duong province.

- Scale: 7 departments and 50 beds
- Area of 3,572 m² includes a 3-storey building including 1 ground floor (320m²) and 2 floors (325 m²).

2. Methods

2.1. Data collection

Collect information about activities and environment:

Natural conditions, infrastructure.

The process of formation and development and organizational structure of the hospital.

Situation of examination and treatment at the hospital.

Current environmental status at the hospital

Environmental management works at the hospital.

This method helps collect information about organizational structure, medical examination and treatment processes, waste sources, and environmental management... which is the basis for determining environmental aspects and building a system. environmental management system.

2.2. Flow diagram (Van Phuc 2 General Hospital, 2014)

Internal medicine clinic: internal medicine clinic, pediatric clinic, dermatology clinic, ENT clinic - Ear, nose and throat examination, eye clinic

Interdisciplinary Department: ENT clinic – Ear, nose, throat examination, maxillofacial clinic, eye clinic

Emergency and resuscitation department

Department of general internal medicine: rehabilitation, pediatrics

Department of Surgery, obstetrics, anesthesia, and resuscitation: general surgery, obstetrics, and gynecology, anesthesiology, and resuscitation

Paraclinical department, functional investigation: X-ray, conventional X-ray, black and white ultrasound, 3- and 4-dimensional color, tests: biochemistry, hematology, immunology, functional investigation, electrocardiography; endoscopy, DSA-Digital Subtraction Angiography.

Pharmacy department: pharmacy warehouse, pharmacy counter, health insurance pharmacy dispensing counter

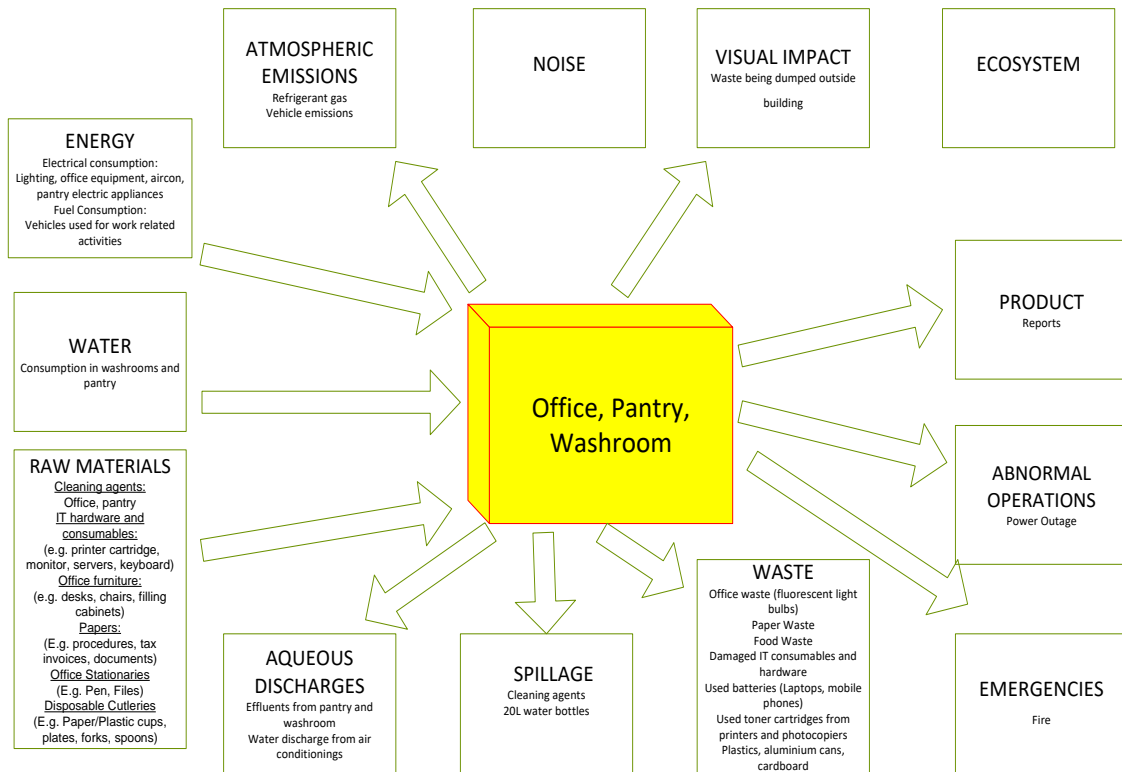


Figure 1. Flow diagram of input and output criteria of activity areas

Source: *InterConformity Assessment and Certification, 2016*

2.3. Multi-criteria (InterConformity Assessment and Certification, 2016)

Use the criteria assessment method to evaluate the significance of the identified environmental aspects based on 4 criteria: law, community, frequency, and severity.

TABLE 1. Criteria for evaluating meaningful environmental aspects

criteria	Consider the aspect	Point evaluation
Law: Is medical treatment regulated in law or hospital regulations?	Low: no regulations provided Medium: there are regulations but no violations High: violation action	0 1 2
Community: do environmental aspects affect the community?	Low: never Moderate: occasionally High: often	0 1 2
Frequency: Frequency of occurrence of environmental aspects	Low: may not appear or appear once in 1 year. Moderate: appears a few times in 1 month to 1 year High: appears for a month or more	0 1 2
Severity: Severity of the aspect impact	Low: no impact or only impact on aesthetic comfort Medium: impact on water, air, soil quality High: detrimental to humans and plant and animal populations	0 1 2

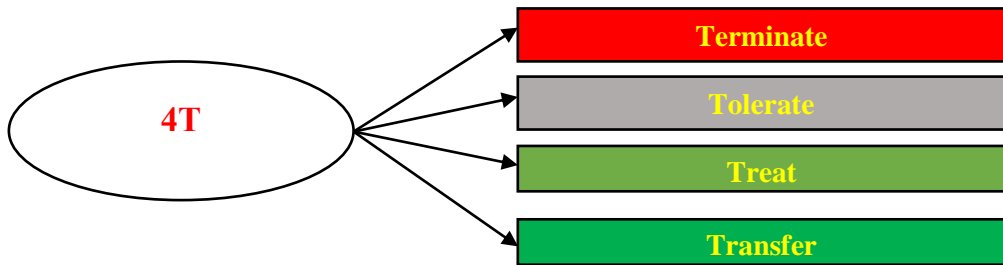
Source: *InterConformity Assessment and Certification, 2016*

Criteria for identifying significant environmental aspects:

Total score = $law + community + frequency + severity / 4 \geq 1.5 \Rightarrow$ Meaningful environmental impact

Total score = $law + community + frequency + severity / 4 < 1.5 \Rightarrow$ Environmental impact is not significant

2.4. Multi-criteria (InterConformity Assessment and Certification, 2016)



This method is used when proposing solutions to respond to or overcome risks and incidents. To consider ways to overcome meaningful environmental conditions.

Terminate: Use measures to eliminate or end aspects that negatively impact the environment (meaningful environmental impact)

Tolerate: Use measures to bring meaningful environmental conditions down to an acceptable level.

Treat: For aspects that can no longer be eliminated, they must be faced by using labor safety solutions: labor protection, chemical safety, and techniques safety in production.

Transfer: When we cannot solve that environmental problem anymore, we can transfer that technology to a party with more advanced technology change to another technology, or hire outside experts.

3. Results and discussion

3.1. Flow diagram of each area

TABLE 2. The material flow diagram is determined in 7 areas as follows:

No	Area	Activity	environmental aspect
1	Parking lot	parking activities	Power consumption Water consumption Ordinary medical waste: packaging non-infectious waste Noise Dust, exhaust gas Vibration Explosion Gasoline leaked Wastewater

2	Canteen	Cooking Eating activities Clean the dining area	Power consumption Water consumption Ordinary medical waste: packaging non-infectious waste, organic waste Noise Explosion Gas leak Excess heat Wastewater Cleaning chemicals
3	Office	Using office equipment (printer, fax machine, computer, etc.) Employee activities	Power consumption Hazardous waste is not infectious Common medical waste: used paper... Explosion Mechanical breakdown
4	Outpatient	Medical examination and first aid Activities - Hygiene of staff, patients, and family members Providing medicine Collection and cleaning activities	Power consumption Water consumption Ordinary medical waste Infectious waste Hazardous waste is not infectious Wastewater Odor Chemical spills Collision and crash noise Ordinary medical waste
5	Boarding	Cure Hygienic activities of staff, patients, and family members Collection and cleaning activities	Power consumption Water consumption Ordinary medical waste Infectious waste Hazardous waste is not infectious Wastewater Odor Dust Chemical spills Collision and breakdown Explosion
6	Solid waste storage	Storage of solid waste and hazardous waste	Power consumption Leachate Odor Broken boxes and shelves Noise Vibration Gasoline leak Emissions Hazardous waste
7	Generator	Generate electricity	Power consumption Odor Noise Vibration Gasoline leak Emissions Heat

The environmental characteristics of each of the aforementioned categories will affect the environment, either positively or negatively, according to the list above. If the repercussions are unfavorable, they will lead to the depletion of natural resources, environmental contamination of the water, air, and land, and a bad influence on employee health. To exclude the significant environmental factors that should be remedied first, this environmental factor will be further calculated. In the table above, the authors have listed and analyzed the following: No area, activity, or environmental aspect.

3.2. Evaluation of meaningful environmental aspects

The study determined the environmental elements of the hospital through actions in 7 areas. The study team will evaluate each environmental factor to identify the significant environmental factors for management, better control, mitigating adverse effects, or preventing adverse effects on the environment and people. We employed a multi-criteria approach to determine the environmental factors, and the outcomes are as follows:

TABLE 3. The synthesis of significant environmental aspects

No	Meaningful environmental aspects	Total score	Related area	Related activities
1	Dust, exhaust gas	1.5	Parking lot	parking activities
2	Odor	1.5	Boarding	Hygiene and activities of staff, patients, and family members
			Storage of solid waste and hazardous waste	Archive
3	Pine medical waste often	1.5	Boarding	Hygiene and activities of staff, patients, and family members
			Outpatient	
4	Infectious medical waste	1.75	Boarding, Outpatient	Treatment and emergency examination
		1.5	Boarding, Outpatient	Hygiene and activities of staff, patients, and family members
5	Wastewater	1.5	Boarding,	Treatment
				Hygiene and activities of staff, patients, and family members
			Outpatient	Examination and first aid
Hygiene and activities of staff, patients, and family members				

According to the summary table of critical environmental characteristics, the hospital's five most important environmental factors are dust, exhaust gas, odor, frequent pine

medical waste, infectious medical waste, and wastewater. Without control and management procedures, the environment, people, and the steady running of the hospital will all suffer.

3.3. Solutions to overcome significant environmental aspects

TABLE 4. The solution addresses meaningful environmental aspects

Environmental aspect	Target	small target	Environmental program	Execution time	Location	implementation responsibility
Medical solid waste	Sort waste at source	100% solid waste classified	<ul style="list-style-type: none"> - Fully equipped with means and equipment to collect and store solid waste and hazardous solid waste in generating areas. - Follow waste control instructions. - Instructions on waste classification at source for all employees according to instructions on waste classification - Paste signs and signs to guide waste classification - Organize propaganda to raise the awareness of staff, patients, and patients' families in maintaining general hygiene and classifying waste 	3 months	Area in the hospital	<ul style="list-style-type: none"> - Environment Department - Organization and Administration
	Reduce amount Solid waste arise	Reduced solid waste generated by 3%.	<ul style="list-style-type: none"> - Develop and launch programs and post slogans to save paper and raw materials - Avoid spilling and leaving leftover food during eating - Check, maintain, repair and replace equipment. - Raw materials are stored, inspected and used in accordance with regulations. 	2 months	Office area. Medical examination and treatment, storage, canteen, parking lot	<ul style="list-style-type: none"> - Environment Department - Staff of departments.
	Collect, transport and treat waste according to the provisions of law	Collection and transportation transfer and process 100% solid waste treatment	<ul style="list-style-type: none"> - Continue to contract with functional units to collect and treat medical solid waste - Supervise solid waste collection by solid waste collection, transportation and treatment units. Ensure solid waste is 	2 days/time (for normal medical waste) 1 week/time (for hazardous waste)	Gathering area, garbage storage	collection company

			completely collected and not scattered during transportation. - Periodically collect to avoid overload			
Odor	Control odor sources	Ensure odors arising in areas are reduced to a minimum	Carry out periodic monitoring	Every 3 months	Hospital	rent services
			Strengthen hospital hygiene, regularly clean areas where odors arise.	daily	Inpatient, outpatient, inpatient, testing, pasteurization	cleaning staff
			Use microbial products to treat and limit strange odors (Enchoice, EM...).	every weeks	Inpatient, outpatient, archives	staff
			Operate the ventilation system effectively, operating continuously with a flow rate that always ensures the ability to exchange 20 - 40 times clean air with the outside.	daily	In the hospital area	Technical staff
			Equip activated carbon masks for employees	Every 3 months	In the hospital area	administrative department staff
Dust, Exhaust gas	Control dust and emissions according to legal requirements	Always ensure that dust and emissions generated in the area meet prescribed standards	- Require motorbikes to turn off the engine and walk before entering or exiting the parking lot - Implement watering and spraying in gate and yard areas - Plant and care for trees in the hospital grounds and parking areas - Regularly clean and sweep away dirt and sand on the road to avoid spreading dust - Concreting internal roads to reduce dust.	daily	Parking area, hospital campus	staff
Wastewater	Manage wastewater according to legal requirements	Always ensure that wastewater after the treatment system meets QCVN 28:2010/ BTNMT column A	Carry out periodic monitoring	Every 3 months	Waste water treatment system	rent services
			Check and maintain the wastewater treatment system	Every months	Waste water treatment system	Technical staff
			Use appropriate chemicals	daily	Waste water treatment system	Technical staff
			Collect sludge to avoid overload	Once every 2 weeks	Waste water treatment system	rent services

Comment: According to the table above, 5 environmental aspects need to be overcome: Medical solid waste, Odors, Dust, exhaust gas, and Wastewater. Proposed by the research team: small goals, environmental program, implementation time, location, and responsibilities for implementation in detail. The proposal table has shown organizational actions, investment in installation, equipment, and actions of the hospital.

4. Conclusion

4.1. Conclude

Through the process of learning, observing, and evaluating the current state of the environment at Van Phuc 2 General Hospital, the project has built an environmental management system and achieved the following results:

Assess the current environmental status and environmental management at the hospital compared to ISO 14001:2015 standards.

Identified 05 significant environmental aspects at the hospital, mainly focusing on the following areas:

Dust and exhaust gas: parking area;

Smell: wastewater treatment systems, solid waste and hazardous waste storage warehouses, inpatient, outpatient;

Ordinary medical waste: inpatient, outpatient;

Infectious medical waste: inpatient, outpatient;

Wastewater: inpatient, outpatient.

Develop environmental policies, goals, and targets for environmental management, monitoring, and measurement programs.

Identify and build a system of documents and records that need to be compiled according to ISO 14001:2015 standards.

The project has built an environmental management system according to ISO 14001:2015 standards for hospitals at the model level based on the actual environmental situation at the hospital and specific instructions when the hospital needs it. Can be applied immediately in a number of areas that have been surveyed and evaluated such as parking lots, canteens, offices, boarding houses, outpatients, wastewater treatment systems, and solid waste storage warehouses. hazardous waste, generators.

4.2. Request

To be able to access and meet the requirements of the Environmental Management System according to ISO 14001:2015 standards, hospitals need to:

There is a commitment from leadership and enthusiastic participation from all officers and staff in the hospital.

Thoroughly overcome significant environmental aspects: dust, exhaust gases, odors, medical waste, wastewater

Supplement sufficient human resources for environmental protection work

Open training classes for officials and employees on the importance of environmental protection, and gain more knowledge about the ISO 14001:2015 standard through training classes.

Raise environmental awareness of all hospital staff through training programs so that they are capable of minimizing negative impacts on the environment through their actions...

Integrate environmental management and environmental quality systems to reduce implementation costs

The hospital should consider and proceed to build an Environmental Management System according to ISO 14001:2015 standards based on the model model that the project has built. This is the necessary document system and specific instructions for the hospital to build a complete Environmental Management System according to ISO 14001: 2015 standards in reality.

References

Hong Tran Le Thi (2008). Environmental risk assessment. *Science and Technology Publishing House*.

<http://benhvienvanphuc.vn/trang-chu/>

<http://www.iso.org>

<http://www.iso.org/iso/iso-survey2010.pdf>.

<http://www.iso-vn.com/vi/iso>

<http://www.thuvienphapluat.vn/>

InterConformity Assessment and Certification (2016). Internal documents.

TCVN ISO (2015). Environmental management system - Requirements and instructions for use: 14001:2015.14001:2015.

Van Phuc 2 General Hospital (2014). Environmental impact assessment of Van Phuc 2 general hospital project. Internal documents.