SOCIALIST REPUBLIC OF VIET NAM
MINISTRY OF HEALTH

SOCIALIST REPUBLIC OF VIET NAM

SUPPLEMENTAL COST ESTIMATE SURVEY

ON

CHO RAY SECOND HOSPITAL

DEVELOPMENT PROJECT

FINAL REPORT

SUMMARY

February, 2015

JAPAN INTERNATIONAL COOPERATION AGENCY

INTERNATIONAL TOTAL ENGINEERING CORPORATION
AXS SATOW INC.
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TABLE OF CONTENTS

List of Tables & Figures

No.	Name of figures	Page

Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
ATM	Automated Teller Machine
APEC	Asia-Pacific Economic Cooperation
ASTM	American Society for Testing and Materials
BCD	Binh Chanh District
BEMS	Building Energy Management System
BQ	Bill of Quantity
BS	British Standards Institution
CASBEE	Comprehensive Assessment System for Built Environment Efficiency
CCU	Coronary Care Unit
CITENCO	City Environmental Company
CRH	Cho Ray Hospital
CRH-2	Cho Ray Second Hospital
CT	Computed Tomography
DI	Drug Information
DOH	Department of Health
DOIT	Department of Industry and Commerce
DONRE	Department of Natural Resources and Environment
DSA	Digital Subtraction Angiography
E/N	Exchange of Notes
EBM	Evidence-based medicine
ECG	Electrocardiogram
EIA	Environmental Impact Assessment
EICU	Emergency Intensive Care Unit
FIDIC	Fédération Internationale des Ingénieurs-Conseils
ESWL	Extracorporeal Shock Wave Lithotripsy
F/S	Feasibility Study
GDP	Gross Domestic Product
GE	General Electric Company
GL	Ground Level
GPD	General Planning Department
HCMC	Ho Chi Minh City
HCU	High Care Unit
HIV	Human Immunodeficiency Virus
HP	Home Page
ICB	International competitive bidding
ICD	International Statistical Classification of Diseases and Related Health Problems
ICT	Infection Control Team
ICT	Information and Communication Technology
ICU	Intensive Care Unit
ID	Identity Document
IMF	International Monetary Fund
IMR	Infant Mortality Rate
ISO	International Organization for Standardization
IT	information Technology
IVR	Interventional Radiology
JETRO	Japan External Trade Organization
JICA	Japan International Cooperation Agency

JIS	Japanese Industrial Standards
JV	Joint Venture
L/A	Loan Agreement
LAN	Local Area Network
LBC	Local competitive bidding
LED	Light Emitting Diode
LIS	Laboratory Information System
ME	Medical Engineering
ME	Medical Equipment
MMR	Maternal Mortality Ratio
MOC	Ministry of Construction
MOF	Ministry of Finance
MOH	Ministry of Health
MONRE	Ministry of Natural Resources and Environment
MRI	Magnetic Resonance Imaging
MSW	Medical Social Worker
NGO	Non-governmental Organizations
NST	Nutrition Support Team
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
OJT	On-the-Job Training
OT	Occupational Therapist
PACS	Picture Archiving and Communication System
PC	Personal Computer
PC	Precast concrete
PCR	Polymerase Chain Reaction
PDCA	Plan-Do-Check-Act cycle
PET	Positron Emission Tomography
PH	Potential Hydrogen
PMU	Project Management Unit
PO	Project Owner
PQ	Pre-Qualification
PR	Public Relations
PT	Physical Therapist
QBS	Quality Based Selection
QOL	Quality of Life
RC	Reinforced-Concrete
RI	Radio Isotope
SCU	Stroke Care Unit
SE	Systems Engineer
SEA	Strategic Environmental Assessment
SPD	Supply Processing & Distribution
SPECT－CT	Single photon emission computed tomography
SRC	Steel Reinforced Concrete
ST	Speech-Language-Hearing Therapist
STEP	Special Terms for Economic Partnership
SUS	Stainless steel
TOR	Terms of Reference
TOT	Training of trainer
UPS	Uninterruptible Power Supply

USD	United States Dollar
VAT	Value Added Tax
VIP	Very Important Person
VRD	Vietnam Rubber Group
VND	Vietnam Dong
WEO	World Endoscopy Organization
WG	Working Group

Chapter 1. Background of the Survey

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1-1. Background of the Project

Owing to economic development, the gross domestic product in the Socialist Republic of Viet Nam (hereafter Vietnam) exceeded $1,907.1 in 2013 (source: IMF, World Economic Outlook Database, April 2014), and Vietnam is now counted among the low- and middle-income countries. Moreover, Vietnam is one of the countries for which coordinated international aid is underway most significantly. Vietnam is progressing smoothly with its development, including its economic development, in part because of aid from other countries. Also, of Vietnam's Millennium Development Goals (MDGs), 3 items among 8 items have been reached, and the remaining 5 items are expected to be reached by 2015. Development can also be seen in the area of medical services, showing steady progress in the growth of the number of hospital beds as well as in the improvement of health indicators.

Under these circumstances, the Vietnamese government, aiming at further improvement of the quality of medical services, has developed plans and implementation programs at the individual hospital level. These plans and implementation programs have been developed within the framework of the "Comprehensive Development Design for the Health System in Vietnam to 2010 and Vision by 2020". For top referral hospitals, the government aims for the improvement of their medical service level as well as the reinforcement of their leading role as high-level medical institutions. In other words, the government aims for the following policy objectives for top referral hospitals: "not only providing advanced medical services, but also i) introducing advanced medical technologies through learning from foreign countries for the purpose of raising their medical service level to the international level, ii) providing a network for instructing lower-level hospitals on medical services, and iii) conducting training and information exchange activities under the direction of the Ministry of Health (hereafter MOH)." Cho Ray Hospital, the object of the present study, corresponds to this category of top referral hospitals.

Health indicators as a whole are showing a trend of improvement; however, there are still various individual problems, for example the over-concentration of patients in high level medical institutions in metropolitan areas has been a major problem over several years. Ho Chi Minh City is no exception. At Cho Ray Hospital, for example, it is difficult to provide sufficient medical services for patients; it is in a condition where the hospital bed occupancy rate has been around 140% for more than 5 years as indicated below. The cause for this said to be the ongoing absolute shortage of hospitals and hospital beds, as well as the malfunctioning of the referral system. The Vietnamese government has been addressing this issue, but has not yet attained its improvement goal.

Table 1-1 Cho Ray Hospital Bed Occupancy Rate from 2008 to 2013

	2008	2009	2010	2011	2012	2013
Number of Beds (beds)	1,800	1,800	1,800	1,800	1,800	1,800
Number of Inpatients (people/day)	2,545	2,513	2,469	2,518	2,490	2,427
Bed Occupancy Rate (%)	141.4%	139.6%	137.2%	139.9%	138.3%	134.9%

Source: Created by the survey team

Taking this situation into consideration, the Vietnamese government requested to the Japanese government at the summit meeting held in January 2013 to support the construction of Cho Ray Second Hospital, aiming at strengthening Cho Ray's capacity for receiving patients, the improvement of its medical level and the improvement of the medical provision system in Vietnam in the medium-to long-term perspective, all of which are urgent issues. In response to this, preparatory survey was carried out including discussions with Vietnamese government from October, 2013 to October 2014. However, after the preparatory survey, Vietnamese side required a significant project cost reduction, so this survey was carried out as an additional survey of the preparatory survey for re-consideration and cost estimation of the project.

1-2. History of Cooperation between Japan and Vietnam in the Health and Medical Sectors

In December 2012, Japan declared in its statement on the policy for the assistance to Vietnam, that "it will help establish the foundation in the fields of healthcare, social welfare, and the aid for the socially vulnerable, for the purpose of the improvement for social and daily lives, alleviating poverty and disparities", which were noted in the statement of "the measures to reduce the vulnerability", one of the critical issues for assisting Vietnam.

In the project development plan, it stated that Japan will help establish healthcare system especially for the three top referral hospitals (Bach Mai Hospital in Hanoi City, Hue Central Hospital in Hue City, and Cho Ray Hospital in Ho Chi Minh City) which Japan has been giving development assistance over the years. Therefore, this project corresponds with the policy and plan.

The table below shows Japanese major aid to health and medical sectors of Vietnam.

Table 1-2 History of Japanese Major Aid to Health and Medical Sectors of Vietnam

Scheme	Project Name	Project Period
Grants aid	The Project for the Rehabilitation and Upgrading of the Cho Ray Hospital	1992 to 1994
Technical cooperation project	The Project on Cho Ray Hospital	1995 to 1999
	In-country Training Program for Strengthening Capacity of Human Resources of Health Care Services in the Southern Area of Vietnam	2004 to 2009
	Project for Improvement of the Quality of Human Resources in Medical Services System	2010 to 2015
ODA loans	Regional and Provincial Hospital Development Project	Agreed in March 2005
	Regional and Provincial Hospital Development Project (2)	Agreed in March 2012

Source: JICA, List of Completed Projects by Schemes

1-3. Project Summary

The project summary planned by Vietnam's MOH is as shown below.

1-3-1. Purpose of the Project

i Construction of Cho Ray Second Hospital shall reduce the overload of Cho Ray Hospital which accepts patients from the Southern part of Vietnam and Ho Chi Minh City, contributing to the improvement for the quality of healthcare service.
ii Cho Ray Second Hospital shall provide highly advanced healthcare service.
iii Cho Ray Second Hospital shall be the hub for the training of medical staff, and technical transportation.
iv Cho Ray Second Hospital shall be the model of hospital quality management.

1-3-2. Scope of the Project

In this project, after the construction of the hospital, medical equipment, especially advanced ones, shall be installed to the hospital, and hospital quality management shall be enhanced making good use of information communication technology.

1-3-3. Authorities in Charge of the Project

MOH and Cho Ray Hospital

1-3-4. Outline of Cho Ray Second Hospital

i Number of beds: 1,000 beds
ii Departments: 29 Clinical departments, 6 Para-clinical departments and 3 Administrative departments

1-4. Purpose of the Survey

As shown in the figure below, the purpose of the survey is to set upon a basic operations and architectural plan for Cho Ray Second Hospital as a means to tackle the issues clarified by the study of the external environment of the project and the present operations of Cho Ray Hospital, in order to achieve the goal mentioned in "1-3. Project Summary 1-3-1. Purpose of the Project".

Purpose of the Project

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iv Cho Ray Second Hospital shall be the model of hospital quality management.

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External environment survey: Study on the national policies and medical resources, and on the appropriateness of the capacity and functions of Cho Ray Second Hospital based on the medical demand projection

Internal environment survey: Study on the present operations of Cho Ray Hospital, and on the course of action for Cho Ray Second Hospital

↓

First solution: Construction of Cho Ray Second Hospital

Second solution: Quality improvement plan for the medical service, human resources and quality management of Cho Ray Second Hospital

↓

Basic operations and architectural plan for Cho Ray Second Hospital

Figure 1-1 Purpose of the survey

Source: Created by the survey team

Chapter 2. External and Internal Environment Survey

Chapter 2. External and Internal Environment Survey

2-1. External Environment Survey

2-1-1. Major Policies on Healthcare Sector in Vietnam

(1) The Ten-Year Socio-Economic Development Strategy (2011 - 2020)

In Ten-Year Socio-Economic Development Strategy, the following items are listed as major issues in the health and medical sector:

- Resolution of various problems associated with large-scale hospitals (reduction of overload)
- Strengthening of health and medical systems and improvement of quality of services (increase in investment, rapid progress of health and medical systems, strengthening of basic health networks)
- Improvement of functions of Province -level hospitals and Central-level hospitals (synonymous with Tertiary Hospitals)
- Promotion of the establishment of hospitals which provide advanced medical treatment and high-quality treatment (Hanoi, Ho Chi Minh and other specific areas)
- Promotion of the establishment of hospitals for medical examinations and treatment
- Assurance of efficient and high-quality health and medical services for the people without any discrimination
- Standardization of quality of hospitals according to local standards and international standards
- Development of legal system for adjustment of medical costs concerning health assurance, medical examinations and medical treatment; establishment of a roadmap for a health assurance system to be provided for all people
- Establishment of policies on medical examination and treatment provided for targeted groups (the poor and children); provision of health and medical services for aged people
- Training of medical staff in expertise, medical ethics and awareness of responsibility

(2) Five-Year Health Sector Development Plan (2011 - 2015)

The Five-Year Health Sector Development Plan is the actualization of the above-mentioned Ten-Year Socio-Economic Development Strategy in the health and medical sector. The major tasks of Five-Year Health Sector Development Plan are shown below.

- Strengthening and achievement of health and medical service network (particularly, enhancement of local hospitals and special hospitals in the areas of obstetrics, cancer and pediatrics)
- Enhancement of preventive medicine and national health and medical program
- Strengthening and improvement of quality of medical examinations and treatment
- Enhancement of population/ family planning and reproductive healthcare
- Development of human resources in the health and medical sector
- Development of health and medical information systems
- Innovation in health and medical services and financial mechanisms
- Medicine and bio-medical products
- Medical equipment and infrastructures
- Reinforcement of management skills in the health and medical sector

(3) Prime Ministerial Decision No.92/QD-TTg

Prime Ministerial Decision No.92/QD-TTg came into effect on January 9, 2013, aiming at quantitative and qualitative expansion and improvement of special hospitals, especially those in metropolitan areas. An outline of the decision is given below.

- Expand and improve 5 special departments (cancer, surgery, cardiovascular, obstetrics, pediatrics).
- As a priority, enhance Central and Tertiary Hospitals in Hanoi and Ho Chi Minh from 2013 to 2015.
- Expand the above measures to Province-level special hospitals from 2016 to 2020.

- The target number of total hospital beds to be newly constructed, refurbished and expanded is at least 7,150, and these measures are to be carried out in stages.
- Promote technology transfer between Central Hospitals and satellite hospitals in medical examinations, diagnosis, treatment, etc., by means of information technologies such as remote diagnosis.
- Improve hospital management skills and enhance information technology measures. In the short term, review the management practice of these hospitals as a means to improve the management skills at hospitals with extremely high bed occupancy rate; allocation of beds and reallocation of balances among the various specialized hospital departments, in order to increase the number of beds in the crowded departments.
- Besides the health budget required for these measures, such financial sources such as ODA and government credit are assumed to have been appropriated.

2-1-2. Medical Services in Vietnam

(1) Present Situation

In Vietnam, health indicators have continued to improve steadily in step with rapid and sustained economic development as shown in the following table. However, it has been pointed out that improvements are increasingly concentrated in metropolitan areas, but that rural residents and the poor are not receiving many benefits.

The population of Vietnam is expected to exceed 100 million people by 2025. Taking such rapid population growth into consideration, the qualitative and quantitative enhancement of hospital beds, equipment, and healthcare personnel is urgently required in order to address health and medical administration issues in Vietnam.

Table 2-1 Health indicators (1)

Indicators	2009	2010	2011
Population (million) **	86.0	86.9	87.8
Population growth rate (%) **	1.06	1.05	1.04
Number of doctors per 10,000 people **	6.59	7.20	7.33
Number of hospital beds per 10,000 people **	27.66	29.07	29.85
Average hospital bed occupancy rate (%)	*127.32	-	**111.74
Public health expenditure (vs. GDP %) ***	6.6	6.9	-
Medical insurance subscription rate***	58.2	60.3	64.9
Infant mortality rate (per 1,000 live births)***	16.0	15.8	15.5
Maternal mortality ratio (per 100,000 live births)***	69.0	68.0	67.0
Average life expectancy (male and female)***	72.8	72.9	73.0

Source: * MOH of Vietnam, *Health Statistics Yearbook 2009*
** MOH of Vietnam, *Health Statistics Yearbook 2011*
*** MOH of Vietnam, *Joint Annual Health Review 2012*

As shown in the table below, the number of hospital beds in Vietnam is 3.1 beds, more than the United States and World but less than Japan, OECD, East Asia and Pacific. The number of hospital beds in Vietnam is different from the one shown in Table 2-1 due to the different sources, so that the indicators shown below are for reference purposes only.

Table 2-2 Number of hospital beds per 1,000 population in Vietnam and other regions and countries

Regions and countries	Number of hospital beds per 1,000 population	Year
Japan	13.7	2,009
OECD	5.2	2,009
East Asia and Pacific	4.8	2,009
Vietnam	3.1	2,009
Singapole	3.1	2,008
The United States	3.0	2,009
World	2.9	2,005

Source: *World Development Indicators 2012*, World Bank

※The number of hospital beds are acute and post-acute beds of public and private hospitals. These hospitals are general hospitals, specialized hospitals and rehabilitation hospitals etc.

※East Asia and Pacific includes China, South Korea, Malaysia, Vietnam and other countries, excluding Japan.

(2) Newly Hospital Construction Plans

【Overview of Plans for New Hospitals (Decided by the prime minister in January 2014)】

On January 14, 2014, the prime minister approved a plan shown in the table to expand city hospitals into central hospitals or to play the roles of central hospitals in Hanoi and Ho Chi Minh, in order to relieve the excessive load of patients at central hospitals for cancer, tumors, external injuries and pediatrics.

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Table 2-3 Overview of the New Hospital Plan Jan. 14, 2014 Decision by the PM

Region	Hospital Name	No. of Beds	Implementation Period
Ha Nam Province	Bach Mai Second Hospital	1,000 beds	2013-2016
Ha Nam Province	Viet Duc Second Hospital	1,000 beds	2013-2016
Ho Chi Minh	Ho Chi Minh City Pediatric Hospital	1,000 beds	2013-2015
Ho Chi Minh	Ho Chi Minh City Oncological Second Hospital	1,000 beds	2013-2015
Ho Chi Minh	Defense Department 175 Military Hospital's Orthopedic and External Injury Hospital	500 beds	2013-2016

Source: MOH, Decision approval the program on reducing hospital overload in the period 2013-2020, Prime Minister, 125/ QD-TTg, Jan. 14, 2014

The relations between Cho Ray Second Hospital and the three new hospitals in Ho Chi Minh City should be examined henceforth.

2-1-3. Healthcare Personnel

Development of healthcare personnel in Vietnam is implemented based on the "Master Plan on Health Human Resource Development 2011-2020", with the following target numbers for the securing and developing of human resources:

- Number of health professionals per 10,000 people： 41 persons by 2015, 52 persons by 2020
- Number of doctors per 10,000 people： 8 persons by 2015, 10 persons by 2020
- Number of university graduate pharmacists per 10,000 people： 2 persons by 2015, 2.5 persons by 2020
- Number of nurses per 10,000 people： 12 persons by 2015, 20 persons by 2020

Although the 2015 total target numbers for health professionals have been already reached as of 2011 as shown in the table below, target numbers for individual occupations personnel are yet to be achieved.

Table 2-4 Change in ratio of principal health professionals to population in Vietnam per10,000 people（2007-2011）

Occupations	2007	2008	2009	2010	2011
Doctors	6.45	6.52	6.59	7.20	7.33
Doctors and Assistant Doctors	12.17	12.23	12.52	13.42	13.54
Nurses	7.18	7.78	8.82	9.35	10.02
Senior pharmacists	1.19	1.50	1.77	1.76	1.92
Total numbers of health professionals	35.48	39.92	42.42	43.99	45.87

Source: Health Statistics Yearbook 2011

In Vietnam, 26 universities, 34 medical junior colleges, 44 mid-level medical vocational schools and several junior vocational training schools are operating as training institutes for health professionals. Although qualifications and other certificates for health professionals are defined in ministerial ordinances, there is no national examination and those who graduate training institutes are regarded as qualified health professionals.

As for nurses, there is a system of regular intake through 9 months of training after graduation from nursing school. With respect to doctors, the introduction of a clinical internship system is envisaged, with 18 months of internship training. As of 2011, in Vietnam there are 2,506 university graduate doctors, 1,234 pharmacists, 1,671 nurses, and 4,452 doctors have finished graduate schools (Master's course and Doctorate).

2-1-4. Referral System

The referral system in Vietnam is divided into four levels as shown in the figure. Medical institutions are directed by an administrative organization depending on their level and are allocated a budget. Technical assistance is carried out by top medical institutions.

Ideally, patients will receive medical care in the medical institutions depending on the level of medical treatment patients require under the referral system. In reality, however, a problem has arisen where patients seeking advanced medical care concentrate in certain healthcare facilities as shown in the figure 2-2. An overload occurred amongst the top referral hospitals, which should have been focused on medical training, research, and advanced medical care, so the declining quality of advanced medical care is also a problem.

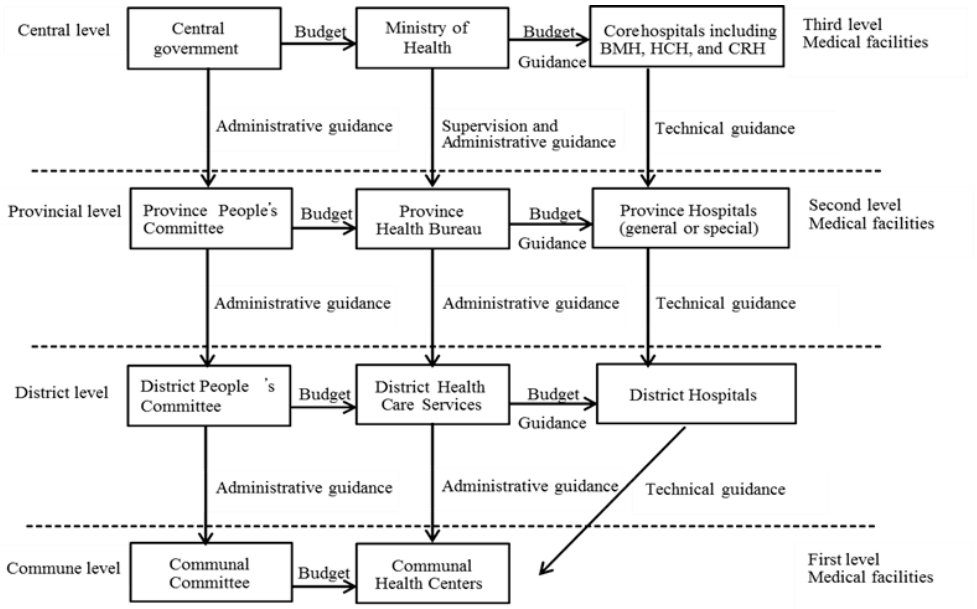


Figure 2-1 Health administration system

Source: JICA, *Vietnam Healthcare Administration Improvement Project*

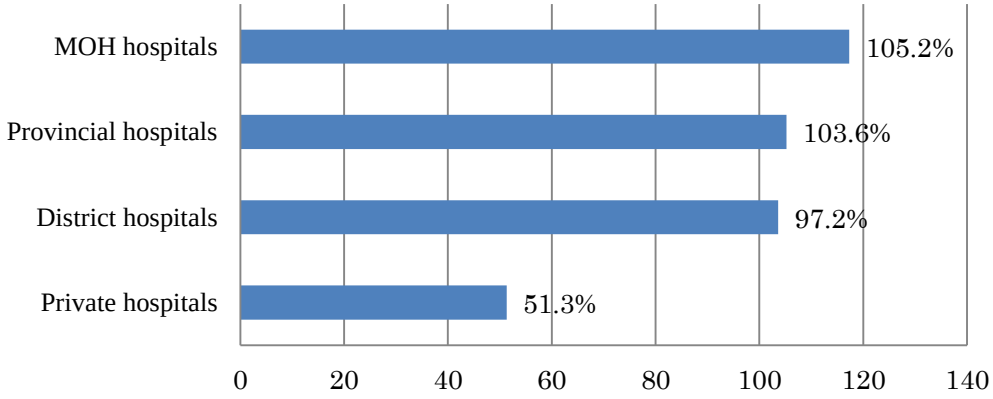


Figure 2-2 Hospital bed occupancy rate by administrative organizations (2009)

Source: Created by the survey team based on JICA, *Information gathered concerning the health sector and investigation for verifications: Report on the analyses of the health sector in the Socialist Republic of Vietnam*

The referral system is a system which aims at reducing the medical expenses of insurance covered patients, providing medical care depending on the severity of the patient's condition, mitigating the overload of upper level hospitals, etc. Under the referral system, a patient with medical insurance who wants to have a check-up in a public hospital can get a check-up through a referral from a lower-level hospital to a higher-level hospital.

The referral system is composed of hospitals classified into four levels as shown in the figure below, namely Commune level, District level, Provincial level, and Central level, in which the Commune level provides preventive and primary medical care, while the others provide more advanced medical care in the order of District level, Provincial level and Central level. Cho Lay Hospital belongs

to the Central level and is one of three top referral hospitals, together with Bach Mai Hospital and Hue Central Hospital.

When a patient with medical insurance has a check-up in a public hospital, the total amount of his or her medical expenses covered by the insurance is paid by the insurance company, through having the check-up using a referral from a lower-level hospital to a higher-level hospital. Moreover, the system makes the transfer of the patient's medical information easier. This is because, under the system, the original medical institution transmits the patient's medical records together with the referral to the higher-level hospital.

If a patient visits a higher-level hospital directly, without following the referral system, the allocation of the medical expenses covered by the patient's insurance varies as shown in the figure on the right. The higher the level of the hospital a patient visits directly, the higher the medical expenses borne by the patient become.

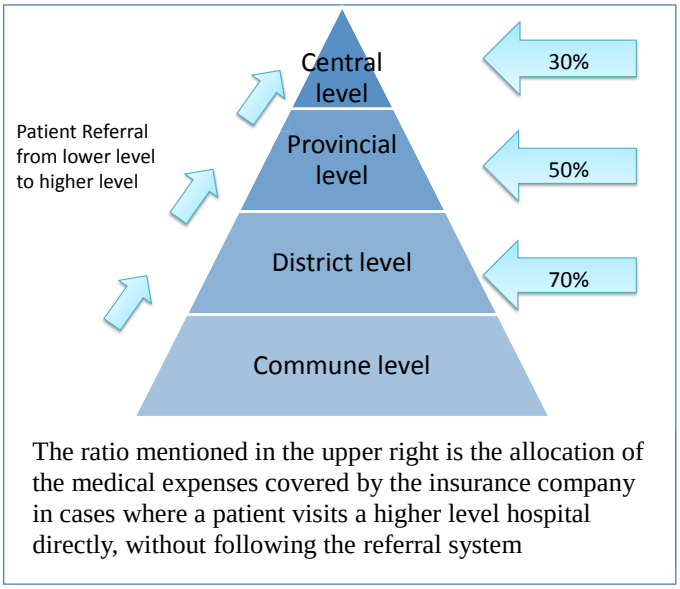


Figure 2-3 Outline of the referral system

For example, a patient having a check-up directly at a Provincial Hospital is required to pay 50% of the medical expenses covered by insurance. Besides, there are some other demerits of not following the referral system, such as the lack of information-sharing through transfer of medical records from the lower-level hospital to the higher-level hospital.

2-1-5. Disease Structure

The number of patients in Vietnam is also growing year on year as shown in the following table . In contrast, the establishment of hospital beds is not keeping up with the increase in patients. The number of hospital beds throughout Vietnam is around 260,000 and the average occupancy rate is 111.74% as shown Table 2-1. The number of inpatients who are not accepted to beds due to overload but to stretchers in Vietnam is estimated around 30,000 (11.74% of 262,223 beds).

Table 2-5 Health indicators (2)

Indicators	2009*	2011*
Total number of outpatients (1 million persons)	28.3	35.0
Total number of hospitalized patients (1 million persons)	11.7	12.0
Total number of hospital beds	237,914	262,223

Source: * MOH of Vietnam, *Health Statistics Yearbook 2009*
** MOH of Vietnam, *Health Statistics Yearbook 2011*

Also, improvement of the social infrastructure and the standard of living associated with the economic development in Vietnam is resulting in major changes to the structure of disease. According to disease trend statistics, the percentage of disease groups caused by infection decreased from 55% of all disease trends in 1976 to about 25% in 2011, and the percentage of non-infectious diseases increased. Other major diseases in Vietnam, circulatory system, pregnancy, childbirth and the digestive system, and infectious and parasitic diseases rank highest in the International Classification of Diseases.

Table 2-6 Disease trends

Indicators	1976	1986	1996	2006	2011
Infectious diseases (%)	55.50	59.20	37.63	24.94	25.89
Non-communicable diseases (%)	42.65	39.00	50.02	62.40	62.72
Accidents, injuries, poisoning (%)	1.84	1.80	12.35	12.66	11.39

Source: MOH of Vietnam, *Health Statistics Yearbook 2011*

Seen from the table below showing disease trends and the mortality trends by the International Classification of Diseases, the major diseases in Vietnam are of the respiratory system, pregnancy, childbirth, and Infectious and parasitic diseases. The diseases related to the respiratory system, Infectious and parasitic diseases predominate the high percentage of the mortality factors; however, improvement has been seen in both the disease trends and the mortality trends in the comparison with the year 2009.

Table 2-7 National disease structures in accordance with International Classification of Diseases (ICD-10)

International Classification of Diseases	2009		2011	
	Morbidity (%)	Mortality (%)	Morbidity (%)	Mortality (%)
Infectious and parasitic diseases	10.63	13.47	11.27	16.09
Malignant neoplasms	2.45	5.63	3.42	3.76
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	0.38	0.39	0.50	0.38
Endocrine, nutritional and metabolic diseases	1.82	0.66	1.48	0.63
Mental and behavioral disorders	0.75	0.11	0.83	0.10
Diseases of the nervous system	3.06	1.22	2.89	1.07
Diseases of the eye and adnexa	2.92	0.02	2.89	0.08
Diseases of the ear and mastoid process	1.04	0.59	1.12	0.02
Diseases of the circulatory system	7.62	19.75	8.83	15.92
Diseases of the respiratory system	20.21	12.55	16.84	11.88
Diseases of the digestive system	10.08	3.75	9.26	8.88
Diseases of the skin and subcutaneous tissue	1.48	0.12	1.34	0.29
Diseases of the musculoskeletal system and connective tissue	3.99	0.09	4.04	0.16
Diseases of the genitourinary system	4.63	1.58	4.08	0.99
Pregnancy, childbirth and the puerperium	11.39	0.57	14.07	0.51
Certain conditions originating in the perinatal period	1.61	10.56	1.85	13.20
Congenital malformations, deformations and chromosomal abnormalities	0.27	2.03	0.37	2.08
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	1.45	4.13	1.64	7.82
Injury, poisoning and certain other consequences of external causes	7.72	16.06	8.65	13.24
External causes of morbidity and mortality	2.64	6.46	2.50	2.78
Factors influencing health status and contact with health services	3.84	0.23	2.13	0.12

Source: * MOH of Vietnam, *Health Statistics Yearbook 2009*
** MOH of Vietnam, *Health Statistics Yearbook 2011*

2-1-6. Medical Demand Forecasting

(1) Verification of the Number of Beds at Cho Ray Second Hospital

The planned number of beds at Cho Ray Second Hospital is 1,000. However, it is necessary to verify that number considering the medical supply-demand situation of the as yet undefined medical care zone.

Upon commencement of verification, the medical care zone of Cho Ray Second Hospital shall be defined and then the assumed medical supply-demand situation of the medical care zone shall be investigated. Furthermore, the impact of construction plans for new hospitals around Ho Chi Minh City shall be studied.

【Method of Verification for the Bed Capacity of Cho Ray Second Hospital】

The presumed bed capacity of Cho Ray Second Hospital shall be examined as follows, based on the expected number of patients and patient share of Cho Ray Second Hospital in the medical care zone, taking target average length of stay and bed occupancy rate of Cho Ray Second Hospital into considerations.

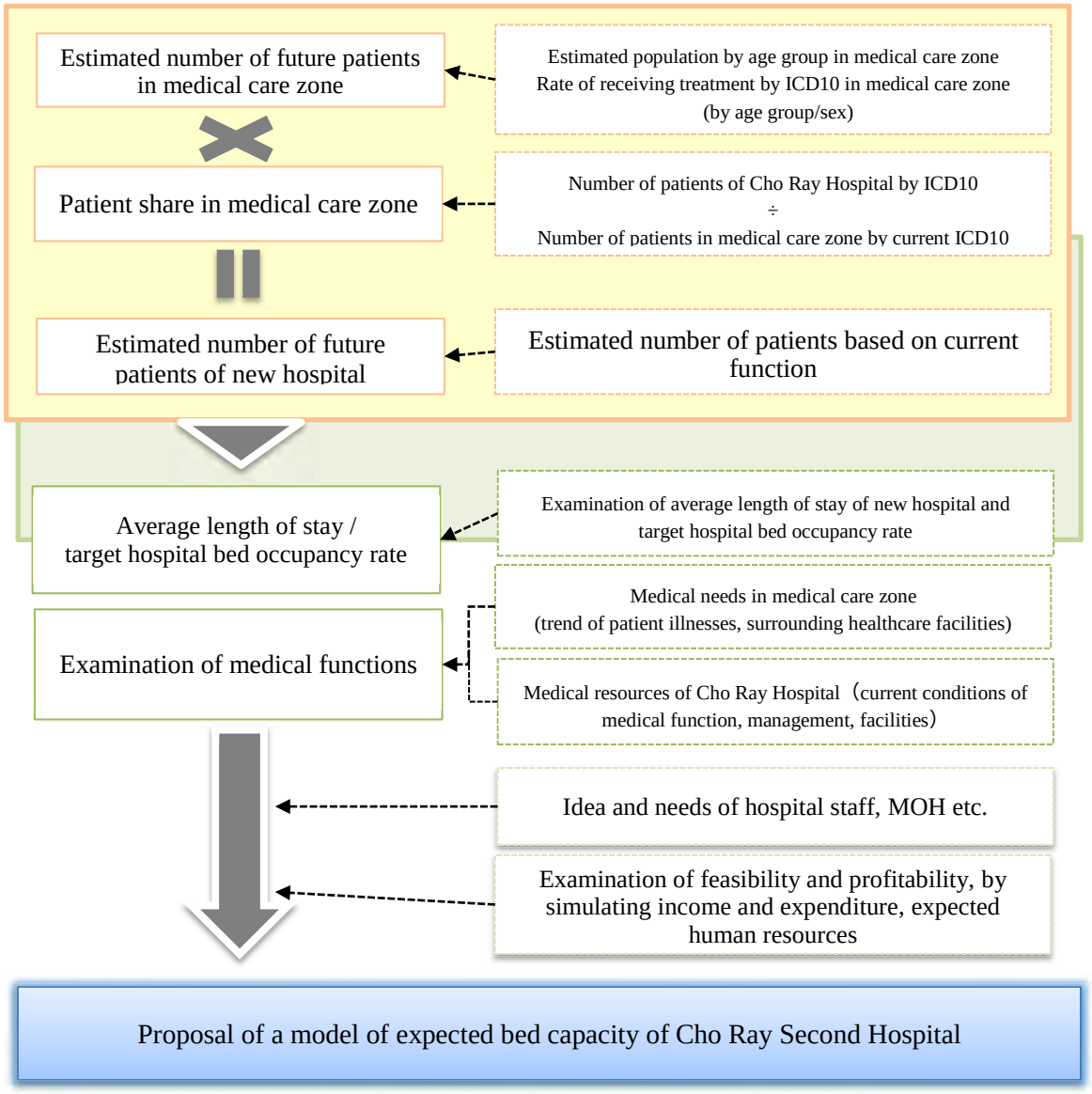


Figure 2-4 Method of verification for the bed capacity of Cho Ray Second Hospital
Source: Created by the survey team

【Definition of the Medical Care Zone】

Since Cho Ray Second Hospital is planned to be managed integrally with Cho Ray Hospital and both hospitals are located in Ho Chi Minh City, the medical care zone of both hospitals is assumed to be the same. 70-80% of patients of Cho Ray Hospital are from the South East and the Mekong River Delta as shown in the following table. Patients from South Central Coast comprise 7-9%, and those from the Central Highlands comprise 5-7%. Patients from the 3 regions of North Central Vietnam comprise less than 1%. Considering these statistics, the medical care zone of Cho Ray Hospital is defined to be the 32 Provinces of 4 Regions, namely the South East, the Mekong River Delta, the South Central Coast, and the Central Highlands.

Table2-8 Cho Ray Hospital: Number of in/out patients by region, 2012

Regions	Inpatients		outpatients	
	New inpatients	Component ratio	Total outpatients	Component ratio
Northern areas	6	0.0%	361	0.0%
Red River Delta	175	0.1%	1,757	0.1%
North Central Coast	752	0.6%	4,575	0.4%
South Central Coast	10,902	9.2%	87,610	7.3%
Central Highlands	8,266	6.9%	57,116	4.7%
South East	46,447	39.0%	448,335	37.2%
Mekong River Delta	47,937	40.3%	440,543	36.6%
Others	4,612	3.9%	163,885	13.6%
Total	119,097	100.0%	1,204,182	100.0%

Source: Compiled from materials received from Cho Ray Hospital

Note: Since addresses are based on patient's declarations, they may contain some uncertainties.

【Estimated Future Population in the Medical Care Zone】

In the whole of Vietnam and also in the medical care zone, the population will increase by a little less than 20% by 2030, and the percentage of aged people will almost double from the present percentage of 5-6%, to 10-11% as shown in the table below. In the future in the medical care zone, it is anticipated that medical needs will increase and also that the incidence of lifestyle diseases, especially cancer, diabetes, stroke, heart disease, etc. will increase.

Table 2-9 Change in population by 3 age categories in the whole of Vietnam and in the medical care zone, 2012-2049

unit : persons/year **unit : %**

Region	2012	2020	2030	2040	2049	2012-2030 Increase rate	2012 Component ratio	2030 Component ratio
Whole of Vietnam	88,604	96,179	103,117	107,004	108,707	16.4%	100.0%	100.0%
Under 14	20,928	22,118	20,987	19,133	19,136	0.3%	23.6%	20.4%
15-64	62,216	67,129	70,544	71,868	70,025	13.4%	70.2%	68.4%
65 and over	5,460	6,931	11,584	16,001	19,545	112.2%	6.2%	11.2%
Medical care zone	46,817	51,419	55,668	57,909	58,830	18.9%	100.0%	100.0%
Under 14	10,999	11,593	11,207	10,354	10,356	1.9%	23.5%	20.1%
15-64	33,309	36,475	38,684	38,894	37,896	16.1%	71.1%	69.5%
65 and over	2,510	3,352	5,778	8,659	10,577	130.2%	5.4%	10.4%

Source : Population Projection for Vietnam 2009-2049, MPI, 2011

Note: Since there are no statistics for the medical care zone for 2040 and 2049, these are calculated using the total population ratio, age composition and sex composition of the estimated population of the whole of Vietnam for 2040 and 2049.

【Rate of receiving treatment (the number of patients per 100,000 people) in the medical care zone】

The rate of receiving treatment by diseases, gender, and 5 years age group in the medical care zone in 2012 is as shown below.

The major diseases for the male patients are 1. certain infectious and parasitic diseases, 10. diseases of the respiratory system, 11.diseases of the digestive system, diseases of the circulatory system, and so forth.

The major diseases for the female patients are 15. pregnancy, childbirth and the puerperium, 1. certain infectious and parasitic diseases, 10. diseases of the respiratory system, and so forth.

Table 2-10 Rate of receiving treatment (the number of patients per 100,000 people) by diseases, gender, and 5 years age group in the medical care zone in 2012

ICD10	Male Inpatients per 100,000 Population by ICD and Five-Year Age Group																	
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80+	Total
1	0	0	0	805	4,647	3,040	5,417	2,735	5,294	6,304	11,231	15,155	17,884	11,040	24,312	48,634	27,016	4,956
2	4	13	4	67	70	157	176	219	388	867	1,464	2,412	3,562	4,555	3,958	3,865	3,260	558
3	0	0	0	83	73	43	57	104	22	52	68	115	111	63	317	0	353	56
4	0	0	0	43	0	21	135	148	156	93	283	709	790	596	1,500	1,432	625	148
5	0	0	0	91	0	86	189	103	109	0	0	229	0	0	788	0	0	67
6	138	47	47	125	222	197	302	236	324	356	310	418	336	286	0	1,144	799	226
7	0	0	0	0	0	57	189	138	145	173	565	762	736	1,665	1,048	1,334	2,329	195
8	0	150	0	0	468	124	0	149	315	563	490	0	0	0	1,137	1,447	1,263	206
9	19	40	40	298	202	397	472	775	986	1,448	2,773	4,270	5,596	6,613	7,415	7,705	15,133	1,167
10	0	0	0	814	1,247	1,256	1,148	1,172	1,591	1,895	4,538	3,155	5,674	14,193	14,672	19,489	27,645	2,011
11	0	0	0	316	542	715	1,046	1,097	1,485	2,308	2,858	3,804	4,251	5,485	4,541	4,856	7,468	1,211
12	0	0	0	166	73	39	128	141	49	177	308	312	334	284	714	909	397	122
13	0	0	0	62	275	190	193	351	371	706	606	545	1,565	1,169	936	1,192	1,189	305
14	0	0	0	150	207	314	396	452	477	710	958	1,168	1,947	1,481	2,438	3,103	4,461	469
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	3,356	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	280
17	22	11	67	178	26	9	31	0	24	56	128	124	119	135	170	217	284	58
18	0	0	0	0	112	357	0	143	452	359	235	0	509	865	1,088	0	1,209	174
19	282	194	345	1,389	2,542	2,312	2,043	1,849	1,748	1,752	1,292	2,018	2,116	2,840	2,207	1,472	2,687	1,547
20	0	0	0	0	0	0	0	0	0	10,749	0	0	0	0	0	0	0	694
21	0	0	25	217	231	348	382	246	78	401	444	490	350	743	187	238	416	231
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	3,820	456	528	4,804	10,939	9,664	12,302	10,056	14,014	28,969	28,550	35,685	45,882	52,014	67,428	97,037	96,534	14,678

ICD10	Female Inpatients per 100,000 Population by ICD and Five-Year Age Group																	
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80+	Total
1	0	0	0	2,948	1,451	2,629	4,146	3,278	984	559	4,001	7,532	10,466	11,674	27,625	16,292	20,383	3,439
2	9	29	29	66	64	114	171	184	333	456	517	978	1,414	1,567	1,586	1,574	1,157	316
3	0	0	0	77	83	112	28	32	146	64	107	191	90	44	97	372	310	74
4	0	0	0	23	59	122	112	177	106	302	396	723	1,342	1,891	1,606	2,933	1,712	289
5	0	0	0	0	82	256	0	0	112	0	151	0	297	0	0	0	0	58
6	123	25	50	174	150	233	279	194	229	145	311	303	338	503	770	140	469	204
7	0	0	73	64	55	113	0	141	74	169	101	757	1,381	4,109	962	5,325	1,025	311
8	0	0	0	0	356	0	271	613	161	183	436	822	856	637	1,391	0	0	249
9	21	21	21	147	158	295	379	673	514	999	1,307	2,807	3,591	4,323	5,462	9,228	8,683	976
10	0	0	0	464	533	897	1,219	516	1,175	1,130	1,837	3,228	5,286	4,645	5,464	10,972	17,055	1,469
11	0	26	0	264	512	491	564	563	669	1,053	1,221	2,232	3,763	2,951	4,667	5,254	5,211	888
12	0	0	0	43	75	77	128	0	152	57	137	86	672	400	655	279	1,164	115
13	0	0	0	178	154	217	224	343	455	517	719	967	1,411	1,424	655	2,196	1,308	372
14	0	0	0	87	135	248	274	387	528	462	1,184	1,106	1,998	1,526	2,193	1,906	2,244	462
15	0	0	0	0	0	7,477	8,255	18,649	9,795	0	0	0	0	0	0	0	0	3,603
16	3,592	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	274
17	12	12	0	0	36	64	51	69	48	41	82	61	64	48	52	266	0	42
18	0	0	0	0	227	118	0	147	463	0	209	0	410	610	666	851	1,419	159
19	287	268	147	472	516	534	389	383	521	389	605	810	1,267	1,472	1,093	1,068	1,851	516
20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
21	0	0	26	136	293	364	112	429	212	241	323	361	282	0	343	0	244	203
22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	4,044	381	345	5,143	4,937	14,360	16,602	26,778	16,677	6,766	13,645	22,964	34,929	37,823	55,289	58,657	64,235	14,020

Source: Compiled by the survey team based on the data acquired from MOH and Cho Ray Hospital

【Medical Care Zone: Estimate of Actual Inpatients in the Future】

An estimate of actual inpatients in the future was calculated in the table below from estimates of future population from 2020 to 2049 by age/sex in the medical care zone shown in Table 2-9, multiplied by the rate of patient by disease, sex, age group in 2012 in the medical care zone shown in Table 2-10, and taking into consideration the change in disease rates in the future due to the changes in age/sex composition. Here, future population estimates from 2040 to 2049 within the medical care zone were calculated based on the future population estimates of the whole of Vietnam.

It is anticipated that from 2012 to 2030, the number of patients within the whole of the medical care zone will increase by 10,000 persons (54%). Diseases especially expected to increase in incidence are diseases of the eye and adnexa, neoplasms, endocrine, nutritional and metabolic diseases, diseases of the circulatory system and diseases of the respiratory system. The causes of these changes are thought to be the increase in lifestyle diseases associated with the increase in the number of aged people, such as diabetes, cancer, cerebrovascular disease, heart disease and kidney disorders.

It is anticipated that from 2012 to 2049, the number of patients within the whole of the medical care zone will increase by 20,000 persons (106%). Diseases especially expected to increase in incidence are the same with the 2012-2030 data.

Supposing that the average length of stay in hospital is 7 days and that the bed occupancy rate is 100%, the required increase in beds amounts to 70,000 by 2030 based on the calculation that the actual number of increased inpatients from 2012-2030 will be 10,000, multiplied by 7 days (the average length of stay), and then divided by 100%(bed occupancy rate). Approximately 140,000 beds will be required by 2049 in the whole of the medical care zone based on the calculation that 20,000 increased patients multiplied by 7 days and divided by 100%.

Table2-11 Medical care zone: estimated actual inpatients in the future by disease (persons/day) 2012 -2049

ICD10		2012	2020	2030	2040	2049	Increase Rate 2012-30	Increase Rate 2012-49
1	Certain infectious and parasitic diseases	5,374	6,583	8,685	10,858	12,198	62%	127%
2	Neoplasms	559	765	1,080	1,339	1,505	93%	169%
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	84	94	111	130	139	33%	67%
4	Endocrine, nutritional and metabolic diseases	281	370	523	666	763	86%	171%
5	Mental and behavioural disorders	80	91	103	113	119	29%	49%
6	Diseases of the nervous system	276	317	365	409	434	33%	57%
7	Diseases of the eye and adnexa	326	443	641	834	969	97%	198%
8	Diseases of the ear and mastoid process	292	340	419	483	511	44%	75%
9	Diseases of the circulatory system	1,373	1,780	2,473	3,218	3,719	80%	171%
10	Diseases of the respiratory system	2,228	2,770	3,768	5,039	5,855	69%	163%
11	Diseases of the digestive system	1,344	1,701	2,227	2,712	3,012	66%	124%
12	Diseases of the skin and subcutaneous tissue	152	187	243	300	337	60%	122%
13	Diseases of the musculoskeletal system and connective tissue	435	546	700	822	896	61%	106%
14	Diseases of the genitourinary system	597	753	987	1,214	1,359	65%	128%
15	Pregnancy, childbirth and the puerperium	2,336	2,642	2,581	2,214	2,325	10%	0%
16	Certain conditions originating in the perinatal period	355	374	333	328	329	-6%	-7%
17	Congenital malformations, deformations and chromosomal abnormalities	64	73	88	101	107	38%	68%
18	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	213	254	325	391	436	52%	105%

ICD10		2012	2020	2030	2040	2049	Increase Rate 2012-30	Increase Rate 2012-49
19	Injury, poisoning and certain other consequences of external causes	1,316	1,477	1,668	1,828	1,912	27%	45%
20	External causes of morbidity and mortality	440	534	620	667	514	41%	17%
21	Factors influencing health status and contact with health services	278	319	356	386	394	28%	42%
22	Codes for special purposes							
	Total	18,402	22,413	28,295	34,053	37,834	54%	106%

Source: Created by the survey team based on the materials received from Cho Ray Hospital MOH, and Ministry of Planning and Investment (Hereafter MPI), *Population Projection For Vietnam 2009-2049*

【Share of Cho Ray Hospital by Disease in Medical Care Zone】

The share of Cho Ray Hospital by disease in 2013 vs. the actual number of inpatient by disease in the medical care zone in 2012 was assumed as shown in the below table, while 1.8% for the total share of Cho Ray hospital.

Table2-12 Patient Share of Cho Ray Hospital by disease in medical care zone

ICD10		Medical Care Zone (2012) persons/day	Cho Ray Hospital (2013) persons/day	Share %
1	Certain infectious and parasitic diseases	5,374	7.5	0.1%
2	Neoplasms	559	79.8	14.3%
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	84	5.1	6.1%
4	Endocrine, nutritional and metabolic diseases	281	7.3	2.6%
5	Mental and behavioural disorders	80	0.5	0.6%
6	Diseases of the nervous system	276	7.5	2.7%
7	Diseases of the eye and adnexa	326	3.0	0.9%
8	Diseases of the ear and mastoid process	292	1.2	0.4%
9	Diseases of the circulatory system	1,373	44.2	3.2%
10	Diseases of the respiratory system	2,228	17.0	0.8%
11	Diseases of the digestive system	1,344	36.0	2.7%
12	Diseases of the skin and subcutaneous tissue	152	2.1	1.4%
13	Diseases of the musculoskeletal system and connective tissue	435	15.8	3.6%
14	Diseases of the genitourinary system	597	20.3	3.4%
15	Pregnancy, childbirth and the puerperium *	2,336	0.2	1.0%
16	Certain conditions originating in the perinatal period *	355	0.0	1.8%
17	Congenital malformations, deformations and chromosomal abnormalities	64	3.6	5.7%
18	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	213	1.0	0.4%
19	Injury, poisoning and certain other consequences of external causes	1,316	61.0	4.6%
20	External causes of morbidity and mortality	440	0.0	0.0%
21	Factors influencing health status and contact with health services	278	7.2	2.6%
22	Codes for special purposes	0	2.6	-
	Total	18,402	323	1.8%

Source: Created by the survey team based on the materials received from Cho Ray Hospital MOH, and MPI, *Population Projection For Vietnam 2009-2049*

【Cho Ray Hospital: Estimated Future Actual Inpatients by Disease 2012-2049】

The estimated actual number of future inpatients of Cho Ray Hospital is calculated in the following table from the actual number of estimated future inpatients in the medical care zone from 2020 to 2049 shown in Table 2-11, multiplied by share by disease at Cho Ray Hospital in 2012 within the medical care zone shown in Table 2-12.

The diseases estimated to sharply increase will be diseases of the eye and adnexa, diseases of the circulatory system, endocrine, nutritional and metabolic diseases, neoplasms, and so forth.

Table 2-13 Estimated number of future actual inpatients by disease at Cho Ray Hospital 2012-2049

ICD10		2012	2020	2030	2040	2049	Increase Rate 2012-2030	Increase Rate 2012-2049
1	Certain infectious and parasitic diseases	8	9	12	15	17	62%	127%
2	Neoplasms	80	109	154	191	215	93%	169%
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	5	6	7	8	9	33%	67%
4	Endocrine, nutritional and metabolic diseases	7	10	14	17	20	86%	171%
5	Mental and behavioural disorders	0	1	1	1	1	29%	49%
6	Diseases of the nervous system	7	9	10	11	12	33%	57%
7	Diseases of the eye and adnexa	3	4	6	8	9	97%	198%
8	Diseases of the ear and mastoid process	1	1	2	2	2	44%	75%
9	Diseases of the circulatory system	44	57	80	103	120	80%	171%
10	Diseases of the respiratory system	17	21	29	38	45	69%	163%
11	Diseases of the digestive system	36	46	60	73	81	66%	124%
12	Diseases of the skin and subcutaneous tissue	2	3	3	4	5	60%	122%
13	Diseases of the musculoskeletal system and connective tissue	16	20	25	30	33	61%	106%
14	Diseases of the genitourinary system	20	26	34	41	46	65%	128%
15	Pregnancy, childbirth and the puerperium	23	26	26	22	23	10%	-1%
16	Certain conditions originating in the perinatal period	6	7	6	6	6	-6%	-7%
17	Congenital malformations, deformations and chromosomal abnormalities	4	4	5	6	6	38%	68%
18	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	1	1	1	2	2	52%	105%
19	Injury, poisoning and certain other consequences of external causes	61	68	77	85	89	27%	45%
21	External causes of morbidity and mortality	0	0	0	0	0	41%	17%
21	Factors influencing health status and contact with health services	7	8	9	10	10	28%	42%
22	Codes for special purposes	3	3	3	3	3	0%	0%
	Total	352	438	562	675	751	60%	113%

Source: Created by the survey team based on the materials received from Cho Ray Hospital MOH, and MPI, *Population Projection For Vietnam 2009-2049*

Table2-14 Cho Ray Hospital future estimates (no. of actual patients / day)

			2012	2020	2030	2040	2049
Estimated no. of future patients / per day	People	(a)	352.4	438.2	562.3	675.5	750.6

Table2-15 Estimated total no. of inpatients per day (no. of actual inpatients ×average length of stay) at Cho Ray Hospital

Inpatient days			2012	2020	2030	2040	2049
6.5 days	People	(b＝a×No. of days)	2,291	2,848	3,655	4,390	4,879

Table 2-16 Number of beds at Cho Ray Hospital if the target bed occupancy rate is 95% (estimated total no. of inpatients per day ÷bed occupancy rate 95%)

Inpatient days			2012	2020	2030	2040	2049
6.5 days	Beds	(c＝b÷95%)	2,412	2,998	3,848	4,622	5,136

Table 2-17 Exceeded no. of inpatients per day at Cho Ray Hospital (2,050 beds, occupancy rate 95%) Upper row: necessary no. of additional beds, lower row: no. of inpatients per day

Inpatient days			2012	2020	2030	2040	2049
6.5 days	Beds People	(d＝c-2,050 beds)	-	948 (901)	1,798 (1,708)	2,572 (2,443)	3,086 (2,931)

Table 2-18 Exceeded no. of inpatients per day at Cho Ray Hospital (2,050 beds, occupancy rate 95%) and Cho Ray Second Hospital (1,000 beds, occupancy rate 95%) Upper row: necessary no. of additional beds, lower row: no. of inpatients per day

Inpatient days			2012	2020	2030	2040	2049
6.5 days	Beds People	(e＝c-3,050 beds)	-	-	798 (758)	1,572 (1,493)	2,086 (1,981)

Source of the Table 2-14 to 18: Created by the survey team based on the materials received from Cho Ray Hospital MOH, and MPI, *Population Projection For Vietnam 2009-2049*

Table 2-14 shows the actual number of future inpatients per day at Cho Ray Hospital in the year 2012 to 2049 as shown in Table 2-13.

Table 2-15 shows the total number of future inpatients per day at Cho Ray Hospital in the year 2012 to 2049, calculated by multiplying the actual number of inpatients per day at Cho Ray Hospital by 6.5 days, the target average length of stay.

Table 2-16 shows the future required number of bed at Cho Ray Hospital assuming the bed occupancy rate as 95%. It is calculated by dividing the total number of inpatients per day at Cho Ray Hospital as shown in Table 2-16 by 95%, the bed occupancy rate.

Table 2-17 shows the exceeded number of inpatients per day at Cho Ray Hospital assuming the number of bed at Cho Ray Hospital as 2,050. The table also shows the required number of bed to accept the exceeded number of inpatients. The exceeded number of inpatients is calculated by subtracting 1,948 patients, which Cho Ray Hospital will be able to accept assuming its bed occupancy rate as 95%, from the total number of inpatients as shown in Table 2-15. The number of required bed is calculated by subtracting 2,050 bed, the number of bed at Cho Ray Hospital, from the future required number of bed at Cho Ray Hospital as shown in Table 2-16.

Table 2-18 shows the exceeded number of inpatients per day at Cho Ray Hospital and Cho Ray Second Hospital, and also the required number of bed to accept the exceeded number of inpatients. The exceeded number of inpatients is calculated by subtracting the 2,898 patients, which Cho Ray Hospital and Cho Ray Second Hospital will be able to accept assuming their bed occupancy rate as 95%, from the total number of inpatients as shown in Table 2-15. The number of required bed is calculated by subtracting 3,050 bed, the number of bed at Cho Ray Hospital and Cho Ray Second Hospital, from the future required number of bed at Cho Ray Hospital as shown in Table 2-16.

The expected number of inpatients per day at Cho Ray Second Hospital in 2020 shall be 901 patients based on the calculation shown in Table 2-16, assuming that the patient share in the medical care zone be 1.8% and the average length of stay be 6.5 days. Therefore, the presumed bed capacity, 1,000 beds, of Cho Ray Second Hospital shall be considered to be appropriate.

The bed capacity of Cho Ray Second Hospital in 2020 also requires to be examined taking into consideration of the effects of three new hospital construction plans of Ho Chi Minh City as shown below.

The construction plans of Oncology Second Hospital and 175 Military Hospital of Orthopedics and External Injury will not have much effect on the bed capacity of Cho Ray Second Hospital, as the expected number of neoplasm and orthopedics patients will exceed the bed capacity of these new hospitals. On the other hand, pediatrics patients are expected to decrease due to the declining birthrate so that the new Pediatric Hospital could accept enough number of patients.

Table 2-19 Study on the effect of the new hospitals to Cho Ray Second Hospital

Name of the hospitals	No. of beds	Expected target patients	Expected no. of patient increase per day (2012-2020)	Necessary no. of beds *	Beds deficiency or excess
a	b	c	d	e=d*8 日/95%	f=e-b
Ho Chi Minh City Pediatric Hospital	1,000	No. of patients under age 14 in HCMC	30	250	-750
Ho Chi Minh City Oncology Second Hospital	1,000	No. of neoplasm patients in HCMC	174	1,465	465
175 Military Hospital of Orthopedics and External Injury, Ministry of Defense	500	No. of patients of external injury and the musculoskeletal system and connective tissue disease in HCMC	167	1,406	906

Source: MOH, Decision approval the program on reducing hospital overload in the period 2013-2020, Prime Minister, 125/ QD-TTg, Jan. 14, 2014

Note: Necessary no. of beds is estimated based on assuming the average length of days as 8 days and bed occupancy rate as 95%.

(2) Means for Dealing with the Increasing Number of Patients in the Future

After Cho Ray Second Hospital opens, both Cho Ray Hospital and Cho Ray Second Hospital shall be operated with the bed occupancy rate less than 95%. But right after the opening, Cho Ray Second Hospital's bed occupancy rate shall be 80%, taking into consideration of gradual recruiting of staff and the number of accepted patients. Its bed occupancy rate shall gradually rise to 95%. Cho Ray Hospital shall gradually reduce the bed occupancy rate to 95% in accordance with the operation of Cho Ray Second Hospital. If both hospitals maintain their share of patients as 1.8% in the medical care zone, certain number of patients shall exceed their bed capacity.

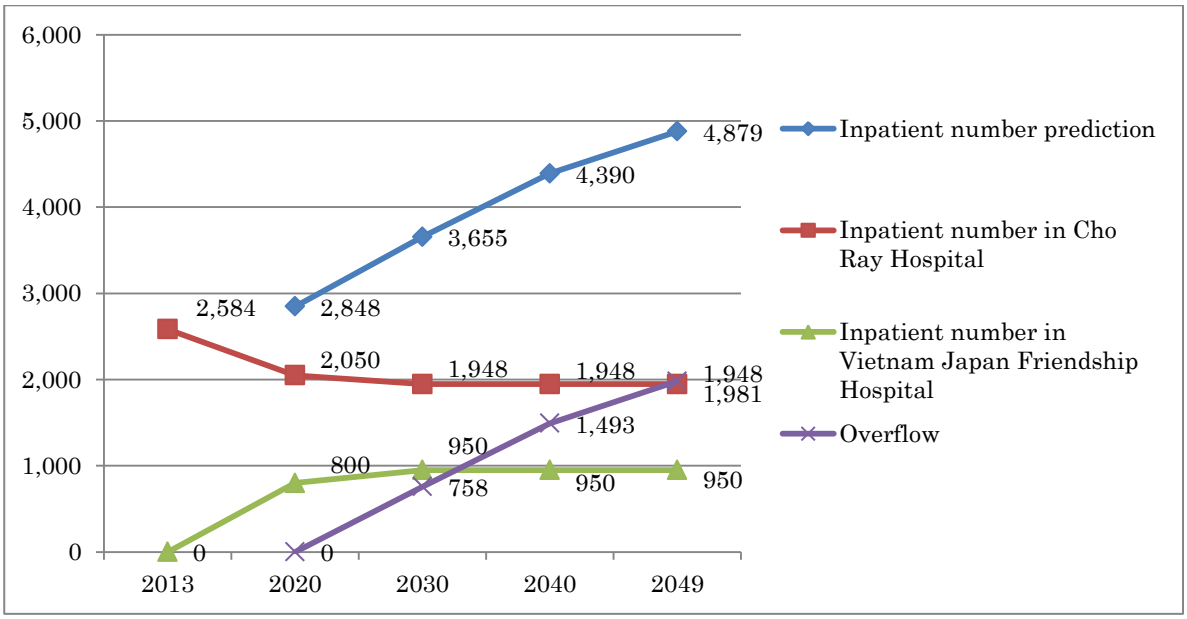


Figure 2-5 Expected number of inpatients in the future

Source: Created by the survey team based on the materials received from Cho Ray Hospital MOH, and MPI, *Population Projection For Vietnam 2009-2049*

As shown in Table 2-17 and Figure 2-5, in the year 2030, 10 years after the opening of Cho Ray Second Hospital, the expected number of overflowed patients both hospitals cannot accept shall be 758 per day. Overflowed patients will continue to increase to be 1,493 per day in the year 2040.

This is the case if both hospitals maintain their patient share in the medical care zone as 1.8%. As the number of patients in the future is expected to increase due to the population growth and aging, and the patient share of both hospitals may increase because of newly constructed buildings. However, as top referral hospitals, both hospitals should put priority on the advanced acute medical service, so that both of them should maintain current standard of patient share. In order to maintain appropriate bed occupancy rate, both hospitals have to share increasing patients with other healthcare institutions properly by means of expanding the bed capacity of lower level hospitals, construction of new hospitals, and enhance referral system. The details are as follows.

- Referral system in Southern Vietnam, where Cho Ray Hospital and Cho Ray Second Hospital shall work as the hub, is required to be enhanced. The detailed proposals are shown in Chapter 4 Basic Operations Plan for Each Department, 4-17 General Planning Department (Regional Medical Liaison Department).
- In cooperation with MOH, Department of Health (hereafter DOH) of Ho Chi Minh City, and Cho Ray Hospital, current emergency medical service in Ho Chi Minh City should be improved based on Japan's emergency medical service, where emergency patients are triaged according to their severity before and after their transportation to hospitals. Improved emergency medical service shall be a model of the service of Vietnam, contributing to reducing the overload of Cho Ray Hospital and Cho Ray Second Hospital. The detailed proposals are shown in Chapter 4 Basic Operations Plan for Each Department, 4-20 Proposals for MOH and Ho Chi Minh City's DOH.
- The establishment of new emergency medical service based on Japan's service, might be acquired with the aid of JICA's technical cooperation.

2-1-7. Additional Proposal

As is pointed out in the Ministry of Health's Joint Annual Health Review, the collection of detailed statistical medical data is indispensable in developing effective healthcare policies.

Patient data sorted by ICD from the Ministry of Health is not totaled by age and gender. In addition, some provinces didn't collect accurate data. Disease structure is largely dependent upon the age and gender structure of population. In order for the detailed analysis on the current healthcare situations and more accurate medical demand forecasting in the future, ICD patient data by age and gender is indispensable.

In Japan, the Health, Labor and Welfare Ministry conducts a patient survey every three years, which includes the detailed number of ICD patients by age and gender for every medical care zone established by each prefecture. Ministry of Health in Vietnam should improve the statistical medical data collection referring to Japan's detailed data collection.

2-2. Internal Environment Survey

2-2-1. History of Cho Ray Hospital

Cho Ray Hospital was founded in 1900. In 1971, the facility was reconstructed on the current area of 53,000 m² and was re-equipped to become one of the largest hospitals in Southeast Asia in June 1974 with the help of the Japanese government. From 1993 to 1995, the facility was reconstructed again with the assistance of Japanese government. Nowadays it has a ward of 11th floors and works as one of the top referral hospitals.

2-2-2. Outline of Cho Ray Hospital

Cho Ray Hospital is considered as one of the three top general hospitals under MOH in Vietnam. The main functions of the hospital are to provide patients in Southern Vietnam with medical service, to train students and medical staff, to research, to enhance international cooperation, and to be the hospitals of international standard.

As shown in the figure below, Cho Ray Hospital is composed of 50 medical treatment and examination departments, 11 administrative departments and 4 centers. Governed under the Board of Directors, which consists of a director and four deputy directors, a total of 3,458 staff members are working.

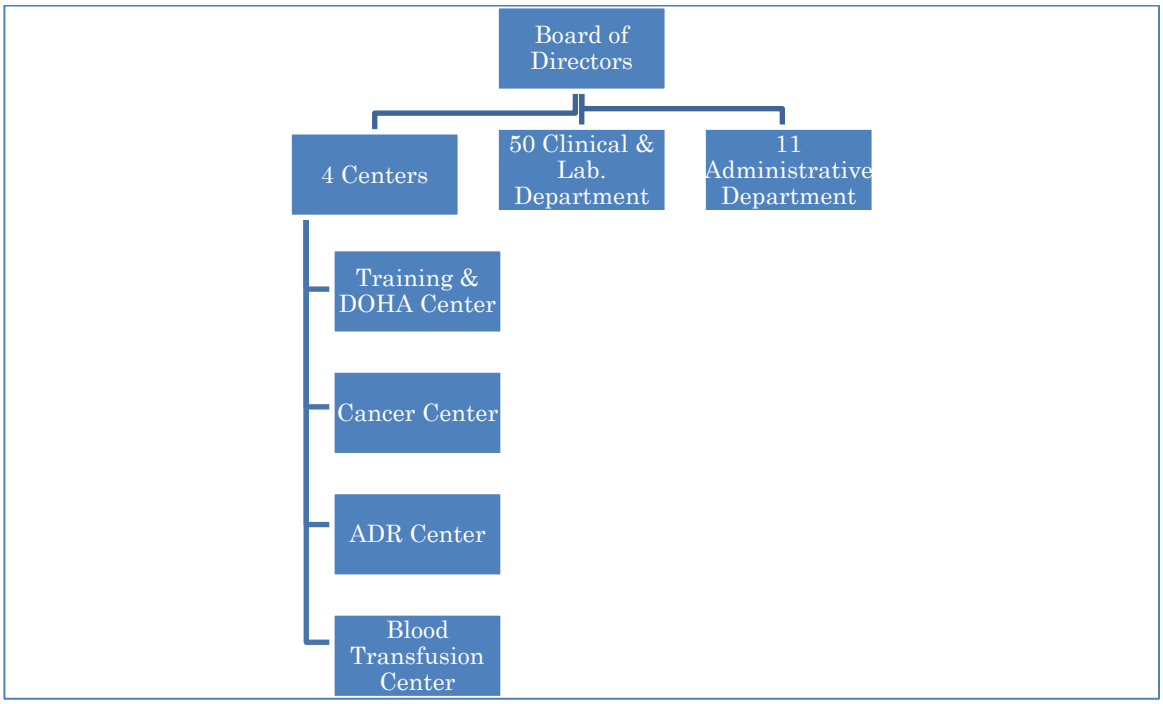


Figure 2-6 Organizational chart of Cho Ray Hospital
Source: Compiled from materials received from Cho Ray Hospital

The breakdown of Cho Ray Hospital's staff members is 705 doctors, 1,484 nurses, 348 pharmacists, 348 medical technicians and 824 administrative staff as shown in the table below.

Personal deployment in a medical institution is defined by Joint Circular No. 08/2007 / TTLT - MOH – BNV. According to this, Cho Ray Hospital is required to employ 1.10-1.20 full-time staff members- per general bed and 2.00-2.20 staff members per emergency/advanced-function bed. Moreover, the Circular defines the breakdown ratio of doctors, nurses, pharmacists, as well as administrative staff among the total numbers of staff members, according to which the deployment of approximately 2,700 full-time staff members (based on actual number of beds) is sufficient. However the hospital deploys approximately 800 additional staff members to cope with the overload situation caused by outpatients and inpatients etc.

Table 2-20 Number of health professionals by department in Cho Ray Hospital

Department	Doctor	Nurse	Medical Technician	Pharmacist	Engineer	IT Technician	Other
Hospital Board of Directors	5	0	0	0	0	0	0
Department of Operating & Anesthesia	28	133	55	1	0	5	13
Department of Cardiac Surgery	23	53	0	0	0	1	3
Department of Vascular Surgery	9	15	0	0	0	0	2
Department of Intensive Care Unit	15	53	0	0	0	1	5
Department of Neurosurgical Intensive Care	14	52	0	0	0	1	5
Department of Neurosurgery	36	82	1	0	2	0	6
Department of Head Injury	14	28	0	0	0	1	5
Department of Gastroenterology (4B1)	24	37	0	0	0	2	3
Department of Hepatobiliary - Pancreatic Surgery (4B3)	23	36	0	0	0	1	3
Department of Urology (5B1)	17	40	0	0	0	0	4
Department of Orthopedics (5B3)	29	30	0	0	0	0	3
Department of Otorhinolaryngology (6B1)	18	20	1	0	0	0	2
Department of Cosmetic and Plastic Surgery (6B1)	9	0	0	0	0	0	0
Department of Ophthalmology (6B3)	12	18	0	0	0	0	2
Department of Thoracic Surgery (7B1)	10	17	0	0	0	1	2
Department of Cardiology (7B3)	19	38	0	0	0	1	3
Department of Interventional Cardiology	13	24	4	0	0	2	2
Department of Pulmonary Medicine	19	40	0	0	0	1	2
Department of Nephrology	15	33	0	0	0	0	2
Department of Digestive Medicine (8B3)	20	29	0	0	0	1	2
Department of General Internal Medicine (9B1)	6	13	0	0	0	0	1
Department of Neurology (9B3)	17	35	0	0	0	1	4
Department of Tropical Diseases	18	33	0	0	0	0	2
Department of Research & Treatment Hepatitis	9	11	0	0	0	0	1
Department of General Internal Medicine (10B1)	4	13	0	0	0	0	2
Department of General Medicine (10B3)	2	13	0	0	0	0	1
Department of Dialysis	14	46	0	0	0	0	5
Department of General Medicine (T. 6)	2	12	0	0	0	0	3
Cancer Center (Department of Oncology)	28	45	15	0	5	3	4
Department of Burn	14	32	0	0	0	0	3
Department of Endocrinology	14	21	0	0	0	0	3
Department of Rheumatology	16	20	0	0	0	0	1
Department of Hematology	14	26	28	0	0	1	5
Blood Transfusion Center	4	25	32	1	1	2	8
Department of Microbiology	2	0	48	0	0	0	2
Department of Biochemistry	3	0	47	1	4	0	1
Department of Physical Therapy	5	0	31	0	0	1	0
Department of Radiology	24	4	52	0	0	2	3
Department of Nuclear Medicine	5	5	10	2	1	2	1
Pet-CT and Cyclotron Unit	3	4	1	0	5	0	0
Radiation Safety Unit	0	2	0	0	3	0	0
Department of Pathology	6	1	11	0	0	1	7
Department of Endoscopy	9	16	0	0	0	0	1
Department of Ultrasonography and Function Test	21	33	0	0	0	1	1
Department of Infection Control	3	25	2	0	0	0	3
Department of Pharmacy	0	0	0	90	0	0	11
DI & ADR Center	0	0	0	2	0	0	0
Emergency Department	34	100	0	0	0	10	13
Department of Outpatient	22	103	7	0	0	40	12
Department of Outpatient II	2	6	0	0	0	7	1

Department	Doctor	Nurse	Medical Technician	Pharmacist	Engineer	IT Technician	Other
Health Care Department	**9**	**15**	**0**	**0**	**0**	**2**	**3**
Department of Nutrition	**3**	**1**	**0**	**0**	**3**	**1**	**0**
Visa Medical Department	**6**	**25**	**0**	**0**	**1**	**3**	**1**
Administrative Department	**0**	**1**	**0**	**0**	**0**	**1**	**16**
Department of Personnel Administration	**2**	**0**	**0**	**0**	**0**	**0**	**11**
Department of Brand & Communication	**1**	**0**	**0**	**0**	**0**	**0**	**63**
Sector Unions	**0**	**0**	**0**	**0**	**0**	**0**	**69**
Department of General Planning	**3**	**11**	**1**	**0**	**1**	**1**	**10**
Department of Information Technology	**0**	**0**	**0**	**0**	**4**	**0**	**4**
Social Medicine Unit	**0**	**1**	**1**	**0**	**0**	**0**	**3**
Department of Nursing	**0**	**5**	**0**	**0**	**0**	**0**	**0**
Training Center	**6**	**1**	**0**	**0**	**0**	**4**	**10**
Department of Finance and Accounting	**0**	**0**	**0**	**0**	**2**	**0**	**97**
Department of Hospital Quality Management	**1**	**0**	**0**	**0**	**0**	**0**	**0**
Department of Material Management	**0**	**0**	**1**	**0**	**14**	**2**	**202**
Department of Medical Equipment	**0**	**0**	**0**	**0**	**12**	**0**	**6**
TOTAL	***705***	***1484***	***348***	***97***	***58***	***103***	***663***

Source: Compiled from materials received from Cho Ray Hospital

2-2-3. Healthcare Activities at Cho Ray Hospital

The table below shows major activities of Cho Ray Hospital. The number of outpatients at Cho Ray Hospital was approximately 1,200,000 persons in 2012. Reception, waiting room and consulting rooms are always crowded, so that in some cases a patient arriving in the early morning cannot have a check-up that day. Although the planned number of hospital beds is 1,800, about 2,400 beds are actually utilized. Therefore, the occupancy ratio is about 140%. This situation is dealt with by hospitalizing 2 patients in one bed or placing stretchers in the passageways of hospital wards. There are 35 operating rooms in the whole hospital, and generally two operations are conducted at the same time in one operating room. The annual number of operations is approximately 40,000.

Table 2-21 Major activities of Cho Ray Hospital（2009-2011）

	2009	2010	2011
Number of outpatients	985,800 (Emergency102,394)	1,091,647 (Emergency103,481)	1,174,591 (Emergency106,438)
Total number of inpatients	918,843	903,616	918,026
Bed occupancy rate	140%	138%	140%
Average length of stay	8.1	7.6	7.3
Number of operations	37,409	38,890	40,674
Number of ordinary X-ray photographs	541,058	583,468	632,598
Number of CT scans	77,442	84,201	90,290
Number of MRI scans	13,275	15,345	15,500
Number of DSA scans	4,368	4,666	4,541
Number of nuclear medicine	45,053	54,211	50,215
Number of ultrasonic diagnoses	168,716	196,562	226,763
Number of digestive endoscopic diagnoses	42,672	41,629	50,738
Number of respiratory endoscopic diagnoses	4,803	4,680	5,314
Number of dialysis treatments	47,601	48,249	45,996
Number of bio chemical examinations	6,233,144	6,567,146	7,309,411
Number of microorganism examinations	390,452	490,607	542,578
Number of blood and immunological examinations	8,413,671	8,826,636	9,541,804
Number of pathology examinations	74,372	77,500	85,660
Number of rehabilitation	81,712	67,523	51,608

Source: Compiled from materials received from Cho Ray Hospital

As mentioned above, Cho Ray Hospital has been overloaded with patients exceeding its capacity. Due to the overload, Cho Ray Hospital hospitalizes 2 patients in 1 bed, and sometimes 2 operations are conducted at the same time in 1 operating room. These operations are considered to be critical issues in terms of patient's amenity and safety. In addition, each department operates under overloaded situations and has other issues. These issues should be resolved at Cho Ray Second Hospital. Details are proposed in Chapter 4 Basic Operations Plan for Each Department and Chapter 7 Architectural Plan etc.

Chapter 3. Basic Operations Plan for Cho Ray Second Hospital

Chapter 3. Basic Operations Plan for Cho Ray Second Hospital

From the point of view that resolves the various issues which have been extracted from the results of the external environment survey, internal environment survey, and interview to MOH and Cho Ray Hospital, we summarized the basic operations plan for Cho Ray Second Hospital. The following contents are our suggestions which we would like to encourage the staff of Cho Ray Second Hospital to adopt for the new hospital on their own initiative, and which are not yet decided to be supported from Japan.

3-1. Vision

Cho Ray Second hospital will be a medical center of international standard that can deploy and apply modern technology, transfer advanced medical skills to the lower level hospitals and contribute to the improvement of healthcare over a larger range for the people in the south part of Vietnam.

3-2. Mission

a. Providing advanced health services to the patients
b. Establishment of the advanced management system for advanced health services and medical safety
c. Acquiring skills of advanced medical services
d. Study and training for the purpose of decision-making support for the policy in medical sector and of transfer of the advanced medical skills to the lower level hospitals
e. International cooperation with international and local medical institutions
f. Establishment of the working environment where the staff shall work with satisfaction and eagerness

3-3. Hospital Management and Operation Utilizing Japanese Expertise and Technical Know-how

The "medical center of international standard", as shown in vision is nothing but the hospital to receive international recognition. Promoting medical services standard which is recognized internationally is required in the Cho Ray Second Hospital. We have set the four items shown below as point of view that embodies the vision and mission utilizing Japanese expertise and technical know-how from the hospital management and operation aspects.

i. Advanced medical service and regional network in accordance with the changing medical demand (especially for lifestyle-related diseases).
ii. Patient-oriented medical services, comfortable hospital for the patients (respect the will of the patients, short waiting time, good manner with the patients, comfortable amenity, cleanliness of the facility)
iii. Safety and security (infection control for the patients and staff and prevention of medical accident)
iv. Efficient and sustainable management

The issues and solutions to each item are shown in the following.

3-3-1. Advanced Medical Service and Regional Network in accordance with the Changing Medical Demand

(1) Issues about lifestyle-related diseases

The main causes of the current overload of Cho Ray Hospital are the patients increase due to aging and population growth and further complication of the treatment of disease due to the change in the structure of the disease from infection or injury to lifestyle-related diseases.

And that the number of patients is increasing by aging and population growth, disease structure changes to lifestyle-related diseases from injury or infection, the treatment of the disease more and due to the fact that it has been complicated.

While the technical level of medical staff in Cho Ray Hospital is high, there is the need for structural improvements and technology in response to lifestyle-related diseases that are expected to increase in the future. The specific issues are below.

i. Gathering and analysis of multi-faceted information about the condition of the patients are essential to treat lifestyle-related diseases, but these are not sufficient in Cho Ray Hospital.
ii. Evidence Based Medicine (EBM) that is valid in treating lifestyle-related diseases is not introduced enough.
iii. System of team medicine that is needed for treating lifestyle-related diseases is not yet developed. For example, nurses are not able to participate actively in the clinical practice.
iv. Continuous care that is needed to treat lifestyle-related diseases is not developed yet. For example, the number of reverse reference from Cho Ray Hospital to the lower hospitals is not sufficient.

(2) Solutions for lifestyle-related diseases

With respect to the above issues, the following can be considered as solutions.

i. Development of Hospital Information System (HIS) focusing on Electrical Medical Record System (EMRS) that enables gathering and analysis of multi-faceted information about the condition of patients.
   (a) Development of data gathering and analysis skill by training programs.
   (b) Development of Data Ware House (DWH) [1] as an analytical tool.
   (c) Publish regularly statistics of hospital which includes both management and clinical statics. (For example, issue an annual report.)

ii. Introduction of EBM
   (a) Acquisition of standard medical procedures and knowledge.
   (b) Introduction of PDCA cycle to measure and evaluate the medical outcomes and to feed them back to the future medical practice.
   (c) Promotion of participation in clinical research, and transmitting information through such as papers and conference presentations.

iii. Introducing Team Medicine
   (a) Enhancement of knowledge and skills of individual staff members. For example, to encourage the acquisition of knowledge and skills that will be necessary to team medicine such as lifestyle guidance to patients, rehabilitation, medication teaching, and nutritional guidance.
   (b) Implementation of training for the team system development and awareness raising. For example, staffs enter the team actually on the training in hospital in Japan and learn the system

[1] DWH is a system for analyzing the relationship between items from operational data stored.

and division of roles, etc. Introduction and thorough practice of techniques such as PDCA cycle being utilized here can be achieved.

(c) Organizing the pilot group in Cho Ray Hospital to learn in practice in advance.

iv. Development of system for continuous care

The aftercare in the regional hospital with a focus on rehabilitation for the patients who are discharged from Cho Ray Second Hospital shall be required.

(a) Strengthening treatment for acute patients in Cho Ray Second Hospital.
(b) Clarification of roles among hospitals and strengthening regional cooperation.
(c) Development operational systems for information exchange, cooperating path of rehabilitation, human resource development, and handling of emergencies.
(d) Carrying out forward and backward reference.

(3) Organizational measures for implementing the solutions

As for the four solutions mentioned above, it is not sufficient to improve the individual skills simply; optimizing the entire organization is required. Therefore, they should be strengthened further by incorporating overall measures as below.

i. Development of operation standard manual

(a) Development of operation flow and manuals
(b) Definition of demarcation model among different medical departments and staff.
(c) Human resource development based on the above-mentioned manuals.

ii. Pilot project

In order to promote medical cooperation, it is efficient to establish pilot hospitals for the purpose of establishment of a model for regional cooperation and continuous care. Examples are as follows;

(a) Development of clinical pathway
- Creation of treatment model of each target disease (For example, rehabilitation after cerebral infarction.) These models could be created based on the medical cooperation path in Japan.
- Determination of roles of pilot hospitals and Cho-ray second hospital.
- Determination of Exchange rules of medical cooperation information.

(b) Human resource development
- Knowledge and skill enhancement of human resources of the individual staff for the medical team system. (Lifestyle guidance, rehabilitation, medication instruction, and nutritional guidance, etc.)
- Training and awareness raising to develop team medicine through PDCA cycle

(4) Improvement of preventive medicine

It is important to consider the solutions for the improvement of the preventive medicine from the nationwide point of view, instead of considering the issue as only for Cho Ray Second Hospital, as shown below.

(a) Increase the medical facilities in accordance with the disease structure.
(b) Awareness raising (educational activities) by the government on preventing lifestyle diseases.

(c) Strengthen governmental policies. (Ex. permission for medical check-ups at companies in commune level, and carrying out the educational activities)

3-3-2. Patient-Oriented Medical Services and Comfortable Hospital for Patients

Patient-oriented medical services are to create an environment to let them make decision of medical care for their own. Therefore, it is desirable to disclose the medical information to the patients, explain the diagnosis in an easy-to-understand manner, and respect their own decision-making.

As medical service should be patient-oriented, Cho Ray Second Hospital should improve the quality of services to the patients. For example, short waiting time, good manner with the patients, comfortable amenity, cleanliness of the facility are the basic principles of patient-oriented services.

(1) Issues about respect for the will of the patients

As too many patients are coming to Cho Ray Hospital, many hospital staff are overworked. In Out-patient department, two to three patients are examined in one examination room at the same time, which makes difficult to ensure patients' privacy and personal information. It is also difficult for doctors to explain enough information to the patients. Due to the short time examination, there is a possibility that doctors cannot explain various options for treatment to their patients so that the patients are unable to examine such options. In the Inpatient department, doctors are also overworked so they don't have enough time to explain much information to their patients. In conclusion, Cho Ray Hospital has the issues about respect for the will of the patients as follows:

i. Insufficient explanation to the patients for the medical treatment.
ii. Decision-making by the patients on their own are not respected sufficiently.

(2) Solutions for implementation of respect for the will of the patients

To respect the will of the patients well enough cannot be achieved easily as it requires hospital staff to change their mind. Therefore, hospital staff need to learn basic principles of the ensuring patients' will first, and then should be trained. After the training, these kinds of attempt shall be experimentally introduced to the request outpatient department and the Special care department expected to be established at Cho Ray Second Hospital, and then be expanded to other departments gradually.

i. Providing easy-to-understand explanation

Providing explanation in an easy-to-understand manner is essential for patients to make decision on their own regarding their medical treatment. The following solutions shall be required.

(a) Manuals for how to explain in an easy-to-understand manner
(b) Visualization of the medical examination results for individual patient by using EMRS
(c) Taking time for explanation and consultation in the diagnosis process
(d) Enhancement of referral system and appointment system in the outpatient department for the purpose of making enough time to explain
(e) Explanation from not only doctors but nurses should be encouraged

ii. Encouraging decision-making by patients

Hospital staff should encourage patients to do decision-making by themselves. To promote the attempt, Cho Ray Second Hospital should take the following actions.

(a) Ensuring the process of paying attention to the will of the patient by promoting standardization and documentation of the process.
(b) Training for hospital staff
(c) Presentation of treatment options

(3) Cause and Issues of Overload at Cho Ray Hospital

Currently Cho Ray Hospital is in the state of overload and causing the patients to wait long time due to the causes considered to be as follows:

i. Population growth and aging, changing disease structure, which required advanced healthcare services.
ii. As Vietnam has been economically growing, Vietnamese people are well-educated. They seek more advanced medical services so that more and more patients are coming to Cho Ray Hospital.
iii. Preventive medicine has been yet to be established.[2]
iv. Poor quality of medical services in regional hospital due to lack of advanced equipment and skilled human resource
v. Accessibility to Cho Ray Hospital has been improved because of the development of the traffic infrastructure such as the establishment of Kanto Bridge and the increasing number of motorbikes.
vi. Due to lack of management of emergency medical services, Cho Ray Hospital accepts emergency patients of any severity, some of whom other lower level hospitals can take care of.
vii. Not many patients make use of appointment system in the outpatient department.

(4) Measures to Avoid Overload at Cho Ray Second Hospital

Based on the above-mentioned issues and measures, the following are the proposed solutions for shortening the waiting time to avoid overload at Cho Ray Second Hospital.

i. Proposal to MOH to establish preventive medicine by promoting it to the public. This project shall contribute to establishing preventive medicine by introducing it to Cho Ray Second Hospital and increasing the number of bed according to the disease structure.
※ In the future it is desirable to take actions concentrating on major diseases based on the statistical data analysis.
ii. MOH should enlighten the public to the referral system where patients pay less medical fee if they follow the system adequately. Medical fee system shall require to be further improved.
iii. Development of the policy for the promotion on the preventive medicine such as conducting medical checkup by commune health centers and business firms.
iv. Policy recommendation according to duration of 1816project. Trainings at the training center of Cho Ray Second hospital with an emphasis on lifestyle-related diseases.
v. Lower level hospitals require continuous improvement for their functions and facilities.
vi. Introduction of thorough appointment system (People who come without reservation need to wait as long as Cho Ray Hospital.)
vii. Policy recommendation according to development of emergency network (confirm the jurisdiction of ambulances)

[2] In Japan, with the spread of regular medical checkup, people have become more careful of their health, and more diseases have been detected in their early stages. Regular medical checkup is conducted mainly by health insurance associations and public health centers, corresponding to Vietnam's commune level health centers.

(5) Issues about welcoming patients and amenity

Healthcare service can be considered to belong to the service industry. This is the basic principle whole hospital staff should understand for establishing the better comfortable hospital. The following actions will be required.

i. Staff lacks the sense of service for patients
ii. The guidance in the hospital is not clear enough
iii. The reception desk is inefficient
iv. Lack of cleanliness
v. The cleaning service is outsourced, but the performance level is low due to the lack of quality standard
vi. Lack of amenity in the hospital
vii. Poor variation of food
viii. Lack of consideration for women

(6) Improvement plan of welcoming patients and amenity

The following projects should be carried out.

i. Staff training
ii. User-friendly guidance and signs / indicators
iii. Outsourcing some services (ex. reception, cleaning, etc.)
（In case of outsourcing some services, outsourcing specifications requires careful examinations. After the contract, continuous monitoring of the service on the achievement of some quality standard shall be required.
iv. Introduce in-hospital convenient facilities (ex. convenient stores)
v. Improvement of hospital food service (ex. improvement for the nutrition control, making general meals to be optional, or other)
vi. Introducing the services for women (ex. establishment of women-only waiting area, taking care of female patients by female staff, installation of powder rooms, and so forth.)
vii. Establishment of the department for dealing with opinions and complaints from patients

3-3-3. Safety and Security

(1) Issues about hospital infection

Hospital infection cases have been happening among the patients and the staff, which should be considered as a significant issue. At Cho Ray Hospital, currently the infection control department cannot take effective actions due to the overflowed patients. Current issues on hospital infections can be summarized as follows.

i. Poor awareness on hospital-acquired infection
ii. There are no specific procedures of prevention
iii. Inconsistent of medical waste treatment

(2) Actions for preventing patients and staff from infection

i. Training the staff on infection control (ex. regular training, conducting examinations, and issuing certification on infection control etc.)
ii. Standard Precaution on hand washing and process of treatments etc. should be created. The hospital staff are required to follow it thoroughly
iii. Establishment of adequate medical waste disposal process such as introducing appropriate equipment, standardization of the process, and conducting spot check etc.

(3) Issues about medical accidents

Dealing with medical accidents is unfamiliar with Cho Ray Hospital. Currently risk management unit is established under the infection control department. Present issues are as follows.

i. There is no standard manual.
ii. The number of accident report is small (accident report is not promoted).
iii. Countermeasure after the accident is not clear.
iv. Risk management unit is under the infection control department. Current organization is not suitable to comprehensively manage the medical accidents in the hospital.

(4) Actions for preventing medical accidents

i. For precaution, introducing standard manual and staff training, easy-to-understand guidance in hospital, user-friendly tools.
ii. (After the accidents) promotion and establishment of incident and accident report (Staff should pay more attention to the matter. Need to review the experience of JICA Project for Improvement of the Quality of Human Resources in Medical Services)
iii. (After the accidents) appropriate measures after the accident should be taken (Need to review the experience of the JICA Project for Improvement of the Quality of Human Resources in Medical Services)
iv. To the patient: explanation, re-treatment
v. To the staff: making standard manual and training, preparation for lawsuit and dealing with media (need to conduct hearings about Vietnamese custom)
vi. Enhancement of organizational structure of the risk management unit (ex. independence from the infection control department, including in the function of head office, and so forth.)

(5) Ensuring security

Currently Cho Ray Hospital is relatively open to strangers. However, as hospitals are dealing with patient personal information, high-cost medical equipment, powerful drugs and narcotic, security restricted areas should be established. At Cho Ray Second Hospital, measures should be taken as introducing information system for ensuring security, establishing security restricted areas in operating rooms and ICU etc., managing entering and exiting such areas.

3-3-4. Efficient and Sustainable Financial Management

(1) Issues of financial management at Cho Ray Hospital

i. Detailed data such as revenue by department, waiting time at outpatient department, etc. is not accumulated.

ii. Benchmark analysis that compares the management situation with other hospitals and extracts the issues of the hospital is not implemented.
iii. At the emergency department in Cho Ray Hospital, currently the proportion of severely-ill emergency patients whom Cho Ray Hospital should mainly accept is only 10% to 20% of the total number of emergency patients. Slightly-ill patients constitute over 80% of the total.
iv. Generally most of the outpatients are less severed conditions and the medical fees per outpatient are lower than that of inpatients. However, Cho Ray Hospital accepts more outpatients than other top referral hospitals. In addition, only 10-20% of the outpatients make appointment for the diagnosis and treatment.
v. The supply purchase costs at Cho Ray Hospital are higher than that of other top referral hospitals.
vi. Insufficient facility and equipment for wealthy patients.

(2) Actions for realizing efficient and sustainable financial management

i. It is important to introduce information system capable of collecting management data of each department, as well as to develop human resources that can analyze the data from a technical standpoint.
ii. As a top referral hospital, Cho Ray Hospital needs to provide its advanced medical services mainly for inpatients and severely-ill patients, contributing to the improvement of medical services in the region. At the same time, it shall acquire high medical fees for its advanced medical services. For these purposes, the hospital is required to improve the referral system by instructing lower level hospitals, and enhance the appointment system at outpatient department. In addition, MOH should play a central role to establish the emergency medical network where medical institutions and ambulance squads cooperate well by conducting triage and sharing patients' information before transporting the patients to medical institutions..
iii. To reduce the procurement cost by introducing SPD so as to put the in-hospital logistics under central management and by standardizing the items of medicinal supplies and commodities under the SPD system after the integration of Cho Ray Hospital and Cho Ray Second Hospital.
iv. To accept more wealth patients by establishing the special care department and improving advanced medical checkup services.

3-4. Organization

3-4-1. Shared Management Structure of Hospitals

The Ministry of Health and top hospital management both share a vision of integrally managing Cho Ray Hospital and Cho Ray Second Hospital and not managing them separately. Unfortunately, since both hospitals are located 15 kilometers apart and are large hospitals with 1,000 beds, it would not be efficient to have personnel move between hospitals frequently. Therefore, as shown in the figure below, a separate independent hospital organization will be created for normal operations; each facility will have its own top management including a director and be operated individually. On the other hand, it is believed that it would be more appropriate if the overall organization of the hospital is made to function as a single head office and areas that can be integrated such as regional medical liaison department /DOHA, general planning department, personnel administration department, supply processing and distribution department and other areas were placed in Cho Ray Hospital as the head office so that all can be managed together.

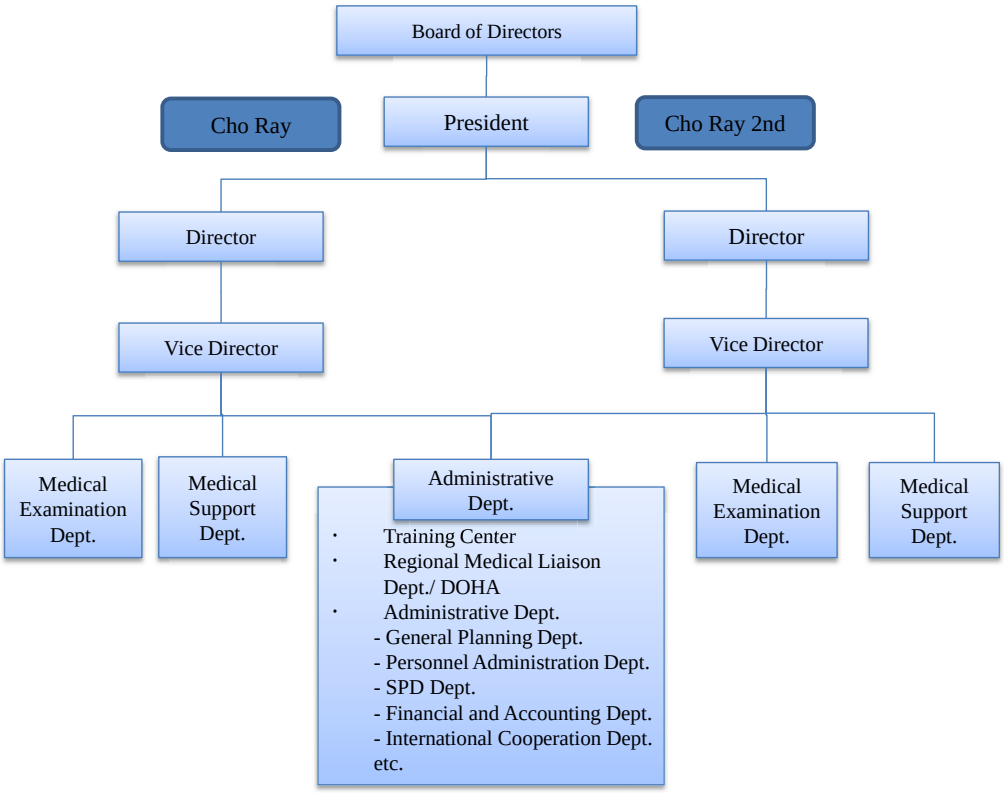


Figure 3-1 Organizational Chart of Cho Ray Hospital/Cho Ray Second Hospital (draft)
Source: Created by the survey team

3-4-2. Strengthened Coordination between Departments through Lateral Organization

Each hospital department at the current Cho Ray Hospital is independent and operated in a parallel organizational system, with a committee which functions as a lateral organization. The normal objectives of the committee are largely based on the autonomy of the participating divisions, and include such things as coordinating ideas between participating divisions, sharing information, and voluntarily helping each individual organization, but there are many cases when this hasn't led to an improvement in quality for the whole organization. The need to coordinate between divisions through participation in lateral organizations and to share the same mindset in governing the hospital will become necessary when introducing a more modern team-based medical system and ensuring overall quality at hospital. Therefore, a laterally-coordinated organization centered around top management and the cultivation of a stable management environment should be established to ensure medical quality and safety and improve patient satisfaction. By establishing cross-departmental management committee, Cho Ray Second Hospital would enhance information sharing and stable quality management. In usual cases, as persons of administrative positions should manage each department, such committee is placed directly under the top administrative staff such as the director. The basic principles of cross-departmental structure are as the following figure.

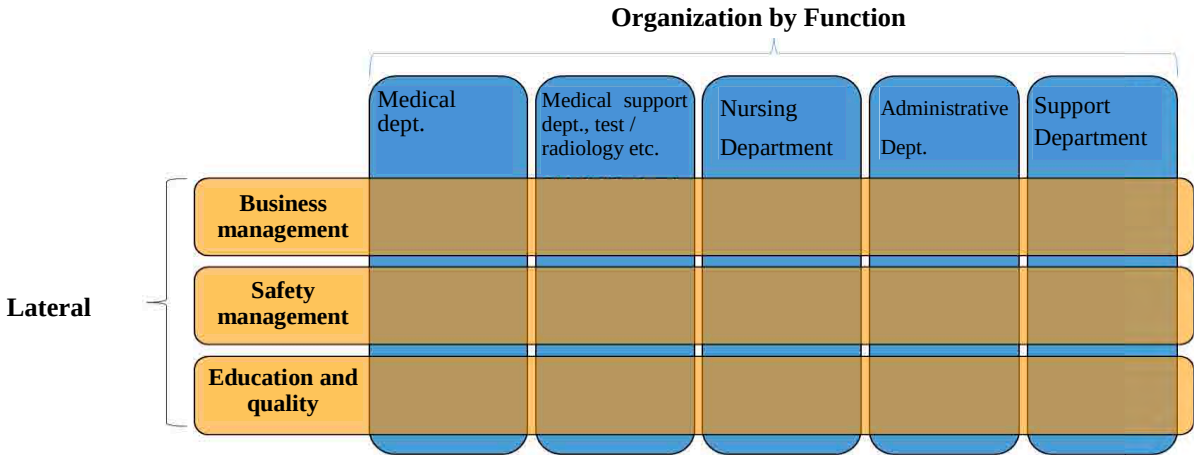


Figure 3-2 Image of cross-departmental structures

Source: Created by the survey team

3-4-3. Department Structure

The configuration of departments at Cho Ray Second Hospital will be based on resolving the excessive load at the current Cho Ray Hospital and the departments will be configured in a way that will allow the handling of future changes in the amount of patients with certain diseases (cancer, stroke, heart disease, diabetes and other life-style related illnesses). Geriatric department will also be established according to the upper level policies of Vietnam.

In addition, Cho Ray Second Hospital shall be equipped with the special care department targeting wealthy people inside and outside the country, bringing back the patients going to the oversees for advanced medical care into Vietnam.

We assumed that the total number of departments shall be around 50.

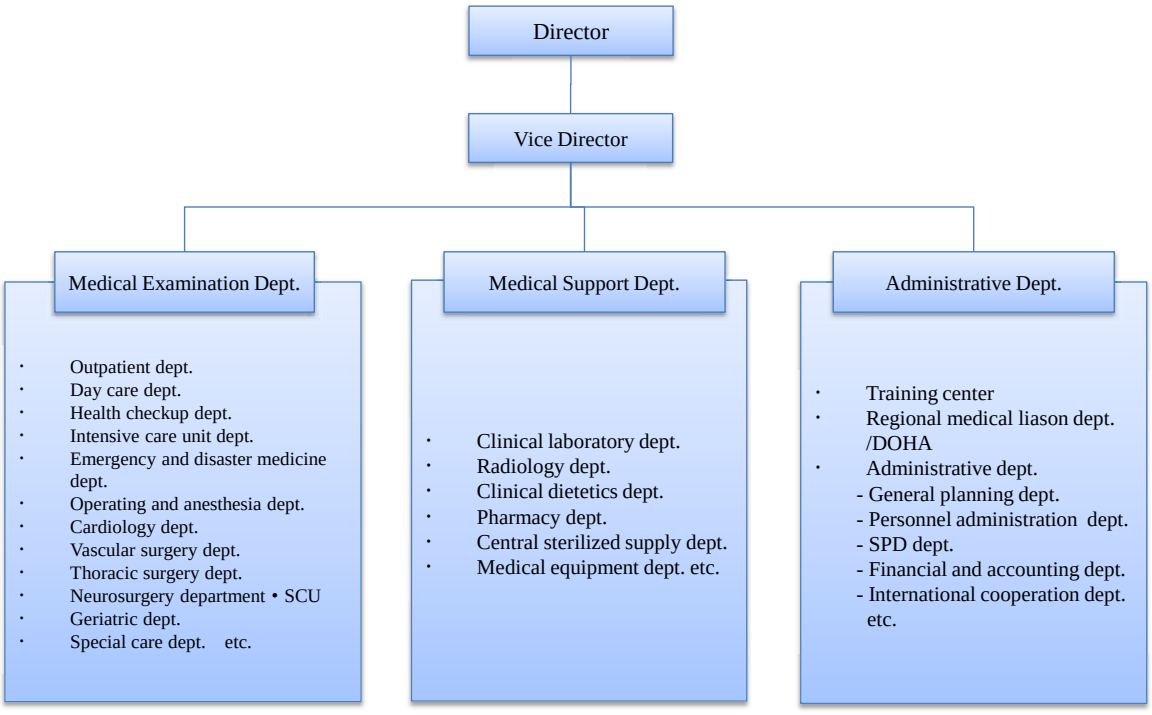


Figure 3-3 Department structure at Cho Ray Second Hospital

Source: Created by the survey team

(1) Medical Examination Departments which exist at Cho Ray Hospital and going to be established at Cho Ray Second Hospital (28 departments)

Outpatient Department, Day Care Department (Chemotherapy Center), Health Checkup Department, Intensive Care Unit Department (ICU/ EICU), Emergency and Disaster Medicine Department, Operating and Anesthesia Department, Cardiology Department, Vascular Surgery Department, Thoracic Surgery Department, ENT Department, Ophthalmology Department, Urology Department, Tropical Diseases Department, Pulmonary Medicine Department, Hepatobiliary-Gastroenterology Department, Liver Gallbladder Pancreas Surgery Department, Digestive Surgery Department, Endocrinology Department, Neurosurgery Department and SCU, Neurology Department, Burn, Plastic Surgery Department, Orthopedics Department, Rheumatology Department, Hematology Department, Dialysis Department, Oncology Department, Special Care Department and General Internal Medicine Department, Rehabilitation Department

(2) Medical Examination Departments which are going to be newly established (1 department)

Geriatric Department

(3) Medical Support Departments (6 departments)

Clinical Laboratory Department (Lab Center, Hematology, Biochemistry, Microbiology and Pathology), Radiology Department (Diagnostic Imaging Department, Nuclear Medicine Department), Clinical Dietetics Department, Pharmacy Department, Central Sterilized Supply Department, Medical Equipment Department

(4) Administrative Department (3 departments)

The following departments shall work as a head office for Cho Ray Hospital and Cho Ray Second Hospital. These departments shall be placed in each hospital, and the departments placed in Cho Ray Hospital shall work as a head office and manage the both hospital's departments.

Training Center, Regional Medical Liaison Department/ DOHA, Administrative Department (General Planning Department, Personnel Administration Department, Facility Management Department, Supply and Processing Distribution Department, Financial and Accounting Department, International Cooperation Department, etc.)

3-4-4. Personnel Structure

The number of permanent staff at medical facilities in Vietnam is stipulated by the Joint Circular No.08/2007/TTLT-MOH-BNV of the Ministry of Health and the Ministry of Interior and each medical facility must ensure a certain number of personnel according to the Joint Circular. The number of permanent personnel required at Cho Ray Second Hospital has been calculated based on the Joint Circular.

As a reference, the average number of personnel at Cho Ray Hospital and average number of personnel by job type at the main university hospitals in Japan (this excludes dentistry since it is not planned for Cho Ray Second Hospital) have been listed and converted to a number for each 1,000 beds.

Table 3-1 Personnel Structure at Cho Ray Second Hospital (Proposed)

	Cho Ray Second Hospital No. of personnel required	Cho Ray Hospital Personnel	Main University Hospitals in Japan Converted to Each 1,000 Beds*
No. of beds	1,000 beds	1,800 beds	1,000 beds
Doctors	Approx. 1,050	702	636
Nurses (Including midwives)		1,492	853
Pharmacists	Approx. 350	98	52
Radiology Technician		344	48
Clinical Laboratory Technologist			70
Physical Therapist / Occupational Therapist			21
Clinical Engineer			16
Nutritionist			10
Clerical Work / Other	Approx. 350	830	326
Total	Approx. 1,750	3,466	2,032

Source: Compiled from materials received from Cho Ray Hospital

In Japan, the standard for the number of personnel which must be on hand at hospitals or clinics with beds to treat patients is listed in Article 21 of the Medical Law. As for the fees of medical procedures, a certain economic evaluation, such as adding to the fee received for high-quality service, is performed if the number of personnel allocated satisfies the personnel standards in the Medical Law. The number of doctors, dentists, pharmacists, nurses, midwives and nutritionists is stipulated by the law, but there is no stipulation for the number of office staff or health professionals such as rehabilitative therapists or clinical radiologist.

Although we cannot necessarily compare Vietnam and Japan because the role and scope of service of each job in the hospital are different, it is expected the national disease structure in Vietnam will be similar to Japan with increase of life-style related diseases, such as cancer, cerebral strokes, heart diseases, and diabetes and acceleration of demographic aging amid lower birth rate. Furthermore, when take into consideration the introduction of the Japanese style hospital management and operation method, it is thought that staff placement in Japan should be referred to as the future targeted value.

3-5. Hospital Management

It is intended that Cho Ray Second Hospital should be a model hospital in the field of quality control in Vietnam, by means of positively introducing Japanese-style hospital operation and management procedures. Therefore, it is under consideration to introduce ICT, SPD, outsourcing, etc., which are practiced in hospitals in Japan, for the purpose of improving the quality of medical treatment as well as strengthening the management, into Cho Ray Second Hospital, while complying with the laws and ordinances of Vietnam. Especially with respect to improving the quality of medical treatment and the strengthening of management, it is necessary to address these issues dealing with Cho Ray Hospital and Cho Ray Second Hospital as one unit. For that purpose, an organization which manages both hospitals in an

integrated manner will be constructed.

3-5-1. ICT

Construction and maintenance of the information system will be implemented under integrated management organization, in order to promote coordination of the information systems of these hospitals, their effectiveness, reductions in costs, etc.

For that purpose, in addition to the setup of separate Information System Department at each hospital, an organization that manages the Information System Departments of both hospitals in an integrated manner will be established, and the masters and data bases used in the information systems of both hospitals will be made compatible as far as possible.

3-5-2. SPD

With respect to supply management, a common system for Cho Ray Hospital and Cho Ray Second Hospital will be constructed, as in the case of ICT. Standardization of medicines and medical materials to be selected will be promoted in order to attain reasonable supply costs. In addition, at Cho Ray Second Hospital improvement of efficiency of transportation line of flow will be promoted through centralizing the location of supply departments (medicines, food service, linen, ME).

3-5-3. Outsourcing

In order that medical professionals can deploy their expertise to the fullest extent, it is necessary to create an environment in which the medical professionals can dedicate themselves to the provision of their expertise. For that purpose, it is desirable to outsource the parts of tasks which can be served by people other than professionals. Recently, outsourcing is being practiced widely in Japan, and it may be possible to provide know-how in this area. The examples of outsourcing tasks are shown in the table below. However, in outsourcing tasks, integrated application is required with the development of laws such as the Medical Care Act; discussions with the Ministry of Health, etc. are therefore necessary.

Table 3-2 Examples of Outsourcing Tasks

Related Department	Examples of outsourcing tasks
Outpatient Department	Consider efficient placement of staff, such as outsourcing of outpatient reception staff.
Hospital Ward Department	Consider outsourcing of hospital ward nurse's aides and hospital ward clerks, etc. in order to mitigate the burden on patient's families and nurses.
Central Materials Department	Ensure a system which positively promotes participation in infection-control workshops within and without the hospital. And in the case of outsourcing of a part of these tasks to contractors, require the contractors to have been carried out necessary training.
Department of Pharmacy	Consider the introduction of a system in which pharmacists can concentrate on their essential tasks, through separating those tasks which can be carried out by persons other than pharmacists, such as inventory control and replenishing, selecting, setting, etc. of medicines, through outsourcing to medical-assistance companies, for example Japanese companies , etc.
Clinical Laboratory Department	Concerning the Clinical Laboratory Department, refer to Japanese outsourcing processes. Consider establishing branch laboratories, etc. of Japanese companies in the future.
Radiology Department	For producing PET radiopharmaceuticals, etc., consider joint use of the cyclotron at Cho Ray Hospital, new installation of a cyclotron in Cho Ray Second Hospital, outsourcing, etc.

Related Department	Examples of outsourcing tasks
Nutritional Management Department	Consider outsourcing of cooks (for example, Japanese companies) for the efficient deployment of human resources. Regardless of outsourcing, nutrition management is conducted by nutritionists within the hospital.
Supply Management Department	Concerning SPD, consider also outsourcing to external companies (Japanese companies, etc.)
Medical Equipment Department	Consider control and maintenance of medical equipment used within the Hospital Ward Department and the Outpatient Department in a centralized manner. Consider applying the know-how of Japanese companies in this respect.

Source: Created by the survey team

3-6. Estimation for the Target Number of Patients

Currently the bed occupancy rate at Cho Ray Hospital is over 100%, resulting in patients overload. Considering the situation, the target bed occupancy rate at Cho Ray Second Hospital shall be less than 95% to prevent patient overload

3-6-1. Number of Inpatients

As was examined in "2-1-6 (1) Verification of the Number of Beds at Cho Ray Second Hospital", the number of beds of Cho Ray Second Hospital assumed to be 1,000.

But right after the opening, Cho Ray Second Hospital's bed occupancy rate shall be 80% as the following table, taking into consideration of gradual recruiting of staff and the expected number of accepted patients. The bed occupancy rate shall gradually rise 5% year by year, up to 95% in full operations.

Table 3-3 Goals of Bed Occupancy Rate at Cho Ray Second Hospital

Year	First year (opening)	Second year	Third year	Forth year
Bed occupancy rate	80%	85%	90%	95%

Source: Created by the survey team based on the discussion with Cho Ray Hospital

3-6-2. Number of Outpatients

We examine the estimated number of outpatients at Cho Ray Second Hospital by taking into considerations of the change of the number of outpatient in the past years, the prospective demand, and the examples of the similar facilities.

The following table shows the number of outpatients per day at Cho Ray Hospital from 2008 to 2013. The number has been increasing from 2008, and it reached 4,199 in 2013, increasing around 1,000.

Table 3-4 Number of Outpatients at Cho Ray Hospital from 2008-2013

Item	2008	2009	2010	2011	2012	2013
No. of outpatients per day	3,144	3,286	3,639	3,915	4,014	4,199

Source: Created by the survey team based on the documents received from Cho Ray Hospital

The following table shows the number of outpatients by ICD 10 at Cho Ray Hospital in December 2013. Diseases of circulatory system, digestive system, musculoskeletal system, and neoplasms constitute a considerable proportion.

Table 3-5 Number of Outpatients by ICD 10 at Cho Ray Hospital in December 2013

ICD 10		No. of outpatients Dec. 2013	Composition ratio
1	Certain infectious and parasitic diseases	2,967	3.7%
2	Neoplasms	8,981	11.3%
3	Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	1,392	1.7%
4	Endocrine, nutritional and metabolic diseases	5,919	7.4%
5	Mental and behavioural disorders	648	0.8%
6	Diseases of the nervous system	3,287	4.1%
7	Diseases of the eye and adnexa	1,234	1.5%
8	Diseases of the ear and mastoid process	455	0.6%
9	Diseases of the circulatory system	13,869	17.4%
10	Diseases of the respiratory system	5,007	6.3%
11	Diseases of the digestive system	9,332	11.7%
12	Diseases of the skin and subcutaneous tissue	1,269	1.6%
13	Diseases of the musculoskeletal system and connective tissue	9,088	11.4%
14	Diseases of the genitourinary system	5,215	6.5%
15	Pregnancy, childbirth and the puerperium	87	0.1%
16	Certain conditions originating in the perinatal period	9	0.0%
17	Congenital malformations, deformations and chromosomal abnormalities	465	0.6%
18	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	3,582	4.5%
19	Injury, poisoning and certain other consequences of external causes	2,341	2.9%
20	External causes of morbidity and mortality	54	0.1%
21	Factors influencing health status and contact with health services	4,617	5.8%
Total		79,818	100.0%

Source: Created by the survey team based on the documents received from Cho Ray Hospital

The following table shows the estimated number of outpatients in the future at Cho Ray Hospital. We calculated the number of outpatients per day by ICD 10 in 2013 by multiplying the composition rate of the number of outpatients by ICD10 in December 2013 by the number of outpatients per day in 2013 (a). We calculated the number of outpatients at Cho Ray Hospital in 2020 and 2030 by multiplying the increase rate of the patients by ICD 10 (b, c) by the number of outpatients per day in 2013 (d, e).

Table 3-6 Estimated Number of Outpatients in the Future at Cho Ray Hospital

ICD 10		Estimated no. of outpatients per day 2013	Increase rate 2012-2020	Increase rate 2012-2030	Estimated no. of outpatients per day 2020	Estimated no. of outpatients per day 2030
		a	b	c	d=a*b	e=e*c
1	Certain infectious and parasitic diseases	156	22.5%	61.6%	191	252
2	Neoplasms	472	36.8%	93.1%	646	912
3	Diseases of the blood and	73	12.0%	33.1%	82	97

ICD 10		Estimated no. of outpatients per day 2013	Increase rate 2012-2020	Increase rate 2012-2030	Estimated no. of outpatients per day 2020	Estimated no. of outpatients per day 2030
		a	b	c	d=a*b	e=e*c
	blood-forming organs and certain disorders involving the immune mechanism					
4	Endocrine, nutritional and metabolic diseases	311	31.4%	85.8%	409	579
5	Mental and behavioural disorders	34	14.3%	29.2%	39	44
6	Diseases of the nervous system	173	14.8%	32.6%	199	229
7	Diseases of the eye and adnexa	65	36.0%	96.9%	88	128
8	Diseases of the ear and mastoid process	24	16.7%	43.7%	28	34
9	Diseases of the circulatory system	730	29.7%	80.1%	946	1,314
10	Diseases of the respiratory system	263	24.3%	69.1%	327	445
11	Diseases of the digestive system	491	26.6%	65.7%	621	813
12	Diseases of the skin and subcutaneous tissue	67	23.1%	59.8%	82	107
13	Diseases of the musculoskeletal system and connective tissue	478	25.6%	60.9%	600	769
14	Diseases of the genitourinary system	274	26.2%	65.4%	346	454
15	Pregnancy, childbirth and the puerperium	5	13.2%	9.8%	5	5
16	Certain conditions originating in the perinatal period	0	5.3%	-6.4%	0	0
17	Congenital malformations, deformations and chromosomal abnormalities	24	14.8%	38.0%	28	34
18	Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	188	19.0%	52.3%	224	287
19	Injury, poisoning and certain other consequences of external causes	123	12.2%	26.7%	138	156
20	External causes of morbidity and mortality	3	21.3%	40.8%	3	4
21	Factors influencing health status and contact with health services	243	14.7%	28.1%	279	311
Total		4,199	21.8%	53.7%	5,284	6,976

Source: Created by the survey team

The number of outpatients at Cho Ray Hospital continues to increase from 2008. We estimated that the number shall reach 5,284 in 2020 and 6,976 in 2030 as shown in the previous table. If we suppose the number of outpatients at Cho Ray Hospital shall be 4,199, the current number at Cho Ray Hospital, the estimated number of outpatients at Cho Ray Second Hospital shall be 1,085 in 2020, 2,777 in 2030, and expected to increase thereafter.

In Vietnam, the number of hospital staff is decided according to the number of beds, which means

that accepting a large number of patients which does not correspond to the bed capacity shall cause overload of staff, and it shall also make it difficult to provide enough medical services to the patients. Therefore, the number of outpatients should be estimated according to the bed capacity.

Generally most of the outpatients are less severed conditions and the medical fees per outpatient are lower than that of inpatients. At Cho Ray Hospital in 2013, the inpatient fees per inpatient was 2,006 thousand VND, and the outpatient fees per outpatient was 616 thousand VND. In Japan, most of the central hospitals with considerable bed capacity charge outpatients without any referral additional fees. In addition, there is another rule that unless central hospitals accept certain number of referral patients, the outpatient fees have to decrease.

Cho Ray Second Hospital shall also be required providing its resources mainly to inpatients by controlling the number of outpatients via accepting mainly referral patients in the improved referral system and encouraging appointment system in the outpatient department.

Considering these factors, although the number of outpatients at Cho Ray Second Hospital is expected to increase considerably in the future, we suppose that the hospital shall accept the appropriate number of outpatients suitable to its bed capacity. We estimate the number of outpatients at Cho Ray Second Hospital by comparing with medical facilities in Japan with similar size as a reference. The table below shows that the number of average outpatients per 100 beds was 211 patients for similar facilities. When this number is used for the number of beds at Cho Ray Second Hospital, the number of people is expected to be around 2,100.

Therefore, the number of outpatients when the hospital is opened is expected to be 2,100 and additional facilities can be built according to changes in demand.

Table 3-7 Number of Outpatients at Cho Ray Second Hospital Using Similar Facilities as Case Examples

	Cho Ray Hospital	Mitsuboshi Medical Center	Kanazawa University Hospital	Tokai University Hospital	Teikyo University Hospital	Osaka General Medical Center	Average *	Cho Ray Second Hospital
Annual Data	2,012	2,012	2,012	2,010	2,010	2,012	-	2,020
No. of beds	1,800	1,099	838	803	1,154	1,063	1,007	1,000
No. of outpatients / day	4,014	8,073	1,581	2,735	1,756	1,885	2,125	**2,111**
Patients /100 beds	223	735	189	341	152	177	211	211
Source	GPD	Website	Website	Association of Private Universities in Japan	Association of Private Universities in Japan	Website	-	-

Source: Created by the survey team

*The average was calculated by taking Cho Ray Hospital and the other five facilities and removing the top and bottom facilities and then averaging the remaining three facilities.

3-6-3. Number of Emergency Patients

The assumed number of emergency patients at Cho Ray Second Hospital was found based on the ratio of emergency patients accounting for current outpatients at Cho Ray Hospital. Trends in the number of emergency patients who come to the hospital are thought to vary depending on the country, region and hospital. It is thought that using the current ratio of emergency patients at Cho Ray Hospital, which is one of the top referral hospitals located in the city and accepts many emergency patients, is the best way to estimate the number of emergency patients at Cho Ray Second Hospital.

The following table shows the changes of the number of outpatients and emergency patients at Cho Ray Hospital from 2009 to 2012.

Table 3-8 Number of Outpatients and Emergency Patients at Cho Ray Hospital 2009-2012

Items	2009	2010	2011	2012	Average
No. of outpatients per year	985,800	1,091,647	1,174,591	1,204,182	1,114,055
No. of emergency patients per year	102,394	103,481	106,438	96,252	102,141
Ratio of emergency patients to outpatients	10.4%	9.5%	9.1%	8.0%	9.2%

Source: Created by the survey team based on the documents received by Cho Ray Hospital

The ratio of emergency patients to outpatients from 2009 to 2012 at Cho Ray Hospital was 9.2%. We calculate the number of emergency patients at Cho Ray Second Hospital based on the ratio, the number of assumed outpatients is 2,100 people per day and the number of emergency patients is around 190 people per day.

The number of emergency patients per day at Cho Ray Hospital is 264, of which the number of emergency patients transported by ambulances is 106, 40% of the whole. The number of emergency patients transported by ambulances per day at Cho Ray Second Hospital shall be around 70, calculated by multiplying 170, the number of emergency patients per day at Cho Ray Second Hospital, by 40%.

Chapter 4. Basic Operations Plan for Each Department

Chapter 4. Basic Operations Plan for Each Department

The following basic plans for individual hospital departments are focused mainly on items that have significant effects on facility plans. These basic plans for hospital departments are formulated based on the present conditions and problems of Cho Ray Hospital's departments so that the Cho Ray Second Hospital staff can carry out the plans on their own initiative in order to overcome similar problems at Cho Ray Second Hospital as well as to continue to implement current good practices. The following contents are our suggestions which we would like to encourage the staff of Cho Ray Second Hospital to adopt for the new hospital on their own initiative, and which are not yet decided to be supported from Japan.

In the basic operations plan at Cho Ray Second Hospital, we caliculate the estimated workload for each department, in order to estimate the capacity for the main departments uch as total number of beds, number of beds for each department, number of operating rooms, number of beds for intensive care, number of examination rooms for outpatient department, and so forth, which have siginificant effects on schematic design. The estimated workload for the other departments is caliculated as a referrence to the detailed design.

[List of Cho Ray Second Hospital Main Departments]

Medical Examination Departments
1 Outpatient Department
2 Day Care Department (Chemotherapy Center)
3 Health Checkup Department
4 Emergency and Disaster Medicine
5 Inpatient Department
※Basic operations plan for the departments with beds
6 Endoscopy Department
7 Dialysis Department
8 Operating and Anesthesia Department
9 Rehabilitation Department

Medical Support Departments
10 Clinical Laboratory Department (Lab Center, Hematology, Biochemistry, Microbiology and Pathology)
11 Radiology Department (Diagnostic Imaging Department, Nuclear Medicine Department)
12 Clinical Dietetics Department
13 Pharmacy Department
14 Central Sterilized Supply Department
15 Medical Equipment Department

Management Departments
16 Training Center
17 Regional Medical Liason Department /DOHA
18 Supply Processing and Distribution Department
19 Administrative Department

4-1. Outpatient Department

4-1-1. Present Conditions of Cho Ray Hospital

(1) Departments

- The Table below shows the present composition of Cho Ray Hospial's outpatient sections and departments.

Table 4-1 Composition of Cho Ray Hospital's Outpatient Sections and Departments

Dept. of General Internal Medicine, Dept. of Neurology, Dept. of Cardiology, Dept. of Interventional Cardiology, Dept. of Gastroenterology, Dept. of Liver Tumor, Dept. of Onchology, Dept. of Pulmonary Medicine, Dept. of Nephrology, Dept. of Endocrinology, Dept. of Hematology, Dept. of Rheumatology, Dept. of Hepatitis, Dept. of Kidney Transplant, Dept. of Digestive Surgery, Dept. of Liver Gallbladder Pancreas Surgery, Dept. of Neurosurgery, Dept. of Orthopedics, Dept. of Thoracic and Vascular Surgery, Dept. of Cardiac Surgery, Dept. of Urology, Dept. of Ophthalmology, Dept. of ENT, Dept. of Dentistry, Dept. of Paraclinical, Dept. of Parkinson's Disease, Dept. of Medical Survey/ Investigation, Dept. of Outpatient Service, Dept. of Tropical Diseases, Dept. of Palliative Care, Dept. of Burn, Plastic Surgery, Dept. of Nuclear Medicine, Dept. of Gamma Knife, Dept. of Rehabilitation, Dept. of Peritoneal Dialysis, Dept. of Artificial Kidney, Dept. of Hospital Staff Health Care Service

Source: Compiled from materials received from Cho Ray Hospital

(2) Number of Days Available for Medical Examination

- Number of days available for medical examination per year: 300 days

(3) Facility Composition

- Number of medical examination rooms: 40 rooms (75 examination desks)
- The Table below shows the number of examination desks at Cho Ray Hospital outpatient sections and departments.

Table 4-2 Number of examination desks at the Cho Ray Hospital Outpatient Sections and Departments

Name of Departments		No. of Examination Desks
General Departments	Dept. of General Internal Medicine	20
	Dept. of Neurology	2
	Dept. of Cardiology	3
	Dept. of Interventional Cardiology	2
	Dept. of Gastroenterology	2
	Dept. of Liver Tumor	2
	Dept. of Onchology	1
	Dept. of Pulmonary Medicine	1
	Dept. of Nephrology	2
	Dept. of Endocrinology	3
	Dept. of Hematology	1
	Dept. of Rheumatology	3
	Dept. of Hepatitis	2
	Dept. of Kidney Transplant	1
	Dept. of Digestive Surgery	1
	Dept. of Liver Gallbladder Pancreas Surgery	1
	Dept. of Neurosurgery	2
	Dept. of Orthopedics	3
	Dept. of Thoracic and Vascular Surgery	2
	Dept. of Cardiac Surgery	1
	Dept. of Urology	1

Name of Departments		No. of Examination Desks
	Dept. of Ophthalmology	2
	Dept. of ENT	2
	Dept. of Dentistry	2
	Dept. of Paraclinical	1
	Dept. of Parkinson's Disease	1
	Dept. of Medical Survey/ Investigation	1
	Dept. of Outpatient Service	1
	Subtotal	66
Specialized Departments	Dept. of Tropical Diseases	1
	Dept. of Palliative Care	1
	Dept. of Burn, Plastic Surgery	1
	Dept. of Nuclear Medicine	1
	Dept. of Gamma Knife	1
	Dept. of Rehabilitation	1
	Dept. of Peritoneal Dialysis	1
	Dept. of Artificial Kidney	1
	Dept. of Hospital Staff Health Care Service	1
	Subtoal	9
Total		75

Source: Compiled from materials received from Cho Ray Hospital

(4) Personnel Structure

- Doctors: 24 (Doctors are also sent from other departments to the Outpatient Departments to provide medical services.)
- Nurses: 109
- Medical technicians: 7
- Reception desk and other guidance staff members: 16

(5) Workload

- Number of outpatients: 1,204,182 per year (2012); 4,014 per day
- Percentages of referral and walk-in patients: 48% referral; 52% walk-in
- Percentages of patients with or without appointments: 10% to 20% with appointments

(6) Outline of Operations

1) Medical examination reception

- Telephone appointment services are available. Patients with appointments are accorded higher priority in the order of receiving medical examinations.
- There are eight reception lines: One line is for hospital staff's families, disabled persons, seniors, and pregnant patients; another line is for patients who require special religious considerations; the other six lines are for general patients. There is no distinction between first-time and revisiting patients, between referral and walk-in patients, or between patients with and without appointments (Image 1).
- Hospital visitors fill in the necessary information (patient number (for revisiting patients), name, date of birth, gender, address, occupation, health insurance coverage, examination fee) on medical examination application forms and submit the applications to the general reception desk to sign up for a reception number.
- Reception numbers are displayed on the reception number display board. Visitors submit their application forms to the general reception counters designated for their numbers.
- The general reception staff receives advance payments of initial examination fees from walk-in patients (payments are manually processed) and issue receipts to patients.
- On receiving a medical examination application from a patient, the reception staff puts the patient's number on the list for the examination room requested at the reception, provide one copy of the patient's number tag to the patient and register the patient using another copy. If the patient has a receipt for his or

her initial examination fee, the staff binds the receipt to the patient's number tag and hand it to the patient.

- Patients without health insurance pay 30,000 VD as a deposit and receive a refund after examinations and tests.
- No automatic reception machine for revisiting patients is installed at the hospital.
- Approximately 9% of patients visiting the hospital daily are infectious disease patients. Such patients are handled in the same way as other outpatients.

2) Medical examination

- Patients who have completed the reception procedure move to the waiting area for outpatients.
- Patients wait first in the hallway, then in the waiting hall, and finally the inside examination rooms. Patients wait in the hallway in the order of their numbers and wait in the waiting hall and examination rooms until they are guided or called by nurses or doctors.
- Two or three doctors share one examination room, in which multiple examination desks are installed. No examination tables are available. Doctors interview and examine patients sitting on stools (Image 2).
- An electronic medical record system for the Outpatient Department is installed on PCs in examination rooms. Doctors enter examination results and test orders in these PCs. Test orders are then sent to the Testing Departments.
- Two copies of an order sheet are printed out: one to be kept by the patient and the other by the hospital. The copy for the hospital is used for fee payment at the reception counter as well as at the departmental reception counter and is finally saved as part of the patient's medical record.
- Outpatient examination rooms are particularly crowded in the following departments: Department of Cardiology, Department of Cardiac Catheterization, Department of Nephrology, Department of Endoscopic Medicine, Department of Rheumatology, Department of Endocrinology, Department of Neurosurgery, Department of Orthopedics and Department of Otolaryngology.
- According to interviews, the hospital examines a maximum of 1,000 patients per hour.
- Patients that need to receive tests make advance payments for the tests at accounting counters and obtain number tags for medical tests.

Image 1) General outpatient reception area

Image 2) Outpatient examination room

3) Accounting

- Accounting counters are located adjacent to examination reception counters; there are a total of five accounting counters in the hospital.
- Patients receive their waiting numbers from waiting ticket machines (ticket machines similar to those installed in banks) and submit documents to accounting counters when their numbers are displayed on the number display board above the counters. They are required to submit medical examination bills (along with copies of their health insurance cards and identification cards).
- Accounting counter staff check the documents submitted by patients (health insurance cards, identification cards and doctors' signatures), settle accounts by entering patients' IDs in the system (accounting data is all entered during medical examination) and print out receipts. At the same time, the staff prints out

waiting number tags for patients who are to receive medical or radiological tests. The staff hand out the number tags to cashiers, who call out patients and their payment amounts using microphones. On receiving payments, cashiers hand out receipts and test number tags to patients.

- After payment, patients with prescriptions receive their medication at the pharmacy within the hospital.
- Waiting time for accounting is reported to be approximately 15 minutes on average.
- Payments are normally made in cash; services are not available for credit card payments or payments from bank accounts. However, credit card payment services are currently provided on a trial basis for outpatients with appointments. No automatic payment machine is installed in the hospital.

4) Patient service training

- The hospital holds patient service training sessions for all hospital employees twice annually. Approximately 80% of all staff members are reported to attend these training sessions.

4-1-2. Present Issues of Cho Ray Hospital

(1) Issues Resulting from the Excessively Large Number of Patients

- As a result of the referral system not properly functioning, patients come to the hospital in numbers greatly exceeding the capacity of the facility. Consequently, there is a shortage of space around reception counters, in the pharmacy, waiting rooms and examination rooms. The shortage of space for examination also makes it difficult to ensure the quality of examination and to protect patients' privacy.

(2) Issues of Hospital Management

- The appointment system is not well known among hospital visitors and many patients come to the hospital without appointments.
- Due to the lack of distinction between patients at the reception counter (first-time or revisiting, referral or walk-in, and with or without appointments), reception operations are inefficient.
- According to an interview with the Outpatient Department Manager, there is no problem with the work processing skills of the reception personnel or with their patient services. Meanwhile, according to interviews with office staff in charge of complaints, many of the complaints (their exact numbers are not known) from patients are about the services of staff members, including reception staff.
- The complexity of the accounting flow, such as patients who need to receive medical tests having to go back to the reception for payment, causes unnecessary movement of patients. However, as a result of Document 1313, a decision made by the Ministry of Health (MOH) in April 2013, starting around the middle of 2014, all hospitals in Vietnam will be obligated to unify and shorten medical examination processes for outpatients and to decrease the number of accounting operations. Therefore, there is a possibility that the movement of patients may be reduced in the near future.
- Reception and accounting operations are not automated to promote operational efficiency. Due also to the effects of inflation, it is necessary for the hospital staff to process large amounts of paper money, which increases the workload of the staff.
- As a result of these problems, reception, examination and accounting areas are extremely crowded with patients.
- There is also concern about the risk of money being stolen due to accounting services being available only for cash payments (credit card payment services are currently provided on a trial basis for outpatients with appointments).
- There is no distinction between infectious disease patients and other general outpatients in terms of reception, examination and accounting procedures as well as the movement of patients. This is not even recognized as a problem.

4-1-3. Basic Operations Plan for Cho Ray Second Hospital

(1) Basic Policy

- To develop an advanced outpatient examination system focused on patients in order to improve patient satisfaction.
- To develop facility and personnel plans to provide a sufficient capacity for the number of outpatients visiting the hospital.
- To reduce waiting time for patients by enhancing the referral system, by promoting the appointment system, and by improving the efficiency of reception and accounting operations.
- To ensure safety and security and consider the privacy and convenience of patients in order to improve patient services.

(2) Workload Estimation

Number of outpatients: 2,100 persons per day (see 3-6-2. Number of Outpatients for the calculation method)
Number of examination rooms for outpatients: approximately 100

- The number of examination rooms for outpatients at Cho Ray Second Hospital was calculated by dividing the total number of outpatients by the targeted number of patients per examination room as shown in the Table below.
- Based on cases of specialized hospitals in Japan, we estimated the combined total number of examination hours in the morning and in the afternoon per day to be five to six hours on average. Assuming that doctors who examine outpatients are engaged in work in hospital wards in the afternoon, we estimated the number of hours at a low level of one to two hours (formulas b and c).
- MOH's Decision 1313/QD-BYT (2013) states that the maximum number of examination hours per examination room should be 8 hours per day and the maximum number of patients 35 persons per day. Based on this statement, we calculated the number of patients per hour as 4.4 persons (calculation formula d).
- By multiplying the number of examination hours per day by the number of patients per hour, we calculated the number of patients per examination room per day as 24.1 persons (calculation formulas e through g).
- By dividing 2,100 patients, the expected number of outpatients per day, by the number of patients per examination room per day, we calculated the number of examination rooms required as 90. Based on cases of university hospitals in Japan, we estimated the number of clinical training rooms required for education and training to be 10% (10 rooms) of the total number of examination rooms (calculation formulas h and i).

Table 4-3 Number of examination rooms for outpatients at Cho Ray Second Hospital

Item	Data	Calculation formula	Note
Number of outpatient per day	2,100 patients	a	
Outpatient department operation time	7hours	b	
Operation time in the afternoon	1.5hours	c=3*0.5	Operation time in the afternoon is estimated as a half of the time of the morning
Number of patients per hour	4.4patients	d=35p/8h	Based on MOH Decision 1313/QD-BYT (2013), the number of outpatients per hour shall be estimated as 4.4. It is noted in the Decision that maximum operation time in the outpatient department is 8 hours and the number of patients per room is 35, thus the number of patient per hour for each room is 4.4.
Number of patients in the morning	17.5patients	e=d*4	
Number of patients in the afternoon	6.6patients	f=c*d	

Item	Data	Calculation formula	Note
Total number of patients per day	24.1patients	g=e+f	
Estimated number of examination rooms	90rooms	h=a/g	
Polyklinik rooms (Clinical training rooms)	10rooms	i=h*0.1	The number of clicnical training rooms is estimated as around 10% of the number of examination rooms, in reference to Japan's university hospital.

Source: Compiled from MOH's Decision 1313/QD-BYT (2013) and ITEC's materials.

(3) Basic Operations Plan

- At reception counters, a distinction between first-time and revisiting patients and between patients with and without appointments should be made. Installing reception machines for revisiting patients shall be considered.
- The use of the appointment system to reduce waiting time for patients with appointments should be promoted. A variety of appointment reservation methods, including installing multiple lines for telephone appointments as well as developing an Internet appointment system should be reviewed. In order to make the appointment system more widely known, the department in charge of public relations will assume the responsibility for advertising the appointment system through public relations activities. At the same time, the possibility of advertising the system by doctors, nurses and accounting staff as well as of describing the system in receipts should be reviewed.
- Measures to reduce outpatients' discomfort from waiting in waiting areas, such as displaying the order of examination on display boards, calling patients on their mobile phones and using more efficient means of contacting patients should be implemented.
- The possibility of using a more convenient accounting system, such as credit card payments and payments from bank accounts should be reviewed. Installing automatic payment machines shall be considered.
- Triage by interviews or other means at an early stage should be performed to distinguish potential infectious disease patients from other outpatients. We will also encourage wearing masks, distinguish between the movement of infectious disease patients and that of other patients, guide infectious disease patients to isolation rooms and provide them with priority examinations in order to minimize the amount of time they spend in outpatient areas.
- We will hold patient service training sessions periodically, as is currently done, in order to improve staff's patient services.
- We will conduct patient satisfaction surveys periodically in order to improve the quality of patient services.

(4) Basic Facility Plan

- The floor plan enables access to each outpatient ward and the medical examination department.
- In order to achieve efficient operation, a block reception system in which patient and staff traffic is clearly separated and a central operational room which centralizes treatment in each department is planned.
- New patient and follow-up visit registration desks will be separately installed in the general reception, and an area has been established in which to install a follow-up care scheduling and automated payment systems.
- A referral and consultation desk for inpatients will be provided for efficient operation.
- A sufficient number of outpatient examination rooms will be established to enable doctors to see patients one at a time. Convenient facilities, such as a restaurant, café and ATM, are located adjacent to the Outpatient Department for improved patient convenience.
- In the Outpatient Department, a large courtyard and vaulted ceilings will be installed to bring natural airflow and light into the building taking into consideration the area's natural characteristics.
- The Table below shows draft of main rooms' structure.

・ **Table 4-4 Structure of main rooms (draft)**

Room Name	Use and Note	No. of rooms
General receptions	・Patient receptions divided as first visits, second visits, reserved patients and referral patients. ・Equipped with accounting functions	1room
Waiting lobby	・Wating place for examination	1room
Unified receptions for multiple departments	・Belonged to multiple departments	Details to be examined
Examination room	・Belonged to all clinical departments equipped with 10 clinical training rooms in total	100rooms
Consultation space	・Consultation space for inpatients and referral patients only	1
Calculus fragmentation room	・Belonged to Nephrology	1room
Laboratory	・Belonged to Nephrology	1room
Plaster room	・Belonged to Orthopedics	1room
Audiometry room	・Belonged to ENT	1room
Operators room	・Belonged to ENT	1room
Treatment room	・Belonged to ENT	1room
Parallel test room	・Belonged to ENT	1room
Eye test room	・Belonged to Ophthalmology	1room
Darkroom	・Belonged to Ophthalmology	1room
Lightroom	・Belonged to Ophthalmology	1room
Dentistry X-rays room	・Belonged to Dentistry	1room
examination for dentistry room	・Belonged to Dentistry	1room
Skin laser room	・Belonged to Plastic Surgery	1room
Central treatment room	・Belonged to whole departments	1room
Restaurant	・Amenity for patients	1room
Shop	・Amenity for patients	1room
Mosque	・Religious considerations for some patients	1room

Source: Created by the survey team

4-2. Day Care Department (Chemotherapy Center)

4-2-1. Present Conditions of Cho Ray Hospital

(1) Facilities

Number of chemotherapy units: 60
(40 more units will be added after the Cancer Center is established, making the total number of units to 100.)

(2) Personnel Structure

- Number of doctors: 10 (all qualified as chemotherapy specialist)
- Number of nurses: 13 (all certified as a chemotherapy specialist at Cho Ray Hospital)
- Number of pharmacists: 2 (all having studied at graduate schools in Europe or the U.S.)

(3) Workload

Number of chemotherapy treatments: Number of actual patients = Approx. 3,000 per year (approx. 1,600 outpatients and approx. 1,100 inpatients)
Number of patients per day: 120
Number of patients per unit: 2

・The number of chemotherapy treatments provided for liver cancer patients is on the decline at around 100 per year.

(4) Outline of Operations

- The Outpatient Chemotherapy Center belongs to the Liver Tumor Department and the Oncology Department, and provides chemotherapy mainly for outpatients.
- The criteria for selecting patients to whom chemotherapy is provided are in accordance with international criteria defined by the National Comprehensive Cancer Network (NCCM).
- A multidisciplinary approach combining surgical procedures, radiotherapy, and chemotherapy is often taken for cancer patients. It is comprised of 59% surgical procedures, 14% radiotherapy, and 27% chemotherapy. According to the Oncology Department Manager, the percentages of chemotherapy and radiotherapy are planned to be increased in the future.
- The advantages and disadvantages of chemotherapy are explained to patients when chemotherapy is provided.
- When a treatment plan is formulated, especially for a difficult treatment case, opinions are sometimes obtained for reference via teleconference, etc., from the HCMC Cancer Hospital (1,300 beds) in the Binh Thanh area. The HCMC Cancer Hospital is one of the largest public hospitals specializing in cancer in the Southern region, and designated as a third-party institution to provide cancer-related guidance in the Satellite Project.
- As for lower level hospitals, guidance is provided directly at the actual site because they have no equipment for teleconferences.
- When chemotherapy is provided, patient safety is ensured by checking the status of each patient's liver, kidney, blood pressure, and other functions.

(5) Outline of the Cancer Center

- Number of beds: 250
- Construction cost: 488 billion VND, of which Cho Ray Hospital is supposed to bear 30%
- Financial resource: Credit capital from the national bank with almost no interest
- Total floor space: 21,416 square meters
- Structure of the building: RC
- Number of floors: 15 floors (B2 floor to 13 floor)
- Construction schedule: 24 months (it shall open in 2015)

- Personnel structure

Table 4-5 Personnel structure at Cancer Center

Occupations	No. of staff
Medical doctors	81
Nurses	230
Pharmacists	12
Medical technicians	54
Engineers	2
IT technicians	4
Others	23
Total	406

Source: Created by the survey team based on the discussion with Cho Ray Hospital

- Important medical equipment: CT of 256 slices (1), DSA (1), MRI 3.0T (1), Liniac (4), Chemotherapy units (40), etc.

4-2-2. Present Issues of Cho Ray Hospital

- Chemotherapy, which is an effective treatment against general and less invasive cancer, should be mainly used as cancer treatment. However, chemotherapy is actually not provided in a sufficient manner because of a lack of space, equipment, and personnel (including specialists), and surgical procedures are mainly provided.
- There is a lack of systems to analyze statistical information.

4-2-3. Basic Operations Plan for Cho Ray Second Hospital

(1) Basic Policy

- The Chemotherapy Center will support outpatients.
- The intent of patients will be respected with a focus on informed consent.
- A system for patient management and statistical analysis will be implemented.

(2) Workload Estimation

Number of chemotherapy treatments: 40 per day (in 2020)
Number of chemotherapy units: 20

- The workload estimation, including the number of chemotherapy units, for Cho Ray Second Hospital has been calculated based on the current status of operations at Cho Ray Hospital, the estimated demand in the medical care zone, and the estimated increase in the percentage of chemotherapy provided for cancer patients as shown in the two Tables below.
- The number of actual cancer patients per year at Cho Ray Hospital is 11,000 (e). It is multiplied by the estimated demand in the medical care zone at the time of the opening of Cho Ray Second Hospital to calculate the estimated number of actual cancer patients per year for both Cho Ray Hospital and Cho Ray Second Hospital in 2020 as 15,047(l).
- The current percentage of chemotherapy provided for cancer patients at Cho Ray Hospital is 27%. The estimated percentage of chemotherapy provided at Cho Ray Hospital and Cho Ray Second Hospital shall be temporarily set as 40% (m) after considering that the percentage of chemotherapy provided at Cho Ray Hospital will be increased according to the Oncology Department Manager and that the percentage of chemotherapy provided at the designated main cancer hospitals in Japan is 80.5%.
- The actual number of chemotherapy patients per year at both hospitals is calculated as 6,019 (n), by multiplying 15,047, the actual number of cancer patients per year for both hospitals in 2020, by 40%, the estimated percentage of chemotherapy provided for cancer patients.
- The number of chemotherapy provided for each patient is 12 at Cho Ray Hospital (o). The total number of chemotherapy patients per year at both hospitals in 2020 is calculated as 72,227 (p), by multiplying 6,019, the actual number of chemotherapy patients per year at both hospitals in 2020, by 12, the number of chemotherapy provided for each patient.
- The total number of chemotherapy patients per day at both hospitals in 2020 is calculated as 241 (r), by dividing 72,227, the total number of chemotherapy patients per year at both hospitals in 2020, by 300, the treatment days at Cho Ray Hospital.
- The number of chemotherapy patients per chemotherapy unit is 2 (s) at Cho Ray Hospital. The total number of chemotherapy units required at both hospitals in 2020 is 120 (t), by dividing 241, the total number of chemotherapy patients per day at both hospitals in 2020, by 2, the number of chemotherapy patients per unit.
- The number of chemotherapy units required at Cho Ray Second Hospital is estimated as being 20 (v), by subtracting 100, the number of chemotherapy units at Cho Ray Hospital at the time of the opening of Cho Ray Second Hospital as the Cancer Center is established, from 120, the total number of chemotherapy units required at both hospitals in 2020.

Table 4-6 Status of chemotherapy at Cho Ray Hospital

	2012	Culculation formula
Number of the chemotherapy units	60	a
Number of patients per 1 unit/day	2	b
Number of patient per all units /day	120	c=a*b
Treatment days	300	d
Number of cancer patients per year	11,000	e
Number of cancer patients treated by chemotherapy per year	3,000	f
Ratio of the patients treated by chemotherapy	27%	g=f/e
Total number of patients treated by chemotherapy	36,000	h=c*d
Number of chemotherapy per patient	12	i=h/f

Source: Compiled from materials received from Cho Ray Hospital

Table 4-7 Estimated number of chemotherapy units at Cho Ray Second Hospital

	2012	2020	Culculation formula
Estimated number of neoplasm patients in the area covered by CRH	559,236	765,002	j
Increase rate of estimated number of neoplasm patients	-	1.37	k
Number of cancer patients in CRH per year	11,000	15,047	l=e*k
Ratio of the patients treated by chemotherapy	27%	40%	m=g+α
Number of patients treated by chemotherapy per year	3,000	6,019	n=l*m
Number of chemotherapy per patient	12	12	o=i
Total number of patients treated by chemotherapy	36,000	72,227	p=n*o
Treatment days	300	300	q=d
Total number of patients treated by chemotherapy per day	120	241	r=p/q
Number of patients per chemotherapy unit	2	2	s=b
Estimated number of chemotherapy units in CRH and CR2H	60	120	t=r/s
Number of chemotherapy units in CRH	60	100	u
Estimated number of chemotherapy units in CR2H	0	20	v=t-u

Source: Compiled from materials received from Cho Ray Hospital

(3) Basic Operations Plan

- When chemotherapy is provided, informed consent will be obtained from patients by explaining the necessity and risks of the treatment in comparison with other treatment methods. Second opinions will be made available for patients who desire them.
- Specialized pharmacists will prepare and formulate anticancer drugs.
- During and after the administration of anticancer drugs, patients' conditions will be appropriately monitored and checked. Furthermore, regimen[1] registration and management, as well as sharing of information among relevant personnel, will be appropriately conducted so that a system to safely provide chemotherapy can be developed.

[1] Regimen refers to a chemotheraphy treatment plan that includes drugs administered, dosage amount, and duration of drug administration.

(4) Basic Facility Plan

- Outpatients need convenient access to the Department of Pharmacy and have long treatment times, so the center is located in the pleasant environment at the end of the east side.
- The table below shows the draft of main rooms' structure.

Table 4-8 Structure of main rooms (draft)

Room Name	Use and Note	No. of rooms
Recrption	・Patient reception, waiting area	1room
Staff station	・Office for staff. Waiting and working space.	1room
Treatment room	・Chemotherapy unit shall be 20units	1room
Preparation room	・For drugs and ingredients for chemotherapy	1room
Examination room	・Examination room for patients	1room
Changing room	・Changing room for patients	1room
Waiting room	・Waiting space for patients	1room

Source: Created by the survey team

4-3. Health Checkup Department

4-3-1. Present Conditions of Cho Ray Hospital

(1) Examination Items

- General examination, blood test, physiological function test, imaging, heart and lung function test, tumor maker for prostate, etc.
- Number of days in operation: 5.5 days per week (only in the morning on Saturdays)
- The main checkup items as shown in the table below.

Table 4-9 Medical checkup items for Vietnamese age under 50 at Cho Ray Hospital

No.	CONTENTS	Under 30 years old		30 to 40 years old		40 to 50 years old	
		PRICE		PRICE		PRICE	
		Male	Female	Male	Female	Male	Female
1	Interview on Medical History Physical Examination ConsuItation and Mcdical Report	100,000	100,000	100,000	100,000	100,000	100,000
2	Blood Group (GS)	97,500	97,500	97,500	97,500	97,500	97,500
3	Erythrocyte Sedimentation Rate (VS)	39,000	39,000	39,000	39,000	39,000	39,000
4	Complete and differential blood count (NGFL)	49,400	49,400	49,400	49,400	49,400	49,400
5	Fasting blood Glucose	26,000	26,000	26,000	26,000	26,000	26,000
6	Lipid profile (Triglyccrid, HDL-Cho, LDL-Cho, Total Cholesterol)	114,400	114,400	114,400	114,400	114,400	114,400
7	Kidney function (BUN, Crcatininc)	52,000	52,000	52,000	52,000	52,000	52,000
8	Liver enzymes (AST, ALT, Gamma G1)	75,400	75,400	75,400	75,400	75,400	75,400
9	Goout (Acid uric)			26,000	26,000	26,000	26,000
10	Hepatitis B Scrccning (HbsAg, HbsAb, Anti HBc)	234,000	234,000	234,000	234,000	234,000	234,000
11	Hepatitis C Scrccning (Anti HCV)	130,000	130,000	130,000	130,000	130,000	130,000
12	HIV Scrccning (At your request)	117,000	117,000	117,000	117,000	117,000	117,000
13	Tumor marker for prostate					110,500	
14	Urinalysis	45,500	45,500	45,500	45,500	45,500	45,500
15	Digital chest X-ray	78,000	78,000	78,000	78,000	78,000	78,000
16	Utrasonogram abdomen	100,000	100,000	100,000	100,000	100,000	100,000
17	Utrasonogram breasts（Female)				100,000		100,000
18	Mammogram XQ-both sides						208,000
19	BMD-Bone Mineral Density for femail						
20	Screening for colorectal cancer: fecal occult blood test						
21	12 Leads Resting Electrocardiogram (ECG)	42,900	42,900	42,900	42,900	42,900	42,900
22	2D-Doppler Echocardiogram					195,000	195,000
23	Cancer screening tests for female: CEA, CA 12.5, CA 15.3, NSE, Cypra 21.1, CA 19.9, AFP						
24	Cancer screening tests for male: CEA, F.PSA, NSE, Cypra 21.1, CA 19.9, AFP						
25	Gynaecological examination (Female)				100,000		100,000

No.	CONTENTS	Under 30 years old		30 to 40 years old		40 to 50 years old	
		PRICE		PRICE		PRICE	
		Male	Female	Male	Female	Male	Female
26	Pap's smear test (Female)				100,000		100,000
27	Pap's smear test (Female) - high technique				300,000		300,000
28	Direct microscopic examination and Gram stain (Female)				30,000		30,000
29	Colposcopy				150,000		150,000
	Total	1,301,100	1,301,100	1,327,100	2,107,100	1,632,600	2,510,100

Source: Created by the survey team based on the documents received from Cho Ray Hospital

Table 4-6 Medical checkup items for Vietnamese age over 50 at Cho Ray Hospital

No	CONTENTS	50 to 60 years old		Over 60 years old	
		PRICE		PRICE	
		Male	Female	Male	Female
1	Interview on Medical History Physical Examination ConsuItation and Mcdical Report	100,000	100,000	100,000	100,000
2	Blood Group (GS)	97,500	97,500	97,500	97,500
3	Erythrocyte Sedimentation Rate (VS)	39,000	39,000	39,000	39,000
4	Complete and differential blood count (NGFL)	49,400	49,400	49,400	49,400
5	Fasting blood Glucose	26,000	26,000	26,000	26,000
6	Lipid profile (Triglyccrid, HDL-Cho, LDL-Cho, Total Cholesterol)	114,400	114,400	114,400	114,400
7	Kidney function (BUN, Crcatininc)	52,000	52,000	52,000	52,000
8	Liver enzymes (AST, ALT, Gamma G1)	75,400	75,400	75,400	75,400
9	Goout (Acid uric)	26,000	26,000	26,000	26,000
10	Hepatitis B Scrccning (HbsAg, HbsAb, Anti HBc)	234,000	234,000	156,000	156,000
11	Hepatitis C Scrccning (Anti HCV)	130,000	130,000	130,000	130,000
12	HIV Scrccning (At your request)	117,000	117,000	117,000	117,000
13	Tumor marker for prostate	110,500		110,500	
14	Urinalysis	45,500	45,500	45,500	45,500
15	Digital chest X-ray	78,000	78,000	78,000	78,000
16	Utrasonogram abdomen	100,000	100,000	100,000	100,000
17	Utrasonogram breasts（Female)		100,000		100,000
18	Mammogram XQ-both sides		208,000		
19	BMD-Bone Mineral Density for femail		195,000		195,000
20	Screening for colorectal cancer: fecal occult blood test	50,000	50,000	50,000	50,000
21	12 Leads Resting Electrocardiogram (ECG)	42,900	42,900	42,900	42,900
22	2D-Doppler Echocardiogram	195,000	195,000	195,000	195,000
23	Cancer screening tests for female: CEA, CA 12.5, CA 15.3, NSE, Cypra 21.1, CA 19.9, AFP				
24	Cancer screening tests for male: CEA, F.PSA, NSE, Cypra 21.1, CA 19.9, AFP				

No	CONTENTS	50 to 60 years old		Over 60 years old	
		PRICE		PRICE	
		Male	Female	Male	Female
25	Gynaecological examination (Female)		100,000		100,000
26	Pap's smear test (Female)		100,000		100,000
27	Pap's smear test (Female) - high technique		300,000		300,000
28	Direct microscopic examination and Gram stain (Female)		30,000		30,000
29	Colposcopy		150,000		
	Total	1,682,600	2,755,100	1,604,600	2,319,100

Source: Created by the survey team based on the documents received from Cho Ray Hospital

Table 4-71 Medical checkup items for Vietnamese including cancer screening test at Cho Ray Hospital

No	CONTENTS	50 to 60 years old include cancer screening test		Over 60 years old include cancer screening test	
		PRICE		PRICE	
		Male	Female	Male	Female
1	Interview on Medical History Physical Examination ConsuItation and Mcdical Report	100,000	100,000	100,000	100,000
2	Blood Group (GS)	97,500	97,500	97,500	97,500
3	Erythrocyte Sedimentation Rate (VS)	39,000	39,000	39,000	39,000
4	Complete and differential blood count (NGFL)	49,400	49,400	49,400	49,400
5	Fasting blood Glucose	26,000	26,000	26,000	26,000
6	Lipid profile (Triglyccrid, HDL-Cho, LDL-Cho, Total Cholesterol)	114,400	114,400	114,400	114,400
7	Kidney function (BUN, Crcatininc)	52,000	52,000	52,000	52,000
8	Liver enzymes (AST, ALT, Gamma G1)	75,400	75,400	75,400	75,400
9	Goout (Acid uric)	26,000	26,000	26,000	26,000
10	Hepatitis B Scrccning (HbsAg, HbsAb, Anti HBc)	234,000	234,000	156,000	156,000
11	Hepatitis C Scrccning (Anti HCV)	130,000	130,000	130,000	130,000
12	HIV Scrccning (At your request)	117,000	117,000	117,000	117,000
13	Tumor marker for prostate	110,500		110,500	
14	Urinalysis	45,500	45,500	45,500	45,500
15	Digital chest X-ray	78,000	78,000	78,000	78,000
16	Utrasonogram abdomen	100,000	100,000	100,000	100,000
17	Utrasonogram breasts（Female)		100,000		100,000
18	Mammogram XQ-both sides		208,000		
19	BMD-Bone Mineral Density for femail		195,000		195,000
20	Screening for colorectal cancer: fecal occult blood test	50,000	50,000	50,000	50,000
21	12 Leads Resting Electrocardiogram (ECG)	42,900	42,900	42,900	42,900
22	2D-Doppler Echocardiogram	195,000	195,000	195,000	195,000

No	CONTENTS	50 to 60 years old include cancer screening test		Over 60 years old include cancer screening test	
		PRICE		PRICE	
		Male	Female	Male	Female
23	Cancer screening tests for female: CEA, CA 12.5, CA 15.3, NSE, Cypra 21.1, CA 19.9, AFP		1,007,500		1,007,500
24	Cancer screening tests for male: CEA, F.PSA, NSE, Cypra 21.1, CA 19.9, AFP	754,000		754,000	
25	Gynaecological examination (Female)		100,000		100,000
26	Pap's smear test (Female)		100,000		100,000
27	Pap's smear test (Female) - high technique		300,000		300,000
28	Direct microscopic examination and Gram stain (Female)		30,000		30,000
29	Colposcopy				
	Total	2,436,600	3,612,600	2,358,600	3,326,600

Source: Created by the survey team based on the documents received from Cho Ray Hospital

Table 4-8 Medical checkup items for foreigners age under 50 at Cho Ray Hospital

No	CONTENTS	Under 30 years old		30 to 40 years old		40 to 50 years old	
		PRICE		PRICE		PRICE	
		Male	Female	Male	Female	Male	Female
1	Interview on Medical History Physical Examination Consultation and Mcdical Report	125,000	125,000	125,000	125,000	125,000	125,000
2	Blood Group (GS)	112,500	112,500	112,500	112,500	112,500	112,500
3	Erythrocyte Sedimentation Rate (VS)	45,000	45,000	45,000	45,000	45,000	45,000
4	Complete and differential blood count (NGFL)	57,000	57,000	57,000	57,000	57,000	57,000
5	Fasting blood Glucose	30,000	30,000	30,000	30,000	30,000	30,000
6	Lipid profile (Triglyccrid, HDL-Cho, LDL-Cho, Total Cholesterol)	132,000	132,000	132,000	132,000	132,000	132,000
7	Kidney function (BUN, Crcatininc)	60,000	60,000	60,000	60,000	60,000	60,000
8	Liver enzymes (AST, ALT, Gamma G1)	87,000	87,000	87,000	87,000	87,000	87,000
9	Goout (Acid uric)			30,000	30,000	30,000	30,000
10	Hepatitis B Scrccning (HbsAg, HbsAb, Anti HBc)	270,000	270,000	270,000	270,000	270,000	270,000
11	Hepatitis C Scrccning (Anti HCV)	150,000	150,000	150,000	150,000	150,000	150,000
12	HIV Scrccning (At your request)	135,000	135,000	135,000	135,000	135,000	135,000
13	Tumor marker for prostate (PSA)					127,500	
14	Urinalysis	52,500	52,500	52,500	52,500	52,500	52,500
15	Digital chest X-ray	90,000	90,000	90,000	90,000	90,000	90,000
16	Utrasonogram abdomen	100,000	100,000	100,000	100,000	100,000	100,000
17	Utrasonogram breasts(Female)				100,000		100,000
18	Mammogram XQ-both sides						300,000
19	BMD-Bone Mineral Density for femail						
20	Screening for colorectal cancer: fecal occult blood test						

No	CONTENTS	Under 30 years old		30 to 40 years old		40 to 50 years old	
		PRICE		PRICE		PRICE	
		Male	Female	Male	Female	Male	Female
21	12 Leads Resting Electrocardiogram (ECG)	49,500	49,500	49,500	49,500	49,500	49,500
22	2D-Doppler Echocardiogram					225,000	225,000
23	Cancer screening tests for female: CEA, CA 12.5, CA 15.3, NSE, Cypra 21.1, CA 19.9, AFP						
24	Cancer screening tests for male: CEA, F.PSA, NSE, Cypra 21.1, CA 19.9, AFP						
25	Gynaecological examination (Female)				125,000		125,000
26	Pap's smear test (Female)						
27	Pap's smear test (Female) - high technique				450,000		450,000
28	Direct microscopic examination and Gram stain (Female)				35,000		35,000
29	Colposcopy				225,000		225,000
	Total	1,495,500	1,495,500	1,525,500	2,460,500	1,878,000	2,985,500

Source: Created by the survey team based on the documents received from Cho Ray Hospital

Table 4-9 Medical checkup items for foreigners age over 50 at Cho Ray Hospital

No	CONTENTS	50 to 60 years old		Over 60 years old	
		PRICE		PRICE	
		Male	Female	Male	Female
1	Interview on Medical History Physical Examination ConsuItation and Mcdical Report	125,000	125,000	125,000	125,000
2	Blood Group (GS)	112,500	112,500	112,500	112,500
3	Erythrocyte Sedimentation Rate (VS)	45,000	45,000	45,000	45,000
4	Complete and differential blood count (NGFL)	57,000	57,000	57,000	57,000
5	Fasting blood Glucose	30,000	30,000	30,000	30,000
6	Lipid profile (Triglyccrid, HDL-Cho, LDL-Cho, Total Cholesterol)	132,000	132,000	132,000	132,000
7	Kidney function (BUN, Crcatininc)	60,000	60,000	60,000	60,000
8	Liver enzymes (AST, ALT, Gamma G1)	87,000	87,000	87,000	87,000
9	Goout (Acid uric)	30,000	30,000	30,000	30,000
10	Hepatitis B Scrccning (HbsAg, HbsAb, Anti HBc)	270,000	270,000	180,000	180,000
11	Hepatitis C Scrccning (Anti HCV)	150,000	150,000	150,000	150,000
12	HIV Scrccning (At your request)	135,000	135,000	135,000	135,000
13	Tumor marker for prostate (PSA)	127,500		127,500	
14	Urinalysis	52,500	52,500	52,500	52,500
15	Digital chest X-ray	90,000	90,000	90,000	90,000
16	Utrasonogram abdomen	100,000	100,000	100,000	100,000
17	Utrasonogram breasts（Female)		100,000		100,000
18	Mammogram XQ-both sides		300,000		
19	BMD-Bone Mineral Density for femail		225,000		225,000
20	Screening for colorectal cancer: fecal occult blood test	75,000	75,000	75,000	75,000
21	12 Leads Resting Electrocardiogram (ECG)	49,500	49,500	49,500	49,500

No	CONTENTS	50 to 60 years old		Over 60 years old	
		PRICE		PRICE	
		Male	Female	Male	Female
22	2D-Doppler Echocardiogram	225,000	225,000	225,000	225,000
23	Cancer screening tests for female: CEA, CA 12.5, CA 15.3, NSE, Cypra 21.1, CA 19.9, AFP				
24	Cancer screening tests for male: CEA, F.PSA, NSE, Cypra 21.1, CA 19.9, AFP				
25	Gynaecological examination (Female)		125,000		125,000
26	Pap's smear test (Female)				
27	Pap's smear test (Female) - high technique		450,000		450,000
28	Direct microscopic examination and Gram stain (Female)		35,000		35,000
29	Colposcopy		225,000		225,000
	Total	1,953,000	3,285,500	1,863,000	2,895,500

Source: Created by the survey team based on the documents received from Cho Ray Hospital

Table 4-104 Medical checkup items for foreigners including cancer screening at Cho Ray Hospital

No	CONTENTS	50 to 60 years old include cancer screening test		Over 60 years old include cancer screening test	
		PRICE		PRICE	
		Male	Female	Male	Female
1	Interview on Medical History Physical Examination Consultation and Mcdical Report	125,000	125,000	125,000	125,000
2	Blood Group (GS)	112,500	112,500	112,500	112,500
3	Erythrocyte Sedimentation Rate (VS)	45,000	45,000	45,000	45,000
4	Complete and differential blood count (NGFL)	57,000	57,000	57,000	57,000
5	Fasting blood Glucose	30,000	30,000	30,000	30,000
6	Lipid profile (Triglyccrid, HDL-Cho, LDL-Cho, Total Cholesterol)	132,000	132,000	132,000	132,000
7	Kidney function (BUN, Crcatininc)	60,000	60,000	60,000	60,000
8	Liver enzymes (AST, ALT, Gamma G1)	87,000	87,000	87,000	87,000
9	Goout (Acid uric)	30,000	30,000	30,000	30,000
10	Hepatitis B Scrccning (HbsAg, HbsAb, Anti HBc)	270,000	270,000	180,000	180,000
11	Hepatitis C Scrccning (Anti HCV)	150,000	150,000	150,000	150,000
12	HIV Scrccning (At your request)	135,000	135,000	135,000	135,000
13	Tumor marker for prostate (PSA)	127,500		127,500	
14	Urinalysis	52,500	52,500	52,500	52,500
15	Digital chest X-ray	90,000	90,000	90,000	90,000
16	Utrasonogram abdomen	100,000	100,000	100,000	100,000
17	Utrasonogram breasts(Female)		100,000		100,000
18	Mammogram XQ-both sides		300,000		
19	BMD-Bone Mineral Density for femail		225,000		225,000
20	Screening for colorectal cancer: fecal occult blood test	75,000	75,000	75,000	75,000
21	12 Leads Resting Electrocardiogram (ECG)	49,500	49,500	49,500	49,500
22	2D-Doppler Echocardiogram	225,000	225,000	225,000	225,000
23	Cancer screening tests for female: CEA, CA 12.5, CA 15.3, NSE, Cypra 21.1, CA 19.9, AFP		1,162,500		1,162,500
24	Cancer screening tests for male: CEA, F.PSA, NSE, Cypra 21.1, CA 19.9, AFP	870,000		870,000	

No	CONTENTS	50 to 60 years old include cancer screening test		Over 60 years old include cancer screening test	
25	Gynaecological examination (Female)		125,000		125,000
26	Pap's smear test (Female)				
27	Pap's smear test (Female) - high technique		450,000		450,000
28	Direct microscopic examination and Gram stain (Female)		35,000		35,000
29	Colposcopy		225,000		225,000
	Total	2,823,000	4,448,000	2,733,000	4,058,000

Source: Created by the survey team based on the documents received from Cho Ray Hospital

- The followings are examples of medical checkup items of other advanced hospitals.
- The table below shows the medical checkup items and prices of standard and special course at Vinmec International Hospital (private hospital. hereafter reffered to as Vinmec) known for its luxurious facility.

Table 4-115 Medical checkup items prices of standard and special course at Vinmec

Services list		Standard	Special
Clinical Examinations			
1	General consultation and physical exam	○	○
2	Eyes vision and color vision check	○	○
3	E-N-T	○	○
4	Oral dental check	○	○
5	Blood pressure and body mass index	○	○
6	Gynecology & breast exam	○	○
Laboratory			
1	Blood test: full blood count(FBC)	○	○
2	Blood Grouping	○	○
3	Blood Lipid (total cholesterol, LDL-C, HDL-C, triglyceride)		○
4	Liver function: ALT, AST, Total Bilirubin, GGT (For Special)	○	○
5	Creatinine	○	○
6	Acid Uric	○	○
7	Glucose fasting	○	○
8	TSH, FT4		○
9	Iron		○
10	HBsAg, Anti-HBs	○	○
11	Hepatitis A IgG Antibody		○
12	Hepatitis C Antibody		○
13	VDRL		○
14	HIV immunology test		○
15	Urine analysis	○	○
16	Occult blood stool		○
17	PAP Smear tumor marker for cervical cancer	○	○
Image Diagnostics			
1	Chest X-ray	○	○
2	Mamography		○
3	Abdomial Ultrasound		○
4	Pelvic		○
5	ECG		○
Cancer screening service			
1	Tumor marker for Liver		○
2	Tumor market for colon and rectom		○
3	Tumor marker for Protaste (for male)		○

Services list		Standard	Special
4	Tumor marker for ovarian		○
5	Tumor marker for stomach, esophageal		○
Total Cost (VND)		2,000,000	7,000,000

Source: Created by the survey team based on the website of Vinmec

・ The table below shows the medical checkup items and price of VIP course at Vinmec.

Table 4-12 Medical checkup items and prices of VIP course at Vinmec

No.	Vin Diamond Services list
I.	Physical examination
1	Clinical consultaion
	General consultation and physical exam
	Oral dental check
	Blood pressure and body mass index
	Gynecology & breast exam
2	Opthomology
	Eyes vision and color vision check (Technical consultation)
3	E-N-T check
	E-N-T check (Technical consultation)
II.	Cardiology
	Special Consultation
	ECG
	ECG stress test
	Echocardiography
	Doppler corotid
	ECG- holter
	Blood pressure - Holter
III.	Basic screening
1	Laboratory
	Blood test: full blood count(FBC)
	Blood grouping
	ESR
	Blood Lipid (total cholesterol,
	LDL-C, HDL-C, triglyceride)
	Liver function: ALT, AST, Total Bilirubin, GGT
	Creatine, Urea
	Micro Albumin
	Acid uric
	Glucose Fasting, HbA1C
	TSH, FT4, Calcitonin, Anti-TG
	Anti-DS DNA
	Anti ANA
	Rheumatoid Factor
	Pro-BNP
	CRP
	Estradiol (E2)
	Progesterone
	Testosterone
	BHCG

No.	Vin Diamond Services list
	Fe
	Ferritin
	B12
	Folate
	HBsAg, Anti-HBs
	Hepatitis A IgG Antibody
	Hepatitis C Antibody
	Syphillis (quick test)
	HIV
	Urine analysis
	Occult blood stool
	ThinPrep PAP test
*	Cancer screening
	AFP
	CEA
	PSA.T
	CA 125
	CA 19-9
	CA 15.3
	Cyfra
	CA 72-4
2	Imaging services
	Chest X-ray
	Mamography
	Breast Ultrasound
	Abdomial Ultrasound (Include Pelvic, Prostate)
	Osteodensitometry
III.	Specific screening
1	Laboratory
	FEME
	Cervical Histopathology
	TPHA
2	Imaging services and function assessment
*	*CT Scanner (Based on client's disease, doctor advices client to choose one)*
	Brain CT Scanner
	Thoraco-Abdomino CT Scanner
*	*MRI (Based on client's disease, doctor advices client to choose one)*
	Brain MRI
	Lumbar Sacral-Spine MRI
	Servical- Spine MRI
	Prostage MRI
	Coronary Angiography
	Heart MRI (according to doctor's recommendation)
IV.	Endoscopic
	Colonscopy with anesthesia
	Gastrosopy with anesthesia
Total cost: 35,000,000 VND	

Source: Created by the survey team based on the website of Vinmec

- The table below shows the medical checkup items and price of standard, extensive, and executive programme at French Vietnam hospital (private hospital. hereafter referred to as FV hospital), also known as its luxurious facility.

Table 4-13 Medical checkup items and prices of standard, extensive, and executive programme at FV hospital

Services List		Standard Programme	Extensive Programme	Executive Programme
Consultations				
	General Practitioner	○	○	○
	Vision and colour (nurse)	○	○	○
	Cardiologist			○
	Ophthalmologist			○
	Slit Lamp examination & visual acuity test			
Investigations				
	Resting ECG	○	○	○
	Chest X-ray	○	○	○
	Abdominal ultrasound		○	○
	Trans-thoracic echocardiography			○
	Doppler of carotid arteries			○
Biology General				
	Complete blood count	○	○	○
	C Reactive protein (CRP)	○	○	○
Renal Function Tests				
	Urinalysis	○	○	○
	Urea	○	○	○
	Creatinine	○	○	○
	Creatinine clearance			○
Liver Function Tests				
	Gamma Glutamyl Transferase	○	○	○
	ASAT / ALAT ratio	○	○	○
Comprehensive Lipid Profile				
	Cholesterol total	○	○	○
	Triglycerides	○	○	○
	HDL-Cholesterol	○	○	○
	LDL-Cholesterol	○	○	○
Metabolism				
	Fasting blood glucose	○	○	○
	Uric acid		○	○
	Calcium		○	○
	Phosphate			○
	Thyroid stimulating hormone (TSH)		○	○
Hepatitis Screening				
	Hepatitis B surface antigen (HBs Ag)		○	○
	Hepatitis B surface antibody (HBs Ab)		○	○
	Hepatitis B core antibody (HBc Ab)		○	○
	Hepatitis C antibody (HCV Ab)		○	○
Tumour Markers				
	Carcino-embryonic antigen (CEA)			○
	Alpha foeto-protein (AFP)			○
Medical Report				
	Individual report	○	○	○
Total Cost		VND 2,300,000	VND 4,500,000	VND 8,300,000

Source: Created by the survey team based on the website of FV hospital

- The table below shows the medical checkup items and price of VIP course at FV hospital.

Table 4-14 Medical checkup items and prices of VIP course at FV hospital

Wellness Check-up Services List	
Consultations	
GP consultation	
	Spirometry
Cardiology consultation	
	Resting ECG
	Echocardiography
ORL consultation	
	Naso-fibroscopy
	Audiometry
Gynaecology consultation	
	PAP smear
	HPV DNA test
Urology consultation	
	Endo-rectal prostate ultrasound
OPH consultation	
	Vision and colour
	Slit lamp and visual acuity
Dental check	
	Ultrasonic dental cleaning
Investigations	
	Urea breath test
Imaging	
	Whole body CT scan
	Abdominal and pelvic ultrasound
	Doppler of carotid arteries
	Bilateral mammography
Biology General	
	CBC
	CRP
	ABO -Rh (blood grouping)
Renal Function Tests	
	Urea
	Creatinine
	Creatinine clearance
	Urinalysis
Liver Function Tests	
	Gamma-Glutamyl Transferase
	ASAT/ALAT
Lipid Profile	
	Cholesterol
	Triglycerides
	HDL-cholesterol
	LDL-cholesterol
Metabolism	
	Fasting blood glucose
	Uric acid
	Calcium
	Phosphate

Wellness Check-up Services List	
Thyroid	
	TSH
Hepatitis Screening	
	HBs antigen
	Anti-HBs antibody
	Anti-HBc antibody
	Anti-HCV antibody
Sexually Transmitted Diseases	
	HIV serology
	VDRL
Tumour Markers	
	Carcino-embryonic antigen (CEA)
	Alpha foeto-proteine (AFP)
	CA 19.9
	Prostate specific antigen (PSA) (men only)
	Free prostate specific antigen (fPSA) (men only)
	CA 125 (women only)
Medical Report	
	Individual report
Total Cost: 27,000,000 VND	

Source: Created by the survey team based on the website of FV hospital

- The table below shows the medical checkup items and prices at City International Hospital (private hospital).

Table 4-15 Medical checkup items and prices at City International Hospital

Services List	Package 1	Package 2	Package 3	Package 4		Package 5	
				Male	Female	Male	Female
Medical Consultation							
Detailed medical history & report	○	○	○	○	○	○	○
Measurement							
Height, weight & body mass index	○	○	○	○	○	○	○
Waist circumference	○	○	○	○	○	○	○
Blood pressure	○	○	○	○	○	○	○
Vision							
Visual acuity	○	○	○	○	○		
Color vision	○	○	○	○	○		
Clinical Examination							
Examination of heart, lungs & abdomen	○	○	○	○	○		
Neurological & musculoskeletal exam	○	○	○	○	○		
Rectal & testicle examination (Male)				○		○	
Gynaecology Study							
Consultation by gynaecologsit					○		○
Breast examination (Female)					○		○
Pelvic examination (Female)					○		○
Pap smear (Thin Prep) (Female)					○		○
Full Blood Count							
Haemoglobin	○	○	○	○	○	○	○
White blood cell count	○	○	○	○	○	○	○
Differential count	○	○	○	○	○	○	○
Haematocrit	○	○	○	○	○	○	○

Services List	Package 1	Package 2	Package 3	Package 4		Package 5	
				Male	Female	Male	Female
Red cell indices (MCV, MCH, MCHC)	O	O	O	O	O	O	O
Red cell distribution width	O	O	O	O	O	O	O
Platelet count	O	O	O	O	O	O	O
Haematology Study							
Blood group (ABO & Rh)	O	O	O	O	O	O	O
Lipid Study							
Total cholesterol	O	O	O	O	O	O	O
HDL cholesterol	O	O	O	O	O	O	O
LDL cholesterol	O	O	O	O	O	O	O
Trigly cerides	O	O	O	O	O	O	O
Cholesterol /HDL ratio		O	O	O	O	O	O
C-reactive protein				O	O	O	O
Diabetes Study							
Fasting blood glucose	O	O	O	O	O	O	O
Glycated haemoglobin (HbA1c)			O	O	O		
Kidney Study							
BUN & urea	O	O	O	O	O	O	O
Creantinine	O	O	O	O	O	O	O
Urine microalbumin			O	O	O		
Liver Study							
Aspartate Aminotransferase (AST/ SGOT)	O	O	O	O	O	O	O
Alanine Aminotransferase (ALT/ SGPT)	O	O	O	O	O	O	O
Gamma-glutamyl transferase (GGT/ SGPT)		O	O	O	O	O	O
Total bilirubin		O	O	O	O	O	O
Direct bilirubin		O	O	O	O	O	O
Total protein				O	O	O	O
Albumin				O	O	O	O
Alkaline phosphatase				O	O	O	O
Bone & Joint Study							
Calclum		O	O	O	O		
Uric acid		O	O	O	O		
Tumour Marker Studies							
AFP (Liver)		O	O	O	O	O	O
CEA (Stomach & Colon)		O	O	O	O	O	O
CA 19.9 (Stomach & Colon)				O	O	O	O
CA 125 (Ovary) (Female)					O		O
PSA (Prostate) (Male)				O		O	
CA 15.3 (Breast) (Female)					O		O
Hepatitis Study							
Hepatitis A antibodies		O	O	O	O	O	O
Hepatitis B antigen		O	O	O	O	O	O
Hepatitis B antibodies		O	O	O	O	O	O
Hepatitis C antibodies		O	O	O	O	O	O
Urine Analysis							
Urine analysis	O	O	O	O	O	O	O
Cardiac Study							
Electrocardiogram	O	O	O	O	O		
Consultation by cardiologist			O	O	O		
Echocardiogram			O	O	O		

Services List	Package 1	Package 2	Package 3	Package 4		Package 5	
				Male	Female	Male	Female
Tread mill test			○	○	○		
Radiology							
Chest X-ray	○	○	○				
Whole abdomen ultrasound		○	○	○	○	○	○
Bone mineral densitometry			○	○	○		
Chest LDCT				○	○	○	○
Breast ultrasound (Female)					○		○
Mamography (Female)					○		○
Package Price (VND)	1,980,000	3,920,000	5,860,000	7,680,000	9,930,000	5,220,000	7,340,000

Source: Created by the survey team based on the board in City International Hospital

- The table below shows the medical checkup items and prices at Japan's Sanno Medical Center.

Table 4-16 Medical checkup items and prices at Sannno Medical Center

Items		Day course			Overnight stay			PET-CTcourse		
		Standard	Special	Brain checkup	Two days and one night Standard	Two days and one night Special	Three days and two night Standard	Day course	Two days and one night	PET-CT
Physical examination	Interview	●	●	●	●	●	●	●	●	●
	Consultaions by general practitioner	●	●	●	●	●	●	●	●	
	Height, weight, obesity, blood pressure	●	●	●	●	●	●	●	●	●
	Vision, audiometry	●	●	●	●	●	●	●	●	
Pysical functions	Eyeground	●	●	●	●	●	●	●	●	
	Ocular tension	●	●	●	●	●	●	●	●	
	Chest ultrasaound	●	●	●	●	●	●	●	●	
	Cervical ultrasound		●	●	●	●	●	●	●	
	Echocardiography		●		●	●	●		●	
	PWV/ABI		●		●	●	●		●	
	Lung function	●	●	●	●	●	●	●	●	
	ECG	●	●	●	●	●	●	●	●	
	Exercise ECG		●		●	●	●		●	
X ray	Chest x ray	●	● at request	●	● at request	● at request	● at request	●	●	
	Stomach fluoroscopy	●	◎	●	◎	◎				
Endoscopy	For stomach	▲	●	▲	●	●	●	●	●	
	For colon					●	●		●	
Imaging	CT (chest/ abdomen)		●		●	●	●			
	CT (pelvis)					●	●			
	MRI/MRA (head)		○	●	○	●	●	●	●	
	Bone density	●	●	●	●	●	●	●	●	
	PET-CT							●	●	●
Biological examination	Protein, albumen	●	●	●	●	●	●	●	●	
	A/G ratio	●	●	●	●	●	●	●	●	

Items		Day course			Overnight stay			PET-CTcourse		
		Standard	Special	Brain checkup	Two days and one night Standard	Two days and one night Special	Three days and two night Standard	Day course	Two days and one night	PET-CT
	GOT、GPT、γ-GTP	●	●	●	●	●	●	●	●	
	Total bilirubin	●	●	●	●	●	●	●	●	
	ALP	●	●	●	●	●	●	●	●	
	cholinesterase、CPK	●	●	●	●	●	●	●	●	
	LDH	●	●	●	●	●	●	●	●	
	serum amylase,pancreatic amylase	●	●	●	●	●	●	●	●	
	Na、Cl、Ca、Fe	●	●	●	●	●	●	●	●	
Lipid	Total cholesterol	●	●	●	●	●	●	●	●	
	Neutral fat	●	●	●	●	●	●	●	●	
	LDL cholesterol	●	●	●	●	●	●	●	●	
	NON-HDL cholestero	●	●	●	●	●	●	●	●	
Kidney	Creatinine	●	●	●	●	●	●	●	●	
	e‐GFR	●	●	●	●	●	●	●	●	
Gout	Acid urine	●	●	●	●	●	●	●	●	
Saccharic check	Fasting blood Glucose	●	●	●	●	●	●	●	●	
	75g-GTT				●	●	●			
	Hb A1C	●	●	●	●	●	●	●	●	
Blood	RBC, WBC, Hb, hematocrit	●	●	●	●	●	●	●	●	
	MCH、MCV、MCHC	●	●	●	●	●	●	●	●	
	Blood platelet	●	●	●	●	●	●	●	●	
	Blood picture	●	●	●	●	●	●	●	●	
	blood sedimentation(one hour)	●	●	●	●	●	●	●	●	
Serum	CRP	●	●	●	●	●	●	●	●	
	RF	●	●	●	●	●	●	●	●	
	TPHA	●	●	●	●	●	●	●	●	
	RPR	●	●	●	●	●	●	●	●	
	HBs antibody (quality)	●	●	●	●	●	●	●	●	
	HBs antibody (quantity)		●		●	●	●	●	●	
	HCV antibody	●	●	●	●	●	●	●	●	
	HIV antibody (requires consent)		●		●	●	●	●	●	
	Blood group（ABO, Rh）first visit	●	●	●	●	●	●	●	●	
Thyroid	TSH、FT4	●	●	●	●	●	●	●	●	
Tumor maker	AFP(quantity)		●		●	●	●	●	●	
	CEA	●	●	●	●	●	●	●	●	
	CA19-9	●	●	●	●	●	●	●	●	
	CA125	●(♀)	●(♀)	●(♀)	●(♀)	●(♀)	●(♀)	●(♀)	●(♀)	
	PSA	●(♂)	●(♂)	●(♂)	●(♂)	●(♂)	●(♂)	●(♂)	●(♂)	
	CA15-3	△	●(♀)	△	△	●(♀)	●(♀)	●(♀)	●(♀)	

Items		Day course			Overnight stay			PET-CTcourse		
		Standard	Special	Brain checkup	Two days and one night Standard	Two days and one night Special	Three days and two night Standard	Day course	Two days and one night	PET-CT
	NSE							●	●	
	SCC							●	●	
	TPA							●	●	
	SLX							●	●	
	CYFRA							●	●	
	53 antibody							●	●	
	Elastase							●	●	
	pro-GRP							●	●	
Helicobacter pylori	Helicobacter pylori antibody	●	●	●	●	●	●	●	●	
Urine	Urine protein, sugar, occult blood,urobilinogen	●	●	●	●	●	●	●	●	
	PH, ratio, acetone body	●	●	●	●	●	●	●	●	
	Hypostasis	●	●	●	●	●	●	●	●	
Faeces	Occult blood	●	●	●	●	●	●	●	●	
Others	Sputum cytology・expectoration	●	●	●	●	●	●	●	●	
	Consultation by a neurosurgeon		○	●	○	●	●	□	□	
Gynecology	cervical cytology	△	●(♀)	△	△	●(♀)	●(♀)	●(♀)	●(♀)	
	Vaginal ultrasound	△	●(♀)	△	△	●(♀)	●(♀)	●(♀)	●(♀)	
	Mammary ultrasaund	△	●(♀)	△	△	●(♀)	●(♀)	●(♀)	●(♀)	
	Mammography	△	●(♀)	△	△	●(♀)	●(♀)	●(♀)	●(♀)	
Price (JPY)		66,960	140,400	108,000	172,800	259,200	324,000	270,000	324,000	108,000

Source: Created by the survey team based on the website of Sannno Medical Center

(2) Facilities

- The facilities at Health Checkup Department are as shown below.

Table 4-21 Facilities

Room name	No. of rooms
ECG	1room
Ultrasound	2rooms
Other examination rooms	2rooms
Blood collecting rooms	4rooms
Examination room	1room
Total	10rooms

Source: Compiled from materials received from Cho Ray Hospital

(3) Personnel Structure

- The personnel structure at Health Checkup Department is as shown below.

Table 4-22 Personnel structure

Occupation	No. of staff
Doctors	9
Consulting doctors	5
Doctors for obstetrics and gynecology tests	1
Doctors for ultrasonic tests	3
Nurses	15
Others （IT, security, reception）	5
Total	29

Source: Compiled from materials received from Cho Ray Hospital

(4) Workload

- Number of health checkups: 150 people per day
  Approx. 80% for basic general checkups and 20% for other checkups

(5) Outline of Operations

- In addition to basic checkups, checkups required for visa acquisition and checkups for foreigners are provided.
- Manuals have been created for each type of checkup and are reviewed as appropriate. Monetary and other penalties are imposed if staffs do not follow the manuals.

4-3-2. Present Issues of Cho Ray Hospital

- There is not a sufficient amount of testing equipment (including ultrasonograph and ECG) for the number of patients getting health checkups. Therefore, patients have to wait for a long time, sometimes up to one or two hours.
- Cho Ray Hospital does not have as many items of medical checkup as other hospitals, especial imaging.
- Endoscopy equipment is not currently available at the Health Care Department, but will be required in the future.
- Prices are lower than other hospitals.
- Toilet, air-conditioning, and other facilities are not sufficiently equipped.

4-3-3. Basic Operations Plan for Cho Ray Second Hospital

As indicated in the “No 153/2006/QD-TTg THE GOVERNMENTAL DECREE Approve Viet Nam health system development master plan towards 2010 with 2020 vision,” the enhancement of preventive care is defined as an important national theme. Preventive care should be enhanced to extend healthy life expectancy and reduce lifestyle-related diseases that are expected to increase. Furthermore, the enhancement of preventive care is considered a contribution to reducing the excessive workload at top referral and other hospitals, as well as decreasing medical costs. It is important for Cho Ray Second Hospital, as one of the top referral hospitals, to promote the enhancement of preventive care in accordance with national measures.

(1) Basic Policy

- Mainly complete medical examination, cancer screening, and other advanced preventive care will be provided.
- Health guidance will be enhanced by doctors, nurses, dieticians, and other staff belonging to the Health Checkup Center.

(2) Examination Item

- In addition to the current health checkups, special couse and VIP course shall be provided. Items and prices shall be examined referring to other advanced hospitals.

- We suppose that the special couse shall have more tumor maker and endoscopic test in addition to the current test items. Prices shall be set around 5,000 thousand VND.
- VIP couse shall have more imaging diagnosis, such CT, MRI, PET-CT. Patients shall stay overnight, and the price shall be set around 25,000 thousand VND.

(3) Basic Operations Plan

- Personnel who can handle complete medical examinations, cancer screenings, and other types of advanced preventive care, which are not been provided at Cho Ray Hospital, should be developed and allocated.
- A statistical system will be implemented so that accumulated information on patients' health checkups can be analyzed and utilized for health guidance, etc.

(4) Basic Facility Plan

- Separate from the outpatient entrance, a physical examination area with its own entrance will be set up to provide advanced preventive medicine, such as thorough medical examinations and cancer screening.
- The table below shows the draft of main rooms' structure.

Table 4-23 Structure of main rooms (draft)

Room Name	Use and Note	No. of rooms
Reception and accounting	・Patient reception and wating space	1room
Changing room	・The changing room for patients	2rooms
Examination room	・These rooms shall also work as consulting and instructions rooms	4rooms
Blood and urine sampling room	・Blood and urine sampling room for patients	1room
Physiological test room	・For electrocardiography, ultra sound examinations	1room
Audiometry room	・For audiometry	1room
Eye test room	・For eye test	1room
X-ray room	・For X-ray test	2rooms
X-ray operation room	・For operating X-ray equipment	1room
Mammography room	・For mammography test	1room
Examination for bone density room	・For bone density test	1room
Endoscopic room	・For endoscopic test	1room
Clinical laboratory	・For simple clinical laboratory test	1room

Source: Created by the survey team

4-4. Emergency and Disaster Medicine

4-4-1. Present Conditions of Cho Ray Hospital

(1) Facilities

- Number of beds in the Emergency Department: 20
  Including EICU[2]: 3 beds
- Number of ambulances owned: 20

Image 3) Entrance to the Emergency Department

(2) Workload

- Number of patients transported: 264 per day
  Of those, number of emergency patients:
  106 per day
  ->Those provided with first aid[3]: 20%, not provided: 80%
- The table below shows patients' percentage by severity level.

Table 4-24 Percentage of emergency patients by severity level

Severity high	10～20%
Severity middle	50%
Severity low	20%

Source: Compiled from materials received from Cho Ray Hospital

->10% of patients do not included in the table are transported during nighttime, and triage is not conducted.

- Number of patients hospitalized: 80 and more per day

(3) Outline of Operations

1) Emergency acceptance system

- Respond to all patients with mild to severe symptoms
- Available hours (365 days a year, 24 hours a day)

2) Triage

- A nurse initially performs triage once a patient has arrived, and puts a red, yellow, or blue band on the patient's wrist depending on the level of severity. A doctor then checks the patient.

3) Examination

- Simple surgeries are conducted at the Emergency Department. As for other surgeries, patients are transferred to the Operation Department. (Elevators in the main area and at the Operation Department are used to transport patients to the Operation Department.)
- Test specimens are tested at the Laboratory Testing Department. Specimens are carried by hand.
- X-ray diagnosis is conducted at a general X-ray room within the Department and a CT room created by modifying a part of the Outpatient Department.

[2] EICU: Emergency Intensive Care Unit. It is essentially an ICU in the Emergency Department.
[3] First aid: Quick treatment conducted for emergency patients. It refers to artificial respiration, cardiac massage, hemostasis, taping, and other measures conducted before and after patients are transported via ambulance.

4) Monitoring

- After an examination is conducted, patients requiring internal medicine treatment are administered on beds in the Emergency Department, and patients requiring surgeries are immediately carried away on a stretcher to a hospital ward and taken care of at the ICU, etc., in the hospital ward.
- After patients are stabilized, they are carried to a hospital ward and hospitalized as needed. Two-thirds of new inpatients are emergency patients.

4-4-2. Present Issues of Cho Ray Hospital

(1) Issues with the Emergency System

- 80% of emergency patients are transported to the hospital without first aid.
- The percentage of patients with severe symptoms who should be accepted by Cho Ray Hospital remains 10 to 20%, and a network of emergency medical care has not yet been established. This is because patients desire to receive medical care at Cho Ray Hospital, and also because rescue crews tend to regard Cho Ray Hospital as the first-choice destination to transport patients to.
- The number of patients is expected to grow due to an increase in population, as well as an increase in lifestyle-related diseases, such as heart disease and strokes.
- When a patient is transported via ambulance, there is no advance notice from either the hospital from which the patient was transported or the rescue crew. The need for advance notice is recognized, but such action is not taken partly because there is no legal requirement.

(2) Issues with Departmental Operation

- It is hard to transport stabilized patients because the hospital ward is crowded.
- It takes a long time to transfer patients to the Operation Department because routes to elevators are crowded.

(3) Issues with the Facilities

- Only one ambulance can enter the yard. Therefore, a special one-way passage is used to support multiple ambulances.
- The route to the Laboratory Testing Department is long, and it takes time to carry specimens.
- There are no CT scanners available within the Department, and patients are carried to a CT room located outside the Department.

(4) Issues with the Personnel

- There is a shortage of doctors and nurses.
- There is no organization to develop personnel for emergency medical care, and only OJT is provided. Education is not sufficiently provided for emergency medical care.

4-4-3. Basic Operations Plan for Cho Ray Second Hospital

(1) Basic Policy

- As a central hospital for emergency medical care in the Southern region, the hospital should provide advanced emergency medical care to respond mainly to the increasing lifestyle-related diseases (including cerebral vascular disease and heart disease).
- The quality of emergency medical care should be improved in close cooperation with rescue crews and lower-level hospitals.
- As a central hospital for disaster response in the Southern region, the hospital should develop a system that can even respond to large-scale disaster.

(2) Workload Estimation

Number of emergency patients: Approx. 170 per day (see 3-6-3. Number of Emergency Patients for details)
Of those, the number of patients transported via ambulance: Approx. 70 per day
Number of emergency beds: 20
EICU: 4 beds
Number of ambulances: 4

(3) Basic Operations Plan

- Information on patients should be shared in advance by rescue crews and hospitals from which the patients are referred. (Suggestion to MOH)
- Triage should be conducted by nurses and doctors when patients arrive at the hospital, and primarily patients with severe symptoms should be accepted.
- The number of emergency beds will be 20, and patients requiring internal medical treatment will be handled after emergency treatment is provided. Patients with severe symptoms will be handled on the 4 beds in EICU. Patients requiring surgeries will be promptly carried away on a stretcher to a hospital ward of operational departments after emergency treatment is provided.
- A system will be established that enables emergency specialists, surgeons, and physicians to take action as much as possible in the emergency treatment room.
- An appropriate on-duty and on-call system will be developed so that doctors, nurses, pharmacists, clinical laboratory technologists, radiological technologists, and administrative staff can appropriately take action even during nighttime or after regular hours.
- Triage will be promptly provided to patients who may have an infection. Relevant personnel will wear masks, put patients on separates routes, lead the patient to an isolation room, and give priority to the patient's examination, so that the patient will not stay any longer than necessary in the Department.
- In the case of a large-scale disaster, appropriate action should be taken as a central hospital for disaster response in the Southern region. Such action includes dispatching a medical team to the disaster area in cooperation with other medical facilities, acceptance of a possibly large number of patients, and supplying drugs and food in stock.

(4) Basic Facility Plan

- A heliport will be constructed to respond to patients with severe symptoms in a wide range of areas and to transport patients and dispatch staffs in the event of a large-scale disaster.
- At the emergency entrance, sufficient parking space for multiple ambulances (four ambulances) will be established to provide prompt emergency treatment during congestion.
- The Emergency Department will be located adjacent to the diagnostic radiology, angiography and endoscopy departments for prompt diagnosis and treatment.
- An elevator to transport patients will be located adjacent to the Emergency Department to directly connect to the Operation Department and Intensive Care Unit.
- To provide the service of emergency laboratory testing, a patient-transport facility directly connected to the Laboratory Testing Department is planned.
- The Tables below show the draft of facilities of emergency.

Table 4-25 Facilities - Emergency outpatient (draft)

Room Name	Use and Note	No. of rooms
Heliport	・For transporting patients and dispatching staff in case of massive disaster	1
Ambulance reception	・Parking space for around 4 ambulances at the same time	1
Examination room	・For emergency and overtime examination	1room
X-ray room	・For X-ray test	1room
IVR-CT room	・For integrated CT angiography	1room
Emergency treatment room	・For emergency treatment	1room
Emergency operation room	・For urgent operations	1room
Anterior chamber	・Anterior chamber for the emergency operation room	1room
Storage for stockpile in case of disaster	・For the stockpile in case of disaster	1room

Source: Created by the survey team

Table 4-26 Facilities - Emergency hospital ward (draft)

Room Name	Use and Note	No. of rooms
Emergency bed	・For accepting patient of internal medicine	20beds
EICU	・Intensive Care Unit for emergency department	4beds
Patient waiting room	・Wating room for patients and family	1room
Staff station	・Office for staff. Waiting and working space.	1room
Recovery room	・For observation and recovery for the patients after emergency treatment	1room
Equipment room	・Equipment storage for emergency department	1room

Source: Created by the survey team

4-5. Inpatient Department

4-5-1. Present Conditions of Cho Ray Hospital

(1) Departments Structure and Workload of Each Department

- The department structure and workload of each department at Cho Ray Hospital's Inpatient Department is as shown below.

Table 4-27 Average number of inpatients per day at Cho Ray Hospital (2012)

Name of Departments	Actual No. of Beds 2012	No. of Inpatients per day 2012	Bed Occupancy rate
Internal medicine & Tropical Diseases Dept.	75	84	112%
Emergency Dept.	20	86	**430%**
Alleviation treatment Dept.	24	45	**188%**
Hepatitis Dept.	14	21	**150%**
Burning Dept.	60	66	110%
Hepatic tumor dept.	34	58	**171%**
Dept. of Operating and Anesthesia	20	6	30%
Cardiology Dept.	136	232	**171%**
Nuclear Medicine Dept.	6	-	0%
General Medicine Dept. (Profit)	118	111	94%
Neuro Surgery Dept.	190	371	**195%**
Gastrointestinal surgery Dept.	70	162	**231%**
Liver Gallbladder Pancreas surgery Dept.	80	120	**150%**
Urology Dept.	69	103	149%
Orthopedic Dept.	91	145	**159%**
Department of Ears, Noses and Throats + Beauty treatment	57	78	137%
Ophthalmology Dept.	32	29	91%
Thoracic surgery Dept.	40	70	**175%**
Pneumonology Dept.	69	127	**184%**
Digestive medicine Dept.	69	125	**181%**
Neurology Dept.	78	97	124%
Endocrinology Dept.	50	69	138%
Vascular Dept.	34	44	129%
Intensive Care Dept.	31	32	103%
Neurosurgery Intensive care Dept.	36	37	103%
Clinical Hematology Dept.	28	61	**218%**
Arthrology Dept. (Rheumatology)	58	76	131%
Nephrology Dept. (Dialysis)	82	129	**157%**
Hepatic tumor dept.	34	58	**171%**
Total	1,671	2,584	**155%**

Source: Compiled from materials received from Cho Ray Hospital

- Average length of stay: 7.5 days
- Number of new inpatients: 350 to 400 per day. Breakdown is shown in the table below.

Table 4-28 Routes to hospitalization

Out-patient department	Emergency department	Total
100～150patients/day	250～300patients/day	350～400patients/day

Source: Compiled from materials received from Cho Ray Hospital

- The number of ICU inpatients by departments is as shown below.
- Almost half of the ICU patients are from Department of Operation and Anethesia.

Table 4-29 Number of ICU inpatients by Dept. (2012)

Name of Departments	No. of Patients per year	Patients' Proportion in ICU by Dept.
Dept. of Operating and Anesthesia	332	44.2%
Dept. of Gastroenterology	42	5.6%
Dept. of Cardiology	42	5.6%
Dept. of Pulmonary Medicine	35	4.7%
Dept. of Orthopedics	34	4.5%
Dept. of Liver Gallbladder Pancreas Surgery	32	4.3%
Dept. of Urology	30	4.0%
Dept. of Digestive Surgery	26	3.5%
Dept. of Nephrology	23	3.1%
Dept. of Thoracic Surgery	21	2.8%
Dept. of Endocrinology	15	2.0%
Dept. of Hematology	14	1.9%
Dept. of Vascular Surgery	14	1.9%
Dept. of Neurology	12	1.6%
Dept. of Head Trauma	12	1.6%
Dept. of Tropical Diseases	11	1.5%
Dept. of General Internal Medicine	11	1.5%
Dept. of General Internal Medicine (Profit)	10	1.3%
Dept. of Rheumatology	7	0.9%
Dept. of Interventional Cardiology	7	0.9%
Dept. of ENT	4	0.5%
Dept. of Liver Tumor	4	0.5%
Dept. of Burn, Plastic Surgery	4	0.5%
Dept. of General Internal Medicine (Profit)	4	0.5%
Dept. of Liver	3	0.4%
Dept. of Cardiac Surgery	2	0.3%
Total	751	100.0%

Source: Compiled from materials received from Cho Ray Hospital

(2) Outline of Operations

1) Reception and payment of hospitalization

- When patients are hospitalized, they are guided to a hospital admission room in the outpatient reception area.
- If some patients desire to stay in a service room, the vacancy of the room will be checked. However, other patients will be basically admitted to the hospital even if the hospital ward is full.
- The admission to the hospital is determined by the chief (doctor) of each section. If an adjustment between departments is required, the head of General Planning Department makes the adjustment, but such cases are rare.
- Taking General Internal Medicine as an example, the patients of the department who are going to undergo operations are admitted to the ward of General Internal Medicine at least one day before the operations.
- If a hospital ward cannot accept a patient, the patient may be transported to a lower level hospital, including a satellite hospital. However, no statistical data is available.
- Inpatients make a deposit for the hospitalization in advance at each hospital ward, and it will be balanced with hospital charged prior to discharge. The cost of meals in the hospital is charged separately.
- If the patient cannot pay the cost of hospitalization, an additional request for payment will not be made. Bills remained uncollected in 1,660 cases in 2012, and the amount of the uncollected bills was approx. 3 billion VND (15 million yen).

- The uncollected balance is offset by funds raised by sponsors, staff, etc. of Cho Ray Hospital. The Social Medicine Unit is commited to support financially poor patients.

2) Examination and administrative work in each hospital ward

- Patients with severe symptoms requiring internal medicine treatment are examined at the general ICU, but patients with severe symptoms requiring surgeries are administered in a room for severe illness (operational ICU) in each department.
- Unlike the Outpatient Department, an information system has not been implemented, and most of the administrative work is based on paper and vouchers.
- There is no delivery equipment, and drugs and specimens are carried by nurses, nursing assistants, and staff from each department.
- Rehabilitation is basically conducted at the hospital ward with a focus on physical therapy.
- The Department of Pharmacy plans administration of drugs to inpatients, mixes injection drugs, distributes drugs to each department, and provides drug-related management instructions (including confirmation of a doctor's prescription and provision of dosing instructions to patients) as drug-related management work for the hospital ward.
- Surveillance cameras and security guards are allocated as security measures.

3) Support for patients released from the hospital

- A chief of each section determines whether or not a patient can be released from the hospital and to where the patient will be released.
- The procedures for patients released from the hospital are conducted by the General Planning Department.
- The hospital to which the patient is released is specified by Cho Ray Hospital, cannot refuse to accept the patient.

4-5-2. Present Issues of Cho Ray Hospital

(1) Issues with the Overcrowding of Patients

Image 4) Hospital ward

- The number of patients exceeds the prescribed number of beds, and many patients are laid on stretchers placed in corridors and balconies (Image 4).
- Doctors at each department do not have enough time to thoroughly check patients because they take care of too many patients. (No statistical data is available.)
- Conventionally in Vietnam, personal care for patients is basically provided by their families, but even some medical procedures (including replacing gauze and assistance with swallowing) are provided by the families because there are too many patients. It is considered a problem.
- Theft and other crimes take place at hospital wards because of the large number of patients and their families. No concrete statistical data is available though. Surveillance cameras and security guards are allocated, but not enough.

(2) Issues with Operations

- When patients are discharged, the staff arrange the appointoment with other hospitals, but considerations on the social situations of the patients (including whether or not they have families or the severity of their financial situation) with a cooperation with other hospitals are not enough as is done in Japan. This is probably because there is a shortage of personnel due to the number of patients and also because no network has been established with regional medical institutions.
- Because there are so many patients and insufficient systematization, there is no system to authenticate drugs (administered and injected), patients, and medical staff. Accordingly, there are some cases in

which in-hospital infection, mix-up of patients, and other medical incidents have occurred. (No concrete data is available.)
- Clinical pathways[4] have not been developed fully, and there is an issue with liaisons between departments and between people with different responsibilities.

(3) Issues with the Facilities

- There is no delivery equipment. Therefore, drugs, specimens, and supplies are carried by nurses, nursing assistants, and the staff from each department. It is becoming burdensome to them.
- During our surbey, simple nurse-call buttons have been installed in private rooms and some patient rooms, but not every bed is covered and many of the call buttons are out of order. (Currently they are re-installed and properly operate.)

(4) Issues with the Personnel

- The number of nurses who are university graduates is small, representing only 20% of the total nurses in the Nursing Department. Many other nurses are middle-level nurses who graduated from short-term training institutions (2-year). College-educated nurses, trained over a longer period of time, are more competent, and it would be ideal if all nurses were college graduates. However, the demand for college-educated nurses is high, and even Cho Ray Hospital cannot easily secure them for employment.

4-5-3. Basic Operations Plan for Cho Ray Second Hospital

(1) Basic Policy

- Appropriate management of beds and support for patients released from the hospital will be conducted, and an appropriate number of inpatients will be admitted.
- Reliable and safe medical care will be provided by preventing in-house infection and medical accidents.
- A hospital ward and room plan will be formulated to provide a comfortable environment for hospitalization. Consideration will be given to the natural environment and patients' amenities in the facilities.
- Staff workload will be reduced by introducing delivery equipment and information systems.

(2) Departmental Structure & Number of Beds

- The number of beds by department at Cho Ray Second Hospital is estimated as shown below, based on the discussion with Cho Ray Hospital taking into consideration the present workload of each department, the estimated number of futre inpatients per department, and the request from Cho Ray Hospital.

Table 4-30 Number of beds by Dept. at Cho Ray Second Hospital (draft)

Name of departments	No. of beds
ICU	25
Emergency department	20
EICU	4
Operation,anesthesia department	18
Circulatory organ department	88
Vascular surgery department	22
Thoratic surgery department	22
E.N.T department	22
Ophthalmology department	10
Urology department	34
Tropical disease department	22
Pulmonary medicine department	44

[4] Clinical pathway: A schedule that chronologically summarizes treatment phases for each disease and testing, as well as various medical procedures that are considered most suitable for eventually attaining the optimal conditions (the goals to be achieved) for patients. There are schedules for patients and for staff. The schedule for patients is created to provide explanations to patients, and the schedule for staff is used to facilitate cooperation by sharing information among multiple medical staff members so that team-oriented medical treatment is promoted with an improvement in quality.

Name of departments	No. of beds
Gastrointestinal medicine department	44
Liver,gallbladder,pancreatic surgery department	44
Digestive surgery department	44
Endoscope department	44
Neurosurgery department	78
SCU	10
Neurology department	44
Burn,plastic surgery department	10
Orthopedics department	44
Rheumatology department	22
Endocrinology department	22
Dialysis department	54
Tumor department	30
Special Care department（servise room）	96
Other departments	83
Total	1,000

Source: Compiled from materials received from Cho Ray Hospital and coordination with the hospital

(3) Workload Estimation

In the opening stage of operation, 800 patients per day (an operating rate of 80%) are expected. The operating rate will be improved by 5% per year, and the final goal should be 950 patients per day (an operating rate of 95%).

(4) Basic Operations Plan

- The management of beds will be appropriately conducted with a 95% of bed utilization rate as the target. All medical procedures should be conducted by medical staff by reducing excess workload relating to patients.
- The daily management of beds should be basically conducted by the chief of the section in each hospital ward or the chief nurse (leader nurse of each department). If coordination cannot be made between departments, a Bed Controller (a General Planning Department Manager or a manager-class nurse) will be assigned to facilitate coordination between departments.
- Patient rehabilitation will be conducted in the hospital ward promptly after surgery so that the patients can return home quickly, and beds can be utilized in an effective manner.
- An electronic medical record system, as well as an ordering system, will be implemented in conjunction with the Outpatient Department in order to share patient information, provide efficient instructions to each department, and promote efficiency in the use of workload and space for medical records.
- Documents, drugs, and specimens are presently carried by hand, but automatic and manual delivery systems should be properly combined, for instance, by using manual delivery on a regular basis and automatic delivery for emergency.
- ICT (Infection Control Team), NST (Nutrition Support Team), Palliative Care Team, and other medical care teams will be established to enhance team-oriented medical treatment, for instance, by holding conferences involving multiple people in different responsibilities when necessary.
- Pharmacists will be engaged in preparing and formulating drugs in the hospital ward as much as they can, so that quality of medical treatment can be improved.
- A clinical pathway should be created for each disease to be used for informed consent with patients, standardization of medical treatment, and provision of team-oriented medical treatment based on the plan. Furthermore, the clinical pathways should be shared among Cho Ray Hospital, Cho Ray Second Hospital, and Workload Reduction Model hospitals[5]. It will also be shared as much as possible with lower-level hospitals in the region, so that regionally-shared clinical pathways can be developed, and medical treatment can be standardized in the region.
- Coordination and support for patients released from the hospital will be proactively provided under the leadership of nurses, MSW[6], and the Regional Medical Liaison Department. Accordingly, a network will

[5] Workload Reduction Model: It refers to six hospitals affiliated with Cho Ray Hospital as backup hospitals so that the excess workload can be reduced at Cho Ray Hospital. Refer to 4-17-1.(3) for details.

[6] MSW: Medical Social Worker. It refers to a specialist who assists patients and their families in resolving and adjusting to psychological

be established with regional medical institutions, and personnel required for the coordination will be developed.

- A patient satisfaction survey will be regularly conducted so that the level of patient satisfaction will be improved.

(5) Basic Facility Plan

- As a general rule, on inpatient floors, there are 44 beds per nurse and 4 units per floor.
- Patient rooms are basically planned to have four beds or to be single occupancy. Four-bed rooms are large enough to accommodate up to six beds if required by hospital operation or during times of disaster.
- The ratio of private rooms is approximately 20% and is designed to achieve efficient hospital operation and improved patient amenity.
- The special care department will consist entirely of private rooms to deal with wealthy and foreign patients.
- Staff stations will be arranged to shorten the traffic lines of nursing staff to bedrooms.
- A training area is created on each ward floor to enhance education and training.
- In order for the ICU Department to provide the emergency laboratory testing services, a patient-transport facility directly connected to the Laboratory Testing Department is planned.
- Vaulted ceilings are carefully arranged in various places on the inpatients ward floors to bring in natural breeze and light.
- An area for possible building expansion is reserved on the north side of the premises to address a future increase in patient volume.
- An area to accommodate patients' families is planned in the north-east part of the premises.
- The table below shows the draft of main rooms' structure.

Table 4-17 Structure of main rooms (draft)

Room Name	Use and Note	No. of rooms
ICU	25beds	1room
SCU[7]	10beds	1room
Staff station	・Staff office for ICU, SCU. Waiting and working space.	1room
Equipment room	・Equipment room for ICU, SCU	1room
Staff station	・All general ward clinical departments,located one room in each floor. Waiting and working space.	5rooms
Equipment room	・All general ward clinical departments,located one room in each floor	5rooms
Biological clean room	・Clinical hematology(general ward)	1room
Plaster room	・Orthopedics（general ward）	1room
Treadmill room	・Endocrinology（general ward）	1room

Source: Created by the survey team

and social issues and promotes social rehabilitation from the standpoint of social welfare, so that patients with disease can live independently in their families and regions. It is not a certified job in Vietnam, but personnel with such skills are considered necessary for the future.

[7] SCU: Abbreviation for Stroke Care Unit. It referes to intensive care unit specialized in apoplexy.

4-6. Endoscopy Department

4-6-1. Present Conditions of Cho Ray Hospital

(1) Test Items, Workload

- The current workload of the department is as shown below.

Table 4-32 Endoscopy and treatment workload at Cho Ray Hospital

Test items	2009	2010	2011
No. of digestive endoscopy	42,672	41,629	50,738
No. of respiratory endoscopy	4,803	4,680	5,314

Source: Compiled from materials received from Cho Ray Hospital.

Item	2012
No. of endoscopic treatment	200

Source: Compiled from materials received from Cho Ray Hospital.

(2) Personnel Structure

- The current personnel structure of the department is as shown below.

Table 4-33 Personnel structure

Doctors	9
Nurses	16
Others	1
Total	26

Source: Compiled from materials received from Cho Ray Hospital.

(3) Outline of Operations

1) Outline

- One of the few facilities in the southern region that can perform endoscopy, and is active in providing guidance to lower-level hospitals.
- Many of the doctors have been trained in Japan, and eight of the nine doctors can perform endoscopic treatment.

2) Flow for testing

- Patients who require pre-processing are provided with a kit ahead of time, and are told to come to the hospital once they have carried out the pre-processing on the morning of their visit.
- The waiting time until the testing starts is 3 to 4 hours.
- The patient's name, medical record, etc. are checked in the waiting room.
- If the endoscopy finds a polyp, then normally the doctor will carry right on with an endoscopic mucosal resection, for example. This does not change the examination fee.
- Cleaning of the endoscope complies with the WEO (World Endoscopy Organization) guidelines.

3) Guidance for lower-level hospitals

- Some of the lower-level hospitals, down to the county hospital level, can carry out endoscopy, but in most cases they can only perform examinations and cannot carry out treatment, so Cho Ray Hospital provides guidance.
- Cho Ray Hospital has previously provided guidance for one hospital in Khanh Hoa Province and two in Dong Nai Province. It is scheduled to provide guidance for a hospital in Long Ann Province, but it is thought that it will take some time for endoscopic examination and treatment to penetrate down to the lower-level hospitals.

4-6-2. Present Issues of Cho Ray Hospital

- There are no manuals showing the testing procedures or treatment procedures for endoscopy.
- There is a lack of equipment such as ultrasound endoscope systems. The staffs are given training in these systems, but are unable to use their full potential due to the lack to equipment.
- There are few lower-level hospitals which can carry out endoscopic treatment, so there is a concentration of patients at Cho Ray Hospital, leading to a three-month waiting list for treatment.

4-6-3. Basic Operations Plan for Cho Ray Second Hospital

(1) Basic Policy

- Actively increase the number of low-invasive tests and treatments.
- Standardize work to improve quality and prevent hospital-acquired infections.
- Increase work efficiency by bringing in information systems.
- Continue to provide guidance to lower-level hospitals for endoscopic examinations and treatment.

(2) Workload Estimation

- The workload estimation for Cho Ray Second Hospital has been calculated based on the number of endoscopic diagnoses and treatments in Cho Ray Hospital at present, the status of waiting patients, and the rate of increase in eligible patients in the medical care zone as shown in the Table below.
- The workload of endoscopic tests and treatments are considered to be closely related to the number of ICD 10 and 11 patients (diseases of digestive and respiratory system).
- The workload at both hospitals in 2020 is estimated by multiplying current workload by the increase rate of ICD 10 and 11 patients in the medical care zone (e) (see Table 2-11 for details).
- The workload at Cho Ray Second Hospital is estimated by dividing the estimated workload at both hospitals by the bed capacity ratio of Cho Ray Second Hospital to Cho Ray Hospital (g).

Table 4-34 Endoscopic diagnosis workload estimation at Cho Ray Second Hospital

Items	No. of tests in 2011 at CRH	How to estimate the no. of tests at CR2H	Increase rate for related patients in the medical care zone from 2012 to 2020	Estimated no. of tests at both hospital in 2020	Estimated no. of tests at CRH in 2020	Estimated no. of tests at CR2H in 2020
a	b	c	d	e=b*d	f=e*67%	g=e*33%
No. of digestive endoscopy	50,738	Correlate with the no. of patients of ICD11(diseases of the digestive system)	129%	65,362	43,932	21,430
No. of respiratory endoscopy	5,314	Correlate with the no. of patients of ICD10(diseases of the respiratory system)	126%	6,713	4,512	2,201

Source: Compiled from materials received from Cho Ray Hospital and analyses of the medical care zone.

Table 4-35 Endoscopic treatment workload estimation at Cho Ray Second Hospital

Items	No. of treatmentsin 2012 at CRH	How to estimate the no. of treatments at CR2H	Increase rate for related patients in the medical care zone from 2012 to 2020	Estimated no. of treatments at both hospital in 2020	Estimated no. of treatments at CRH in 2020	Estimated no. of treatments at CR2H in 2020
a	b	c	d	e=b*d	f=e*67%	g=e*33%
No. of Endoscopic treatments	200	Correlate with the no. of patients of ICD10(diseases of the respiratory system) and ICD11(diseases of the digestive system) *	127%	300	202	98

Source: Compiled from materials received from Cho Ray Hospital and analyses of the medical care zone.

* Endoscopic treatment appointments are fully booked for the next three months, so the estimated figure for 2020 multiplies the increase rate of the catchment area over the current number of treatments and then carries the tens.

(3) Basic Operations Plan

- Manuals for endoscopic examinations and treatment will be prepared and used in increasing the efficiency of the work processes and in guidance for lower-level hospitals.
- Advanced, cutting-edge equipment and facilities such as ultrasound endoscopy systems will be brought in.
- Efforts will be made to systematize testing and treatment requests and results reporting through the introduction of an Endoscope Department system, an endoscopy ordering system, etc. that work in conjunction with the electronic medical records. Testing results and image data will be viewable from the electronic medical record system by using PACS or a similar system.
- Patients' identities will be confirmed using wrist bands or similar means to prevent mix-ups.
- Endoscopy cleaning will be done in accordance with WEO guidelines to ensure the prevention of hospital-acquired infections.

(4) Basic Facility Plan

- Endoscopy Rooms shall be 7 rooms based on the examples of similar hospitals.
- In a convenient location for outpatients adjacent to the Emergency Department to enable immediate response.
- The elevator to transport patients is to be placed adjacent to the Endoscope Department in consideration of access from the hospital ward.

4-7. Dialysis Department

4-7-1. Present Conditions of Cho Ray Hospital

(1) Facilities

- Number of beds and equipment for dialysis treatment: 53

(2) Personnel Structure

- Number of doctors: 15
- Number of nurses: 33
- Other: 2

(3) Workload

- Number of dialysis treatments: 126 per day
- Number of dialysis treatments per unit: 2.4 per day
- Hours required for dialysis per patient: Approx. 4 hours
- The number of dialysis treatments from 2009 to 2011 is as shown below.

Table 4-36 Number of dialysis treatments

	2009	2010	2011
No. of dialysis patients	47,601	48,249	45,996

Source: Compiled from materials received from Cho Ray Hospital

(4) Outline of Operations

- 53 dialysis treatment units are owned and operated 24 hours a day.
- Dialysis treatment, such as hemodialysis and continuous renal replacement therapy, is provided at a hospital ward and the ICU for patients with severe symptoms.
- Dialysis treatment for patients with infections is provided at an isolation room (not BCR[8] or negative pressure room).
- After inpatients requiring dialysis treatment are released from the hospital, the patients continue to receive dialysis treatment as outpatients at Cho Ray Hospital and other lower level hospitals.

4-7-2. Present Issues of Cho Ray Hospital

- According to our interview survey, due to insufficient number of dialysis equipment, dialysis treatment is given to only 10% of patients who are in need of the treatment.
- The dialysis center is located away from the hospital ward and the Outpatient Department, and the traffic line is long.
- There aren't enough nurses.
- There is no operational manual, and the materials for training are in short supply.

[8] BCR: Biological Clean Room. It refers to a room in which a certain level of air cleanliness is maintained from the perspective of preventing infection and contamination.

4-7-3. Basic Operations Plan for Cho Ray Second Hospital

(1) Basic Policy

- To provide a treatment to patients, whose treatment is difficult at local medical institutions due to having entered the introduction period for dialysis and/or be with complications.
- To handle patients in both the Outpatient Department and the hospital ward.

(2) Workload Estimation

- Considering the current workload as well as the expected increase in the number of patients suffering from urinary system diseases in the medical care zone, the required number of dialysis equipment shall be estimated as two tables below.
- Currently the number of dialysis treatment per day at Cho Ray Hospital is 153.3 (d), and the number of the treatment per unit is 2.9 (e).
- The increase rate of urology patients in the medical care zone from 2012 to 2020 is estimated to be 1.26 (g) (see Table 2-11).
- The estimated number of dialysis treatment per day in 2020 at Cho Ray Hospital is 193 (h), calculated by multiplying 153.3, the number of dialysis treatment per day at Cho Ray Hospital, by 1.26, the increase rate of urology patients in the medical care zone.
- The estimated number of diaysis patients per day who need treatment at Cho Ray Second Hospital is 40 (i), calculated by subtracting 153, the current number of patients per day, from 193, the estimated number of patients in 2020.
- The required number of dialysis units is estimated as 14 (k), by dividing 40, the estimated number of dialysis patients in 2020 at Cho Ray Second Hospital, by 2.9, the number of dialysis patients per unit.
- According to an interview survey conducted with the Dialysis Department Manager, it is assumed that there are 1.9 times more potential patients than the present number of patients. In addition, the demand will increase in the future due to the increase of lifestyle related diseases. Therefore, the required number of dialysis units at Cho Ray Second Hospital is estimated as 30, by multiplying 14 units by 1.9 (l) (the value in the ones plance is rounded up).

Table 4-37Current operational status at Cho Ray Hospital

	2012	Calculation formula
No. of dialyzers	53	a
Number of dialysis patients per year	45,996	b
Treatment days	300	c
Number of dialysis patients per month	153.3	d=b/c
Number of patients per dialyzer	2.9	e=d/a

Source: Compiled from materials received from Cho Ray Hospital

Table 4-38 Required number of dialysis equipment at Cho Ray Second Hospital

	2012	2020	Calculation fomula
Number of estimated urology patients in the covered area by CRH and CR2H	597	753	f
Urology patients increase rate in the covered area	-	1.26	g
Number of estimated dialysis patients in CRH per day	153	193	h=d*g
Number of overloaded dialysis patients in CRH per day (Same as the number of estimated dialysis patients in CR2H per day)	-	40	i=h-d
Number of patients per dialyzer	2.9	2.9	j=e
Estimated raw number of dialyzer in CR2H		14	k=i/j
Estimated adjusted number of dialyzer in CR2H ※	-	30	l=k*1.9

Source: Compiled from materials received from Cho Ray Hospital as well as analysis materials in the medical care zone

※ According to an interview survey conducted with the Dialysis Department Manager, it is assumed that there are 1.9 times more potential patients than the present number of patients, and thus the estimate for the required number of dialysis equipment is multiplied by 1.9. Furthermore, the value in the ones place has been rounded up, assuming that demand will increase in future.

(3) Basic Operations Plan

- To prepare the operational manual and utilize it to promote work efficiency and personnel training for staff.
- Depending on the local demand, operate two to three courses per day, which is not much different from the present.
- By introducing the dialysis order and the department system which are coupled to the electronic medical record system, promote work efficiency and sharing of information about patients. The dialysis order should have the specification according to which it is coupled with related orders including hospitalization order, meal order, testing order, and pretreatment order.
- For inpatients who cannot be carried to the blood purification therapy room because they suffer from severe infection or because their circulation dynamics are unstable, doctors, nurses, or clinical engineers will treat them by bringing the necessary equipment with them and going to the hospital ward (such as ICU and the general ward) and other such places. For this reason, a required number of portable dialysis equipment should be available.
- Regularly check a patient's condition after he/she leaves the hospital and create a system that realizes long-term monitoring of a patient.
- Actively make efforts such as conducting conferences with other departments and facilities as well as reviewing cases.

(4) Basic Facility Plan

- With consideration to outpatient users and inpatient users from the hospital ward, the department will be placed adjacent to the core elevator for transporting patients for easy bidirectional access.
- The table below shows the draft of main rooms' structure.

Table 4-39 Structure of main rooms (draft)

Room Name	Use and Note	No. of rooms
Reception, wating room	・For reception and wating space for patients	1
Staff station	・Staff office. Waiting and working space.	1room
Examination room	・Examination room for dialysis patients	1room
Dialysis room	・This room shall have the space for 30 dialyzers ・Number of dialyzers shall be 20 at the time of the opening	1room
Private dialysis room	・For infectious patients	1room
Treatment room	・For treatment to dialysis patients	1room
Preparation room	・For preparation for dialysis treatment	1room
Washing room	・For washing dialysis equipment	1room
Changing room	・Changing room for patients	2rooms
Equipment room	・Equipment room for dialysis	1room
Machine room	・For water supplier for dialyis	1room

Source: Created by the survey team

4-8. Operating and Anesthesia Department

4-8-1. Present Conditions of Cho Ray Hospital

(1) Facility Composition

- Number of operating rooms: 24
- Number of operating tables: 35 (In some cases, a single operating room may have two operating tables)
- Specialized operating rooms: Cardiac disease, cranial nerve, kidney transplant, etc.
  Others: Many are general-purpose operating rooms
- Recovery room: 20 beds (surplus patients are laid on stretchers)

(2) Personnel Structure

- Personnel structure of this department is shonw in the Table below.

Table 4-40 Personnel structure

Doctors in charge of anesthesia	28
Nurses	133
No. of nursese in charge of anesthesia out of total	60
Medical technicianstaffs	55
Pharmacists	1
IT techniciancs	5
Others	13
Total	235

Source: Compiled from materials received from Cho Ray Hospital

- There are 28 doctors, all anesthesiologists. The doctor in the respective section serves as the operating surgeon.
- During day shift, there are 15-20 doctors, 35 circulating nurses (1 at the operating table) + α (miscellaneous work), 70 scrub nurses, 12-16 nursing assistants.
- After office hours, there are 3 doctors, 8 circulating nurses, 14 scrub nurses, 8 nursing assistants.

(3) Workload

- Number of operations: 40,316 cases/year
- Number of operations per day per operating table: 3.8 cases/day
- The number of operations from 2009 to 2011 is as shown below.

Table 4-41 Number of operations

	2009	2010	2011
No. of operations	37,409	38,890	40,316

Source: Compiled from materials received from Cho Ray Hospital

- The number of operations according to type of surgery in 2012 is as shown below.
- Neurosurgery, orthopedics, surgery general hold a large number of these operations.

Table 4-42 Number of operations according to the surgical type in 2012 at Cho Ray Hospital

No.	Surgery type	No.
1	Cardiac Surgery	1,056
2	Neurosurgery	8,667
3	Surgery general	8,142
4	Urology	2,909
5	Orthopedics	8,350
6	Otorhinolaryngology	3,349
7	Ophthalmalogy	1,513
8	Liver Tumour	541
9	Thoracic	2,963
10	Vascular Surgery	528
11	Burn - Plastic Surgery	1,616
12	Cosmetic And Plastic Surgery	682
Total		**40,316**

Source: Compiled from materials received from Cho Ray Hospital

Table 4-43 Number of operations according to the level of severity in 2012

Operations classification according to severity	Number of operations
Super Surgery	5,557
Level 1	18,734
Level 2	10,486
Level 3	5,539
Total	**40,316**

Source: Compiled from materials received from Cho Ray Hospital

- Operations performed by the Operation Department are super surgeries and those at levels 1-3 (1 being the highest level). Super surgeries refer to operations such as cardiac disease, cranial nerve, and kidney transplant. Operations at level 2 and above usually involve general anesthesia, and roughly 60-70% of all the operations involve general anesthesia. The above Table shows nmber of operations according to the lebel of severity.
- Operations for mild cases at level 4 and below are performed by the respective section, and no statistics are available.

(4) Outline of Operations

1) Operational status at operation rooms

- Operational hours of an operation room: 24 hours
  Daytime shift: 7:00-16:00
  Nighttime shift: 16:00-7:00
- Operations are performed mostly during daytime. Since only emergency cases are handled at nighttime, personnel distribution is decreased.

Image 5) Operating hall

2) Schedule Control

- Schedules for operations are created by three to four nurses who are specifically appointed for this purpose.
- Schedules are managed on paper, and scheduled general operations, scheduled emergency operations, as well as the progress of operations are written on whiteboards.

3) Surgical plans

- A surgical plan may be laid out by holding a conference which involves various professions.
- Prior to an operation, the anesthesiologist and operating surgeon hold a meeting.

4) Explanations to patients/families

- Pursuant to the provisions of MOH, surgical consent is obtained by all patients. A surgical consent form requires signatures of all three parties involved, which are the anesthesiologist, operating surgeon, and patient. Once the doctor in the respective department provides an explanation and signs the form, it is stored in the medical record.

5) Performing operations

- The patient is transported into an operating room from the hospital ward on a stretcher or wheelchair, and the patient is moved onto a different stretcher/wheelchair before entering the operating room, and is then moved onto the operating table. Staff will change their footwear.
- The operation is done by the doctor of the respective section. An anesthesiologist and a nurse from Anesthesia Department are in charge of managing anesthesia as well as nursing services.
- In some cases, different operations are performed concurrently on two operating tables in a single operating room.
- There are two operating tables in the only operating room which is exclusively used for cases of infectious diseases, but this is not enough, and sometimes other normal operating rooms are used.
- There are no established procedures for performing an operation, and facilities/equipment suitable for day surgeries (rooms for short-term stay, dressing room, etc.) are not available. As such, day surgeries cannot be performed right now, but plans for performing day surgeries are under consideration.

6) Postoperative records

- Following an operation, instruments and gauze are counted.
- Operative records are kept on a PC. Information such as the patient's name, doctor in attendance, drug name, and materials used are recorded.

7) Postoperative management

- Following an operation, patients are kept in a recovery room. The recovery room has 20 beds, and surplus patients are laid on stretchers.
- After an operation, the anesthesiologist only refers to operative records and does not call on the patient.

4-8-2. Present Issues of Cho Ray Hospital

(1) The issue of the Large Number of Patients

- Since there aren't enough operating rooms, two operating tables are placed in a single operating room and different operations are performed concurrently (about two-thirds of all operations are performed concurrently). As the result, there are concerns about the risk of infection as well as the risk of mix-up of patients (no specific statistics are available).
- Although there is an operating room with two tables that is exclusively used for cases of infectious diseases, it is not enough, and thus other normal operating rooms are used.
- In the recovery room, a stretcher may be used for a patient, and thus there are problems in terms of hygiene.
- Due to the large number of patients, the anesthesiologist is unable to call on patients after operations.

(2) Issues in Terms of Operations

- Schedules for operations are managed on a paper-based system, which is troublesome.
- The procedures for implementing a day surgery are not established, and the facilities/equipment suitable for a day surgery (rooms for short-term stay, dressing room, etc.) are not available. As such, day surgeries cannot be performed at present, but plans for performing day surgeries are under consideration.
- No system is available for managing drugs and instruments, which is a troublesome task.

(3) Issues Surrounding Facilities

- The area for the department is small, and thus it is very crowded near the entrance to the Operation Department as well as in the corridor inside the department.
- The traffic line from the hospital ward or Emergency Department is long. Furthermore, the Operating Department is far away from ICU/SCU/recovery room.

4-8-3. Basic Operations Plan for Cho Ray Second Hospital

(1) Basic Policy

- To provide treatment in a secure/safe environment.
- To introduce advanced operative technology and to provide advanced medical care.
- To improve efficient use of operating rooms, intended to shorten the waiting time before an operation as well as to decrease the number of days spent waiting.
- To lessen the workload of the staff, through efforts such as introduction of efficient supply control method and information system.

(2) Workload Estimation

- Number of operations/year: 13,286 cases
- Number of operating rooms: 18 (13,286 cases ÷ 300 days ÷ 3.0 cases/day = 15-18 rooms)
- Number of recovery rooms: 18

- The number of operations and operating rooms at Cho Ray Second Hospital shall be estimated based on the current number of operations and the increase rate of related indicators as shown below.
- Taking cardiac surgery as an example, it is considered to be closely related to the number of ICD9 patients (the diseases of the circulatory system.).
- The number of ICD 9 patients per cardiac surgery at Cho Ray Hospital in 2012 is estimated as 0.07 (16,166 ICD 9 patients ÷ 1,056 cardiac surgery)

Table 4-18 Opinions about the number of operations at Cho Ray Second Hospital

Present operations in CRH in 2012			How to estimate the no. of operations in CR2H	No. of related patients at CRH per year in 2012	No. of operations per related patients
No.	Operations	Number			
1	Cardiac Surgery	1,056	No. of the surgery shall correlate with the no. of patient of ICD9(diseases of the circulatory system)	16,116	0.07
2	Neurosurgery	8,667	No. of the surgery shall correlate with the no. of patient of ICD2 (neoplasms) and ICD 6 (diseases of the nervous system)	31,836	0.27
3	Surgery general	8,142	No. of the surgery shall correlate with the total no. of inpatients	117,840	0.07
4	Urology	2,909	No. of the surgery shall correlate with the no. of patient of ICD2 (neoplasms) and ICD 14 (diseases of the genitourinary system)	36,504	0.08
5	Orthopedics	8,350	No. of the surgery shall correlate with the no. of patient of ICD13 (diseases of the musculoskeletal system and connective tissue) and ICD 19 (injury, poisoning etc.)	28,020	0.30
6	Otorhinolaryngology	3,349	No. of the surgery shall correlate with the no. of patient of ICD2 (neoplasms) , ICD 8 (diseases of the ear and mastoid process) and ICD10(diseases of the respiratory system)	35,772	0.09
7	Ophthalmalogy	1,513	No. of the surgery shall correlate with the no. of patient of ICD7(diseases of the eye and adnexa)	1,104	1.37
8	Liver Tumour	541	No. of the surgery shall correlate with the no. of patient of ICD2 (neoplasms)	29,112	0.02
9	Thoracic Surgery	2,963	No. of the surgery shall correlate with the no. of patient of ICD10(diseases of the respiratory system)	6,204	0.48
10	Vascular Surgery	528	No. of the surgery shall correlate with the no. of patient of ICD9(diseases of the circulatory system)	16,116	0.03
11	Burn - Plastic Surgery	1,616	No. of the surgery shall correlate with the no. of patient of ICD 19 (injury, poisoning etc.)	22,248	0.07
12	Cosmetic And Plastic Surgery	682	No. of the surgery shall correlate with the no. of patient of ICD12 (diseases of the skin and subcutaneous tissue) and ICD 19 (injury, poisoning etc.)	23,004	0.03
Total		40,316	Total no. of surgeries at CR2H shall be estimated by accumulating each no. of surgery mentioned above.	-	-

Source: Compiled from materials received from Cho Ray Hospital

- The number of opeartions at Cho Ray Second Hospital is estimated as Table below..
- The number of cardiac surgery per year at Cho Ray Second Hospital in its full operation is estimated as 374 (0.07 operations per ICD 9 patients × 5,702 ICD 9 patients)
- The number of other types of operations is estimated by the same method.
- The total number of operations per year at Cho Ray Second Hospital in its full operation is estimated as 14,762. The total number of operations per day is 49 assuming the operation days are 300.
- Currently the number of operations per operating room at Cho Ray Hospital is 3.8. At Cho Ray Second Hospital, the number of operations per operating room is 3.0 mainly to reduce the workload of the staff.
- The required number of operating rooms at Cho Ray Hospital is estimated as around 20 (49 operations per day ÷ 3.0 operations per operating room)
- Based on the discussion with Cho Ray Hospital, the number of operating rooms shall be reduced to 18, therefore the estimated number of operation per year shall also be reduced around 1%, thus 13,286 cases.

Table 4-45 Expected number of operations at Cho Ray Second Hospital based on a demand projection

Operations	How to estimate the no. of operations in CR2H	Estimated no. of related patients at CR2H in full operation	Operation/Target patient at CRH in 2012	Estimated no. of opertaions at CR2H in full operation
		A	B	C=A×B
Cardiac Surgery	No. of the surgery shall correlate with the no. of patient of ICD9(diseases of the circulatory system)	5,702	0.07	374
Neurosurgery	No. of the surgery shall correlate with the no. of patient of ICD2 (neoplasms) and ICD 6 (diseases of the nervous system)	11,719	0.27	3,190
Surgery general	No. of the surgery shall correlate with the total no. of inpatients	52,432	0.07	3,623
Urology	No. of the surgery shall correlate with the no. of patient of ICD2 (neoplasms) and ICD 14 (diseases of the genitourinary system)	13,410	0.08	1,069
Orthopedics	No. of the surgery shall correlate with the no. of patient of ICD13 (diseases of the musculoskeletal system and connective tissue) and ICD 19 (injury, poisoning etc.)	8,790	0.30	2,620
Otorhinolaryngology	No. of the surgery shall correlate with the no. of patient of ICD2 (neoplasms) , ICD 8 (diseases of the ear and mastoid process) and ICD10(diseases of the respiratory system)	13,115	0.09	1,228
Ophthalmalogy	No. of the surgery shall correlate with the no. of patient of ICD7(diseases of the eye and adnexa)	410	1.37	561
Liver Tumour	No. of the surgery shall correlate with the no. of patient of ICD2 (neoplasms)	10,865	0.02	202
Thoracic	No. of the surgery shall correlate with the no. of patient of ICD10(diseases of the respiratory system)	2,104	0.48	1,005
Vascular Surgery	No. of the surgery shall correlate with the no. of patient of ICD9(diseases of the circulatory system)	5,702	0.03	187
Burn - Plastic Surgery	No. of the surgery shall correlate with the no. of patient of ICD 19 (injury, poisoning etc.)	6,813	0.07	495
Cosmetic And Plastic Surgery	No. of the surgery shall correlate with the no. of patient of ICD12 (diseases of the skin and subcutaneous tissue) and ICD 19 (injury, poisoning etc.)	7,066	0.03	209
Total	Total no. of surgeries at CR2H shall be estimated by accumulating each no. of surgery mentioned above.	-	-	14,762

Source: Compiled from materials received from Cho Ray Hospital as well as analysis materials in the medical care zone

(3) Basic Operations Plan

- One operation per hour per operating room
- In order to make day surgeries possible, create manuals for procedures and prepare necessary facilities/equipment (short-stay rooms, space for changing clothes, etc.).

- Ensure efficient schedule control through measures such as systemizing the schedule control for operations and managing the progress in each operating room on a real-time basis, and reviewing the operating schedule when it is required due to the level of emergency.
- Make efforts in terms of patient-oriented medical services by providing sufficient explanations to patients before and after an operation as well as explanations to the families concerning the progress, so as to alleviate feelings of insecurity by patients and their families.
- When a patient arrives at the Operation Department, confirm the patient's wristband.
- Upon starting an operation, confirm operation time-out and the patient's name, operative method, surgical site, etc.
- Following an operation, count instruments and gauze so as to prevent any foreign substance from remaining in the body.
- After an operation, the patient is kept in a recovery room for postoperative control. Once the patient's condition is stable, he/she is transported to the general ward.
- Aim at decreasing the preparatory work through measures such as placing surgical instruments in containers and making kits for medical supplies.
- If the plan of using containers is put into action, make sure that surgical instruments are thoroughly withdrawn from and collected in the containers, so as to prevent cross-contamination among supplies in the Operation Department.

(4) Basic Facility Plan

- The Operation Department is located on the same floor as the Intensive Care Unit and Central Sterile Supply Departments so that cleanliness can be properly managed for optimized operation.
- In addition to regular operating rooms, some operating rooms are designed to be large enough to accommodate the need for a large-scale special operating room, such as required by Da Vinci surgical systems and hybrid operating rooms.
- The elevator to transport patients is directly connected to the Operation Department for efficient access from inpatient ward floors and the Emergency Department.
- In order to provide emergency laboratory testing services, a patient-transport facility directly connected to the Laboratory Testing Department is planned.
- The Table below shows the draft of main rooms' structure.

Table 4-46 Structure of main room (draft)

Room Name	Use and Note	No. of rooms
Day surgery room	・For day surgery	3rooms
Hybrid operating room	・Operating room equipped with DSA	1room
General operating room	・For general surgery	4rooms
Operating room for training	・Operating room with training equipment	2rooms
Operating room for orthopedics surgery	・For orthopedics surgery	1room
Operating room for circulatory surgery	・For circulatory surgery	1room
Operating room for respiratory surgery	・For respiratory surgery	1room
Operating room for neurosurgery	・For neurosurgery	1room
Operating room for pancreas and liver surgery	・For pancreas and liber surgery	1room
Operating room for urology surgery	・For urology surgery	1room
Operating room for plastic surgery	・For plastic surgery	1room
Operating room for oral surgery	・For oral surgery	1room
Equipment room	・Storage for the surgical equipment and instruments	2rooms

Room Name	Use and Note	No. of rooms
Emergency laboratory	・For emergency tests during operations	1room
Conference room	・Conferrence room for staff	1room
Preparation room	・For operations preparation	1room
Staff station	・Staff office. Waiting and working space.	1room
Recovery room	・For observation and recovery for the patients after operations	1room

Source: Created by the survey team

4-9. Rehabilitation Department

4-9-1. Present Conditions of Cho Ray Hospital

Image 6) Rehabilitation Department Reception

(1) Personnel Structure

- The personnel structure of the department is as shown below.
- Most of the staffs are physical therapists as the department mainly conduct physical therapy.

Table 4-47 Personnel structure

Doctors	5
Occupational therapist (OT)	2～3
Physical therapist (PT)	26
Speech Therapist (ST)	2

Source: Compiled from materials received from Cho Ray Hospital

(2) Workload

- Number of patients engaged in rehabilitation (2012) Approx. 47,312 (See the Table below)
  Of the above, 30,524 are inpatients, and 17,067 are outpatients
  Of the above, apoplectic stroke is 17,080, heart disease is 12,768
  Of the above, 85 % of the rehabilitation is physical therapy
- Length of one course of rehabilitation: 30-60 minutes

Table 4-19 Number of rehabilitation cases by disease in 2012

Rehabilitation according to the disease	No. of patients
Apoplectic stroke	17,080
Heart disease	12,768
Rehabilitation of having orthopedic treatment	4284
Head injury	3,955
Backache	2058
Others	7,167
Total	47,312

Source: Compiled from materials received from Cho Ray Hospital

Table 4-49 Ratio according to rehabilitation types in 2012

Rehabilitation classification	Commponent ratio of outatients	Commponent ratio of inatients
Occupational therapy	10%	0%
Physical therapy	85%	100%
Speech Therapist	5%	0%

Source: Compiled from materials received from Cho Ray Hospital

(3) Outline of Operations

- Acute-phase rehabilitation centered on physical therapy is implemented. Many of the patients in rehabilitation are inpatients.
- Originally, rehabilitation in Vietnam was not scientific but consisted mostly of classic exercise therapy. However, by receiving education through JICA's training, rehabilitation began to be implemented using unified standards.
- Speech therapy began recently (supported by Dr. Shimamura of International University of Health and Welfare), and two doctors participate in the program. Currently there is no speech therapy room, and the conference room is used tentatively.

- Traditional medicine (acupuncture), implementation of which is mandatory at each hospital as instructed by the Ministry of Health, is available in this department.
- Rehabilitation during hospitalization is basically conducted at a patient's bedside. It is conducted from Monday to Friday, and every day at the ICU and Dialysis Treatment Rooms.
- For outpatient rehabilitation, advance payment is made after an examination, followed by rehabilitation. Based on the result of rehabilitation, the patient has another examination and makes payment again.
- Emphasis is placed on cooperation among sections and departments during rehabilitation, and cooperation between the Nutrition Department and Neurosurgery Department have proven successful.

(4) Mentoring Lower Level Hospitals

- Doctors at Cho Ray Hospital who have received education through JICA's training provide education to lower level hospitals, mainly satellite hospitals, by holding lectures on scientific rehabilitation and implementing training at Cho Ray Hospital. Through these activities, it is hoped that a unified level of rehabilitation can be provided at Cho Ray Hospital as well as at lower level hospitals and at home.

4-9-2. Present Issues of Cho Ray Hospital

- A unified program is provided through JICA training, but some of the doctors at Cho Ray Hospital resist the idea of new training.
- Existing manuals only deal with basic rehab, and more advanced rehabilitation is dealt with through OJT.
- Clinical pathways and other tools will be needed to encourage inter-departmental links.
- Further training in lower-level hospitals will be need to encourage the provision of unified rehab from the acute stage to the home stage.
- Rehab income is low. It is about 1,000 VND (approx. 5 yen) per session.

4-9-3. Basic Operations Plan for Cho Ray Second Hospital

(1) Basic Policy

- To enhance rehabilitation as a key measure for lifestyle-related diseases, which are expected to increase in the future, inter-departmental links and inter-hospital links will be encouraged, and rehabilitation will be carried out at a unified standard, from the acute stage to the home stage.
- Rehabilitation will be carried out at the earliest possible stage for critical patients such as post-operative patients in order to improve their QOL.

(2) Workload Estimation

- The number of rehabilitation patients at Cho Ray Second Hospital shall be estimated based on the current workload at Cho Ray Hospital and the increase rate of related indicators as the Table below.
- Taking apoplectic stroke as an example, the number of rehab for apoplectic stroke at Cho Ray Hospital is 17,080. The rehab is considered to be closely related to ICD 6 patients (diseases of nervous system).
- The increase rate of ICD 6 patients from 2012 to 2020 in the medical care zone is 1.15 (d) (see Table 2-11 for details).
- The number of rehab for apoplectic stroke at both hospitals in 2020 is estimated as 19,616 (e) (17,080 apoplectic stroke rehab × 1.15 increase rate of ICD 6 patients).
- The bed capacity ratio of Cho Ray Second Hospital accounts for 33 % of the bed capacity of both hospitals (1,000 bed ÷ 3,050 bed)
- The number of rehab for apoplectic stroke at Cho Ray Second Hospital in 2020 is estimated as 6,431 (g) (19,616 apoplectic rehab at both hospitals × 33 % bed capacity ratio of Cho Ray Second Hospital)
- The number of rehab for other diseases is estimated by the same method. The total number of rehab at Cho Ray Second Hospital in 2020 is estimated as 18, 848.

Table 4-50 Estimated number of rehab cases by type at Cho Ray Second Hospital

Rehabilitation type	No. of related patients at CRH in 2012	How to estimate the no. of rehab cases at CR2H	Increase rate for the related diseases	Estimated no. of rehab cases at both hospitals in 2020	Estimated no. of rehab cases at CRH in 2020	Estimated no. of rehab cases at CR2H in 2020
a	b	c	d	e=b*d	f=e*67%	g=e*33%
Apoplectic stroke	17,080	Correlate with the no. of patients of ICD6(diseases of the nervous system)	1.15	19,616	13,184	6,431
Heart disease	12,768	Correlate with the no. of patients of ICD9(diseases of the circulatory system)	1.30	16,556	11,128	5,428
Orthopedics	4284	Correlate with the no. of patients of ICD13(diseases of the musculoskeletal system and connective tissue)	1.26	5,381	3,617	1,764
Head injury	3,955	Correlate with the no. of patients of ICD19(injury, poisoning etc.)	1.12	4,439	2,983	1,455
Backache	2058	Correlate with the no. of patients of ICD13(diseases of the musculoskeletal system and connective tissue)	1.26	2,585	1,737	847
Others	7,167	Correlate with the total no. of patients	1.24	8,910	5,989	2,921
Total	47,312	-	-	57,486	38,638	18,848

Source: Compiled from materials received from Cho Ray Hospital and analyses of the medical care zone

* The estimated number for Cho Ray Second Hospital has been calculated by multiplying the estimated numbers for Cho Ray Hospital and Cho Ray Second Hospital for 2020 (e) by the ratio of sickbeds in Cho Ray Second Hospital over the number of sickbeds for both hospitals (1,000 beds/3,050 beds = 33%).

(3) Basic Operations Plan

- Rehab will be largely done bedside in the wards, and started as soon as possible following surgery or treatment to help patients return home sooner and improve their QOL.
- More detailed manual will be created for instructing hospital staff and guidance for lower-level hospitals.
- To encourage inter-departmental links, clinical pathways will be created for the main illnesses, with rehab conducted through links with the various departments. In addition, a unified standard of rehab will be provided from the acute stage to the home stage through developing inter-regional clinical pathways and sharing with lower-level hospitals.
- For the creation of effective rehab programs, the improvement of the rehabilitation quality such as an appropriate assessment of rehab, and the risk management, the Rehabilitation Department systems should be changed to systems that allow statistics and analyses of care results, assessments of technical standard, and studies of training amount and patient satisfaction levels and incidents/accidents during training.
- The rehab program will work to improve the QOL for patients by improving their independence in daily life through studying as a team at joint conferences for specialists, etc.

(4) Basic Facility Plan

- In order to handle the increasing number of stroke cases, cardiac infarctions and external injuries, the Rehabilitation Department is in a convenient location for both outpatients and inpatients.
- Ample indoor space has been made for rehabilitation and an outdoor rehabilitation area has been provided for efficient management of the Rehabilitation Department.
- The Table below shows the draft of main rooms'structure.

Table 4-51 Structure of main rooms (draft)

Room Name	Use and Note	No. of rooms
Physical therapy room	・For physical therapy	1room
Occupational therapy room	・For occupational therapy	1room
Hydrotherapy room	・For hydrotherapy	1room
Speech therapy room	・For speech therapy	1room

Source: Created by the survey team

4-10. Clinical Laboratory Department（Lab Center, Hematology, Biochemistry, Microbiology and Pathology）

4-10-1. Present Conditions of Cho Ray Hospital

Image 7) Test Department

(1) Personnel Structure

- Doctors: 32
- Nurses: 34
- Medical technicians: 106

(2) Workload

- The workload of the department from 2009 to 2011 is as shown below.

Table 4-52 Number of tests by type at Cho Ray Hospital

Test items	2009	2010	2011
No. of ultrasound examinations	168,716	196,562	226,763
No. of biochemical examinations	6,233,144	6,567,146	7,309,411
No. of microbiology examinations	390,452	490,607	542,578
No. of blood, immunity examinations	8,413,671	8,826,636	9,541,804
No. of pathology examinations	74,372	77,500	85,660

Source: Compiled from materials received from Cho Ray Hospital.

(3) Outline of Operations

1) Outline

- The Laboratory Area has four departments: Hematology, Biochemistry, Microbiology and Pathology.
- Each department has its own working policies, including lab manuals, quality system essentials (QSEs), SOPs for managements (personnel, equipments, etc. and for technical matters (i.e. sample collection own working policies, includiinternal quality control, etc.)
- The main customers are in- and out-patients of Cho Ray Hospital. Each department of Laboratory Area also serves as Referral Lab for other laboratories in Ho Chi Minh City for some special tests: such as Acetylcholine receptor auto-antibody, Cytokine panel, Tri-Cat, etc. in Biochemistry Department.
- Inversely, the Microbiology Department has sent some special tests, as DNA of bird flu virus, to other referral Lab as Pasteur Institute or Welcome-Trust Lab of Tropical Diseases Hospital
- Training function: Each department has function of teaching for many students from medical technology school, medicine universities. Many graduated and post-graduate students have done researches in each department.
- Researches are also a function of all departments. Every laboratory department has involved in many studies from institutional level to national level.
- Cho Ray Hospital has laboratory tests very laboratory department has involved in many studies from institutional level to natFor in- and out-patients of Cho Ray Hospital, all patients have been reviewed by doctors before receiving the list of requirement tests.

2) Sample Collection

- For outpatients: all biological samples (blood, urine, body fluids, sputum, etc.) are collected at the sample collection rooms. There are 4 sample collection rooms in the Outpatient Department. The staffs have been trained about the standard procedures for collection of right samples. The list of requirement tests are

ordered in advance by doctors of the Outpatient Department and payment of tests are verified by staff of Financial Department via local net before the samples come to the sample collection rooms.

- For inpatients: all biological samples (blood, urine, body fluids, sputum, etc.) are collected in the clinical wards by nurses/ or assistant doctors. The tests and biological samples are done according to the written test orders signed by doctors-in charge.

3) Sample transportation

- For outpatients: all biological samples from collection rooms are carried to laboratory by hand-carrying way (hand-carry transport) by staffs of collection rooms. The sample transportation is done every 15-20 minutes following the requirement.
- For inpatients: Laboratory technicians of each department visit clinical wards, timing from 7.30 to 9.00 am, for collecting biological samples prepared by nurses, then carry the samples back their laboratory departments.
- All biological samples of clinical wards collected after 9.00 am will be transported to the laboratory departments by nurses.
- The delivering/receiving of biological samples will be done according to SOP for sample management of each department. Simply, the verification has done by computer via local net for outpatients (because of having the Hospital Information System and Laboratory Information System between Outpatient Dearptment and Laboratory); and hard copies of test order list are used for verification of inpatient samples.

4) General process for test analysis

- Each laboratory department has its own SOPs for test analysis.
- The general process for test analysis are as follows:
  - Sample preparation and checking the integrity quality: sample centrifugation and reviewing the quality of samples (clotting, dark yellow, hemolysis, milky, etc.)
  - Preparations of analysis machines following routine SOP.
  - Run the internal quality controls (IQC).
  - Analyze and review the results of IQC. If the results of IQC are acceptable, the patient samples will be run.
  - Run the samples according to their own procedures.
  - Obtain the result of tests.

5) Test report and release

- The test results are firstly reviewed by the technician running the test, thereafter are reviewed by the head of the test groups. If there is no doubt about the re-run for verification, the result of tests will be validated and reported.
- For outpatients: the final validated results will be uploaded to local net to the Outpatient Department. Outpatients will receive the hard copies of test results at the same sample collection rooms. Doctors can see all test results on computers via the local net.
- For inpatients: the final validated results will be printed in paper, signed by authorized persons (vice-head of department, etc.) and released to the nurses of clinical wards. The delivering/receiving of test result reports will be done according to SOP of the job.

6) Participate in external quality scheme:

- All departments of Laboratory Area have participated in one or two external quality schemes. The internal quality control is put as policy of all laboratory tests.

7) Physiological testing

- In physiological testing, all data is stored electronically using the testing system brought in about five years ago. However, the limitations to its storage capacity mean that they are regularly transferred to CD-ROM for storage.
- The test results summary for patients uses a predetermined A4 format, with the test results being presented in a reduced form.

- The results are provided for doctors from the department system to their electronic medical records. Some are provided as printouts if the doctors request more details.

8) Pathological testing

- There have been an increasing number of requests from outside for pathological testing. While there are more and more cases of testing and treatment using endoscopes at lower-level referral hospitals in recent years, there are still not enough pathologists to diagnose them, and with the recent completion of the Can Tho Bridge, cutting the travel time from the Mekong Delta from two days to six hours, there has been an increase in the number of requests.
- Remote diagnosis is also performed through, for example, regular conferences with the International University of Health and Welfare.

4-10-2. Present Issues of Cho Ray Hospital

- The Testing Departments are scatted around the hospital, which makes work more inefficient.
- Workload of laboratory tests continues to increase. For biochemistry, it is estimated to increase 5-10% of total number of tests/year.
- The need to upgrading of the equipment in laboratory is increasing to reduce the workload.
- Automation system in laboratory is required. However, it remarks that all systems relating to laboratory automation must be upgraded simultaneously. Suppose that the barcode system for identification of tests per individual tube must be established (treated per individual tube); if not the automation can not be run fully effective.
- Hand-sample transport can not be replaced by pneumatic transport system for whole parts in Cho Ray Hospital, due to the structure of the facility.
- Almost all of main equipment in laboratory has been put by companies which won the tenders. The accessory equipment (i.e. centrifuge machines, water filtration, etc.) have been purchased by hospital. Both of the equipment must be run simultaneously.
- ISO 15189: 2012 for quality and competence of laboratory has just been introduced in to 4 departments of Lab Area in the year 2014. The deparments have to fulfill lots of requirements for training, consultation, testing, calibration, measurement of uncertainty, reviewing and timing, causing more workload for all staffs.

4-10-3. Basic Operations Plan for Cho Ray Second Hospital

(1) Basic Policy

- Prompt, accurate, and safe testing work will be carried out and the time required before the results arrive will be shortened.
- Increase efficiency of operation by consolidating the various Testing Departments.
- Reduce the workload on staff by automating testing and transportation work and introducing information systems.
- Obtain external performance values (MOH Performance Assessment, ISO 15189, etc.) as possible and improve the quality of the Testing Departments.

(2) Workload Estimation

- The workload at Cho Ray Second Hospital is estimated based on the current workload at Cho Ray Hospital and the estimated number of patients at Cho Ray Second Hospital as shown below.
- The number of tests per patient is estimated by dividing the number of tests by the number of inpatients and outpatients at Cho Ray Hosital (d).
- The estimated number of inpatients and outpatients at Cho Ray Second Hospital in its full operation is 976,750 (e).
- The total number of tests at Cho Ray Second Hospital in its full operation is estimated as 8,259,915 by multiplying the number of tests per patient by the estimated number of patietns.

Table 4-53 Estimated workload at Cho Ray Second Hospital

Items	Cho Ray Hospital in 2011			Cho Ray Second Hospital in full operation	
	Number	No. of inpatients and outpatients per year	No. of tests per patient	No. of inpatients and outpatients per year	Estimated no. of tests
a	b	c	d=b/c	e	f=d*e
No. of ultrasound examinations	226,763	2,093,792	0.11	976,750	105,784
No. of biochemical examinations	7,309,411		3.49		3,409,826
No. of microbiology examinations	542,578		0.26		253,112
No. of blood, immunity examinations	9,541,804		4.56		4,451,233
No. of pathology examinations	85,660		0.04		39,960
Total	17,706,216		8.46		8,259,915

Source: Compiled from materials received from Cho Ray Hospital and analyses of the medical care zone.

(3) Basic Operations Plan

- When inpatients are tested or specimens are taken, they will be given wristbands or other identification means, and specimen barcodes will be read to prevent misidentification of patients. Obtaining specimens will be mainly done by nurses at the bedside.
- When outpatients are tested or specimens are taken, their name, date of birth and other information is checked with the patient. Specimens are obtained at the Central Blood & Urine Sampling Room, and done with the cooperation of both the Nursing Department and the Testing Department.
- For revisiting patients, the response to testing prior to examinations will be studied and efforts will be made to shorten the waiting time for outpatients. In addition, target indices will continue to be set, such as having results for normal tests available within half a day, and results for emergency tests available within half an hour.
- The installation of equipment suited for the transportation of specimens will be based on manual transportation using elevators. Automatic transportation equipment will be brought in to connect the Operation Department, the Emergency Department, and the ICU.
- Tests that are difficult to carry out at Cho Ray Hospital or Cho Ray Second Hospital will be done through links with external organizations.
- As an effort to improve the quality of the Testing Departments and the efficiency of the work, aim to obtain external performance values (MOH Performance Assessment, ISO 15189, etc.).
- As an effort to shorten the time that patients have to wait for their results, promote the systematization of testing, the introduction of advanced testing equipment, and other measures to increase work efficiency.
- Increase work efficiency through bringing in ordering for tests and department systems that work in concert with ordering.
- Create a system where test results, including both numerical data and image data, can be read on the electronic medical record system by entering them into a department system that is linked with the electronic medical records system.
- Clinical laboratory technicians will be trained to carry out tests efficiently while understanding and complying with the detailed rules of the related laws, internal rules and regulations, etc., and to develop

excellent data analysis abilities. Therefore it is necessary to ensure that trainers are available, to bring in a system that will allow statistical processing, and to develop a range of manuals.

(4) Basic Facility Plan

- In the Clinical Laboratory Department, testing is consolidated and centralized. Urine sampling and blood collection sites for outpatients are in an easy-to-find, convenient location.
- An elevator to transport patients is located adjacent to or directly connected to the Clinical Laboratory Department from the hospital wards and the operating room for prompt transfer of specimens.
- The Physiology Department is also in a convenient location for outpatients and has easy access for inpatients for efficient operation.
- The Table below shows the draft of main rooms' structure.

Table 4-54 Structure of main rooms (draft)

Room Name	Use and Note	No. of rooms
Preparation room	・For physiological examinations	1room
pulmonary function test room	・For physiological examinations	1room
Electrocardiogram room	・For physiological examinations	2rooms
Treadmill room	・For physiological examinations	1room
Echocardiography room	・For physiological examinations	1room
Abdominal echo room	・For physiological examinations	1room
EEG room	・For physiological examinations	1room
EMG room	・For physiological examinations	1room
Equipment room	・For physiological examinations	1room
Central laboratory	・For biochemical examinations and blood test	1room
Preparation room	・For microbiology examinations	1room
Machine room	・For microbiology examinations	1room
Washing room	・For microbiology examinations	1room
Cultivation room	・For microbiology examinations	1room
Anterior chamber	・For microbiology examinations	1room
Low-temperature room	・For microbiology examinations	1room
Genetic test room	・For genetic examinations	1room
Washing room	・For genetic examinations	1room
Preparation room	・For pathological examinations	2rooms
Examination room	・For pathological examinations	1room
Specimen storage room	・For pathological examinations	1room
Washing room	・For pathological examinations	1room
Autopsy room	・For pathological examinations	1room
Blood bank	・For blood transfusion	1 room

Source: Created by the survey team

4-11. Radiology Department (Diagnostic Imaging Department, Nuclear Medicine Department)

4-11-1. Present Conditions of Cho Ray Hospital

(1) Principal Testing Equipment

- The principal testing equipment of the department is as shown below.

Table 4-55 Principal testing equipment

Main testing equipment	Number
X-ray	17
CT	4
MRI	2
DSA	2

Source: Compiled from materials received from Cho Ray Hospital.

Image 8) Image Diagnosis

(2) Personnel Structure

- The personnel structure of the department is as shown below.

Table 4-56 Personnel structure

Doctors	32
Nurses	13
Pharmacists	2
Engineers	63
Others	19
Total	129

Source: Compiled from materials received from Cho Ray Hospital.

(3) Test Items and Workload

- The workload of the department from 2009 to 2011 is as shown below.

Table 4-57 Test items and workload

Test items	2009	2010	2011
No. of X-ray photography	541,058	583,468	632,598
No. of CT photography	77,442	84,201	90,290
No. of MRI photography	13,275	15,345	15,500
No. of DSA photography	4,368	4,666	4,541
No. of RI examinations	45,053	54,211	50,215

Source: Compiled from materials received from Cho Ray Hospital.

(4) Outline of Operations

- The hospital has facilities to provide nuclear medicine testing, which is limited in the southern region, and provides CTs and MRIs in addition to basic imaging diagnosis.
- Patient confirmation is done before imaging through checking their name, age, sex, etc.
- The test results for general imaging are printed on film and handed to the patient.
- CT and MRI scans are stored electronically using PACS,[9] and the doctor can view them using an electronic medical record terminal.
- Appointments are done through books rather than an information system.
- Patients sometimes take simple, CT, or MRI scan film at external radiographic testing centers. Testing costs at external organizations are 20% to 50% higher than at Cho Ray Hospital.

[9] PACS: Picture Archiving and Communication System. This is designed for the storage, viewing, and management of image data received from imaging equipment such as CRs, CTs, and MRIs. Bringing in a PACS should allow a reduction in both costs and effort for the transport and storage of film, as well as increase the efficiency of hospital work by linking with the electronic medical records, ordering systems, and other systems.

- Protectors are always available to reduce the radiation dosage levels for patients and staff, and the safety procedures are made clear.
- The rough waiting times for each test and the total time required from testing to the provision of results are shown below. These are only based on interviews, and are generally of an acceptable level.

Table 4-58 Waiting time by test item

Test items	Waiting time	Time to report the test result after conducting tests
X ray photography	1.3 hours	30-45 minutes
CT photography	1.5 day	3 hours
MRI photography	1day	3 hours
DSA photography	5day	Less than 30 minutes

Source: Compiled from materials received from Cho Ray Hospital.

4-11-2. Present Issues of Cho Ray Hospital

- There are only a few places in the southern region for departments of nuclear medicine, and a lack in the region as a whole, so patients will continue to concentrate here.
- The various departments for radiological testing are scattered around the hospital, leading to inefficient work, personnel structure, and traffic lines.

4-11-3. Basic Operations Plan for Cho Ray Second Hospital

(1) Basic Policy

- Make efforts to carry out prompt, accurate, and safe testing and shorten the waiting time for tests.
- Make efforts to increase the efficiency of work through the introduction of information systems.

(2) Workload Estimation

- The workload at Cho Ray Second Hospital is estimated based on the current workload at Cho Ray Hospital and the estimated number of patients at Cho Ray Second Hospital as shown below.
- The number of tests per patient is estimated by dividing the number of tests by the number of inpatients and outpatients at Cho Ray Hosital (d).
- The estimated number of inpatients and outpatients at Cho Ray Second Hospital in its full operation is 976,750 (e).
- The total number of tests at Cho Ray Second Hospital in its full operation is estimated as 370,000 by multiplying the number of tests per patient by the estimated number of patietns.

Table 4-59 Estimated workload at Cho Ray Second Hospital

Test items	Workload at Cho Ray Hospital in 2011			Estimated workload at Cho Ray second Hospital （At the time of full operation）	
	No. of tests	No. of inpatients and outpatients per year	No. of tests per patient	Estimated no. of inpatients and outpatients per year	Estimated no. of tests
a	b	c	d=b/c	e	f=d*e
No. of X-ray photography	632,598	2,093,792	0.30	976,750	295,106
No. of CT photography	90,290		0.04		42,120
No. of MRI photography	15,500		0.01		7,231
No. of DSA photography	4,541		0.00		2,118
No. of radioisotope examinations	50,215		0.02		23,425
Total	793,144		-		370,000

Source: Compiled from materials received from Cho Ray Hospital and analyses of the medical care zone.

(3) Basic Operations Plan

- Bring in radiological testing, medical care ordering, and Radiology Department systems, linked with the electronic medical record system, digitize the appointments system which is currently paper-based, and work to shorten the waiting time for patients and increase work efficiency based on an efficient appointments system.
- Bring in a PACS and create a system that allows image data to be viewed on electronic medical record terminals.
- Reduce waiting time for patients through setting goals, etc. In addition, have as a goal for normal image diagnosis that the results be delivered by the evening of that day, or during the following day at the latest. The results for image diagnoses for emergencies will be returned at the moment the image is created.
- Image diagnoses should ideally all be done by a radiologist as a rule, but, depending on the thoroughness of the personnel structure, a system for jointly interpreting the image with the attending doctor will be studied.
- To increase the accuracy of the interpretation, an environment which makes it easy for the attending doctor and the radiologist to consult with specialists from other areas or other facilities will be prepared.
- Protectors will be permanently available to reduce the radiation dosage levels for patients and staff, and appropriate measures for the appropriate treatment of waste materials for RI tests will be studied.
- Images brought in by referral patients will be scanned and digitized, and loaded into the electronic medical records.
- The production of drugs for PET scans assumes joint use of the cyclotron at Cho Ray Hospital.

(4) Basic Facility Plan

- Radiological Diagnosis, Radiation Therapy and Nuclear Medicine Departments are consolidated for increased cooperation.
- As medical technology and equipment advances rapidly in these departments, this area is designed to have an open space at the end of the hallway and extra space has been established for to make possible future expansion easier.
- The Table below show the draft of main rooms' structure.

Table 4-60 Structure of main rooms (draft)

Room Name	Use and Note	No. of rooms
MRI room	・For diagnostic imaging ・Two MRI shall be equipped at the time of opening	5rooms
CT room	・For diagnostic imaging ・Two CT shall be equipped at the time of opening	6rooms
X-ray room	・For diagnostic imaging	5rooms
Mammography room	・For diagnostic imaging	1room
Bone density examination room	・For diagnostic imaging	1room
DSA room	・For diagnostic imaging	2rooms
Catheter room	・For diagnostic imaging	2rooms
Hyperthermia therapy room	・For radiotherapy. At first only the room shall be installed	1room
CT positioning room	・For radiotherapy. At first only the room shall be installed	1room
Linear accelerator room	・For radiotherapy. At first only the room shall be installed	1room
Linear accelerator preparation room	・For radiotherapy. At first only the room shall be installed	1room
Recovery room	・For radiotherapy. At first only the room shall be installed	1room
Examination room	・For radiotherapy. At first only the room shall be installed	1room
Cyber knife room	・For radiotherapy. At first only the room shall be installed	1room
ESWL room	・For nuclear medicine	1room
SPECT-CT room	・For nuclear medicine	1room
RI examination room	・For nuclear medicine	1room
PET-CT room	・For nuclear medicine	1room
RI storage room	・For nuclear medicine	1room
Infection control room	・For nuclear medicine	1room
RI management room	・For nuclear medicine	1room

Source: Created by the survey team

4-12. Clinical Dietetics Department

4-12-1. Present Conditions of Cho Ray Hospital

(1) Personnel Structure

- The current personnel structure of the department is as shown below.
- The cooks are outsourced staff.

Table 4-61 Personnel structure

Doctors(also nutritionists)	3
Nurses	1
Food Technical Engineers	3（in charge of making menu and hygiene maintenance of the kitchen）
Cooks	Over 100, from 70～80 person per work shoft
Total	Around 106

Source: Compiled from materials received from Cho Ray Hospital.

(2) Workload

No. of meals: An average of some 2,000 meals per day. Breakdown: 20% general meals, 75% therapeutic diet meals, 5% or less special meals.
(Some patients fast in preparation for the operation.)

Meal times: General meals: Breakfast from 6:30 to 7:00, lunch from 10:30 to 11:00, dinner from 16:00 to 16:30
Therapeutic diets: First meal at 6:30, second meal at 10:30, third meal at 14:30, fourth meal at 17:30.

(3) Outline of Operations

1) Outline

- Since a personnel with professional qualification for dietician is not exist currently, doctors also serve as dieticians. All three of the doctors at Cho Ray Hospital have learned the skills of dieticians overseas. A university teaching nutrition opened in Hanoi two years ago, and so an increase in the number of dieticians with specialist skills is expected in the future.
- Catering is assigned to a German company, Dussman Service.
- Some 2,000 meals are provided to patients each day. Patients' families only check the nutritional status, and do not provide meals. Family members are prohibited from bringing food into the hospital, but this is not fully enforced in practice.

2) Meal types

- Meals are divided into three types: general meals, therapeutic diet meals, and special meals.
- General meals can be selected from three choices according to the patient’s preferences (meat, fish, vegetables, etc.), and care is taken with amenities.
- Special meals are created to match the patient’s nutritional requirements, and so they are determined in consultation with the doctors in charge of each department and through interviews about their nutritional requirements.

3) Flow for serving and clearing up

- Meal request charts are submitted to the Nutrition Department from each department by 3 pm on the previous day, the details of each request are entered into the Nutrition Department’s own computer, and the Nutrition Department then orders the meals from the kitchen.
- Serving is done by the cooks carrying the meals from the kitchen to the wards, and the nurses distributing them to the patients in each ward.
- Clearing up and the disposal of leftovers is outsourced to a company.

4) Systematization

- Calories are calculated manually as there is no Nutrition Department system. The system is currently being developed, and is scheduled to be introduced within the next two years. Following the introduction of the system, it should be possible to analyze statistical information such as patient likes or consumption information, and manage nutritional guidance for patients.

5) Training human resources

- Courses on nutrition for doctors and nurses are provided twice a year by the Nutrition Department, and they are considering bringing in external lecturers as well.

6) Meal costs

- Meals for inpatients are divided into general meals (42,000 VND per day), special meals (50,000 VND per day) and VIP meals (120,000 VND per day). They are not covered by insurance, but charged separately to hospitalization costs, and are paid for by the patients each day. There are waivers for poor patients.
- The costs for inpatient meals collected by the hospital are paid monthly directly to the contractor.

4-12-2. Present Issues of Cho Ray Hospital

- The kitchen is separate from the wards, and meals need to be transported out in the open air.
- There is limited space, and not enough equipment. There is no space for storing frozen food, automatic dishwashers, or dryers.
- The system is currently being developed, so at present it is not possible to analyze statistical information such as patient likes or consumption information, or to manage nutritional guidance for patients.
- The large number of patients, the lack of a personnel structure, and the lack of links with the various departments means that NST has not yet been introduced. There is an awareness of its necessity.
- Special meals are created to match the patient's nutritional requirements, and so they are determined in consultation with the doctors in charge of each department and through interviews about their nutritional requirements. This requires a lot of work, and interviews with the Nutrition Department Manager show that normally another three dieticians would be needed.
- The heavy workload means that there are no surveys on how satisfied patients are or any revisions to the general meal menus.

4-12-3. Basic Operations Plan for Cho Ray Second Hospital

(1) Basic Policy

- Make an effort to improve the quality of patient nutrition management and patient services.
- Try to increase the efficiency of work through the introduction of an information system, etc.

(2) Workload Estimation

- The workload at Cho Ray Second Hospital is estimated based on the current workload at Cho Ray Hospital and the estimated number of inpatients at Cho Ray Second Hospital as shown below.
- The amount of meals is considered to be closely related to the number of inpatients.
- The amount of meals per inpatient is estimated by dividing the amount of meals by the number of inpatients at Cho Ray Hospital (d).
- The estimated number of inpatients per day at Cho Ray Second Hospital in its full operation is 950 (e).
- The total amount of meals per day at Cho Ray Second Hospital in its full operation is estimated as 777, by multiplying the amount of meals per inpatient by the estimated number of inpatietns (f).

Table 4-62 Estimated amount of meals at Cho Ray Second Hospital

Meals	Workload of Cho Ray Hospital in 2012			Estimated workload of Cho Ray Second Hospital in full operation	
	No. of meals	No. of inpatients	No. of meals per inpatient	No. of inpatients	Estimated no. of meals
a	b	c	d=b/c	e	f=d*e
General meals	400	2445	0.16	950	155
Therapeutic meals	1,500		0.61		583
Special meals	100		0.04		39
Total	2,000		-		777

Source: Compiled from materials received from Cho Ray Hospital and analyses of the medical care zone.

(3) Basic Operations Plan

- The status of nutritional intake and preferences for patients will be understood appropriately and an analysis of their nutritional state will be conducted jointly by a multidisciplinary group in consideration of the results of the various tests, to provide meals that are appropriate for each individual pathology.
- Along with introducing meal ordering, meal cancellation ordering, and a Nutrition Department system that works in concert with the electronic medical record system, as well as working to improve efficiency, the nutritional status of patients will also be managed appropriately. The Nutrition Department system will have functions to manage menus, the number of meals, and whether patients are eating, and to provide support for nutritional guidance.
- A patient satisfaction survey will be conducted regularly, and efforts will be made to enhance patient service by, for example, revising the menus.
- A greater selection of general meal menus will be prepared for patients to choose from, and efforts made to improve patient service.
- An NST Team will be established to promote active links with ward departments, and so on as the principal members.
- There will be an increased focus on the creation of clinical pathways for the principal diseases, and enhanced team treatment.
- Separate serving and clearing-up carts will be prepared and contamination managed appropriately.
- Serving and clearing up for wards will be largely done by the Nutrition Department, with the help of the ward nurses and orderlies.

(4) Basic Facility Plan

- Considering prompt transportation of ingredients delivered from outside and meals to the hospital wards, the department is located adjacent to the SPD Department on the north side on the second floor.
- An elevator dedicated to transportation of meals to the hospital wards is provided for efficient serving.
- The Table below shows the draft of main rooms' structure.

Table 4-63 Structure of main rooms (draft)

Room Name	Use and Note	No. of rooms
Kitchen	・For cooking for patients	1room
Milk formula room	・For milk formula	1room
Washing room	・For washing dishes	1room
Bottles washing room	・For washing bottles of milk etc.	1room
Service room	・Cart pool for delivering meals	1room
Strorage room	・Storage for dishes and carts	1room
Preparation room	・Preparation for cooking	1room

Source: Created by the survey team

4-13. Pharmacy Department

4-13-1. Present Conditions of Cho Ray Hospital

(1) Scope of work

- Dispensing prescription drugs for outpatients.
- Ward drug management
  Dosing regimen, mixing of drugs for injections, distribution of drugs to each department, drug management guidance (checking doctors' prescriptions, providing guidance to patients about drugs), etc.
- Chemotherapy drug co-injection, etc.

Image 9) Pharmacy

(2) Personnel Structure

- The personnel structure of the department is as shown below.
- The department has 40 pharmacists, of whom 18 university graduates.

Table 4-64 Personnel structure

Pharmacists	90 （of whom 18 university graduates）
Others	11
Total	101

Source: Compiled from materials received from Cho Ray Hospital.

(3) Workload

- Injection drug mixing workload: 18,000 per year (in 2013).
- Drug management guidance workload: 1,800 to 2,300 per day.
- Dispensing workload (number of times drugs are provided to patients)
  : Outpatients: 398,300 times per year (in 2012)
  : Inpatients: 46,200 times per year (in 2012)

(4) Outline of Operations

1) Outline of outpatient tasks

- Doctors make an order, and hand over the order details in the form of a printed prescription, which the patient then takes to the pharmacy.
- The order is sent to the pharmacy at the same time, and cross-checked at the pharmacy.
- After the drugs are dispensed, the patient is given a number of types of drugs in a package.

2) Outline of ward tasks

- The amount used per day for all departments is added up from the order information and sent to the various departments by the Department of Pharmacy.
- The nurses divide up the drugs for each patient and give them one day's dose each.
- To relieve the workload of the nurses, the Department of Pharmacy creates packages for each patient for six wards (burns, tropical diseases, etc.) and sends them to those wards.
- Each ward has a drug storeroom, which is managed by a pharmacist.
- In addition, they handle the creation of dosage plans, mix injection drugs, check the details of prescriptions, and carry out other work.

3) Drug management guidance

- Drug management guidance work involves providing guidance to patients about drugs (combining drugs, use methods, etc.).

- Unlike Japan, drug management guidance work is not measured in the medical fees.

4) Chemotherapy drug formulation

- For chemotherapy, the Department of Pharmacy mixes drugs and provides them to the wards or treatment rooms.

5) Drug purchase management

- When purchasing new drugs, a meeting of the Drug and Therapeutic Committee is held to deliberate the issue. It has around 18 members, including the Hospital Director, the representatives of each section, and the Department of Pharmacy. Each department makes proposals for the purchase of new drugs, and the committee researches whether there are equally effective drugs or not, the price, and other matters in order to make its decision.

6) Storeroom management

- Over 1,800 types of drugs are handled.
- Stock management is done using a system which uses a consignment stock system where only the amount used is billed out of the amount delivered by companies.
- The amount of drugs used each month and the use-by dates are checked and the necessary amount is ordered from the companies.

4-13-2. Present Issues of Cho Ray Hospital

- The pharmacy is located far from the wards and the Emergency Department, and drug transport is done manually, so there are problems with the traffic lines.
- There is not enough space or equipment in the Dispensing Department.
- Drugs are picked manually and this takes time.
- There is no function to check for contraindicating drugs in orders for outpatient prescriptions.

4-13-3. Basic Operations Plan for Cho Ray Second Hospital

(1) Basic Policy

- Use site planning that considers traffic lines with the related departments.
- Reduce the workload on staff by making dispensing work and transport work more efficient and by bringing in an information system, etc.

(2) Workload Estimation

- The workload of the department at Cho Ray Second Hospital shall be estimated based on the current workload and the estimated number of patients at Cho Ray Second Hospital as shown in the Table below.
- The workload per patient is estimated by dividing the current workload at Cho Ray Hospital by the current number of patients at Cho Ray Hospital (c).
- The workload at Cho Ray Second Hospital in its full operation is estimated by multiplying the estimated workload per patient by the estimated number of patients (e).

Table 4-65 Estimated workload at Cho Ray Second Hospital

Items	Workload at Cho Ray Hospital in 2012			Estimated workload at Cho Ray Second Hospital in full operation	
	Number	How to estimate the workload at CR2H	Workload per patient	Estimated no. of patients	Estimated workload
	a	b	c	d	e=c*d
No. of drug distributions per year	444,500	-	-	-	226,011
To outpatients	398,300	Correlate with the no. of outpatients	0.33	630,000	208,381
To inpatients	46,200	Correlate with the no. of inpatients	0.05	346,750	17,629
No. of instructions on the use of drugs per day	2,000	Correlate with the no. of inpatients	0.82	950	777
No. of compounding injection drugs per year	18,000	Correlate with the no. of inpatients and outpatients	0.01	976,750	8,321

Source: Compiled from materials received from Cho Ray Hospital and analyses of the medical care zone.

(3) Basic Operations Plan

- Transportation of drugs will be done in general manually through elevators located with consideration given to the traffic lines to the related departments.
- Prescription ordering, injection ordering, treatment ordering, etc. that operates in concert with the Inpatient, Outpatient, and Central Treatment Departments will be brought in. In addition, efforts will be made to increase work efficiency through the systematization of the Department of Pharmacy, including a picking system for drugs and an automated dispensing support system.
- In the wards, the Department of Pharmacy will actively continue to manage drugs within the wards, mixing, and drug guidance tasks.
- When providing drugs to patients, a three-point check of the patient's wristband, the person administering the drug, and the drug label will used in an effort to prevent patient mix-ups.
- When transporting injection drugs, in general the operation will be to pass one at a time, and, depending on the personnel structure in the Department of Pharmacy, per-ward, per-patient, or per-dosage will be studied. In the critical wards in the Emergency Department and other departments that require injections urgently, keeping a set number of injections on stock will also be studied.
- The amount held in the storeroom in the Department of Pharmacy and in the storerooms of the other departments will be managed uniformly using a Drug Master or similar method through the Department of Pharmacy system, allowing constant awareness of any immobile stock or drugs that are near their use-by date, and a system to study use promotion measures by the Drug and Therapeutic Committee or similar groups will be developed.
- Having the Drug and Therapeutic Committee or similar groups make the decision on the use of new drugs will be studied. In addition, reducing the number of item will also be studied.

(4) Basic Facility Plan

- In consideration of delivery and management of drugs, the Department of Pharmacy is located on the second floor together with other SPD related departments centering on the transportation hall.
- An elevator to transport patients is directly connected to the Department of Pharmacy for prompt supply to hospital wards and other departments, including the outpatient ward.
- The Table below shows the draft of main rooms' structure.

Table 4-66 Structure of main rooms (draft)

Room Name	Use and Note	No. of rooms
Prescription laboratory	・For prescription	1room
Clean room	・For sterile prescription	1room
Washing room	・For washing bottles	1room
Cart storage	・Carts for supplying drugs	1room
Drug storage	・For drug storage	1room
Low temperature storage for drugs	・Drug refrigerator	1room
General storage	・Storage for general goods	1room

Source: Created by the survey team

4-14. Central Sterilized Supply Department

4-14-1. Present Conditions of Cho Ray Hospital

(1) Workload

- The current workload of the dearptment is as shown below.

Table 4-67 Volume of sterilization per day

Items	Sterilization volume
Linen	1,500 kg
Surgical instruments sterilized by autoclaves	1,200 kg
Surgical instruments sterilized by low temperature plasma autoclaves	350 kg
Instruments supplied for other Invasive procedures	500 kg
Total	3,550 kg

Source: Compiled from materials received from Cho Ray Hospital.

(2) Personnel Structure

- The current personnel structure of the dearptment is as shown below.

Table 4-68 Personnel structure

Doctors	3
Nurses	25
Medical technicians	2
Others	3
Total	33

Source: Compiled from materials received from Cho Ray Hospital.

(3) Outline of Operations

1) Outline

- Responsible for sterilization for the entire hospital as one department belonging to Infection Control Department.
- The department is divided into the three areas of Contaminated, Washed, and Sterile.
- Sterilization and washing is done according to the Spaulding classification and MOH's guideline. The number of items required by the various wards is entered the day before, referenced by the department at six am in the next morning, and the required items are supplied to the various wards.
- Some materials are managed individually, but in general, surgical equipment is managed as sets for each type of surgery.
- There are some cases where a consumable item that would only be used once in Japan is reused.
- There is a system in place to notify the rest of the hospital immediately when an infection is discovered as a result of testing.

Image 10) Central Sterilized Supply Department

2) Systematization

- The traceability system is scheduled to be started in 2014. This system will use barcode management.

3) Training system

- Sterilization staffs are taught by the Infection Control Department Manager. The Manager is one of the pioneers in training for sterilization and teaches courses in many hospitals and at the university.

4-14-2. Present Issues of Cho Ray Hospital

- The department lacks space.
- The air conditioning system for controlling infection is inadequate. The process of washing, assembling, sterilizing, storing, and supplying prepared instruments crosses the narrow space,which makes infection control inadequate.
- Few specialists qualified in sterilization in Vietnam..
- Being able to narrow down as much information as possible for the origin of an infection is key in preventing infection, but at present information is only collected for the hospital as a whole and for the ICU.

4-14-3. Basic Operations Plan for Cho Ray Second Hospital

(1) Basic Policy

- Ensure sufficient space for the facility, equipment, and cleanliness management.
- Ensure there are specialist staffs for sterilization and carry out high quality sterilization work.
- Standardize sterilization work to make it more efficient, which will contribute to prevent hospital-acquired infections.

(2) Workload Estimation

- The estimated volume for sterilization in Cho Ray Second Hospital has been calculated as shonw in the Table below, by setting a highly relevant index (d) related to the current volume of sterilization at Cho Ray Hospital (b), and calculated sterization volume per indicator (e).
- The estimated related indicators for Cho Ray Second Hospital when it is at full operation were calculated (f), and correlating it with caluculated sterization volume per indicator to caluculate estimated sterilization volume at Cho Ray Second Hospital in full operation (g)
- For example, we assume that surgical instruments sterilized by autoclaves are correlated with the number of surgery (c).
- The amount of surgical instruments sterilized by autoclaves per day at Cho Ray Hospital is 1,200kg (b). The number of surgery per day is 134 (d).
- The amount of sterilized instruments per surgery is calculated as 8.93kg (e), dividing the indicator (b) by the indicator (d).
- The estimated number of surgery at Cho Ray Second Hospital when it is in full operation is, as shown at 4-8-3., 13,286 per year. It is 44 surgeries per day (f) assuming the operation days as 300.
- The estimated amount of sterilized surgical instruments at Cho Ray Second Hospital is 393kg (g), multiplying the amount of sterilized surgical instruments per surgery 8.93kg (e) by the number of surgery per day (f) .

Table 4-69 Estimated sterilization volume per day at Cho Ray Second Hospital

Items	Workload at Cho Ray Hospital in 2012				Estimated workload at Cho Ray Second Hospital in full operation	
	Volume	How to estimate the workload at CR2H	Related indicators	Sterilization volume per indicator	Estimated related indicators	Estimated sterilization volume
a	b	c	d	e=b/d	f	g=e*f
Linen	1,500 kg	Correlate with the no. of inpatients	2,445 patients	0.61 kg	950 patients	583 kg
Surgical instruments sterilized by autoclaves	1,200 kg	Correlate with the no. of operations	134 cases	8.93 kg	44 cases	393 kg
Surgical instruments sterilized by low temperature plasma autoclaves	350 kg	Correlate with the no. of operations	134 cases	2.60 kg	44 cases	114 kg
Invasive instruments	500 kg	Correlate with the no. of operations	134 cases	3.72 kg	44 cases	164 kg
Total	3,550 kg	-	-	-	-	1,254 kg

Source: Compiled from materials received from Cho Ray Hospital and analyses of the medical care zone.

(3) Basic Operations Plan

- Develop facility/human systems that can support the estimated number of surgeries in the future.
- Delivering, receiving, storing instruments will be managed totally by ICT if possible.
- Regulate a training program for staff and train high quality staff. Specifically, train staff to ensure that they are familiar with handling the various washing and sterilizing equipment needed for sterilization work, are skilled in putting together sets of equipment required for surgery, and can handle the appropriate storage and inspection work, etc.
- Avoid single washing in wards, etc. of used equipment, and centrally manage the tasks generated in the hospital from washing sterile equipment to disinfection, assembly, sterilization, and dispensing at the department, and work to ensure staff safety and increase the efficiency of sterilization work.
- Develop a series of manuals for the work (SOP, Standard Operating Procedure). In particular, ensure that management uses the various indicators in order to ensure sterilization. (Examples: Constantly monitor the physical indicators,[10] and record whether the sterilization conditions are being met. The chemical indicators[11] are used on the inside and outside of the pack each time, and the user checks that the equipment is sterilized. The biochemical indicators[12] are used once per week to check that the sterilization effects are being checked directly.)
- Make efforts to reduce the preparation workload by creating containers of surgical instruments and kits of medical supplies.
- Study a system that will allow patient histories to be managed on a per-container basis for equipment if possible, as medical supplies are supplied with consideration to preventing infection.

(4) Basic Facility Plan

- Located adjacent to the Operation Department to enable the prompt supply of sterilized materials.
- In this department, cleaning, disinfection, assembly, sterilization, storage and supply areas are clearly segmented for efficient one-way operation.
- Designed to smoothly provide supplies to departments other than the Operation Department, such as hospital wards, and to address emergency surgery which can be expected from the increased volume of emergency patients.
- The Table below shows the draft of main rooms' structure.

Table 4-70 Structure of main rooms (draft)

Room Name	Use and Note	No. of rooms
Washing room or dirty room	・For washing unsterilized instruments	1room
Setting up and Sterilization room	・For setting up and sterilizing instruments	1room
Storage and supply room	・Storage for sterilized instruments and for supplying	1room

Source: Created by the survey team

4-15. Medical Equipment Department

To be described in detail in Chapter 12

4-16. Training Center

To be described in detail in Chapter 14

[10] Physical indicators: To check that the temperature, time, pressure, etc. in the sterilization process are appropriate.
[11] Chemical indicators: To check that the heat or gas or other sterilization effects have reached within the package of the item to be sterilized in the sterilization process.
[12] Biochemical indicators: To detect the actual killing of spores and sterilization within a sterilizer.

4-17. Regional Medical Liaison Department /DOHA

4-17-1. Present Conditions of Cho Ray Hospital

(1) Details of Work

- Planning related to hospital operations
- Information system management
- Medical information management
- Referral system management
- Medical records management

Details of the referral system which Regional Medical Liaison Department shall mainly deal with are given below.

(2) Referral System Outline

Cho Ray Hospital is part of the top Central Level of the referral system for public hospitals, forming one apex of the three top referral hospitals along with Bach Mai Hospital and Hue Central Hospital.

According to "Project on Satellite Hospitals," "Project 1816," and others, Vietnam overall is transferring technology from central hospitals to lower-level hospitals, moving ahead with a project to establish satellite hospitals for central hospitals, with the goal of improving the service of treatment at lower-level hospitals and reducing the workload of central hospitals. With the 2013 decision of the Prime Minister, satellite hospitals of fourteen central hospitals have been targeted for this project to transfer technology from central hospitals to satellite hospitals in the five fields of cancer, trauma, heart disease, perinatal period, and pediatric care.

Cho Ray Hospital is responsible for transferring technology to satellite hospitals in the two fields of trauma and heart disease. Trauma is being taught to the two hospitals of General Hospital of Dong Nai and Tien Giang Hospital, and heart disease Khan Hoa Hospital, Tieng Gian Hospital, and Thong Nhat Hospital of Dong Nai.

At Cho Ray Hospital, about half of both the inpatients and outpatients use the referral system to come to the hospital, but the other half are emergency patients and those who come directly. In addition, as shown in the Table below, counter referral rate is 17.0%, which means about 80% of discharged patients are not given counter referrals. Cho Ray Hospital has six backup hospitals, called the "Workload Reduction Model," and often sends patients there rather than to where they were originally referred from, which is one reason for this trend.

Table 4-71 Numbers of patients with or without referrals in 2012 at Cho Ray Hospital

	No. of referral or counter referral patients	No. of patients without referrals or counter referrals	Total	Referral rate	Counter referral rate
No. of new inpatients	62,682	56,415	119,097	52.6%	-
No. of discharged patients	20,259	98,773	119,032	-	17.0%
No. of outpatients	578,750	625,432	1,204,182	48.1%	-

Source: Compiled from materials received from Cho Ray Hospital

(3) Workload Reduction Model

Cho Ray Hospital has six backup hospitals shonw in the Table below, in what it terms its "Workload Reduction Model." In the Workload Reduction Model, hospitals accept patients discharged from Cho Ray Hospital who are out of the acute phase, contributing to alleviating the burden on Cho Ray. Cho Ray Hospital sends doctors and nurses to each hospital to provide treatment jointly.

Table 4-72 Cho Ray Hospital Workload Reduction Model

	7A Military Hospital	Nursing Rehabilitation Hospital	175 Military Hospital	International Neurosurgery Hospital	1A Hospital	Dialysis Hospital
Address	District 5	District 8	Go Vap District	District 11	District 11	District 5
Administrative organizations	Military	DOH	Military	Private	MOH	Private
Main functions	Cancer（chemotherapy）Orthopedics	Neurosurgery Orthopedics	Cancer specialized hospital	Neurosurgery	Head injury Neurology	Dialysis

Source: Compiled from materials received from Cho Ray Hospital

The Workload Reduction Model was created by joining Cho Ray Hospital and the other hospitals through contracts. Each of the other hospitals can present its requests, and Cho Ray Hospital can also consult them in turn. When the target hospitals are listed, the director of each department will observe the hospital concerned at the direction of the Hospital Director, and the General Planning Department carries out the legal procedures, while the contract is signed following a final decision by the Hospital Director.

Cho Ray hospital is studying the further expansion of the Workload Reduction Model, but there are a large number of private hospitals in the area, and so patients' medical costs will increase, so it needs to consider the matter very carefully. In addition, there have been some strongly-voiced complaints from the media about the Workload Reduction Model, saying that, for example, it does not fully treat patients. For these reasons, it will be hard to expand.

4-17-2. Present Issues of Cho Ray Hospital

The following issues can be raised as the major factors for why patients come to Cho Ray Hospital directly.

(1) Brand Consciousness of Patients and the Lack of Top Referral Hospitals

Patients want the best medical treatment and facilities they can have, so they tend to prefer to directly visit top referral hospitals that are the highest ranked public hospitals. The low numbers of top referral hospitals is another factor.

(2) The Low Level of Medical Treatment at Lower-level Hospitals

Compared to the top referral hospitals, the level of medical treatment at lower-level hospitals is low, and the staff and patients of top referral hospitals have no faith in the level of medical treatment at lower-level hospitals. However, the quality of treatment at some lower-level hospitals has been improving thanks to the satellite project, and they have also been improving their facilities and equipment through, for example, rebuilding. Along with working to increase the quality of treatment at lower-level hospitals through the satellite project and other means, quality indicators and other means could be used to make the level of medical treatment at lower-level hospitals clear and administrative bodies could work on spreading awareness.

(3) Lack of Awareness about the Referral System and Insurance System

There are cases where the patients do not understand the referral system, which is closely linked with the insurance system. Both patients and local medical institutions need to be made equally aware of the referral system.

(4) Lack of Information Exchange with Lower-level Hospitals

In order for the referral system to function smoothly, it is vital that information be exchanged between hospitals. However, there is no department at Cho Ray Hospital that has jurisdiction over patient dealings with lower-level hospitals, and there is a lack of information exchange with lower-level hospitals. Patients who are sent for emergency treatment are sent without any advance notification.

Information exchange for referral patients is generally done on a paper basis (referral letters, medical records), but as the National ID spreads, there is a need to promote sharing and computerization of patient information.

In addition, doctors are too busy to respond to the referring medical institutions.

(5) Traffic Lines for Referral Patients and General Outpatients are not Kept Separate

Outpatients to Cho Ray Hospital are registered without differentiating between whether they are general patients or referral patients, and most patients are mixed together. It is necessary to set up a counter or registration room for referral patients to reduce the amount of time they have to wait.

(6) Low Level of Medical Costs

One major factor is that Cho Ray Hospital and the other public hospitals, such as the provincial hospitals and district hospitals, have generally the same fee system, and are cheaper than private hospitals even without going through the referral system. It may be necessary to revise the fee system, which the Ministry of Health is currently studying, in such ways as setting higher fees for the advanced treatment provided by the top referral hospitals.

(7) Lack of Primary Care Doctors

To prevent a concentration of patients at Cho Ray Hospital, local Health Commune Centers should treat patients as primary care doctors and refer them to the appropriate lower-level hospital in accordance with the severity of their condition. However, with the current lack of primary care doctors themselves, and the lack of understanding by primary care doctors of the referral system, patients with serious cases are sent to Cho Ray Hospital.

4-17-3. Basic Operations Plan for Cho Ray Second Hospital

(1) Basic Policy

- Strive to improve the functions of the referral system by establishing a Community Medical Cooperation Department in both Cho Ray Hospital, which currently does not have such a department, and Cho Ray Second Hospital, stepping up cooperation between the two hospitals, and furthermore ensuring that the two hospitals join forces in working closely with other related hospitals
- The roles of the Community Medical Cooperation Department include external relations with other medical institutions, management of information on the hospital's referral patients, and coordination and support for patients after discharge from hospital, and currently part of these roles is undertaken by the General Planning Department. (The General Planning Department is responsible for gathering and managing diagnosis and treatment information and managing diagnosis and treatment records, and duties related to referral patients are excluded from its responsibilities. The details of the operations plan for the department shall be shown at 4-17 Administrative Department.)
- Guide lower-level hospitals in satellite projects and other undertakings

(2) Basic Operations Plan

1) Management of referral patient information

- Information on referral patients should be managed by the Community Medical Cooperation Department in an integrated manner so that it is shared with other medical institutions in advance mainly through telephone, facsimile, and information systems. In addition, patient information gathered in advance should be shared among related departments in the hospital using the electronic medical record system and other tools.

- The Community Medical Cooperation Department should take leadership in starting up an organization to consider ways of improving the referral system. The duties of this organization should include confirmation of information on referral patients, clarification of the present condition of the referral system and identification of its challenges, confirmation of diagnosis and treatment information at hospitals that refer patients, and guidance of such hospitals for improvement.

2) Coordination and support for discharge from hospital (promotion of counter referral)

- Return patients as much as possible to the medical institutions that referred them after they are discharged from hospital (counter referral), thus establishing closer cooperation in the community and providing integrated medical care from the acute to sub-acute to chronic phases.
- Manage the status of return calls to medical institutions that refer patients to the hospital on a department-by-department and doctor-by-doctor basis under the leadership of the Community Medical Cooperation Department in order to ensure that return calls are made without fail
- Like Cho Ray Hospital, Cho Ray Second Hospital should work with the current six Workload Reduction Model hospitals of Cho Ray Hospital (which serve as Cho Ray Second's backup beds) other than medical institutions that refer patients to the hospital in order to secure institutions that accept the patients after they are discharged from hospital. The number of Workload Reduction Model hospitals should be increased with the approval of the director as required. To that end, it is necessary to exchange actively with lower-level hospitals for close cooperation under the leadership of the Community Medical Cooperation Department.
- The Community Medical Cooperation Department consists mainly of nurses and medical social workers (MSWs) because they are required to have skills not only to provide support to patients when they are hospitalized and then discharged with their conditions taken into consideration but also to help coordinate and solve psychological and social problems that patients and their families face and to encourage social rehabilitation. These personnel are also required to have a high level of communication skills because they need to not only provide health care to patients but also to work closely with medical institutions in the community.

3) Guidance for lower-level hospitals

- Coordinate guidance for lower-level hospitals in cooperation with the training center.
- In 2013, the Prime Minister decided to ensure that stronger human resource development and other measures should be taken in five areas: cancer, traumatic injuries, heart diseases, perinatology, and pediatric medicine. Among these designated areas, Cho Ray Hospital is responsible for playing a leading role in the fields of traumatic injuries and heart diseases. As the number of patients with heart diseases is expected to grow in the future, Cho Ray Second Hospital should consider such diseases as a major pillar of its diagnosis and treatment, and together with Cho Ray Hospital, it should play a leading role in guiding satellite hospitals in the community. With respect to traumatic injuries and cancer, which are similarly expected to affect more people, it should also consider playing a leading role in guiding lower-level hospitals in cooperation with Cho Ray Hospital.

4) Activities for spreading clinical pathways

- Share in-hospital clinical pathways prepared in cooperation with Cho Ray Hospital with lower-level hospitals, thus increasing the number of workload reduction model hospitals, establishing closer cooperation with hospitals that have functions similar to those of such model hospitals, and reducing the overall workload of Cho Ray and Cho Ray Second Hospitals

5) Flow of diagnosis and treatment for referral patients

- The Figure below shows the flow of diagnosis and treatment for referral patients
- Ensure that referral patients are received separately from general outpatients in an effort to provide better amenities to referral patients
- Information on referral patients should be managed by the Community Medical Cooperation Department in an integrated manner for the purposes of reporting to committees and other organizations, confirming information on diagnosis and treatment at referring medical institutions, and guiding such institutions for improvement.
- The Community Medical Cooperation Department should take leadership in coordinating the discharge of patients from the hospital, giving feedback information on diagnosis and treatment to medical institutions that receive patients after discharge, and taking other follow-up measures.

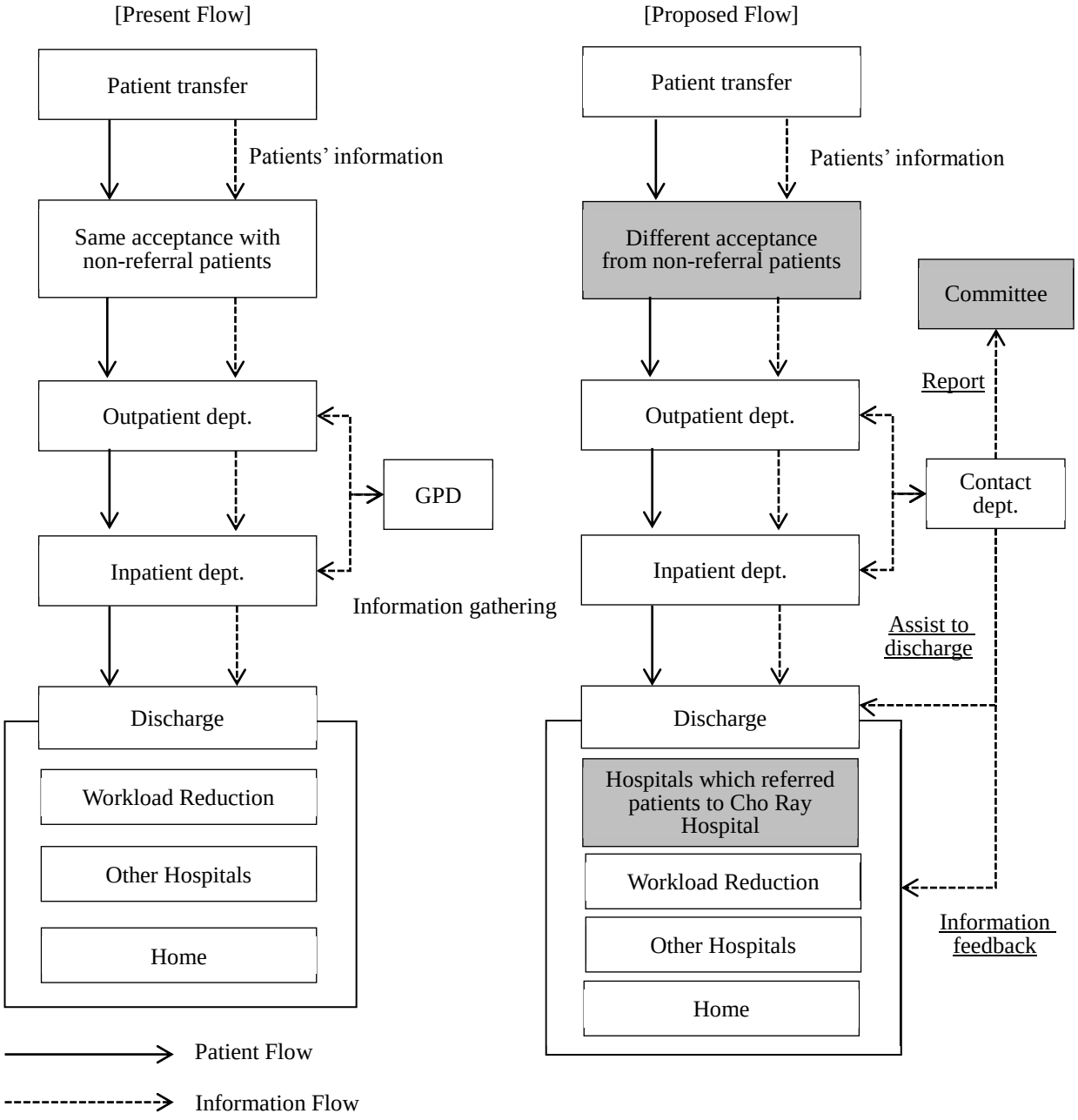


Figure 4-1 Flow of diagnosis and treatment for (general) referral patients (draft)

6) Flow of diagnosis and treatment for emergency patients (referred by other hospitals)

- The Figure below shows the flow of diagnosis and treatment for emergency patients
- Before emergency patients referred by other hospitals are brought to the hospital, information on the patients should be collected by the Community Medical Cooperation Department and conveyed to the Emergency Department.
- After emergency patients are treated by the Emergency Department, the Community Medical Cooperation Department should play a central role in managing information on these patients, coordinating and supporting their discharge from hospital, and providing other services as with ordinary referral patients.

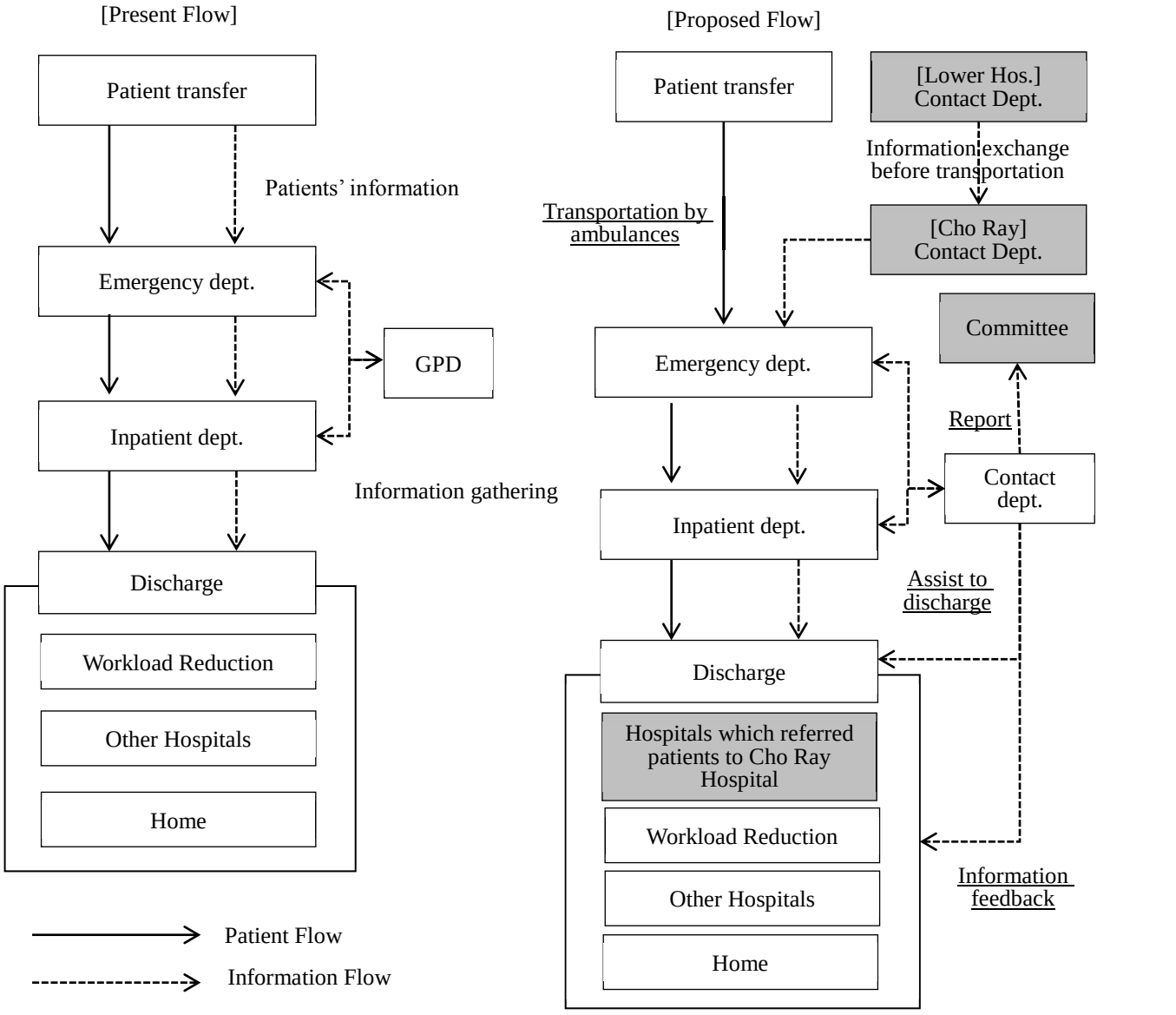


Figure 4-2 Flow of diagnosis and treatment for emergency patients (as referred by other hospitals) (draft)

(3) Basic Facility Plan

- Regional Medical Liaison Room, consultation rooms, and other rooms
- The Regional Medical Liaison Department is located adjacent to the Outpatient Department to strengthen cooperation with related hospitals and the referral system. In addition, auditorium shall be located near the entrance in order for easy access from the outside to improve regional medical cooperation and for the effective training. The elevators shall also be located near the entrance, making it easy to access to the traning center located at the top floor.
- The consultation desk, adjacent to the outpatient entrance, addresses referral patients to improve the current situation of referral consultation.
- The consultation desk is located adjacent to the Regional Medical Liaison Department to enable sufficient coordination.

4-18. Supply Processing and Distribution Department

4-18-1. Present Conditions of Cho Ray Hospital

(1) Details of Work

- There are three main departments that handle supplies, and the supplies they handle are those shown below.

Table 4-73 Outline of supplies management

Department of supply processing and distribution	The department manages stationery,sanitary items, bed sheets, fuel, uniforms, medical gas, construction materials, furniture, tea, etc. They also manage the outsourcing jobs such as cleaning and laundry.
Department of medical equipment	Medical equipment
Department of pharmacy	Drugs and medical materials

Source: Compiled from materials received from Cho Ray Hospital

(2) Outline of Operations

1) Purchasing

- Purchasing for office supplies is done using competitive bidding to keep prices down.
- Office supplies are purchased a month's worth at a time, and as there is no storage space in the central storeroom or elsewhere, they are distributed to the various departments immediately. Any supplies lacking are ordered when they are needed.

2) Stock management

- Stock management for office supplies is done using the same consignment stock system of paying only for the items used that the Department of Pharmacy uses, which means that there is no unwanted stock.

3) Contractor management

- Contracts out the laundry and cleaning work, and manages the contracted work.
- Items covered by this are mainly the laundering of patient hospital gowns and bedding. Staff clothing and surgical gowns are laundered by the staff.
- When selecting a contractor, the person in charge visits the company to check the quality. There is regular monitoring following the selection.

4-18-2. Present Issues of Cho Ray Hospital

- Management of office supplies is not computerized, so it takes extra work.
- There is limited storage space in the central storeroom and other areas.
- There are no manuals for item storage.
- There is no space to dry laundry.
- Laundry of surgical gowns is done by the staff, but there are issues with hygiene, as surgical instruments are sometimes found in the gowns.

4-18-3. Basic Operations Plan for Cho Ray Second Hospital

(1) Basic Policy

- Ordering, purchasing, and stock management for office supplies in the hospital will be done in bulk by the Supply Management Department as a rule.
- Reduce the staff workload by making transportation work more efficient and introducing an information system, etc.
- Ensure there is enough storage space for supplies and carry out appropriate stock management.
- Hygiene management for laundry and cleaning work will be done based on health grounds according to the ATP testing method,[13] etc.

(2) Basic Operations Plan

- Ordering, purchasing, and stock management of office supplies in the hospital will be done in bulk by the Supply Management Department as a rule, and efforts made to manage stock appropriately. Pharmaceuticals will be managed by the Department of Pharmacy and medical equipment by the Medical Equipment Department. The Medical Equipment Department will carry out efficient purchasing, operation, maintenance, inspection, management, etc. of medical equipment through unified management of all medical equipment within the hospital. (See Chapter 12 for more detail)
- Transport of supplies within the hospital will be done by people using elevators located nearby, and carry out messenger work based around the Supply Management Department.
- Purchasing supplies will be done by comparative studies of quality and cost over several companies.
- The person in charge of ordering and the person in charge of acceptance inspections will be separated, in order to ensure that internal check functions are working.
- Appropriate stock management and prompt ordering will be achieved through the introduction of a supplies management system.
- As a rule, each department will carry out stocktaking at least twice a year to check and adjust their stock levels.
- A manual will be created showing the sequence of tasks related to distribution management, and used to make work more efficient and to train personnel.
- To allow scientific, hygienic management for hygiene tasks such as laundry and cleaning, outsourcing to Japan-based companies, etc. will be considered.

(3) Basic Facility Plan

- The SPD Department, which manages supplies, is located on the second floor and is clearly divided into outpatient, staff and emergency traffic lines for prompt and efficient facility management.
- The Supply Management Department is located off the transportation hall and adjacent to the elevator to transport patients to achieve prompt inspection, storage and payment for supplies and efficient management.
- The Table below shows the draf of main rooms' structure.

Table 4-74 Structure of main rooms (draft)

Room Name	Use and Note	No. of rooms
Materials stroage room (central storage)	・The central storage for goods and materials in the hospital	1room
Storage for stockpile in case of emergency	・Storage in case of emeregency	1room

Source: Created by the survey team

[13] ATP testing method: Adenosine triphosphate (ATP), which exists within the cells of all living things, produces light when combined with an enzyme, and the amount of light it emits (in Relative Light Units, RLU) is measured and used to check the degree of contamination of instruments, for example, or the extent of washing.

4-19. Administrative Department

4-19-1. Present Conditions of Cho Ray Hospital

(1) Details of Operations

- Operations of the administrative department are as shown below.

Table 4-75 Organizational structure of the administrative departments and their operations

General planning department	Management of medical statistics and medical charts etc.
Administrative department	Management of the documents of laws and decrees, medical accidents and lawsuits, responding to complaints from patients, secretarial work of the director, call center, public relations, management of outsourcing jobs, financial management of the hospital, etc.

Source: Compiled from materials received from Cho Ray Hospital

(2) Outline of Operations

1) Management of diagnosis and treatment information

- Certain statistical information such as the number of patients per department, by ICD10 code, and by region is managed.
- MOH's laws require hospitals to store paper medical records, and all medical records printed out of the electronic medical record system are stored.
- The Outpatient Department has introduced electronic medical records, but the Inpatient Department has not.

2) Handling complaints

- It has been decided that a hot line should be installed to receive complaints in accordance with the Ministry of Health's Procedures for Receiving and Handling Complaints from Patients about Diagnosis and Treatment Services through a Hot Line (01/QT-BVCR, 2013). Cho Ray Hospital has three hot lines, which have received 81 complaints during the past three months. One of them is for the director, and the others are connected to the operator. There are many hot lines connected directly to the director.
- In addition, letter boxes for patients are installed in the hospital in order to collect their opinions.
- Specifically, complaints concern waiting time, the content of treatment, patient services, facilities, and so forth. Many of them are about the content of treatment and patient services.
- After they receive complaints, hot-line officers respond to them by calling back the complainants in ten to 15 minutes. For complaints that take time to handle, they call the complainants back at a later date, write letters, or send email.
- Training is provided for all job types as part of the measures to provide better hospitality. Depending on the content of training, external lecturers such as teachers from law schools are invited to training sessions. Roughly 80% of personnel participate in the training program, which is offered about twice a year.
- Complaints about waiting time are handled mainly by improving the waiting facilities, including the expansion of hallways and building additional testing and diagnosis rooms.

3) Response to medical accidents

- If a medical accident occurs, Cho Ray Hospital handles it in accordance with relevant laws. Serious accidents are discussed by a committee that includes the director, the doctors involved, and other parties concerned, and all measures taken for such accidents require the approval of the director.

- Only one of the accidents that have occurred during the past five years developed into a lawsuit. In most of the accidents, a settlement is reached before they are taken to court.

4) Public relations activities

- Public relations activities consist mainly of measures taken for mass media and international exchange. Cho Ray Hospital does not carry out public relations to attract patients.

5) Management of outsourcing jobs

- Cho Ray Hospital outsources the cleaning and laundry in the hospital.
- The followings are the workload of laundry.
  - Patient, relatives clothes,staff's uniform: 45,000kg per month
  - Bed sheets: 70,000 kg per month
  - Operation linen: 45,000 kg per month
- Operation line is laundered in the hospital because there is no laundry companies in Ho Chi Ming City which have the permission and facilities to launder contaminated linen.

6) Administration and financial management

- Administration and financial management officers are chiefly responsible for compiling annual budgets for the hospital, analyzing its business performance, and convening a meeting of the in-hospital management council annually.

4-19-2. Present Issues of Cho Ray Hospital

- Cho Ray Hospital has many documents such as complaints from patients about medical accidents, medical records, and MOH's circular notices, but there is no place to store them. It rents external warehouses three to four kilometers away from the hospital. It takes time and labor to go and pick up documents.
- The business plan for the entire hospital, which is developed by the Finance Department, covers only one year, and no medium- to long-term plans are drawn up based on a hard look at what things will be like three to five years from now.
- Paying fixed amounts of salary to personnel is cited as a management task, but nothing else is recognized as such. Cho Ray Hospital does not identify its challenges by comparing it with and analyzing other top referral hospitals.
- Certain diagnosis and treatment information is managed, but detailed data are not collected that lead to evaluation of the quality of medical service such as waiting time before the reception of outpatients and the number of retests and X-ray photographs taken.
- There are problems with operational efficiency with only part of the operations systematized. In particular, Cho Ray Hospital is delayed in systematization at the Inpatient Department.
- According to MOH's regulations, hospitals are required to store medical records in paper form even if they have introduced electronic ones, and therefore, a sufficient storage space is needed.

4-19-3. Basic Operations Plan for Cho Ray Second Hospital

(1) Basic Policy

- In order to manage Cho Ray and Cho Ray Second Hospitals in an integrated manner, operations such as personnel administration and labor affairs, facility management, procurement, management planning, finance, medical information management, and community medical cooperation should be controlled together as part of the headquarters.
- Management plans should be developed from a medium- to long-term perspective and carried out while implementing the PDCA cycle.
- A statistical system should be introduced that enables the hospital to gather and analyze diagnosis and treatment information that leads to evaluation of the quality of medical service.
- An appropriate space should be secured to store records of diagnosis and treatment and other documents.

(2) Basic Operations Plan

- Develop a medium- to long-term management plan that covers three to five years taking into consideration the present state of management, movements of administrative agencies, and future trends in diseases and carry it out while implementing the PDCA cycle.
- In analyzing the present state of management, management tasks should be identified and analyzed by through comparison with other MOH-controlled hospitals and top referral hospitals, particularly Bach Mai and Hue Hospitals, and improvement plans should be developed and implemented. In developing and implementing improvement plans, working groups consisting of five to ten members should be formed for each subject for detailed consideration.
- Consider introducing systems to enable integrated collection and control of diagnosis and treatment information, management data, etc., develop databases of diagnosis and treatment information, and create various clinical indicators in order to effectively use them for data-based hospital administration and examination of treatment policy
- Ensure that diagnosis and treatment records can be shared by various job types on computer terminals mainly through electronic medical records with the aim of speeding up diagnosis and treatment and promote health care by medical teams
- Develop managers versed in both medical care and business administration, make appropriate investments under sound management policy, and thus aim to establish a system to maintain the quality of medical care
- In case there is no laundry company with high-quality at the time of the opening, laundry should be planned to be done in the hospital.

(3) Basic Facility Plan

- Rooms for managers such as the director, deputy director, and head nurse, doctor's offices, conference rooms, administrative offices, rooms for medical record management, medical record strorage room, auditorium, and so forth
- The Department of General Affairs and Administration will be on the 10th floor, which will be the same as the Medical Office and Training Center, for efficient operation.
- Medical Offices are integrated with the Training and Research Departments in the Training Center to enable sufficient coordination and functionality as an educational, training and research hospital.
- A large auditorium will be placed on the first floor to provide education and training services, and is to be used as an emergency examination area and shelter in the event of a disaster or pandemic.
- A garage for official vehicles and other facilities (space for 25 vehicles, maintenance space, warehouse, etc.) is planned in other building outside the hospital facility.
- If there is no laundry company with high-quality, laundry spaces are required such as dirty area, cleaning area, and storage and supply rooms are required.

4-20. Proposals for MOH and Ho Chi Minh City's DOH

4-20-1. Emergency and Disaster Medicine

- Currently, emergency patients are brought into the Emergency Department of Cho Ray Hospital without patient information being provided by ambulance squads or medical institutions in advance. The advance sharing of patient information is expected to contribute to swifter triage and a higher lifesaving rate. The major reason patient information is not shared in advance is that there are no statutory regulations to ensure it. Therefore, it is necessary to stipulate by law that patient information should be shared in advance when patients are brought into hospitals.
- In Japan, emergency call centers are installed in each prefecture. If a person gets sick or injured person, the call center checks the patient's conditions via phone and gives appropriate advice on where and how the patient should be transported. This prevents ambulances from being dispatched unnecessarily and enables ambulances to be provided to seriously sick or injured persons who require ambulance transportation. It would be beneficial to install emergency call centers in Ho Chi Minh City using those in Japan as examples.

4-20-2. Rehabilitation Department

- The remuneration for one session of rehabilitation is low, at about 1,000 VND (about five yen). Rehabilitation rich in content contributes to better QOL for patients, and it is hoped that the remuneration will further be increased. Japan and Vietnam cannot be compared simply, but in Japan, points worth around 2,000 yen are given for one session of rehabilitation, making rehabilitation a hospital's source of income.

4-20-3. Pharmacy Department

- Cho Ray Hospital provides inpatients with medication management and instruction, but this service is not covered by the remuneration for medical treatment. Appropriate medication management and instruction enhances the effects of pharmacotherapy and at the same time allows pharmacists to display their high technical knowledge, and it is a service that needs to be properly evaluated in the assessment of remuneration for medical treatment. In Japan, a value of 3,000 to 4,000 yen is set for this service, making medication management and instruction a source of income for the Department of Pharmacy.

4-20-4. Team Approach to Medicine

- A team approach to medical treatment such as nutrition support teams (NST) and infection control teams (ICT) is not covered by remuneration for medical treatments, either. It aims to enhance the quality of medical treatments by encouraging specialists to work together as medical treatment becomes increasingly complicated and advanced, and in the future, it will be indispensable in Vietnam, too. In Japan, such an approach is evaluated as an act of diagnosis and treatment that involves health care workers other than doctors earns 2,000 yen paid per session of treatment by NST and 1,000 to 4,000 yen by ICT.

4-20-5. Referral System

- One of the reasons the referral system does not work properly is lack of understanding about the system on the part of patients and medical institutions in the community. For this reason, patients tend to directly consult a doctor at one of the top referral hospitals such as Cho Ray Hospital, and doctors at lower-level medical institutions such as health commune centers tend to refer patients to Cho Ray Hospital if they are seriously sick or injured. It is necessary for administrative agencies to actively educate patients and local residents in this system using mass media such as newspapers, television, and the Internet as well as other media. The educational program on the referral system, which is planned for medical institutions in the province of Hoa Binh, needs to be implemented in the southern region as well.
- It is necessary to develop family doctors, who diagnose and treat patients periodically and refer them to appropriate medical institutions according to their conditions.
- It is also necessary to continue improving the functions of lower-level hospitals through satellite projects and other initiatives.

Chapter 5. Planned Construction Site and Existing Hospital Findings

Chapter 5. Planned Construction Site and Existing Hospital Findings

5-1. Construction Site Survey

5-1-1. Construction Site Summary

The planned construction site of Cho Ray Second Hospital is located in Ho Chi Minh City's Binh Chanh District in the Le Minh Xuan 3 Industrial Park. Currently farmland, it is 16 km west of the city center. Located approximately 12 km in a direct line from the current Cho Ray Hospital, it is about 30 minutes by car, but can take nearly an hour depending on traffic conditions.

Ho Chi Minh City has an area of 209,555 km², about the same size as Tokyo (218,758 km²), and a population of 7,791,789 (2012 HCMC City Statistics). The Binh Chanh District, at 252.69 km², is the third largest in Ho Chi Minh City, and has 491,900 people (2012 HCMC City Statistics). Referred to as the "gateway of the west" because it lies along the southwest periphery of Ho Chi Minh City, it has become the entrance to Ho Chi Minh City from the Mekong Delta region. Although farmland and forest areas are currently scattered throughout parts of Binh Chanh District, due to a change in the employment structure and rapid population growth, population is expected to increase to 600,000 by 2015, and 750,000–800,000 by 2025 (Ho Chi Minh City Future Population Urban Planning Master Plan, October 2012) as urbanization continues at a fast pace.

Le Minh Xuan Commune is 35 km² with a population of 26,530 (2006 Bin Chanh District City Plan Statistics). The Saigon VRG Investment Holding Corporation (Saigon VRG) obtained land use rights for planning and development from the Ho Chi Minh City People's Committee.

The planned construction site of the Cho Ray Second Hospital is in a corner of the Le Minh Xuan 3 Industrial Park compound. Provincial Road #10, which is one of the roads radiating from central Ho Chi Minh City, is the main access.

Construction has already commenced on the plan to widen Provincial Road #10 (present width: 15 m) to 40 m. The eastern part of Provincial Road #10 is connected to National Highway 1A. It is expected to connect to Can Tho Expressway (plan) that will link the Mekong Delta region and Ho Chi Minh City by way of the same road. Additionally, the western part of Provincial Road #10 is planned to connect with Ring Road No. 3, one of the peripheral roads around Ho Chi Minh City. It is thought that access from the southwestern part of Vietnam will be good if this road network is maintained. (See Figure 5-1)

There are mainly three reasons that the Ministry of Health selected the land for a construction site for Cho Ray Second Hospital.

1. The land is suitable for construction a hospital geologically and topographically.
2. It will contribute to reduce overloaded current at the existing Cho Rai Hospital as well as to reduce the overload of technical infrastructure in the core area of Ho Chi Minh City indirectly.
3. The land planning matches the master-plan of the area, and corresponds to the invitation strategy of Ho Chi Minh City.

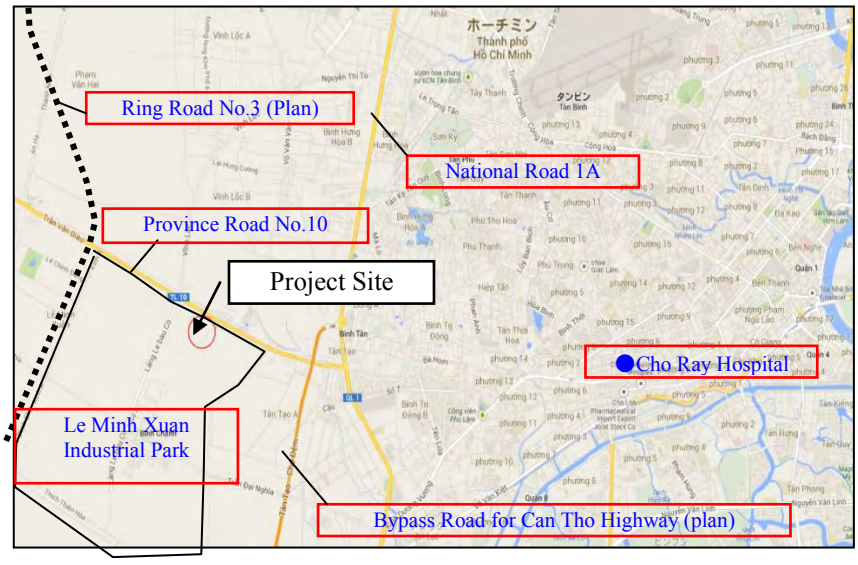


Figure 5-1 Site Plan Access

5-1-2. Road Development around Project Site

Preparation for a 37-meter-wide road from Provincial Road #10 to the hospital site (west side) is planned. Within the industrial park, there will be a 22 m-passage road and a 15 m-branch (road A) on the side of the hospital. Plans to improve the width of the roads around the hospital area are also scheduled: south 30 m (road C), east 20 m (road D), north 15 m (road B) (See: Figure 5-2).

Road development within Le Minh Xuan Industrial Park (Figure (5-2) south side of the waterway) will be implemented by the Saigon VRG Investment Holding Corporation (hereinafter VRG) and the north side of the waterway by the Binh Chanh District.

In addition, there is another plan to construct the several East-West Drainage leading to Cho Dem River in the Industrial Estate. (according to 1/2000 area development plan). It is planned that the construction of drainage is required to dispose rainwater and discharged water from changing farmland to industrial area. VRG is responsible to conduct this plan.

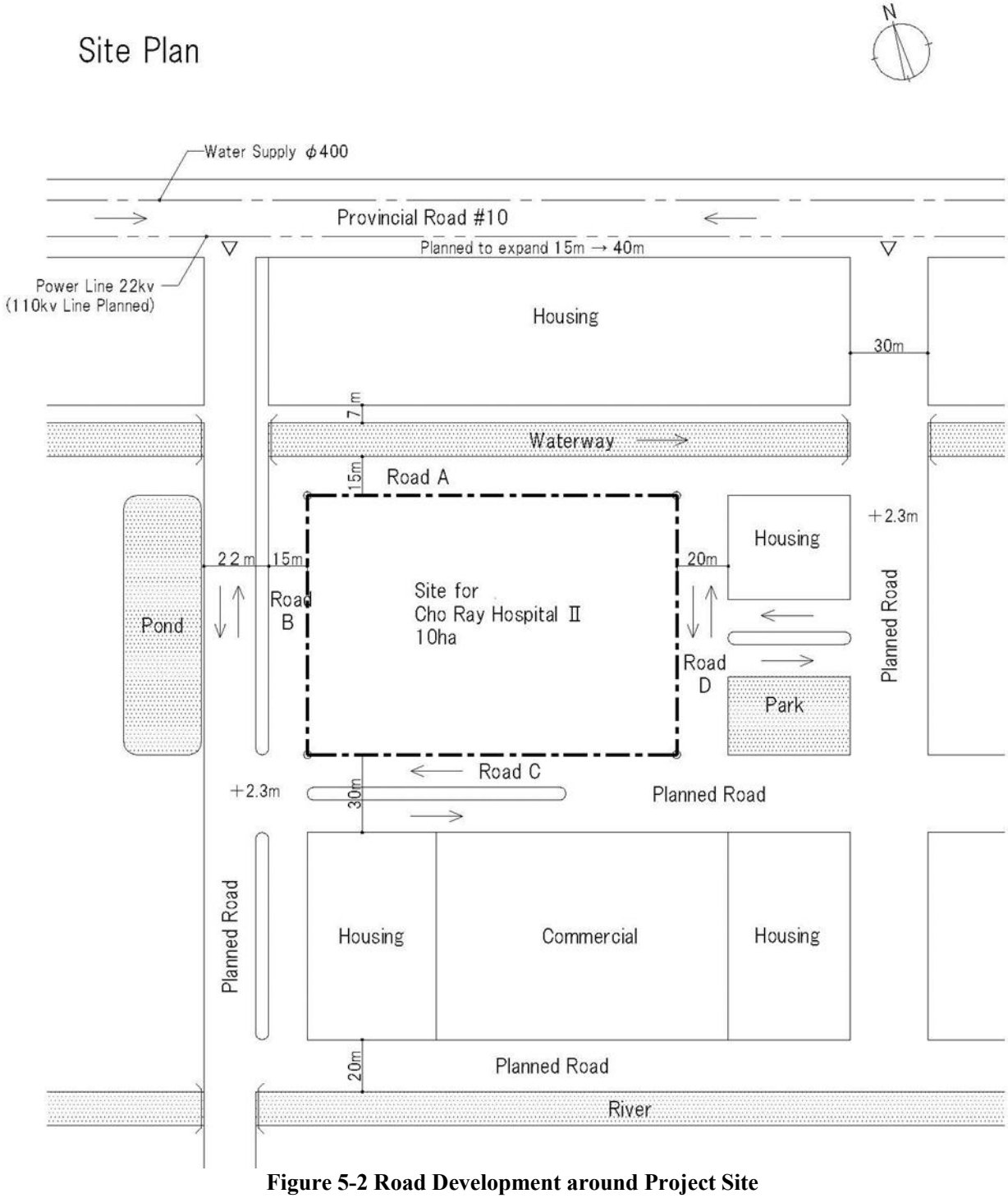


Figure 5-2 Road Development around Project Site

5-1-3. Minimum Necessary Development Works for the Hospital Construction

The range indicated in red-dot line in Figure 5-3 shows the minimum necessary development works such as landfilling, road and infrastructure construction required to the construction of Cho-Ray Second Hospital. Since there will be heavy traffics with large trucks for landfill, resettlement of the roadside inhabitants should be completed by the day of starting landfill, for their safety and avoidance of noise. Also the development of drainage should be done at the same time to prevent storm water outflow. Infrastructure and access roads to the hospital should be completed up to 6 months before the completion of the hospital construction.

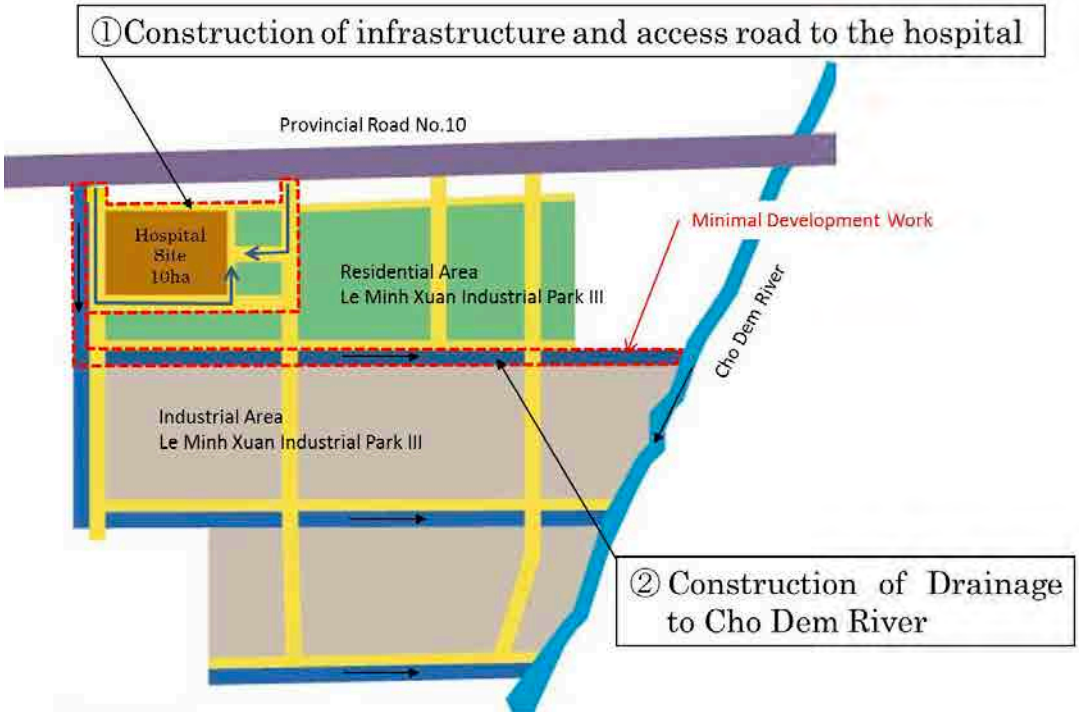


Figure 5-3 Minimum Necessary Development Works

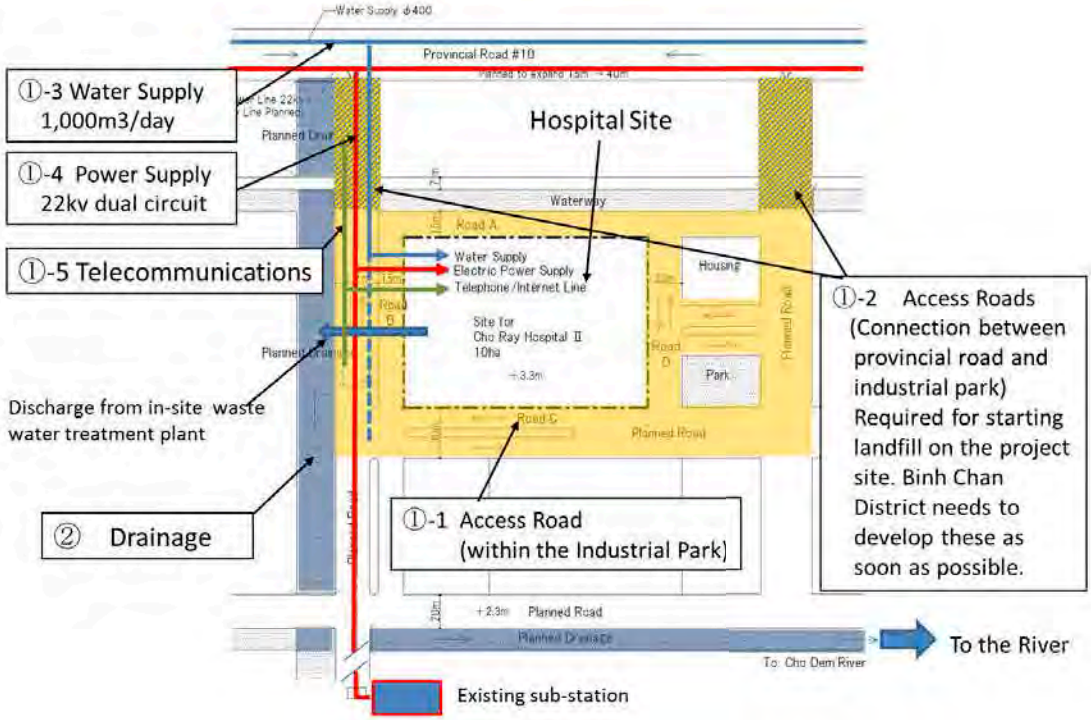


Figure 5-4 Minimum Necessary Development Works (Enlarged Plan)

5-1-4. Site Development and Landfill

Because the site is located lower than the road level, ground fill is needed as shown in the figure below. The current level is about 0.2m above sea level. Based on Binh Chanh District city planning, construction for regional development as a whole should be 2.3m or above.

The ground floor level of the hospital should be set about 1m higher than the road (+ about 3.3m above sea level) to prevent an inflow of water into the site so that medical service can continue even when roads are flooded. Because of the soft ground, settlement due to consolidation is expected, and it will be necessary to complete landfill construction work 1 year before commencement of the hospital construction, and 2 years before commencement of the eternal works, such as road pavement and underground pipings. For preventing from uneven settlement, landfill on the hospital site and surrounding area should be done simultaneously.

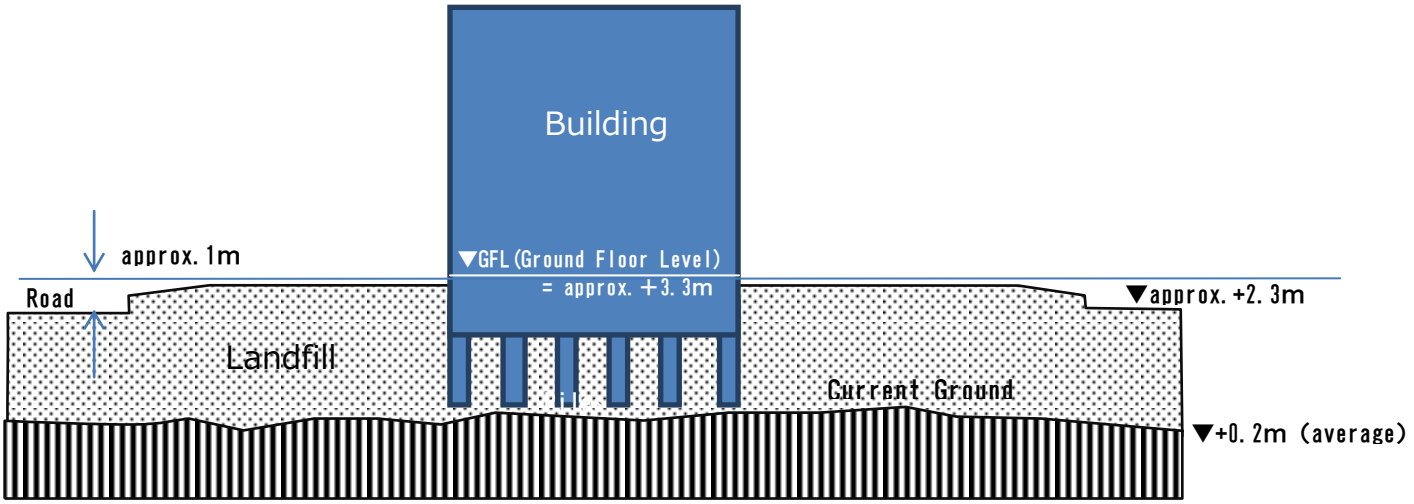


Figure 5-5 Site Development Plan

5-1-5. Time Schedule for Implementation of the Project

Table 5-1 Items and Deadline Necessary for the Construction of Cho Ray Second Hospital

Item	Responsible Party	Dead line to finish	Remarks
Development Permit (1/5000,1/2000 Plan)	VRG HCMC	Dec. 2014	This is the most critical issue for start design and construction.
Determination of Site-Road Boundary, and final Landfill Level	VRG	Mar. 2015 by starting of landfill design (hospital site)	This will be a basic criteria for landfill design.
Detailed Design of Development Work (Road, Drainage, Landfill, etc.)	VRG	Oct. 2015	This will be a basic criteria for hospital design.
Resettlement and Removal of existing houses (within hospital site)	CRH	Dec. 2015	To be implemented in accordance with RAP (Resettlement Action Plan)
Resettlement and Removal of existing houses (surrounding area)	VRG BCD	March 2016	by starting of temp. road construction

Construction of Temporary Road for Landfill Work	VRG BCD	June 2016	Expansion of existing roads By starting of landfill work
Construction of Drainage	VRG BCD	July 2019	Needs to be done simultaneously with landfill
Access Road to the Hospital (with Landfill)	VRG BCD.	July 2019	Needs to be done simultaneously with landfill in the hospital site Nees to be considered sufficient settlement term
Construction and Connection of Infrastructures	CRH Relevant Public Enterprises	July 2019	Water supply Power Supply Telecommunications Apprication by CRH, construction by each public enterprise

HCMC: Ho Chi Minh City BCD: Binh Chan District CRH: Cho Rai Hospital
VRG: Saigon VRG Investment Holding Corporation

5-1-6. Site Area and Boundaries, etc

In the site, the planned land area is about 10ha in the residential area in Le Minh Xuan 3 Industrial Park. Ho Chi Minh City People's Committee is in agreement with the official document concerning the use of this land by the Ministry of Health for the purpose of constructing Cho Ray Second Hospital (April 22, 2013 4885/UBND-DTMT). Moreover, there is agreement among VRG, Cho Ray Hospital, and Ho Chi Minh City People's Committee on the site boundary and the eight boundary stakes set up at the locale.

The following Figures 5-6 to 5-11 show the overview of the hospital site.

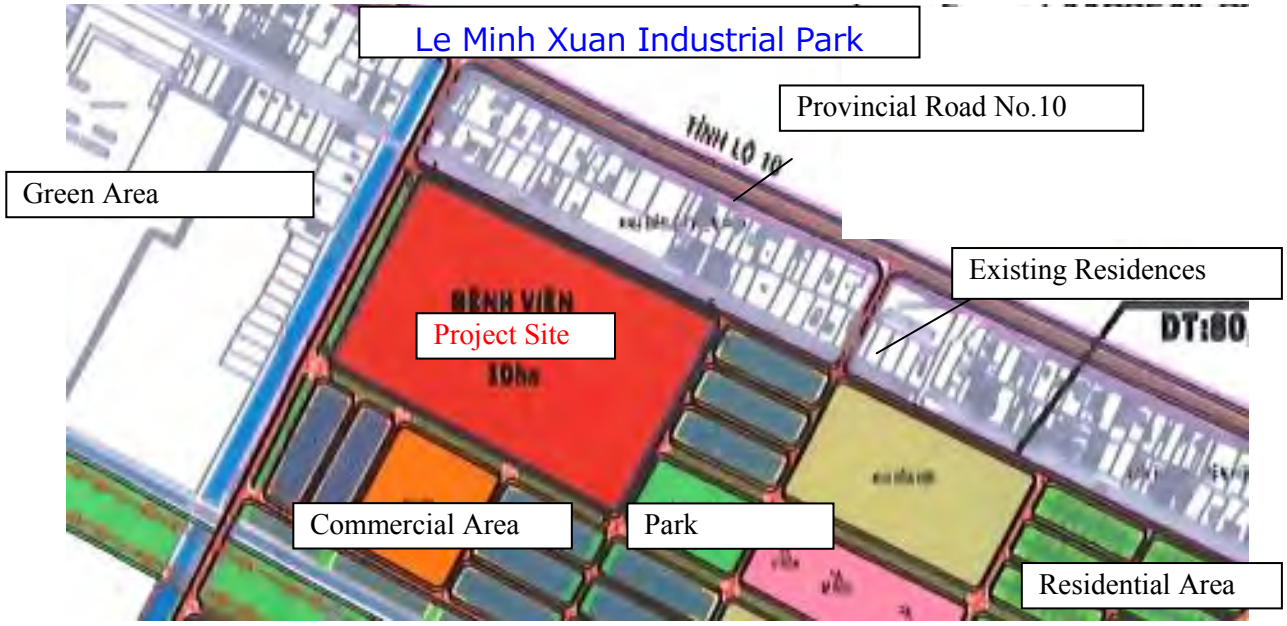


Figure 5-6 Site Plan and Surrounding Land Utilization Plan

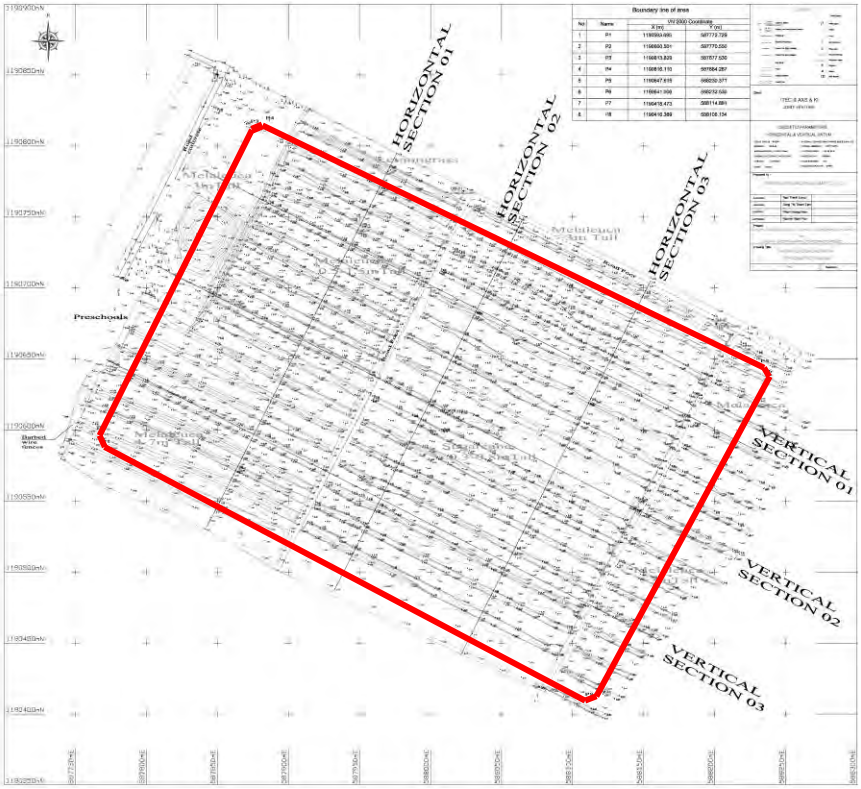


Figure 5-7 Land Survey Figure

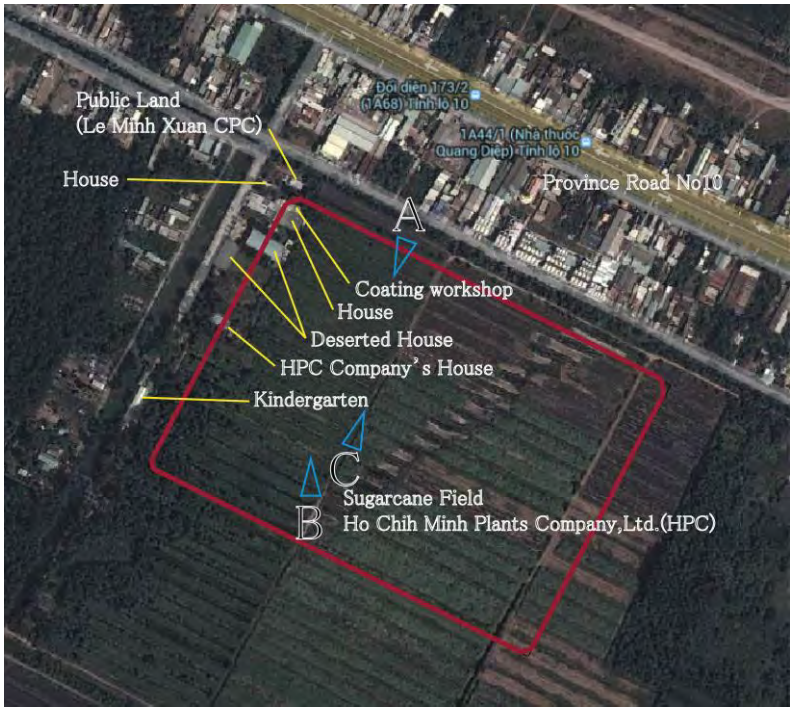


Figure 5-8 The Site Airscape

Figure 5-9 The Site Photograph A

Figure 5-10 The Site Photograph B

Figure 5-11 The Site Photograph C

5-1-7. Project Site Architectural Restrictions

The Binh Chanh District Committee has specified building coverage as 37% or less, afforestation coverage as 30% or above. There is no limitation for height or capacity.

5-1-8. Infrastructure Condition of Construction Site

(1) Electrical Power 2020 Urban Planning (Power Supply Plan) Acquisition

- A power station substation has been newly established at a point approximately 2 km south of the site and it includes the plan site area. As electricity demands will grow in the future, two more substations are planned as well as a 110-kV power line along Provincial Road #10 that will run on the plan site's north side.
- As an urban planning review will be carried out in 2015, a development plan that matches the power usage of the hospital will be possible.
- Concerning the power situation, in recent years both the power supply and voltage have been stable; almost no blackouts or planned rolling blackouts on the electrical company's side have occurred during construction.

(2) Communication

- Telephone and information infrastructure will be equipped according to demand and will be similarly developed in the construction of the hospital.

(3) Water Supply 2020 Urban Planning (Water Supply Plan) Acquisition

- A 400φ main water pipe will be underground laid in the parallel to Provincial Road #10 that runs along the north side of the project site.So enough quantity of watersupplay will be expected more than the use quantity of the hospital.
- There are water supply planning of Industrial Zone.If the water supply is insufficient, it is also possible to supply from the south side.

(4) Drainage

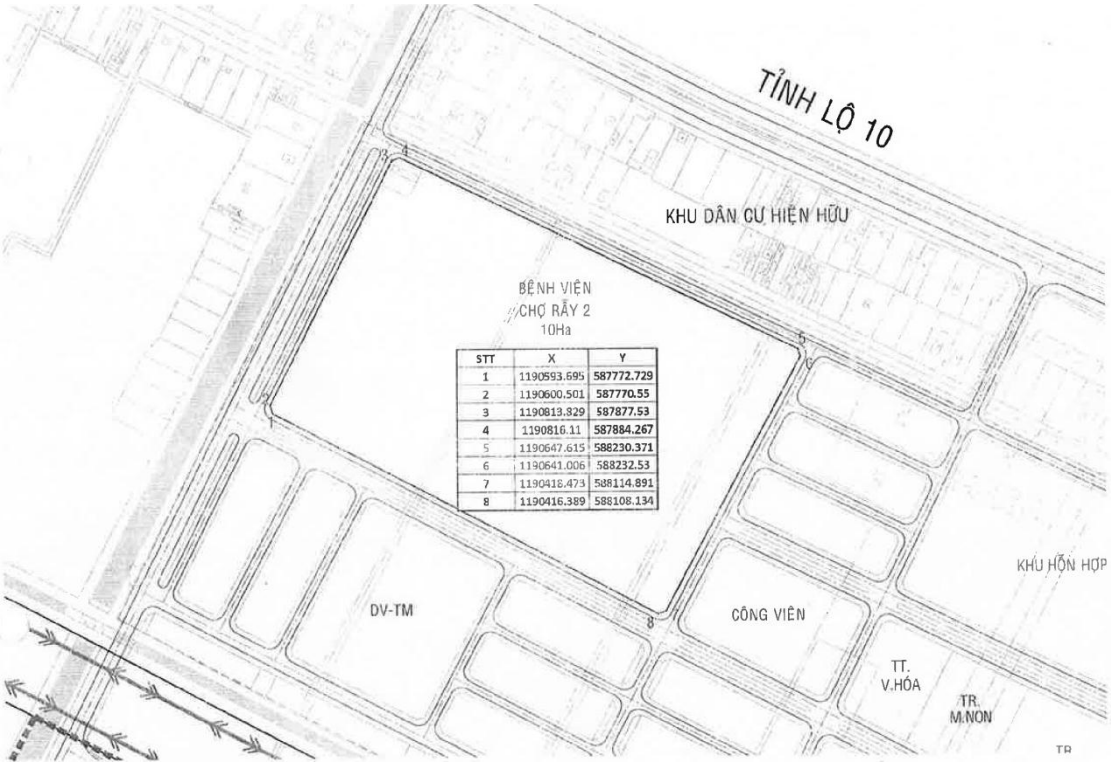
- Concerning sewage and hospital wastewater, a water treatment facility can be set up, and, if compliant with established wastewater regulations (QCVN28), wastewater can be discharged into the north-side waterway.
- It will also be possible to perform the primary treatment at the hospital site and the final processing at a sewage treatment plant in the development zone; however, the sewage treatment plant completion date has not yet been decided.
- It is not necessary to store rainwater on-site; it can be discharged to a waterway through a drain installed along the site boundary. The existing waterway is underdeveloped, but the Binh Chanh District will develop it in accordance with the development of the industrial park.

(5) Urban Area Gas

- There is no schedule to lay a gas pipe.

5-2. Natural Condition Survey

We began natural condition survey on geographical and geological features, climate and weather from March 18 in 2014, after we recieved the Land Survey Figure (Figure 5-7) and Figure of Project Site Boundary Stake Coordinates (Figure 5-12) and confirmed the boundary on site. The figure of the five spots for geological features survey is as shown in Figure 5-13. The survey report was completed on June 13.



STT	X	Y
1	1190593.695	587772.729
2	1190600.501	587770.55
3	1190813.329	587877.53
4	1190816.11	587884.267
5	1190647.615	588230.371
6	1190641.006	588232.53
7	1190418.473	588114.891
8	1190416.389	588108.134

Figure 5-12 Figure of Project Site Boundary Stake Coordinates

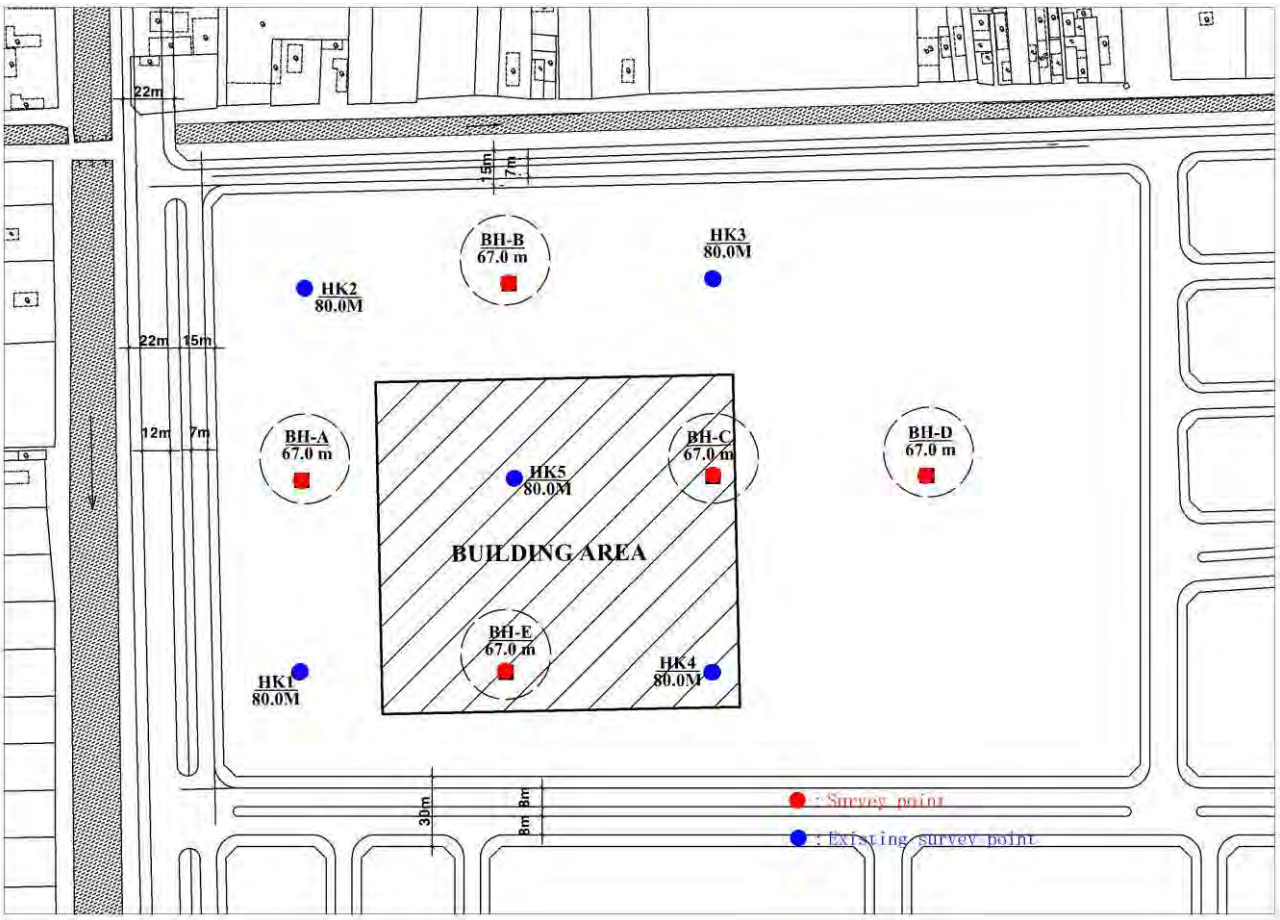


Figure 5-13 Five Spots for Geological Features Survey

5-2-1. Geographical and Geological Features

Ho Chi Minh Plain is a combined delta created in the lower reaches of the Saigon River and Dong Nai River, and Ho Chi Minh City is located on the Plain of Reeds of the Mekong Delta, through which the Saigon River runs.

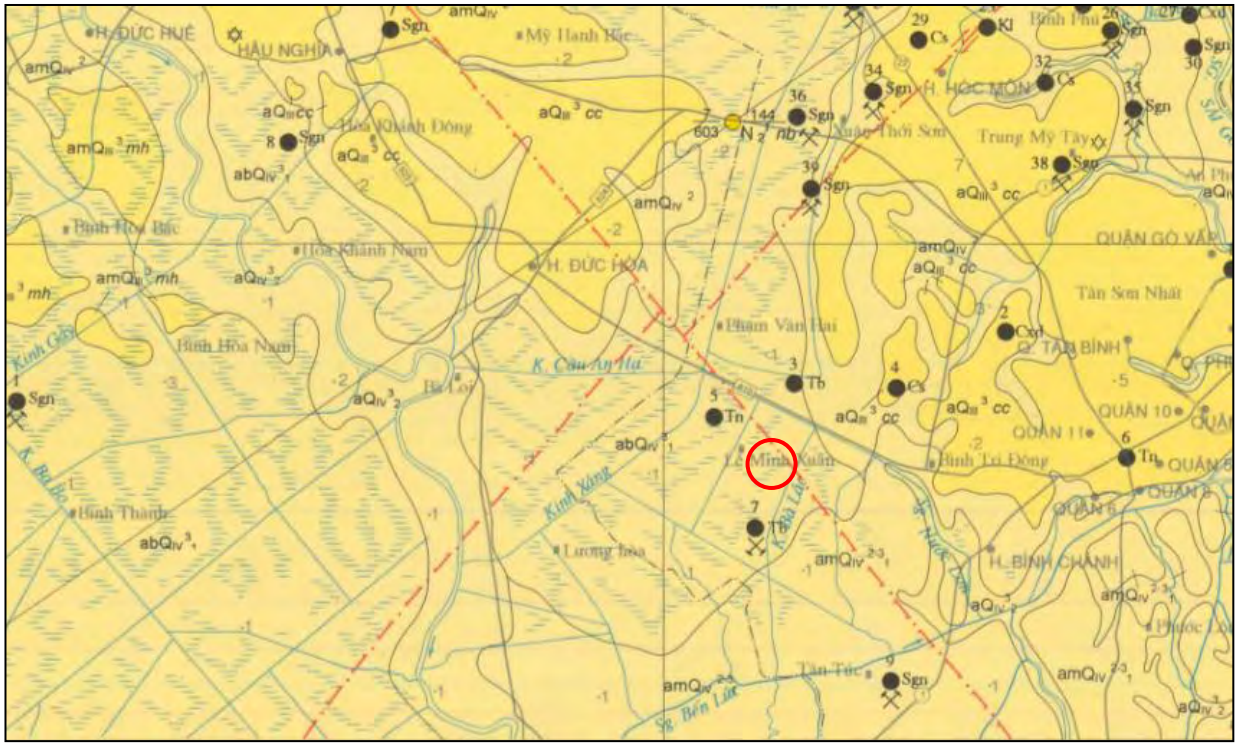
Ho Chi Minh City is located in the transition zone between the South-EastregionandMekong Delta. In general, topography isgradually lean from the north to the east and the south to the west.

In general, Ho Chi Minh City's terrainis uncomplicated, however it is quite diversification. The study area (see the figure below) is located in BinhChanh district, in the left of Saigon River, most of the ground has elevation from +0.7 m to +1.0 m.

Figure 5-14 Aerial Map of Study Area (BinhChanh District)

According togeological and mineralmapof Ho Chi Minh City (Saigon, C-48-XI, Figure 5-12 below) scale1:200000 published by Geological survey of Vietnam in 1995, Ho Chi Minh City is on southwest edge of Da Lat block. Thereare two main kinds of strata: basement consists of bedrock at the bottom and weakly loose sediments above the basement. The bedrock of LongBinh formations sometimes reveal at LongBinh Ward, District 9.

Theoverburdensedimentsoccupy mostofHo Chi Minh City, the age is from Mioceneto present (Pleistocene and Holocene Sediments). On the surface, there is the Quaternary sediment with small and medium cohesion in the Thu Duc, Cu Chi, BinhChanh, Can Gio formation. These areas with vary soil bearing capacity, so it needs to be paidattention for construction.



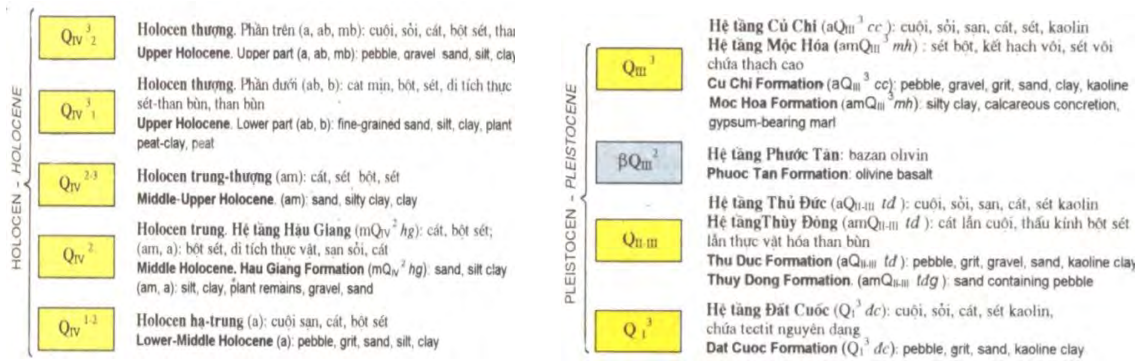


Figure 5-15 Sub-Surface Geological Map of Project Area

(1) Consolidation settlement sutdy of the ground

Compared with sea level, average current ground elevation of project is +0.2m, elevation of urban ground design is +2.3m, and elevation of project ground design is +3.3m. Geological properties of this project are soft clay with high moisture content and the thickness of soft soil is about 20m. So different settlement is predicted in the leveling process.

Report of soil investigation in November 2013 of Vietnamese investor has no “one dimension consolidation test result”, so results of later soil investigation is the basis for consolidation settlement calculation in leveling process.

1) Study model

Study soil layer model is a ground survey BH-E, was set on the basis of a variety of soil test results.

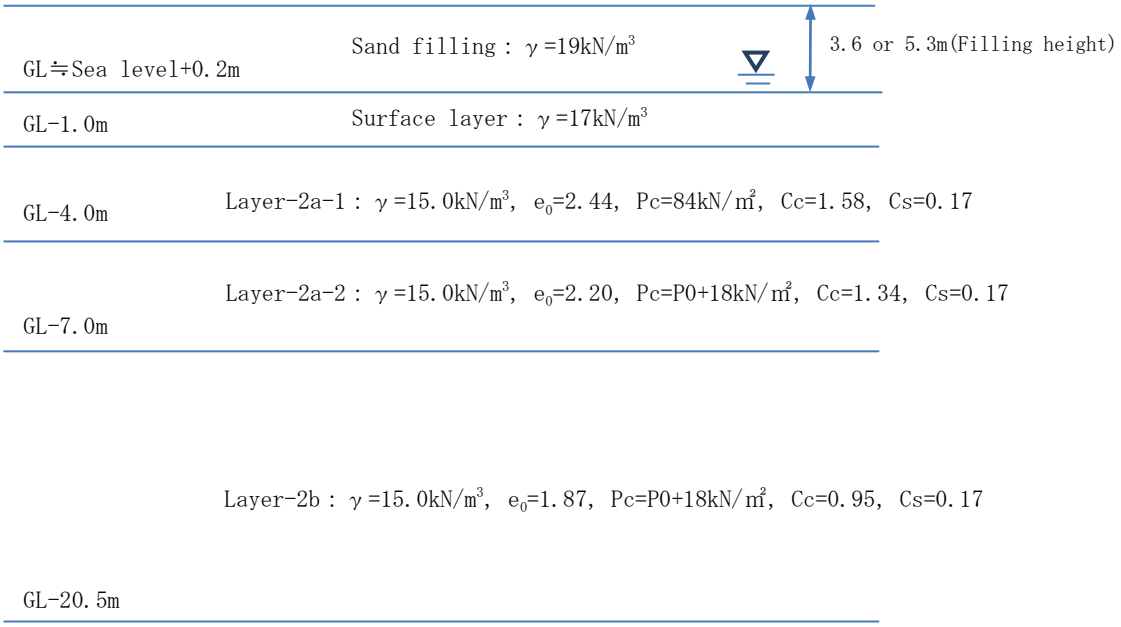


Figure 5-16 Study Soil Layer Model

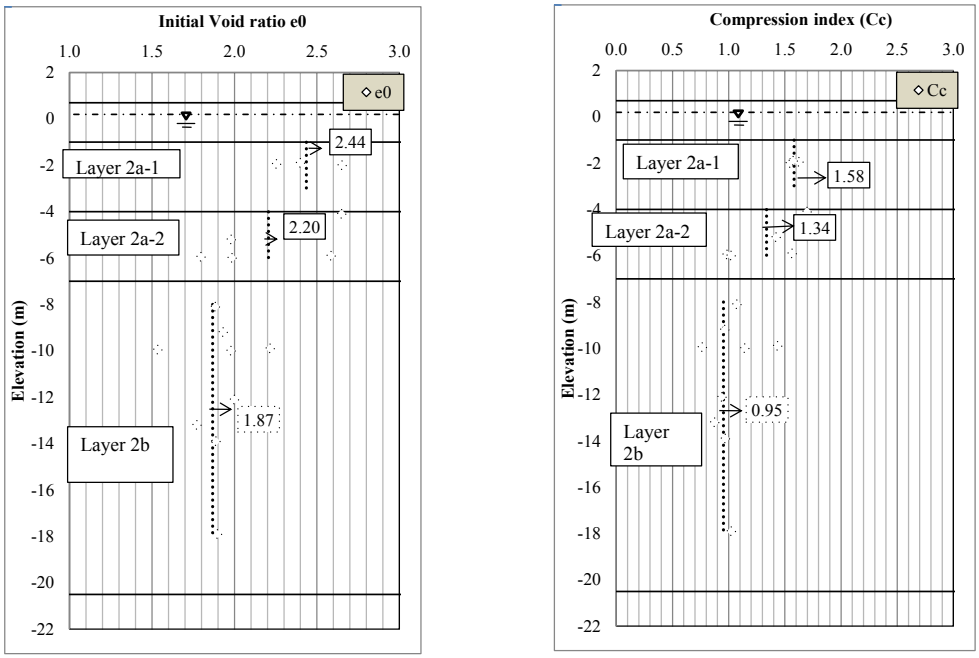


Figure 5-17 Soil Constants-1

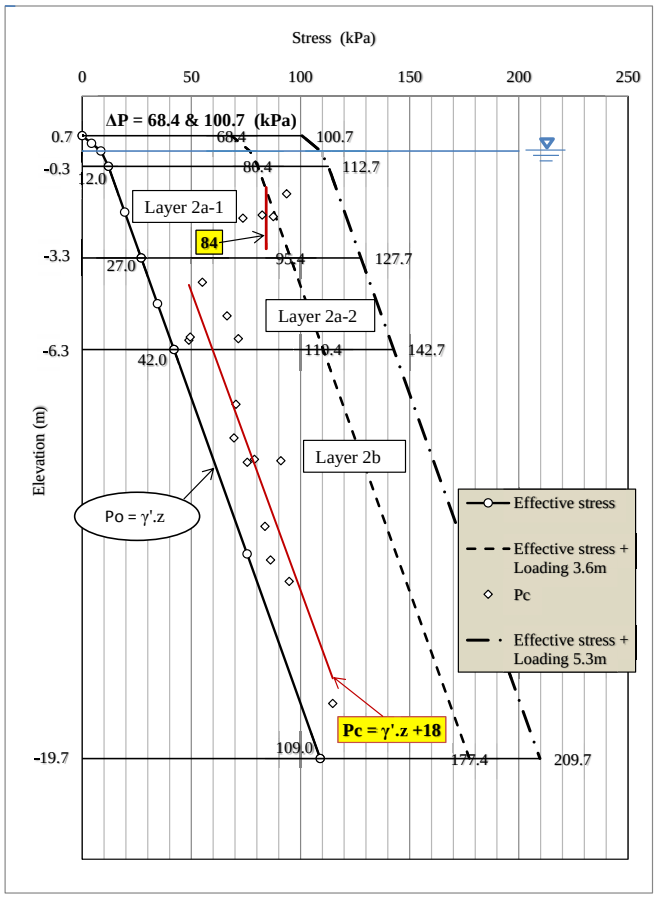


Figure 5-18 Soil Constants-2

2) Consolidation Settlement Study

Study soil layer model is a ground survey BH-E, was set on the basis of a variety of soil test results.

- Pc < P0

$$S = \frac{Cc}{1+e_0} H \cdot \log \frac{P_0 + \Delta P}{P_0}$$

- P0 < Pc < P0 + ΔP

$$S = \frac{Cs}{1+e_0} H \cdot \log \frac{Pc}{P_0} + \frac{Cc}{1+e_0} H \cdot \log \cdot \frac{P_0 + \Delta P}{P_c}$$

$$Cs = \frac{\Delta e}{\log \frac{P_0 + \Delta P}{P_0}}$$

S : Settlement
Cc : Compression index
Cs : Swell index
e0 : Initaial Void ratio
P0 : Effective stress
ΔP : Filling load
Pc : Pre-consolidation stress
H : The thickness of the clay stratum

3) Study Result

Results of consolidation settlement calculation are shown in table 5-15 and 5-16. Value of settlement for each filling height is shown in the following table.

a) Elevation of urban ground design: +2.3m above sea level, calculation sheet of filling height is shown below.

Based on results of consolidation settlement calculation, project ground level with filling height +3.6m will reach design elevation: +2.3m (above sea level). Total settlement is about 1.5m.

Filling height: 3.6 m Saturated density: 19 kN/m3

Layers	Thickness (m)	Depth (m)	Depth calculation (m)	γ ' (kN/m3)	P0 (kN/m2)	Δ P (kN/m2)	Pc (kN/m2)	P0+Δ P (kN/m2)	Cc	Cs	e0	S (m)
1	1	1	0.5	17	8.5	68.4		76.9				0
2a-1	1	2	1.5	15	14.5	68.4	84	82.9	1.58	0.17	2.44	0.035
	1	3	2.5	15	19.5	68.4	84	87.9	1.58	0.17	2.44	0.040
	1	4	3.5	15	24.5	68.4	84	92.9	1.58	0.17	2.44	0.047
2a-2	1	5	4.5	15	29.5	68.4	47.5	97.9	1.34	0.17	2.2	0.143
	1	6	5.5	15	34.5	68.4	52.5	102.9	1.34	0.17	2.2	0.132
	1	7	6.5	15	39.5	68.4	57.5	107.9	1.34	0.17	2.2	0.123
2b	2	9	8	15	49.5	68.4	65	117.9	0.95	0.17	1.87	0.185
	2	11	10	15	59.5	68.4	75	127.9	0.95	0.17	1.87	0.165
	2	13	12	15	69.5	68.4	85	137.9	0.95	0.17	1.87	0.149
	2	15	14	15	79.5	68.4	95	147.9	0.95	0.17	1.87	0.136
	2	17	16	15	89.5	68.4	105	157.9	0.95	0.17	1.87	0.126
	2	19	18	15	99.5	68.4	115	167.9	0.95	0.17	1.87	0.116
	1.5	20.5	19.5	15	107	68.4	123.8	175.4	0.95	0.17	1.87	0.081
											Total	**1.479**

Figure 5-19 Settlement Calculation result (Height fill need to +2.3 m above sea level urban planning)

b) Elevation of project ground design: +3.3m compared with sea level, calculation sheet of filling height is shown below.

Based on consolidation settlement calculation results, project ground level with filling height +5.3m will reach design elevation: +3.3m (above sea level). Total settlement is about 2.2m.

Filling height: 5.3 m Saturated density: 19 kN/m3

Layers	Thickness (m)	Depth (m)	Depth calculation (m)	γ ' (kN/m3)	P0 (kN/m2)	Δ P (kN/m2)	Pc (kN/m2)	P0+Δ P (kN/m2)	Cc	Cs	e0	S (m)
1	1	1	0.5	17	8.5	100.7		109.2				0
2a-1	1	2	1.5	15	14.5	100.7	84	115.2	1.58	0.17	2.44	0.101
	1	3	2.5	15	19.5	100.7	84	120.2	1.58	0.17	2.44	0.103
	1	4	3.5	15	24.5	100.7	84	125.2	1.58	0.17	2.44	0.106
2a-2	1	5	4.5	15	29.5	100.7	47.5	130.2	1.34	0.17	2.2	0.194
	1	6	5.5	15	34.5	100.7	52.5	135.2	1.34	0.17	2.2	0.182
	1	7	6.5	15	39.5	100.7	57.5	140.2	1.34	0.17	2.2	0.171
2b	2	9	8	15	49.5	100.7	65	150.2	0.95	0.17	1.87	0.255
	2	11	10	15	59.5	100.7	75	160.2	0.95	0.17	1.87	0.230
	2	13	12	15	69.5	100.7	85	170.2	0.95	0.17	1.87	0.210
	2	15	14	15	79.5	100.7	95	180.2	0.95	0.17	1.87	0.193
	2	17	16	15	89.5	100.7	105	190.2	0.95	0.17	1.87	0.179
	2	19	18	15	99.5	100.7	115	200.2	0.95	0.17	1.87	0.167
	1.5	20.5	19.5	15	107	100.7	123.8	207.7	0.95	0.17	1.87	0.117
											Total	**2.208**

Figure 5-20 Settlement Calculation result (Height fill need to +3.3 m above sea level urban planning)

(2) Investigation of work schedule for land development project of 10 ha

Based on the above-mentioned, work schedule shall be investigated.

1) Conditions for the investigation

- Investigation area is the project site with the area of 10 ha.
- The land development at the vicinity area around the project site shall be executed simultaneouslyby the government of Viet Nam.
- Filling efficiency shall be assumed to be 1,500 m3/day based on the past experience.
- Mobilization distance of the fill material form the quarry to the site shall be assumed to be less than 25 km.

2) Assumed work schedule

Based on the investigation, the term of land development shall be expected to be by 12 months, where the preparatory earth work, filling, the term of settlement acceleration, and the removal of extra fill shall be executed.

(3) Future subject

During the stages from the design and the execution, the further important considerations to be considered shall be mentioned down below.

- The choice of settlement acceleration method including filling plan making the post construction settlement within the allowable settlement shall be carried out during the design stage such as basic design and detail design.
- Since the settlement feature within the project site would be influenced by the surrounding land development project executed by the Viet Nam government, and vice versa, the organizationfor adjusting both project, especially the design of the land development and its execution procedure shall be necessary.

5-2-2. Climate and Weather

Located in the southeastern region of Vietnam, Ho Chi Minh City has a tropical monsoon climate, with high temperatures and humidity throughout the year. The average temperature is over 25°C and the average humidity is over 75%. The year is divided into two distinct seasons. The rainy season usually begins in the middle of May and ends in late November, and the dry season is from late November to the middle of May.

5-2-3. Water Sources and Quality

As shown in the figure below, Ho Chi Minh City is located in the downstream areas of Dong Nai- SaiGon river system, so river and canal net is plentiful. Aquifers (in Miocene through to Pleistocene strata) including groundwater are widely distributed under the ground and used as a precious resource. In recent years, groundwater development is proceeding rapidly along with population growth, industrial development and urbanization in Ho Chi Minh City, which has caused a drawdown of groundwater and accelerated salinization.

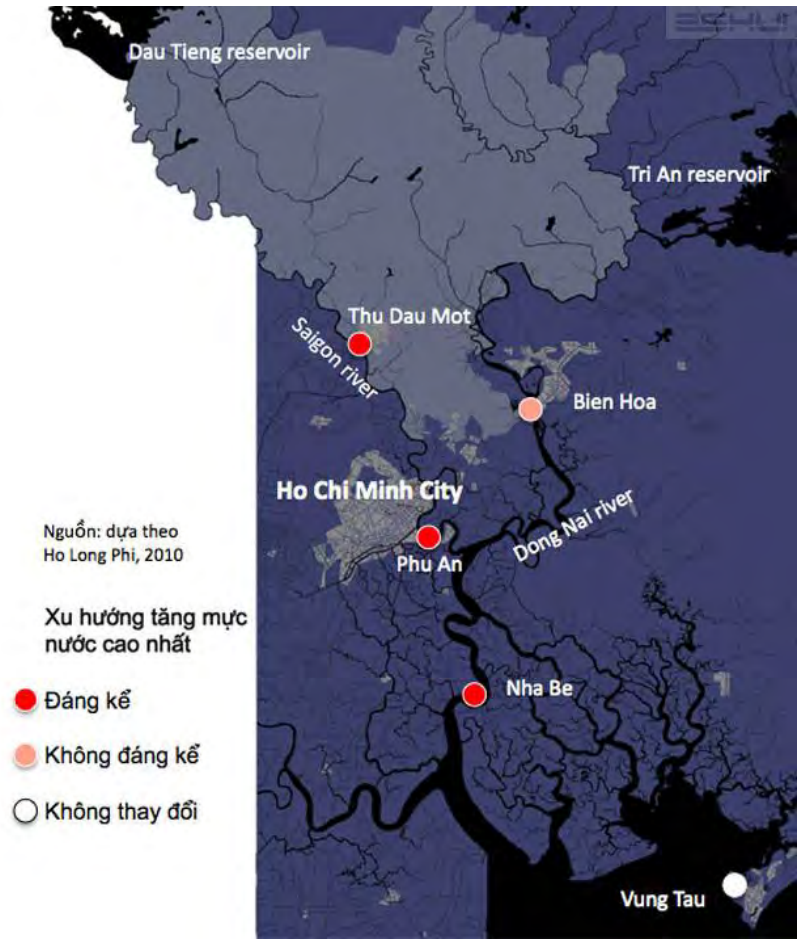


Figure 5-21 Position of Hydrographic Stationsin SaiGon – Dong Nai River Basin

5-2-4. Earthquakes

Earthquakes rarely occur in the south of Vietnam, and when they do occur they are of relatively low magnitude.

5-2-5. Ground Subsidence

In Ho Chi Minh City, while the level of groundwater is measured, subsidence is not measured continuously. Drawdown of Pliocene and Pleistocene groundwater has been confirmed, with an annual drop of 2 m. It is said that some areas in the city experience subsidence of around 2 cm annually.

5-3. Current Condition Survey of Cho Ray Hospital

5-3-1. Building Condition

- Cho Ray Hospital does not seem like a building that is over 40 years old, because there are no cracks or explosive fractures in its structure, indicating a high level of quality management during the building's construction. In comparison with another hospital inspected, Bach Mai Hospital in Hanoi, the building quality is far better and there has been sufficient maintenance.
- Cho Ray Hospital does not seem like a building that is over forty years old, because there are no cracks or explosive fractures in its stration of the natural airflow into the building and shading from direct sunlight, and louvers, eaves, balconies, and fittings, all demonstrate that the building was designed with a full understanding of the local climate.
- The original scheme of the main building in the planning stage has basically not changed to any great extent, which indicates that it was well planned. On the other hand, the hospital has undertaken various projects such as extensions, renovations and construction of additional buildings in response to changes in hospital functions.

5-3-2. Status of Hospital Functions

(1) External Functions

- Various facilities are separately located throughout the premises.
- There is not enough space for parking cars and bikes because of the large number of outpatients and staff.
- The kitchen, laundry, drug store room, Department of Medical Equipment, shop, special practice and special ward are located separately outside, and because they too far away from the main building of the hospital, there are inefficiencies and possible issues with hygiene.

(2) Internal Functions

1) Medical Examination Department

- Departments such as the outpatient, emergency, X-ray, physiological examination, specimen examination and pharmacy departments are so crowded with patients and obviously overloaded that the movement of people and goods is hampered as well as transportation of patients. On the other hand, the hospital is managed so that order is maintained, as demonstrated for example in the control of the movement of patients to different floors and the use of elevators.
- Hearings showed there are almost no problems with the setup of the medical examination departments. But the plan chart is complicated due to the decentralized arrangement of the departments, which is due to the hospital having been forced to extend and repair many different examination departments in response to changes in hospital functions.
- The Department of Surgery and Department of Material Management are apparently overloaded since Cho Ray Hospital performs 38,000 operations annually. Along with the overload of the facility, the entrance area is too crowded to control infection. Furthermore, the Intensive Care Unit and Recovery Departments are in the same situation.
- The Department of RI, Department of Radiology and Department of Dialysis are located in separate buildings.

2) Supply Department

- The kitchen, laundry, pharmaceutical storage and medical equipment are all in separate buildings and the route between them is extremely long.
- Efficiency is markedly decreased due to supply facilities being remotely located.

3) Management/Welfare Departments

- Medical offices, libraries, meeting rooms and conference areas are extremely scarce.
- There are very few educational and training areas.
- It is difficult for patients to utilize the shop/cafeteria facility because it is too narrow and located in a separate building.

4) Hospital Ward Department

- The general hospital ward accommodates twice as many patients as the originally planned number of beds per floor, which results in an abnormal situation in which there are too many people, both patients and their families, in the wards and even in hallways. Infectious patients are separately accommodated.
- In the original plan, half of the wing on the top floor was designated to accommodate resident physicians, but it has been converted to a special ward to increase the number of beds and add a nursing unit.
- Two elevators for family use were added and other elevators were designated and operated according to use, such as sterile and non-sterile. However, the elevators are extremely crowded and overloaded. At the time of the survey, a survey was underway to investigate boring for the installation of two additional elevators to be exclusively used for trash.

5-3-3. Overview of Survey of Facility Size and Floor Plan

A survey of the size of the facility and the current floor plan was conducted by reviewing the plans and square meter data submitted by the hospital and by conducting a building investigation and interviewing relevant personnel.

Drawings and data for present facility and facility size

- The hospital does not have building drawings for the present facility and has not created all of the drawings of the building after expansion.
- We acquired all of the drawings and facility size data that could be submitted by the hospital. There are discrepancies between the acquired data and the current facility and various other aspects. Since there are buildings and expansion areas without drawings, interviews and on-site verification were conducted to correct the data as much as possible, and a list of drawings and data of the present facility and its size was created.

5-3-4. List of Facility Size and Floor Plans

(1) Map of the existing facility

- Photo of the exterior
- Photo of the interior

(2) Drawings of the existing facility

- General arrangement plan of the facility
- Floor plan of each floor of the hospital main building
- Floor plan of each floor of other buildings

(3) Drawings of the hospital main building expansion and change of use

- Floor plan of each floor of the hospital main building expansion and change of use

(4) Survey drawing of area size

- Layout plan of the hospital's functional structure
- Floor plan of each floor of the hospital main building by department
- Floor plan of each floor of other buildings by department

- Table of square footage of the entire facility by department
- Consistency chart of the received plans and data

(5) Drawing of the original hospital main building plan

- Floor plan of each floor of the original hospital main building plan

5-3-5. Facilities (electricity, air conditioning and plumbing system)

(1) Electrical facilities

1) Receiving and transforming facility:

- 3ϕ3W 50 Hz 15 kV Duplicate service, Contract demand 5,100 kVA.
- Three Substations are located, there is little chance of blackout and Voltage fluctuation is about 5%.

2) Generation facility

- Diesel engine, 3ϕ4W 380 V 1,000 kVA × 3, Diesel oil
- Generators generate electricity 2,500 kVA and supply to whole roads except air conditioning facilities. When the power generation still has a sufficient capacity, the generators also supply power to some air conditioning facilities.
- Two generators have been renovated in 2007 and one other generator has been renovated in 2013.

3) Telephone facility

- Making a contract with VNPT (Vietnam Post and Telecommunications Group)
- Incoming telephone line: Metal line: 23 lines, No optical fiber line
- Extension line: 700 lines, No reserve line

4) Internet

- Making a contract with VNPT (Vietnam Post and Telecommunications Group)
- 30 Mbps × 2 lines, 50 Mbps × 1 line
- Security camera facility
- Cameras monitors gates, parking, outpatient waiting hole, doorways and so on

5) Wards

- General lighting: undersurface opening type fluorescent, NO reading light and treatment light
- Receptacle (per bed): single bed room: (2-pin + E) × 4, multi bed room: 2-pin × 2
- Although a simple nurse-call button has been installed in private rooms and some patient rooms, not every bed is covered and many of the call buttons are out of order.

(2) Water supply system

1) City water supply is required to pump up to the receiving tank from the basement water tank because the main pipe water pressure is low. The consumption of supply water quantity is very large and so it needs saving water measure.

2) Hot-water system: The central hot-water supply system is mainly limited to the laundry room and so on. The water supply for shower at the ward is replaced with individual electric water heater system.

3) Drainage system: The all drainage that excludes storm water is processed in the wastewater treatment facilities established 2 years ago and is discharged to the public sewerage line.

4) Medical gas system: The liquid oxygen cold evaporator, the vacuum pump unit and the air supply unit are added and replaced with the increase of consumption.

(3) Air conditioning system

1) Air conditioning system is running with maintenance from the construction and renewal but the equipment seems over age in some case.

2) Packaged air conditioners are installed in the extension area and each single sickroom.

Chapter 6. Basic Policy of Plan and Design

Chapter 6. Basic Policy of Plan and Design

6-1. Five Keywords for Facility Planning

In order to accomplish the vision and mission indicated in Chapter 3: sections 3-1 and 3-2, it is necessary that the facility develop advanced medical functions equivalent to those of advanced hospitals in Southeast Asian countries, and that it also functions as a human resource training center for subordinate hospitals. Additionally, it is necessary to relieve the excessive congestion found in the current Cho Ray Hospital, improve medical safety, employees' working environment and patient services as well as maintain a "patient-centered medical care" environment. In order to realize this, establish an advanced and lasting hospital that considers Vietnam's culture, climate and socio-economics, together with the introduction of Japanese advanced technology and know-how concerning hospital construction and hospital management.

The central idea for implementing a sophisticated plan and design is based on the above-mentioned points and the following five keywords.

Vision and Mission of Cho Ray Second Hospital

Vision

Cho Ray Second hospital will be an international-standard medical center that can deploy and apply modern technology, pass developed medical techniques on to lower level hospitals and contribute to healthcare over a larger range for the people in the south part of Viet Nam

Mission

a. Providing health services in patient care
b. Establishing and applying a high quality management system aiming at guaranteeing advanced medical services as well as safety for patients
c. Applying advanced medical techniques
d. Training center, scientific research, direction of healthcare activities and technology transfers to lower level hospitals
e. International cooperation with global and local medical centers
f. Creating highly gratifying and rewarding environment for staff members

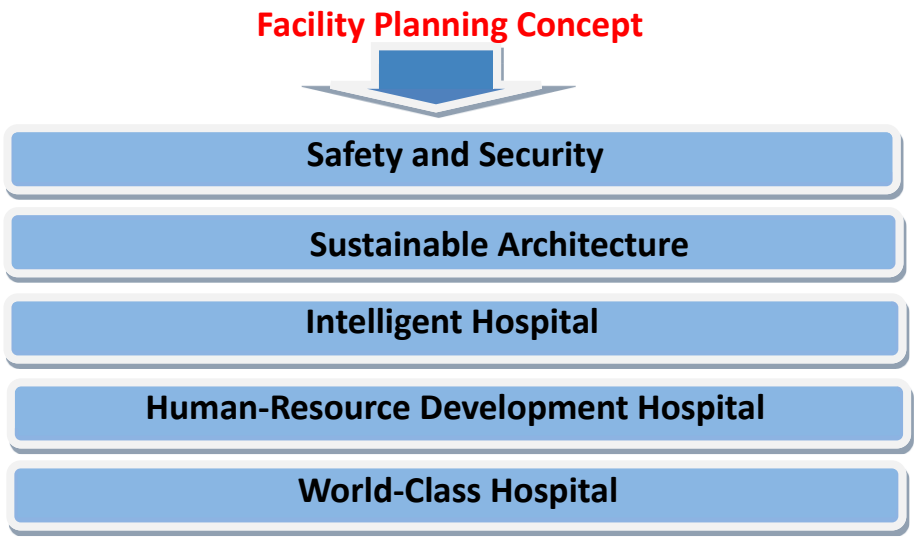


Figure 6-1 Five Keywords for Facility Planning

6-1-1. Safety and Security

Create a plan that not only considers patient and staff safety, but also fully considers the safety of the natural and social environment as well. Moreover, plan a hospital that brings relief to the local community by enhancing emergency and disaster medical care functionality.

Planning and design considerations are as follows:

- Clearly separate clean and contaminated zoning as well as other flow lines in order to prevent hospital infections; and, in accordance with the infection control measures manual, arrange for effectively designed non-contact-type washrooms (automatic taps) and contaminated-items-only treatment rooms.
- Make equipment to dispose of on-site infectious wastewater, hazardous waste, radioactive wastewater and other possible environmental pollutants available. Introduce a monitoring system to check if it is working properly whenever necessary.
- In case of a fire emergency, there are plans to ensure the safety of inpatients and patients undergoing medical treatment as well as evacuation measures. Fire prevention, fire extinguishers and evacuation equipment will be prepared in compliance with the laws and regulations of Vietnam.
- Plan a strong facility that does not yield to natural disasters, such as earthquakes, thunder, gales, or flood damage. Prepare an independent system of energy and supplies in order to continue medical care even during a breakdown of the city's infrastructure, including a blackout or suspension of the water supply
- Set up a facility capable of dealing with emergency patients in the case of a massive occurrence, such as accidents or disasters, as well as a facility that can accommodate the practice of medical services in case of a new viral outbreak (pandemic)
- Plan a hericopters landing space on the ground for rescue activities and patient transport in case of disaster.

6-1-2. Sustainable Architecture

Plan buildings with a longer operating life and flexibility in accordance with changes in social needs and advances in medical technology. Furthermore, introduce effective technology to save energy and resources and plan to reduce maintenance costs and environmental impact.

Planning and design considerations are as follows:

- Create architectural forms that incorporate natural lighting and suitable ventilation appropriate for the Vietnamese climate
- With the introduction of a system for automatic control and monitoring of proper equipment operation as well as the adoption of highly efficiency equipment, it will be possible to conserve energy and reduce greenhouse gas
- Lower repair and renewal costs by adopting highly durable, long-lasting materials and equipment and control the generation of construction waste disposal
- Create developmental architecture that can easily be extended or enlarged for those sectors where increasing demand is expected in the future
- Ensure sufficient parking space to accommodate the "car society" anticipated in the near future
- Promote greening of the buildings and site and build eco-friendly facilities
- Conform to Vietnamese environmental laws as well as check performance according to the Japanese Comprehensive Assessment System for Built Environment Efficiency (CASBEE; see the figure below) so that Japan's high-quality environmental engineering will be reflected in the design.

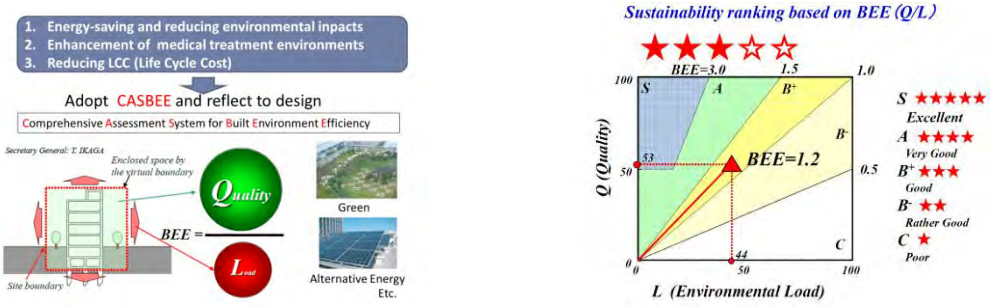


Figure 6-2 CASBEE (Comprehensive Assessment System for Built Environment Efficiency)

6-1-3. Intelligent Hospital

Plan a highly efficient and highly functioning facility that corresponds to ICT technology and a Japanese-style management system. Prepare a multi-functional space that can accommodate high-level medical treatment and a high-quality equipment system. Planning and design considerations are as follows:

- Separate patient (family), staff, and distribution flow lines as much as possible and smooth in-hospital traffic and supply transport
- Introduce SPD and ME centers, promote centralized management of medical supplies and equipment and plan time-saving transport.
- Create flexible treatment spaces with multi-functionality, such as an operating room panel system that integrates both medical gas and air conditioning systems, etc.
- Design spaces for the wards so the distance between nurse stations and patient rooms is shortened and provides a clear view. Plan flow lines for the smooth transport of patients and supplies as well
- The appropriate number of beds per ward corresponds to the number of certified nurses and the duty structure
- Ensure dedicated flow lines from the emergency section to the operating rooms and ICUIntroduce a temporary transport system (pneumatic tubes) from the emergency section, surgical department and ICU section to the specimen laboratories.

6-1-4. Human Resource Development Hospital

Enhance facilities for clinical research and medical personnel training, and plan a human resource development center that can be used at any time from other facilities in the southern region of Vietnam. Moreover, plan a facility that can establish a pleasant staff-working environment as well as promote communication essential to medical team development.

- Plan auditoriums, lecture halls, conference rooms, laboratories, training rooms, etc. that can be flexibly used based on education and training programs
- Plan education and training facilities that can be easily used from other institutions
- Create a plan in which facilities can be expanded along with increases in future needs and introduction of new training content
- Plan conference rooms on each ward for the purpose of activating medical teams where members from each section can gather for multidisciplinary discussions
- Set up practice areas even in clinical areas so that more practical education and training can be done
- Enhance welfare facilities, such as the staff lounge, staff cafeteria, refreshment lounge, etc., to reduce stress and activate mutual communication

6-1-5. World-Class Hospital

Plan a patient-centered facility that corresponds to international standards and considers medical safety, informed consent, privacy concerns and full-amenity facilities together with consideration for a patient's family, etc. Moreover, plan a profitable facility that utilizes the Cho Rai brand status effectively for patient rooms and the medical check-up center that correspond to international standards with hospital-grade amenities.

The plan and design matters under consideration are listed below:

- Plan easily cleanable and maintainable facilities that can always be comfortably used
- Construct barrier-free structures that can be completely and smoothly used by those with physical or perception disabilitiesEnhance outpatient waiting areas as well as shorten outpatient waiting time through use of ICT technology
- Enhance the convenience of facilities, such as restaurants, shops, libraries and places of worship, for patients and families
- Prepare a basic plan of four beds to a standard room and a private room for infection isolation and critical care in each ward. Arrange for special-rate rooms to have hotel-grade amenities

- Plan consulting and meeting rooms based on privacy considerations in the outpatient department as well as each ward to facilitate giving patients explanations and information

The table below shows a summary of the points for each keyword.

Table 6-1 Facility Planning and Design: Major Points

Keywords	Major Points	Main Considerations
Safety and Security	• Hospital Infection Prevention • Environmental Pollution Prevention • Emergency Disaster Medical Care	• Clean/Contaminated Flow Line Separation • Medical Waste /Wastewater Monitoring and Disposal • Energy Independence,
Sustainable Architecture	• Climate Adaptation • Change and Growth Response • Energy and Resource Conservation	• Natural Ventilation / Lighting, Solar Radiation Reduction • Flexible Design for Future Expansion and Enlargement • Highly Efficient Equipment、Long-lasting Material Adoption
Intelligent Hospital	• Advanced Medical Care Response • Accelerated Movement/Transport • Supply/Information Central Control	• Integrated Panel System for Operation Rooms • Patient, Staff, Supply Flow Line Separation • SPD、ME Centers, etc. Introduction
Human-Resource Development Hospital	• Hospital Education/Training for Subordinate Hospitals • Medical Technology Development/Dissemination • Medical Care Team Promotion	• Auditorium, Lecture Hall, Conference Room, Training Room Preparation • Laboratory、Simulation Lab, etc. Room Preparation • Conference Room for Each Department Preparation
World-Class Hospital	• Patient and Family Amenities • Staff Work Environment Improvement • Acceptance by Wealthy/Foreigners	• Waiting Room /Treatment Area Enhancement • Dining Area, Lounge, etc. Welfare Facilities Enhancement • Hotel-Grade Special Room Installation

6-2. Land Utilization Plan

6-2-1. Access

It's thought that users of this hospital will go via Provincial Road #10. A road connecting to Provincial Road #10 on the site's west side (width: 22m) is planned, but access from here requires a left-hand turn into the site. This is not preferable due to the large volume of traffic. (In Vietnam, when a car in the right-hand lane turns left, it crosses over the opposite lane.) Therefore, the main access route (right-hand turn) is planned from a road (width: 20m) about 100m east of the site.

The ambulance entrance allows for rapid access from two directions and is planned to face the east-west passage across the site. The entrance for staff and service vehicles is planned for side roads on the site's north and west sides in order to avoid congestion with general users (See the Figure 6-3).

6-2-2. Site and Surrounding Environmental Management

Because the main access to the hospital will be from the site's east side, the development plan suggests that the commercial zone on the site's east side be moved across the road to the south side. (This requires consultation with the developer.) This is expected to to be more convenient for people utilizing the hospital.

Concerning landscape, promote greening along the part that faces the main road on the south and west sides to form a green belt from the park in the east to the preserved forest in the west.

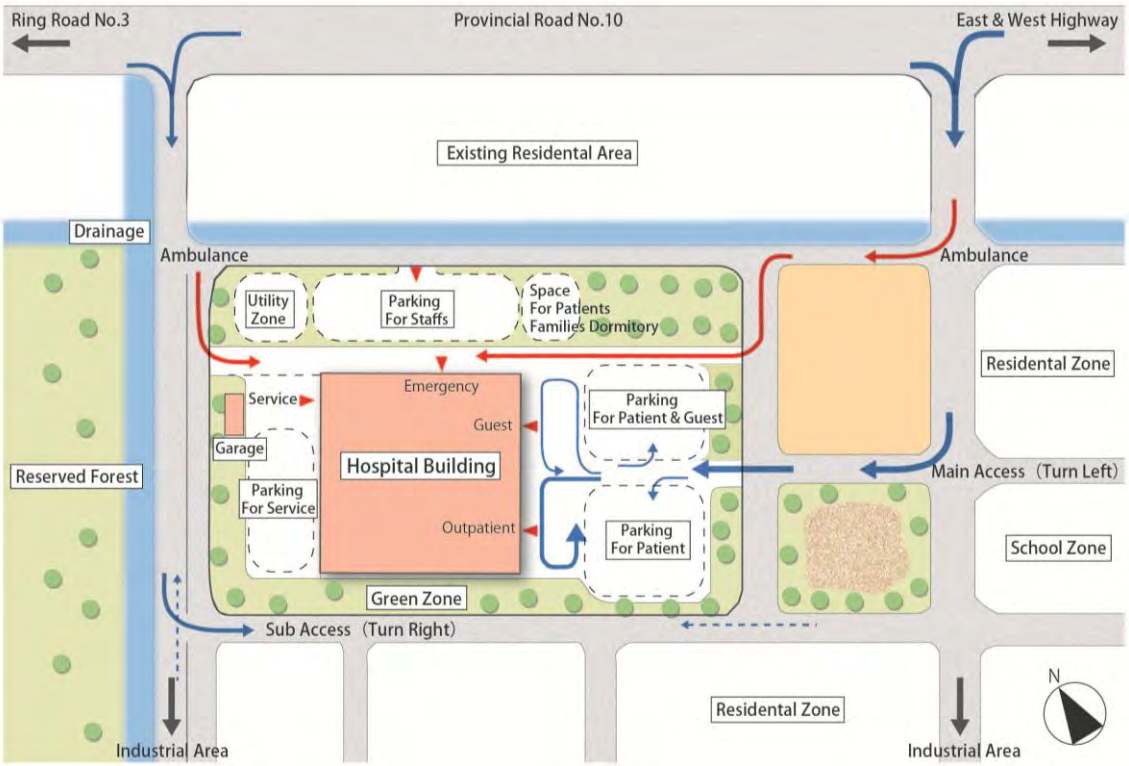


Figure 6-3 Site Zoning and Access Plan

6-2-3. Parking

A general-use parking area, staff parking area, visitors' parking area and additional parking areas, such as business-vehicle parking, ambulance parking and bus and taxi stands will be planned according to need.

The parking area capacity required for the hospital opening is expected to be 1350 2-wheel vehicles and 550 4-wheel ones. For the moment, although this provides space for a parking area and includes space for future enlargement, the open space will be reduced due to building extensions and an increase in 4-wheel vehicles. In the future, it will be necessary to also consider constructing a multi-storey car park.

It should be noted that for the development of public transport to be effective in reducing parking numbers, it will be necessary to examine fixed bus route links and shuttle bus service between Cho Ray Hospital and Cho Ray Second Hospital.

(Estimated number of required parking spaces)

(1) Outpatient Parking Area：

Daily Outpatient Numbers（2100） x Automobile Usage Ratio (0.8) x Peak Ratio (0.5)
= 840 vehicles (2-wheel 588, 4-wheel 212)

(2) Staff Parking Area：

Staff (1700) x Attendance Ratio (0.66) x Peak Ratio (0.8)
= 718 vehicles (2-wheel 502, 4-wheel 216)

(3) Visitors' Parking:

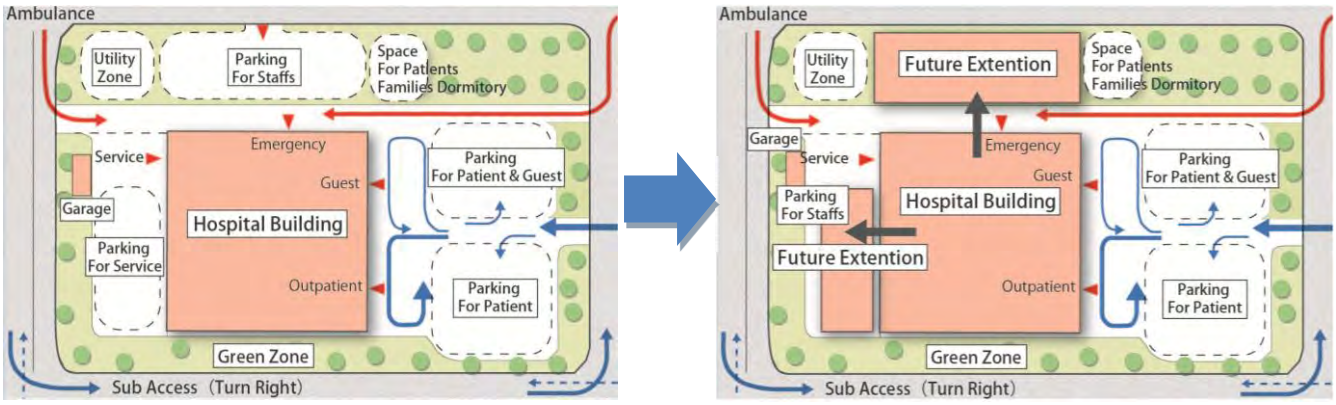
Daily Visitor Numbers (500) x Automobile Usage Ratio（0.8） x 0.5 Peak Ratio
= 200 vehicles (2-wheel 140, 4-wheel 60)

Notes: ・As public transportation facilities are not well developed, 80% of the vehicle-use rate (two wheel 70% and four wheel 30%) was used for calculation.
・The peak rate was considered from the current situation of Cho Ray Hospital, and assumed to be 80% for staff and 50% for patients and the visitors.
・The number of staff was calculated for full-time staff, and the attendance rate was assumed to be 66% (20 working days per month).

6-2-4. Hospital Wards

The hospital will be built in a compact shape and constructed in an eccentric position slightly to the southwest from the site center. It is expected that the scale of medical treatment will increase about 1.7 times ten years after the hospital opening. Space is ensured for future extension to the north and west side of the building. A relatively small extension of the outpatient department and the central medical treatment section is planned on the west side. On the north side, a large-scale extension including increased ward floor space is planned.

Concerning education and training facilities, areas inside the wards, such as an auditorium, will be set up to make OJT, which utilizes clinical areas, and coordination easier (See Figure 6-4). The staff parking lot will shere the basement floor, when an extension building is constructed on the existing parking.



Opening Design　　Future Design

Figure 6-4 Future Extension Plans

6-2-5. Annex Facilities

(1) Utility Zone

A facility zone is planned where the connection of the infrastructure is easy and the drainage to the waterway is easy to carry out in a site on the northwest corner, and the water-receiving tank and the wastewater treatment facilities, etc. will be consolidated.

(2) Garege

A garage building that can hold about 20 vehicles, such as ambulances, medical check-up cars and other hospital vehicles is planned near the service yard.

(3) Patients' Families Dormitory

Accommodation for patients' families who come from far way will be assured within the construction site premises. Since the construction of this facility will be a non-eligible portion (excluded

from ODA loan), it should be developed by Vietnamese side.

The patients' families dormitory is planned to consider about one room for 4 beds (convinient for four familiy member sharing) so that about 200 people can stay. It is assumed that total floor area is about 2,000m2 by two story, and is estimated about 100 million JPN or 20 billion VD.

Chapter 7. Architectural Plan

Chapter 7. Architectural Plan

7-1. Scope of Work

7-1-1. Works included in the Project

Categories	Contents
(Subject to ODA loan)	
Building Construction	• Hospital building (1)
Attached Facility	• Water supply and waste water treatment facility (1) • vehicles garage (1)
External Works	• Pavement, car parking, rainwater drainage, planting, helicopter landing space
(Not subject to ODA loan)	
Land fill	• 0.5m～1.0m higher than planned road level

7-1-2. Works not included in the Project

Categories	Contents
Road	• Construction of access and surrounding roads
Infrastructure	• Construction and connection of infrastructure (electricity, water supply, drainage, sewage, telecommunications, etc.)
Building / Equipment	• Construction of patients' family dormitory • Kitchen equipment
Others	• All works outside of site area

7-2. Size of Facility

7-2-1. Outline of Building

- Site area: 10 ha
- Total floor space: Approximately 90,000 m^2
- Building area: Approximately 22,000 m^2
- Structure: Reinforced concrete construction (assumed)
- Number of floors: 10 floors above ground and a 1-floor rooftop structure (estimate)

7-2-2. Outline of Utilities

(1) Electrical facilities

Power substation,Stand-by qenerator system, UPS system, Lighting, Telephone and Internet system, Public Address system, TV system, Intercom system, Nurse call system, Electric lock system, Security camera system, Fire alarm system, Lightning protection system

(2) Water Supply, Drainage and Sanitary Facilities

Water reservoir, Elevated water tank, Hot water supply system, LPG system, Medical gas system, general wastewater treatment plant, Medical wastewater treatment plant, RI wastewater treatment plant, Kitchen equipment, Fire fighting system

(3) Air Conditioning Facilities

Cooling and heating system, Ventilation system, Air heat exchanging system (loss-less ventilation), RI filtration system, Smork extract system, Central monitoring system with BEMS (Building Energy Management System), Operation room panel system (combined with Airtight interior panel system, Lighting system,, Medical gas system, Electrical isolation system, Clean air supply system, Radiation protection system)

(4) Transport Facilities

Elevator, Escalater, Large-size pneumatic tube system

7-2-3. Basis for Setting Condition

Adapting to international standards, this plan aims not only to enrich advanced medical care functions but also to realize a medical center which has training and research functions. In addition to this, in terms of management, it aims to establish standards for hospital management systems in Vietnam by introducing Japanese styles in the following aspects: medical safety, risk management, infection control, medical care based on scientific evidences, patient service, electronic medical record, SPD (Supply, processing and distribution system), PACS (Picture archiving and communication system), and outsourcing.

Design conditions of the facility are decided through three types of studies on design conditions.

(1) Study on design conditions using analogous cases in Japan and South Korea

(2) Study on design conditions through projections of the medical care zone

(3) Study on design conditions through local interview surveys

Regarding the analogous cases, sample hospitals which met the following four facility conditions were selected based on the facility policy of this plan in order to analyze the facility condition items such as various functions and scale.

[Conditions to select facilities]
1. Hospital with a number of beds around 1,000
2. Hospital with advanced medical care functions
3. Hospital with training functions
4. Hospital with fully developed administration and management systems

7-2-4. Selection of a Comparable Hospital Sample

Meeting the aforementioned conditions for selection, the following facilities were chosen as analogous hospitals: three recently-completed large-scale advanced university hospitals (public, private), and two large-scale hospitals in Japan and South Korea which were completed in the expansion period of the medical facilities.

[Analogous hospitals]
1. Tokai University Hospital 803 beds
2. Teikyo University Hospital 1,154 beds
3. Kanazawa University Hospital 838 beds
4. Samsung Medical Center 1,099 beds
5. Osaka City General Hospital 1,063 beds

Estimation of the facility outline through the study of analogous hospitals

(i) Scale and functional conditions

a) Number of beds: 1,000
b) Facility area: 100,000 m^2
c) Private room ratio: about 20%
d) Number of beds in a standard bedroom: 4 beds
e) Outpatient medical care room, treatment room, etc.: about 130 beds
f) Operating room: about 20 rooms
g) Diagnostic radiology room: about 18 rooms
h) Angiography room: about 4 rooms
i) Radiotherapy room: about 2 rooms
j) Nuclear medicine room: about 4 rooms
k) Large auditorium: 1 room

Refer to the comparative analysis table on facility scale and functions by analogous hospital (Refer to Appendix-3)

(ii) Estimation of rough figure of area by each department

Hospital Ward Department	40,980 m^2
General Ward	37,956 m^2
ICU, CCU	3023 m^2
Outpatient Department	10,871 m^2
General Outpatient	8,885 m^2
Requested Outpatient	843 m^2
Emergency Department	1,142 m^2
Diagnostic & Treatment Dept.	17,707 m^2
Laboratory Testing	2,913 m^2
Physiology	1,170 m^2
Endoscope	860 m^2
Radiology Department	3,748 m^2
Radiotherapy	1,176 m^2
Nuclear Medicine	1,043 m^2
Operation Department	3,977 m^2
Delivery Department	283 m^2
Rehabilitation	1,063 m^2
Hemodialysis	520 m^2
Special examination	948 m^2

Supply Department	15,637 m^2
Dispensary	1,422 m^2
CSSD	1,018 m^2
Blood Transfusion Dept.	232 m^2
Food preparation room	1,725 m^2
Laundry	366 m^2
Storage and supply room	1,813 m^2
Machine room	9,058 m^2
Administration Department	15,103 m^2
Management-related	10,514 m^2
Welfare-related	4,589 m^2

・Refer to the comparative analysis table on areas of departments by analogous hospital (Refer to Appendix-4)

7-2-5. Setting of Design Conditions

(1) Method of setting design conditions

In order to set the design conditions, a schematic design drawing was prepared to be used in meetings based on the materials obtained from the "(1) study on design conditions using analogous cases in Japan and South Korea" of the three types of studies on design conditions. Also, interview surveys with each local department and the projected scale settings for the medical care zone were taken into account.

(2) Outline of the Design Settings Conditions

(i) Scale and functional conditions

- Total Number of beds : 1,000 beds
- Total floor are : approx.90,000m2
- Ratio of private room : approx. 20%
- Standard bedroom : 4 bed room
- Intensive Care Units : ICU, SCU, HCU, EICU
- Operating room : 18 rooms (including DSA hybrid operation room 1)
- Radiology room : MRI (2 rooms + 1 vacant space 1), CT (4 rooms + 1 vacant space), DSA (4 rooms), IVR-CT(1 room)
- Nuclear medicine room : SPECT(1 room), PET-CT(1 room), Gamma Camera (1 room) including Radiation monitor system and RI wastewater treatment facility
- Isolation Unit : 2 units in Emergency dept., 2 units in ICU dept., 2 units in Inpatient Ward (high level isolation unit)
- Lecture Hall : for 300 audience (1 room)

Refer to the comparative analysis table on facility scale and functions by analogous hospital (Refer to Appendix-3)

(ii) Rough figure of area by each department (reference)

Hospital Ward Department	37,100m2
General Ward	34,050m2
ICU, CCU	3,050m2
Outpatient Department	11,500m2
General Outpatient	9,650m2
Requested Outpatient	750m2
Emergency Department	1,100m2
Diagnostic & Treatment Dept.	15,500m2
Laboratory Testing	2,750m2
Physiology	1,100m2
Endoscope	800m2
Radiology Department	3,300m2
Nuclear Medicine	800m2
Operation Department	3,650m2
Rehabilitation	1,050m2
Hemodialysis	700m2
Special examination room	1,350m2

Supply Department	13,100m2
Dispensary	1,750m2
CSSD	1,200m2
Blood Transfusion Dept.	350m2
Food preparation room	1,750m2
Laundry	400m2
Storage and supply room	1,850m2
Machine room	5,800m2
Administration Department	12,800m2
Management-related	10,100m2
Welfare-related (including garage and warehouse outside the hospital facility)	2,700m2

・Refer to the comparative analysis table on areas of departments by analogous hospital (Refer to Appendix-4)

7-3. Architectural Plan

7-3-1. External Entry Plan

- On the east side of the building, which provides the main access for outpatients, there are outpatient, hospital, and physical examination entrances and they are connected by large canopied carports. Car and motorcycle access is clearly indicated to smoothly lead visitors to each entrance.
- The emergency entrance is also used as an after-hours entrance and the entrance faces the road that runs east to west on the premises. The entrance is arranged for prompt two-way access from Ho Chi Minh City and the southern areas.
- The after-hours staff entrance is located adjacent to the emergency entrance. They are located adjacent to the safety control center to provide thorough security for the facility.
- Delivery of supplies is done from the west side. Efficient supply transportation will be possible by delivery via the second floor through the newly installed ramp, so that supply transportation does not interfere with outpatient and emergency traffic flow.
- Cadavers will be removed from the west side of the building, and a large canopy will be installed to avoid visibility from the upper floors of the hospital.

7-3-2. Internal Facility Plan

(1) Outpatient Department

- The floor plan enables access to each outpatient ward and the medical examination department.
- In order to achieve efficient operation, a block reception system in which patient and staff traffic is clearly separated and a central operational room which centralizes treatment in each department is planned.
- New patient and follow-up visit registration desks will be separately installed in the general reception, and an area has been established in which to install a follow-up care scheduling and automated payment systems.

- A referral and consultation desk for inpatients will be provided for efficient operation.
- A sufficient number of outpatient examination rooms will be established to enable doctors to see patients one at a time, and also sufficient waiting space that can accommodate a large number of users including the patient's attendant families will be prepared. Convenient facilities, such as a restaurant, caflarge number of users including the patient's attendant families a timeed payment ntral operati
- In the Outpatient Department, a large courtyard and vaulted ceilings will be installed to bring natural airflow and light into the building taking into consideration the areaderation the areaflow and liThe courtyard will be used for multi-purpose, such as a children's playground, resing, waiting and eating space.

(2) Outpatient Chemotherapy Center

- Outpatients need convenient access to the Department of Pharmacy and have long treatment times, so the center is located in the pleasant environment at the end of the east side.
- It is necessary to discuss the number of treatment beds in the chemotherapy rooms.

(3) Health Care Center

- Separate from the outpatient entrance, a physical examination area with its own entrance will be set up to provide advanced preventive medicine, such as thorough medical examinations and cancer screening.

(4) Emergency and Disaster Medicine Department

- A heliport will be constructed to respond to patients with severe symptoms in a wide range of areas and to transport patients and dispatch staffs in the event of a large-scale disaster.
- At the emergency entrance, sufficient parking space for multiple ambulances (four ambulances) will be established to provide prompt emergency treatment during congestion.
- The Emergency Department will be located adjacent to the diagnostic radiology, angiography and endoscopy departments for prompt diagnosis and treatment.
- An elevator to transport patients will be located adjacent to the Emergency Department to directly connect to the Operation Department and Intensive Care Unit.
- To provide the service of emergency laboratory testing, a patient-transport facility directly connected to the Laboratory Testing Department is planned.
- A helicopters landing space will be located on the ground, where long-distance transport of critical patients or rescue activities at the time of large-scale disasters can be done. Material on regulations of obstacle limitation surfaces for heliports (take off/landing field) in Japan is attached for reference.

(5) Inpatient Department

- As a general rule, on inpatient floors, in consideration of introducing Japanese style hospital operation and management, 44 beds per nurse unit, which is common in acute hospitals in Japan, will be planned. Also, based on the height regulation in Vietnam, 4 nurse units per floor will be planned.
- Patient rooms are basically planned to have four beds or to be single occupancy. Four-bed rooms are large enough to accommodate up to six beds if required by hospital operation or during times of disaster.
- The ratio of private rooms is approximately 20% and is designed to achieve efficient hospital operation and improved patient amenity.
- The 4 nursing units on the 9th floor will consist entirely of private rooms to deal with wealthy and foreign patients.
- A ward for infectious patients will be created but has yet to be discussed.
- Staff stations will be arranged to shorten the traffic lines of nursing staff to bedrooms.
- A training area is created on each ward floor to enhance education and training.
- In order for the ICU Department to provide the emergency laboratory testing services, a patient-transport facility directly connected to the Laboratory Testing Department is planned.
- Vaulted ceilings are carefully arranged in various places on the inpatients ward floors to bring in natural breeze and light.

- An area for possible building expansion is reserved on the north side of the premises to address a future increase in patient volume.
- An area to accommodate patients' families is planned in the north-east part of the premises.

(6) Hemodialysis Department

- With consideration to outpatient users and inpatient users from the hospital ward, the department will be placed adjacent to the core elevator for transporting patients for easy bidirectional access.

(7) Operation Department

- The Operation Department is located on the same floor as the Intensive Care Unit and Central Sterile Supply Departments so that cleanliness can be properly managed for optimized operation.
- In addition to regular operating rooms, some operating rooms are designed to be large enough to accommodate the need for a large-scale special operating room, such as required by Da Vinci surgical systems and hybrid operating rooms.
- The elevator to transport patients is directly connected to the Operation Department for efficient access from inpatient ward floors and the Emergency Department.
- In order to provide emergency laboratory testing services, a patient-transport facility directly connected to the Laboratory Testing Department is planned.

(8) Rehabilitation Department

- In order to handle the increasing number of stroke cases, cardiac infarctions and external injuries, the Rehabilitation Department is in a convenient location for both outpatients and inpatients.
- Ample indoor space has been made for rehabilitation and an outdoor rehabilitation area has been provided for efficient management of the Rehabilitation Department.

(9) Clinical Laboratory Department

- In the Clinical Laboratory Department, testing is consolidated and centralized. Urine sampling and blood collection sites for outpatients are in an easy-to-find, convenient location.
- An elevator to transport patients is located adjacent to or directly connected to the Clinical Laboratory Department from the hospital wards and the operating room for prompt transfer of specimens.
- The Physiology Department is also in a convenient location for outpatients and has easy access for inpatients for efficient operation.

(10) Diagnostic Radiology and Nuclear Medicine Departments

- Radiological Diagnosis and Nuclear Medicine Departments are consolidated for increased cooperation.
- As medical technology and equipment advances rapidly in these departments, this area is designed to have an open space at the end of the hallway and extra space will be established for to make possible future expansion incluing radiotherapy department easier.

(11) Endoscope Department

- In a convenient location for outpatients adjacent to the Emergency Department to enable immediate response.
- The elevator to transport patients is to be placed adjacent to the Endoscope Department in consideration of access from the hospital ward.

(12) Nutrition Management Department

- Considering prompt transportation of ingredients delivered from outside and meals to the hospital wards, the department is located adjacent to the SPD Department on the north side on the second floor.
- An elevator dedicated to transportation of meals to the hospital wards is provided for efficient serving.

(13) Department of Pharmacy

- In consideration of delivery and management of drugs, the Department of Pharmacy is located on the second floor together with other SPD related departments centering on the transportation hall.
- An elevator to transport patients is directly connected to the Department of Pharmacy for prompt supply to hospital wards and other departments, including the outpatient ward.

(14) Central Materials Sterilization Department

- Located adjacent to the Operation Department to enable the prompt supply of sterilized materials.
- In this department, cleaning, disinfection, assembly, sterilization, storage and supply areas are clearly segmented for efficient one-way operation.
- Designed to smoothly provide supplies to departments other than the Operation Department, such as hospital wards, and to address emergency surgery which can be expected from the increased volume of emergency patients.

(15) Supply Management Department

- The SPD Department, which manages supplies, is located on the second floor and is clearly divided into outpatient, staff and emergency traffic lines for prompt and efficient facility management.
- The Supply Management Department is located off the transportation hall and adjacent to the elevator to transport patients to achieve prompt inspection, storage and payment for supplies and efficient management.

(16) Regional Medical Liaison Department

- The Regional Medical Liaison Department is located adjacent to the Outpatient Department to strengthen cooperation with related hospitals and the referral system. In addition, auditorium shall be located near the entrance in order for easy access from the outside to improve regional medical cooperation and for the effective training. The elevators shall also be located near the entrance, making it easy to access to the traning center located at the top floor.
- The consultation desk, adjacent to the outpatient entrance, addresses referral patients to improve the current situation of referral consultation.
- The consultation desk is located adjacent to the Regional Medical Liaison Department to enable sufficient coordination.

(17) Administrative Department

- The Department of General Affairs and Administration will be on the 10th floor, which will be the same as the Medical Office and Training Center, for efficient operation.
- Medical Offices are integrated with the Training and Research Departments in the Training Center to enable sufficient coordination and functionality as an educational, training and research hospital.
- A large auditorium will be placed on the first floor to provide education and training services, and is to be used as an emergency examination area and shelter in the event of a disaster or pandemic.
- A garage for official vehicles and other facilities (space for 25 vehicles, maintenance space, warehouse, etc.) is planned in other building outside the hospital facility.

7-3-3. Disaster and Pandemic Response

- To cope with natural disasters such as typhoons and flooding, the level of the site to be developed is planned to be 0.5-1.0m higher than the surrounding roads. In addition, the hospital will have the adequate response capabilities to natural disasters to provide services to a large number of victims through the following measures: ensuring an on-site emergency stockpile warehouse, provision of a rainproof triage space by using canopies or setting up temporary tents, use of the auditorium to temporarily accommodate patients, and the use of spaces directly accessible from outside, including the Medical Checkup Department, the restaurant, and the entrance hall, as temporary examination areas.
- To provide services to the great number of patients who would visit the hospital in the case of a pandemic outbreak, a "fever outpatient" area will be provided for setting clear cut-off lines to block infection. The general examination area and the "fever-outpatient" area will be clearly demarcated through the following processes: The front entrances for patients and for staffs will be blocked, a temporary entrance for patients on the south side will be provided, and the off-hours entrance on the north side will be used for staff. The Medical Checkup Department, equipped with various diagnostic devices, will be used as an examination space for "fever outpatients", and the restaurant and the auditorium, which are to be accessible directly from the outside, will be used as a space to temporarily accommodate the "fever outpatients". In addition, connecting the temporary shelter for patients with the infection hospital ward using a dedicated elevator will enable an integrated operation.
- Refer to the diagram for the facility response in case of a pandemic outbreak to understand the facility response to disasters - (Refer to Appendix-5)

7-4. Schematic Drawing (Refer to Appendix-6)

The schematic design drawing shows the basic concept of the hospital facility in this plan. The detailed design will be drafted based on the construction-related standards in section 11-1 of Chapter 11.

7-4-1. Layout Plan

7-4-2. Cross-sectional Plan

7-4-3. Floor Plan for Each Floor

Chapter 8. Structural Plan

Chapter 8. Structural Plan

8-1. Basic Structural Policy

A Structural plan will be made taking into account a sufficient analysis of the results of research into the features of the natural environment that are important to facility planning, such as geographical features, geological conditions, soil properties, hydrogeological features, ground characteristics, and weather and climate.

The structure in this plan will essentially feature reinforced concrete construction with hospital function and safety in mind. It will be designed to ensure high aseismic capacity so that building performance is not lost in the event of a disaster and to maintain high quality.

- For the floor plan and cross-section plan, a well-balanced plan will be drawn up taking the building equipment to be used into account.
- Consideration will be given to flexibility of the plan and ductwork by arranging supports with functionality of the interior space of the building in mind.
- Strength of structural elements will be ensured in terms of withstanding load, durability and fire-resistance performance and preventing harmful deformation and vibration.
- As salt damage and flood disaster measures, water insulation walls will be installed around the building. In addition, the concrete covering depth for iron reinforcing bars will be increased to ensure the durability of the long-life building frame.

8-2. Structural Plan Overview

8-2-1. Scale of Structure

10 floors and 1 floor rooftop structure (anti-seismic structure)

8-2-2. Structure Classification

Structure based on reinforced concrete

8-2-3. Framework Structure

Rigid frame structure with quake-resistant walls

8-2-4. Structural Basis

Structure based on pile foundations (supporting layer will be a solid layer that can stably support structural load: about 60m)

- Selection will be made following a precise study after a survey of foundations.

8-2-5. Design Load

Vietnamese or equal level standards will be followed for seismic load, wind pressure, and hydraulic pressure.

8-2-6. Design Standard and Guideline Compliance

The Building Standard Law and other regulations (or equal level of standards) in Vietnam will be followed.

8-2-7. Materials to be Used

The following Veitnamese standard specification materials (or equal level of standard specification) will be used in appropriate combination.

- Concrete
- Reinforcing bars
- Steel frames

Chapter 9. Facility plan

Chapter 9. Facility plan

9-1. Electrical Facilities

9-1-1. Basic Policy

The purpose is to understand the overall character and the specific characteristics of the hospital sufficiently and to build a system that contributes to the development of medical care in the future, the social and public interest, patient services and so on.

Achieving the social benefits mentioned above, by introducing advanced technology and know-how from Japan in the fields of electric power and other technologies, we also plan to found a cutting-edge, long-running hospital which is well adapted to the local cultural background, the climate and the socio-economic conditions of Vietnam.

As for planning of electrical facilities, the three key points below shall be the basic policy.

(1) **In case of a power failure or disaster, the facilities can maintain their medical care function.**

- Considering incoming electric power for facility maintenance, power failures due to accidents in the city power lines and so on, and planning multiple incoming lines.
- Considering the case where all power transmission is interrupted, we plan an emergency generation system that makes possible the continuation of the power supply.

(2) **Improvement of patient services and medical treatment environments**

- The plan secures facility spaces and wiring routes to flexibly support the building for an advanced information system.
- It makes the lighting plan on the theme of "light" to make a calm, tranquil atmosphere.
- It makes the optimal lighting plan for medical interventions, such as examinations and treatment.

(3) **Consideration of energy saving and a clean environment**

- The plan reduces the amount of artificial lighting by the use of natural lighting and natural ventilation and power-facility energy.
- It reduces energy loss by the adoption of power-saving equipment and high-efficiency equipment.
- It makes a building plan and arranges smooth daily maintenance and equipment updates.

9-1-2. Infrastructure Plan

(1) **Electric power intake**

The method of power intake considers the following points and it plans double-line intake (difference substations):

- It is the base hospital for the local area and medical care functions must not be compromised in case of power failure caused by an accident or disaster.
- In case of power-supply disruption at substations or a power-transmission network accident, power failure time must be as short as possible.

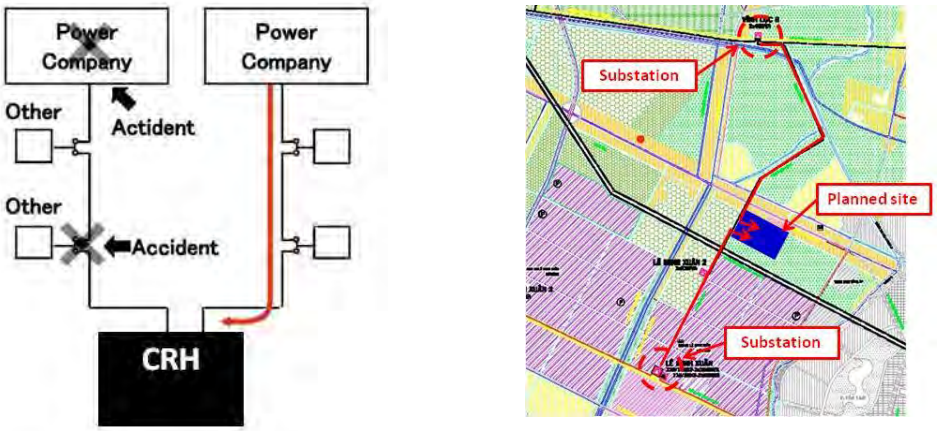


Figure 9-1 Method of incoming power and supply routes
Source: Adapted from the data prepared by the survey team

The plan for power intake points on the plan site considers the arrangement and extension area of buildings (Figure 9-2).

The following points have been confirmed with Dept. of Industry and Trade (DOIT) in accordance with the above plans:

- Incoming power line is planned for a 2- line system.
- It is possible for DOIT to complete infrastructure development by the opening of hospital operations.
- DOIT will immediately investigate and hold a review conference with Binh Chanh District People's Committee and EVN regarding the transformer substation system and power supply routes, etc.
- DOIT would also like CRH to participate in the conference for this project.

(2) **Incoming communication cables**

The plan considers the following points about incoming communication cables and proposes double incoming lines:

It is the base hospital for the area, and medical care functions must not be compromised in case of power failure caused by an accident or disaster.

The plan for incoming points on the plan site considers the arrangement and extension area of buildings (Figure 9-2).

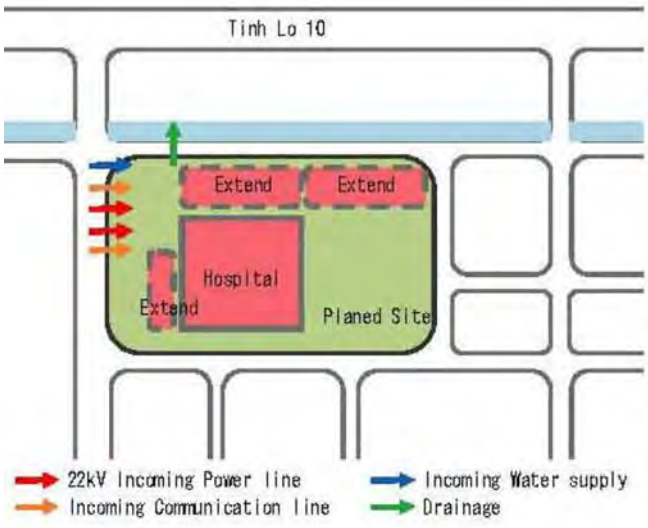


Figure 9-2 Planning of infrastructure
Source: Adapted from the data prepared by the survey team

9-1-3. Electric Power Facilities

To realize a stable supply of electric power, we plan to provide commercial electric power by multiple lines (different substations).

Multiple emergency generators will be installed, and in case of a power failure, this secures a more stable power supply by emergency generators (Figure 9-3).

Also, in consideration of major flooding, the electric room and generator room will not be placed on the ground floor.

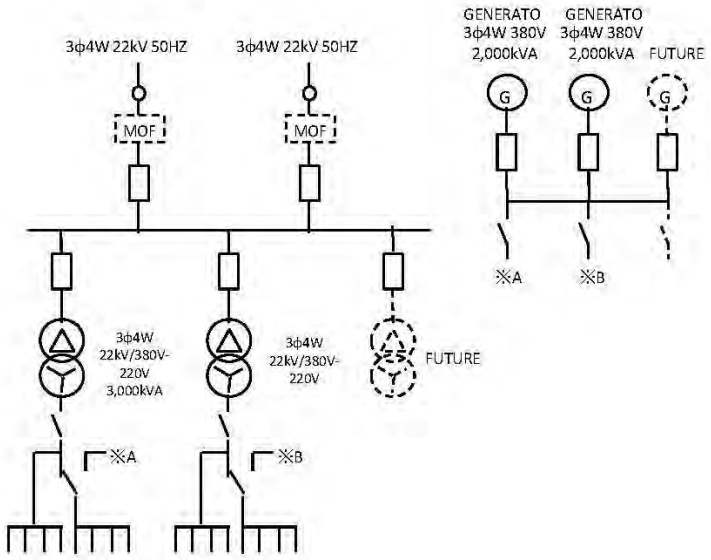


Figure 9-3 Conceptual diagram of power distribution
Source: Adapted from the data prepared by the survey team

We plan the installation of emergency generators as backup power in case of power failure. Contruct demand is supposed to 2,800kVA.

Currently, Cho Ray Hospital possesses three generators of 1,000 kVA to supply the electric power demand of 5,100 kVA, and covers about 60% of the electric power supply.

During power failures, the generators will supply the full power load excluding air-conditioning facilities; however, if there is leeway in the amount of generated power, air-conditioning facilities will be supplied as well.

Generators at similar facilities can supply about 70% of required power so this plan also proposes to secure about 70% of the demand electric power in this way.

The plan considers that electric power may become insufficient due to building extensions and so on. Therefore, additional space for a generator will be secured in advance.

The installation of an Uninterruptible Power Supply (UPS) for voltage backup of installed generators is also planned.

There are life-support systems and shadowless lights which is used in operating theaters and ICU, etc.; these need an uninterrupted power supply in the case of a commercial power failure and so on.

The plan secures power supply to operating rooms, ICU, CCU, SCU, EICU, emergency wards, intracardiac catheters and so on.

UPS information facilitiy is installed separately from the medical one.

9-1-4. Lighting Plan

For this medical facility, which is composed of various spaces, consideration for the needs of healthcare workers and patients is a basic necessity; the lighting plan should consider the medical care environment and the work environment.

Besides, functionality, workability, proper design, energy saving and environment considerations need to be factored into the plan, while harmonizing with spatial design.

(1) **Lighting standards and lighting settings**

Lighting settings take the medium degree of the applicable JIS standard as the standard for the plan.

(2) **Consideration of maintenance**

- Long-lifetime lights are selected.
- Lighting types are unified as much as possible.
- Ease of maintenance and consistence with the spatial design plan are taken into consideration.

(3) **Consideration of energy saving**

- The plan adopts Japanese high-quality LED appliances as the main constituent.
- By using the automatic blink method (sensors and so on), prevention of wasteful lighting is planned.

9-1-5. Information and Communications Facilities Plan

The plan for electric facilities proposes facility installation spaces and facility shafts for flexibility in case of facility addition and update and so on, to support advancing ICT.

9-1-6. Plan for Disaster Prevention

(1) **Unification of disaster-prevention monitoring and crime-prevention monitoring**

The plan composes a network of facilities, with disaster prevention unified with fire alarms, the fire-extinguishing system, evacuation, crime prevention and so on. It is necessary to build a system which can be centrally controlled by the disaster control center.

(2) **Fuel reserves**

Fuel is stored in preparation for a prolonged power failure.

(3) **Plan of Electric room location**

The electric room and generator room will be placed on the 2nd floor to avoid damage even in cases of unexpected flooding.

9-1-7. Plan for Energy Saving and Environment

(1) **High-efficiency equipment**

- The plan adopts Japanese high-quality LED appliances as the main constituent.

(2) **Energy loss reductions**

- Thoroughgoing measures are planned for ascertaining the amount of energy consumption and preventing excess power use.
- By ascertaining the amount of energy consumption in each department using the building energy-management system (BEMS), we plan longer equipment life simultaneously with rationalization and preservation of energy use.

9-2. Plumbing Systems

9-2-1. Basic Policy

The following three key words are the basis of the plumbing system planning policy:

(1) **Safety: The plan prepares a facility with continuity of medical care functions.**

- It plans the securing of sufficient clean water in case of disruption of the water supply or disasters.
- It plans firefighting equipment that conforms to Vietnamese law and uses fireproofing blocks.

(2) **A world-class Hospital: the improvement of medical treatment environment and patient service**

- It plans to provide sanitary ware for the prevention of hospital infection and for health management.
- It plans to provide long-life equipment and plumbing materials (SUS piping).
- It plans to provide the flexibility in responding to social developments and social and environmental changes. (Free-access floor and plumbing on the floor)

(3) **Consideration of energy saving and the environment**

- The plan provides advanced high-efficiency equipment for medical gas.
- It plans wastewater treatment facilities, which conform to Vietnamese environmental protection law.

9-2-2. Infrastructure Plan

(1) **City water**

- It plans to provide water intake from the planned city pipeline to be laid under the road on the west side of the site, which connects to the main pipe (ϕ 400mm) under Provincial Road #10.
- Construction of the pipeline is to be conducted by VRG and Binh Chan District.

(2) **Drainage system**

- The hospital drainage is discharged after wastewater treatment process compliant to Vietnamese drainage standard, to the river through the drainage waterway, which is planned on the western side of the site.
- Storm water is discharged to the waterway above mentioned by another line.

9-2-3. Water Supply System

(1) **Water supply method**

The water supply method uses an elevated storage tank system.

(2) **Water Supply Lines**

- There are two lines, the domestic water line and the non-potable water line.
- The domestic water line supplies to wash basins and sinks. The non-potable water line supplies to water closets, urinals and the cooling tower.

(3) **Calculation of the water supply amount**

The daily quantity of water is assumed from the hospital having 1,000 beds and the quantity of water being approximately 1,000 L/Day/Bed. This is based on the existing Cho Ray Hospital and the Japanese standard (400 L–1,000 L/day/bed). The adoption of a water-saving device will succeed in reducing use of the water supply by 10% compared to the current amount of water used in the hospital.

The daily water supply of the new hospital
Q = 1,000 B × 1,000 L/day /Bed = 1,000,000 L/day
Assuming that the ratio of the domestic water to non-potable water is 6 : 4.
The amount of consumption of domestic water is 600 m^3/d.
The amount of consumption of non-potable water is 400 m^3/d.

(4) **Receiving tank capacity**

Domestic water-receiving tank capacity: 600 m^3
(Storage of 1 day's consumption of water in stainless steel tank)
Non-potable water-receiving tank capacity: 800 m^3
(Storage of 2 day's consumption of water in a pit)

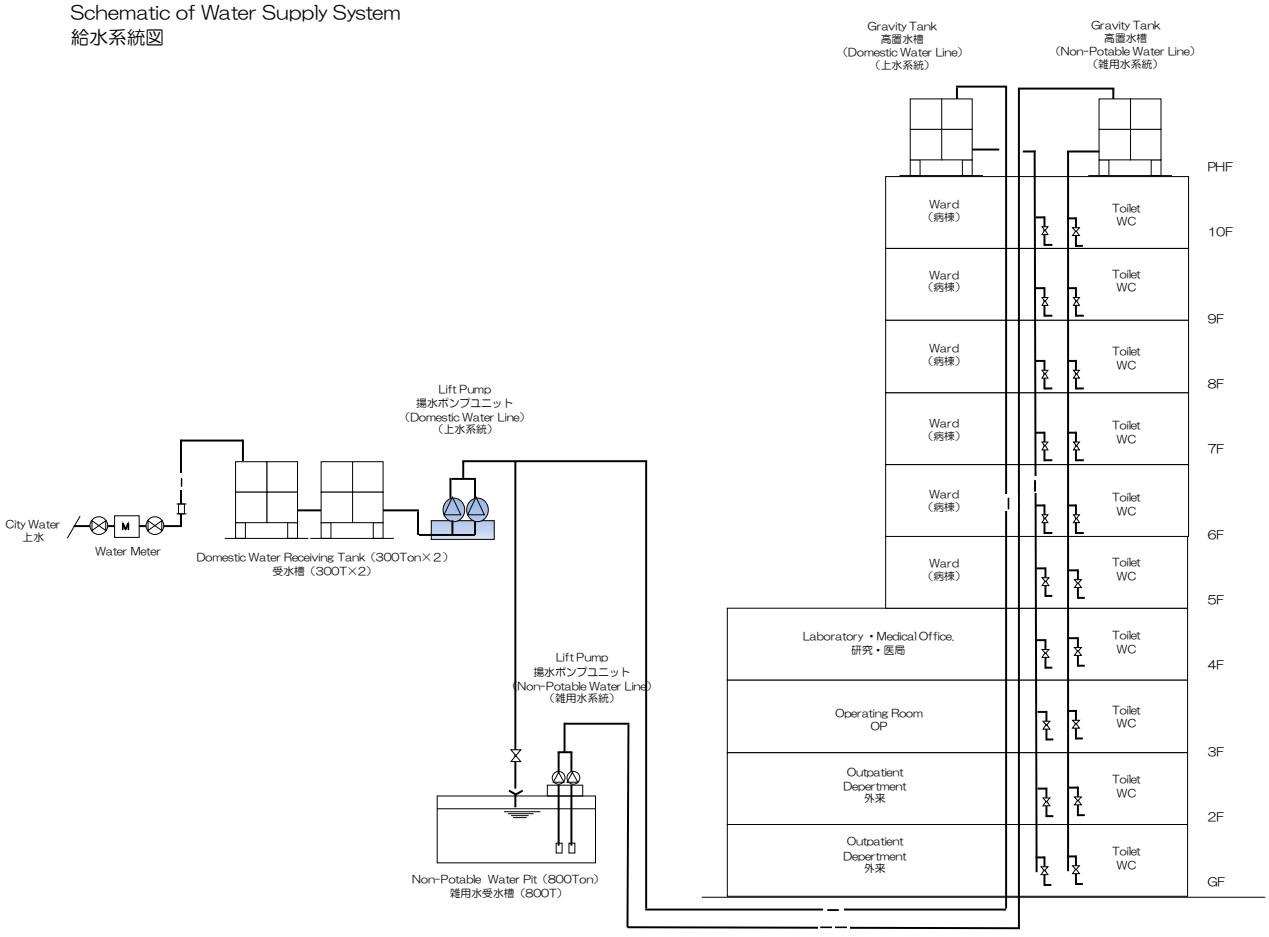


Figure 9-4 Schematic of water supply system
Source: Adapted from the data prepared by the survey team

9-2-4. Hot Water Apparatus

Hot- water supply system

- The local hot-water supply system supplies hot water for the shower room by a storage-type electric water heater.

9-2-5. Drainage System

The in-hospital drainage is classified into the following 8 systems (See Figure 9-5):

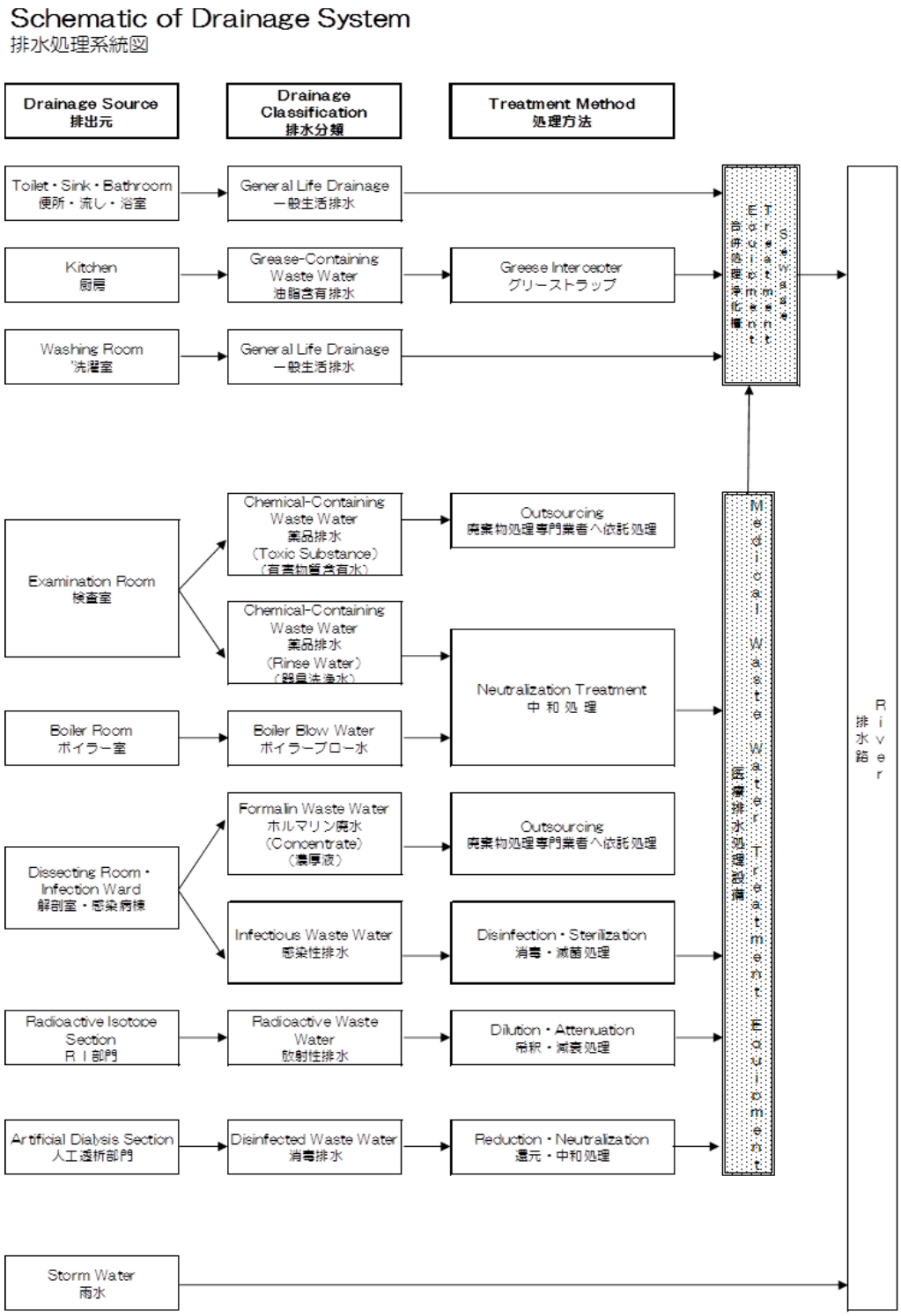


Figure 9-5 Schematic of drainage system
Source: Adapted from the data prepared by the survey team

- In the building, domestic sewage separates into sewage and miscellaneous drainage; it then flows into the first catch basin and it discharges to the planned waterway after processing in the wastewater treatment facility.

- The inspection drainage collects field wastewater and first-wash wastewater goes indoors to the tank according to the classification.
- It then gathers secondary-wash wastewater, conducts it to a neutralization tank and discharges it to the wastewater treatment facility.
- Kitchen wastewater is high in BOD and exhibits high normal hexane extraction. Oil is removed through a grease trap and discharged to the wastewater treatment facility.
- In dialysis treatment, drainage is conducted to a neutralization tank and is discharged to the wastewater treatment facility.
- Washing drainage discharges to the planned waterway after processing in the wastewater treatment facility.
- The processing of RI pollution drainage makes the safekeeping system (the attenuation system) a principle, and it uses a dilution system as the system demands.
- The system makes infection ward and dissection room drainage independent in their plumbing and it processes them through disinfection.
- It discharges to the neutralization tank and to the wastewater treatment facility.
- Storm water discharges to the planned waterway by independent plumbing.

9-2-6. Wastewater Treatment Facilities

Based on the first survey result, the plan proposes drainage-processing equipment in the following 3 systems:

(1) **Sewage treatment equipment**

This processes the general-purpose drainage, kitchen drainage, and washing drainage which is emitted from the hospital at below the Vietnamese drainage standard value.

(2) **Medical wastewater treatment equipment**

This processes the chemical-containing wastewater, which is emitted from the laboratories, the dissection room and the dialysis treatment room at below the Vietnamese drainage standard value.

(3) **RI (Radio Isotope) drainage treatment equipment**

This attenuates a half-life in a collection tank; it dilutes drainage from the RI management area with a dilution tank, measuring concentration with a drainage monitor. After the confirmation of acceptable levels of radiation, waste discharges to the general-purpose drainage (The collection tank is made of stainless and it can be checked on all surfaces).

(4) **Drainage water-quality standards**

Table 9-1 Vietnamese hospital drainage emission standard

Regulation	Item	Water-quality standard
QCVN40:2011	Hydrogen ion concentration (pH)	6.5–8.5
	Biochemical Oxygen Demand (BOD)	20 mg/L or under
	Suspended Solids (SS)	50 mg/L or under
	Mineral oil content	5 mg/L or under
	Grease and oil content	10 mg/L or under
	Phenols content	0.1 mg/L or under
	Copper content	2 mg/L or under
	Number of colitis germ legions	3,000/cm^3 or under

9-2-7. Hygienic Fixtures

(1) **Basic matters**

1) It should be easy to maintain cleanliness and safety, the handling is easy and the fixtures are durable.
2) It uses water conservation appliances. Trying to reduce about 10% of current amount of water use.
3) As necessary to prevent hospital infections and for health management, non-contact type taps are installed in the required locations.

9-2-8. Firefighting System

(1) **Installation criteria**

These are based on Vietnamese firefighting-related laws and regulations and the instructions of the nearest firehouse.

(2) **Sprinkler facilities**

Sprinkler heads are provided for the whole building by firefighting law.

9-2-9. Propane Gas Facilities

Compulsion vaporization equipment is installed in the propane cylinder storehouse and after passing through the gas meter, it supplies the required locations.

A gas-leak alarm for is provided for locations using gas.

9-2-10. Medical Gas Systems

(1) **Kind of the medical gas facilities**

a. Oxygen Gas (O): Liquid Oxygen Cold Evaporator + The spare cylinder
b. Nitrous Oxide Gas (N): cylinder
c. Nitrogen Gas (N2): cylinder
d. Carbonic Acid Gas (CO2): cylinder
e. Compressed air (A): Air compressor, the tank (With HEPA filter)
f. Vacuum (V): suction pump, the tank
g. Surplus anesthesia gas discharging equipment (Ex)

(2) **Supply system**

Oxygen installs two li Liquid Oxygen Cold Evaporator in outdoors and supplies outlets with the plumbing from the manifold.

Incidentally, it considers the maintenance and repair opportunity, it provides a spare oxygen bomb.

Nitrous oxide, nitrogen and the carbonic acid gas install a cylinder in the medical gas container storehouse in the building respectively and supply outlets with the plumbing from the manifold.

The compressed air installs an air compressor, tank, HEPA filter, dehumidifier and decompression equipment in the machine room and supplies outlets with the plumbing from this.

The Vacuum installs a suction pump, a tank in the machine room and doing plumbing from this to the outlet.

As the security measures, it installs the caution facilities of the pressure decline and the remaining amount display.

9-3. Air Conditioning

9-3-1. Basic Policy

The following three keywords are basic to the air-conditioning policy:

(1) **Safety: The facilities maintain continuity of medical care function in case of accident and or disaster.**

Mutual backup for the equipment is in place.

Equipment is durable and easy for regular maintenance.

(2) **Internationalization: patient service and the improvement of the medical treatment environment**

Plan focus on hospital infection prevention and health management.
Long-life equipment and plumbing materials (SUS) are used.

(3) **Consideration of energy saving and the environment**

In the new hospital, since an increase in electricity prices is expected due to factors such as an increase in the air conditioning area, the following should be considered:

High-efficiency equipment should be installed in the space as well as planning the system numerically controls operation by using a chiller, boiler and so on.

As a result, high efficiency and the reduction of the amount of energy consumption is possible.

Reduced labor for maintenance is planned by the simplification and automation of the operational control of each of the facilities.

9-3-2. Heat Source Facility

(1) **Heat source demand**

The assumed cooling load
Total floor area A1 = approximately 90,000m^2
The unit of cooling capacity q =100 W/m^2
(Vietnamese and the average of similar domestic facility)
(The air-conditioned area is 70% of 140 W/m^2)
The chiller's capacity
Qr1 = A1･q = 9,000,000 W = 9,000 kW
= approximately 2,560 USRT(1USRT = 3,024 KCAL/H=3,515 W)
→ 3,000 USRT

(2) **Heat source facilities**

Chiller: 1,000 USRT × 4 (One spare)
The steam boiler: 2,000 kg/h × 2 (One spare)

9-3-3. Air Conditioning System

(1) **Design condition**

1) The fresh air design condition (The Vietnamese climate dater, the design standard)

36°C DB 63%
Note: DB (°C) Dry bulb temperature x (%) relative humidity

2) The indoors temperature design

The Japanese hospital facility standard: Guidelines for the design and management of the hospital air conditioning" HEAS-02 (1998)

Summer season	DB (°C)	RH (%)
General sickrooms	26.0	55
General rooms	26.0	55
Operating rooms	22-26	55

(2) **Air-conditioning method**

- The general air-conditioning method uses an air handling unit (with heat exchanger).
- Packaged air conditioners are to be installed in rooms to be heated.
- An all-fresh air-handling unit is planned for rooms, to prevent hospital infection, rooms with unpleasant odors, the room which cannot use recirculation air and so on.
- HEPA filters may be used to increase air purity where necessary.
- Fan coil unit + all fresh air-handling unit can be controlled individually in the Outpatient Department and wards.

9-3-4. Ventilation System

(1) **Ventilating method**

Ventilation facilities are based on the Vietnamese ventilation facility standards and are installed indoors with the purpose of removing unpleasant odors.

(2) **Total heat exchanger**

Energy is saved by the heat exchange of exhaust air and fresh air.

9-3-5. Smoke Exhaust System

Mechanical smoke exhaust equipment is installed in hallways and rooms which cannot achieve natural smoke ejection. The system is based on Vietnamese law.

9-3-6. Central Monitoring System

(1) **Central monitoring facilities**

1) Basic policy

Hospital air conditioning consumes more energy than general buildings.
Therefore, proper management is important and it is necessary to perform appropriate central control.
A special microcomputer has central control for easy exchange in case of trouble and ease of management.
Operational management of apparatus and equipment,etc., is performed by adopting BEMS (Building Energy Management System), thereby reducing energy consumption.
In collaboration with IT, energy management is supported from Japan.

2) Main monitoring items

- The monitoring : Equipment condition
- The control : Operation and stop control
- The record : Operation record

(2) **Automatic control system**

1) Basic policy

A central control system reduces labor, creates energy saving, the extension of equipment life cycle and good cost performance.

2) Main control item

- Operation and stop control of the chillers
- The numerical control of the cold water pump
- The control of the various air handling units and the cooling tower
- The package type air-conditioner control
- The heat exchanger control
- The fan coil control
- The pressure control among the headers and the flow rate control
- The others

9-3-7. Transport Equipment

(1) **Elevator**

Elevators are to be separated by use such as for passengers, emergency patient transportation, bed transportation and cargo carry. Assumed numbers and specifications as follows.

General passengers use	: Capacity-1350kg, Speed-90mpm	6 nos.
Emergency use	: Capacity-1600kg, Speed-90mpm	4 nos.
Bed transportation	: Capacity-1400kg, Speed-90mpm	6 nos.
Cargo carry	: Capacity-3000kg, Speed-90mpm	2 nos.

(2) **Escalator**

Escalators are installed in the main hall for outpatients move between the grand floor and the

first floor. Assumed numbers and specifications as follows.

Escalator : Capacity-3000kg, Speed-90mpm 2 nos.

(3) **Goods conveyance facilities**

Large pneumatic tube system is to be installed for urgent good conveyance such as specimen, drag and paper document.

The roots and stations are follows (3 roots and 4 stations)

- Emergency Department←→Laboratory Department
- Operation Department←→Laboratory Department
- ICU←→Laboratory Department

Besides those, small goods lifts (dumb-waiters) are to be installed as needed

Chapter 10. Medical Waste Plan

Chapter 10. Medical Waste Plan

10-1. Basic Policy

We investigate the disposal standards on medical waste in Vietnam and in Ho Chi Minh City and consider the disposal of medical waste generated at Cho Ray Second Hospital.

10-2. Overview of Survey

10-2-1. Legal Standards

The legal standards on medical waste in Vietnam are based on DECISION No.43/2007/QD-BYT (MOH) and official notice TT12/2011 from the Ministry of Natural Resources and Environment. The legal standards on medical waste in Ho Chi Minh City are also in accordance with the standards of Vietnam.

10-2-2. Administration of Medical Waste

The Department of Natural Resources and Environment (DONRE) of the Ho Chi Minh City People's Committee is responsible for administration of waste including medical waste in Ho Chi Minh City. Waste is disposed of at waste disposal plants by a state-controlled company, Ho Chi Minh City Environmental Company (hereafter, CITENCO). There are three waste disposal plants in Ho Chi Minh City. Both non-infectious and infectious medical wastes are incinerated at one of the plants, Binh Hung Hoa Waste Disposal Plant. The total disposal capacity of the three plants is 31,000 kg/day. Since the current waste-disposal amount is 13,500 kg/day, the three plants have the capacity to accept much more medical waste for disposal. CITENCO also collects, transports, and disposes of RI waste.

10-2-3. Medical Waste Handling at Cho Ray Hospital

At Cho Ray Hospital, waste is collected separately as the following four types.

- Infectious medical waste
- Hazardous medical waste
- General waste
- Recyclable waste

Each type of waste is stored separately at the hospital, and CITENCO collects, transports, and disposes of the separated waste. At the hospital, bags with different colors are used to collect waste according to the types of the waste (Figure 10-1). Bags for collecting infectious medical waste are yellow and orange; yellow bags are used to collect waste having no sharp edges, such as gauze and cotton masks, and orange bags are used to collect sharp objects, such as needles and glass. Black bags are used to collect hazardous medical waste. Collected infectious medical waste is stored in a medical waste storage building (Figure 10-2) located on the hospital site, and the internal temperature of the storage building is maintained at approximately 10° C (Figure 10-3). Radioactive waste contained in the collected hazardous medical waste will be kept by the Radioactive Safety Management Department until each radioactive material has reached its half life.

Figure 10-1 Category table for in-hospital waste separation

Figure 10-2 Infectious waste storage building

Figure 10-3 Storage temperature control board

10-3. Medical Waste Plan

10-3-1. Planning for Collection and Storage of Medical Waste

The method that is practiced at Cho Ray Hospital is impeccable for waste separation and collection. Accordingly, the same method will be applied to waste separation and collection at Cho Ray Second Hospital. In addition, a storage building capable of temperature control as seen in Cho Ray Hospital will be constructed in order to store infectious medical waste. An elevator dedicated to transporting waste will be provided in a location isolated from the traffic of patients so that waste generated in each location of the hospital can be transported to the storage building.

10-3-2. Examination of Medical Waste Disposal

In Ho Chi Minh City, the construction of incineration facilities for disposal of waste, including medical waste at hospital sites, is prohibited. Accordingly, when waste disposal is necessary, requests for the collection, transportation, and disposal of waste will be made to state-controlled companies, such as CITENCO. In addition, hospitals are prohibited from storing waste in the hospital sites for more than six months. However, it is not practical to ensure a place for storing waste generated for a period exceeding six months. Therefore, this prohibition does not need to be taken into consideration.

Chapter 11. Confirmation of Permits and Approvals Concerning Construction

Chapter 11. Confirmation of Permits and Approvals Concerning Construction

11-1. Systems and Procedures of Permits and Approvals Concerning Construction

- Major criteria concerning building are as follows.
  1. General Hospital Guideline
  2. Vietnam Building Code on Fire Safety of Buildings
  3. Vietnam Building Code on Dwelling & Public Buildings - Occupational Health & Safety
  4. Building Quality Management

- Since laws concerning building in Vietnam are very complicated and frequently modified, they lack consistency in many cases. In addition to that, although legal standards are provided, those are just a standard. So, for a large-scale project, as the sketch plan is submitted to responsible departments and consultations are conducted on urban planning rules and others for each proposal, there are many cases where the project does not meet the legal standards.

11-2. Construction-related Standards

- The legal procedure is as follows;
- Environmental permit application should be submitted and approved concurrently with fire permit application and approval, environmental assessment application and approval, and construction application and approval.
- The HCM Planning & Architectural Department conducts a screening in the procedure of environmental permit application and approval
- The HCM Fire Department conducts a screening in the procedure of fire permit application and approval.
- Ministry of Natural Resources and Environment conducts a screening in the procedure of environmental assessment application and approval.
- In the procedure of construction application and approval, applications are normally submitted to the People's Committee. However, as this project is under the jurisdiction of the Ministry of Health, the things proceed in the form of a process like a planning notice instead of a construction application. For this reason, the basic design is submitted to Ministry of Construction, and responsible government ministries and agencies conduct screening.
- Although it is possible to move forward with the different procedures of application and approval with overlapping processes, adequate prior consultations are required and the overlapping of processes is not allowed in the final procedure of construction application and approval.
- Since application of laws depends on consultations in a great number of cases as mentioned above, such consultations have a large impact on cost and schedule, and for this reason, adequate prior consultations are required.

11-3. Medical Equipment-related Standards

- The medical facility must follow the procedures below ruled by the Circular (No.10/BYT/TT) issued on June 26th in 1994 for the purchase of medical equipment.
- For the purchase of the medical equipment valued at 200 million to 500 million VND (approximately 20,000 to $ 50,000) , one must submit technical and economic reports to MOH's Advisory Council of medical technical equipment. For the purchase of the equipment of more than 500 million VND, one must submit the technical and economic feasibility study to MOH's Advisory Council of medical technical equipment.
- The equipment in the following categories must be agreed by the technical advisory council of the medical device.

- X-Ray - Ultrasound - CT-Scanner - MRI - Anesthesia machines, breathing machine - Examination machine in daily living and hematology - Electroencephalogram, cardiac electric, Monitoring - Ambulance - Radioisotope equipment (Gamma-Camera) - Equipment for center of sterilization - Equipment for the production of medical gases.

11-4. Matters Concerning Bidding Procedures

- Preparation of order specifications for bidding procedures shall begin after the final legal procedure of construction application and approval.
- The bidding procedure and the schedule after the preparation of the order specification will be planned in consideration of both JICA and the Vietnamese regulations.

Chapter 12. Medical Equipment Development Plan

Chapter 12. Medical Equipment Development Plan

12-1. Equipment Plan

12-1-1. Current state of Cho Ray Hospital Equipment

All department of Cho Ray Hospital can be divided into 12 parts and the current state of the medical equipment for each part is described as follows.

(1) Radiology Department (Imaging Diagnosis and Nuclear Medicine)

Although some equipment for both imaging diagnosis and nuclear medicine are the number of units and the equipment specification level are both comparable to that of top referral hospitals in advanced nations. There are three of MRI (of which two are 1.5 T and one is 3.0 T), one PEC-CT, and two of LINAC.

As for ultrasound diagnostic imaging devices, most of the devices are centered in the Ultrasound Diagnostic Department and other departments share the devices without central controle. However, according to the hearing survey, other departments cannot borrow the devices from the Ultrasound Diagnostic Department promptly due to the overload in the Ultrasound Diagnostic Department.

(2) Clinical Laboratory Department

Each examination room included some old equipment, but both the number of units and their specification levels are comparable to top referral hospitals in advanced nations. However, the furnishings are mainly simple working tables.

(3) Operation/Central Sterilization Department

Since there is no equipment in storerooms, most of the equipment is left out in the corridors. Operating rooms contain two operating tables per room, and two people can undergo surgery at the same time. The ceiling equipment is only shadowless lamps, and reels for providing medical gas. The quality and quantity of anesthesia equipment, electric surgical units, and other equipment is the same as hospitals in advanced nations.

The central sterilization department has a large number of sterilization units, but both newer and older units are set randomly into the narrow space and the separation of clean and dirty area is unclear.

(4) Intensive Care Wards

The intensive care ward departments (ICU, Neuro ICU) have only the minimum equipment such as syringe pumps, ventilators, patient monitors, etc. Despite the fact that, like general ward, they have a large number of patients. In particular, there is only one patient monitor per patient, and there are only two central monitors for eight-patients, which means that they can only monitor critical patients. In addition, there are no ceiling pendants to supply medical gas, and aspirators are used for suction.

(5) General Wards

None of the general wards has much equipment, and the existing equipmentis limited to syringe pumps, aspirators, patient monitors, pulse oximeters, and treatment lamp. In particular, there is no equipment related to hygiene (bathing equipment, bedpan washers, etc.), and as most wards are crowded with patients, there is a high risk of in-hospital infection. Fixtures such as cabinets do not exisit in wards. In addition, stretchers are commonly used for patients due to move them easily. Even the extra-fee wards only have the same level of fixtures found in the general wards of advanced nations.

(6) Outpatient/Endoscope/Health Care Department

General outpatient departments are focused on health checkups, and have almost no equipment apart from diagnostic equipment such as endoscopes and ultrasound diagnostic imaging device. Special outpatient departments (dentistry, otolaryngology, and ophthalmology) only have the bare minimum of equipment.

The Endoscope Department has a standard complement of endoscopes, but it has few systems and probes in relation to the number of beds. Washing and cleaning is almost done by hand, and there is only one endoscope cleaning unit.

The Health Care Department has equipment to diagnose health for visa applicants, including radiology equipment and clinical testing equipment. Although these equipments limited to the minimum required, but they are relatively new.

(7) Emergency Department

There is almost no equipment in the emergency treatment wards, but the ceilings have some fixed ceiling pendants to provide oxygen, suction, and electricity.On the other hand, treatment rooms for critical patients have ample defibrillators, ventilators, and patient monitors. Operating rooms and X-ray imaging equipment are available.but the operating rooms only have the sort of equipment found in central treatment rooms in Japanese hospitals.

(8) Dialysis Department

There are nearly 60 dialysis units, but all onese are in use except some broken ones. According to a manufacturer of dialysis units, there is an absolute lack, with only 10% of patients in Vietnam who require dialysis able to get access to units. Therefore, there is a high demand for dialysis units in the new hospital.

(9) Rehabilitation Department

The existing equipment are mainly for physical therapy such as horizontal poles, wall bars, and platforms, but almost no infrared therapy units or microwave therapy units exisit. There is a whirlpool bath for hydrotherapy, but it is broken and not being used.

(10) Nutrition/Linen Department

The Nutrition Department uses a German company based on consignment contract. They installed kitchen equipment and provide food services for patient meals. The equipment is mainly stainless steel carts, sinks, fridges, and so on, but their specification is the same level as that in general facilities, and so is not as high standard as in hospitals in advanced nations. There is also a cafeteria for patients and one for staff, which are prepared and run by the hospital.

The Linen Department launders surgical gowns only, using special detergents. Clothings for patients and staff are collected by an external company that provides laundry service. Therefore, the major equipment installed is only some large washing machines and dryers, which is relatively few for a hospital of this scale.

(11) Department of Pharmacy

Drugs are not prepared in the hospital, however, purchased and distributed to patients directly. Therefore, there are no dispensing or packaging devices at all. The equipment installed is mainly shelves and refridgelators for storing drugs. There is a clean room where clean benches are installed, for the purpose of mixising anticancer drugs. However, general injection products are mixed without sterile way, which results in a high risk of the bacterial infection. A clean room for anticancer drugs is planed to installed in the Cancer Center which is under construction. Accordingly, the clean room for anticancer drugs in Cho Ray hospital is scheduled to be used for mixing general injection products.

(12) Other (Human Resources Department, etc.)

There are no usage problems with fixtures and equipment in meeting rooms and auditoriums.

The library is small and has few volumes, and the shelves are not organized fully. There are a dozen of information terminals for staffs.

In addition, there is a room of the skills laboratory with narrow space which is used only for strage. There are several simulators for heart massage and intravenous injections in skills laboratory room, and the use frequency is not so much, approximately 1-2 times per month.

12-1-2. Current State of Medical Equipment at Tu Du Hospital (obstetrics and pediatrics hospital)

We visited Tu Du Hospital, which specializes in the obstetrics and pediatric departments that the current Cho Ray Hospital does not cover.

Just as wards in Cho Ray Hospital, the obstetrics ward is overflowing with patients. Equipment in the obstetrics ward consists of two ultrasound diagnostic imaging devices, electrocardiographs, and 17 to 20 patient monitors. There are no syringe pumps, nor any gas pipes in the rooms, thus mobile pumps are used when oxygen is needed.

There are not enough patient monitors in the NICU for the number of babies and only one central monitor (for six persons). Two delivery beds exist in each delivery room, but there are no fetal monitoring devices. Some incubators accommodate two premature babies at once

12-1-3. Issues in the present conditions

- In Clinical Laboratory department, equipment for work efficiency such as the automated testing equipment, the experiment tables, the work beds, etc. is not installed.
- In CSSD department, area division between clean and dirty and planned allocation of each equipment for infection control is unclear.
- In ICU department, patient monitor is not installed for each patient.
- In ICU department, the ceiling pendants which are able to supply the medical gas are not developed.
- In Ward department, bathing equipment and bed pan washer are not planned for infection control.
- In Endoscope department, endoscope washing machine is not equipped enough for infection control.
- In Hemodialysis department, since the blood circuit of the artificial dialyzator is recycled, infection risk is high.
- In Linen Department, the number of large washing machine and dryer is not enough for the number of beds .

12-1-4. Basic Policy of Medical Equipment Development in Cho Ray Second Hospital

In consideration of the market survey and current state of medical equipment in Cho Ray Hospital, there will be no problem with maintenance if the same specification of medical equipment as in top refferel hospitals in the developed countries is planned in Cho Ray Second Hospital. The basic concept for Cho Ray Second Hospital is to install medical equipment that enables the hospital to be medical facilities that meets international standards as follows.

(1) Basic Policy

- To introduce medical equipment in consideration of advanced medical technology
- To develop medical equipment in consideration of infection control
- To introduce medical equipment which compatibles with medical information processing system aiming at efficient works
- To introduce medical equipment in consideration of an external supporting system for maintenance

(2) Main Development Contents

- To introduce imaging diagnostic equipment (PET-CT, CT, MRI, DSA, Ultrasound diagnostic imaging devices) in consideration of advanced medical technology
- To introduce medical equipment (IVR-CT, general X-ray device) for advanced emergency medical technology as a top referral hospital for emergency medicine

- To arrange patient monitor and ventilator per bed in ICU-related rooms for providing reliable medical service to patiants in severe health condition.
- To introduce ultrasound diagnostic imaging devices to the examination rooms for heart surgery, nephrology, etc. of the Outpatient Department for prompt medical examination.
- To introduce ultrasound endoscopes to each room of the Endoscopy Department for detailed examination of gastrointestinal cancer.
- To introduce automated clinical testing equipment and pathological equipment that compatibles with electronic medical record systems and department systems for efficient works
- To introduce water treatment devices and central sterilization equipment in consideration of water treatment for dialysis and infection control of surgical instruments.
- To introduce rehabilitation equipment (occupational therapy equipment, treadmill, etc.) that is used for the early recovery of circulatory disease such as heart disease and cerebrovascular disease as an advanced acute care hospital
- To introduce medical equipment in the pharmacy department that leads to efficient pharmaceutical work, prescription audit and drug management, such as automatic dispensing machine and automatic dose packing machine which compatible with drug management information and prescription ordering information.
- To introducing imaging diagnostic equipment and clinical testing equipment in consideration of an external supporting system for maintenance such as on-call system, and suppling system of spare parts and consumables by manufactures and agencies.

12-1-5. Development Plan

We surveyed the current state of medical equipment and listed the existing equipment of Cho Ray Hospital. Then, the required medical equipment, which is expected to introduce into Cho Ray Second Hospital, is added to the list based on the medical equipment in a Japanese university hospital and a basic policy of 12-1-4. With the list, we conduct hearings and discussion with each department in Cho Ray hospital. As a result of the survey it was confirmed to introduce "CT (320 rows)", "MRI (3.0 T)" and "Hybrid operating room (equipped with DSA)" into Cho Ray Second Hospital and it is confirmed that radiation theraphy equipment is a future corresponding.

It is necessary to introduce the advanced CT and MRI for cancer detection and to plan two DSAs for heart and for general purpose each to the Radiology Department for cardiovascular disease since patients with life-style disease will increase in Vietnam. One of two DSAs planned for general purpose is installed by Cho Ray Hospital in the future.

As for patient monitors and ventilators, in consideration of the situation in Cho Ray Hospital that those devices are not installed per bed in the ICU rooms, those devices are planned per bed in the ICU-related rooms in Cho Ray Second Hospital for providing safe medical service.

Ultrasound diagnostic imaging devices are arranged, without the central comtrol, in the examination rooms for heart surgery, hepatobiliary-pancreatic surgery, otorhinolaryngology, urology, lithotripsy room for providing medical examination promptly.

In addition, the medical professionals of Cho Ray Hospital have been already familiar with diagnostic imaging equipments such as CT, MRI, and DSA, and there is no problem with the operation and the maintenance of those equipment in the Cho Ray Second Hospital.

The final medical equipment list based on hearing result and discussion is shown in Appendix-7.

12-2. Maintenance

12-2-1. Current State and Analysis of Maintenance at Cho Ray Hospital

(1) Maintenance system

Medical equipment maintenance in Cho Ray Hospital is carried out by the Medical Equipment Department. There are 12 engineers in the department, of which 7 repair broken equipment in repair space of their office, and the remaining 5 move around the hospital to repair and check medical equipment. When medical equipment is broken, the department onsite contacts the Medical Equipment Department, and the engineers go to the department onsite to confirm. Simple

faults are fixed onsite with the manual by the Medical Equipment department. However, the Medical Equipment Department is located in a separate building to the wards, so it is not easy to deliver equipment from the various departments to the Medical Equipment Department.

In addition, major faults in equipment are dealt with by the manufacturers or agencies on request from the various departments or the Medical Equipment Department. In the end, submit a report to the director after repair completion, and the report is kept by the Medical Equipment Department.

When requesting repair from a manufacturer or agency, there is one issue that agencies lack the technical ability to repair the equipment, and the repaired medical equipment often breaks down soon afterwards. Thus,for some medical equipment, there is no maintenance contract with the manufacturer or agency, and no request to repair is made to the manufacturer from the hospital, and the equipment remains unrepaired.

The medical equipment at Cho Ray Hospital is not centrally managed by the Medical Equipment Department. Although a list of the medical equipment exists, but it does not cover every items. In addition, management of equipment is done on paper, therefore the documents are often lost and the space which can store the documents is not enough. We believe that it is necessary to assign a management number to each piece of equipment and create a system to manage them centrally.

(2) Personnel

Training for medical equipment is provided by the manufacturers, or physicians invited from Japanese universities. Therefore, the technical level of medical equipment operators are enough for the medical equipment in the existing hospital. Thus, the existing medical equipment is operating properly, and there is no medical equipment that cannot be used due to its high level for the staffs. In addition, although the medical equipment which is not used at an existing hospital is planned as medical equipment of the new hospital, it reveals that the operators for medical equipment have enough experience of training in foreign countries and knowledge for the medical equipment. Therefore, only initial operation instruction of planned medical equipment would be enough as operation instruction before the opening. However, there is medical equipment including endoscopes needing a certain level of technique , the manufacturer-based periodical training is required.

On the other hand, the staff of the medical equipment section does not participate in the in-hospital training or the outside hospital training. Medical equipment Department demand to participate in the outside hospital training to acquire updated medical equipment information.

(3) Maintenance finance

Repair cost and comsumable fees for medical equipment are expended from the income of the hospital. The budget is not distributed for each sction, but compiled as the whole hospital.The medical equipment maintenance expenses of 5 years (from 2008 to 2012) are as follows.

Table12-1 Medical Equipment Maintenance Costs in the Cho Ray Hospital Unit: million VND

Annual cost	2008	2009	2010	2011	2012
Maintenance costs	13,097	9,486	5,235	15,269	8,382

Source: Data received from Cho Ray Hospital

Medical equipment maintenance expense includes repair cost and comsumables fee of the medical equipment. Only the settlement of the director is required when repair of the medical equipment and comsumables fee are small sums. However, In the case of large amount, permission of Ministry of Health is required in addition to the settlement of the director. It takes about 1.5 months until permission application is granted by Ministry of Health, from documents presentation about.

(4) Infrastructure for medical equipment

To plan medical equipment, installing emergency power supplies shall be considered in case of the event of a blackout for critical medical equipment, such as life-support machines. The following table shows the principal medical equipment that requires an emergency power

supply unit as listed in JIS T 1022. JIS T 1022 regulates three types of emergency power supplies: 40 seconds or less startup for General Emergency Power Supply, 10 seconds or less startup for Special Emergency Power Supply, and 0.5 seconds or less for Instant Emergency Power Supply.

Table 12-2 Major Medical Equipment by Emergency Power Supply Type

Power type	Equipment	Type	Capacity (A)
Special Emergency Power Supply (Treatment equipment)	Electric surgical unit	Single-phase 2-wire 100 V	14
	Dialysis therapy equipment	Single-phase 2-wire 100 V	13
	Transfusion pump	Single-phase 2-wire 100 V	0.1
	Electric suction unit	Single-phase 2-wire 100 V	4
	Endoscope	Single-phase 2-wire 100 V	3
Special Emergency Power Supply (Diagnostic equipment, etc.)	Anesthesia gas monitor	Single-phase 2-wire 100 V	2
	Pulse oximeter	Single-phase 2-wire 100 V	0.2
	Blood pressure monitor	Single-phase 2-wire 100 V	1.5
	Electroencephalograph	Single-phase 2-wire 100 V	5.5
	Electrocardiograph	Single-phase 2-wire 100 V	0.9
	Ultrasound diagnostic imaging device	Single-phase 2-wire 100 V	10
	Mobile X-ray imaging equipment	Single-phase 2-wire 100 V	5
	Blood gas analyzer	Single-phase 2-wire 100 V	1
	Electronic medical record	Single-phase 2-wire 100 V	2–3
Special Emergency Power Supply (Radiology equipment)	General radiography TV	Triple-phase 3-wire 200 V	50
	X-ray	Triple-phase 3-wire 200 V	75
	CT simulator	Triple-phase 3-wire 200 V	75
	Injector	Single-phase 2-wire 480 V	19
	Mammography	Single-phase 2-wire 480 V	10
	Linac	Triple-phase 3-wire 200 V	70
	Angiography	Triple-phase 3-wire 200 V	380
	MRI unit	Single-phase 2-wire 200 V	380
	Dry imager	Single-phase 2-wire 100 V	11
	PET system	Single-phase 2-wire 200 V	15
		Triple-phase 3-wire 200 V	80
Instant Special Emergency Power Supply	Heart-lung machine	Single-phase 2-wire 100 V	5
	Defibrillator	Single-phase 2-wire 100 V	0.8
	Ventilator	Single-phase 2-wire 100 V	2.5
	Anesthesia unit	Single-phase 2-wire 100 V	2.4
	Shadowless lamp	Single-phase 2-wire 100 V	10
	Patient monitor	Single-phase 2-wire 100 V	2

An emergency power supply should be planned for the items in the table above from the list of medical equipment.

12-2-2. Issues in the present conditions

- Medical equipment is not centrally managed in the Medical Equipment Department.
- Although the list of medical equipment exists, all medical equipment are not covered in the list.
- Medical equipment are managed on the basis of paper, and there is not enough document control.
- Since the engineer in the Medical Equipment Department hardly participates in the training inside and outside the hospital, they have less chance to acquire updated information for medical equipment.

12-2-3. Basic Policy

Based on the above, following points will be the policy for maintenance by the professionals of the Medical Equipment Department.

- Storing, lending, and centrally-managing including checking current state of maintenance and usage with information system.
- Engineers will perform simple repairs to medical equipment or outsource to repair shops.
- Maintenance management such as comsumables supplies or inspections should be

conducted on a planned basis.

- Information on medical equipment should be collected and provided to the hospital staff or used for update planning for medical equipment.
- An annual training plan for Medical Equipment Department staffs should be developed and carried out with the cooperation of manufacturers.
- Maintenance conditions should be established for controlling maintenance expenses and making medical equipment repairs more efficient, and medical equipment will be selected in consideration of these conditions.

Chapter 13. ICT Plan

Chapter 13. ICT Plan

13-1. Current Situation Survey of Cho Ray Hospital ICT

13-1-1. Survey Details

First Field Survey and Second Field Survey have been conducted to check the current situation of Cho Ray Hospital.

- Current information systems (introduction history, current systems, future plans for introduction)
- Outpatient reception, Outpatient Accounting Department
- Outpatient Medical Examination Department, Treatment Cost Accounting Department, Emergency Department
- Ward Nursing Department, Inpatient Accounting Department, Infection Control Department
- Department of Pharmacy, Laboratory Testing Department, Physiology Department
- Radiology Department, Rehabilitation Department, Nutritional Management Department, Pathology Department
- Operation Department
- Patient satisfaction, staff satisfaction
- Information systems infrastructure (hardware, network, etc.)

13-1-2. Survey Results

- The outpatient information system is not perfect, but operates an electronic medical record system. Orders for various tests, radiological tests, prescriptions, and so on are largely (around 70%) done by the physicians directly, which contributes to work efficiency. Medical record entries such as findings or observations are also entered to create outpatient medical records. There are many inadequate functions compared to the electronic medical records used in Japan, in terms of the richness of individual functions and the depth of each function.
- At present, the inpatient information system is based around admission and discharge registration and accounting entries, but a next-generation electronic medical record system is being developed at the moment with the aim of implementing it next year.
- Unlike the medical insurance system in Japan, the simple medical insurance system here allows accounting to be done based on the sum calculation of the examination fee, tests, and medicine for each patient, which means the information system is also simple. In addition, entering accounting data at the treatment side also means that patients are not required to wait as long (the average wait time is 15 minutes).
- The biggest problem with the information system as currently operating is that outpatient treatment and inpatient treatment are in separate systems, so patient data is not centrally managed. Building a system that is specialized to the characteristics of each has the merit of making it easy to introduce the system, but it does present a major hurdle in achieving patient-centered treatment. At present, this issue is known, and there is a plan to include outpatient treatment in the next-generation admissions information system.
- Functionality in the outpatient electronic medical record system is lacking. To start with, support functions for physician consultations are poor, for example. These include a function for explaining the various medical examination items, a function to display the test results both chronologically and in graph form, a function to link with PACS that can reference images in an electronic medical record, and an alert function for drugs (narcotics, poisons, maximum doses, interactions, etc.). Next, when it comes to physician observations, they are treated as character strings, and so it is not possible to manage the patient's pathology in the form of an electronic medical record. In addition, paper medical records are printed out when the outpatient treatment ends. These are required by law, but there are corrections made by the physicians to the electronic medical records, so the problem becomes a practical one of not being able to use them for medical lawsuits.
- The hardware also contains software the hospital developed and installed themselves, so the system works without requiring major costs.
- Overall, there are a number of missing functions, but the hospital is working tirelessly to bring in an information system in stages. This is becoming a vital part of the hospital infrastructure, supporting

the many outpatient receptions, consultations, accounting, tests, etc. for outpatient treatment and supporting the work of the hospital through 24-hour operation.

- In this way, while there is quantitative support in the sense of processing a large number of patients, there is a major physical and psychological burden for outpatients, who must spend most of the day inside the hospital, and a substantial burden for the physicians as well, who must enter all the different sorts of diagnostic data. An initial consultation fee is collected from outpatients who do not have insurance, and the pharmacies are different depending on whether a patient has insurance or not. So, the fact that patient movement differs according to whether they have insurance or not means ultimately that there is twice the amount of work. Thus, improvements are needed in terms of increasing work efficiency and reducing effort, as well as improving patient services. An information system is needed, because it could halve the time outpatients spend in the hospital. In addition, it could increase patient satisfaction by improving patient services through guiding them, etc., and at the same time enhance examination support functions and increase the qualitative aspects of medical treatment.

- An outline of the next-generation information system (settled on the FPT Information System Corporation, having 13 years of experience in hospital information system sector and installing more than 70 hospitals in Vietnam, as of January 2013) that is currently being developed is shown below.
  - Phase 1 (Operational in July 2014): An inpatient electronic medical record system and 40 departmental subsystems, such as drug and articles management, hospital infection control, ME management, human resources, finances and accounting, and hospital management as departmental systems
  - Phase 2 (During 2015): An outpatient electronic medical record system and outpatient versions of the 40 subsystems above as departmental systems
  - Phase 3 (End of 2015): A total system that integrates both inpatients and outpatients

- Although the hardware which is the infrastructure for the above information systems can handle daily system operations, safety measures such as unit duplexing, have not been taken. The system is therefore quite vulnerable, and there is concern that the whole information system will be unusable if the major equipment components break down. With respect to power supply, a UPS has been installed for some sections in the system, but it is presumed that power is supplied from general power sources to many sections. For the department system, even more simplified equipment is used.
- The network system has a three-layer star configuration, but the equipment (switches) is not duplicated. Therefore, the systems for the entire hospital or entire floor will no longer be usable in the case of a failure of the core switch or floor switch.
- As regarding the security of the information systems, the following issues have been pointed out as indicating the vulnerability of the system to physical and electronic attacks from outside:
  - The lock mechanism of the server room is simple.
  - Free software is used against viral infection from outside, including emails.
  - The same network is used for emails, which have external connections, and electronic medical records.

13-2. Current Issues

Based on the results of the above surveys, the following problems can be pointed out in terms of the ICT of Cho Ray Hospital:

13-2-1. Issues regarding the Functions and Operation of the Information Systems

- Although the information system for outpatients has been organized to a basic degree, almost no systems for inpatients have been introduced yet. Therefore, the linkage between outpatient data and inpatient data is not sufficiently established.
- Provision of comprehensive information about patients' therapeutic situation, changes in time-series test results and changes in inpatients' vital signs of, has not been organized yet; this information is needed in order to ascertain the therapeutic situation of each patient.
- There is some concern about misidentifying patients because an identification method using the information system for inpatients (for example, wrist bands with a bar code for patients) has not

been adopted yet. There is no function that matches order contents and target patients with respect to medication, injections, and examinations. Procedures for ensuring the safety of patients, including prevention of infection, are currently poorly developed.

- Procedures for improving medical safety and efficiency based on the standard treatment plans, such as clinical path and treatment plan by illness, have not yet been organized.
- Procedures for operational improvement are currently poorly developed; e.g., properly analyzing the pharmaceuticals inventory based on the medication information entered in electronic medical records, using the medical information primarily and management information secondarily.
- Information including examination plans and treatment records is not sufficiently provided to patients.
- Services including showing waiting time to outpatients and appointment operation are not sufficiently provided to patients.

13-2-2. Issues regarding the Infrastructure of the Information Systems

- With respect to the server system, measures such as duplexing, including hot-swap configuration of the server, and redundancy, including data integrity against physical destruction, are not being taken sufficiently.
- With respect to the network system, redundancy, such as duplexing in case of a system failure, for example, a stack configuration of switches, is not provided sufficiently.
- With respect to the equipment, such as power supply and air conditioners in the server room, redundancy in case of a system failure, measures against power failure, and safety measures against physical attacks from outside are not being taken sufficiently.
- Measures against threats from outside through the Internet, including measures against viruses, a virtualized server, and installation of DMZ, are not being taken sufficiently.

13-3. Basic Policy of ICT for Cho Ray Second Hospital

13-3-1. Basic Policy for ICT Plan

The basic policy for realizing ICT for Cho Ray Second Hospital based on the results from the primary survey is as follows:

(1) Total System with Electronic Medical Record System at Its Core

A total hospital information system with electronic medical record system at its core will be introduced. An organic link between systems from each department will reduce waiting time for the patients and increase business operation efficiency. The aim is to enhance patient services.

(2) Functions to Support Examinations

With an electronic medical record system, it is possible to examine a patient by referring to the patient's past medical examination and treatment details. During the medical examination process, it is possible to order various tests such as laboratory testing, physiological function testing, and radiographic testing, without having to rely on other people. Then, looking at the test results on the screen, the medical examination can be finished by entering a diagnosis and observations as well as placing orders for prescription medicines. Checking functions make accurate orders possible when entering the orders into the electronic medical record system. Also, test results are displayed in a timeline as part of the functionality that supports doctors.

(3) Implementation of System for Patient Safety

Hospitalized patients wear wristbands; barcodes are pasted on containers for medicines, specimens, blood, etc.; and barcodes are pasted on staff member name tags. When administering medicine or during blood transfusions, these three points: staff, patient, and medication, blood, etc. are checked to enhance patient safety.

(4) Approach to Standardized Examination Services

In Vietnam, standardized examinations typified by clinical pathway have not yet been introduced. However, it is desirable that improvements, including sharing of information among the staff, reduction of medical malpractice, and reduction of length of hospital stay, should be promoted through standardization of examinations. Therefore, an information system with a clinical path function should be established.

In addition, in order to make standardized examinations more widespread, training for the relevant people on the importance of what a clinical path is should be offered at an early stage and a standard treatment plan should be formulated, so that the accuracy of medical treatment will be increased and the practice of team medical care will be promoted.

(5) Compliance with Decision for Hospital Information Systems in Vietnam

The ITC should comply with the Decision of the Ministry of Health (Decision 2013 2035/QD-BYT) regarding medical information systems. Standard protocols and standard codes in the technology of medical information use designated in this decision are shown in the table below.

Table 13-1 Standard Protocols and Codes in the Decision of the MOH (Decision 2013 2035/QD=BYT)

Standard protocols and standard codes	Explanation
ICD-O-3	(International Classification of Diseases for Oncology 3rd version) Code system to classify the tumors (neoplasms) of the ICD by the site and the form.
ICD-10-PCS	(International Classification of Diseases Procedure Coding System) Code system to classify and record the medical procedures taken by medical professionals.
ICD-10-CM	(International Classification of Diseases Clinical Modification) Code system to classify and record the diagnoses, symptoms and procedures in conjunction with hospital care.
ATC	(The Anatomical Therapeutic Chemical Classification System) Code system to classify the drugs according to the organ or system on which they act and their chemical, pharmacological and therapeutic properties.
LOINC	(Logical Observation Identifiers Names and Codes) Code system that identifies the information obtained from medical examination and practice.
HL7[1] messages ver.2.x, ver.3.0	(Health Level Seven messages) The version of the standard for transmitting information between different systems in HL7.
HL7 CDA	(Health Level Seven Clinical Document Architecture) Standard used to exchange medical documents electronically developed by HL7, defining item description codes of various documents such as referral letter, drug dispensing information, admission-discharge records, etc.
HL7 CCD	(Health Level Seven Continuity of Care Document) Standard used to exchange clinical summary of the patients (care progress document) electronically developed by HL7.
DICOM	(The Digital Imaging and Communications in Medicine) Standard defines the formats for medical images of radiographic device (CT, MRI, CR, .etc.) and the communication protocol between the medical imaging equipment and systems dealing with these images.
SDMX-HD	(Statistical Data and Metadata Exchange format for the Health Domain) Standard used to exchange and share the statistical data and metadata in the health domain developed by WHO.
ELINCS	(EHR[2] -Lab Interoperability and Connectivity Specification) Standard formatting and coding of electronic messages for exchanging the clinical examination results between EHRs of external organizations.

Source: Decision 2013 2035/QD-BYT, (Explanation) created by the survey team

[1] Standard for medical information exchange between the medical information systems

[2] Electric Health Record：Mechanism for storing, referring, using, and sharing various information related to health care of individuals.

(6) Increase in Efficiency of Business Operations by Outpatients Paying Later

The prepayment system for outpatient accounting, which causes inefficiencies in the outpatient medical care service, should be abolished, and the post-medical examination payment system should be adopted instead in accordance with the medical process guidelines issued by the Ministry of Health. At the same time, the appointment medical care system for outpatients should be promoted proactively so as to reduce patients' waiting times and streamline the operations.

(7) Unifying the Business Operation Process for Medical Examinations and Treatment for Both Insured and Uninsured People

At Cho Ray Hospital, reception and pharmacies differ for patients who have insurance and those that do not. This causes redundant business operations and complicates patient flow; but the Ministry of Health is planning on establishing a universal health insurance system by 2020 and Cho Ray Second Hospital is aiming for a hospital information system with unified business operations not affected by whether or not one has insurance.

(8) Supporting Human Resources Development through Remote Diagnosis System and Remote Conferencing System

By connecting Cho Ray Hospital, Cho Ray Second Hospital, and the backward hospitals with a remote diagnosis system, to enhance the diagnostic capabilities of pathological diagnosis and imaging diagnosis and to promote human resource development in the backward hospitals are aimed.

In addition, the technology transfer of medical care to Vietnam should be enabled by providing advice to the diagnosis and treatment for difficult cases, etc. from Japanese universities and medical institutions through this system.

Furthermore, by a remote conference system, it is expected to support the lectures and meetings with remote locations.

However, remote conference system proposed here is a generic TV conference system to share documents and voice and face of the members of the remote location. If the TV conference system which Cho Ray Hospital is going to introduce in 2015 is a system of some specific area such as video-sharing of the surgical field, it should be used with the proposed conference system. Conversely, if it is a general type system and the functions of those two systems are redundant, the compatibility of equipment and operation should be kept by extending the system introduced in Cho Ray Hospital in advance.

(9) Space for the Hospital Information System Management Department

With a view to the future integrated use of the information systems of Cho Ray Hospital and Cho Ray Second Hospital, an approximately 300 m2 space (including a server room, SE operation room, meeting room, warehouse, etc.) should be provided to manage the hospital information systems of both hospitals.

(10) Secondary Utilization of Medical Information and Management Information

Data associated with patients' medical care contains a large amount of information, including information on consumption of pharmaceuticals and details of examinations required for each illness, which, when analyzed, is directly related to operational improvement and reduction of cost. A management control system that can accumulate, analyze, and use such data should be introduced.

(11) Provision of Information to Patients

To hasten treatment of patients and prevent illness recurring, patients' understanding of regarding their illness and treatment is absolutely essential.

From this perspective, a system that prints out such information to be provided to each patient should be introduced in order to explain the treatment plan and the treatment process to each patient and gain their understanding of the medical treatment of their illness.

(12) Application of the Outstanding Technologies of the Japanese Information System

Most of the issues mentioned in the above policies have actually been resolved over 20 years or so in Japan's hospital information system. For example, the following items are well-known as functions and procedures which support medical care:

- Internet reference, DI (medical-package insert information about efficacy and usage) reference
- Case retrieval, medical guide reference
- Maximum dose/incompatibility check
- Checking the implementation status of contents of instructions (understanding of actually implemented contents)
- References and graphs of time-series test results
- Hospital-ward temperature display board (time-series graphs of body temperature, blood pressure, pulse, etc.)
- Images other than DICOM, such as brain waves, electrocardiograms, endoscope, echocardiographic images, and protein fractionation graphs
- Patient management: allergies, infectious diseases, and contraindication
- Procedures for preparing medical certificates, summaries, and medical referral letters
- Critical pathways (basic care map)
- Unified management of appointment system (outpatient medical care, test, appointment for hospitalization)
- Checking of patient identification, action to be taken, and practitioner
- Input of information on patients' vital signs
- Incident report/Infection control system
- Bedside terminals
- Team medical care functions and procedures (specifying teams and information-sharing)
- Community medical cooperation (referencing patients among multiple hospitals/cooperation pathways)

In Japan, these functions have been realized as the result of trial and error, which means that they have been accomplished through an accumulation of successes and failures in a learning cycle of function enhancement -> worsening of response -> improvement of response -> function enhancement.

An advanced information system should be established in Cho Ray Second Hospital using the previously-described technologies and know-how in the deployment of a Japanese information system vendor, without taking a roundabout approach.

13-3-2. Details of the Introduction of an Information System

To achieve the basic policies for introducing the ICT, the information system for Cho Ray Second Hospital should have a comprehensive medical information system, consisting of the following systems. (As for detailed information about the function of each system, refer to Appendix-8 "Details List of Information System Functions" and Appendix-9 "PC Arrangement Plan")

(1) Examination Support System

1) Electronic Medical Record System

- Creation and management of electronic medical records
- Prescription orders
- Injection orders
- Laboratory testing orders
- Physiological function test orders
- Pathological examination orders
- Radiological examination orders
- Treatment orders
- Endoscope orders
- Surgery orders
- Blood transfusion orders

- Dialysis orders
- Rehabilitation orders
- Admission basic orders
- Nutrition orders
- Disease name orders
- Reservation orders
- Clinical pathway functionality, etc.

2) PACS

- Accumulation/management of radiological examination images
- Retrieval/reference of radiological examination images
- Modality connection(image-gathering)

(2) Department Systems

- Drug Control Department system
- Laboratory Testing Department system (blood, biochemistry, microbiology, and pathology) [LIS]
- Physiological Function Testing Department system
- Radiology Department system [RIS]
- Endoscopy Department system
- Operation Management Department system
- Blood Transfusion Management Department system
- Rehabilitation Management Department system
- Nutrition Management Department system
- Central Material Management Department system (sterilization, goods, consumables, and ME)
- Nursing Management Department system
- Infection Control Department system
- Emergency Department system
- Medical Practice Department system (including issuance of consultation ticket, indication of patient reception order, and indication of payment order)
- Personnel/Salary Management Department system
- Business Management Department system

(3) Network System Connected to External Network

- Internet (web access, e-mail)
- Tele-Pathology (network between domestic and overseas medical institutions and research institutions)
- Tele-Conference (network between domestic and overseas medical institutions and research institutions)
- Appointments system

(4) Sharing Information and System Management Function

1) Groupware System

Internal e-mail, bulletin boards, meeting room reservations, document management, etc.

2) Integrated Operations Management Software

Integrated management, asset management, user ID management, job management, software distribution, platform management, backup management, server management, network management, storage management, application management, log management, etc.

(5) Network

- Voice/data integrated network
- Wireless LAN is used in the wards, ICU, and HCU

13-4. Methods for Building an Information System for Cho Ray Second Hospital

13-4-1. Options for the System Construction Methods

There are two overall methods for building the comprehensive medical information system which was mentioned earlier: system construction by vendors in Vietnam and system construction by Japanese vendors.

Another possible method is a combination of the above two approaches, i.e., system construction through cooperation (e.g. technical cooperation) between vendors in Vietnam and Japanese vendors.

The options for the system construction methods are summarized as follows:

A: System construction by vendors in Vietnam

B: System construction through cooperation between vendors in Vietnam and Japanese vendors

C: System construction by Japanese vendors

13-4-2. Comparative Evaluation of Each Method

The table below shows the comparative evaluation of the above methods based on the results of surveys on the technologies, expenses, and other elements for the comprehensive medical information system for Cho Ray Second Hospital.

Table 13-2 Comparative Evaluation of the Methods for Building an Information System

Section	Item	A Vietnam	B Japan/Vietnam	C Japan	Remarks
1	Medical-information system package functionality	○	○	◎	
2	Technological capability/know-how of the vendors	△	○	◎	
3	Understanding of systems/operations in Vietnam	◎	◎	△	
4	Securing of SE (resident) at the time of introduction	○	○	△	
5	Securing of SE (resident) after the operation of the system has started	○	○	×	
6	Expenses for building and maintaining the information system	◎	○	×	
7	Construction of a core system	○	○	◎	
8	Construction of a department system	○	○	×	
9	Construction of an advanced system	×	△	◎	

[Legend] ◎: Excellent, ○:Fair, △: Somewhat poor, ×: Poor

Source: Adapted from the data prepared by the survey team

13-4-3. Advantages and Disadvantages of Each Method

(1) A: System Construction by Vendors in Vietnam

Judging from the fact that vendors in Vietnam are developing electronic medical records systems under the current prevailing conditions, they have the technological capability to set up an electronic medical records system and the capability to support SE from construction through maintenance of the system; accordingly, it should be possible to trust them to build a system for the future.

Based on our development experience, vendors in Vietnam seem familiar with the systems and customs in Vietnam as well as the operations in hospitals. Therefore, no major disruptions should be expected to arise from the system development for Cho Ray Second Hospital.

However, some aspects of the current system functions in Vietnam have enormous differences from system functions in Japan. (Details are described in (12) in the section of "Basic policies for ICT introduction" and other sections.) In addition, there is also a noticeable difference in measures including duplexing of information system infrastructure (equipment and network) between the two countries.

It will be difficult to implement these advanced functions at an early stage relying only on the capabilities of the various vendors in Vietnam. It is also anticipated that it will take a long time to correct the elements of system degradation such as slowdown in response times that will occur after system implementation. This method offers the lowest cost for building the information system.

(2) B: System Construction through Cooperation between Vendors in Vietnam and Japanese Vendors

There are various possible levels of cooperation between vendors, from high-level cooperation in which the package specifications are disclosed, to basic-level cooperation that handles dispatching personnel (securing of workforce). At this point, it is difficult to predict what level of cooperation can be realized.

It is assumed that technical guidance for the external design (at the level of screens and forms) which has already been realized in Japan can be provided at the level of dispatching engineers and technicians; this may not be the case for a level of cooperation that requires complex agreements between vendors, such as disclosure of the package specifications.

This method will probably allow the relevant parties to achieve insights about developing functions and technologies which do not exist in Vietnam, and allow them to work on the development of advanced functions.

It is hoped that technical assistance in terms of the optimum system configuration and setup will also be provided for the measures such as duplexing of the information system infrastructure (equipment and network) which are needed to ensure stable operation 24 hours a day, every day.

The cost of building the information system will fall between methods A and C.

(3) C: System Construction by Japanese Vendors

Although many vendors showed a negative attitude toward proposals concerning Vietnam in our primary survey, as we interviewed the vendors individually, there were some vendors which showed a positive attitude toward running business in Vietnam for the following reasons:

- They have had several business offers from Vietnam and neighboring countries.
- There have been some proposals for system construction by hospitals which are looking for a chance to expand their business from Japan to Vietnam.
- Therefore, they want to make proposals after checking the market size of the medical information system in Vietnam, etc.

Japanese vendors have been working on development of software packages for the medical information system for more than 20 years. The major vendors involved have already launched third-generation electronic medical-records packages onto the market.

The third-generation software is realizing advanced functions in terms of system (such as comprehensive collection and display of patient information, and functions that run across multiple systems such as clinical path); these are functions which have not been previously realized in Vietnam or even in Europe and the United States. The technological capabilities and know-how accumulated through repeated trial-and-error processes should be outstanding in this field.

Approximately 10 years should be allowed for the vendors in Vietnam to acquire these technological capabilities and this know-how (although it took about 20 years in Japan), yet it would be significant if Vietnam adopted a Japanese-based information system.

Although Japanese vendors have advanced technological capabilities, it seems impossible to establish a support system for the system engineers (SE) overnight in building an information system and maintaining it in Vietnam. In addition, it is anticipated that dispatching competent personnel to Vietnam as resident personnel only for a single establishment, that is Cho Ray Second

Hospital, will be difficult from a business perspective.

Even if a sufficient number of engineers required for building a core system including the electronic medical-records system is achieved, it may be difficult to secure the personnel for building the entire system up to the establishment of individual department systems. This means that orders for building of the individual department systems will probably need to be passed on to Vietnamese vendors.

The cost for building the information system under this method will be high. (It is equivalent to the expense of buying the time (10 years?) required for the establishment of an advanced system.)

13-4-4. Recommended System Construction Method

To achieve advanced functions at an early stage, Method C, System construction by Japanese vendors, is desirable.

Considering the issue in terms of technologies, costs, and SE support, Method B, System construction through cooperation between vendors in Vietnam and Japanese vendors, should be recommended.

13-5. Visualizing the Future of Cho Ray Hospital and Cho Ray Second Hospital

13-5-1. Setting up Information-system Departments

Cho Ray Hospital and Cho Ray Second Hospital are sister hospitals which are run on the same management basis. Therefore, it is desirable that information systems will be built and maintained under an integrated management structure in order to improve linkages and efficiencies in the information systems of the two hospitals, and also in order to reduce costs.

For this reason, aside from an information-system department in each hospital, a structure for integrated management of the two information-system departments, such as an organization called, for example, the Inter-hospital Information System Control Room, should be established.

13-5-2. Securing of the Compatibility of Data between Cho Ray Hospital and the backward hospitals

It is predicted that many patients and hospital staff will be exchanged between Cho Ray Hospital and Cho Ray Second Hospital, as will the relevant data.

For this reason, it will be desirable to ensure as far as possible the compatibility of the master data and database items which are used in the information systems of both hospitals.

In addition, for the data sharing of medical information and images, etc. not only between the both hospitals but also with the backward hospitals, even in the backward hospitals, generation of standardized data according to standard conventions of international shown in the Ministry of Health decision of Table 13-1, such as ICD, LOINC, HL7 or other and preparation of medical equipment and PACS that conform to the DICOM format is required.

13-5-3. Intersystem Coordination between the Two Hospitals

For integral management and operation of Cho Ray Hospital and Cho Ray Second Hospital, it is desirable to establish systems using the same system and database in the future.

Because it will be difficult to achieve this immediately due to limitations imposed by bidding, for example, it is desirable to plan step-by-step integration.

(1) First Phase System of Cho Ray Second Hospital

Since it is assumed that many patients who will visit Cho Ray Second Hospital will have been treated at Cho Ray Hospital, an environment in which the electronic medical-records data of Cho Ray Hospital can be referenced will be established in Cho Ray Second Hospital.

The following figure shows a conceptual image of the system to reference the medical information of Cho Ray Hospital at Cho Ray Second Hospital:

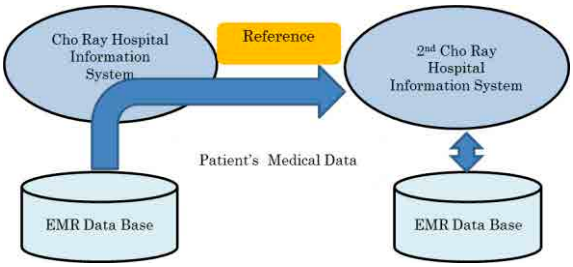


Figure 13-1 Cho Ray Hospital and Cho Ray Second Hospital Cooperation 1
Source: Adapted from the data prepared by the survey team

(2) Information System of Both Hospitals in the Future

The information system of Cho Ray Hospital and that of Cho Ray Second Hospital will be integrated so as to be shared between the two hospitals.

The figure on the right is a conceptual image of the integrated system that handles electronic medical records of both hospitals, which should be used in the operation of the system in the future.

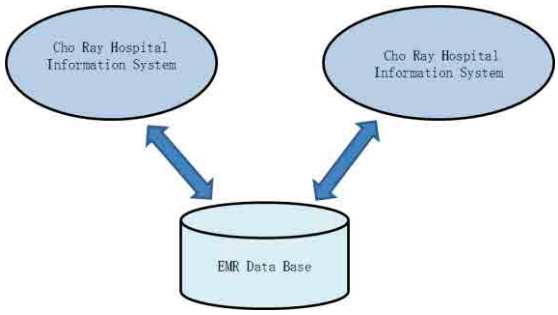


Figure 13-2 Cho Ray Hospital and Cho Ray Second Hospital Cooperation 2
Source: Adapted from the data prepared by the survey team

13-5-4. Reducing the Burden of Running Costs

For the information system of the Cho Ray Second Hospital would be a large scale system which includes the entire hospital, reducing the burden of running cost such as server maintenance fees is an important management issue. Because the running cost becomes to a requirement on the contract with the vendor, reduction means such as setting of maintenance conditions for each equipment and discount by long-term contracts should be considered in requirement specification on the tender or in the discussion on the contract.

Chapter 14. Human Resource Recruitment / Development Plan

Chapter 14. Human Resource Recruitment / Development Plan

14-1. Basic Plan of Recruitment and Allocation

14-1-1. Current Situation of Cho Ray Hospital's Recruitment and Allocation

(1) Recruitment and Turnover

Cho Ray Hospital has developed an employment plan based on the number of employees defined in the circular (No.08/2007/TTLT-MOH-BNV) in Vietnam. Cho Ray Hospital also employs contract workers, etc. to alleviate their overloaded status. Cho Ray Hospital determines the number of employees to be recruited every year, taking into account the above factors and the number of employees who have left employment. Data on the number of employees by job type and the number of employees who have left employment for the past five years are shown below.

Table 14-1 Number of New Employees recruited by Cho Ray Hospital (people) [2009 to 2013]

Joy Type	Level	2009	2010	2011	2012	2013
Doctor	Ph.D.	3	1	2	1	2
	Master's Degree	2	0	1	2	4
	Specialist II	1	2	3	0	4
	Specialist I	16	9	1	3	5
	Bachelor's Degree	62	33	40	20	24
	Total	**84**	**45**	**47**	**26**	**39**
Nurse	Senior	5	7	28	2	13
	Secondary	21	107	59	77	20
	Primary	1	2	1	0	0
	Total	**27**	**116**	**88**	**79**	**33**
Pharmacist	Senior	1	2	9	2	0
	Secondary	4	17	5	7	8
	Primary	0	0	0	0	0
	Total	**5**	**19**	**14**	**9**	**8**
Medical Technician		28	21	26	16	18
Others		109	126	68	39	41
Total		**253**	**327**	**243**	**169**	**139**

Source: Compiled from materials received from Cho Ray Hospital

Table 14-2 Number of employees who have left employment of Cho Ray Hospital (people) [2009 to 2013]

Joy Type	Level	2009	2010	2011	2012	2013
Doctor	Ph.D.	4	6	2	2	3
	Master's Degree	1	3	4	2	3
	Specialist II	6	6	5	3	2
	Specialist I	18	10	6	3	10
	Bachelor's Degree	14	6	7	26	14
	Total	**43**	**31**	**24**	**36**	**32**
Nurse	Senior	3	2	3	8	7
	Secondary	68	55	27	36	29
	Primary	0	0	0	0	0
	Total	**71**	**57**	**30**	**44**	**36**
Pharmacist	Senior	3	2	9	5	2
	Secondary	2	4	2	3	5
	Primary	0	0	0	0	0
	Total	**5**	**6**	**11**	**8**	**7**
Medical Technician		24	17	13	20	10
Others		51	55	45	43	35
Total		**194**	**166**	**123**	**151**	**120**

Source: Compiled from materials received from Cho Ray Hospital

(2) Employment Process

There are two employment processes: the regular employment process and the irregular employment process. Through the regular employment process, employees are recruited according to the recruitment process prescribed by Vietnam, and the employment selection process takes about six months. The table below shows the employment process in 2013. The irregular employment process is carried out as needed mainly for recruiting managerial-level staff and contract workers.

Table 14-3 Employment process at Cho Ray Hospital (2013)

Date	Process
1st to 8th August, 2013	Establishment of Recruitment Plan
12th to 13th August, 2013	Approval of the Recruitment Plan at the Recruitment Committee
16th August to 1st September, 2013	Application of the Recruitment Plan to MOH
8th October, 2013	Approval of the Recruitment Plan by MOH
14th to 16th October, 2013	Public Announcement (Newspaper, Bulletin board, etc.)
17th October to 13th November, 2013	Acceptance of Application Documents
15th to 17th November, 2013	Evaluation of the Application Documents
18th to 19th November, 2013	Approval of Short List at the Recruitment Committee
20th November, 2013	Announcement of the Short List
27th to 28th November, 2013	Holding the Job Interview Evaluation Committee
3rd December, 2013	Holding the Examination Proctor Committee
4th December, 2013	Holding Pre-Interview Meeting for Candidates
5th December, 2013	Conducting Job Interview
6th December, 2013	Conducting Foreign Language / Computer Examinations
9th to 13th December, 2013	Conducting Scoring
16th December, 2013	Approval of the Score at the Recruitment Committee
17th December, 2013	Announcement of the Score
18th to 29th December, 2013	Acceptance of Objection of the Score
30th December, 2013	Re-evaluation of the Score
31st December, 2013	Decision of Successful Candidates at the Recruitment Committee
1st to 2nd January, 2014	Announcement of the Successful Candidates
3rd to 4th January, 2014	Reporting the Successful Candidates to MOH
3rd to 15th January, 2014	Confirmation of Successful Candidates' Resumes and Qualification Certificate
1st February, 2014	Execution of Employment Contracts

Source: Compiled from materials received from Cho Ray Hospital

(3) Personal Allocation

As described earlier, the headcount of Cho Ray Hospital is based on the circular of personnel allocation in Vietnam and calculated by the actual number of beds, with some addition in consideration of the overload state. The personnel allocation by job type in each department is shown in the following table.

Table 14-4 Human resource allocation at Cho Ray Hospital by job type in each department (people) [As of December 31, 2013]

Department	Doctor	Nurse	Medical Technician	Pharmacist	Engineer	IT Technician	Other
Hospital Board of Directors	5	0	0	0	0	0	0
Department of Operating & Anesthesia	28	133	55	1	0	5	13
Department of Cardiac Surgery	23	53	0	0	0	1	3
Department of Vascular Surgery	9	15	0	0	0	0	2
Department of Intensive Care Unit	15	53	0	0	0	1	5
Department of Neurosurgical Intensive Care	14	52	0	0	0	1	5
Department of Neurosurgery	36	82	1	0	2	0	6
Department of Head Injury	14	28	0	0	0	1	5
Department of Gastroenterology (4B1)	24	37	0	0	0	2	3
Department of Hepatobiliary - Pancreatic Surgery (4B3)	23	36	0	0	0	1	3
Department of Urology (5B1)	17	40	0	0	0	0	4
Department of Orthopedics (5B3)	29	30	0	0	0	0	3
Department of Otorhinolaryngology (6B1)	18	20	1	0	0	0	2
Department of Cosmetic and Plastic Surgery (6B1)	9	0	0	0	0	0	0
Department of Ophthalmology (6B3)	12	18	0	0	0	0	2
Department of Thoracic Surgery (7B1)	10	17	0	0	0	1	2
Department of Cardiology (7B3)	19	38	0	0	0	1	3
Department of Interventional Cardiology	13	24	4	0	0	2	2
Department of Pulmonary Medicine	19	40	0	0	0	1	2
Department of Nephrology	15	33	0	0	0	0	2
Department of Digestive Medicine (8B3)	20	29	0	0	0	1	2
Department of General Internal Medicine (9B1)	6	13	0	0	0	0	1
Department of Neurology (9B3)	17	35	0	0	0	1	4
Department of Tropical Diseases	18	33	0	0	0	0	2
Department of Research & Treatment Hepatitis	9	11	0	0	0	0	1
Department of General Internal Medicine (10B1)	4	13	0	0	0	0	2
Department of General Medicine (10B3)	2	13	0	0	0	0	1
Department of Dialysis	14	46	0	0	0	0	5
Department of General Medicine (T. 6)	2	12	0	0	0	0	3
Cancer Center (Department of Oncology)	28	45	15	0	5	3	4
Department of Burn	14	32	0	0	0	0	3
Department of Endocrinology	14	21	0	0	0	0	3
Department of Rheumatology	16	20	0	0	0	0	1
Department of Hematology	14	26	28	0	0	1	5
Blood Transfusion Center	4	25	32	1	1	2	8
Department of Microbiology	2	0	48	0	0	0	2
Department of Biochemistry	3	0	47	1	4	0	1
Department of Physical Therapy	5	0	31	0	0	1	0
Department of Radiology	24	4	52	0	0	2	3
Department of Nuclear Medicine	5	5	10	2	1	2	1
Pet-CT and Cyclotron Unit	3	4	1	0	5	0	0
Radiation Safety Unit	0	2	0	0	3	0	0
Department of Pathology	6	1	11	0	0	1	7
Department of Endoscopy	9	16	0	0	0	0	1

Department	Doctor	Nurse	Medical Technician	Pharmacist	Engineer	IT Technician	Other
Department of Ultrasonography and Function Test	**21**	**33**	**0**	**0**	**0**	**1**	**1**
Department of Infection Control	**3**	**25**	**2**	**0**	**0**	**0**	**3**
Department of Pharmacy	**0**	**0**	**0**	**90**	**0**	**0**	**11**
DI & ADR Center	**0**	**0**	**0**	**2**	**0**	**0**	**0**
Emergency Department	**34**	**100**	**0**	**0**	**0**	**10**	**13**
Department of Outpatient	**22**	**103**	**7**	**0**	**0**	**40**	**12**
Department of Outpatient II	**2**	**6**	**0**	**0**	**0**	**7**	**1**
Health Care Department	**9**	**15**	**0**	**0**	**0**	**2**	**3**
Department of Nutrition	**3**	**1**	**0**	**0**	**3**	**1**	**0**
Visa Medical Department	**6**	**25**	**0**	**0**	**1**	**3**	**1**
Administrative Department	**0**	**1**	**0**	**0**	**0**	**1**	**16**
Department of Personnel Administration	**2**	**0**	**0**	**0**	**0**	**0**	**11**
Department of Brand & Communication	**1**	**0**	**0**	**0**	**0**	**0**	**63**
Sector Unions	**0**	**0**	**0**	**0**	**0**	**0**	**69**
Department of General Planning	**3**	**11**	**1**	**0**	**1**	**1**	**10**
Department of Information Technology	**0**	**0**	**0**	**0**	**4**	**0**	**4**
Social Medicine Unit	**0**	**1**	**1**	**0**	**0**	**0**	**3**
Department of Nursing	**0**	**5**	**0**	**0**	**0**	**0**	**0**
Training Center	**6**	**1**	**0**	**0**	**0**	**4**	**10**
Department of Finance and Accounting	**0**	**0**	**0**	**0**	**2**	**0**	**97**
Department of Hospital Quality Management	**1**	**0**	**0**	**0**	**0**	**0**	**0**
Department of Material Management	**0**	**0**	**1**	**0**	**14**	**2**	**202**
Department of Medical Equipment	**0**	**0**	**0**	**0**	**12**	**0**	**6**
TOTAL	***705***	***1484***	***348***	***97***	***58***	***103***	***663***

Source: Compiled from materials received from Cho Ray Hospital

The following tables show the numbers of human resources for each job type by level.

Table 14-5 Number of doctors at Cho Ray Hospital by level (people) [As of December 31, 2013]

Professor/ Associate Professor	Ph.D.	Master's Degree	Specialist II	Specialist I	General Doctor	Total
13	38	155	110	220	169	705

Source: Compiled from materials received from Cho Ray Hospital

Table 14-6 Number of nurses, pharmacists and medical technicians at Cho Ray Hospital by level (people) [As of December 31, 2013]

Job Type	Senior	Secondary	Primary	Total
Nurse	293	1,177	14	1,484
Pharmacist	21	71	5	97
Medical Technician	180	168	0	348

Source: Compiled from materials received from Cho Ray Hospital

The numbers of medical technicians at Cho Ray Hospital by job type are as follows. They are allocated to each specialized department.

Table 14-7 Number of medical technicians at Cho Ray Hospital by job type (people) [As of December 31, 2013]

Job Type	Number of Medical Technician (people)
Anesthesia Technician	56
Clinical Laboratory Technician	203
Radiology Technician	53
Radiotherapy Technician	2
Physical Therapist	32
Dental Technician	1
ENT Technician	1
Total	348

Source: Compiled from materials received from Cho Ray Hospital

(4) Work environment

1) Working Hours

Working hours at Cho Ray Hospital are eight hours for the day shift and 10 to 12 hours for the night shift. Employees in hospital wards work on a two-shift system in principle, however, a three-shift system is used for employees working in some departments (departments for patients with a high level of severity), such as the ICU, SCU, Emergency Department, surgery wards, etc. Also, a system enabling employees to take a six-month leave of absence for child care is provided by law.

2) Working Situation

The following table shows a comparison of the status of human resource allocation to major job types between Cho Ray Hospital and Japan's national university main hospitals. Workloads of the same job types are compared by calculating the workloads at the national university main hospitals in Japan for the same number of inpatients per day as Cho Ray Hospital. As a result, it was found that Cho Ray Hospital has only about 35% as many doctors, about 55% as many nurses, and about 35% as many radiology technicians as the national university main hospitals in Japan, which means, Cho Ray Hospital allocates less human resources for the same workloads.

Table 14-8 Comparison of human resource allocation to major job types between Cho Ray Hospital and Japan's national university main hospital

Job Type	Cho Ray Hospital (people) (average number of inpatient per day in 2012 is 2,458)	Average of Japan's National University Main Hospitals (people) (Calculated using Cho Ray Hospital's average number of inpatient in 2012)
Doctor	**705**	**2,028**
Nurse	**1,484**	**2,720**
Pharmacist	**97**	**165**
Radiology Technician	**53**	**152**
Clinical Laboratory Technician	**203**	**223**
Physical Therapist / Occupational Therapist	**32**	**66**

Source: Compiled from materials received from Cho Ray Hospital

The labor status of nurses in major departments is as follows. This also shows that less human resources are allocated compared to Japan.

Table 14-9 Labor status nurses at Cho Ray Hospital

	Number of Patient	Number of Nurse: Day Shift	Number of Nurse: Night Shift	Number of Patient per One Nurse
Outpatient Department	Approx. 4,000	Approx. 94	-	Approx. 43
General Ward	Approx.100	Approx. 18	Approx. 6	Day Shift: Approx. 5 to 1 Night Shift: Approx. 16.7 to 1
ICU	Approx. 35	3	10	Day Shift: Approx. 2.7 to 1 Night Shift: Approx. 3.5 to 1

Source: Compiled from materials received from Cho Ray Hospital

3) Salary

The personnel expense per employee at Cho Ray Hospital is approximately 510,000 yen per year. According to an interview of the Human Resources Department, average salaries by job type are as follows. In principle, there is no difference in salary between full-time employees and contract workers, however, there are restrictions on the promotion of contract workers.

Table 14-10 Average salaries by job type at Cho Ray Hospital

Job Type	Level	Average Salary (VND)	Average Salary (JPY) 1VND=0.0049JPY
Doctor	Ph.D.	8,000,000	39,200
	Master's Degree	7,000,000	34,300
	Specialist II	8,000,000	39,200
	Specialist I	7,000,000	34,300
	Bachelor's Degree	5,000,000	24,500
Nurse	Senior	6,000,000	29,400
	Secondary	5,000,000	24,500
	Primary	3,000,000	14,700
Pharmacist	Senior	5,000,000	24,500
	Secondary	4,000,000	19,600
	Primary	3,000,000	14,700
Medical Technician		5,000,000	24,500

Source: Compiled from materials received from Cho Ray Hospital

4) Incentive

Cho Ray Hospital provides incentive awards to employees who meet the requirements of decisions made by the Ministry of Health. There are several types of awards, such as those presented by the Ministry of Health, the hospital, and departments. There are cases where incentives are offered in cash. In 2013, about 330 employees were granted awards. In addition, other incentives such as subsidies for training seminar fees and scholarships to study abroad are available for excellent employees.

5) Job Rotation

Cho Ray Hospital implements a personnel rotation program targeting nurses 30 years of age or younger in which they work in six different departments for six months each over three years. For doctors, no such regular rotation system exists, although there are transfers from similar departments when a new department has been set up. It is also stipulated in the regulations of Vietnam that personnel involved in the Finance Department are required to be transferred after three years.

14-1-2. Issues in Current Situation

(1) Quality and Quantity of Health Professionals

With respect to doctors, the number of doctors assigned to the hospital is about a half of the number assigned to a Japanese hospital of the same size. In addition, since there is no doctor license examination and the license is given to everyone graduating from a university medical department, knowledge and skill levels of doctors are not standardized. Also, although doctors who graduated from a university medical department are obliged to receive clinical training for 18 months according to the Law on Medical Treatment and Examination of Vietnam, a hearing survey with the hospital revealed that the scheme for this clinical training has not yet been implemented.

As for nurses, while it should be noted that there is a difference in the scope of work of nurses between Vietnam and Japan, compared with a Japanese hospital of the same scale, the number of nurses assigned is about 70%. As is the case with doctors, nine-month training is mandatory for nurses upon graduation. At Cho Ray Hospital, 70-120 trainee nurses come every year. Although such training is conducted at Cho Ray Hospital, due to the lack of nurse license examination, knowledge and skill levels of nurses at the point of recruitment are varied, depending on the quality of institutions that they graduated from. Another issue that was pointed out is that the number of senior nurses who have at least graduated from university is few despite the effort of the government to increase them.

With respect to the other health professionals, there are also issues about the license system and the quality of development organizations.

(2) Hospital Management and Operations

While having problems of excess workload and inadequate facilities and equipment, the hospital is devoid of elements essential to hospital operations, such as patient services, patient safety and infection control. Moreover, initiatives to achieve patient-centered healthcare, such as team-based medical care, nursing management, nutritional guidance and medication counseling, have not been put into practice.

Also, important operations for quality assessment and management of the whole hospital, such as collection, analysis and secondary utilization of data on medical treatment and finance, have not been sufficiently implemented.

With respect to the quality of healthcare provided by the hospital, in accordance with the circular issued by the MOH (No.19/2013/TT-BYT Guideline on Implementation of Quality Management of Medical Service in the Hospital), the hospital has just started a program for assessment, monitoring and improvement using clinical and other indicators.

(3) Loss of Human Resource to Other Hospitals

1) Loss of Human Resources to Cho Ray Phnom Penh Hospital

In January 2014, there was an inauguration of Cho Ray Phnom Penh Hospital, which is the first facility in the medical field under the cooperation of Viet Nam and Cambodia. The 1st stage construction has been completed. It is a general hospital with modern medical installations, consisting of internal medicine, surgery, pediatrics, obstetrics and gynecology departments as well as an emergency medical care center and a general outpatient center. The number of beds is 200, and 300 beds will be added in the 2nd stage construction.

The role of Cho Ray Hospital to Cho Ray Phnom Penh Hospital is basically to let it use the name of Cho Ray so that they could use the brand name and to send 10 peoples (mainly doctors) in two weeks to one month cycle for 3 years from the opening. Also, there is no plan to send people as a full-time employee. Therefore, the impact of personnel loss associated with this matter is expected to be small.

2) Loss of Human Resources to Private Hospitals

In Vietnam, it is said that there is a great difference in salary levels between public and private hospitals, which could cause an outflow of human resources. However, due to the brand power of Cho Ray Hospital, the benefits of stability that can be enjoyed as employees of a public hospital, and the high-level pensions after retirement, the turnover rate of Cho Ray Hospital remains as low as 3 to 5 percent as shown in Table 14-11. The turnover rate of nurses is

also a low 2 to 4%. These rates are quite low compared to the average turnover rate of 11% at hospitals in Japan. Furthermore, as shown in Table 14-12, of all the employees who have left employment, those who retired due to mandatory age limits account for 40%, which shows that there is no significant outflow of human resources to private hospitals. However, like the former head of the Nursing Department who moved to a private hospital, employees who leave the hospital for "personal reasons" may include those who leave to go to other hospitals.

Table 14-11 Turnover rate of Cho Ray Hospital (2010 to 2013)

	2009	2010	2011	2012	2013
Number of New Employment	253	327	243	169	139
Number of Leaving Employment	194	166	124	151	120
Total Number of Staff	3,141	3,302	3,421	3,439	3,458
Turnover Rate	-	4.79%	3.50%	4.21%	3.35%

Source: Compiled from materials received from Cho Ray Hospital

Table 14-12 Reasons for leaving employment of Cho Ray Hospital and percentage breakdowns (2013)

Leaving Reason	Number of Leaving Employment (people)	Percentage (%)
Age-limit Retirement	48	40.0%
Personal Reasons	47	39.2%
Contract Expires	12	10.0%
Moved to Rural Hospital	4	3.3%
Leave of Absence	4	3.3%
Move Abroad	3	2.5%
Death	1	0.8%
Dismissal	1	0.8%
Total	120	100%

Source: Compiled from materials received from Cho Ray Hospital

14-1-3. Basic Plan of Human Resource Recruitment and Allocation for Cho Ray Second Hospital

(1) Basic Policy

- Secure necessary human resources required for the operation of Cho Ray Second Hospital in accordance with the notice from Vietnam, assuming 800 beds when the hospital first opens and 1,000 beds by the third year of hospital operation.
- Secure experienced staff required to provide sufficient medical care services at Cho Ray Second Hospital through transfers from Cho Ray Hospital and mid-career recruitment.
- Develop a plan to dispatch people from universities and specialized hospitals in Ho Chi Minh City as administrators of new departments.

(2) Personnel Allocation (Number of Required Personnel)

The human resources required for all of Cho Ray Second Hospital must be deployed in accordance with the notice from Vietnam. The total number of human resources required is approximately 1,700 as shown in the table below. By the time Cho Ray Second Hospital starts operation (with 800 beds), 241 doctors, 1,197 nurses, 44 pharmacists, and 282 healthcare professionals must be hired, and by the third year of hospital operation, an additional 65 doctors, 185 nurses, 10 pharmacists, and 43 healthcare professionals must be hired.

Table 14-13 Necessary human resources at Cho Ray Second Hospital by job type

Year		Cho Ray Hospital	Cancer Center of Cho Ray Hospital	Cho Ray Second Hospital	New Employment
2013	Number of Planned Bed	1,800			
	Number of Actual Bed	**1,620**			
	Number of ICU Bed	**117**			
	Doctor	705			
	Nurse	1,484			
	Pharmacist	97			
	Medical Technician	348			
	Engineer	58			
	IT Technician	103			
	Others	663			
	Total	**3,458**			
	Permanent Staff	2,688			
	Contract Staff	770			
2015	Number of Planned Bed	1,800	250		
	Number of Actual Bed	**1,620**	**250**		
	Number of ICU Bed	**117**	-		
	Doctor	677	28		
	Nurse	1,439	45		
	Pharmacist	97	0		
	Medical Technician	333	15		
	Engineer	53	5		
	IT Technician	100	3		
	Others	659	4		
	Total for each hospital	3,358	100		
	Total	**3,458**			
	Permanent Staff	**3,094**			
	Contract Staff	364			
2nd Hospital Opening	Number of Planned Bed	1,800	250	1,000	
	Number of Actual Bed	**1,800**	**250**	**800**	
	Number of ICU Bed	**117**	-	**90**	
	Doctor	596	81	269	241
	Nurse	1,690	230	761	1,197
	Pharmacist	89	12	40	44
	Medical Technician	397	54	179	282
	Engineer	15	2	7	-
	IT Technician	26	4	12	-
	Others	168	23	75	-
	Total for each hospital	2,981	406	1,343	
	Total	**4,730**			
	Permanent Staff	**4,730**			**1,764**
	Contract Staff				
2 years after opening	Number of Planned Bed	1,800	250	1,000	
	Number of Actual Bed	**1,800**	**250**	**1,000**	
	Number of ICU Bed	**117**	-	**90**	
	Doctor	596	81	334	65
	Nurse	1,690	230	946	185
	Pharmacist	89	12	50	10
	Medical Technician	397	54	222	43
	Engineer	15	2	8	1
	IT Technician	26	4	15	3
	Others	168	23	93	18
	Total for each hospital	2,981	406	1,668	
	Total	**5,055**			
	Permanent Staff	**5,055**			**325**
	Contract Staff				

Source: Compiled from materials received from Cho Ray Hospital

(3) Human Resource Recruitment Plan

Cho Ray Hospital plans to secure human resources with the following methods, assuming the opening of Cho Ray Second Hospital in 2021. Personnel expenses to be incurred by the time the hospital opens are estimated separately. Vietnamese side needs to secure the budget for these human resources.

1) Existing Departments

- Human resources required for Cho Ray Hospital are hired every year in accordance with the standard procedures. Human resources hired in the future will work at Cho Ray Hospital or Cho Ray Second Hospital.
- When Cho Ray Second Hospital opens, some doctors with experience in management having special qualifications will be transferred as administrators from Cho Ray Hospital.
- During the period from 2015 to 2017, 100 to 150 personnel will be hired for Cho Ray Second Hospital every year (300 to 450 personnel in total), and they will work at Cho Ray Hospital.
- During the period from 2018 to 2020, 200 to 300 personnel will be hired for Cho Ray Second Hospital every year (600 to 900 personnel in total), and they will receive intensive training at educational institutions or through continuous training programs, without working at Cho Ray Hospital in principle.
- During the period from 2019 to 2020, experienced staff will be hired to work at Cho Ray Second Hospital.

2) New Departments

- During the period from 2018 to 2020, human resources required for new departments will be hired, and they will receive intensive training until the opening of Cho Ray Second Hospital, without working in principle.
- Plans will be made to dispatch people from special hospitals and universities in Ho Chi Minh City as administrators of new departments.

(4) Proposal

In Vietnam, the disease structure is predicted to become similar to that in Japan, resulting from the declining birthrate and aging population as well as the increase of life-related diseases such as cancer, stroke, heart disease, and diabetes, also Cho Ray Second Hospital is a top referral hospital taking in charge of clinical practice, education, and research. Thus, we propose the number of people at the same level in the national university main hospitals in Japan shown in the following table as the ideal number of people at Cho Ray Second Hospital in the future.

Table 14-14 Ideal number of personnel at Cho Ray Second Hospital using Japan's national university main hospitals as a model

	Average of Japan's National University Hospitals (Main Hospital)	Cho Ray Second Hospital (Ideal in the Future)
Number of Bed (beds)	774	1,000
Doctor (people)	492	**636**
Nurse (including Midwife) (people)	660	**853**
Pharmacist (people)	40	**52**
Radiology Technician (people)	37	**48**
Clinical Laboratory Technician (people)	54	**70**
Physical Therapist / Occupational Therapist (people)	16	**21**
Biomedical Equipment Technician (people)	12	**16**
Nutritionist (people)	8	**10**
Administrative Staff/Others (people)	252	**326**
Total (people)	1,571	**2,032**

Source: Created using materials from ITEC

14-2. Basic Plan of Training Center

14-2-1. Current Situation of Cho Ray Hospital Training Center

(1) Implementation and Management Structure

Cho Ray Hospital has a training center led by the Deputy Director of the hospital. The training center has the following organization structure with a total of 21 personnel including 6 medical doctors, 1 nurse and 14 other office staffs.

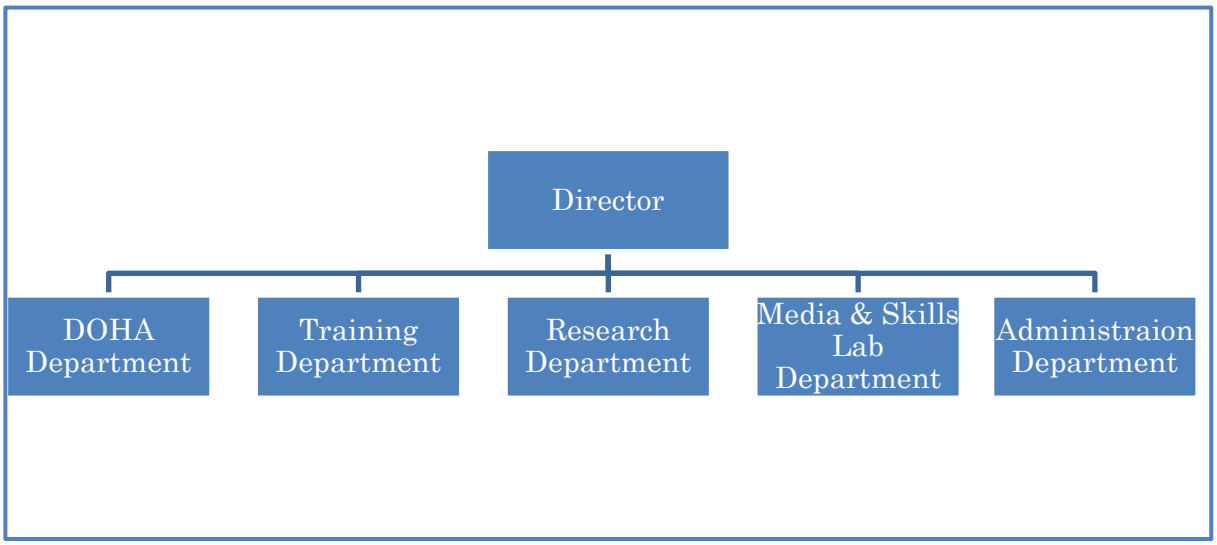


Figure 14-1 Organization structure of Cho Ray Hospital's training center

(2) Budget

The DOHA Department has implemented training and technology transfer activities based on the policy of the MOH, and it has received contributions amounting to 900,000,000 VND (approximately 4,410,000 yen: 1 VND = 0.0049 yen) per year from the MOH. On the other hand, training programs conducted by the Training Department under the initiative of Cho Ray Hospital have been conducted mostly using the fees collected from program participants, although part of the budget is provided by the MOH.

(3) Work Contents of in Each Department

1) DOHA Department

DOHA Department carries out personnel development and technical transfer for lower-level hospitals based on the DOHA activity policy of the MOH. Through projects implemented by the ministry as part of the activities, such as the Project on Satellite Hospitals and the Project 1816, the department conducts personnel development and technical transfer for lower-level hospitals.

The Project on Satellite Hospitals provides technical transfer to 4 hospitals in the southern region through acceptance of trainees at Cho Ray Hospital, provision of clinical instructions from instructors dispatched to satellite hospitals for a certain period and equipment improvement with funding from the project. The Project 1816 provides technical transfer to 14 lower-level hospitals in the southern region through acceptance of trainees at Cho Ray Hospital and provision of clinical instructions from instructors dispatched to lower-level hospitals. In 2010, 380 health professionals were dispatched to the 14 target hospitals and a total of 612 types of technical transfers were provided, resulting in an average of 17.45% reduction of referral patients

2) Training Department

The Training Department is in charge of Post graduate training for specialist I and specialist II, continuous medical education, training for staff of Cho Ray Hospital and southern provincial hospitals, technical transfer under 1816 project and elective course for foreign students. In 2012, the department received 91 specialist I and 9 specialist II students. Under circulars of the MOH (No.7/2008/TT-BYT and its revision, No.22/2013/TT-BYT Guideline on Continuous Training Activities for Medical Staff), health professionals are required to receive training for a certain amount of time every year. The department provides many certified courses for this. In 2013, the department provided 45 types of 3-month training to 437 participants, on job training for 787 trainees and 4608 scientific conferences . The department also provided practical trainings for 1600 medical students and post graduate doctors. Regarding 1816 project, 700 medical staff was received technical transfer from Cho Ray Hospital. 150 foreign students participated in elective courses.

3) Research Department

In charge of management and operation of clinical trials and studies carried out at Cho Ray Hospital, the Research Department is currently conducting about 20 clinical trials (diabetes drugs, etc.). Part of its clinical study activities, it published about 400 articles from 2009 to 2012.

4) Media and Skills Lab Department

The Media and Skills Lab Department organizes various events including patient and family education; manages and operates the skill lab, the auditorium and the library; and plans and conducts video conferences etc. In 2012, the department published 2 books, held 26 events, used the skill lab 22 times, conducted 1653 lectures and conducted 21 video conferences. In 2012, the library had 279 books and a total of 4567 users.

5) Administration Department

The responsibilities of the Administration Department includes coordination of programs of the four other departments, arrangement for training participants, development of training textbooks and management of training data.

14-2-2. Issues in Current Situation

(1) Budget

According to interviews, the current budget of Cho Ray Hospital's training center does not adequately meet the requirements that a hospital undertaking education and research projects has, including the planned introduction of a post-graduate clinical training program for doctors. Therefore it is necessary to increase the budget for the training center in the future.

(2) Each Department

1) DOHA Department

As described earlier, technology transfer to lower-level hospitals through the Project on Satellite Hospital and the Project 1816 implemented in accordance with the DOHA Activity Policy has achieved substantial results. It is expected that the number of unnecessary referral patients will decrease by expanding these projects with the initiative of the MOH in the future.

2) Training Department

In terms of the number of training, health professionals have received refresher training as necessary based on the circular of the MOH. However, the system for evaluation and follow-up is not sufficient and as such, it is important to strengthen evaluation and monitoring in the future. Training of cross-functional areas such as patient service, infection control, team medical care, etc., and hospital management and operation based on data analysis for executives and for office workers is inadequate, but in view of the fact that support has been provided to

clinical instructor training (TOT) and cross-functional training in eight subjects (nursing management, measures to control nosocomial infection, training management, medical safety, hospital management, comprehensive healthcare, emergency healthcare and referral) in the "Project for Improvement of the Quality of Human Resources in the Medical Service System" of JICA, it is expected that improvement will be made in such fields.

This is a five-year project that began in 2010. The overall goal of the project is to improve the quality of medical services in the medical services system in Vietnam. The following are the expected outputs of the project:

Output 1: Revision and development of the master plan and regulations related to human resources development in the medical services field.

Output 2: Standardization and usage of training curricula and materials at the Training Center of Medical Service Administration/Ministry of Health, three core hospitals, and the DOHA training center for the central and provincial hospitals under the direct control of the Ministry of Health.

Output 3: Implementation of an improved training system at the Training Center of Medical Service Administration/Ministry of Health, three core hospitals, and the central and provincial hospitals under the direct control of the Ministry of Health.

Output 4: Development and application of monitoring and evaluation (M&E) of the quality of training for medical professionals nationwide.

Related items are expected to be improved through the outputs of the project, however, self-help efforts are required for the Vietnam side to continuously implement and appropriate the outputs of the project. It is also necessary for the Japan side to continue to follow up on the project.

3) Research Department

Most papers on clinical studies in Cho Ray Hospital have been written by doctors and involvement of nurses, pharmacists and other health professionals in clinical studies is still limited. From the viewpoint of quality improvement of the health professionals, it is considered necessary to allow health professionals other than doctors to take part in clinical studies in the future.

4) Media and Skills Lab Department

The current main operations of the department are the planning and operation of various events, and the management and operation of training center facilities. There seems to be no established system in place for the Skills Laboratory to operate, and the room is currently used as a warehouse, and used as the Skills Laboratory only once or twice a month. However, the department is indispensable as a hospital that undertakes education since it provides facilities, equipment, and devices that are generally provided at university hospitals in Japan. It is necessary to establish a system for the department to fully operate and prepare facilities, equipment, and devices to contribute to the improvement of clinical techniques in the future.

5) Administration Department

Data on training programs and the number of program participants are not well managed. From now on, analyzing training data and making use of them for program development and follow-ups is required.

(3) Training Center Facilities

The training center of Cho Ray Hospital has six lecture halls (one big lecture hall, two medium lecture halls, and three small lecture halls), one library, and two office rooms. However, the number of lecture halls is insufficient for the number of programs being implemented, and they are located separately from each other. At present, training programs are even held in meeting rooms borrowed from each clinical department from time to time as needed. As a hospital that undertakes clinical practice, education, and research, Cho Ray Second Hospital is required to prepare enough facilities.

14-2-3. Basic Plan of Cho Ray Second Hospital's Training Center

(1) Basic Policy

- Cho Ray Hospital and Cho Ray Second Hospital should jointly manage the formulation and implementation of training plans, etc.
- A sufficient amount of facilities and equipment must be prepared as a hospital that undertakes clinical practice, education, and research.

(2) Structure of Department

The DOHA Department, Training Department, Research Department, Media and Skills Laboratory Department, and Administrative Department

(3) Operation Plan

- As a hospital that accepts trainees from lower level hospitals, surrounding medical institutions, and educational institutions before and after graduation, strengthen cooperation among departments to provide a sufficient quality and quantity of training.
- Actively hold teleconferences to further enhance cooperation with hospitals both at home and abroad.
- Plan the introduction of remote medical treatment systems, and strengthen the referral system with lower level hospitals, and further promote cooperation with overseas medical institutions and universities.
- Promote evaluation and follow-up activities for after training and enhance the use of training data, etc. to continuously improve training programs.
- Make effective use of the Skills Laboratory and make efforts to improve clinical techniques.
- Encourage nurses, pharmacists, and other healthcare professionals to participate in clinical research to improve the quality of their medical care.

(4) Facility Condition

The table below is a draft of room required at the training center.

Table 14-15 Rooms required at Cho Ray Second Hospital's Training Center (draft)

Name	Purpose	Number
Large Lecture Hall (capacity 300 people)	Lecture, Large scale trainings	1 room
Medium Lecture Hall (capacity 50 people)	Normal trainings	4 rooms
Lecture Hall for Tele-Conference (capacity 50 people)	Normal trainings, TV conference	2 rooms
Office	For each department	5 rooms
Director and Vice Director Office	One director, Two vice directors	3 rooms
Skills Laboratory Room	Skills Laboratory	1 room
Audio-Visual / IT room	Creation of training materials, etc.	1 room
Library		1 room
Examination Room	Examination of clinical trial patients, etc.	3 rooms
Drug Safe Keeping Room	Safekeeping of clinical trial drug, etc.	1 room
Patient's Bedroom	For clinical trial patients (4 to 5 beds)	1 room
Laboratory Tests Room	For research and experiment	1 room
Documents Warehouse		1 room

Source: Compiled from materials received from Cho Ray Hospital

14-3. Basic Plan of Human Resource Development

14-3-1. Request for Personnel Development Programs

Cho Ray Hospital made the following requests regarding the human resources development programs for Cho Ray Hospital and Cho Ray Second Hospital.

Table 14-16 Requests from Cho Ray Hospital for human resource development programs

No	Subject	Target Hospital	Timing (Cho Ray)	Timing (Cho Ray Second)	Priority
1	Clinical Pathway	Cho Ray Cho Ray Second	2014-15	2018-19	A
2	Quality Indicator	Cho Ray Cho Ray Second	2014-15	2018-19	A
3	Data Analysis	Cho Ray Cho Ray Second	2014-15	2018-19	A
4	Medical Equipment Management	Cho Ray Cho Ray Second	2015-16	2018-19	A
5	Facility Management	CRH-2		2018-19	B
6	Team Medicine	Cho Ray Cho Ray Second	2014-15	2018-19	C
7	Nursing Management	Cho Ray Cho Ray Second	2014-15	2018-19	C
8	Safety Management	Cho Ray Cho Ray Second	2015-16	2018-19	C
9	Medication Management	Cho Ray Cho Ray Second	2015-16	2019-20	C
10	Managerial Accounting System	Cho Ray Cho Ray Second	2015-16	2018-19	C
11	Referral System	Cho Ray Cho Ray Second	2015-16	2018-19	C
12	Nutritional Guidance (NST)	Cho Ray Cho Ray Second	2016-17	2019-20	C
13	Clinical Skills (especially New Department)	Cho Ray Cho Ray Second	2015-18	2019-20	C

Source: Compiled from materials received from Cho Ray Hospital

14-3-2. Current Situation of Required Programs

(1) Clinical Pathway

Cho Ray Hospital uses several clinical pathways independently created by each department. According to a decision by the Ministry of Health, a unified clinical pathway is required for the hospital.

(2) Quality Indicator

According to a decision by the Ministry of Health, each hospital is required to evaluate the quality of the hospital based on predefined indexes. Cho Ray Hospital also needs to submit an evaluation report every year.

(3) Data Analysis

Medical examination data, financial data, accounting data, personnel data, etc. are not accurate enough, and data collection, analysis, and secondary use are not adequate.

(4) Medical Equipment Management

Although the Medical Equipment Department is in charge of maintenance of medical devices, medical equipment is not managed in a centralized manner.

(5) Facility Management

Although the Supply Management Department is in charge of facilities management, facilities are not managed in a centralized manner.

(6) Team Medicine

They have a basic knowledge and an understanding of the importance of team medical care. Team medical care is also included in the training items of the Project for Improvement of the Quality of Human Resources in the Medical Service System currently underway by JICA.

(7) Nursing Management

Nursing management is partially performed in Cho Ray Hospital as well. They have a high level of basic knowledge and understanding of the importance of nursing management. Nursing management is also included in the training items of the Project for Improvement of the Quality of Human Resources in the Medical Service System currently underway by JICA.

(8) Safety Management

They have a high level of basic knowledge and understanding of the importance of safety management. Safety management is also included in the training items of the Project for Improvement of the Quality of Human Resources in the Medical Service System currently underway by JICA.

(9) Medicine Management

They have a high level of understanding of drug administration guidance. Drug administration guidance is partially performed in Cho Ray Hospital.

(10) Managerial Accounting System

The Finance Department prepares business plans for only one year at a time, and no official management accounting system has been introduced.

(11) Referral System

Strengthening of the referral system has been implemented as part of DOHA activities (Satellite Hospital Project, 1816 Project). This is also included in the training items of the Project for Improvement of the Quality of Human Resources in the Medical Service System currently underway by JICA.

(12) Nutritional Guidance

They have a high level of understanding of nutritional guidance. Nutritional guidance is partially performed in Cho Ray Hospital.

(13) Clinical Skill (Especially New Department)

As a means of preventive healthcare (Health Care Department), approximately 150 people per day are given general medical checkups. There is no department in charge of medical care for the elderly, but each department provides medical examinations and treatments.

14-3-3. Issues in Current Situation

(1) Clinical Pathway, Quality Indicator, Data Analysis

Clinical pathways used in Cho Ray Hospital are individually prepared and introduced by doctors, etc. in charge of each department who learned about clinical pathways by themselves. Therefore, the clinical pathways used in Cho Ray Hospital are not prepared based on correct theories and methods.

The quality has been evaluated every year for the past several years. However, Vietnam has no integrated system of evaluation, and evaluation items and methods have been changed every year. Therefore, changes and improvements have not been made over time. An independent department for this purpose has just been established recently. Furthermore, problems have occurred, such as patients being forcibly discharged from the hospital to raise the evaluation score.

Data analysis is a basic skill for evaluating clinical pathways and medical care services and for introducing team medical care, EBM, ICT, etc. However, the hospital currently lacks both knowledge and technologies.

(2) Facility Management and Medical Equipment Management

There is no independent department for facility management. Therefore, the Supply Management Department performs facility management as part of its operations. A new building management system is planned to be installed in Cho Ray Second Hospital, which is very important for appropriate maintenance of facilities and saving energy.

As medical equipment management is lacking at present, in most cases, medical equipment is individually managed. However, a central management system for medical equipment is planned to be introduced to Cho Ray Second Hospital, which is very important in terms of being able to use medical equipment appropriately and effectively. This management system can also be introduced to Cho Ray Hospital.

Currently, maintenance of facilities and medical equipment are performed only when there is a failure or defect in them. So it is expected that preventive maintenance will be able to be performed by introducing the new system mentioned above.

(3) Team Medicine, Nursing Management, Medication Management, Nutritional Guidance

Team medical care is one of the fields on which Vietnam is focusing its attention as a type of comprehensive care. It is expected that team medical care in Vietnam will be strengthened in cooperation with JICA's Project for Improvement of the Quality of Human Resources in the Medical Service System. Nursing management, drug administration guidance, and nutritional guidance are necessary factors to implement team medical care. They are partially implemented in Cho Ray Hospital, however, an established system is not in place yet. In addition, since no medical treatment fees are paid for drug administration guidance and nutritional guidance, state-level measures are also necessary for the full-fledged introduction of these kinds of medical care and guidance.

(4) Safety Management

Efforts have been made to ensure that safety is managed by implementing measures against hospital-acquired infection, patient safety measures, etc. However, safety management is still lacking due to overload and defects in facilities and equipment. Reports and data disclosures do not provide a sufficient explanation. Since they have a high level of understanding of the importance of safety management, we expect that they will gradually improve the situation in cooperation with the Project for Improvement of the Quality of Human Resources in the Medical Service System by

JICA.

(5) Managerial Accounting System

The Finance Department prepares a business plan for only one year at a time. It is necessary to consider the introduction of a management accounting system since it would provide information on past and present results and a tool for developing mid- and long-term management plans. Before introducing a management accounting system, correct data collection and analysis are required.

(6) Referral System

Vietnam has been working to reduce the overloading its top referral hospitals and has achieved some positive results. However, it is necessary to make extended efforts in the future while continuing cooperation with the Project for Improvement of the Quality of Human Resources in the Medical Service System by JICA.

(7) Clinical Skills

For new departments, it is necessary to develop human resources while in cooperation with specialized hospitals, universities, etc. Also, they should cooperate with guiding hospitals designated in each field.

(8) Others

According to interviews of experts in JICA's Project for Improvement of the Quality of Human Resources in the Medical Service System currently underway, the staff of Cho Ray Hospital have a high-level of knowledge on infection control, patient safety, etc. However, this knowledge has not been put into practice in many cases, and a change in awareness as medical professionals is required. Through the interviews with different departments, we also felt that they are proud and confident because they work for one of the top referral hospitals in the country, and that this is causing a lack of awareness of yet unresolved problems.

14-3-4. Basic Plan of Human Resource Development

(1) Basic Policy

To fulfill the role as a top referral hospital in charge of clinical practice, education, and research, while taking into account the objective of the project, the vision and mission of Cho Ray Second Hospital, the hospital management operation method making use of Japan's knowledge, the challenges of each department, and requests for training programs from Cho Ray Hospital, human resources need to be developed based on the following policies:

- Human resources development that provides advanced medical care services as a top referral hospital
- Human resources development that provides patient-oriented team medical care
- Human resources development that allows patients to receive safe and secure medical care services

(2) Basic Plan of Human Resource Development to Transfer Techniques to Lower-level Hospitals as a Top Referral Hospital

1) Training Program

On account the above analysis, consider implementing the following training programs on a priority basis. For facilities management, however, after confirming whether or not the building management system is installed, re-examine the contents of training programs. Regarding items with priority level C, consider whether or not they should be implemented

while taking into account budgets and other factors.

- Clinical Pathway
- Quality Indicator
- Data Analysis
- Medical Equipment Management
- Facility Management

2) Basic Plan of Implementation

The following is the basic plan for the outputs and activities of training programs.

Table 14-17 Outputs and Activities of the Human Resource Development Plan

Outputs	Activities
Output 1: Administrator level personnel acquire the theories and knowledge of each training item.	Activity 1: Implement training programs for administrator-level personnel at medical institutions, etc. in Japan.
Output 2: The persons in charge of each training item acquire theories and knowledge.	Activity 2: Administrator-level personnel who have received training in Japan prepare training curricula and materials and provide training programs to the persons in charge in Vietnam.
Output 3: The items learned in training are actually implemented at Cho Ray Hospital and Cho Ray Second Hospital.	Activity 3: Specialists are dispatched from Japan for a certain period of time as advisors and supervisors to provide guidance and supervision.
Output 4: The items learned in training are continuously improved and implemented at Cho Ray Hospital and Cho Ray Second Hospital.	Activity 4: Administrators and persons in charge improve and implement the items learned in training using the PDCA cycle.
Output 5: Training items are continuously implemented at Cho Ray Hospital and Cho Ray Second Hospital, and are then introduced to lower level hospitals.	Activity 5: Administrators provide training and transfer technologies to lower level hospitals.

Source: Prepared by the survey team

3) Implementation Scheme

Cho Ray Hospital strongly desires to implement the training programs as soon as possible. In addition, many of the training programs must be introduced to and implemented in Cho Ray Hospital as well. Therefore, plan the implementation of these training programs as technical cooperation programs on a priority basis. Make a plan to achieve greater outputs by closely cooperating with the Project for Improvement of the Quality of Human Resources in the Medical Service System currently underway. As the next step to implementing the training programs as technical cooperation programs, conduct research to make a detailed plan, and then use that information to continue planning at a greater level of detail, including the timing and period of the programs, the target number of participants, etc.

Chapter 15. Project Implementation Structure/ Construction Plan/Procurement Plan

Project Implementation Structure/Construction Plan/Procurement Plan

Chapter 15. Project Implementation Structure

Organizational Structure for Project Implementation

15-1. The line agency (hereinafter "LA") on the Vietnamese side is the Ministry of Health (MOH), and the Project Owner (or Executing Agency, hereinafter "PO") is Cho Ray Hospital. Organizational structure for whole project implementation is as follows.

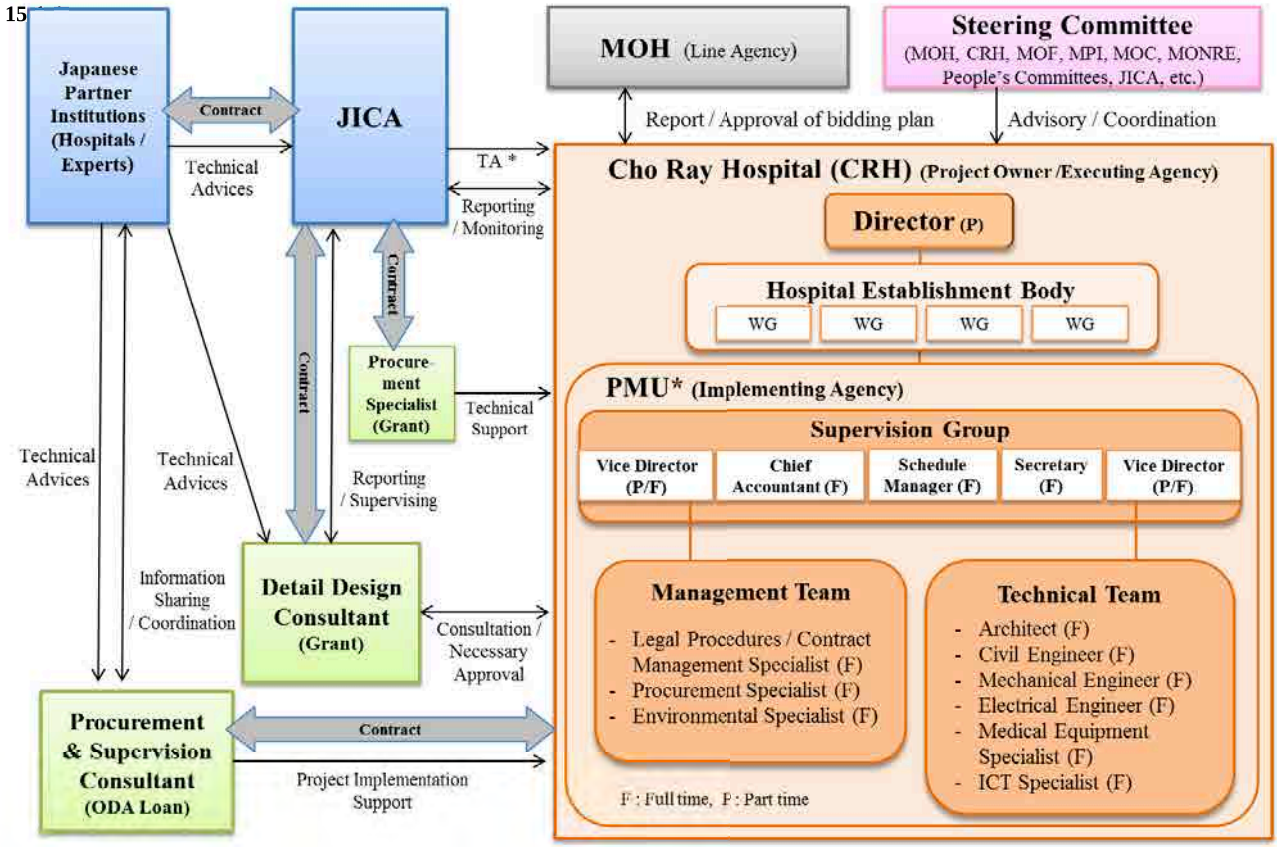


Figure 15-1 Organizational Structure for Project Implementation (draft)
Source: Created by the Survey Team

For smooth operation, after the scale, expense and location of the project become clear, Cho Ray Hospital as PO composes Project Management Unit (hereinafter "PMU") within 30 working days after approval of the project based on Vietnamese Decree " Decree 38/2013/ND-CP (hereinafter "Decree 38").

According to Decree 38, the contents of the duties of PMU in the project implementation phase are as follows:

- Assisting the PO, formulating the master plan and detailed annual plan of the implementation plan.
- Assisting the PO, carrying out preparation and execution of the project.
- Assisting the PO, conducting management of bidding and contracts.
- Assisting the PO, conducting payment as well as financial and asset management.

Conducting preparations for the receipt of outcomes of the project on behalf of the PO, such as receiving the completion report after completion of the project, performing financial audit during the formulation of the financial accounts report, or the transfer of assets.

Based on the abovementioned duties stipulated in the law, in the specific plan for Cho Ray Second Hospital, the hospital construction and management plan, provision of medical equipment,

construction of an IT system, and human resources employment and training are to proceed simultaneously. Accordingly, the principal duties of PMU are thought to be related to contracts and procurement, implementation management and verification of outcomes.

It would be desirable to compose PMU in Cho Ray Hospital and to select the member from Cho Ray Hospital, but that it is necessary to also consider selecting part of members from the external or MOH. Additionally, because rapid decision-making is essential, it would be desirable to include the staff that experienced the PMU of the project of international development finance institution of the Yen loan or World Bank in the PMU. The following are projects that the MOH and Cho Ray Hospital carried out in the past. To appoint individuals who have experience of these projects and utilize the knowledge and experience is required.

- Construction Project of Cho Ray Hospital Oncology Center (National budget and State bank loan, loan amount: 146.4 billion VND)
- North East and Red River Delta Regions Health System Support Project (The World Bank loan, loan amount: 150 million USD)
- Regional and Provincial Hospital Development Project (yen loan, loan amount: 1.805 billion yen)
- Regional and Provincial Hospital Development Project (II) (yen loan, loan amount: 8.693 billion yen)

The table below shows the Survey Team's proposition of membership of PMU.

Table 15-1 Membership of PMU (draft)

Position	Number of staff	Tasks and Qualification	Working time	MOH / Cho Ray Hospital
Director	1	Task: Overall project management Qualification: Having specialized qualifications and experience in project/program management. Having good knowledge on the donor's procedures, mechanism and policies, capacity for management and coordination of project/program's activities	Part time	Cho Ray Hospital
Supervising Group				
Vice Director (Management Team Leader)	1	Task: To assist the director and supervise the management team in accordance with JICA ODA loan guideline and regulations of GOV Qualification: Having specialized qualifications and experience in project/program management. Having good knowledge on the donor's procedures, mechanism and policies, capacity for management and coordination of project/program's activities	Full time	Cho Ray Hospital
Vice Director (Technical Team Leader)	1	Task: To assist the director and supervise the technical team in accordance with JICA ODA loan guideline and regulations of GOV Qualification: Having specialized qualifications	Full time	Cho Ray Hospital

		and experience in project/program management Having good knowledge on the donor's procedures, mechanism and policies, capacity for management and coordination of project/program's activities.		
Chief Accountant	1	Task: To be responsible for overall financial management in accordance with JICA ODA loan guideline and regulations of GOV. Qualification: Having specialized qualifications and experience as a chief accountant in similar project.	Full time	Cho Ray Hospital
Schedule Manager	1	Task: To manage the overall project implementation to be in line with the planned schedule. Qualification: Having experience in project management of similar project.	Full time	Cho Ray Hospital
Secretary	1	Task: To support the PMU staff in administrational matters. Qualification: Having experiences as secretary in project.	Full time	Cho Ray Hospital
		Management Team		
Legal Procedure / Contract Management Specialist	1	Task: To arrange any legal issues related to the project in accordance with JICA ODA loan guideline and regulations of GOV Qualification: Having experiences in legal procedure of the hospital construction	Full time	Cho Ray Hospital
Procurement Specialist	1	Task: Responsible for the procurement procedure in accordance with JICA ODA loan guideline and regulations of GOV Qualification: Having experiences in procurement of similar loan projects	Full time	Cho Ray Hospital
Environmental Specialist	1	Task: To arrange any environmental issues related to the project in accordance with JICA ODA loan guideline and regulations of GOV Qualification: Having experiences in handling the environmental issues of the hospital construction	Full time	Cho Ray Hospital
Accountant	2	Task:	Full time	Cho Ray

		Responsible for financial management of the project in accordance with JICA ODA loan guideline and regulations of GOV Qualification: Having practice experiences in similar scheme project/program		Hospital
Technical Team				
Architect	1	Task: To handle the architectural issues of the project in accordance with JICA ODA loan guideline and regulations of GOV Qualification: Bachelor's degree in Architecture Having experiences in hospital construction projects	Full time	Cho Ray Hospital
Civil Engineer	1	Task: To handle the Civil Engineering issues of the project in accordance with JICA ODA loan guideline and regulations of GOV Qualification: Bachelor's degree in Civil Engineering Having experiences in hospital construction projects	Full time	Cho Ray Hospital
Mechanical Engineer	1	Task: To handle the Mechanical issues of the project in accordance with JICA ODA loan guideline and regulations of GOV Qualification: Bachelor's degree in Mechanical Engineering Having experiences in hospital construction projects	Full time	Cho Ray Hospital
Electrical Engineer	1	Task: To handle the Electrical issues of the project in accordance with JICA ODA loan guideline and regulations of GOV Qualification: Bachelor's degree in Electrical Engineering Having experiences in hospital construction projects	Full time	Cho Ray Hospital
Medical Equipment Specialist	1	Task: To handle the Medical Equipment issues of the project in accordance with JICA ODA loan guideline and regulations of GOV Qualification: Bachelor's degree in related sectors Having experiences in procurement of medical equipment for hospital	Full time	Cho Ray Hospital

		construction projects		
ICT Specialist	1	Task: To handle the ICT issues of the project in accordance with JICA ODA loan guideline and regulations of GOV Qualification: Bachelor's degree in related sectors Having experiences in development and installation of ICT system in hospitals	Full time	Cho Ray Hospital

Source: Created by the Survey Team

In addition, about the facilities and operation of the Cho Ray Second Hospital, Japanese-style model has been proposed. To this end, Japanese-style model is also valid for opening preparation business to consider operation and facilities of the Hospital.

Also in the hospital of Japan, previously, there was a strong vertical sectionalism of each department and tendency to neglect the cooperation of multiple departments with a focus on service to the patient. However, since the improvement of patient service and the efficiency of hospital operation have become to be required and the means such as medical information system and supply processing and distribution system have become essential, inevitably, that relevant departments share the information, and that do their business in cooperation have been popular.

In particular, in the case to consider the operation and facilities of the new hospital upon the renovation, etc. of the overall hospital, it has become popular to organize the Working Group (hereinafter, WG) with the members selected from the departments for the promotion of hospital opening preparation. The purpose of the WG is not just to build up the operation and facilities of the new hospital, but also to make each member understand the optimization as the entire hospital and to contribute the development of human resources through the strengthening the cooperation of each department and collaborative consideration with other departments.

There is no fixed structure of the WG, but it would be effective to be constructed form the following viewpoints particularly for Cho Ray Second Hospital.

1. Areas where the departments operate jointly
   Outpatient, Emergency and disaster medicine, Inpatient

2. Newly established department and areas where strengthening the existing department's function
   Preventive medicine (complete medical examination), referral

3. Areas that are involved in the department in a cross-sectional manner
   Medical information systems (ICT), Supply management system (SPD)

WG is composed of doctors, nurses, technicians, and office management staff of Cho Ray Hospital. The members study the draft of request specification related to hospital management system, architectural design, ICT, SPD, medical equipment, etc. from the viewpoint of the optimization of the entire hospital with a focus on patients, rather than the interests of each department. They report the results of the consideration to the PMU appropriately and ask decision.

With this policy of the entire hospital that was discussed in the WG, each department studies policies of them, operational system, architectural design, ICT, medical equipment preparation, etc.

In addition, it is planned to introduce the knowledge of Japanese hospitals to Cho Ray Second Hospital to improve the various issues of Cho Ray Hospital. That knowledge should be also referred to improve existing issues in Cho Ray Hospital, to realize the system that can operate the two hospitals integrally. The hospitals integration committee of which the members are the executive Cho Ray Hospital should be launched in 2015.

The following figure shows the Survey Team's proposition of WG organization.

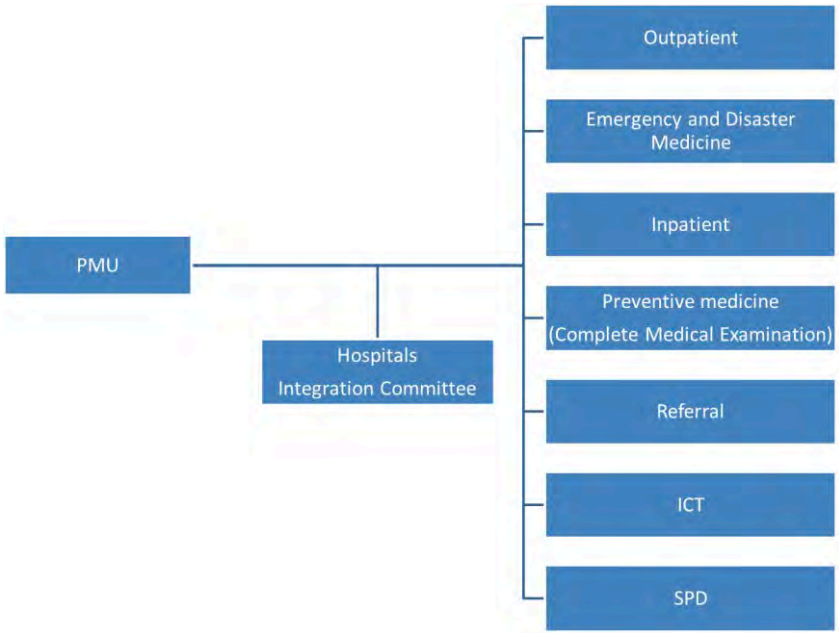


Figure 15-2 Organizational Structure for WG (draft)
Source: Created by the Survey Team

The main subjects and timing of study of the Committee and the WGs are shown in the following table.

Table 15-2 Subjects and Timing of Study of the Hospitals Integration Committee (draft)

Committee	Main Subjects of Study	Timing
Hospitals Integration Committee	➢ Identify issues for integration of the Hospitals ➢ Case study of organization runs multiple hospitals (in Japan and in Vietnam) ➢ Setting up an organizational structure for the Hospitals Integration ➢ Personnel and payroll planning ➢ Making various regulations ➢ Personnel allocation planning ➢ Recruitment ➢ Training ➢ Review and change of personnel allocation after Cho Ray Second Hospital open	2015 2015 2015 2015 2015 2016 2017 2016~2020 2016~2020 2020~2021

Source: Created by the Survey Team

Table 15-3 Subjects and Timing of Study of the department WG (draft)

WG	Main Subjects of Study	Timing
Outpatient WG Emergency and Disaster Medicine WG Inpatient WG	➢ Investigation of actual operational conditions of Cho Ray Hospital, Identifying issues, Considering measures of improvement and Reflection to the Cho Ray Second Hospital ➢ Basic operation system of Cho Ray Second Hospital (basic policy, contents of business, personnel structure, conditions for architectural design, and equipment and supplies plan) ➢ Details operation system of Cho Ray Second Hospital (business flow and confirmation and arrangement of design) ➢ Operation manual of Cho Ray Second Hospital (documentation of work procedure and rules, education and training, and operation rehearsal) ➢ Review and improvement after running	2015 2015 2016~2017 2018~2019 2020~2021

Preventive medicine (complete medical examination)	➢ Investigation of actual advanced cases (in Japanese and in Vietnam), Target setting of Cho Ray Second Hospital (target customers, scale) ➢ Basic operation system of Cho Ray Second Hospital (basic policy, contents of business, personnel structure, conditions for architectural design, and equipment and supplies plan) ➢ Details operation system of Cho Ray Second Hospital (business flow and confirmation and arrangement of design) ➢ Operation manual of Cho Ray Second Hospital (documentation of work procedure and rules, education and training, and operation rehearsal) ➢ Review and improvement after running	2015 2015 2016~2017 2018~2019 2020~2021
Referral	➢ Investigation of actual operational conditions of Cho Ray Hospital, Identifying issues, Considering measures of improvement and Reflection to the Cho Ray Second Hospital ➢ Selection of cooperation hospitals and agreement ➢ Basic operation system of Cho Ray Second Hospital (basic policy, contents of business, personnel structure, conditions for architectural design, and equipment and supplies plan) ➢ Details operation system of Cho Ray Second Hospital (business flow and confirmation and arrangement of design) ➢ Operation manual of Cho Ray Second Hospital (documentation of work procedure and rules, education and training, and operation rehearsal) ➢ Review and improvement after running	2015 2015 2015 2016~2017 2018~2019 2020~2021
Medical Information System (ICT)	➢ Investigation of actual operational conditions of Cho Ray Hospital, Identifying issues, Considering measures of improvement and Reflection to the Cho Ray Second Hospital ➢ Survey of latest trends in Vietnamese government, surrounding environment, trend of systems, and trend of vendors ➢ Basic plan of information system of Cho Ray Second Hospital (Basic policy, introduction scope, investment cost, introduction conditions) ➢ Request specification of information system of Cho Ray Second Hospital (hardware, software, network, data transfer, education and training, maintenance system) ➢ Procurement of information system of Cho Ray Second Hospital (public procedures, proposal evaluation, scoring, contract method study) ➢ Installation of information system of Cho Ray Second Hospital (confirmation of system design contents, operational simulation, and rehearsal planning, execution, evaluation and improvement) ➢ Review and improvement after running	2015 2015 2015 2016~2017 2018 2018~2020 2020~2021
Supply management system (SPD)	➢ Investigation of actual operational conditions of Cho Ray Hospital, Identifying issues, Considering measures of improvement and Reflection to the Cho Ray Second Hospital ➢ Basic operation system of Cho Ray Second Hospital (basic policy, contents of business, personnel structure, conditions for architectural design, and equipment and supplies plan)	2015 2015

	➢ Details operation system of Cho Ray Second Hospital (business flow and confirmation and arrangement of design) ➢ Operation manual of Cho Ray Second Hospital (documentation of work procedure and rules, education and training, and operation rehearsal) ➢ Review and improvement after running	2016~2017 2018~2019 2020~2021

Source: Created by the Survey Team

Chapter 16. Review of Environmental Social Considerations

Chapter 16. Review of Environmental Social Considerations

In this chapter, we study, predict, and evaluate the impacts that this project causes or likely to cause on the environment or local community, and then, present plans to avoid or reduce the impacts.

16-1. Environmental and Social Considerations

"Environmental and social considerations" means considering environmental impacts including air, water, soil, ecosystem, flora and fauna, as well as social impacts including involuntary resettlement, respect for the human rights of indigenous people, and so on.

The numerical values of this chapter and so on are based on the collected existence material and the investigation.

The source of the main existence material is as follows.

"General Construction Plan Binh Chanh District-Ho Chi Minh City 2012"
(Abbreviated designation; Binh Chanh Dist. 2012)
"Statistical Yearbook of Ho Chi Minh City. 2012" (HCMC. 2012)
"Statistical Yearbook of Vietnam. 2012" (Vietnam. 2012)
Draft"EIA of Project"Construction Investigation of Cho Ray 2 Hospital,size 1000 beds (EIA)
"Abbreviated Resettlement Action Plan (ARAP) Ministry of Health Viet Nam, July, 2014"
"Compensation, support and resettlement when the State makes landacquisition for the construction of Cho Ray Second Hospital in Le Minh Xuan Commune, Binh Chanh District, Ho Chi Minh City, September30,2014" (Abbreviated designation; RAP)

16-1-1. The Overview of the Business Component which has an Environment Society Influence

(1) Overview of the project

Project name: Cho Ray Second Hospital
Project site: Le Minh Xuan, Binh Chanh District-Ho Chi Minh City
Total floor: About 90,000 m^2
Total beds: About1,000 beds

(2) Overviw of the project site

Binh Chanh District, Ho Chi Minh City is located in the southwest in the municipal area and is close to Long An Prefecture border.

Figure 16-1 Vietnam complete map

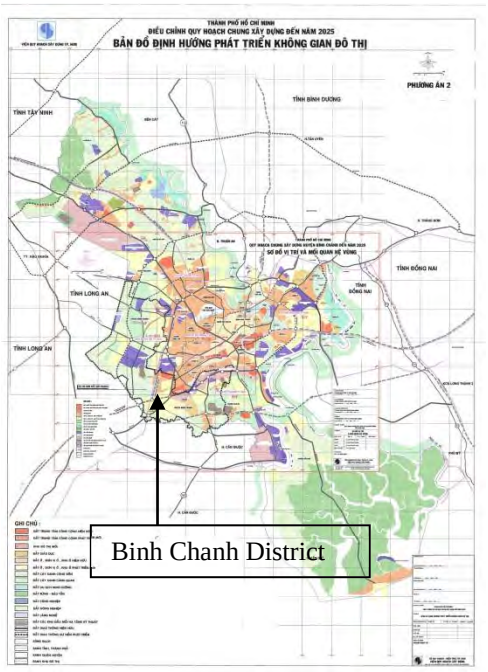


Figure 16-2 Ho Chi Minh City planning map

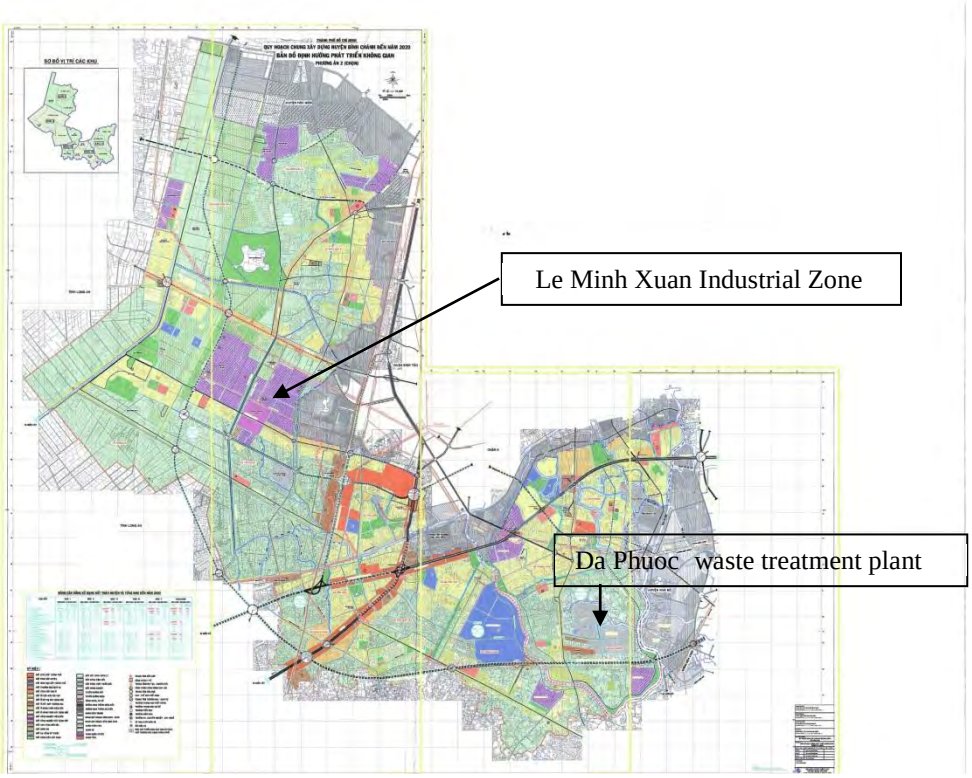
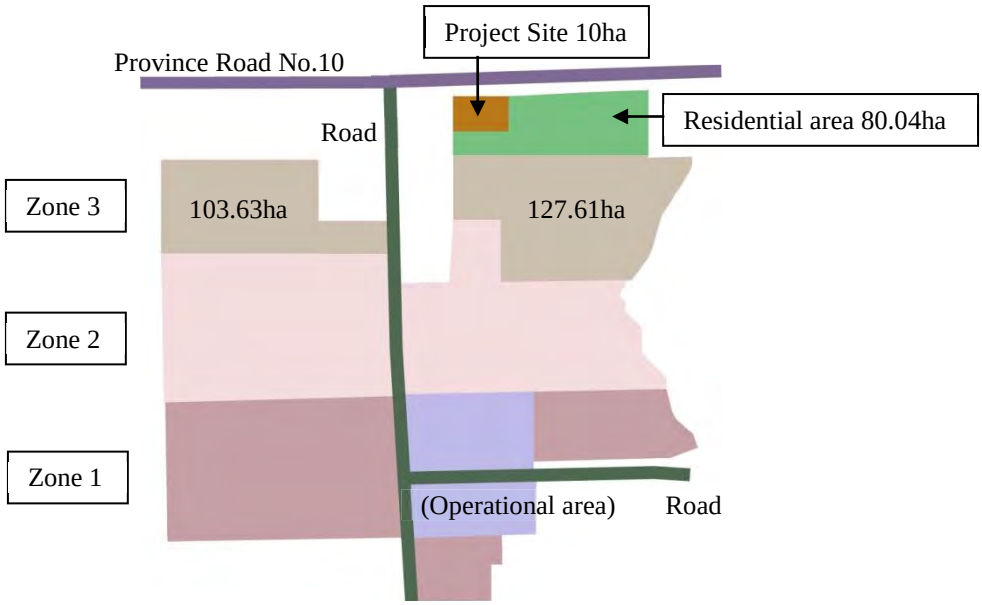


Figure 16-3 Binh Chanh District planning map

As for the land use status of Binh Chanh District, the agriculture and river irrigation system, the forest and so on is 84.47% and the industrial place is 720.93ha of 2.85%. (HCMC. 2012)

According to the city planning scheme drawing, there are about ten industrial parks and plans of various sizes. The Le Minh Xuan plan is the largest at a scale of about 1,000ha (including Le Minh Xuan Industrial Zone 1, 2, 3).



The whole area which contains the residential area is about 1,000 ha.

Figure 16-4 Project site and Le Minh Xuan Industrial Zone Plan

In Vietnam,"The Central Supervisory Ministry People"s Commision, when creating the industrial zone"s detailed construction planning, should appropriately arrange land use for apartments, culture, society and services for overall planning in the industrial zone based on the present resident area in accordance with the demands for housing for the labor force working in the industrial zone."

(According to government agreement N0. 181/2004/ND-CP concerning land law enforcement) 10ha of the hospital project site is located in an 80ha circumference residential area within 231ha of the Le Minh Xuan 3 Industrial Zone.

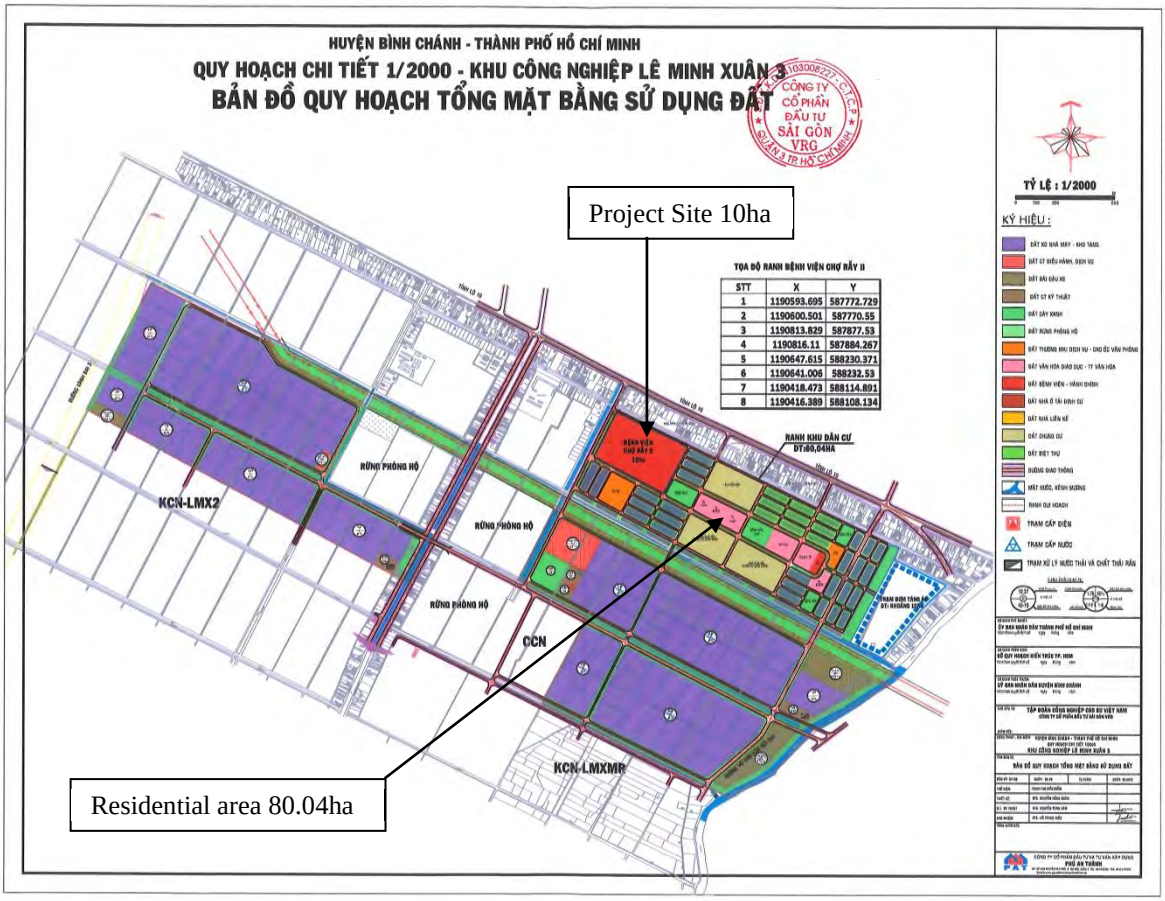


Figure 16-5 Le Minh Xuan Industrial Zone 3 Planning Map

16-1-2. The Basic Status of Environment and Society

(1) Land Use (See5-1-1 Construction Site Summary)

The present condition of the project site is mostly sugarcane field.

Table 16-1 Current use of land

No.	Property Type	Unit	Damage
A	The total number of affected	people	22
B	Land		100.000
1	Farmland	m2	97.531.5
2	Residential land	m2	1,780.1
3	Public land	m2	688.4
C	Works on land		
1	Steel Buildings	m2	1,515.8
2	Concrete Buildings	m2	952.7
3	Abandoned building	m2	560
D	Trees planted on land		
1	Sugarcane	m2	97,531.5

Source: ARAP, EIA

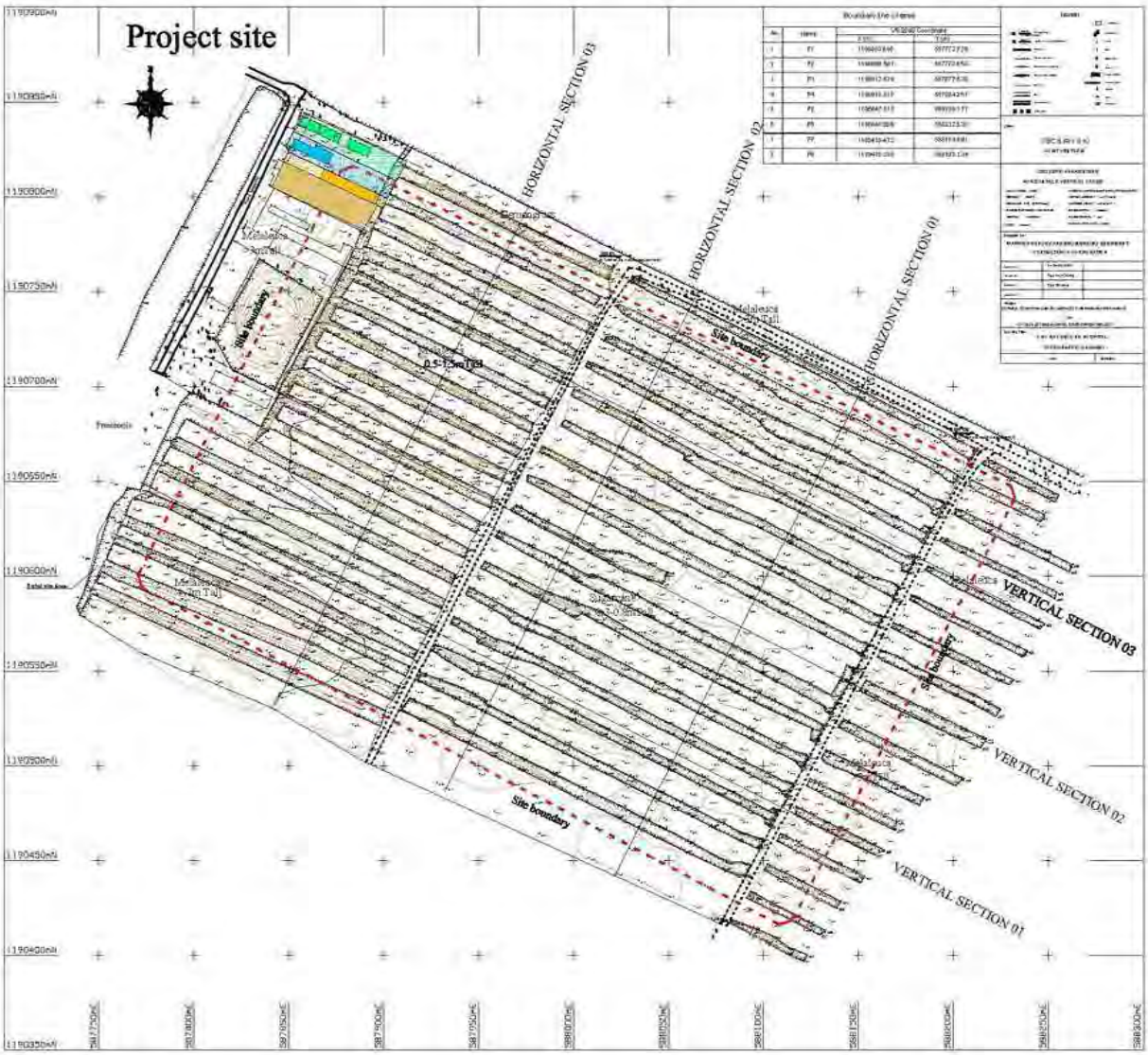


Figure 16-6 Land Survey Figure
Source: Natural Condition Survey by Surverance

(2) Natural Environment (See 5-2 Natural Condition Survey)

Landforms

Geographically, Ho Chi Minh City (209,555 km2) is located approximately 10km north out of the delta area of Mekong River. Binh Chanh District is the southwestern end in city area and near a farm village in the rice crop area.

Binh Chanh District is a low flat and the inclination of the land is approximately 0. (Binh Chanh Dist. 2012) Le Minh Xuan Commune farms is bottomland and marsh, Elev.0.5m-1.0m and poor drainage. It is mainly occupied by rice land. Surrounding canals and channels that affect the project site, there is no water flow, but lead to Cho Dem River flowing in the about 1.5 km east from the project site. (EIA) Cho Dem River connecting with many canals and rivers flows into the big Nha Be River in Ho Chi Minh City finally and leads to the South China Sea.

There is an occurrence of the heavy rain in Binh Chanh District, but there has not been a history of disaster (according to local accounts).

There is a preparation of the banks that prevent the countercurrent of seawater in case of the high tide in each river in HCMC city.

The canals and the channels, the river irrigation system area are 42,247 km2. It accounts for 20.2% of HCMC city area. (In Tokyo Met. 23-Ku, 4.8%: Tokyo Construction Bureau) In Binh Chanh District, it is 15.51 km2 and is 6.14% to total area 252.69 km2. (Binh Chanh Dist. 2012)

In the HCMC city, the main problems are a landform being lower than the surface of the sea that is weak about flooding, and ability lack of drainage facility which was serviced in 1870 of the

French colony times. (Osaka-City, "The survey on the measure of city flood in HCMC, 2012") There are same issues at the project site.

Geological features

A site survey and laboratory test results show that the project site of Cho Ray Second Hospital is characterized by a rather complex geological structure, according to the survey results to the depth of 80m from the surface.

The cultivated land of the surface layer is made up of dark gray or yellowish -gray loam, where trees take root, but is wasteland of region specific, and covers the entire surveyed surface between 0.2m and 0.3m thick. (EIA)

Soft clay layer is deposited over 20m beneath it. Therefore, ground subsidence is expected during and after the landfill process. It will be necessary to take technical measures and a sufficient embankment construction period during the landfill stage. The hard stratum is located in the further downward. (See 5-2 Natural Condition Survey)

Weather

The annual rainfall in Ho Chi Minh City in 2012 was 1,883.0 mm. (The average in Japan is 1,718 mm: The Ministry of Land, Infrastructure and Transport.) The month with the most rainfall was October, 434.4 mm. The average year temperature is 28.6 (degrees C). The highest monthly average temperature is 29.5 in March and the lowest is 27.5 of September. The average annual humidity is 73%. (HCMC. 2012)

Prevailing wind direction are these; Southwest-west wind from the Indian Ocean during the rainy season, roughly from June to October, blows at the average speed of 3.6 m/s.The wind blows strongest in August, at the average speed of 4.5 m/s. North-northeast wind from the South China Sea in the dry season, roughly from November to February, blows at the average speed of 2.4 m/s. In addition, the south – southeast monsoon, roughly from March to May, blows at the average speed of 3.7 m/s. (EIA)

The central part of Vietnam was severely damaged by the huge typhoons in 2012, 2013. In Ho Chi Minh City, the preparation for the flood damage is continuously the most important according to the weather status in recent years. To change agricultural land to a industrial park including residential area decreases the ability of the land of the rain penetration to about 1/6. The drainage plan that includes a flood measure at the county on the low flat land that contains the project site should be worked out.

Air Quality

The reinforcement of the environmental monitoring is expressed and regulations about "the drainage, exhaust gas, the solid body waste and the harmful waste materials" are being implemented.

Home fuel burning emits CO, NOx, and Sox. Industrial activity emits a chemical, CO, NOx, Sox, and Hydrocarbon. CO, NOx, Sox, Hydrocarbon, the benzene, and the harmful gas of the toluene are detected by the exhaust of the vehicle. (Binh Chanh Dist. 2012)

In Le Minh Xuan industrial district, it regulates <NOx, SO2, CO, dust, Pb, THC (=total hydrocarbon)> as the air environment.

Table16-2 Results of air samples analyzed in the project area

Gathering day:11thJuly,2014

No.	Position Mesurement.	Dust (mg/Nm3)	NOx (mg/Nm3)	SO2 (mg/Nm3)	CO (mg/Nm3)	NH3 (mg/Nm3)	H2S (mg/Nm3)
1	K1 Area building wastewater treatment plants, waste storage areas to focus	0,08	0,055	0,214	6,7	15	3
2	K2 Parking area & entrance hospital	0,11	0,061	0,18	5,6	10	7

3	K3 Area hospitals	0,07	0,067	0,110	4,58	11	5
QCVN 05:2009/BTNMT		0,3	0,2	0,35	30		
QCVN 06:2009/BTNMT		-	-	-	-	200	42

Source: EIA, Centre for Research and Technology services environment, 2014

Water Quality

Currently, 95% of the wastewater is discharged unprocessed in Vietanam. According to the statistics, the processing conformed to the Vietnamese environmental standard is accomplished only about 4.26% out of the whole industry wastewater. The system which divides living wastewater and industry wastewater, too, has not built, and these are released to the river in the mixed condition.

There are about 1,000 hospitals in Vietnam at present but these hospitals release the wastewater of 100,000m3 per day without conforming to the water quality standard. Since discharging without proper processing leads to the spreading of the infection, the health risk to the local resident is worried about.

Most of the canal systems around Binh Chanh District show a pollution phenomenon. (Ministry of the Environment Japan: "The present situation of the environmental pollution and so on in Vietnam".)

Table16-3 Water Quality of River and Canal in Binh Chanh District

Name	Ph	DO (Mg/l)	BOD5 (mg/l)	E. coli (MPN/100mL)
Sông Chợ Đệm	6,9-7	0-0,74	4,6-38,3	$2,3.10^6$-$7,5.10^7$
Rạch Nước Lên	6,9-7	0-0,47	8,2-18,7	$9,3.10^6$-$9,3.10^{10}$
Sông Cần Giuộc, Bến Lức	7, -8	3,1-4,5	11-30	21.10^3-24.10^4
Rạch Bà Lào	7,2-7,6	2,8-3,8	18-29	24.10^3-24.10^4
TCVN 5942 1995/B	6-8,5/5,5-9	>6/>2	<4/<25	5.10^3/10^4

Source: Binh Chanh Dist. 2012

Table16-4 Results of the environmental quality of surface water (channel Cong 1)

Gathering day:11thJuly,2014

No.	Parameter	Unit	Result	QCVN 08:2008/BTNMT, Colum B1
1	pH	--	6,25	5,5-9
2	TSS	mg/l	25	50
3	COD	mg/l	42	30
4	BOD5	mg/l	30	15
5	DO	mg/l	5,62	$\geq_4$
6	Nitrat	mg/l	0,148	10
7	Photphat	mg/l	0,058	0,3
8	Pb	mg/l	0,024	0,05
9	Fe	mg/l	0,721	600
10	Oil	mg/l	0,3	0,5
11	coliform	MNP/100ml	7.500	0,05

Source: EIA, Centre for Research and Technology services environment, 2014

The reinforcement of the environmental monitoring is expressed and regulations about "ph, DO, BOD, oil and Escherichia coli bacteria" of water quality of river and canal are being implemented. (Binh Chanh Dist. 2012)

In the residential area, people tend to use water wastefully. The organic matter and the germ are polluting environment, and nematode eggs are detected.

The wastewater from the plants of chemical, fiber industries and food processing containing PAH, heavy metal, phenol, lignin, grease, a coloring and high level organic hydrocarbon has caused serious environmental pollution in the industrial park. (Binh Chanh Dist. 2012)

Table16-5 Wastewater Quality of Binh Chanh District Local Industrial Parks

Industrial Park	Ph	COD (mg/l)	BOD_5 (mg/l)	Oil (mg/l)	E. coli (MPN/100mL)
Vĩnh Lộc	7.07	10.5	8.5	5.3	$2.3.10^8$
Le Minh Xuan	7.26	253	126	2.5	$9.3.10^9$
TCVN 5945 1995	6-9	50	20	5	5.10^3

Source: Binh Chanh Dist. 2012

On the other hand, there is a regulation of the drainage in Le Minh Xuan industrial park area. Sewage and hospital wastewater can be discharged to the specific watercourse to be provided in the industrial park if they establish an wasetewaer treatment facility and follow the drainage standard (QCVN28) of the regulation. It is also possible to process the first step treatment in the hospital and the last step treatment in the new sewage treatmen plant in the industrial park development area, but the completion date of the new sewage treatment plant is undicided.

There is no need of the storage of wainwater in the site. It is allowd to discharge to the watercourse through the drainage gatter which is installed on the site boundary.

In this project, there is drainage from the construction site, heavy equipment, vehicles and the construction lodgings during under construction. In the industrial park development area, when the new sewage treatment plant has not been completed before this project construction beginning, the management of discharging wastewater quality becomes necessary. In operation, they should conform the each standard value, establish the wastewaer treatment facility, and discharge the wastewater below the standard value to the specific watercourse. (Binh Chanh District commissar)

As a result of the local survey, these things became in the clarifying; the north side waterway is cut off in the east side of the present project site and it doesn't connect to the river.The west side waterway is congested and water is not flowing.

The Underground Water Quality

Making the monitoring network of "the groundwater quality" is expressed and they are monitoring about "ph, NO2-, NO3-, Fe, H2S, TDS, NH4+ and Coliform bacteria "every 6 months. (Binh Chanh Dist. 2012) The seepage water from industrial and home drainage and repository site penetrates the underground layer and causes ground water pollution. This becomes the cause of underground water pollution by heavy metal and nitric acid, the arsenic and so on. (Ministry of the Environment Japan: “The present situation of the environmental pollution and so on in Vietnam”)

As the hydraulic and geological characteristics of the area, underground water is accumulating over 5 layers. Vietnam is making effort to not use the poor-quality groundwater which is contained in top layer in sediment for drink. (Binh Chanh Dist. 2012)

National technical regulation on underground water quality (QCVN09:2009/BTNMT) has been published.The EIA Report analysised the groung water quality of the project site, and all result fell below those quality standards.

Table16-6 Analysis results of groundwater quality

Gathering day:11thJuly,2014

NO.	PARAMETER/UNIT		RESULT	QCVN 09:2008/BTNMT
1.	pH	--	6,06	5,5-8,5
2.	COD	mg/l	1,26	4
3.	Hardness	mg/l	90	500
4.	Clorua	mg/l	11,36	250
5.	Sulfat	mg/l	24,19	400
6.	TS	mg/l	253	1500
7.	Nitrat	mg/l	0,11	15
8.	Nitrit	mg/l	0,005	1
9.	Fe	mg/l	2,465	5
10.	Amoni	mg/l	0,05	0,1
11.	Pb	mg/l	0,005	0,01
12.	coliform	MNP/ 100ml	3	3

Source: EIA, Centre for Research and Technology services environment, 2014

The Waste

Ho Chi Minh City takes charge of both waste public administration and management of waste processing business. In a waste public administration Department of Natural Resources and Environment (DONRE) in Ho Chi Minh City Commissar is responosible for planning about the environment which including regulation, planning, waste. The waste general engineering and facilities division that belongs to DONRE is responsible for management of solid waste (city waste, hazardous waste) such as collection, movement, carriage, recycling, processing, reclamation and so on, and is responsible for management of buria and cemetery also.

Division of Environment Management takes charge of the environmental protection in Ho Chi Minh City. Ho Chi Minh City Environmental Protection Agency (HEPA) does examination, monitoring, inspection, antipollution, environmental protection activity about the environmental improvement, the save of the biodiversity, the use of the technology, the improvement of the public consciousness, and the collection of the environmental protection expenses.

The City Environment Company (CITENCO) and the environment public corporations of district wards take the processing business of the city waste. (Tokyo Metropolitan Government-Bureau of Environment)

CITENCO provides the following services under the direct contract with the individual customer;

- The collection, the carriage, the disposal of the hospital waste from the medical agency
- The management, the land readjustment, the reclamation material about the processing of a construction waste
- The design, the repair, and the construction of the city sanitary facilities
- The consultant about the development related to the city sanitation and the preparation of the investment project
- The collection, the transportation, and the disposal of the garbage from home, offices, schools, hospitals, hotels, restaurants and so on
- The collection, the transportation, and the processing of a wide range of wastes from the residential area, city area, and industrial zone, and the sanitation service

The disposal site of the the construction waste of this project is Da Phuoc which is in Binh Chanh District about 17 km southeast of the project site among the two waste disposal site in Ho Chi Minh City.(See Figure 16-3) The area of the disposal sate is 680 ha.

Waste management of the project is is done by the construction contractor during construction and in service by Cho Ray Second Hospital in accordance with DONRE regulations.

There are priority regulations for Binh Chanh District. The regulatory content is the same as that of Ho Chi Minh City.

Table16-7 Regulation of Solid Waste and Hazardous Waste

Pollutant source	Solid waste
Residential area	Garbage, Paper, Plastics, Timber, Glass
Industrial area and individual industry facilities	Junk hood, Coal, Slag, Paper, Cloth, Plastic, Hazardous waste
Landfill	Garbage

Source: Binh Chanh Dist. 2012

Noise and Vibration Quality

The noise level at night in a almost city areas in Vietnam is about 70 dB (A), which is below the maximum standard. But in the daytime the noise level reaches to 70–75 dB (A), and reaches to 80–85 dB (A) near the big roads. (Ministry of the Environment Japan: "The present situation of environmental pollution in Vietnam")

Main roads including the national highway Route 1a go through the Binh Chanh District. The total length of the road network in Binh Chanh District is 330.767m. (Binh Chanh Dist. 2012)

In Le Minh Xuan industrial zone, noise is regulated together with chemicals as the air environment.

On the north side in this project site, there are existing residential area and a school. Across from them, Ministry Road 10 runs away 100 m from the site.

During construction, construction vehicles will come and go frequently to the final disposal site of construction waste and on the road for delivery of construction materials.

Table16-8 Results of climate analysis at the project site

Gathering day: 11thJuly,2014

No.	Position Measurement	Noise (dBA)	Temperature (degrees C)	Wind Speed (m/s)
1	K1 Near the hospital wastewater treatment plants and waste storage facilities	60-65	29,3	1,6
2	K2 Near the parking area and hospital entrance	63-67	36,8	0,9
5	K3 Location of the hospital	65- 68	30,5	1,1
QCVN 26 : 2010/BTNMT		6 h - 21 h: 70 21 h - 6 h: 55	-	-

Source: EIA, Centre for Research and Technology services environment, 2014

Soil pollution

The causes of the soil pollution in Vietnam are agricultural chemical use and industrial waste.

a) Agricultural chemical use;

About 50% of nitrogen, 50% of potassium, 80% of phosphoric acid agricultural chemicals remain in the soil.

(The agricultural chemical amount of consumption in Japan is 430 kg/ha. On the other hand, the amount of consumption in the Vietnam is 80-90 kg/ha.)

Insecticide remains in the soil and the groundwater and has an effect on all ecosystem of the ground environment.

b) Industrial waste;

The heavy metal concentration in the soil in and near the industrial area is increasing in recent years.

In the industrial cluster of Phuoc Long, the chrome concentration became 15 times, the cadmium concentration became 1.5-5 times, the arsenic concentration became 1.3 times the standard value. (Ministry of the Environment Japan: “The present situation of the environmental pollution and so on in Vietnam”)

Table16-9 Results of measurement and analysis of soil quality of the project

Gathering day:11thJuly,2014

NO.	PARAMETER	UNIT	RESULT	QCVN 03:2008/BTNMT
1	Asen (As)	mg/kg	Not detected	12
2	Cadimi (Cd)	mg/kg	0,001	10
3	Cu	mg/kg	0,25	100
4	Pb	mg/kg	0,01	300
5	Zn	mg/kg	0,10	300

Source: EIA, Centre for Research and Technology services environment, 2014

Protective zone, Ecosystem

The Vietnamese side confirmed that the project site is not included in any type of protected area or subject to any form of environmental regulation and informed it to JICA in writing.

The project site of which the land use right is to be expropriated from agricultural land is sugar cane filed in Le Minh Xuan village. There is no biological scarcity value on a global level, including the flora such as trees, plants and ground cover plants. (EIA)

(3) Social economy status

Industrial population and Income

The industrial population of Binh Chanh District, Ho Chi Minh City was 128,606 in 2006. The agriculture and forestry fisheries industry is 31.8%, the manufacturing is 38.7% and the trade service industry is 29.5%.

As for the economy production, the handicraft industry, the commerce, and the agriculture are high in turn. (Binh Chanh Dist. 2012)

The age population of 15 years old, 47.4% of agriculture and forestry fisheries industries, the manufacturing are 13.8%, and the trade service industry is 12.2% in Vietnam.

The monthly pay of employee of the national is 4,465,600 VND (about 21,475 Japanese yen). (Vietnam Statistics 2012)

Economic condition

The substantial GDP growth rate of Vietnam in 2012 was 5.0% and rate of increase in consumer price index was 9.2% in the annual average.

The exchange rate maintains about 20,800 VND per doller and the macroeconomics is stable. The balance of trade converted into favorable balance first time in 19 years. The unemployment rate is 3.3%. (JETRO)

On the other hand, Ho Chi Minh City has three problems roughly by the economy development. The 1st is the development of the industrial park which is necessary for the industrial production, the 2nd is the problem of garbage and wastewater which occurs by the urbanism, and then the 3rd is a traffic problem. (APEC 2007)

In the Zone 1 that is located in the south of Le Minh Xuan Industrial Zone, some factories are running. Along the Province Road No.10 in the north of the Zone 3 planned site, small stores and houses are built in line. In the sugar cane field which spreads around the project site, harvest is finished. In the neighbor north side, the waterway is the simply digged hollow, and flow of water cannot be seen. There is a skate place trace in the ruin convention center in the west side of the site. There are coffee shop traces and fishing pond traces along the passage. However, at present, there is not economic activity. There are new apartments and a school between the Province Road No.10 and the road on the north side of the waterway. (See 16-2)

16-1-3. Environmental Social Consideration System and the Organization, the EIA Acquisition in Vietnam

(1) The decree and the standard which relates to the environmental social consideration (the environmental impact assessment, the information disclosure) and so on

There is "Law on Environmental Protection: law number 52/2005/QH11" in the law about the environment in the Vietnamese country.

There is "the strategy environment assessment (SEA)" "the environmental impact assessment (EIA)" "the environmental protection pledge" in the procedure about the environment society consideration in the law.

SEA is "the economic society development strategy," of the national level, EIA is "the important national project," "the environmental protection pledge" is a home scale and the application repartition is prescribed in the article of 14, 18, and 24 of the Law on Environmental Protection.

Table 16-20 Projects requiring creating EIA report

1.	Important project at the national level
2.	Projects that use or affect negatively natural reserve, national park, Historical Heritage, Cultural Heritage, Natural Heritage, or landscape
3.	Projects that affect negatively river areas, coastal areas or ecosystem conservation area
4.	Construction projects of infrastructures in economic or industrial zone, new technology industrial zone, export-processing zone, or artifice zone.
5.	Construction project of new urban center or congested residential area
6.	Projects that use a large-scale of groundwater or natural resources
7.	Projects that have other potential risks and affect the environment

Source: Law on Environmental Protection Article 18

Table 16-11 A detailed list of projects for which EIA report must be prepared (Excerpt)

Type of project		Scale
Construction project group		
4	Infrastructure of urban centers and residential areas	Not less than 50ha
5	Industrial complexs,high-tech parks, export procedure zones	All
6	Supermarkets	Not less than 200 stores
7	Sport centers	Not less than 10ha
8	Hospitals	Not less than 50beds

Source: Decree No21/2008/ND-CP Appendix

The industrial zone and the hospital are both subject to EIA according to Table16-10 and 11.

The local developer is responsible for the application of the industrial area EIA and it is in the midst of development application now. (Feb/28/2014)

The Cho Ray Second Hospital is located in the 10ha site and, by law, the EIA to be submitted in this project plan is alone Cho Ray Ssecond Hospital of 10ha site, and legally, submission at architectural design stage is mandatory. The Ministry of Natural Resources and Environment (MONRE) will examine it.

"The contents of the report of the environmental impacts assessment (Law on Environmental Protection Article 20)" is following 9 items.

Table 16-12 Contents described in EIA report

1.	Construction contents and dimensions, period and schedule, technologies and its details introduced for each construction and all of the project
2.	Current assessment of the environment in the project area and in its neighborhood, assessment of acceptable impacts for the environment
3.	Detailed assessment of environmental impact on the implementation of the project, detailed assessment of the environmental and socio-economic impacts that project has and prediction of accident.
4.	Specific measures for minimizing environmental damages, prevention of environmental accident and specific measures for accident occurrences
5.	Manifestation of duties dealing with environmental protection
6.	Implementation lists of the project, management environmental problems and monitoring plan
7.	Estimattion for the environmental protection measures costs in regards to all project budget.
8.	Opinion about administrative commune/sector, or township level People‟s Committee and community representative, Objection about project area or environmental protection measures
9.	Chart, data, sources of appraisal method

Source: Law on Environmental Protection Article 20

There is the “Circular No.26/2011/TT-BTNMT issued on 18th July 2011 by Ministry of Natural Resources and Environment Ondetailed Guidelines for Some Articles of DECREE29/2011ND-CP dated on18th April 2011 of the Government for Strategic Environmental Assessment, Environmental Impact Assessment and Environmental Protection Commitment” connecting to the Law on Environmental Protection.

It is based on the regulation by the Law on Environmental Protection. "EIA report sample with the composition and the items" in Annex 2.5 of Circular No.26/2011/TT-BTNMT .shows detailed contents. Incidentally, as the law related with EIA and SEA, the following was published.

Circular 218/2010/TT-BTC; it prescribes about the standard, the collection system, and the paying of EIA report examination fee and the use management.

Circular19/2007/QD-BTNMT; it is the regulation of the service activity and the condition of EIA report examination.

Table 16-13 EIA report sample with the composition and the item.
Annex2.5 of Circular No.26/2011/TT-BTNMT

Introduction

1. Background of the project
   - Explanation on the background leading to the occurrence of the project and the type of project (new, supplementary, or other)
   - Approving organization of the project
2. The relevant laws and documents proving the technology, needed to implement EIA
3. Statement of implementing EIA
   - Overview of the implementation of EIA and the preparation of EIA report.
     Existence/non-existence of any employed consultant when preparing the reports. If some consultant is employed, the name and address of the organization and the representative person
   - A list of personnel who are directly involved in the implementation and preparation of EIA

Chapter 1 Overview of the project

1.1 Name of the project

Same as the name entered in F/S and investment reports.

1.2 Name of the project implementer

Name, address, and contact of the project implementer, and name and title of the representative person of the organization.

1.3 Geographical information

Geographical explanation on the area for implementing the project, including the surrounding natural items, socio-economical elements, and other buildings and housing areas, as well as maps showing these elements.

1.4 Main contents of the project

- The scale of the project in terms of space and time, design drawings included in the following 2 types of construction.
  - With an aim for major construction, manufacturing, business, and services
  - Necessary for the facilities for supplementary construction/transport systems, postal mails, telecommunication, electricity, water supply, water discharge, resettlement,forest-related, effluent-treatment facilities, solid wastes treatment and recovering facilities (if possible), and other items needed for the major construction work.

- Details and the explanation of the technologies used. The explanatory figures shall contain the environmental factors in the water source used (if possible).
- A list of the equipments and facilities utilized. The manufacturer, date of manufacture and the status shall be clearly written.
- A list of materials used such as fuels. The name and chemical composition shall be clearly written (if possible)

Chapter 2 The natural environment and socio-economic aspects related to the project

2.1 Status of the natural environment

- Geological and geographical aspects: Explain the item which will be influenced, the related phenomenon and the process (For projects which will change the geological elements and landscape, and the projects involving the development of minerals and the construction of underground structures, the details should be explained). The sources of quoted documents and information should be clearly shown.
- Hydrologic/meteorological aspects: Explain the item which will be influenced, the related phenomenon and the process (For projects which will develop, use and change the hydrological elements, the details should be explained). The sources of quoted documents and information should be clearly shown.
- Natural environmental aspect: Explain the environmental factors which will be directly affected. As for the status of atmosphere, water and lands, the following items should be clearly written.
- Clear methods for data measurement/analysis when EIA is implemented.
- General assessment on the influence which can be accepted in terms of the environment and accuracy.

2.2 Status of society and economy

- Economic aspect: Explain the economic activities which will be influenced (industry, agriculture, transport, mining, tourism, trade, service, and other sectors). The sources of quoted documents and information should be clearly shown.
- Social aspect: Explain the activities of culture, society, religion, creed, historical heritage, houses, urban areas, and other sectors which will be influenced. The sources of quoted documents and information should be clearly shown.

Chapter 3 Influences on the environment

3.1 Environment influencing factors

- Origins of the influences caused by wastes: A list of all the origins which can cause solid,liquid, gas, and other forms of wastes. Quantification of those origins and clarification of possible places and times of occurrence. Comparison with reference values and regulations, if possible.
- Origins of influences which have nothing to do with wastes: Predictions on all the factors causing mudslide, corrosion and subsidence; erosion of riverbanks, pond rims and coasts; deposition on the riverbed, pond bottoms and sea beds; change of water levels in the surface water and groundwater; variation in chloride- and aluminate-forming process; change in local weathers and environmental factors; degradation of biodiversity; and other influences. Clarification of the extent, possible places and times of occurrence. Comparison with reference values and regulations, if possible.
- Prediction on the environmental risks: environmental risks predictable when the project is planned and operated.

3.2 The predicted target and the extent of the influences

All the predicted targets in the natural, economic, cultural, social, religious, creedal, and historical heritages within the project implementation areas and the surrounding areas which will be influenced by waste-derived and non-waste-derived origins. Details of the possible places and times of occurrence.

3.3 Impact assessment

- Clearly show the impact assessment on the cause of each influence and the target objects which will be influenced. Details of the extent, place and time.
- Clearly show the impact assessment of each project.

3.4 Assessment method

Evaluate the reliability of the assessment method. Uncertain points and the reasons, proposal of improvement measures.

Chapter 4 Measures for reducing environmental impact and preventive measures for environmental accidents

- Responses to environmental loads
  - Formulate reduction measures for each environmental load. The advantages and inconveniences, feasibility, efficiency, and effects should be clearly shown. If optimal reduction measures cannot be found, file a statement of reason and a claim to the competent bodies for allowing them to take countermeasures.
  - By comparing with the current standards and regulations, demonstrate how much load can be reduced after implementing the reduction measures. If the requirements cannot be fulfilled, file a statement of reason and a claim to the competent bodies for allowing them to take countermeasures.
- Responses to environmental accidents: Propose general countermeasures including the following items.
  - The contents and methods of countermeasures that can be implemented by the project implementer. Evaluation of the feasibility and effects.
  - The contents and methods of countermeasures which need cooperation with administrative bodies and other organizations
  - Items and claims essential for the handling of environmental accidents

Chapter 5 Implementation of environment conservation measures

Statement of the duty of the project implementer to reduce environmental loads and to commit itself to the environment conservation

Chapter 6 Construction and management/supervision for improving environmental loads

6.1 A list of construction for improving environmental loads

- A list of construction for responding to solid, liquid, gas, and other forms of wastes. The process of each construction.
- A list of construction for responding to environmental loads other than wastes (the factors causing mudslide, corrosion and subsidence; erosion of riverbanks, pond rims and coasts; deposition on the riverbed, pond bottoms and sea beds; change of water levels in the surface water and groundwater; variation in chloride- and aluminate-forming process; change in local weathers and environmental factors; degradation of biodiversity and other influences). The process of each construction.
-

6.2 The system of management/supervision

- Management programs
  - The organization of personnel, who are in charge of the environmental loads related to the projects involving the environment, wastes, toxic wastes, avoidance ofenvironmental accidents and other projects.
- Supervision programs
  - Wastes: Based on the current standards, monitor the statistics on the generated amount of wastes and environmental pollution, especially paying attention to the wastes. It shall be implemented at least

every 3 months. Details of the places to be monitored shall be clearly shown on the maps.

- Surrounding environment: If there are no monitoring posts or places of the administrative agencies, based on the current standards, monitor the statistics on the environmental pollution, especially paying attention to the wastes. It shall be implemented at least every 6 months. Details of the places to be monitored shall be clearly shown on the maps.
- Other: If there are no monitoring posts or places of the administrative agencies, monitor the mudslide, corrosion and subsidence; erosion of riverbanks, pond rims and coasts; deposition on the riverbed, pond bottoms and sea beds; change of water levels in the surface water and groundwater; variation in chloride- and aluminate-forming process; change in local weathers and environmental factors; degradation of biodiversity and other influences at an adequate frequency. Details of the places to be monitored shall be clearly shown on the maps.

Chapter 7 Estimation of the budget for the construction related to environment conservation

Chapter 8 Reflection of the public opinion

8.1 Opinions from the administrative village level People"s Committee

8.2 Opinions from the representatives of communities

Chapter 9 The sources of statistics, data and assessment methods

9.1 The sources of statistics and data

- A list of quoted statistics and information: The title, author, publisher and publication year of the reference materials and information. Evaluation of the accuracy, reliability and the status of updates of the information.
- Documents and information created by the implementer: A list of the title, publication year and the publisher of referenced documents and information. Evaluation of the accuracy, reliability and the status of updates of the information.
-

9.2 Methods used

- A list of all the methods used in implementing EIA and preparing EIA report.
- Evaluation of the reliability of the above methods.

9.3 Objective reference to the accuracy and reliability of the predicted change in the natural environment and socio-economic aspects during the project implementation and other time periods. If required information cannot be represented, show the objective and subjective reasons.

Conclusions and claims

1. Conclusions: Conclusions shall include the following contents:

- Were all influences captured and assessed? Where are uncertain points?
- A generalized evaluation of the extent and scale of the influences
- Possibility of influence reduction measures
- The influences that cannot be reduced by the implementer and the claims

2. Proposals: Request for cooperation to solve the unavoidable problems

(2) Flow of EIA report approval

The Figure below shows the rough flow of EIA report appraisal and approval. After creating of an EIA report, the project implementation person applies to receive the appraisal. After that, EIA report reflects the appraisal is completed, and that apply for the EIA approval. After the approval of the EIA report, it should be given the investment permission, the construction permission, and the operational permission at last.

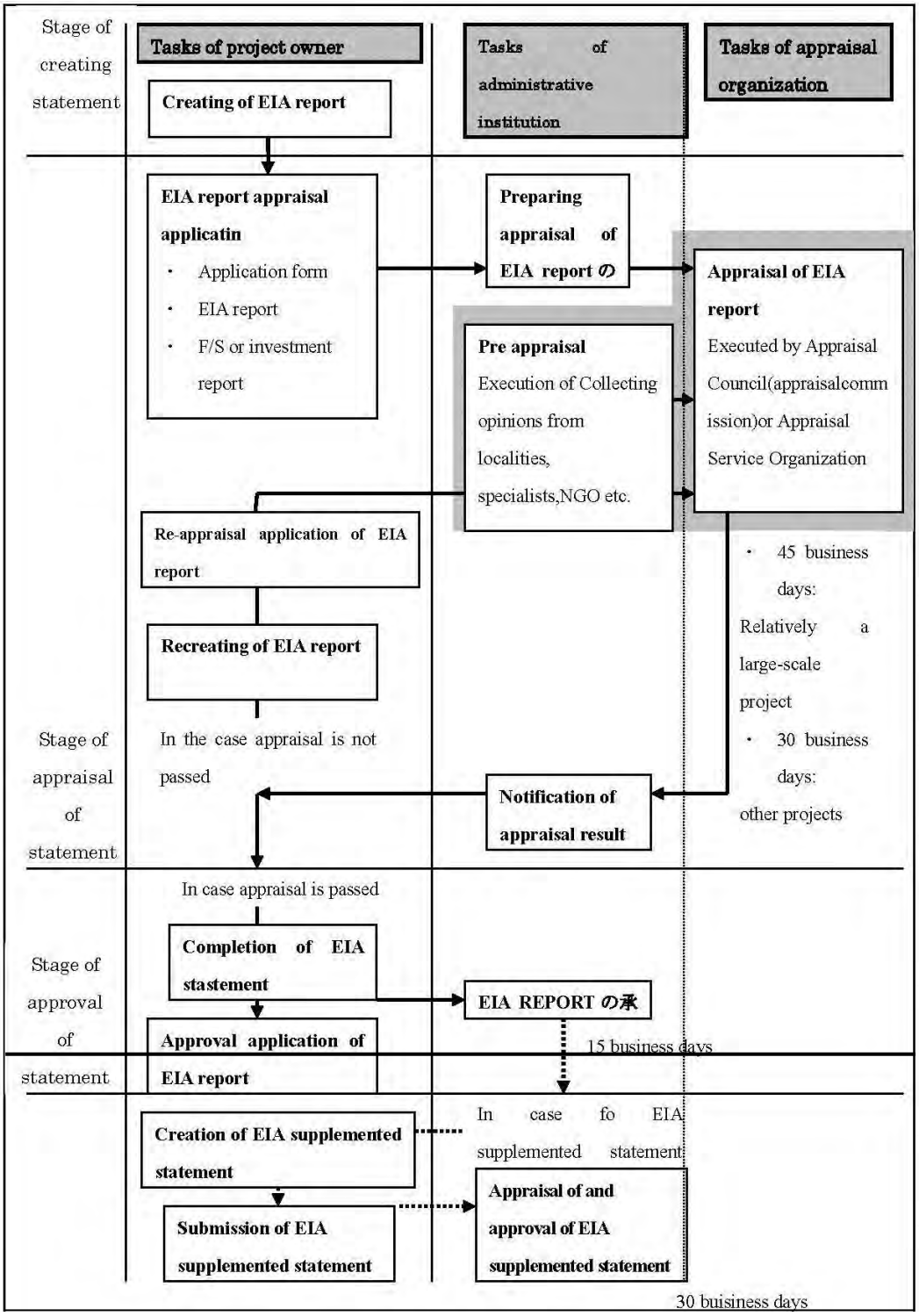
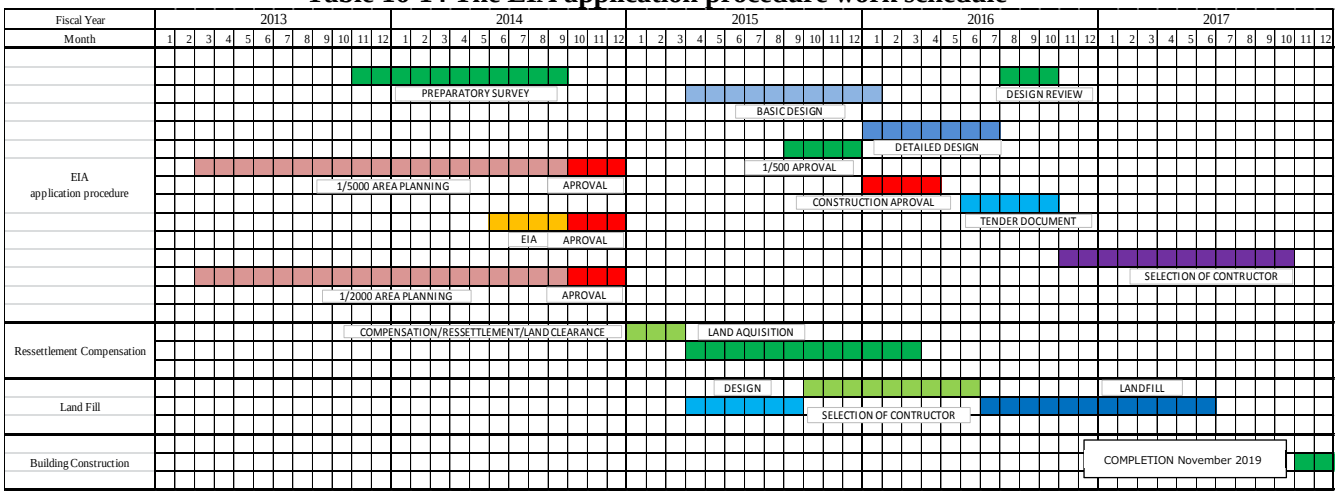


Figure 16-7 Flow of EIA report approval
Sourse: JICA Envilonmental Profile

An EIA report to be submitted by this project is about the Hospital in the 10ha site. Hospital EIA is necessary to the application of "Project Feasibility Study (F/S)" of Vietnam to be approved as a national project.

Table 16-14 The EIA application procedure work schedule



(3) EIA application about Cho Ray Second hospital

Before hospital construction, EIA should be presented to MONRE at the same time of F/S. creating.

- The contents of EIA cover the overall impact on the the construction and the environment.
- EIA should include the opinion of the Le minh Xuan commissar and people.
- The gathering of people's opinion, the Le minh Xuan commissar is responsible.
- The submission address and the examiner of EIA is Ministry of Natural Resources and Environment (MONRE).
- On the rule, Approval period is up to six months from the submission of the EIA.
- Investment, construction and development permission are given and distributed by the Ministry of Construction (MOC) after the EIA approval.
- It publishes the appraisal of the EIA examination to the Le minh Xuan commissar and people.
- The regulation for the EIA creating is shown in Decree No. 28 issued in 2007 or 2009. Decree No. 29 issued in 2011 should be referred to, also.
- Department of Natural Resources and Environment (DONRE) in Ho Chi Minh City is responsible about the right relation of the land and the waste.

(Binh Chanh District commissar)

"The report EIA" is to be created and presented with "the Feasibility Study report of the project (F/S)" simultaneously.

"The consultant service organization which creates EIA report should have an enough staff condition and the necessary physical and technical basics." (Law on Environmental Protection Article19)

(Binh Chanh District commissar)

The EIA for Cho Ray Second Hospital was completed by Cho Ray Hospital in July 2014 based on the examination discussion with the survey team. And it is nessesaly to be approved by MONRE by the Loan Agreement (L/A)

(4) EIA in the whole industrial park

An EIA report creating guideline is issued in 2008-2009, such as report in the dyeing, the cement production, thermal power plant, the industrial park infrastructure, and the living garbage landfill. In the hearing by MONRE, there was a comment that the EIA application for the whole Le Minh Xuan industrial park is necessary separately.

(5) The related authorization (The construction and the development)

The applications of each of the development, the fire fighting, the feasibility studies, and the structure are necessary in relation to EIA.

These applications can be concurrently presented to the related organization. A construction permission is published when all of these containing EIA are permitted. (Hearing of Design office)

Concerning of Cho Ray Second Hospital, fire-fighting application should be presented to Ho Chi Minh City, EIA application should be presented to MONRE, and other applications should be presented to MOC by MOH (or Cho Ray Hospital). (Hearing of MOC) Sigon VRG presented the land

use plan of whole Le Minh Xuan Industrial Zone 3 to the urban planning department of Ho Chi Minh City, and it is during examination.(Binh Chan Distrit Commisser)

MONRE, MOC, HCMC confirmed that the hospital EIA can be applyed with another application procedures.

The Land use plan 1/5,000 deals with the entire Le Minh Xuan Industrial Zone1, 2, 3. However, Saigon VRG presents Zone3, but another development companies present each Zone1 and 2. (Saigon VRG 9th June 2014)

(6) Analysis of Accordance and Gap among Local Legal System, new Environmental Guideline and Safeguard Policy of World Bank

The following Table 16-15 describes about the comparison of Japan International Cooperation Agency Guidelines for Environmental and Social Considerations (hereinafter reffered as to New Environmental Guidelines) proclaimed in April 2010, Safeguards of the World Bank and related laws in Vietnam about EIA. There is not big difference concerning the system.

Table 16-15 Comparison of New Environmental Guidelines/Safeguards of the World Bank and related laws in Vietnam about EIA

	Response policy of comprising New Environmental Guidelines and Safeguard policy of the World Bank	EIA related laws in Vietnam	Main different point	Compatible policy about this Compatible policy about this
Procedure system	It is confirmed if the projects comply with the law or standards related to the environment in the central and local goverments of host countries. It is also confirmed that the projects do not deviate significantly from the World Bank"s Safeguard Policies.	Environmental Impact Asessment system exists, which DONRE has formulated.(Decree NO.80/2006/ND-CP)	(There is not difference in particular.)	Cho Ray Hospital should create EIA employing a Vietnamese consultant
Language of Environmental Assessment Statement	Environmental Assessment Statements (their names may be different depending on systems) must be written in official language or language used widely in coutries where the projects are implemented. Also, when explanating, document must be formulated in languages and forms that are understandable to local people.	It is written in Vietnamese or English.(Circular No.08/2006/TT-BTNMT)	(There is not difference in particular.)	This report should be written in Vietnamese and English.
Information disclosure of environmental and social considerations	In principle, host countries etc. disclose information about the environmental and social considerations of their projects. As needed, assist host countries etc. Encourage project proponents etc. to disclose and present information about environmental and social considerations to local stakeholders. So that information on environmentaland social considerations be made public and provided	It is required to receive opinions of People"s committee of commune, ward and township during formlating EIA report and they must be included in EIA report (Law on Environment Protection Article 20) Public hearing must be held and in addition, EIA report must be disclosed (Decree NO.80/2006/ND-CP). However, details of disclosure procedure such as disclosure period, or the way of receiving comments are not decided.	Under the domestic legal system, detailed process of disclosing EIA report has not been decided.	EIA report should refrect a opinion of Le Minh Xuan Commune people to Hospital Design.

Access/Copy	Environmental Assessment Statements are disclosed in countries where projects are implemented to local residents as well. It is required htat they are accessible by stakeholders such as local people and permitted for copying.	EIA report is disclosed on project sites (Circular No.08/2006/TT-BTNMT)	(There is not a difference in particular.)	
Consultaion with stakeholoders	In principle, host countries consult with local stakeholders as much as widely in a rational range, assist host countries as needed. In the case of Category A projects, encourage host countries to consult with local stakeholders about their understanding of development needs, the likely adverse impacts on the environment and society, and the analysis of alternatives at an early stage of the project.	Residents are ble to participate in the scoping and EIA report review steps. As for all projects of the State and in Category A, at the scoping step, consultation with stakeholders including residents is required. Also, at the EIA report review process, public hearing has to be held. (Circular No.08/2006/TT-BTNMT)	Currently, procedures, system of sanctions etc. are not fixed.	The commissar meeting and Cho Ray Hospital to explain to local residents must be held. MOH,CRH must create Abbreviated Resettlement Action Plan(ARAP)
Disclosure of monitoring results	Confirm monitoring results through host countries to confirm if host countries etc. implement environmental and social considerations. Host countries are required to report information needed to confirm monitoring results in an appropriate manner such as documentations. Also, it is required to disclose the monitoring results conducted by host countries etc. on the website to the extent that they are made public in host countries.	Monitoring results are edited in the form of white paper, and the State stores them as archive. (At 3 levels of province , local and State) (Circular No.08/2006/TT-BTNMT)	(There is not a difference in particular.)	This Report describes the Monitoring.

Source: New Environmental Guidelines, World Bank Safeguard policy, Related laws in Vietnam

(7) Roles of relation organization

The roles of each department in MONRE and in administrative levels for appraisal, approval and registration of EIA report, SEA statement and Environment Protection Commitment are as follows in Table16-16.

Table 16-16 The roles of each department in each administrative level

Administrative level	Name of department	Role
MONRE	Department of Environmental Impact Appraisement and Assessment	It is in charge of Permanent Appraising Agency (It supports Competent Appraising Agency and conducts appraisal of EIA report and SEA statement. In cooperation with the related institutions, it manages and monitors all activities related to SEA and EIA)
	Bureau of Preserving the Environment	It monitors the implementation of the approved EIA report, EIA supplemented statement and the conditions imposed at the time of approval in cooperation with Department of Environmental Impact Appraisement and Assessment or related institutions.
	Inspectors of MONRE	It monitors and penalizes violations in regard to SEA and EIA issues in cooperation with Department of Environmental Impact Appraisement and Assessment or Bureau of preserving the environment and related institutions.

Province level	Department of Natural Resource and Environment	It is in charge of Permanent Appraising Agency at province level People"s Committee (It supports Competent Appraising Agency and manages and monitors implementation of EIA report and EIA supplemented statement.)
District level	Division of Natural Resource and Environment or specialized department for environmental protection	It supports district level People"s Committee and conducts appraisal and registration of Environment Protection Commitment.
Administrative Commune level	Staff and department in charge of protection of natural resources and environment	It supports administrative-commune-level People"s Committee and conducts appraisal and registration of Environment Protection Commitment. Also, it manages and monitors its execution.

Source: Circular No.08/2006/TT-BTNMT

(8) The organization about EIA

Appraisal and approval of the EIA report is charged by mainly Competent Appraising Agency. (See Figure 16-8) However, actually, Appraisal Council (appraisal commission) or Appraisal Service Organization conducts appraisal of EIA report. As summarized in Figure 16-8, based on the kinds of the project, each Competent Appraising Agency has responsibilities in organizing Appraisal Council or Appraisal Service Organization. The chief of Competent Appraising Agency examines specialties and technical aspects of the project and complexities of the surrounding environments, then, decides either Appraisal Council or Appraisal Service Organization conducts appraisal.

Figure 16-8 Relational chart of organization related to appraisal of EIA report
Source: "Profile on Environmental and Social Considerations in VietnamV JICA2011

(9) The application of CASBEE

Therefore, environment evaluation by CASBEE (Comprehensive Assessment System for Building Environmental Efficiency, Japan) should be attached to Design Drawing concerning the EIA application based on the law in Vietnam.

(The minutes of MONRE, MOC, etc)

(10) EIA and the work experience to Land acquisition and relocation

The Cho Ray Hospital is constructing a cancer center in the existing site and has an office work experience about the application of EIA.

Saigon VRG Investment Holding Corporation (Saigon VRG), responsible for development of the site, has got Business Registration Certificate No. 4103008227 dated October 24, 2007 issued by the Department of Planning and Investment (HCM City). It is developing as business the investment and development of industrial park, infrastructure management in industrial park, and management of houses, commercial center, and real estate, etc.

As for the ability to implement, Saigon VRG is a member of Vietnam Rubber Group (VRG), one of the natioanl largest and most trusted conglomerates with annual profit roughly 5,000 billion VND with multi-sectors investment such as rubber plant station, latex processing, banking and finance, real estate development, mine ores, energy, construction, infrastructure development, tourism, etc.

Vietnam Rubber Group established Saigon VRG for developing and handling the large scale projects in the Southern Key Economic Zone.

As former experience, at present, Saigon VRG is the owner of the following projects:

- Dong Nam Industrial Park (342ha)
- Phuoc Dong Industrial Park – Urban and Service Combined Zone (3,158ha)

These projects are developed as the production centers and the commercial gates of the Southern Key Economic Zone of Vietnam. They will play a significant role as a connection and cooperation between Vietnam and global partners. (Saigon VRG Website)

16-1-4. The comparative examination of the substitution plan

Concerning the possibility of the establishment of the basement floor, the Table below shows the comperative examination from the standpoint of the prevention of flood at the time of the local heavy rain including abnormal weather, the term of shortening of construction work period and the construction cost reduction.

Table 16-17 The Comparative Examination of the Substitution Plan

	Non-existence of A basement floor (Present Plan)	A whole area establishment of a basement floor	A half area establishment of a basement floor
A construction cost	±0	+¥2,500,000,000	+¥1,250,000,000
A term of construction work	±0	Roughly 1 year	Roughly 6 months
A risk of being flooded	Low	High	High
A Measure to flood	Landfill +1m from around road	Landfill +2m from around road level Making the half basement Installing a water stop wall	Landfill +2m from around road level Making the half basement Installing a water stop wall
A groundwater prevention from entering	Double slab(=Floating foundation and basement slab)	Double slab (=Floating foundation and basement slab) Making a dryarea around.	Double slab (=Floating foundation and basement slab) Making a dryarea around. Underground Double wall(=Foundation wall and water stop finish wall)
A influence over the environment	–	The increase of the earthwork vehicle The prolongation in the construction period The influence over the groundwater pulse is worried about.	The increase of the earthwork vehicle The prolongation in the construction period The influence over the groundwater pulse is worried about
A way of securing a parking lot in case of enlarging in future	A ground parking lot will be established.	A basement floor will be used for the parking lot.	A basement floor used for the parking lot A basement staff parking lot will be installed in the annex
The general study result	◎ The site that isn"t flooded can be secured and the disaster medical care can be practiced.	× The risk of the water disaster is high and it isn't possible to do disaster medical care.	× The risk of the water disaster is high and it isn't possible to do disaster medical care.

Source: Survey team

16-1-5. TOR of Scoping and Environmental and Social Consideration

The range and the investigation way of evaluation items which are important and seem to be important should be decided.

Table 16-18 Scoping (Proposed)

A+/-: Significant positive/negative impact is expected.
B+/-: Positive/negative impact is expected to some extent.
C+/-: Extent of positive/negative impact is unknown. (A further examination is needed, and the impact could be clarified as the study progresses)
D: No impact is expected.

Classification		Influence item	Evaluation		Reason for the evaluation
			Before construction Under construction	After completion	
Pollution Control	1	Air Quality	B-	C	Under Construction; As the construction machinery and materials operate, temporarily, it is estimated that air quality is aggravated. After Completion; By the increase of the traffic, the influence of the negative to the air quality by the running car emission gas is estimated.
	2	Water Quality	B-	B-	Under Construction; There is risk of the water contamination by the drainage from the construction site, a heavy-equipment, vehicles and construction lodgings and so on. After Completion; It is estimated that Hospital drainage on a road in case of the rainfall flow.
	3	Waste	B-	A-	Under Construction; It is assumed that the construction surplus soil and waste occur. After Completion; Hospital waste occurs.
	4	Soil	B-	C	Under Construction; The risk of the soil pollution by the outflow of oil for the construction is thought of. After Completion; The influence of the soil pollution by the waste is thought of.
	5	Noise and Vibration Quality	B-	C	Under Construction; Noise and vibration by the operation of construction machinery and materials and vehicle are assumed. After Completion; The noise influence by the increase of the traffic is thought of.
	6	Ground subsidence	B-	B-	Under Construction; It is estimated that the land subsidence occurs with the Landfill. After Completion; The continuation of the land subsidence is worried about.
	7	Odor	C	C	Under Construction; The work which causes a stench isn't assumed but management of construction waste should be done. After Completion; Management of waste should be done.
	8	Sediment	C	C	Under Construction; It is possible that the outflow of waste and drainage may affect the sediment of adjacent waterways in service at the time.
Natural environment	9	protective zone	D	D	Under Construction, After Completion; The national park and so on don't exist in project site and around it.
	10	Ecosystem	C	C	Under Construction, After Completion; There is much agricultural land in project site whole but it thinks that there are few influences over the ecosystem.
	11	Hydrology	B-	B-	Under Construction; It is estimated that the water environment changes by the land fill. After Completion; It is estimated that the water environment changes by land fill completion.
	12	Landform, geological feature	B-	B-	Under Construction; It is estimated that the landform, geological feature changes by the land fill. After Completion; It is estimated that the landform, geological feature changes by land fill completion.

Classification		Influence item	Evaluation		Reason for the evaluation
			Before construction Under construction	After completion	
Social environment	13	Land acquisition and Resettlement	B-	B-	Under Construction; It assumes that relocation occurs with site acquisition. After Completion; The relocation has ended but the necessity of the monitoring of the life after moving is estimated.
	14	Poverty level group	B-	B-	Under Construction; There is possibility that poor people are contained in relocation. After Completion; The necessity of arranging the environment that the poor people can receive medical care is estimated.
	15	Ethnic Minorities and Indigenous Peoples	D	D	Under Construction ,After Completion;It is estimated that there is not an ethnic minority and indigenous people in project site and around it.
	16	Regional economic such as employment and sustenance	C	C	Under Construction; Influence to the regional economic by the second hospital construction is estimated to be big. After Completion; Influence to the regional economic by the second hospital management is estimated to be big.
	17	Land use and area resource use	C	C	Under Construction, After Completion; As for the land use which makes agricultural land a hospital, the medical care environment improves but the influence of the loss in the agricultural land as area resources is estimated.
	18	Water supply	B-	B-	Under Construction; The influence by under construction muddy water is thought of, when using water on the waterway around the project site and so on. After Completion; the influence by dust and oil on a road in case of the rainfall flow is thought of, when using water on the waterway around the project site and so on. When hospital drainage isn't processed, the influence is thought of.
	19	Existing social infrastructure and the social service	B-	B-	Under Construction; Traffic jam is assumed. After Completion; Because the increase of a traffic and a driving speed become fast, the increase of the environment obstruction is worried about; when there is an area (dwelling, school, medical facility and so on) for which it is easy to undergo influence.
	20	Social structure of social capital and local decision- making institutions, etc	C	C	Under Construction ,After Completion; The project is second hospital construction; there are few influences over the society.
	21	Damage and uneven distribution of benefits	D	D	Under Construction, After Completion; The project is second hospital construction; it doesn't bring about the damage and the convenience which is unfair to the circumference area. It thinks that the thing occurs hardly.
	22	Area Conflict of Interest	D	D	Under Construction, After Completion; The project is second hospital construction; it thinks that it never causes conflict of interest in the area.
	23	Cultural heritage	D	D	Under Construction, After Completion; The cultural heritage and so on don't exist in project site and around it.
	24	Scenery	D	D	Under Construction, After Completion; The project is second hospital construction; it thinks that there are few influences over the view. The Vietnamese side agreed to double-check that the project site is not included in any type of protected area or subject to any form of environmental regulation and inform JICA. In addition to the agricultural land, there is not scenery.
	25	Gender	D	D	Under Construction; An influence about the gender is estimated not to occur. After Completion; The status of the gender concerning the

Classification		Influence item	Evaluation		Reason for the evaluation
			Before construction Under construction	After completion	
					hospital and the user is good and an influence is estimated not to be caused by this ploject.
	26	Children"s right to play	D	D	Under Construction ; An influence about "the Children"s right to play" is estimated not to occur. After Completion; The status of "the Children"s right to play" concerning the hospital and the user is good and an influence is estimated not to be caused by this ploject.
	27	The infection of HIV/AIDS and so on	C	C	Under Construction; With the inflow of the construction worker, the possibility that the infection spreads is thought of. After Completion; The necessity of the medical care to the infection person is estimated.
	28	Working environment (includes occupational safety).	B-	B-	Under Construction; It is necessary to consider at the working environment of the construction worker. After Completion; When occupational safety management isn't accomplished about the handling of the medical equipment, there is possibility that occupational safety isn't secured.
Others	29	The accident	B-	B-	Under Construction; The under construction accident prevention measure is necessary. After Completion; Because the increase of a traffic become fast, the increase of the traffic accident is worried about.
	30	Crossing border influence and Climate change	B-	B-	Under Construction, After Completion;It thinks that there are no influences of "Crossing border influence." Damage by the local heavy rain is estimated in relation to the climate change.

Table 16-19 Terms of Reference (TOR)

Environment item	Investigation item	Investigation technique
Atmosphere	(1) The confirmation of the environmental standard and so on (The environmental standard of the * * country, the environmental standard, the WHO standard of Japan and so on) (2) The air quality present state grasping (3) The grasping of the degree of the traffic increase in use which is based on the traffic prediction of demand (4) The confirmation of the nearby dwelling in the business target place, the school, the hospital and so on (5) The under construction influence	(1) The existence material investigation (2) The existence material investigation and it measures as occasion demands (3) The impact forecast which the traffic prediction of demand result is based on (4) The local search and the hearing (5) The confirmation of the contents, the method of construction, the period, the position, the range of the construction, the kind, the operation position, the operation period of the construction machine, the running number, the running course of the construction vehicle and so on
Water quality	(1) The river water quality (2) The status of the living use of river water (3) Drainage quality,Medical Drainage quality (4) Underground water ruality	(1) Existing material investigation, Information collection from relavant organizations (2) Hearing inside the local search, in the business target place vicinity
Waste	(1) The processing method of the construction waste (2) Medical waste (3) Final waste treatment plant	(1) Existing material investigation, Information collection from relavant organizations (2) Hearing, the similar case investigation to the related organization
Soil pollution	(1) The under construction oil leak prevention measure (2) The soil pollution origin	(1) The confirmation of the contents, the method of construction, the period of the construction, the kind, the operation and safekeeping position of the construction machine and the machinery and materials and so on

Environment item	Investigation item	Investigation technique
		(2) Existing material investigation., Information collection from relavant organizations
Noise and the vibration	(1) The confirmation of the environmental standard and so on (The environmental standard of the Viet Nam country, the environmental standard, the WHO standard of Japan and so on) (2) The distance to the resident area and the hospital, from the source the school (3) The under construction influence	(1) Existence material investigation (2) Local search and the hearing (3) Confirmation of the contents, the method of construction, the period, the position, the range of the construction, the kind, the operation position, the operation period of the construction machine, the running number, the running course of the construction vehicle and so on
Ground subsidence	(1)Ploject site ground (2)Landfill height	(1) Natural condition survey by survey team (2) Circumference landfill plan investigation (3) Industrial zone infrastructure investigation
Odor	(1)The waste recovery method (2)The odor origin	(1) Existing material investigation., Information collection from relavant organizations (2) Local search
Sediment	(1) The circumference waterway,river,canel (2) The influence origin	(1) Natural condition survey by survey team (2) Existing material investigation., Information collection from relavant organizations (3) Local search
Ecosystem	(1)Present condition of the ploject site and surcomference	(1) Natural condition survey by survey team (2) The local search
Hydrology	(1) The circumference waterway,river,canel (2) The rainwater drainage	(1) Natural condition survey by survey team (2) The industrial zone infrastructure investigation
Landform, geological feature	(1)Present condition of the ploject site and surcomference	(1) Natural condition survey by survey team (2) Local search
Land acquisition and Resettlement	(1)The confirmation of scale of the site acquisition and the resident moving (2)The creating of a relocation plan" Abbreviation Resettlement Action Plan" of this project" when the site acquisition or the resident moving occurs	(1) The relevant law system and the related case and so on (2) The sanitary photograph in the target area (3) The confirmation of the existence or non-existence, the kind (the dwelling, the school, the medical facility and so on) at the building around the object road by the local search and so on (4) The confirmation of the land use status around the object road by the land use map and the interview in local search (5) Lands Act in the Viet Nam country, and the JICA environment society consideration guideline, world silver Operational Policy. The creating of the resident relocation plan (the summary version) which is based on the 4.12nd prize
Poverty level group	(1)The local area"s present state	(1) Existing material investigation., Information collection from relavant organizations (2) Local search
Ethnic Minorities and Indigenous Peoples	(1)The local area"s present state	(1) Existing material investigation., Information collection from relavant organizations (2) Local search
Regional economic such as employment and sustenance	(1)The local area"s present state	(1) Existing material investigation., Information collection from relavant organizations (2) Local search
Land use and area resource use	(1)Present condition of the ploject site and surcomference (2)City planning	(1) Existing material investigation., Information collection from relavant organizations (2) Local search
Water supply	(1)The local area"s present state	(1) Existing material investigation., Information collection from relavant organizations (2) Local search
Existing social infrastructure and	(1) The existence or non-existence in the dwelling around the business target place,	(1) Existing material investigation., hearing from relavant organizations

Environment item	Investigation item	Investigation technique
the social service	at the school around it, in the medical facility around it and so on	(2) Local search
Social structure of social capital and local decision-making institutions, etc	(1)The local area"s present state	(1) Existing material investigation., hearing from relavant organizations (2) Local search
Damage and uneven distribution of benefits	(1)The local area"s present state	(1) Existing material investigation, hearing from relavant organizations (2) Local search
Area Conflict of Interest	((1)The local area"s present state	(1) Existing material investigation, hearing from relavant organizations (2) Local search
Cultural heritage	(1)The local area"s present state	(1) Existing material investigation, Information collection from relavant organizations (2) Local search
Scenery	(1)The local area"s present state	(1) Local search
Gender	(1)The local area"s present state	(1) Existing material investigation, Information collection from relavant organizations (2) Local search
Children"s right to play	(1)The local area"s present state	(1) Existing material investigation, Information collection from relavant organizations (2) Local search
The infection of HIV/AIDS and so on	(1) The nearby HIV/AIDS infection percentage of the business target place	(1) Existing material investigation, Information collection from relavant organizations
Working environment (It includes occupational safety).	(1) The occupational safety measure	(1) Existing material investigation, Information collection from relavant organizations
Accident	(1) The traffic accident increase in use (The distance and the physical relationship between the movement of the distribution status, the person of the dwelling and the facilities with all kinds and the planned transportation facility)	(1) Existing material investigation (2) Local search
Crossing border influence and Climate change	(1)The status of the crossing the border of the area (2)The status of the climate change in the area	(1) Existing material investigation, Information collection from relavant organizations

16-1-6. Environmental and Social Consideration Result

Survey result according to the Scoping and TOR are as follows;

Table 16-20 Field Survey Result Which Was Implemented Based on Scoping and TOR

Air quality

By this project, the aggravation of the air quality by exhaust gas caused by the traffic of the under construction machinery and materials and the vehicle, and lead damage by the vehicle running by the tire with mud is estimated.
In the EIA of this project, prediction of emissions and an evaluation of mitigation measures are made as follows:

Table 16-21 Quantity of effluent gas of the average per one diesel vehicle (3.3-16t car); (g / day)

(Speed;5km/h, Distance /100m)

Dust	SO2	NOX	CO	THC
0.9	2.15	11.8	6.00	2.60

Source: EIA

Table 16-22 Air pollution load due to vehicles

No.	Parameters	pollution load (g/day)
1	Dust	7,2
2	SO2	17,2
3	NOx	94,4
4	CO	48
5	THC	20,8

Source: Handbook of emission, Non Industrial source, Netherland

Mitigation measures

- Require bidders do not have to use the facilities too old, too young to shelf construction.
- Implement fuel savings, selection of advanced construction method
- When transporting construction materials, transportation vehicles should be covered to avoid spillage of cement, sand, earth and ice on the road.
- Do not carry the load of the vehicle, limiting spillage along the way.
- Distribution of the density of vehicles transporting materials to fit, avoid congestion caused haze pollution in the region.
- When handling materials protective equipment to limit dust affects the health of workers.
- Cleaning, cleaning up spilled material and maintain the road surface spray sunny day. Sprinkler irrigation frequency is 2-4 times / day.
- Spraying water on the beltway project areas and transportation routes in the project area to limit to the maximum dispersal of dust into the air, polluting the environment and affecting the health of workers and local people.

(EIA)

There are air pollution from medical activities such as Ethylene oxide gas (EOG) and H2S,and the effects of solvents and chemicals used in chemotherapy.Moreover ,there are the impact of the type of radiation used in radiotherapy and dust pollution, emissions from transport activities.

In addition, in active stage hospital operation, it is estimated that air quality is aggravated by the exhaust gas which is due to the increase of the traffic.
In the EIA of this project, prediction of emissions and mitigation measures have been made as follows:

Table 16-23 Pollution load in exhaust fumes from vehicles(Operation)

Vehicles	Number Of vehicles	Pollution Load (kg/day)				
		Dust	SO2	NOx	CO	VOC
Motor vehicles> 2,000 cc	50	0,0025	0,074	0,0715	0,148	0,014
Motorcycle Engines> 50cc, 4-stroke	7.605	0,913	5,78	2,282	152,1	22,815

Truck loads <3.5 tonnes	5	0,00075	0,0042	0,0275	0,0425	0,025
The total pollution load	-	0,916	5,858	2.381	152,291	22,854

Source: EIA

Mitigation measures

- Arrange central air conditioning operated independently on the roof of the main building (medical area) to supply air directly to the healthcare sector, to ensure the transfer of cold air navigation.
- Air conditioning with separate freezer for residence halls.
- Designing clinics ventilation by means of natural ventilation with fresh air supply fan system and smoke emissions (chemical fumes, solvents persist in the atmosphere of the clinic) to outside.
- Overall Ventilation (EIA)

A medical radiation is used in hospital operation.

In the EIA, the examination of a prediction evaluation and a mitigation measure for discharge is accomplished as follows.

Prediction evaluation

The equipment ionizing radiation in imaging science as X-ray machines, CT scanners are located in the X-ray room, have the potential to leak radiation, such as X-rays, alpha rays, beta rays , gamma environment. Radioactive substances arising in the course of diagnosis (capture diagnostic radiation, X-rays from the camera to the process of bone metabolism such as MRI) without a good distance measures with the external environment will cause a strong impact on the environment and public health.

Mitigation measures

The project needs special attention to this issue and to take measures to protect the most appropriate and safe.

Water quality

About influence prediction under construction, in the EIA, the examination of a prediction evaluation and a mitigation measure for discharge is accomplished as follows.

Prediction evaluation

During the construction phase of the project, estimated to have about 200 workers, so the water demand per day is about:

200 × 45 liters / person / day = 9,000 liters / day = 9 m^3 / day

The total volume of wastewater per day during the construction period is taken equal to 100% of the water supply: 9 m^3 / day. (EIA)

Table 16-24 Concentrations of pollutants in waste water

No.	Parameters	Unit	The average concentration of untreated	QCVN 14:2008/BTNMT, colum A
1	pH	-	5 - 9	6 - 9
2	SS	mg/l	220	50
3	BOD5	mg/l	220	30
4	Amoni	mg/l	25	5
5	Nitrat	mg/l	-	30
6	Total N	mg/l	40	15
7	Total P	mg/l	8	4
8	Coliform	MNP/100ml	107 100ml	3.000

Source: Urban Waste Water Treatment and industry, Lam Minh Triet

Mitigation measures

The pollution parameters in waste water will not reach QCVN 14: 2008 / BTNMT, column A, thus requiring wastewater treatment by appropriate measures before discharging into the environment.

If construction done during the rainy season, with the possibility of flooding in the area. Therefore, prior to construction, the project owner will be combined with the construction contractor deposition system pits, temporary rain drainage in the area to minimize the possibility of flooding, affecting the construction process as well as waste washed into surface water.

Controlling pollution from stormwater runoff, wastewater and flood control construction in the building process is essential to ensure that no polluting schools, ensure good drainage at the construction area and not affecting around. Investors project the following measures apply:

- Good management building materials, waste generated at construction sites, in order to limit the drop down drains causing blockages and flow polluting the environment.r
- Conduct dig drainage ditches around construction areas. Construction of temporary sedimentation manholes along drainage ditches and storm water runoff wastewater construction to minimize sediment and other pollutants into the atmosphere.
- The storm water drainage lines, water waste in the construction process is carried out in accordance with the drainage plan of the area.
- Do not focus the materials at the near edge of the sewer line to prevent loss escape into sewage drains.
- Sediment will be dredged when the construction phase ends and the project construction contractors collection, processing carried prescribed.n(EIA)

About influence prediction in active stage, in the EIA, the examination of a prediction evaluation and a mitigation measure for discharge is accomplished as follows.

Prediction evaluation

- Stormwater runoff through entrainment area hospital sand, soil, litter dropping into the water.
- Wastewater generated from the clinical, laboratory, X-ray film development, health and hygiene tool.
- Wastewater staff, patients and relatives containing residue, suspended solids (SS), organic matter, nutrients (N, P) and micro-organisms.
- Wastewater from operation of the canteen cooking oil containing grease, suspended solids (SS), organic matter, nutrients (N, P) and micro-organisms.

To evaluate the composition and nature of the waste water generated from the operation of hospitals, reference quality analysis results of untreated wastewater from Cho Ray Hospital (NT1), Dong Nai General Hospital (NT2) and the General Hospital in Kien Giang (NT3). Results on the composition and nature of the waste water are shown in the table below here.

Table 16-25 The composition and properties of the untreated hospital waste

No.	Parameters	Unit	Results			QCVN 28:2010/BTNMT, column A
			NT1 Cho Ray Hospital	NT2 Dong Nai General Hospital	NT3 General Hospital in Kien Giang	
1	pH	-	7,2	7,1	7,09	6,5 - 8,5
2	BOD5 (200C)	mg/l	118	150	364	30
3	COD	mg/l	192	220	626,24	50
4	TSS	mg/l	216	210	1.262	50
5	Sunfua	mg/l	-	-	0,8	1,0
6	Amoni	mg/l	-	-	14,17	5
7	Nitrat	mg/l	-	-	0,46	30
8	Phosphat	mg/l	3,8	3,5	0,44	6
9	Oil and grease	mg/l	-	-	207,5	10
10	Coliforms	MPN/ 100ml	24N/ 5	34N/ 5	2,4 5005	3.000

Source: Evaluation of the efficiency of wastewater treatment Cho Ray Hospital and Long Thanh Hospital; Environmental Protection Scheme General Hospital of Kien Giang province, 2012

According to calculations, the total amount of water used to process medical and life of the patient, family and staff of the hospital employees an average of 1931.15 m ^{3}/ ay. Thus, the flow of waste water in an average day 1931,15m^3/ day

Mitigation measures

- Stormwater system is designed to separate the sewerage system;

- The amount of stormwater runoff on the surface of internal roads, airport, ... be filtered by spam-size sheets of wire mesh or slatted garbage in the manholes before flowing into the storm drain system.
- Stormwater drainage system of hospitals, including reinforced concrete pipe D300, D400, D600, D800 and connected to stormwater drainage systems across the region.
- The manholes will be periodically dredged sludge collection will rent units with functional transport, treatment justice;
- Rain water from the roof will be collected in plastic tubes stand will then be discharged into the stormwater system and hospital discharge stormwater drainage systems across the region. Receiving water from rain water drain channel 1 hospital in the region

Outline of wastewater treatment

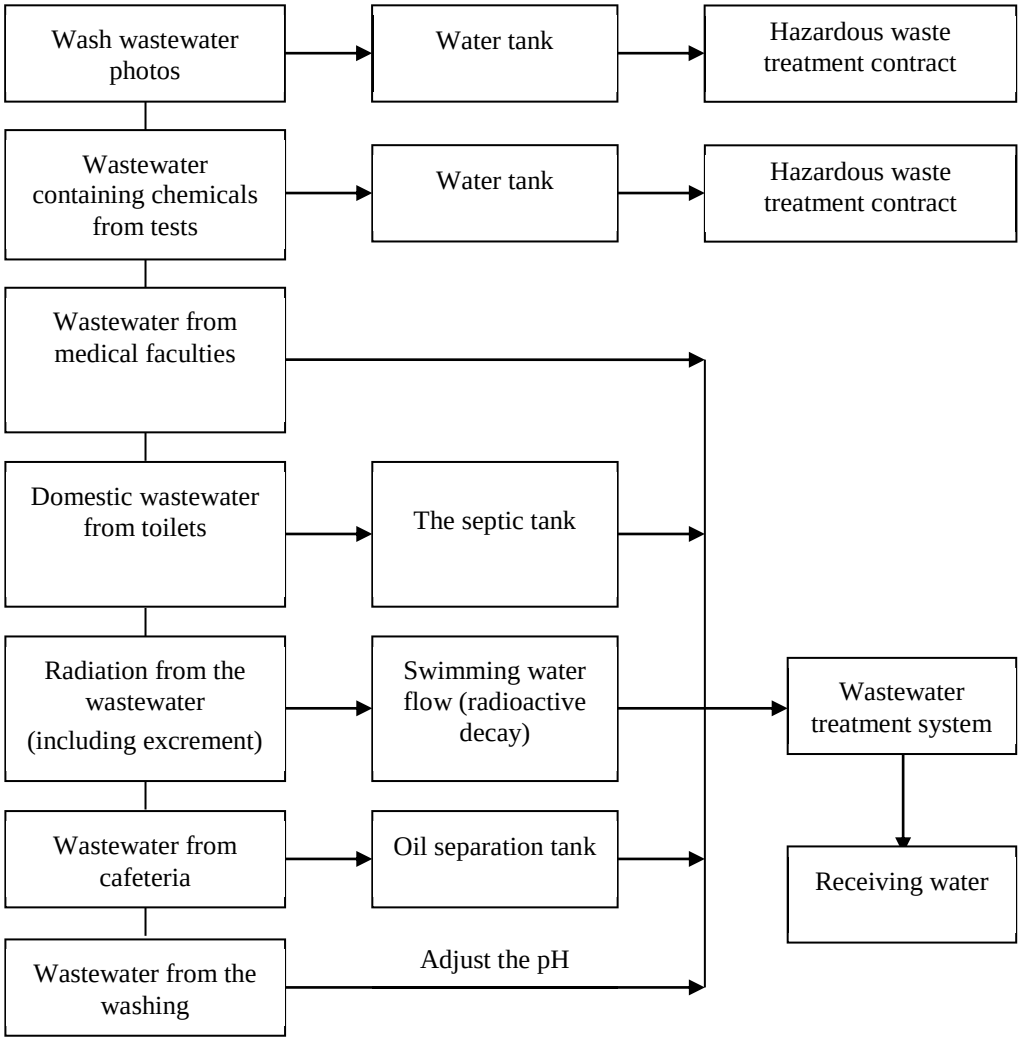


Figure 16-9 Schematic wastewater collection
Source: EIA

Radiation from the waste water
About influence prediction in operation, in the EIA, the examination of a prediction evaluation and a mitigation measure for discharge is accomplished as follows.

Prediction evaluation
Water supply for phase imaging drug solution for rinsing the X-ray film of the diagnostic imaging department about Q_{XQ} = 50 liters / month = 0.05 m^3 / month.
Mitigation measures
Average amount of water used for radiotherapy treatment patient are 27m^3 / month.
Radioactive waste water tank encased inside the composite layer waterproof should be built underground, and processed.

Waste	About influence prediction under construction, in the EIA, the examination of a prediction evaluation and a mitigation measure for discharge is accomplished as follows. Prediction evaluation Solid wastes from operational activities of workers: There are about 200 workers, the average amount of waste taken equal to 0.5 kg / person / day, the total amount of municipal waste is about: 100 kg / day Waste from the construction process: The amount of waste is generated depending on project characteristics and methods of project management. Solid waste does not cause a significant impact to human health, but the loss of regional landscapes. According to Circular No. 09/2012 / TT-BXD and from the actual construction site other then the volume of waste generated is estimated at 300 kg / month. Hazardous waste; Waste oil; Volume lubricants, fatty rag ... estimated at 50 kg / month. Packaging, containers paint: Volume arise: an estimated 100 kg / month. Mitigation measures Solid waste daily living • Investors will be equipped with 01 storage tanks with a capacity of about 660 liters, with a lid to collect the entire amount of domestic waste from the camp of the workers. • Project owners will be combined with the unit construction contract with functional units for collection, transportation and disposal regulations. • Establish rules requiring construction workers not littering. Solid waste build • Collection sold to institutions purchasing function scrap solid wastes can be recycled as scrap metal, plastic, paper, cement. • For other types of non-recyclable waste collection and leasing agency functions transported the waste handling activity. • Solid waste is debris for filling low-lying areas or leveling. Hazardous waste • For hazardous waste is concentrated and stored in closed containers and stored in labeled waste repository.i • Contracts with unit collection and transportation of hazardous waste to deal with. • This unit must be licensed in accordance with Circular 12/2011 / TT-BTNMT dated 14/04/2011 of the Ministry of Natural Resources and Environment regulations on hazardous waste management. About influence prediction in active stage, in the EIA, the examination of a prediction evaluation and a mitigation measure for discharge is accomplished as follows. Prediction evaluation All waste generated from hospitals are considered hospital waste. During operation of the hospital, the sources of solid wastes are mainly as follows: Solid waste daily living • Approximately 75-90% of hospital waste is common waste (including waste from living life activities of patients, relatives and staff employees of the hospital and medical waste non-hazardous in the course of medical treatment) causes no serious effects. Hazardous waste Medical waste accounts for about 10-25% of hazardous divided into 4 groups follows: 1) Infectious waste including sharp waste, infectious waste is not sharp, pathological waste, waste high risk of infection.e 2) Chemical wastes including chemicals commonly used in medical, formaldehyde, photoelectric chemicals, heavy metals, pharmaceutical waste and cytotoxic waste. 3) Radioactive waste

	4) Tank pressure. According to the latest survey research, the amount of solid waste typically is in average 0.66 kg / bed / day. In Cho Ray Second Hospital with a scale of 1,000 beds, the amount of waste generated for hospital: 0.66 kg/bed/day × 1.000 bed = 660 kg/day = 19,800 kg/month The amount of waste generated from 2,100 outpatient medical visits (norm 0.5 kg/person/day): 2,100 × 0.5 kg/person/day = 1,050 kg/day = 31,500 kg/month Thus, the volume of typically solid waste generated by hospitals are relatively large (1.710 kg / day = 51,300 kg / month), it is necessary to take measures to collect and manage appropriately to avoid polluting environment. Mitigation measures • To manage medical waste in accordance with Decision No. 43/2007 / QD – BYT; promulgating the regulation on management of medical waste • Decree No. 59/2007 / ND-CP dated 09/04/2007 regarding solid waste management and Circular No. 12/2011 / TT-BTNMT dated 14/04/2011 of the Ministry of Natural Resources and Environment regulate the management of hazardous waste. • For effective implementation of waste management, the first important issue is to sort waste at the source. Waste sorting at source arises to reuse solid waste, simplify processes, save costs and reduce environmental impact. • Hospital will implement management and waste separation at source, with each barrel, colored trash bags containing separate different types of waste. (See CHAPTER10. “MEDICAL WASTE PLAN”)
Soil pollution	This project site is agricultural land at present, and is low land in cane field and wetland. The development and land readjustment construction is to be done to construct The Cho Ray Second Hospital.(Cho Ray Hospital, MOH) It is necessary for landfill to comfirm the safety of soil. Quality of soil analysis must be performed in advance and confirmation that the value does not exceed the standard value is necessary. About influence prediction in the EIA, the examination of a prediction evaluation and a mitigation measure for discharge are performed as follows. It is necessary to perform these safely. Prediction evaluation Wastewater, solid waste, liquid and chemical material leakage become an influence source of soil pollution. There is a fuel leakage during construction, leakage of radioactive material and chemical materials in operation.. Mitigation measures Designing storage area roof, cement floor to minimize the leakage of chemicals and raw materials into the environment and surrounding land Under construction See; Accident In active stage Use proper technique and compliance with safety rules for each category of materials and fuels. This project use construction machines and equipment which have non-oil dripping specification. Processing method should be made for the oil leakage occurrence, and be told to all and managed. So as not for the soil pollution by the waste to occur, CITENCO collects all waste of the home garbage, the construction industrial waste, the hospital waste. Specification container should be used, washing water of a temporarily depository should be processed to below the standard value with the drainage processing facilities in the Hospital, and it should be drained by the planned

	specification drainage.
Noise and Vibration	About influence prediction under construction in the EIA, the examination of a prediction evaluation and a mitigation measure for discharge is accomplished as follows.

Table 16-26 Calculation results and predicted noise levels of a number of project construction equipment

No.	Type of machinery	Noise level by source 1m		Noise level corresponding to each distance (m)					
		about	averge	5	10	20	50	100	200
1	Truck	82 - 94	88	74,0	68,0	62,0	54,0	48	42
2	Concrete mixers	75 - 88	81,5	67,5	61,5	55,5	47,5	41,5	35,5
3	Cranes	76 - 87	81,5	67,5	61,5	55,5	47,5	41,5	35,5
4	Generator	72 - 82,5	77,2	63,2	57,2	51,2	43,2	37,2	31,2
5	Air Compressors	75- 87	81	67,0	61,0	55,0	47,0	41,0	35,0
QCVN 26:2010: National technical regulations on noise: 55-70 dBA (6-21h)									

Source: Mackerminze, 1985

The calculation results in the table above shows the noise level decreases with distance to the source point; X> 20m, ensuring noise levels Regulations Vietnam QCVN 26: 2010 / BTNMT. Estimated distance from the project to the existing residential area is 200 m, so the level of noise impact is not significant, and the impact will cease when the construction phase is complete.

Mitigation measure
- Making shielding fence around the construction site to minimize noise
- Set the appropriate construction time. Construction should not be conducted during the rest of the community.
- Construction workers in the zone of many machinery and haigh noize should be wearing earplugs of noise prevention.
- It is necessary for the administrator to encourage drivers to drive vehicles at low speed so as to prevent vibration to reduce an influence for neighborfood.

About influence prediction in active stage, in the EIA, the examination of a prediction evaluation and a mitigation measure for discharge is accomplished as follows.

Prediction evaluation
The typical noise sources in hospitals:
- Activity of people in the hospital
- Operation of the generator.
- Operation of vehicle traffic is allowed to circulate in the hospital, but only in the defined areas (ambulance, cargo trucks, cars ...).
- Operation of machinery and equipment for ancillary works (pumps, blowers serve the wastewater treatment system of the hospital)

Mitigation measure
- Paste reminder signs, noise restrictions in the health care sector and the hospital's resorts.
- Mitigation measures of the noise vibration of the generator technically must be carried out continuraly
- High walls surrounding the hospital campus to reduce noise from surrounding areas

	• Regulations maximum speed permitted on the hospital campus. • Regular maintenance and timely repair of service vehicles Because new residences and a kindergarten will be completed around the Cho Ray Second Hospital, there will be noise aused by an increase of people traffic such as hospital users. It is necessary to ensure low-speeds and safe driving.
Ground subsidence	The project site is currently agricultural land and marshland and neighbors a waterway. The large scale of ground subidence bigan from landfill is estimated to settle in about 2 years‟ time because of the clay composition, which contains a lot of moisture. Construction can begin after that. Subisidence may sometimes occur during construction and during use after starting, too. It is necessary for temporary measures to be taken for safety if a ground level change occurs. After completion, in active stage, a change in ground level may sometimes occur around buildings. Building technology to handle land subsidence when it occurs should be utilized around each entrance. Monitoring of land subsidence should be done during under construction and after completion.(See 5-2-1)
Odor	THE CITY ENVIRONMENT COMPANY (CITENCO) takes the processing business of the city waste with specification containers. A odor wasn't felt around the city center, Cho Ray Hospital, the project site during the investigation period. About influence prediction in active stage, in the EIA, the examination of a mitigation measure for discharge is accomplished as follows. • Regularly clean up the Hospital • Regular cleaning of the central air-conditioning system, to kill the microbes in the system and deodorizing the air
Sediment	There is a possibility of impact on the sediment of the adjacent waterways caused by improper or inadequate wastewater treatment and waste management in this project. Appropriate wastewater treatment and waste management is required.
Ecosystem	The project site is currently agricultural land and marshland. According to the EIA, biological resource in the project construction area is almost none. Hence, the construction process does not affect the current status of biological resources around.
Hydrology	The project site neighbors a waterway. In the case of the heavy rain at the site, there is the possibility of overflowing rainwater invading. However, Binh Chan Distrit Commisser specifies it to be unnecessary to establish a flood control basin in the industrial park zone. There are no records of natural disasters except for heavy rain. Note, however, that by making a vast agricultural land and marshland that reaches 1,000 ha to the industrial park, it is expected that potential basement penetration will decline. It is necessary to prepare for possible flooding from heavy rain in extreme weather. The landfill and readjustment level should be set to a level that is higher than sufficient for the circumference road level.
Landforms, geological features	The landfill and readjustment will change on landforms and geological features. There are mainly three kinds of soil property: Clay ground 3,716 ha (14.7%); alluvial soil 5,797.7 ha (23%); and salt, alum ground (41.7%) 10,508.6 ha. (Binh Chanh Dist. 2012) Result from Natural Condition Survey, compared with sea level, average current ground elevation of the project site is +0.2m. Geological properties of this project site are soft clay with high moisture content. The thickness of soft soil is about 20m. (See Chapter 5, 5-2-1)
Land acquisition and Resettlement	We confirmed that there were people who need resettlement in the field survey. From ARAP investigation, there are 3 affected units, 11 affected persons and 2 involuntary resettlement families. It is confirmed that Binh Chanh district Commissar and Investment company Saigon VRG should do it along with the acquisition of the right to use of the land.(See 16-2-3)
Poverty level groups	According to the Statistical Yearbook of Vietnam 2012, percentage of poor people accounts for 1.4% of the residents in the southeastern area and 10.6% in the Mekong delta area. (Vietnam 2012) The Cho Ray Second Hospital is located in the entrance to the Mekong delta area in Ho Chi Minh City. So, it is expected to improve the access to the medical care in this area by providing medical care to poor people. There are not poverty groups in resettlement peoples.
Regional economic	In this project, under construction, it facilitates employment for a large amount of labor, creates opportunity of temporary employment and income for workers, and timulates the development of a

<table>
<tr><td>factors, such as employment and sustainability</td><td>number of services such as rental accommodation, catering business, entertainment.
However, frictions to the community and between workers are also generated at the same time..
This project is the Second Hospital construction.
It is not restricted to employment of medical staff and other staff in the surrounding area, the activated influence including the cooperation and support of patients and their families that will have on the regional economy is large,.</td></tr>
<tr><td>Land use and area resource use</td><td>In the development of In Le Minh Xuan industrial zone 3, a residential area is set.
The project site is at the north-east end of the area and is situated at a location nearest the turnpike.
The project can also support medical schemes and population growth from development of the surrounding area in cooperation with the hospital. This is a mission for Cho Ray Second Hospital.
The current state-operated agriculture company can continue production in another area.</td></tr>
<tr><td>Water supply</td><td>Because there is a water supply in use around the project site at present, there is no use of a waterway or groundwater as water supply. (Binh Chanh District Commissar)
The downstream site of the present waterway is not a paddy field but dry field, and there is no wastewater drawing in.
There is a planned industrial zone around planned drainage area with approximately 1.5km width between the project site and Cho Dem River. It is a farmland and there is no housing now.
Wastewater during under construction and after completion should be monitored.
There is a plan to use well water in the project after completion.
There is a quality standard for well water resources and it should be managed.</td></tr>
<tr><td>Existing social infrastructure and social services</td><td>Traffic safety measures become necessary with the increase of traffic during construction and after completion. The user of motorbikes is increasing in Ho Chi Minh City, but establishment of traffic lights is limited to the central city.
There are few traffic lights in the suburbs; this is the cause of the traffic jam and the accident.</td></tr>
<tr><td>HIV/AIDS infections and related</td><td>At present in Binh Chanh District, HCMC, there are patients with HIV/AIDS infections, and improvement in theCho Ray Second Hospital is expected.

Table 16-27 Number of HIV/AIDS infected persons (HCMC. 2012)
<table>
<tr><td></td><td>HCMC total</td><td>Bin Chanh District only</td></tr>
<tr><td>HIV infected persons</td><td>2,430</td><td>126</td></tr>
<tr><td>AIDS infected persons</td><td>2,141</td><td>98</td></tr>
<tr><td>AIDS deaths</td><td>465</td><td>21</td></tr>
</table></td></tr>
<tr><td>Working environment (includes occupational safety).</td><td>Consideration to the working environment should be made during the construction in line with Vietnamese Occupational Health and Safety Law.
The construction law, the labor law, and <Circular No. 22/2010/TT-BXD> on December 3rd of the Ministry of Construction about the occupational safety of the construction work in 2010 are important. Credential of the job is required for construction workers, and it is a condition of adoption. There are provisions such as overtime hours in the labor law. There is a provision to a method of construction, too. (MOC)
This project should make a hospital plan that creates not only a good environment for patients but also good working conditions for staff when providing services for patients. Infection and accident prevention measures in the working environment have been specified in the EIA.</td></tr>
<tr><td>Accidents</td><td>The road traffic accidents in Ho Chi Minh City in 2012 were 888 cases. 786 people were killed and 335 people were injured (HCMC 2012).
The number of people killed is higher than the number of people injured and many heavy accidents occur.Even in the central city, traffic lights are not installed on roads except for in limited areas. In the daytime, full-size cars are restricted from approaching the central city and motorcycles constitute most of the traffic. They drive at low speed because of traffic jams, so there is little occurrence of fatal accidents. Fatal accidents occur in places with little traffic, such as suburbs. (Local hearing)
It is necessary to install signals for traffic accident prevention at the intersection of the entrance to Cho Ray Second Hospital and the turnpike in this project. It is important to traffic safety measures in response to an increase of the traffic.

EIA describes fuel management and labor accident
• Store fuel in cool, safe, away from the area with the construction.
• Using fuel containers must be in good condition, regularly check the lids, leak detection.i</td></tr>
</table>

	• Prepare a full range of fire safety equipment is inadequate CO2 expiry and ready to respond to the risks.o • Limit the airspace in the storage area, must have full management . • Only sufficient fuel reserves to use. Prevent and respond to incidents labor accidents Thorough safety procedure in lifting, scaffolding management, safety equipments, thorough safety management and procedure of earthworks, installation of the clinic to the construction site, rapid implementation of first aid
Influence on border crossing Climate change	An action plan to Ho Chi Minh City climate change in 2015 as the climate change relation policy (Ho Chi Minh City congress2484/QĐ-UBND 2013/5/15) is worked out. In Ho Chi Minh City, sea level rise of up to 100 years later is estimated to 2.5 m. There is no record document of disasters nor a hazard map except for heavy rain in Bin Chanh District. However, in the cataclysm on Mekong River in 2000, the inundaition depth near the county border away 6 km from the project site was 0.2 - 0.5 m. When, 1000 ha agricultural land changes to the industrial park contains a residential area in, the decrease of the underground penetration quantity of water occurs. The underground penetration percentage decreases by a maximum of about 0.15 times. That is, the depth of being flooded in case of the rainfall gets for the present state to be 6.5 times. Therefore, when the 900 mm rainfall which is equivalent to about 1/2 of the annual fall from the influence of the extream weather is in the short time, an about 60 cm flood is caused at the project site of which completion is estimated to precede the completion of the drainage facilities. The annual fall of Ho Chi Minh City in 2012 is 1,883.0 mm. (The average in Japan is 1,718 mm. In the Izu-oshima disaster, it is recording 824 mm / day. The Ministry of Land, Infrastructure and Transport.) Flood measures of this facility should be made. To implement medical care in case of the disaster, it prevents being flooded including the front yard. It makes the green area around the site slopes and it makes the hospital design ground 3.3 m sea level, 1m higher than the surrounding road of 2.3 m sea level that is due to the Binh Chanh District planning specification.

16-1-7. Evaluation of Effects

Based on the survey results, the following evaluates the environmental impact of the project according to the Scoping and TOR.

Table 16-28 Scoping Plan and Field Survey Results

Classification	No.	Environmental impact item	Evaluation of impact at "SCOPING"		Evaluation of impact based on survey results		Reason for the evaluation
			Before construction During construction	After Completion	Before construction During construction	After Completion	
	1	Air Quality	B-	C	B-	B-	Under construction: The influence of the negative by the construction vehicle must be evaded.
	2	Water Quality	B-	B-	B-	B-	Under construction: During drainage, untreated wastewater might exceed an environmental standard. It is necessary to perform outflow prevention of sediment and outflow prevention of seepage water from the construction industry waste. Wastewater should be discharged to a specification watercourse after conforming to environmental standards, and be monitored. After completion: During drainage, untreated wastewater might exceed an environmental standard.Wastewater treatment facilities should be installed. It discharges the Wastewater should be discharged being conformed to an environmental standard to the specified watercourse, and

							be monitored.
	3	Waste	B-	A-	B-	A-	Under construction: THE CITY ENVIRONMENT COMPANY (CITENCO) collects construction waste, so specified containers should be used. After completion; CITENCO collects all waste (general waste, and hospital waste), so it is necessary that specified containers should be used. After completion: CITENCO collects all of solid waste daily living and Hospital waste, so specified containers should be used.
	4	Soil pollution	B-	C	B-	B-	Under construction: Oil leak prevention should be managed. After completion: Specified containers should be used for collection of waste to prevent soil pollution.
	5	Noise and Vibration	B-	C	B-	B-	Under construction: Because there is a school nearby, the necessity of the evading of the influence of the noise and the vibration by the increase of the traffic is estimated. After completion: Residences and a kindergarten will be established around the road and there will be a school nearby. Therefore, the necessity of the evading of the influence of the noise and the vibration is estimated.
	6	Ground subsidence	B−	B−	A-	A -	Under construction: The project site is currently agricultural land and marshland near a watercourse. It is estimated that it will take about 2 years until the large sinking settles from landfill. After completion: It is estimated that the land subsidence continues.
	7	Odor	C	C	B-	B-	Under construction: Specific containers should be used and managed for construction waste. After completion: Hospital waste should be packed by specific containers. A waste strage should be constructed in the project hospital.
	8	Sediment	C	C	B-	B-	Under construction: If the drainage work is not handled properly, there is a possibility of impact on the sediment of the adjacent waterways occuring. After completion; If the wastewater treatment or waste storage has not been done properly, there is a possibility of impact on the sediment of the adjacent waterways occuring
Natural environment	9	Protective zone	D	D	D	D	Under construction, After completion; The Vietnamese side agreed to double-check that the project site is not included in any type of protected area or subject to any form of environmental regulation and then to informed JICA.
	10	Ecosystem	C	C	D	D	Under construction, After completion: The project site is currently agricultural land and marshland. No effects are expected to occur.
	11	Hydrology	B-	B-	B-	B-	Under construction, After completion: By making a vast

							agricultural land and marshland to the industrial park, it is expected that the potential for basement penetration will decline. It is necessary to prepare for flood in relation to the heavy rain from extreme weather.
	12	Landforms and geological features	B-	B-	B-	B-	Under construction: The landforms and geological features will change according to the landfill and readjustment . After completion: The influence of change of landforms and geological features after the landfill and readjustment completion is estimated.
Social environment	13	Land acquisition and Resettlement	B-	B-	B-	B-	Before construction: There will be relocation of the residences, the factory and the kindergarten and the agricultural land, and compensation will be given. The development supplier will begin negotiations. The commissar meeting will do the valuation. After completion The necessity of monitoring after relocation is estimated.
	14	Poverty level group	B-	B-	B-	B-	Before construction: The living investigation result in Vietnam country of the relocation people must be evaluated. After completion: The necessity of medical care to poor people will be estimated.
	15	Ethnic minorities and indigenous peoples	D	D	D	D	Before construction, After completion: There are no ethnic minorities or indigenous people at the project site or around it.
	16	Regional economic factors such as employment and sustainability	C	C	B+	B+	Under construction: This project is the second hospital construction and it will have a large influence on the regional economy by the creating of an employment and the construction investment. After completion: Hospital management will have a large influence on the regional economy.
	17	Land use and area resource use	B-	B-	B-	B-	Under construction: The influence by the loss in the agricultural land is worried about. After completion: The land use value as the hospital in the residence area which neighbors an industrial park is big. Contribution to the area by the health promotion is estimated.
	18	Water supply	B-	B-	B-	B-	Under construction: There is need of the influence evading to the circumference waterway by under construction muddy water. After completion: There is a plan to use well water in the project after completion, so the quality of the well water shouled be managed. It is necessary to install a wastewater purifying equipment and manage it.
	19	Existing social infrastructure and social services	B-	B-	B-	B-	Under construction, After completion: Because there are few traffic lights, traffic safety measures will become necessary with the increase of the traffic.
	20	Social structure of social capital and local decision-making institutions, etc	C	C	B-	B-	Under construction: The benefit which accompanies construction work occurs. After completion: The benfit for the congestion easing at Cho Ray Hospital and the rural areas on the Mekong delta are occur to social improvements related to medical care.
	21	Damage and uneven	D	D	D	D	Before construction, After completion: This project is the

		distribution of benefits					second hospital construction so it will never brings about the unfair damage and benefit to the circumference area.
	22	Area Conflict of Interest	D	D	D	D	Before construction, After completion: This project is the second hospital construction., so it there will be no conflict of interests in the area.
	23	Cultural heritage	D	D	D	D	Before construction, After completion: The cultural heritage and so on don't exist in and around the ploject site. site.
	24	Scenery	D	D	D	D	Before construction, After completion: There is no obstruction of the view expected after hospital construction. The Vietnamese side agreed to double-check that the project site is not included in any type of protected area or subject to any form of environmental regulation and then informed to JICA.
	25	Gender	D	D	D	D	Under construction; It is estimated that the influence of the Gender will not be occur. After completion: Gender status in relation to the hospital and its users are good. There will be no negative effects caused by this project.
	26	Children"s right to play	D	D	D	D	Under construction: It is estimated that the influence of "Children"s right to play" will not be occur. After completion: Children"s right status in relation to the hospital and its users are good. There will be no negative effects caused by this project,
	27	HIV/AIDS infection	C	C	B-	B+	Under construction: According to the coming of the construction worker, there is possibility that the infection spreads. After completion: At present, there are HIV/AIDS infected patients in Bin Chanh District, HCMC, and improvements are expected in the hospital.
	28	Working environment (includes occupational safety).	B-	B-	B-	B-	Under construction: Consideration should be given in construction to the working environment in keeping with the Vietnamese Occupational Health and Safety Law. After completion: This project should make a good safety working conditions for staff .
Others	29	Accidents	B-	B-	B-	B-	Under construction: There is a need to ensure the prevention of construction occupational accidents. The safe running by the construction vehicle becomes necessary. After completion: It is important to take traffic safety measures in response to the accompanying increase in traffic.
	30	Crossing border influence and Climate change	B-	B-	B-	B-	Under construction, After completion: It is estimated that crossing border influence will not be occur. A heavy rain measure concerning climate change should be planned at the hospital site.

16-1-8. Countermeasures

Countermeasures and compatibility issues in the future are given below for all the items that were evaluated as having a negative influence A- or B- in the influence evaluation above.

During the construction period, these costs are contained in the construction costs; after completion, the implementing organization is responsible for them.

It should be noted that these Countermeasures refer to the Environmental Monitoring of EIA of Project (July 2014), but some items have been added in light of the results of this survey.

Table 16-29 Countermeasures

No.	Impacts	Mitigation Measures	Implementing Organization	Responsible Organization	Cost (Unit)
Under construction					
1	Air Quality	Construction vehicles should be driven using eco-driving principles. Unleaded gasoline should be used.	Constructor	Constructor	-
2	Water Quality	Wastewater treatment facilities should be installed and wastewater should be discharged to a specific watercourse after conforming to environmental standards. This whole process should be managed.	Constructor	Constructor	-
3	Waste	THE CITY ENVIRONMENT COMPANY (CITENCO) should collect all construction waste by specification.	Constructor	Constructor	-
4	Soil pollution	Construction machines and materials with low risk of oil leak should be used. Oil leak corrective action should be made and managed.	Constructor	Constructor	-
5	Noise and Vibration	Nearby residencial area is 40m from site boundary and is 100m from the construction building.and construction machines, and materials with low noise and vibration should be run. It installs noise and a vibrograph in the site boundary.	Constructor	Constructor	-
6	Ground subsidence	It is necessary for construction temporary to be designed for safety when a ground level change occurs.	Constructor	Constructor	-
7	Odor	See:Waste Mitigation measure	Constructor	Constructor	-
8	Sediment	Same as Water Quality and Waste	Constructor	Constructor	-
9	Hydrology	By making a vast area of agricultural land and marshland into the industrial park, it is expected that potential for basement penetration will decline. It is necessary to prepare for flooding in relation to heavy rain in extreme weather. The landfill and readjustment level should be set to be sufficiently higher than the surrounding road level.	Constructor	Ministry of Health	-

No.	Impacts	Mitigation Measures	Implementing Organization	Responsible Organization	Cost (Unit)
10	Landforms, geological features	Landfill and readjustment will change according to landform and geological feature. Quality assurance for the soil in landfill development should be done solely by Vietnam going forward.	Constructor	Ministry of Health	-
11	Land acquisition and Resettlement	The system of the working report of the monitoring of the resettlement and the compensation must be made.	Binh Chanh district commissar	Ministry of Health	-
12	Poverty level group	The action plan of Relocation and Compensation must be made	Binh Chanh district commissar	Ministry of Health	-
13	Regional economic factors such as employment and sustainability	It will have a large influence on the regional economy by the creating of an employment and the construction investment.	Cho Ray Second Hospital	Cho Ray Second Hospital	-
14	Land use and area resource use	The influence by the loss in the agricultural land should be made minimum.	Cho Ray Second Hospital	Cho Ray Second Hospital	-
15	The water supply	The well use requires an effort toward the water quality management. When necessary, it the remover of the toxic substance need to be installed.	Cho Ray Second Hospital	Cho Ray Second Hospital	-
16	Existing social infrastructure and social services	As a traffic safety measure on roads without signals, a traffic control worker should be arranged at the entrance at the turnpike.	Constructor	Constructor	-
17	Social structure of social capital and local decision-making institutions, etc	The project will make the benefit to the areas.	Cho Ray Second Hospital	Cho Ray Second Hospital	-
18	HIV/AIDS infection	It does the health care of the construction worker.	Cho Ray Second Hospital	Cho Ray Second Hospital	-
19	Working environment (includes occupational safety).	Industrial Safety and Health Law in Vietnam should be conformed.	Cho Ray Second Hospital	Cho Ray Second Hospital	-
20	Accidents	It is important to implement traffic safety measures along construction vehicle routes. Fuel management, labor disaster management must be done.	Ho Chih Minh City	The transportatn authority of People"s Committee	-
21	Influence on border crossing Climate change	Construction should be managed with safe measures against floods and heavy rain to avoid being flooded.	Constructor	Ministry of Health Supervisor	-
After Completion, In Active Stage					
1	Air Quality	Building equipment should be operated with little environmental load. Vehicles should be driven using eco-driving principles. Unleaded gasoline should be used. Leakage from medical care radiation must be strictly managed.	Cho Ray Second Hospital	Cho Ray Second Hospital	-

No.	Impacts	Mitigation Measures	Implementing Organization	Responsible Organization	Cost (Unit)
2	Water Quality	Wastewater treatment facilities should be installed and wastewater should be discharged to a specific watercourse after conforming to environmental standards. This whole process should be managed.	Cho Ray Second Hospital	Cho Ray Second Hospital	-
3	Waste	THE CITY ENVIRONMENT COMPANY (CITENCO) should collect all construction waste by specification, so specified containershould be used.	Cho Ray Second Hospital	Cho Ray Second Hospital	-
4	Soil pollution	Same as Water Quality and Waste	Cho Ray Second Hospital	Cho Ray Second Hospital	-
5	Noise and Vibration	Around the hospital, quiet low-speed eco-driving of vehicles should be done. This also encourages users to do the same at the same time.	Cho Ray Second Hospital	Cho Ray Second Hospital	-
6	Ground subsidence	The interlocking block pavement that can respond to land subsidence when it occurs should be utilized around each entrance.	Constructor	Design and Supervision	-
7	Odor	Hospital waste should be packed by specific containers.A waste strage should be constructed in the project hospital.	Cho Ray Second Hospital	Cho Ray Second Hospital	-
8	Sediment	Same as Water Quality and Waste	Cho Ray Second Hospital	Cho Ray Second Hospital	-
9	Hydrology	Countermeasures for heavy rain and flooding should be used continually to prevent being flooded.	Cho Ray Second Hospital	Cho Ray Second Hospital	-
10	Landforms, geological features	Landfill mentenance must be done continuously.	Cho Ray Second Hospital	Cho Ray Second Hospital	-
11	Land acquisition and Resettlement	The system of the working report of the monitoring of the resettlement and the compensation must be made.	Binh Chanh district commissar	Ministry of Health	-
12	poverty level group	The action plan of Relocation and Compensation must be made.	Binh Chanh district commissar	Ministry of Health	-
13	Regional economic factors such as employment and sustainability	It will have a positive influence on the regional economy by the Cho Ray Second Hospital managing.	Cho Ray Second Hospital	Cho Ray Second Hospital	-
14	Land use and area resource use	The land use value as the hospital should be made.	Cho Ray Second Hospital	Cho Ray Second Hospital	-
15	Water supply	The well use requires an effort toward the water quality management. When necessary, it the remover of the toxic substance need to be installed.	Cho Ray Second Hospital	Cho Ray Second Hospital	-
16	Existing social infrastructure and social services	It is necessary to install a signal for traffic accident prevention at the intersection of the entrance to Cho Ray Second Hospital and the turnpike.	Cho Ray Second Hospital	Ho Chi Minh City	-

No.	Impacts	Mitigation Measures	Implementing Organization	Responsible Organization	Cost (Unit)
17	Social structure of social capital and local decision-making institutions, etc	The congestion easing at Cho Ray Hospital and the benefit to the rural areas on the Mekong delta should be made.	Cho Ray Second Hospital	Cho Ray Second Hospital	-
18	HIV/AIDS infection	It promotes prevention and a treatment to the infection patient.	Cho Ray Second Hospital	Cho Ray Second Hospital	-
19	Working environment (includes occupational safety).	It creates the environment that is considered in the safety of the medical care of the staff.	Cho Ray Second Hospital	Cho Ray Second Hospital	-
20	Accident	Signs to indicate that drivers should drive at low-speed around the hospital should be installed as a traffic safety measure for the accompanying increase in traffic.	Ho Chi Minh City	The transportation authority of People"s Committee	-
21	Influence on border crossing climate change	Measures should be taken to prevent influence in case of heavy rain and flood occurrence in the facilities. It makes the hospital design ground 3.3 m sea level, making 1m higher than the surrounding planning road	Constructor	MOH Design and Supervision	-
Total cost					-

16-1-9. Environmental Management and Monitoring Plan

For each item to be monitored, the following plan specifies the frequency of monitoring, location, responsible organization, and result. Items are divided into those to consider during construction and those after completion.

The Monitoring Plan wase created from the point of view of the safety management of the hospital environment based on Cho Ray Hospital Plan and the reduction of load the surrounding environment.

It should be noted that these Countermeasures refer to the Environmental Monitoring of EIA of Project (July 2014), but some items have been added in light of the results of this survey.

Table 16-30 Monitoring Plan (Scheme)

No.	Impacts	Mitigation Measures	Number of Points	Position	Frequency (In Active Stage duration)	Implementing Organization	Responsible Organization	Cost (Unit)
Under Construction								
Air quality	Tempreture,Humidity,Wind speed,Dust,SO2,NO2,CO	Measurement	2	Construction Site	1time/3months	Constructor	MONRE	5,520,000VND/year
Waste water	pH,Colour,BOD5,COD,TSS Total N,Total P,Coliforms	Measurement	1	At the storm drain	1time/3months	Constructor	MONRE	5,800,000VND/year
Construction Waste	Construction waste, Hazardous waste, General waste,	List of kind, quantity, Record of collection supplier	-	Construction Site	1time/1month	Constructor	MONRE	-
Soil polution	Oil	Watching Oil leak	-	Construction Site	1time/1month	Constructor	MONRE	-
Noise,Vibration level	Noise（dB(A)）	Measurement	2	Construction Site property boundary	1time/3months	Constructor	MONRE	800,000VND/year
Ground subsidence	Difference with design GL	Actuar survey	4 East West South North	Construction Site	1time/1month	Constructor	MONRE	-
Accident	Work related accidents/ Traffic accidents	Accident Record	-	Construction Site/Viecl route	1time/1day	Constructor	MOC/ The transportatn authority of People"s Committee	-
After Completion, In Active Stage								
Air quality	Tempreture,Humidity,Dust,SO2,NO2,CO,THC,H2S,NH3	Measurement	2	Ambient air Close to Waste water treatment system /Near Waste storage	1time/6months (3years)	Cho Ray Second Hospital	MONRE	4,840,000VND/year
	Tempreture,Humidity,Dust, SO2,NO2,CO,THC,H2S,NH3	Measurement	4	Areas of clinical practice at the x-ray /at the lab	1time/3months (3years)	Cho Ray Second Hospital	MONRE	19,360,000 VND/year

				/the area of radiation therapy /in the morgue				
Medical care radiation dose rate	Activity of α,β	Measurement	2	Radiation management area	1time/3months (3years)	Cho Ray Second Hospital	MONRE	16,000,000 VND/year
Hospital Wastewater quality	Displacement volume	Actual survey (automatic measurement)	1	At the last drain	Normaly	Cho Ray Second Hospital	MONRE	-
	pH,BOD5,COD,TSS,Sunfna ,Amoni,Nitrat, Phosphat, Plant and animal oil ,Coliforms	Measurement	2	In manholes before discharging /Aftre treatment,hot disinfection	1time/3months (3years)	Cho Ray Second Hospital	MONRE	15,600,000 VND/year
Drainage radiation dose	Activity of α,β	Measurement	2	Ditto	1time/3months (3years)	Cho Ray Second Hospital	MONRE	16,000,000 VND/year
Quantity of bacteria in Hospitalwaste water	Salmonella,Shigella, Vibrio cholerae	Measurement	2	Ditto	1time/3months (3years)	Cho Ray Second Hospital	MONRE	9,600,000VND/year
Hospital Waste	Infectious medical waste , Hazardous medical waste General household waste Recycling	List of kind, quantity, Record of collection supplier	-	Waste strage	1time/3months (3years)	Cho Ray Second Hospital	MONRE	-
Noise and vibration	Noise（dB(A)）	Measurement	2	Same as Air quality Ambient air	1time/6months (3years)	Cho Ray Second Hospital	MONRE	120,000 VND/year
			4	Same as Air quality Areas of clinical practice	1time/3months (3years)	Cho Ray Second Hospital	MONRE	480,000 VND/year
Ground subsidence	Difference with design GL	Actuar survey	4 East West South North	Construction Site	1time/6months (3years)	Cho Ray Second Hospital	MONRE	-

16-1-10. Stakeholder Consultation

The following stakeholder discussion becomes necessary.

(1) Relocation and Compensation

The participant: Concerned people, Le minh Xuan commune, Binh Chanh district commissar, Ho Chi Minh City, Saigon VRG Investment, Cho Ray hospital,MOH
The discussion contents: Explanation about Relocation and Compensation.

(2) EIA

The participant: Neiborhood people, Le minh Xuan commune, Binh Chanh district commissar, Ho Chi Minh City, Saigon VRG Investment, Cho Ray Hospital
The discussion contents: Hearing of opinion on the EIA of Cho Ray Second Hospital

(3) The road safety

The participant: The construction contractor, the commissar meeting transportation authority, Ho Chi Minh City, Cho Ray Hospital
The discussion contents: The security measures and the safe low-speed running of construction vehicle passage cours during construction

(4) The disaster medical care

The participant: The expert of the disaster medical care and the emergency medical care, Ho Chi Minh City, the fire department, each commissar meeting, neiborhood people
The discussion contents: Cooperation with Ho Chi Minh City and the Vietnamese country that is estimated to become issue about the natural disaster measure of the flood and so on and the disaster medical care system at the Cho Ray Second Hospital

16-1-11. Definition of Budget, Fiscal Resources, and Implementation

This project monitors for the professional, outsourcing.
During the construction period, the construction firm entrusts and in operation after completion, the hospital entrusts.
The budget and the fiscal resource become each load.
(Binh Chanh District commissar)
Addionally, the monitoring result report system is as follows:

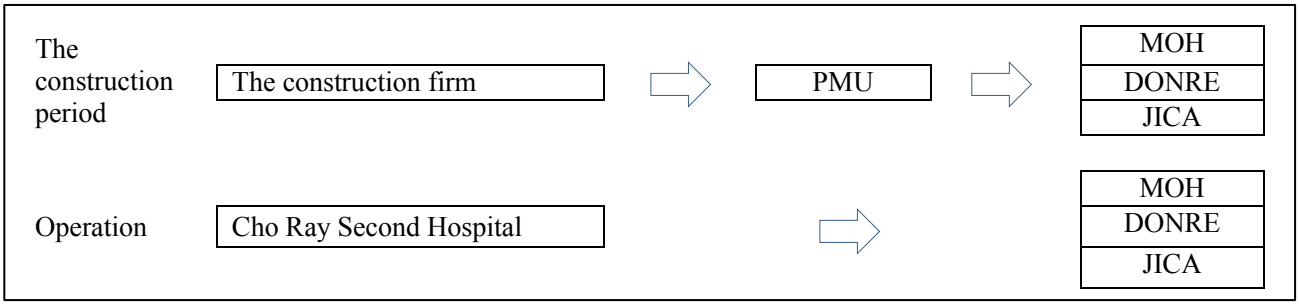


Figure 16-10 The report system of the monitoring result

16-2. Acquisition of the Right to Use of the Site and Resettlement

16-2-1. Necessity of Acquisition of the Right to Use of the Site and Resettlement

Accoding to Vietnamese law, all land is national land, but MOH claimed the right to use the 10ha hospital site (Mar/2012) and the HCMC commission gave its consent (Apr/22/2013).
SAIGON VRG INVESTMENT HOLDING CORPORATION (Saigon VRG) is doing the industrial park application procedure for 80ha Le Minh Xuan Industrial Zone3 that contains the

hospital project site.

The Le Minh Xuan Commune, which is the planning areas of Le Minh Xuan Industrial Zone3 including this project site, was originally farmland that "Ho Chi Minh Plants Company, Ltd. (HPC CO., LTD)," subsidiary of Saigon Agricultural Incorporation, managed and used. The land use right of it will be returned to the commission for district development.

After the project approval, as for 10ha of hospital project site, the right to use on the land will be transferred to MOH and the rest of The Le Minh Xuan industrial Zone3 with residential area to Saigon VRG.(Minutes of Binh Canh District comissar, Novemver/23, 2013)

It is confirmed that there are entitlement persons in the project sight by the field survey.

It is confirmed that the relocation and the site acquisition occurred with the project in Binh Chanh District commissar.

The survey team verified that the HPC CO., LTD. is the only legal owner of the land use right of the present farmland and HPC worker"s house.

Because this is the state-operated company which 100 % of countries invest, HPC CO., LTD does not not satisfy the Criteria for Eligibility of the OP4.12-Involuntary Resettlement by the World Bank Operational Manual as beneficiaries. Also, the land use right will be transferred from HPC CO., LTD to MOH via the Binh Chanh District People"s Committee. Therefore, since compensation associated with land acquisition is unnecessary, it will not be described as compensation subject to the ARAP.

Separately, the People"s Committee will make the RAP of Le Minh Xuan Industrial Zone, but the project site 10ha has priority and it is to be created by the end of September at the latest.

(August 29, Ho Chi Minh City People's Committee Urgent Announcement 2014)

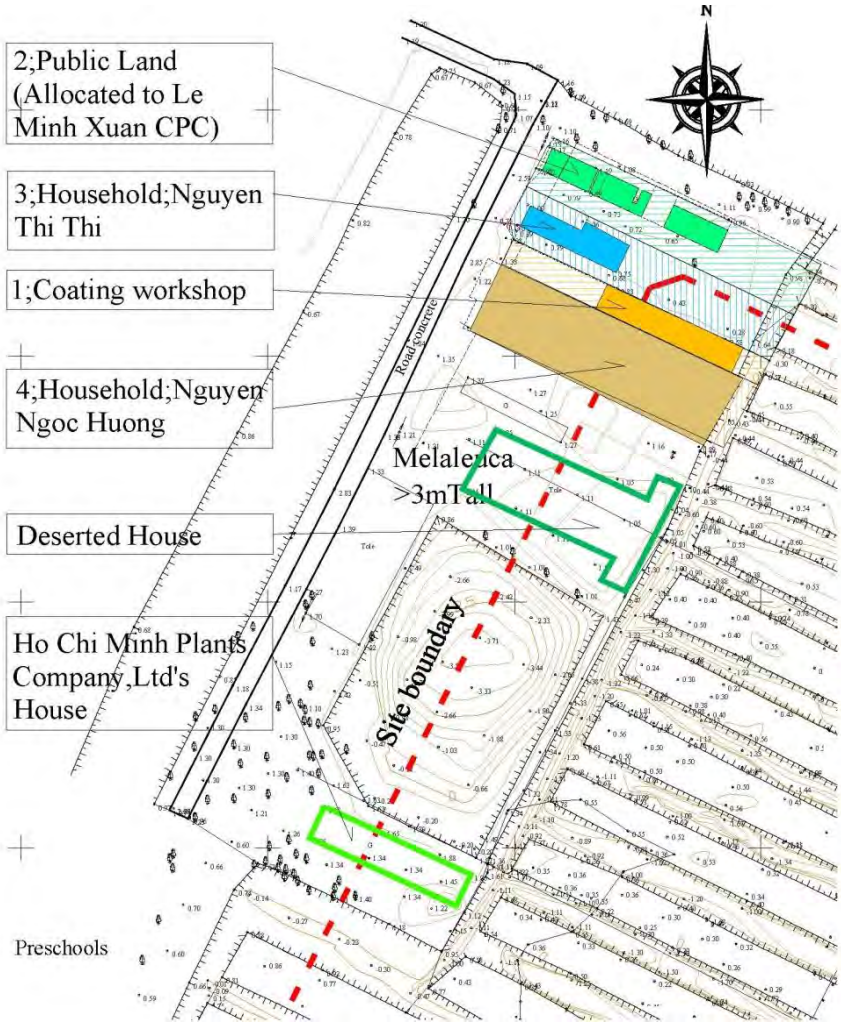


Figure 16-11 House/Building and site border eligible for resettlement

Source: ARAP

16-2-2. Legal Framework of the Acquisition of the Right to Use of the Site and Resettlement

(1) Overview of Land Law and Background of Amending

Land Law of Vietnam stipulates clearly state‟s land possession and regulates land management, and application, registration, issuing certification etc.of land use right. Regulations related to land acquisition are included in land acquisition Decree, Circular 116/2004/TT-BTC, Circular 69/2006/TT-BTC. Also, calculation method of land cost is stipulated in Decree 188/2004/ND-CP and Circular 114/2004/TT-BTC.

Land Law (No.45/2013/QH13/29 Nov.2013) is a law that stipulates land rights related-issues and relevant procedures comprehensively, and situated above Land Acquisition Decree. Basicaly The old law (15 Oct.1993/1998/2003) enacted in 1993, by which, legal provision reform related to land issues was implemented including integrated land management by the State, restriction and responsibilities, promotion of industrialization, modernization and resettlement of the land. And new Land Law (No.45/2013/QH13/29 Nov.2013) attempts the definition of the phrase and the concept.

New Land Law Chapter6 ”LAND RECOVERY, LAND REQUISITION, COMPENSATION, SUPPORT AND RESETTLEMENT” includes “Section1. LAND RECOVERY AND LAND REQUISITION” that describes “Land recovery for national defense or security purpose (Article 61),” “Land recovery for socio-economic development in the national or public interest (Article 62)” and “Compensation and land clearance responsible organization; management of recovered land (Article63) so on. Section2 “COMPENSATION FOR LAND, SUPPORT AND RESETTLEMENT” describes agricultural land, residensial land and economic organizations, foreign organizations with diplomatic functions, and foreign-invested enterprises. Section3 “COMPENSATION FOR DAMAGE TO ASSETS, PRODUCTION AND BUSINESS” describes “Payment of compensation, support and resettlement money (Article 93).

Regulations related to land acquisition, compensation system and people resettlement in Vietnam are described below.

1. The Land Law No.45/2013/QH13/29 Nov.2013
2. Decree 181/2004/ND-CP of Oct. 29,2004 - Govermental resolution on Land Law implementation (Expired portion are specified in Decree88 / 2009 / ND-CP)
3. Decree 197/2004/ND-CP of December 3, 2004 on compensation, support and resettlement when land is recovered by the State - Govermental resolution on land acquisition decree
4. Decree 197/2004/ND-CP of December 3, 2004 - Circular of the Ministry of Finance on the implementation of land acquisition decree.
5. Circular14/2009/TT-BTNMT - Provisions for compensation, auxiliary, resettlement and land recovery, delivery and lending of land
   Circular 57/2010/TT-BTC - Probision of the budget creation use of expenses, settlement of accounts for implementing of the compensation, auxiliary and resettlement of when the State recover the land
6. Decree 188/2004/ND-CP of Nov. 16, 2004 - Govermental resolution on land price calculation method and land price
7. 145/2007/TT-BT - Circular of the Ministry of Finance on implementation of land calculation method promulgation
8. Decree No.69/2009/ND-CP of August 13, 2009 „Additional Regulations on Land Use Plan, Land Price, Land Acquisition, Compensation, Assistance and Resettlement‟ - additional rule of governmental resolution on land acquisition decree

(2) The JICA policy of land acquisition and resettlement of this project

See Appendix-10

(3) Analysis of Accordance and Gap among Local Legal System, new Environmental Guideline and Safeguard Policy of World Bank

The following Table describes about the comparison of Japan International Cooperation Agency Guidelines for Environmental and Social Considerations (hereinafter reffered as to New Environmental Guidelines) proclaimed in April 2010, Safeguards of the World Bank and related laws in Vietnam about EIA. There is not a big difference in regard to the system.

Table 16-31 Comparison of New Environmental Guidelines/Safeguards of the World Bank and related laws in Vietnam about EIA

No.	Gap Analysis Contents	Prescriptions in the Laws of Vietnam	Contents of Gaps
1	**<Eligibility>** The eligibility is clearly distinguished andit includes the following: a) Those who have formal legal rights toland. b) Those who do not have formal legal rights to land at the time the census begins but have a claim to such land or assets; (provided that such claims are recognized under the laws of thecountry or become recognized through a process identified in the resettlement plan). c) Those who have no recognizable legalright or claim to the land which they are occupying.	The New Land Law, Article 75: The land users satisfy the following conditions: a) Those who have certificate of land use or ownership of non-land assets. b) Those who do not have a certificate of land use or equivalent documents, but eligible to have certificates. The New Land Law, Article 77: For agricultural land use before 1 July 2004 land users who are directly involved in agricultural production, but have no certificate or be eligible for a certificate land use rights and ownership of houses and other assets attached to land under the provisions of this Article shall be compensated for the actual land area used, the area of compensation shall not exceed the credit limit for agricultural land specified in Article 129 of this Law. c) For the people who are not eligible for compensation, the Provincial People's Committee considers to support (New Land Law, Article 83).	No significant difference
2	<**Compensation at replacement cost**> It indicates compensation at replacement cost for losses of assets. It clearly indicates the following: a) Calculation method of the replacement cost for agricultural land and land in urban area b) Management of cost of any registration and transfer taxes c) In repairing structures, necessary costs such as transport cost of building materials and labor cost should be covered. d) Interest in the case of delays in actual payment of compensation	<u>Compensation for land:</u> Clause 2, Article 74, the New Land Law provides the principle of compensation: Compensation for land is basically provided by alternative land with the same land use. In case alternative land is not available, compensation equal to the value of land use rights, which is calculated based on land prices at the time of land recovery decision, will be paid. Current regulation (Decree No. 69) - Article 11: When land price for compensation stipulated in aprovincial decision is not close to the marketprice, the Provincial Peoplecial Peopleetprice, re-examine appropriate land price. No registration and transfer taxes required for relocating households to the allocated plot of land in the resettlement sites. <u>Compensation for houses/ structures:</u> Clause 1, Article 89, the New Land Law: For houses, structures affected shall be compensated by the value of new houses/structures with similar technical standards. Article 91, the New Land Law regulates the relocation support, including allowance forbuilding material transport. <u>Compensation for crops/trees:</u> Article 90 provides guidelines for	There is a possibility of gap in operation, even though land price is supposed to be re-examined by referring the latest market price based on the Vietnamese law. There is a difference between the land price of PPC (People"s Committee) and the rates suggested by the external valuers, even the methodology of valuation survey is in compliance with the Vietnamese regulations.

		compensation of annual crops, perennial trees, and aqua-breeding ensuring adequate compensation. Delay in actual payment of compensation: If compensation payment is delayed, and the delay is caused by the Stateelayed, and then amount should be paid with interest rate (Article 93)	
	<Compensation and assistance (livelihood restoration, resettlement and community)>		
3	Compensation modes for lost assets are clearly prescribed; land-based resettlement strategies or cash compensation, or both.	Clause 2, Article 74, the New Land Law provides the principle of compensation: Compensation for land is basically provided by alternative land with the same land use. In case alternative land is not available, compensation is paid in cash.	No significant difference
4	Necessary assistance for livelihood recovery is required such as short-term employment, livelihood assistance, and income compensation.	The New Land Law, Article 82: Enumerates the support provided to the affected people as follows: • Support for life and production stabilization; • Support for job-change training and job creation are provided in case of agricultural land acquisition • Resettlement allowance • Other support The government shall issue detailed regulations. Article17, Decree No. 69: Assistance for landacquired by the government comprise: 1. Relocation assistance and resettlementassistance in case of acquiring residential land; 2. Assistance to stabilize life and production,training for career change and vocationaltraining, in case of acquiring agricultural land; 3. Assistance upon acquiring agricultural land located in the residential area; garden land and pond land which are not certified as residentialland; and 4. Other assistance Articles 18-23 of Decree No. 69 give guidelines to identify eligible people and levels for different types of assistance.	There is no clear classificationof assistances in the law such as employment, livelihood (cash or in kind assistance), and income compensation. Almost all assistances are provided in cash.
5	Relocation assistance such as relocation allowance is addressed and requested explicitly.	Resettlement allowance is addressed in the New Land Law, Art 82. In the Decree No. 69, detailed criteria to be provided relocation assistance and resettlement assistance: Article 18, Relocation Assistance: Household, individual have to relocate shall be assisted with relocation cost, including transport allowance,house renting… Article 19, Resettlement Assistance:	Only formal residents are eligible for resettlement assistance

		Relocated people having no other accommodation will be allocated with land or house at the resettlement sites. If the relocated houses are not current used as accommodation or the relocating households have other houses and are living there, they will be not entitle to resettlement assistance.	
6	Enhancement of infrastructure in the resettlement site such as roads, water supply, drainage and sewerage, waste management, and public service such as education and health, and provision and assistances of alternative or similar resources to compensate loss of access to the community resources such as fisheries, rangelands, fuels, feeds, farms, and irrigation water, are required.	Land is acquired only after resettlement site is ready (Article 85, New Land Law). It is mentioned that the resettlement areas must have the infrastructure to ensure that planning and construction standards are in accordance with the natural and social conditions of individual regions.	No significant difference Even though the regulations of the law is more general. The decree guiding the implementation of the New Land Law should provide further details.
7	**<Participation of PAPs >** Appropriate participation of affected persons and its communities are facilitated in planning, implementation, and monitoring measures on involuntary resettlement and loss of livelihood.	There is no clear description about public participation in planning and implementation of resettlement plan. However, there is a principle to ensure "democracy" in the New Land Law, Clause 2, Article 73 emphasized that "the compensation, support, and resettlement be provided when the State acquires land to ensure democracy, objectivity, fairness, openness, and compliance with the law." <u>Planning phase:</u> Participation of affected people is mentioned through the Land Law: (i) Public meetings on announcement of land acquisition (Article 69); (ii) Public meetings on the draft plan of compensation, support, and resettlement (Article69; (iii) Meetings to discuss the plan of job changing/creation with affected people (Clause 3,Article 84); and (iii) Publicly posting the information of resettlement sites and allocation land plots in the resettlement sites (Article 86). According to Decree 69/2009 (Article 25), representatives of affected people and mass organizations, such as women union and farmer union, are members of the District CompensationCommittees. The committees operate until all compensation, support, and resettlement are completed.	Although approach of public participation is different, it is ensured. Regulations address participation in the planning phase of resettlement only, no mention of the implementation phase and post-resettlement. During implementation and after resettlement, affected people can participate through their representatives in PC of communes and District Compensation Committees.
8	**<Grievance redress mechanism>** Appropriate and accessible grievance redress mechanism is required.	The New Land Law, Article 204: Land users and people who have rights and obligation related to the land use have the right to complain on the decisions related to land administration. A four-stage procedure for redress of grievances is regulated in Vietnam	No significant difference
9	**<Consultation with PAPs>** Discussion with PAPs to be relocated	The New Land Law, Article 69: Consultation with PAPs is mentioned	Timing and approach of public consultation

	and host-communities in resettlement site, and strategies for participation of communities in preparation and implementation of resettlement activity are required. As steps of the participation, whether (1) information disclosure, (2) public consultation, and (3) public participation are carried out properly in the planning and implementation stages or not.	through the New Land Law: (i) Opinions of affected people are collected during resettlement plan preparation through public meetings with affected people in the project area; and to post publicly the plan. The posting of the plan shall be recorded in the minutes with confirmation of representatives from CPC, Commune Fatherland Front, and persons whose lands are acquired. (Article 69); (ii) The plan of job change/creation is consulted with affected people (Clause 3, Article 84); and (iii) Selection of resettlement sites and allocation land plots in the resettlement sites are discussed with relocated people (Article 86).	meetings are different. According to the Vietnamese regulations, consultation meetings on resettlement are only held during the implementation stage (after the project is approved by relevant authorities). While WB requests consultation during preparation and implementation of RAP, with a different way to consult with affected people.Vietnamese regulations have no specific requirement to discuss with the host communities of the resettlement sites. However, Article 85, New Land Law requests that resettlement sites must be suitable with the social conditions of the region.
10	**<Considerations to socially vulnerable groups>** It requires paying special attention to socially vulnerable groups, especially those below the poverty line, landless, elderly, women, children, indigenous people, persons with disabilities, and minority group.	There is no clear description about specific support for socially vulnerable people, in Article82, the New Land Law only mentions about other support and request to the government such as to give detailed regulations. In Decree No. 69/2009, Article 23, it is regulated that necessary support is provided by considering the local situation in addition to livelihood rehabilitation.	In fact, in the existing decisions of the Provincial People‟s Committees on compensation, support, and resettlement, attention are paid to the poor and special-treated people only. Other vulnerable groups such as the landless, elderly, women and children, ethnic minorities are not covered.
	<Monitoring>		
11	It requires the design of plans, implementation structures, costs, and financial source for both internal and external monitoring during and after the resettlement.	Monitoring is not clearly requested. Section 1 of Chapter XIII, the New Land Law mentions the monitoring, follow-up, and evaluation on the use and management of land in general. Article 198 regulates the responsibilities of National Assembly, People‟s Council at different level and member of Father Front Unions; while Article 199 provides the rights for people to monitor, supervise on the use and management of land, including land acquisition,support, and resettlement.	There is no detail regulation on monitoring of land acquisition and resettlement.
12	It requires disclosure of monitoring results to stakeholders for both internal and external monitoring during and after the resettlement.	There is no relevant description.	There is no detail regulation on monitoring of land acquisition and resettlement.

Note: Where the JICA Guidelines do not specify the detailed requirements, as per JICA‟s policy, the WB requirement is referred in the column of”JICA Guidelines”.

Source: Prepared by JST

(4) Specific Measures for Compensation and Support

Some houses and buildings still remain in part of the development area.

Binh Chanh District People"s Committe council has a procedure of compensation for resettlement and conduct the adjustment under the guidance of DONRE. (Minutes of Binh Canh district people"s committee on 28th February, 2014.)

However, MOH is responsible for compensation, support and resettlement for the project site 10ha. (ARAP)

Moreover, the progress of the discussion Resettlement Action Plan for this project is following;

- Binh Chanh district people"s committee council must make "Resettlement Action Plan" of whole Le Minh Xuan Industrial Zone3 and residential area.
  According to the Vietnamise Law (New Land Law article 49), investigation had not been done, because 1/5000 Land Use Plan had not been permited. Unique investigation by the survey team was not permitted.
  (Minutes of Binh Canh district people"s committee on 3th June, 2014.)
- In addition, the council made the resident investigation of the hospital project site 10ha and provided it for MOH according to the conference in 9th June, 2014.
- It was proved that "former employee"s three houses" built on the project site were requiring the right to use on the land at the first time at the meeting. These three houses become eligible for RAP by Vietnamese law.
  (Minutes of Binh Canh district people"s committee on 11th June, 2014.)
- MOH and Cho Ray Hospital has created the Resident Investigation of ARAP for the project site in July.
  Compensation and Ressettlement plan has not been done.
- HCMC made the urgent announcement that the RAP for the Cho Ray Second Hospital project site be made by the Binh Chanh PC by September 30.
  (HCMC August 22, 2014)
- The Binh Chanh PC made the RAP on 30th August,2014. (See Anex18)

16-2-3. Scale and Range of the Right to Use of the Site and Resettlement

New land acquisition decree (Decree197) stipulates the following 4 kinds of subjects that are compensated and assisted when land is acquired by the State.

<Compensated subjects>

・Land acquired by projects

・Costs invested for buildings and relevant land within sites acquired by projects

<Assisted subjects>

・Restoring livelihood, finding a new employment and its training and other assistance measures for resettlement.

・Payoff and assistance for restoring living at resettlement places

Binh Chanh district people"s committee confirmed that range of compensation for this project is 10ha project sight for Cho Ray Second Hospital in residensial area in Le Minh Xuan Industrial Zone3.

There are following buildings, houses and so on at the west area and around of the project sight, as a result of the local search.

- 3 buildings for office and meeting space of the administrative agency (Le minh Xuan commune)
- A Coating workshop, a house and a house with workspace
- Workers house of Ho Chih Minh Plants company,LTD.(HPC,Ltd)
- 5 kindergarten facilities that civilians manage
- The crops for which tillage was permitted at the site

Others include 2 deserted houses (remains of convention center, remains of a skating place) and a coffee shop trace in the passage. In addition, there are remains of a facility that the Saigon Agricultural Incorporation disposed of on the east side of the site.

The relocation destination of the kindergarten is planned to be in the culture and education zone

in the development area. (Explanation of VRG)

Figure 16-12 Le Minh Xuan Commune Office

Figure 16-13 Meeting Place of Commune

Figure 16-14 House with workspace

Figure 16-15 House

Figure16-16 Deserted House (Convention center)

Figure 16-17 Kindergarten (Out of ARAP)

Figure 16-18 Coating Workshop

Figure 16-19 Workers House of HPC, Ltd.

Figure 16-20 Sugarcane Field

The legal owner of land use right of the project site is only Ho Chi Minh Plants Company Ltd. (HPC CO., LTD). Buildings of former staffs requiring a right to use on the land are"Coating Workshop(Figure16-18)" and 2 houses(Figure16-14,15)". It confirmed that these 3 buildings" requiring area hangs over the project site 10ha partially, checking with the resident investigation, the Natural Condition Survey on geographical features and local search. And they could admit a right to use legally in RAP.

A resident investigation result is shown below. (Source: ARAP)

(1) Population census

Table 16-32 Number of Project Affected Units (PAUs) and Affected Persons (APs)

Type of loss	Owners with right to use	Fortune	No of PAUs			No of APs			No of commuting laborers		
			Legality	illegality	Sub Total	Legality	illegality	Sub Total	Legality	illegality	Sub Total
Company buildings located on	Coating workshop	Coating factory	1	0	1	0	0	0	0	0	0
	Sugarcane company	Workers house of Ho Chi Minh	1	0	1	0	0	0	(11)		(11)

national land		Plants Company, Ltd.									
	Residents"houses	2 houses	0	0	0	(11)	0	(11)	0	0	0
	Le Minh Xuan commune	deserted house (remains of convention center)	1	0	1	0	0	0	0	0	0
TOTAL			2	0	2	(11)	0	(11)	(11)	0	(11)

Source: ARAP

(2) Fortune and site investigation

Table 16-33 Land

No.	Location	Land Type	Affected(m2)
1	Le Minh Xuan Commune Binh Chanh District Ho Chi Minh City	Agricultural Land (sugarcane field of Ho Chi Minh Plants Company ,Ltd.)	97,531.5
2		Residential Land (3 households)	636.8 + 827.4 + 315.9 = 1780.1
3		Public Land (Allocated to Le Minh Xuan CPC)	688.4
4		Commercial Land	
Total			100,000m2

Source: ARAP

Table 16-34 Building (All of the buildings that build in the project site any part)

No	Location	Type of Building	Structure/Floors/ Areas(m2) / Number
1	Le Minh Xuan Commune Binh Chanh District Ho Chi Minh City	Coating workshop (315.9m2)	4-level-standardized house, concrete, brick, paved floor, area: 136,24m2. Shed: steel sheet, concrete poles, concrete floor, area: 34,16m2 Fence: steel B40-hole-size steel net, area 39,32m2
2		Public Land (Allocated to Le Minh Xuan CPC) (Area 688.4m2)	Hamlet 7 hall: steel roof, brick wall, ceramic-paved floor, area: 51,49m2 Toilet: concrete, brick, ceramic paving, area: 47.38m2 Community classroom: concrete, brick, ceramic-paved floor, area: 60,25m2 Shed, B40-hole-sized steel net, balcony, concrete yard
3		Household: Nguyen Thi Thi (5 people - area 636,8m2)	4-level-standardized house, concrete poles, brick, ceramic-paved floor, area: 103.34 m2. - Fence: steel B40-hole-size steel net: 20.31m2 - Cement yard: 61.73m2 - Shed: 12,41m2
4		Household: Nguyen Ngoc Huong (6 people – area: 827,4 m2)	- 4-level-standardized house, steel roof, brick wall, brick poles, plaster ceiling, ceramic-paved floor, area: 81.61 m2 Workshop: steel roof, brick wall, iron frame, concrete floor, area: 730,19m2 - Shed: Steel, concrete floor, area: 35,25m2

Source: ARAP

Table 16-35 Crops, Tree, Livestock

No	Location	Land Type	Owners with right to use	No of Affected Persons/ commuting laborers	Using land area in the project sight	Harvest (Finished /Non)	Next term growing schedule (Yes/No)
1	Le Minh Xuan Commune Binh Chanh District Ho Chi Minh	Sugarcane field	Ho Chi Minh Plants Company ,Ltd.	10	97,531.5	Finished	NO

	City						

There is not a fruit tree and livestock. Source: ARAP

(3) Results of household expenditure and living surveys targeting all residents who occupy the project area and employees

Reference data: The average monthly salary of Vietnamese employed workers is 4,465,600 VND (=approx. 21,475 yen) (Vietnam Statistic 2012)

(4) Poor and vulnerable households

There are not socially disadvantaged people.

(5) Compensation

Overview of the New Land Law in Vietnam is shown below about Specific Measures for Compensation and Support.

1) Compensation for land:

Clause 2, Article 74, the New Land Law provides the principles of compensation: Compensation for land is basically provided by alternative land with the same land use. In case alternative land is not available, compensation equals to the value of land use rights, which is calculated based on land prices at the time of land recovery decision will be paid.

2) Compensation for houses/structures:

Clause 1, Article 89, the New Land Law: For the affected houses and structures shall be compensated by the value of new houses/structures with similar technical standards.

Article 91, the New Land Law regulates the relocation support, including allowance for building material transport.

The adjustment of the gap between compensation of ARAP for objective buildings from resident investigation and JICA Policy is shown below.

Table 16-36 Compensation estimates Buildings, fortune, and JICA Policy

No	Location	Type of building loss	Relocation destination	Compensation	Adjustment with JICA Policy
1	Le Minh Xuan Commune Binh Chanh District Ho Chi Minh City	Coating workshop (315.9m2)	Unclear; It was relocated befor census	It is prescribed in the RAP.	None
2		Public Land (Allocated to Le Minh Xuan CPC) (Area 688.4m2)	Unclear; Public place	Unclear;	
3		Household: Nguyen Thi Thi (5 people - area 636,8m2)	It plans in the moving on Resettlement areas in the south of Cho Ray Second Hospital sites	The minimum resettlement plot is prepared.(RAP) For houses, structures affected shall be compensated by the value of new houses/structures with similar technical standards.(Clause 1, Article 89, the new Land Law) Support for resettlement (Article 82, the new Land Law)	None The confirmation of the difference in area between present land and the new land with support was necessary, but it is prescribed in the RAP.

4		Household: Nguyen Ngoc Huong (6 people – area: 827,4 m2)	Ditto	Ditto	Ditto
5		Houses of workers of Ho Chi Minh Plants Company ,Ltd.	Planned to move to another plantation area of HPC,Ltd.	None	Relocation cost of workers.must own to HPC,Ltd.
6		Deserted house (remains of convention center) Le Minh Xuan Commune.	None	None	None

(September 30, 2014;by Survey Team)

The crops have already been harvested by the owner, Ho Chi Minh Plants Company, Ltd. There is no further cultivation plan; therefore, it is not the subject of loss compensation.

(6) The Cut-off-date

The cut-off date is the starting date of the census survey (July, 2014).

(7) Resettlement areas

Vietnamese Laws stipulate the resettlement arrangement for persons to be relocated and who need to recover the land (Article 85, 86, Land Law 2013; Article 26, 27 Decree 47/2014/ND-CP).

A part of residential area in Le Minh Xuan Industrial Zone3 was planned to be the resettlement area for this project and other projects (with priority to resttlement of this project) by ARAP.

The resettlement area is divided into plots. Each plot is about 100m2

Resettlement plots are adjacent to Cho Ray Second Hospital with highly convenient to the hospital. (ARAP)

But it is difficult to remove ahead of the construction by establish of surrounding infurastructure and landfill schedule. In the RAP two resettlements areas are prepared one is nearby VINH LOC B beyond the provincial road 10 and the other is AN HA in the 7.5 km left northeast provided with possible condition to live in.

Figure 16-21 Resettlement areas
(Source: Cho Ray Hospital, Google)

(8) Life reconstruction measures for people eligible to receive compensation, which improves or at least restores the household and living standards, compared to pre-relocation situation.

Article 82, the new Land Law enumerates the support provided to the affected people as follows:

- Support for life and production stabilization
- Support for vocational training , occupation changing and job seeking to those having agricultural land recovered;
- Support for resettlement
- Others

About moving houses, it estimates that there will be no change for life in relation to the neighborhood because resettlement areas in development zone will be prepared in the neighborhood of present area.

But they are farming admitted agricultural land in the right to use, they must be need the monitoring and the living support after relocation.

ARAP describes clearly that a resident consultation meeting about compensation and life reconstruction cost will be held on August 29, 2014, but it was postponed. On September 27,the meeting was held ,but Compensation costs was presented. On September 30, 2014, Binh Chanh District PC made the RAP and described Compensation costs and life reconstruction measures clearly.

(9) Entitlement matrix

It gathers type of building loss, Owner, Compensation, and Responsible organization to the table.

Table 16-37 Entitlement matrix

No	Type of building loss	Owner	Compensation	Laws,Guide line	Responsible organization
1	a. Loss at Lands 315.9 ㎡ b. Loss at house 136.24 ㎡ c. Loss at shed 34.16 ㎡	Coating workshop	a) The resettlement minimum plot is prepared one is nearby VINH LOC B and the other is AN HA in the 7.5 km left northeast (RAP) b) For houses, structures affected shall be compensated by the value of new houses/structures with similar technical standards.(Clause 1, Article 89, the new Land Law) Support for resettlement (Article 82, the new Land Law)	RAP Clause 1, Article 89, the new Land Law Article 82, the new Land Law	MOH Binh Chanh district people"s committee
2	a. Loss at Lands requiring the right to use 688.4 m2 b. Loss at 3 buildings 51.49+47.38+60.25m2	Le Minh Xuan Commune	unclear	unclear	MOH Binh Chanh district people"s committee

3	a. Loss at Lands requiring the right to use 636.8m2 b. Loss at house103.34m2 c.Loss at shed12.4m2	Nguyen Thi Thi (5 peoples)	a) The resettlement minimum plot is prepared one is nearby VINH LOC B and the other is AN HA in the 7.5 km left northeast (RAP) b) For houses, structures affected shall be compensated by the value of new houses/structures with similar technical standards.(Clause 1, Article 89, the new Land Law) Support for resettlement (Article 82, the new Land Law)	ARAP(MOH) Clause 1, Article 89, the new Land Law Article 82, the new Land Law	MOH Binh Chanh district people"s committee
4	a. Loss at Lands requiring the right to use 827.4m2 b. Loss at house 730.19 ㎡ c. Loss at shed 35.25m2	Nguyen Ngoc Huong (6 peoples)	Ditto	Ditto	Ditto

(September 30,2014;by Survey Team)

16-2-4. Establishment of Appropriate and Accessible Grievance Mechanisms

The representation from the resident is dealt with according to land law and Decree181. (Decree197 Article49)

It assumes the duty which the district level commissar meeting adjusts.(Decree197Article43)

In this project, Binh Chanh district commissar meeting should do. (Binh Chanh district commissar)

16-2-5. Institutional Framework for Implementation (Specifying the Organization for Resettlement and Its Responsibility)

Responsibilities for the compensation process of govermental organizations or related parties are described in the below table.

Table 16-38 Responsibilities for compensation process of each institution

Compensation process	Organization in charge; Binh Chanh district commissar meeting	Organiztion of this project
Entirety	It is stipulated that the State organizes land acquisition, compensation, resettlement and the State has a responsibility in the entirety. (Decree197 Article3) Practical business is conducted by People"s committees at province, district, and commune levels.	VIETNUM
Fund	Project owner, Investor;	The Hospita project site 10ha is MOH. Industrial Zone is Saigon VRG
Plan –making	People"s committee at province level and city level under direct control decide compensation plan and amount, etc.(Decree 197 Article 43)	Ho Chi Minh City commisser meeting

Plan implementation	People"s Committee at district and commune levels provide residents with information, coordinate practical business with residents of the same level, committees of compensation, assistance, and resettlement, departments of relevant governmental organizations, investors etc.(Decree 197 Article 43)	Binh Chanh district commissar, Le minh Xuan commune
Monitoring	Monitoring is not clearly stipulated. However, it is stipulated that the Ministry of Finance leads the implementation of compensation, assistance and resettlement policies etc. and check them. The Ministry of Plan Investment has responsibilities in making resettlement plan, leading of implementation and investigation (Decree197 Article 46) ; The representation from the resident is dealt with according to land law and Decree181. (Decree197 Article49), People"s committees at District level have responsibilities in coordination(Decree197 Article 43).	Binh Chanh district commissar (Hearing)

Source: Created from Decree197

16-2-6. Implementation Schedule; After the loss assets compensation payment completed, physical resettlement begins.

RAP describes that Time of land acquisition: likely to be in 2015 and Time of implementation of compensation, land clearance: likely to be in the 1st quarter of 2015. (RAP)

(See Table 16-14 The EIA application procedure work schedule)

16-2-7. Financial Plan and Fiscal Resources

The development of the land foundation is specified. (Decree69 Article25-26, 34-35)

1) There are following description. (Decree 197 Article 39, Decree 69 Article 25)
   - The provincial level People"s Committee, considering the regional situation, shall delegate the resettlement service to
   a) Committee of Compensation, Support, Resettlement of district level or
   b) TheLland fund development organization.
   (a) and b) are belong to the commissar meeting.)
2) About the land fund development organization, there are addition entry in Decree 69 Article 34, 35, a purpose and a duty and the following contents of the organization establishment were written, being the first time.
   - There is a qualification to reserve 30 - 50 % of the state income through the use and the loan of the land in the commissar meeting of the Ministry levelfor the establishment of the land fund development organization. (Article34: Fund for Land Development)

Binh Chanh District People"s Committe council does a procedure of compensation for resettlement for the project site under the guidance of HCMC. (Binh Chanh district commissar, 28 February 2014)

However, MOH will bear the cost burden for the project site 10ha. (ARAP)

16-2-8. Monitoring System of Enforcement Organization and Monitoring Form

As for the monitoring, it isn't clealy prescribed.

However, it is prescribed when Ministry of Finance guides and checks the implementation of the resettlement policy. Ministry of Planning and Investment assumes the working-out of a relocation plan, the guide of the implementation, and the duty of the investigation. (Decree197 article46)

It is comfirmed that Binh Chanh district commissar shoud do the monitoring of the project sight. (Binh Chanh district commissar)

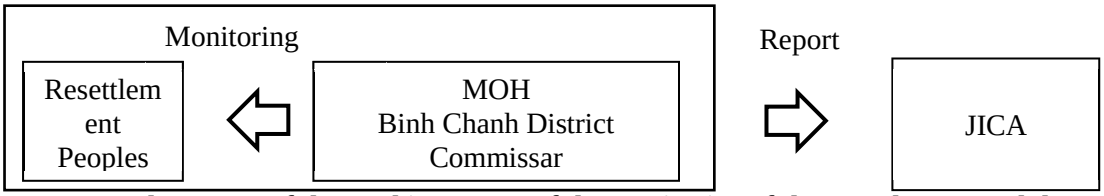


Figure 16-22 The system of the working report of the monitoring of the resettlement and the compensation

16-2-9. Participation of and Explanation to People Affected by the Project

According to Vietnamese regulation, 3 times of briefings for local residents have been held by 30th September,2014.

Table 16-39 The 1st meeting of Participation of and Explanation to People Affected by the Project

Title	Reflection of comments of local people on detail planning 1/2000 of the the Le Minh Xuan Industrial Zone (IZ) and the adjacent residential area
Date	March,14,2013
Place	The meeting held in the meeting room of People"s Committee of Le Minh Xuan Commune (Le Minh Xuan CPC)
To	People"s Committee of Binh Chanh District (Binh Chanh DPC) The department of Urban Administration of Binh Chanh District
Attendants	85 peoples
	Total delivered voting paper: 85 – total collected paper: 72 • Agreement on the governmental policies on the establishment of Le Minh Xuan IZ 3 and agreement on the detail planning 1/2000: 72 votes • Agreement on the city policies on the establishment of the adjacent residential area serving the IZ and agreement on the detail planning 1/2000: 72 votes
	Other comments include: • A request to keep the current residential area on Vo Huu Loi Street to avoid movement, clearance and compensation • A request for a planning of effective treatment for hospital waste, industrial wastewater and of green area distribution • An assurance that trees are properly planned between the IZ and the adjacent residential area • An assurance that the water treatment area is planned the detailed planning 1/2000 not to cause any pollution • The construction of the IZ shall cause no pollution and water disposal shal not affect to the hospital. • The treatment system for disposal, emission, and smog must be standardized to ensure the health safety of local people. The resettlement area should be given preferentially to compensate receivers. The construction vehicles should be kept to avoid properly any inconvenience to local traffic. • The IZ construction shall ensure the environmental hygiene and cause no pollution by the industrial water. • After the proposal of planning is approved, the investigator shall invite local people for a meeting to explain the planning and inform the compensatory rate, planning period to avoid the plan prolonged and group complaint. • It is necessary to construct the adjacent residential area before the IZ construction to ensure the accommodation for evacuated households. Schools and play grounds for children should be built in the residential area. This is the report of local people"s comments on the detail planning 1/2000 of the Le Minh Xuan Industrial Zone (IZ) 3 and the adjacent residential area serving the Industrial Park in Binh Chanh District. On behalf of CPC Chairman (signed and stamped) Tran Quang Sang

Table 16-40 The 2nd meeting of Participation of and Explanation to People Affected by the Project

Title	About the 1/5000 Master Plan of Le Minh Xuan Industrial Zone3 and Residential Area
Date	8 and 10 o'clock of 17th June 2014
Place	Le Minh Xuan Commune
To	People"s Committee of Binh Chanh District (Binh Chanh DPC) The department of Urban Administration of Binh Chanh District
Attendants	8 o'clock ; 54 peoples, 10 o'clock ; 49 peoples
	All the members agreed with Master Plan of Le Minh Xuan Industrial Zone3 and residential area in Binh Chanh district.

	Note points • Environment should be kept by the Law during the project. • It is necessary for appropriate Resettlement Action Plan for receiving support measures to bring life back to normal. • Changing job training and the creating of employment should be done so that they can participate in the economic activity of the project in future. • A new welfare facility should be constructed along the development of the district. • Almost all land is managed by HPC CO., LTD, the implementation of the clearance and the work to deliver land to the investor should be early. On behalf of CPC Chairman (signed and stamped) Tran Quang Sang

Table 16-41 The 3rd meeting of Participation of and Explanation to People Affected by the Project

Title	**Ref: An excerpt from Meeting Minutes of Policy Announcement for the Construction Project of Cho Ray Second Hospital (Vietnam cerpt from Meeting Minutes o**
Date	08:30 AM, September 27th, 2014
Place	Meeting room at Le Minh Xuan Commune of Policy Announceme (CPC)
Attendants	1. Mr. Vo Thanh Cong Le Minh Xuan CPC Vice chairman 2. Mr. Nguyen Quoc Tuong Representative of Cho Ray Second Hospital 3. Mr. Nguyen Anh Thi Representative of Ho Chi Minh City Plant Company 4. Mr. La Dieu Van Representative of District Compensation Committee 5. Mr. Nguyen Ngoc Thuong Representative of household 6. Ms. Pham Thi Xuan Hong Officer of New Rural Development Programme Chairperson: Mr. Vo Thanh Cong Minutes Keeper: Ms. Pham Thi Xuan Hong
	Content of the minutes followed by the meeting progress: 1. Representative of CPC ● Presentation on documents about the Second Cho Ray Hospital: Decision No. 4400/QD-BYT dated 09/11/2012 by the Ministry of Health on the approval of investment preparation for the investment project of constructing the Second Cho Ray Hospital; Document No. 185/UBND-CNN dated 14/01/2012 by Ho Chi Minh City's People Committee (HCM CPC) about the investment on Le Minh Xuan 3 Industrial Zone; Document No. 1885/UBND-DTMT dated 22/04/2013 by HCM CPC about the location for the construction of Cho Ray Second Hospital in Le Minh Xuan Commune. ● Presentation of guidelines, laws and policies of the Government and listening to feedbacks, requests and comments from affected households. 2. Comments from households ● Agreement on the Government lapolicies about the construction of Cho Ray Second Hospital (Vietnam – Japan Friendship Hospital) which will serve the social security demands of the people. ● Agreement on land delivery for the implementation of the project. ● Requests to relevant competent organization for the implementation of compensation, support and resettlement to ensure lives of the people. The was adjourned at 9:15 AM on the date.

	Minutes Keeper (Signed) **Pham Thi Xuan Hong**	Meeting Chairperson (Signed and Stamped) **Vo Thanh Cong**

It is necessary to give an explanation about the resettlement and the compensation to the affected people who had a right to the buildings and agricultural land, which are in the project site at present. It is also necessary to proceed with agreement of land acquisition and resettlement.

It has been confirmed by the field survey, that the drawing of the area development project was officially announced on a bulletin board on the opposite side of the commune office at the project site.

Figure 16-23 Bulletin Board with the Drawing on the Opposite Side of the Commune Office

Figure16-24 Drawing of the Area Development Project on the Bulletin Board

16-2-10. Items that the Vietnamese Side (Enforcement Organizations and Related Organizations Should Accomplish for Realization of the Project

- According to the Environmental Protection Law of Vietnam, this project is subject to EIA. The EIA application for Cho Ray Second Hospital located published by MOH on July 2014. The EIA for Cho Ray Second Hospital must be approved by the examining authority before the conclusion the Loan Agreement (L/A) with JICA.
- The land use plan 1/5000 and the area development detailed plan 1/2000 must be approved by HCMC immediately.
- It is necessary for the Vietnamese enforcement organization and related organizations to take coordinate the General Construction Plan Binh Chanh District-Ho Chi Minh City and Cho Ray Second Hospital Development Project.
  It is also necessary for them to settle the site, and all neccessary road and circumference infrastructure such as a newly planned drainage line; these infrastructures must be constructed before the completion of this project.
- Conforming "The Guidelines for Environmental and Social Consideration (April 2010, JICA)", it is necessary to conform with Vietnamese law and to acquire the right to use of the project site by RAP.

16-3. Others

16-3-1. Monitoring Form

The monitoring form was created based on 16-1-9. Monitoring Plan.

Table 16-42 Monitoring Form

1. Authorization and resident explanation

Monitoring item	Status during the report period
Site measure, Circumference measure, Boundary representation, Resettlement, Compensation, Land concessionaire	

2. Landfill Soil

Item (units)	Measure (Average)	Measure (Max)	Measure	Local standard	Reference international standard	Reference international standard	frequency
Asen (As)				QCVN 03:2008/BTNMT Do not be detected		1time/5,000 ㎥	Before a conveyance, Collection field
Cadimi (Cd)				QCVN 03:2008/BTNMT 0.001 mg/kg			
Cu				QCVN 03:2008/BTNMT 0.25 mg/kg			
Pb				QCVN 03:2008/BTNMT 0.01 mg/kg			
Zn				QCVN 03:2008/BTNMT 0.10 mg/kg			

3. Pollution abatement
[Under Construction Stage]
- Air quality

Item (units)	Measure (Average)	Measure (Max)	Measure Construction Site Position1	Measure Construction Site Position2	Local standard	Reference international standard	frequency	Remarks (Measurement site, frequency, method, etc.)
Tempe -rature								
Humidity								
Wind speed								
SO2					National technical regulation on ambient air quality (QCVN05:2009/BTNMT) 350 µg/Nm3/hour, 125 µg/Nm3/24hour, 50 µg/Nm3/year	The Clean Air Act / Japan 0.1ppm /hour 0.04ppm/hour/ 24average	1times /3months	
NO2					National Technical Regulation on Industrial Emission of inorganic Substances and dust (QCVN19:2009/BTNMT) 850 mg/ Nm3 (B)	The Clean Air Act / Japan 0.04-0.06ppm/ hour/24average		
CO					National technical regulation on ambient air quality (QCVN05:2009/BTNMT) 30,000 µg/Nm3/hour, 10,000µg/Nm3/8hour 5,000µg/Nm3/24hour	The Clean Air Act / Japan 10ppm/hour/ 24average And 20ppm/hour/ 8hour average		

Dust					National Technical Regulation on Industrial Emission of inorganic Substances and dust (QCVN19:2009/BTNMT) 200 mg/ Nm3 (B)	The Clean Air Act / Japan Reglrar 0.04～0.7g/ Nm3 Special 0.03～0.2g/ Nm3		

-Waste water quality (Construction Stage)

Item (units)	Measure (Average)	Measure (Max)	Measure Construction Site At the storm drain	Local standard	Reference international standard	frequency	Remarks (Measurement site, frequency, method, etc.)
pH				National technical regulation on industrial wastwater (QCVN14:2008/BTNMT) 6-9	The Water Pollution Prevention Act/Japan 5.8～8.6	1time /3months	
Colour				National technical regulation on industrial wastwater (QCVN24:2009/BTNMT) 70mg/l(B)			
TSS				National technical regulation on industrial wastwater (QCVN24:2009/BTNMT) 100mg/l(B)	The Water Pollution Prevention Act/Japan 200mg/l 150mg/l/ 24hour average		
BOD5				National technical regulation on industrial wastwater (QCVN14:2008/BTNMT) 30 mg/l	The Water Pollution Prevention Act/Japan 160mg/L 120mg/L/ 24hour average		
COD				National technical regulation on industrial wastwater (QCVN24:2009/BTNMT) 100mg/l(B)	The Water Pollution Prevention Act/Japan 160mg/L 120mg/L/ 24hour average		
Total N				National technical regulation on industrial wastwater (QCVN14:2008/BTNMT) 15mg/l	Ministry of the Environment waste water regulations / Japan 120mg/L 60mg/L/ 24hour average		
Total P				National technical regulation	Ministry of the Environment		

				on industrial wastwater (QCVN14:2008/BTNMT) 4 mg/l	waste water regulations / Japan 16mg/L 8mg/L/ 24hour average		
Coliforma				National technical regulation on industrial wastwater (QCVN14:2008/BTNMT) 3000 NMP/l00ml	The Water Pollution Prevention Act/Japan 3,000/cm3		

- Construction Waste (Under construction)

Monitoring item	Status during the report period	Measurement site	frequency
Construction waste		Construction site	1time / 1 month
Hazardous waste			
General waste			

-Soil polution (Under construction)

Monitoring item	Status during the report period	Measurement site	frequency
Oil leaks out from the vehicle, the machine		Construction site	1time/ 1 month

- Noise and vibration (Under construction)

Item (units)	Measure (Average)	Measure (Max)	Measure Construction Site property boundary1	Measure Construction Site property boundary2	Local standard	Reference international standard	frequency	Remarks (Measurement site, frequency, method, etc.)
Noise level					National Technical Regulation on Noise (QCVN26:2010/BTNMT) special place5-21;55dB(A) 21-6;45dB(A) sharing place6-21;70dB(A) 21-6;55dB(A)	The Basic Environment Law / Japan Social welfare facilities gathering area and calmness need area 50dB(A):Day 40dB(A):Night Trunk line traffic area 70dB(A):Day 65dB(A):Night It doesn't apply to the construction work noise.	1time / 3 months	The noise level meter vibrograph
Vibration level					National Technical Regulation on Vibration	The Basic Environment Law / Japan		

					special place6-18;75dB(A) 18-6; background levelsharing place6-21;75dB(A) 21-6; background level	The standard dwelling area affected road traffic vibration 65dB(A):Day 60dB(A):Night		

- Ground subsidence (Under construction)

Item (units)	Measure (Average)	Measure (Max)	Measure Building boundary EAST	Measure Building boundary WEST	Measure Building boundary SOUTH	Measure Building boundary NORTH	frequency	Remarks (Measurement site, frequency, method, etc.)
Ground subsidence							1time / 1 month	Actual survey of difference with design GL

4. Social environment

-Accident (Under construction)

Monitoring item	Status during the report period	Measurement site	frequency
Work related accidents		Construction Site	1time/day
Traffic accidents		Construction Viecl route	

5. Pollution abatement
[In Active Stage]
- Air quality

Item (units)	Measure (Average)	Measure (Max)	Measurement site Frequency Measure						Local standard	Reference international standard
			Ambient air 1time/6months (3years)		Areas of clinical practice 1time/3months (3years)					
			The position close to the waste water treatment system	Location near solid waste storage area and hazardous waste	The position at the x-ray and CT-Scaner,MRI	The position at the lab	The position in the area of radiation therapy	The position in the morgue		
Temperature										
Humidity										
SO2									National technical regulation on ambient air quality (QCVN05:2009/BTNMT) 350 µg/Nm3/hour, 125 µg/Nm3/24hour, 50 µg/Nm3/year	The Clean Air Act / Japan 0.1ppm /hour 0.04ppm/hour/ 24average
NO2									National Technical Regulation on Industrial Emission of inorganic Substances and dust (QCVN19:2009/BTNMT) 1,000 mg/Nm3 (A) 850 mg/Nm3 (B)	The Clean Air Act / Japan 0.04-0.06ppm/ hour/24average
CO									National technical regulation on ambient air quality (QCVN05:2009/BTNMT) 30,000 µg/Nm3/hour, 10,000µg/Nm3/8hour 5,000µg/Nm3/24hour	The Clean Air Act / Japan 10ppm/hour/ 24average And 20ppm/hour/ 8hour average

Dust									National Technical Regulation on Industrial Emission of inorganic Substances and dust (QCVN19:2009/BTNMT) 200 mg/ Nm3 (B)	The Clean Air Act / Japan Reglrar 0.04～0.7g/ Nm3 Special 0.03～0.2g/ Nm3
THC									Total hydrocarbon	The guideline with hydrocarbon concentration in the atmosphere for the generation prevention of the photochemical oxidant / Japan Non- methane hydrocarbon NMHC 0.20ppmC-0.31ppmC/6-9AM
H2S									(QCVN06:2009/BTNMT) 42mg/Nm3	The Clean Air Act / Japan 0.1ppm/hour 0.04ppm/hour/ 24hour average
NH3									(QCVN06:2009/BTNMT) 200mg/Nm3	Odor prevention method enforcement regulations / Japan 1ppm～5ppm

-Medical care radiation doserate (In Active Stage)

Item (units)	Measure (Average)	Measure (Max)	Measure Radiation managem ent area 1	Measure Radiation managem ent area 2	Local standard	Reference international standard	frequency	Remarks (Measurement site, frequency, method, etc.)
Activity of α, Activity of β						(The specifying of Radiation management area and so on) The Radiation therapy business must specify "the Radiation management area "with the sign. 1.The area where there is a fear which exceeds 1.3 mmSv/3months in total of the practical effect dose by the outside radiation and the practical effect dose by the radioactive material in air 2. In the radioisotope that the density of the radioactive material in the surface of the one which is polluted by the radioactive material releases an alpha ray, it is 0.4 Bq/c ㎡. It is the area where there is a fear which exceeds 4 Bq/c ㎡ except it. (The limit of the dose at the facilities and so on) The total of the practical effect dose by the outside radiation in the place, which the laborer always meddles in, and the practical effect dose by the radioactive material in air must be done below the sievert of 1 mmSv/ week. (The receiving limit of the radiation business practitioner) 1. It is necessary for administrator to make the Radiation therapy laborer receives not exceed 100mmSv/5years by the outside radiation in the place, in radiation management area. Moreover, it is necessary to make not exceed the sievert of 50 millimeters per year. 2. It is necessary for administrator to make the Women Radiation therapy laborer receives not exceed 5mmSv/3months by the outside radiation in the place, regardless of the regulation of the preceding clause1. • It is necessary for administrator to make the Radiation therapy laborer receives on the lens of the eyes not exceed 150mmSv/1year, and on the skin not exeed 500 mmSv/1year. • It is necessary for administrator to make the diagnostic woman radiation therapy laborer receives not exeed following value from the time to have been diagnosed as the pregnancy until birth. (being pregnant) 1. As for the practical effect dose by the internal exposure, it is 1 mmSv. 2. As for the equivalent dose to receive to the abdominal surface, it is 2 mmSv.	1time/3months (3years)	The specification measuring machine

- Hospital Wastewater quality (In Active Stage)

Item (units)	Measure (Average)	Measure (Max)	Measure In manholes before discharging	Measure Aftre treatment,hot disinfection	Local standard	Reference international standard	Frequency	Remarks (Measurement site, frequency, method, etc.)
Displacement volume							Daily normal	Actual survey (automatic measurement)
pH					National technical regulation on Hospital wastwater (QCVN28:2010/BTNMT) 6.5-8.5	The Water Pollution Prevention Act/Japan 5．8～8．6	1time /3months (3years)	
BOD5 (20℃)					National technical regulation on Hospital wastwater (QCVN28:2010/BTNMT) 30mg/L	The Water Pollution Prevention Act/Japan 160mg/L (120mg/L/24hour average)		
COD					National technical regulation on Hospital wastwater (QCVN28:2010/BTNMT) 50mg/L	The Water Pollution Prevention Act/Japan 160mg/L (120mg/L/24hour average)		
TSS					National technical regulation on Hospital wastwater (QCVN28:2010/BTNMT) 50mg/L	The Water Pollution Prevention Act/Japan 200mg/L (150mg/L/24hour average)		
Sunfua (measure in H2S)					National technical regulation on Hospital wastwater (QCVN28:2010/BTNMT) 1.0mg/L			
Amoni (measure in N)					National technical regulation on Hospital wastwater (QCVN28:2010/BTNMT) 5mg/L			
Nitrat (measure in N)					National technical regulation on Hospital wastwater (QCVN28:2010/BTNMT) 30mg/L			

Phosphat (measure in P)					National technical regulation on Hospital wastwater (QCVN28:2010/BTNMT) 6mg/L			
Plant and animal oil					National technical regulation on Hospital wastwater (QCVN28:2010/BTNMT) 20mg/L			
Coliforms					National technical regulation on Hospital wastwater (QCVN28:2010/BTNMT) 3,000 MPN/100 mL	The Water Pollution Prevention Act/Japan (3,000/cm3/24hour average)		

-Drainage radiation dose (In Active Stage)

Item (units)	Measure (Average)	Measure (Max)	Measure In manholes before discharging	Measure Aftre treatment,RI disinfection	Local standard	Reference international standard	Frequency	Remarks (Measurement site, frequency, method, etc.)
Activity of α						IAEA TECDOC-100 " Clearance of the material which occurs with the use of the radionuclide about the medical care, the industry and the research " The work in the sewage-treatment plant The receiving limit value of the supplierGa-67:1E8 Bq/y Sr-89:1E9 Bq/y Y-90:1Eq Bq/y Tc-99m:1E9 Bq/y I-131:1E7 Bq/y TI-201:1E8 Bq/y Note: The others need evaluation about the sewage mud.	1time /3months (3years)	The specification measuring machine
Activity of β								

-Quantity of bacteria in Hospitalwaste water (In Active Stage)

Item (units)	Measure (Average)	Measure (Max)	Measure In manholes before discharging	Measure Aftre treatment,hot disinfection	Local standard	Reference international standard	Frequency	Remarks (Measurement site, frequency, method, etc.)
Salmonella							1time /3months (3years)	
Shigella								
Vibrio cholerae								

-Hospital Waste (In Active Stage)

Monitoring item	Status during the report period	Measurement site	frequency
Infectious medical waste ,		Waste strage	1time / 6 months (3 years)
Hazardous medical waste			
General household waste			
Recycling			

- Noise and vibration (In Active Stage)

Item (units)	Measure (Average)	Measure (Max)	Measurement site Frequency Measure						Local standard	Reference international standard
			Ambient air 1time/6months (3years)		Areas of clinical practice 1time/3months (3years)					
			The position close to the waste water treatment system	Location near solid waste storage area and hazardous waste	The position at the x-ray and CT-Scanner, MRI	The position at the lab	The position in the area of radiation therapy	The positionin the morgue		
Noise level									National Technical Regulation on Noise (QCVN26:2010/BTNMT) special place5-21;55dB(A) 21-6;45dB(A) sharing place6-21;70dB(A) 21-6;55dB(A)	The Basic Environment Law / Japan Social welfare facilities gathering area and calmness need area 50dB(A):Day 40dB(A):Night Trunk line traffic area 70dB(A):Day 65dB(A):Night It doesn't apply to the construction work noise.
Vibration level									National Technical Regulation on Vibration special place6-18;75dB(A) 18-6; background levelsharing place6-21;75dB(A) 21-6; background level	The Basic Environment Law / Japan The standard dwelling area affected road traffic vibration 65dB(A):Day 60dB(A):Night

- Ground subsidence (In Active Stage)

Item (units)	Measure (Average)	Measure (Max)	Measure Building boundary EAST	Measure Building boundary WEST	Measure Building boundary SOUTH	Measure Building boundary NORTH	frequency	Remarks (Measurement site, frequency, method, etc.)
Ground subsidence							1time / 6 months	Actual survey of difference with design GL

16-3-2.Environment Check List

Appendix of
"JAPANESE INTERNATIONAL COOPERATION AGENCY (JICA)
GUIDELINES FOR ENVIRONMENTAL AND SOCIAL CONSIDERATIONS
(Translation of Japanese Version) April 2010"

Table 16-43 Environment Check List

Category	Environmental Item	Main Check Items	Yes: Y No: N	Confirmation of Environmental Considerations (Reasons, Mitigating Measures)
1 Permits and Explanation	(1) EIA and Environmental Permits	(a) Have EIA reports been already prepared in the official process? (b) Have EIA reports been approved by authorities of the host country's government? (c) Have EIA reports been unconditionally approved? If conditions are imposed on the approval of EIA reports, are the conditions satisfied? (d) In addition to the above approvals, have other required environmental permits been obtained from the appropriate regulatory authorities of the host country's government?	(a) Y (b) N (c) N (d) N	(a) There are EIAfor the Industrial Zone and the hospital project site. The Hospital EIA must be presented with Feasibility Study (F/S) procedure in Vietnam for National Project authorization. The EIA for Cho Ray Second Hospital was completed in July 2014. (b) As of September 2014, it isn't approved. (c) Since not yet been approved, the existence or non-existence of the conditons is unclear. (d) The application concerning the development of the industrial park is done by the developer. The land use plan including the 1/5000 Industrial Zone drawing and the 1/2000 detailed drawing has been presented. As of end of September, final HCMC permission had not been done. Construction permission is granted after the feasibility study and EIA mentioned are completed.
	(2) Explanation to the Local Stakeholders	(a) Have contents of the project and the potential impacts been adequately explained to the local stakeholders based on appropriate procedures, including information disclosure? Has understanding been obtained from the local stakeholders? (b) Have the comments from the stakeholders (such as local residents) been reflected in the project design?	(a) Y (b) Y	(a) New industrial park plan which contains the hospital has been shown and meetings to the resident done by the development supplier in Vietnam. Briefings for local residents have been held twice,and there are records. (b) When the hospital EIA application is presented, people's opinion gathered by Le Minh Xuan commissar meeting is specified in a part of EIA application. It reflects the request such as the hospital waste and the green tract of land preservation to modify this project in the plan and it is proceeding.
	(3) Examination of Alternatives	(a) Have alternative project plans been examined with social and environmental considerations?	(a) Y	(a) At present, the plan is no basement but reviews whether to build the full or half basement from the point of mesurement for the flood disaster, the influence over the environment, the future extention.
2 Pollution Control	(1) Air Quality	(a) Do air pollutants, (such as sulfur oxides (SOx), nitrogen oxides (NOx), and soot and dust) emitted from the proposed infrastructure facilities and ancillary facilities comply with	(a) Y (b) Y	(a)The facility equipment of the environmental performance below the emission standard value will be installed. (b) Specification fuel will be used.

		the country˝s emission standards and ambient air quality standards? (b) Do electric and heat sources in accommodation use fuel with a low emission factor?		
	(2) Water Quality	(a) Do effluents or leachates from various facilities, such as infrastructure facilities and the ancillary facilities comply with the country˝s effluent standards and ambient water quality standards?	(a) Y	(a) The facility will be equipped with wastewater purification facilities.
	(3) Waste	(a) Are wastes from the infrastructure facilities and ancillary facilities properly treated and disposed in accordance with the country˝s standards?	(a) Y	(a) THE CITY ENVIRONMENT COMPANY (CITENCO) will take on the processing of the city waste.
	(4) Soil Contamination	(a) Are adequate measures taken to prevent contamination of soil and groundwater by the effluents or leachates from the infrastructure facilities and the ancillary facilities?	(a) Y	(a) Building and facility structure, which prevents outflow, will be constructed.
	(5) Noise and Vibration /Ground Subsidence	(a) Do noise, vibrations and Ground Subsidence comply with the country's standards?	(a) Y	(a) It is equipped with soundproof non-vibration in the machine room and so on. Administrators will encourage drivers to drive vehicles at low speed so as not to create noise and vibration. Ground subsidence measure before construction must be done. It aimes that dense pressure sinking of landfill should be made enough. It shoulrd be carried forward early beginning with VN.
	(6) Odor	(a) Are there any odor sources? Are adequate odor control measures taken?	(a) Y	(a) The waste becomes an odor source. Specific container will be used and temporary depository will be constructed at the project hospital.
3 Natural Environment	(1) Protected Areas	(a) Is the project site or discharge area located in the protected areas designated by the country's laws or international treaties and conventions? Is there a possibility that the project will affect the protected areas?	(a) N	(a) The Vietnamese side agreed to double-check that the project site is not included in any type of protected area or subject to any form of environmental regulation and informed to JICA. Biological resources are relatively poor, mainly including terrestrial vegetation, trees, plants and lawn.
	(2) Ecosystem	(a) Does the project site encompass primeval forests, tropical rain forests, ecologically valuable habitats (e.g., coral reefs, mangroves, or tidal flats)? (b) Does the project site encompass the protected habitats of endangered species designated by the country's laws or international treaties and conventions? (c) If a serious impact on the ecosystem may occur, are	(a) N (b) N (c) N (d) N	(a)(b)(c)Same as (1) Protected Areas (d) Sewage disposal facilities will be equipped,and make it consistent. It prevents influence from occurring.

		adequate measures to be taken to reduce the impact on the ecosystem? (d) Is there a possibility that the amount of water (e.g., surface water, groundwater) used by the project will adversely affect aquatic environments, such as rivers? Are adequate measures taken to reduce the impacts on aquatic environments, such as aquatic organisms?		
	(3) Hydrology	(a) Is there a possibility that hydrologic changes due to the project will adversely affect surface water and groundwater flows?	(a) Y	(a) By making a vast area of agricultural land and marshland that reaches 1,000 ha into the industrial park, it is expected that the potential for basement penetration will decline. It is necessary to prepare for flooding from heavy rain in extreme weather.
	(4) Topography and Geology	(a) Is there a possibility the project will cause large-scale alteration of the topographic features and geologic structures in the project site and surrounding areas?	(a) Y	(a) The landfill and readjustment will change the landforms and geological features.
4 Social Environment	(1) Resettlement	(a) Is involuntary resettlement caused by project implementation? If it is caused, are the efforts made to minimize the impacts caused by the resettlement? (b) Is adequate explanation on compensation and resettlement assistance given to affected people prior to resettlement? (c) Is the resettlement plan, including compensation with full replacement costs, restoration of livelihoods and living standards developed based on socioeconomic studies on resettlement? (d) Is the compensation going to be paid prior to the resettlement? (e) Is a compensation policy document prepared? (f) Does the resettlement plan pay particular attention to vulnerable groups or people, including women, children, the elderly, people below the poverty line, ethnic minorities, and indigenous peoples? (g) Are agreements with the affected people obtained prior to resettlement? (h) Is the organizational framework established to properly implement resettlement? Are the capacity and budget secured to implement the plan?	(a) Y (b) Y (c) Y (d) Y (e) N (f) Y (g) N (h) Y (i) Y (j) Y	(a) The project will lead to some involuntary resettlement. As for resettlement area, two are prepared; one is the 800 m vicinity in the north side beyond provincial road from the project site, another is 7.5 km of the northwest. (b) Binh Chanh District People‟s Committee hosted a stakeholder consultation meeting about the project on September 27, 2014. However, it isn't briefing the explanation of the specific of resettlement and compensation contents. (c) Binh Canh district people‟s committee worked out the RAP of the project site 10ha on September 30, 2014. (d) It is to be done before moving on the domestic law. (e) It is done by the RAP. (f) There are no vulnerable groups or people. (g) It implements moving after getting agreement from the resettlement peoples. (h) Binh Chanh district PC is proceeding. And MOH is undertaking budget activities. (i) Binh Chanh district PC confirmed to to do the monitoring after resettlement, too. (j) On the law, Binh Chanh district PC should do the complaint reception and processing..

		(i) Are any plans developed to monitor the impacts of resettlement? (j) Is the grievance redress mechanism established?		
	(2) Living and Livelihood	(a) Is there a possibility that the project will adversely affect the living condition of inhabitants? Are adequate measures considered to reduce the impacts, if necessary?	(a) N	(a) It is no possibility.
	(3) Heritage	(a) Is there a possibility that the project will damage the local archeological, historical, cultural, and religious heritage? Are adequate measures considered to protect these sites in accordance with the country's laws?	(a) N	(a) In the project site and sorrunding there is no cultural heritage.
	(4) Landscape	(a) Is there a possibility that the project will adversely affect the local landscape? Are necessary measures taken? (b) Is there a possibility that landscape is spoiled by construction of high-rise buildings such as huge hotels?	(a) N (b) N	(a) There is no landscape necessary to be considered especially. (b) Since the surrounding area also becomes Industrial Zone, it is not that landscape is impaired by the hospital of this project.
	(5) Ethnic Minorities and Indigenous Peoples	(a) Are considerations given to reduce impacts on the culture and lifestyle of ethnic minorities and indigenous peoples? (b) Are all of the rights of ethnic minorities and indigenous peoples in relation to land and	(a) N/A (b) N/A	(a) (b) There are no ethnic minorities or indigenous peoples.

		resources respected?		
	(6) Working Conditions	(a) Is the project proponent not violating any laws and ordinances with regard to the working environments of the country which the project proponent should observe in the project? (b) Are tangible safety considerations in place for individuals involved in the project, such as the installation of safety equipment that prevents industrial accidents, and management of hazardous materials? (c) Are intangible measures being planned and implemented for individuals involved in the project, such as the establishment of safety and health program, and safety training (including traffic safety and public health) for workers, etc.? (d) Are appropriate measures taken to ensure that security guards involved in the project do not violate the safety of other individuals involved, or local residents?	(a) Y (b) Y (c) Y (d) Y	(a)(b)(c)(d) This project will follow the Vietnamese Occupational Health and Safety Law.
5 Others	(1) Impacts during Construction	(a) Are adequate measures considered to reduce impacts during construction (e.g., noise, vibrations, turbid water, dust, exhaust gases, and wastes)? (b) If construction activities adversely affect the natural environment (ecosystem), are adequate measures considered to reduce impacts? (c) If construction activities adversely affect the social environment, are adequate measures considered to reduce impacts?	(a) Y (b) N (c) Y	(a) Construction machines, materials with low noise and vibration specifications should be used. Conduct dig drainage ditches around construction areas to minimize sediment and other pollutants into the atmosphere. Spraying water on the beltway project areas and transportation routes in the project area to limit to the maximum dispersal of dust into the air. The vehicle uses unleaded gasoline to reduce pollution to air quality with the effluent gas The waste must be sorted and the management according to the kind. (b) The bad influence to the ecosystem doesn't occur. (c) Traffic from construction vehicles will increase. Administrators will encourage drivers to drive safely.

	(2) Monitoring	(a) For items that impact is considered among the above environment items, is monitoring of proponent planned and implemented? (b) What are the items, methods and frequencies of the monitoring program? (c) Does the proponent establish an adequate monitoring framework (organization, personnel, equipment, and adequate budget to sustain the monitoring framework)? (d) Are any regulatory requirements pertaining to the monitoring report system identified, such as the format and frequency of reports from the proponent to the regulatory authorities?	(a) Y (b) Y (c) Y (d) Y	(a)(b)(c) It is prescribed in the environmental monitoring plan based on the plan in EIA. (d) There is a Binh Chanh district plan, and it goes along to that and creates with this report.
6 Note	Reference to Checklist of Other Sectors	(a)Where necessary, pertinent items described in the Roads and Railways and Bridges checklist should also be checked (e.g., projects including access roads to the infrastructure facilities). (b) For projects, such as installation of telecommunication cables, power line towers, and submarine cables, where necessary, pertinent items described in the Electric Power Transmission and Distribution Lines checklist should also be checked.	(a) N (b) N	(a) A road corresponds but is included in this checklist. (b) It doesn't correspond.
	Note on Using Environmental Checklist	(a) If necessary, the impacts to trans boundary or global environment issues should be confirmed (e.g., the project includes factors that may cause problems, such as trans boundary waste treatment, acid rain, destruction of the ozone layer, or global warming).	(a) Y	(a) The project will take measures to prevent disaster in the case of heavy rain and the occurrence of flooding in the facilities. It takes measurement that the hospital design ground should be made 1m higher than the surrounding road.

Chapter 17. Structure of Operation and Maintenance

Chapter 17. Structure of Operation and Mainteance

It is necessary that Cho Ray Second Hospital, as a main body, maintains the building construction, the facility, the equipment, etc. after opening of Cho Ray Second Hospital. The survey team's proposal of maintenance system is described in this chapter.

17-1. Facility Maintenance and Management

17-1-1. Businesses for facility maintenance and management

In consideration of the contents and functions of Cho Ray Second Hospital, following businesses are requred to maintenance and management of facilities.

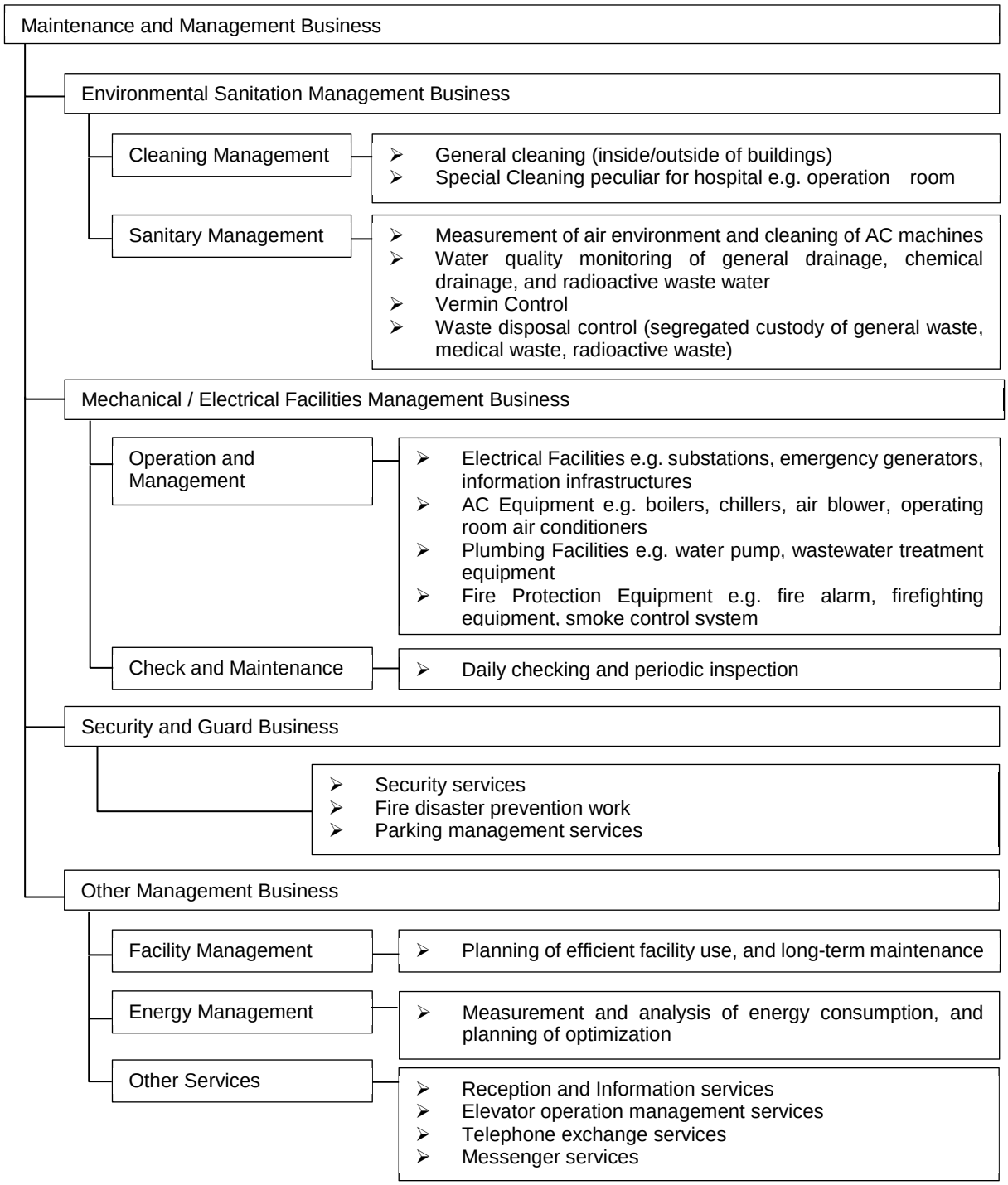


Figure 17-1 Required Businesses for Facility Maintenance and Management

Source: Created by the survey team

17-1-2. Human resources required for facility maintenance and management

Human resources with a high degree of skill and expertise are required for the maintenance and management of Cho Ray Second Hospital, which has a large and advanced facilities.The classifications of necessary professionals are as follows.

Table 17-1 Human resources required for facility maintenance and management

Field	Required Human Resources
Sanitary Management	➢ Cleaning Experts (qualified technicians with the know-how of various cleaning needs of hospitals) ➢ Cleaning work supervisors (supervisors with the knowledge of hospital infection prevention and clean management) ➢ Air and water quality measurement practitioner
Mechanical/Electrical Facilities Management	➢ Electrical engineers ➢ Mechanical engineers ➢ Boiler operating engineer and refrigerator operating engineers ➢ Elevator inspectors ➢ Fire equipment inspectors ➢ Wastewater treatment facilities operating engineers ➢ Radiologists (management of radioactive waste water and waste) ➢ Medical engineers (management of medical gas equipment) ➢ Systems engineer (management of information infrastructures)
Security and Guards	➢ Security guard ➢ Security system manager (operation and management of security monitors, remote control locks, etc.) ➢ Hazardous materials handlers (management of fuel)

At the present Cho Ray Hospital, cleaning work is outsourced, but basically the maintenance management of the facilities is done by the technical expert and the laborer at the in house (Personal employment).

To maintain a building and facilities properly, it is necessary to arrange above-mentioned professional personnel in the in-hospital facility administration section.

Also, it is possible to outsource to the professional who had the knowledge and the know-how of each field, too.

For example, the outsourcing to the guard supplier which does the operation and the management of the monitoring camera and the electric lock, the building management supplier which undertakes the management of the general operation and the maintenance of the facility equipment and so on is thought of.

Also, it is desirable to make an agency and a maintenance contract, and to implement regular maintenance about the advanced facilities of the drainage processing system, the medical care gas system and so on.

17-1-3. Use of BEMS (Building Energy Management System)

Operation of building facilities changes every day according to climate and availability. Facility management shall endeavor to efficient energy consumption by controlling mechanical / electrical equipment to suit varied conditions. BEMS (see the figure below) is a system for monitoring and controlling centrally varied equipment in a building , which records at all times when, where , and what kind of energy is being used, and mekes it possible to track data of actual energy consumption.

It enables to suppress the energy consumption by optimizing the operation of the equipment, and guides to a big energy saving by performing continuous improvement. However, knowledge of data analysis and development of improvement plans is necessary for the use of BEMS, it is desirable to add a contract for technical guidance period to the trader to the introduction of the system.

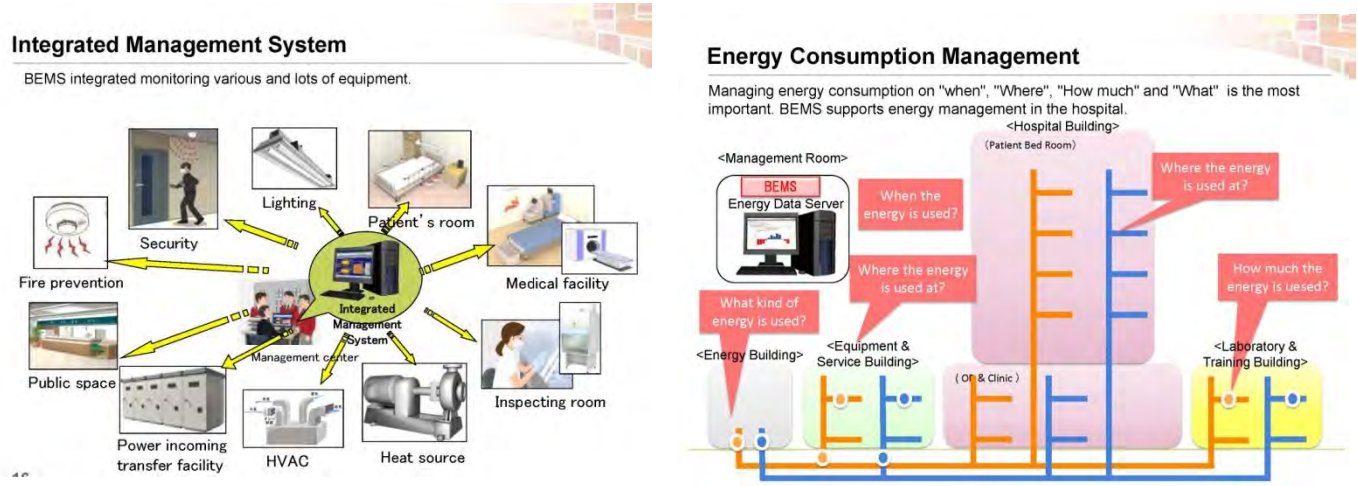


Figure 17-2 BEMS（Building an Energy Management System）

17-2. Operataion and Maintenance of Medical Equipment

The Medical Equipment Department will provide clinical engineering techniques to staff and professional engineers will perform training of staff on regular maintenance and inspection as well as on appropriate operational methods of medical equipment, in order to avoid accidents caused by poor maintenance or mis-operation. Also, medical equipment commonly used in each department, such as artificial respirators, infusion pumps, etc. will be controlled in a centralized manner, for the purpose of effective use of medical equipment and thus for the purpose of rationalization of hospital management.

17-2-1. Task System

Tasks required for management and maintenance of medical equipment are shown in the table below.

Table 17-2 Task system for operation and maintenance of medical equipment

Item	Contents
Provision of clinical techniques	Clinical engineers will provide clinical techniques on preparation for operation, inspection, operation, etc. of life-support systems such as artificial heart-lung machines, artificial respirators, etc.
Management of medical equipment	(1) Relevant equipment The relevant equipment will be ME for diagnostic monitoring and medical treatment used in hospital wards, ICU and the Operation Department. However, medical equipment which is subjects to O&M contracts with manufacturers, such as radiological equipment, examination equipment, rehabilitation equipment, etc. will be excluded from the relevant equipment. (2) Regular inspection Control the inspection records and inspect medical equipment regularly, for the prevention of accidents. (3) Repair and request for repair Concerning requests for repair from each department, classify the medical equipment which can be repaired at Medical Equipment Department and which cannot be, and for medical equipment which cannot be repaired within the department order repairs from external companies. (4) Keeping and control of spare parts and manuals Conduct inventory control of spare parts and collection of manuals of relevant

	equipment. Also, spare parts and consumable stores of relevant equipment will be supplied from the Medical Equipment Department in a centralized manner.
Training on operation of medical equipment	Clinical engineers and external trustee companies will jointly conduct training on the correct operation of medical equipment, for the purpose of prevention of accidents or failure caused by mis-operation.

Source: Created by the survey team

17-2-2. Allocation of control duties of medical equipment

The main medical equipment controlled by the Medical Equipment Department is as following table. Concerning medical equipment which is governed under O&M contracts, such as the X-ray equipment at the Radiology Department, the automated analyzer at the Testing Departments, the measurement/evaluation equipment at the Development Support Department, etc., data on maintenance/inspection records, etc. will be controlled in real time at each department which uses them, and the Medical Equipment Department will share this information as a part of the data control of the whole hospital. The Medical Equipment Department will introduce a system which can control records of lending, inspection, repair, etc. of medical equipment in order to accumulate information on durability, etc. of medical equipment and in order to provide the information needed for selection or procurement of medical equipment.

Table 17-3 Allocation of control duties of medical equipment

Allocation of control duties	Definition	Principal target medical equipment
Centrally controlled equipment	・Medical equipment used commonly at each department, which is maintained, inspected and kept at the Medical Equipment Department and is lent to each department as required. [lending by request]	・Infusion pump, syringe pump, low-pressure retaining suction apparatus, patient monitor (bedside), electrocardiogram telemeter, artificial respirator, ultrasonic nebulizer, etc.
Equipment controlled by each department	・Medical equipment installed in each department, which is maintained and inspected at the Medical Equipment Department. [fixed-number installation]	・Patient monitor (central), electrocardiogram telemeter (central), defibrillator, ultrasonic diagnostic apparatus, electronic scalpel, etc.

Source: Created by the survey team

17-3. Operation and Maintenance of ICT

17-3-1. Task System

The task system necessary for operation and maintenance of ICT is shown below.

Table 17-4 Task system for operataion and maintenance of ICT

Item	Content
Maintenance management of system	(1) Troubleshooting Identification of problem conditions and investigation of causes, resolution of problem (repair), direction of users on the occasion of problem, taking of measures to prevent recurrence (2) Regular maintenance Conduct of regular inspection, conduct of preventive maintenance (prediction and replacing, etc.) (3) Troubleshooting Identification of problem conditions and investigation of causes, resolution of problem (repair), direction of users on the occasion of problem, taking of measures to prevent recurrence (4) Regular maintenance

Item	Content
	Conduct of regular inspection, conduct of preventive maintenance (prediction and replacing, etc.)
Management of system running	(1) Server management Monitoring of server running, monitoring of disk capacity, data backup (2) Management of PC and peripheral equipment Installation of equipment and movement management, setup management of PC, management of backup (3) Network management Movement monitoring of network, setup management of network (4) Server-room management, Management of entry and exit access, equipment management for power supply and air conditioning (5) Virus check for computers Infection check, virus extermination, etc.
Operation management of system	(1) Master management/authority management Registration, elimination, change of various masters and management of utilization authority (2) Regular processing of tasks Schedule management and enforcement management of regular processing of tasks, confirmation of enforcement and completion of temporally required tasks, various statistical processing operations (3) Consumable stores management Replacement of various consumable stores, inventory control of consumable stores (4) Documentation management Development and maintenance of various instruction manuals and operation manuals, development and maintenance of various troubleshooting manuals
System user support	Support of training of hospital staff Response to inquiries related to medical information systems
System planning	Task-management-related system Development of improvement plan for systems Enforcement of improvement plan (securing of budget, enforcement plan, etc.)

Source: Created by the survey team

17-3-2. Human resources needed for operation and maintenance of ICT

The human resources and skills needed for operation and maintenance of ICT are classified as shown below.

1) Human resources needed for maintenance management of systems

Human resources having a skills level equivalent to those of SE or CE of vendors.

2) Human resources needed for management of system running

Human resources having knowledge of basic techniques on information systems such as server, network, etc.

3) Human resources needed for operation management of system

Human resources understanding the operation of Cho Ray Second Hospital
It is desirable for them to have skills on information systems, but it is not necessarily essential.

4) System user support

Human resources understanding the information system of Cho Ray Second Hospital

It is desirable for them to have skills on information systems, but it is not necessarily essential.

5) System planning

Human resources having experience of development of task-improvement plans, and able to apply these to information systems

Among human resources needed for the above the A to E, those who are nearer to the A need a higher level of specialized skills on information systems.

Although it is desirable to employ or develop human resources having specialized skills within the hospital itself, it is rather difficult in many cases. Therefore, it is desirable to outsource information system operations to specialized companies, or to conclude a maintenance contract with equipment manufacturers or agents in the case of high-level tasks.

17-4. Organization for Operation and Maintenance

Because the level of awareness regarding regular inspection and preventive maintenance is still low in Vietnam, it is necessary to construct a system to carry out operation and maintenance operations systematically from a long-term perspective and from the standpoint of facility management. For that purpose, it is desirable to manage the outsourcing tasks systematically under the system as shown in the figure below, through unifying the procurement of materials and services as well as the maintenance management of facilities and equipment at Cho Ray Hospital and Cho Ray Second Hospital. It is desirable to manage systematically; This is to be done in a centralized organization under the control of a president and through placing management supervisors at each specialized department, who can formulate the operation and maintenance plan for the facilities.

Also, by making headquarters ordering about the outsourcing business and the maintenance contract with manufacturers that is more than a certain amount of money, the reduction of the price by the scale merit and the standardization of the quality of the service can be attempted. The small outsourcing procurement needed to facilitate the management of hospital routine, it is assumed to be performed with the privileges of each hospital.

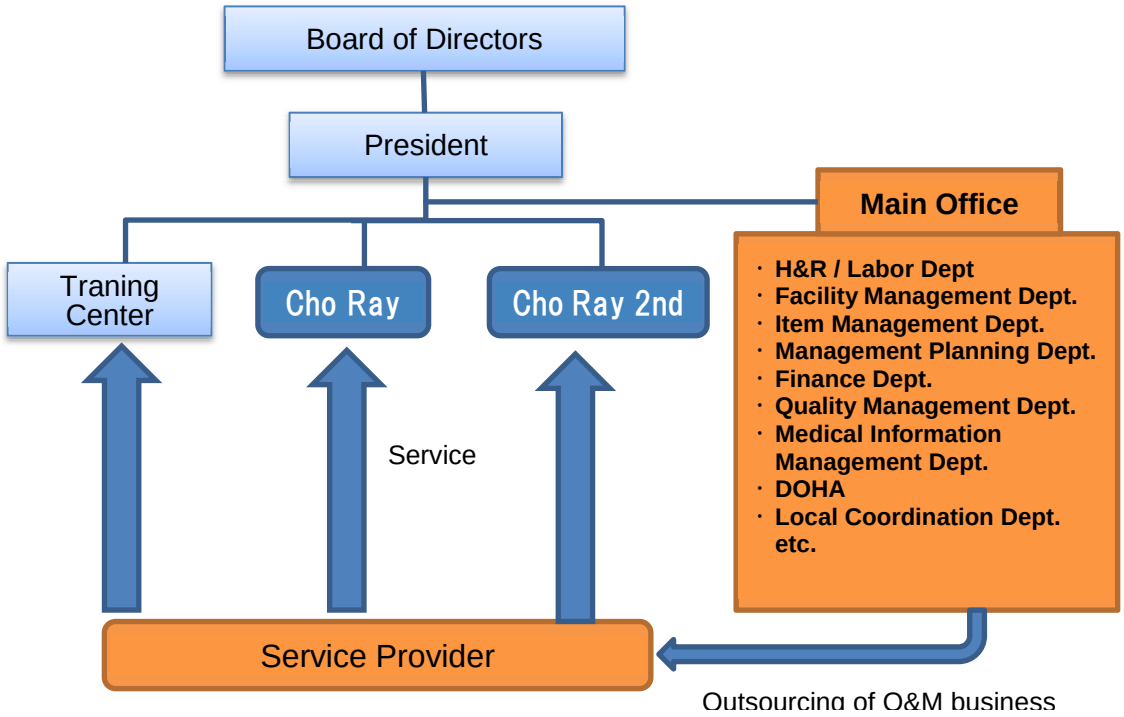


Figure 17-3 Organization of Operation and Maintenance (draft)
Source: Created by the survey team

Chapter 18. Validity of Project

Chapter 18. Validity of Project

18-1. Study on Operation Indicators and Effect Indicators

18-1-1. Operation Indicators

In Chapter 2, we concluded that Cho Ray Second Hospital will reach its full-scale operation stage three years after its opening on the basis of factors such as the acquisition of staff and the gradual transfer of patients from Cho Ray Hospital.

Another consideration concluded that the appropriate quantitive indicator to evaluate the alleviation of overload in the ward and outpatient department at Cho Ray Second Hospital shall be the bed occupancy rate and the number of outpatietns. Other indicators to evaluate the provision of the advanced medical services and the sustainability of the management shall be the number of CT and MRI, considering also their accessibility. The target value of the bed occupancy rate shall be 95%. We estimated the target value of the number of outpatients and CT and MRI by correlating them with the bed capacity of Cho Ray Hospital and Cho Ray Second Hospital. The appropirate indicator to evaluate the team medicine and the communication between hospital staff and the patients and their family shall be the number of clinical pathway.

We concluded that the appropriate qualitative indicator shall be the implementation of the financial management of the departments by PDCA which Cho Ray Second Hospital shall be encouraged to adopt.

The Table below shows the operation indicators and the target value we set based on the above concept.

Table 18-1 Operation indicators

Indicators	Original (Yr 2014)		Target (Yr 2023)	
	CRH	CR2H	CRH	CR2H
Bed occupancy rate (%)	134.9 (2013)	-	95 (average of CRH and CR2H(*1))	
Number of outpatients (person / year)	1,259,697 (2013)	-	1,110,000	630,000
CT (cases / year)	96,892 (2012)	-	79,771	42,120
MRI (cases / year)	17,879 (2012)	-	14,720	7,231
Periodical PDCA conducted by each clinical department	Partially Implemented	-	Implemented	Implemented
Number of clinical pathway(*2)	20 (*3)	-	40	40

*1 : Average = total number of inpatients of CRH and CR2H / total bed numbers of CRH and CR2H

*2 : Definition:

(i) to facilitate communication among the team members and with patients and families

(ii) to coordinate the roles and sequencing the activities of the multidisciplinary care team, patients and their relatives

*3 : All or a part of the current 20 clinical pathways are tentatively planned to be revised by the JICA's technical assistance.

Source: Created by the survey team

18-1-2. Effect Indicators

The medical care zone of Cho Ray Hospital and the expected medical care zone of Cho Ray Second Hospital shall cover the entire area of the south of Vietnam. Accordingly, we examined the effect indicators on the entire area of the south.

We set the number of patients receiving the advanced operations (Super Surgery and level 1) as an effective indicator. The indicator means the number of patients who shall contribute to the economy of

the area by living longer by undergoing advanced operations. The target value shall correlate with the number of beds for Cho Ray Hospital, and with the future number of patients by disease for Cho Ray Second Hospital.

We set the ratio of referral patients to new inpatients, as an indicator to measure the achievement of "advanced medical technology and regional network" which Cho Ray Second Hospital aims at. The target value shall be 70% based on the current value of Cho Ray Hospital. Futhermore, we set the number of trainees from lower level hospitals who complete the training program at Cho Ray Hospital and Cho Ray Second Hospital as an indicator to evaluate the quality of medical services in the southern region of Vietnam.

The Table below shows the effect indicators and the target value we set based on the above concept.

Table 18-2 Effect indicators

Indicators	Original (Yr 2014)		Target (Yr 2023)	
	CRH	CR2H	CRH	CR2H
No. of patients receiving advanced operations (persons /year) (*1)	24,291 (2012)	-	19,999	8,894
Ratio of referred patients to new inpatients (%) *Includes emergency medical service	52.6 (2012)	-	70 (average of CRH and CR-VJH)	
Number of trainees from lower-level hospitals who have completed the training courses in CRH / CR2H (persons / year)	1,394 (2013)	-	1,500	387

*1 : The operations stipulated as “Super Surgery” and “Level 1 operations” in Decision/2590/2004/QĐ-BYT.
Source: Created by the survey team

18-2. Cooperation with Other Projects

18-2-1. JICA Project for Improvement of the Quality of Human Resources in the Medical Service System

Cho Ray Second Hospital will become the top referral hospital of the south. The hospital will accept patients from the other provinces in the south and will operate as an organization providing education (DOHA activities) for lower level hospitals in the south.

At present, JICA is progressing a project in Vietnam, the Project for Improvement of the Quality of Human Resources in the Medical Service System. In the project, needless to say, Cho Ray Hospital needs to play a critical role as central hospital in improving the medical skills of lower level hospitals in the south and medical cooperation among them. Accordingly, to raise the standard of community medicine, cooperation with the Project for Improvement of the Quality of Human Resources in the Medical Service System by JICA is essential; it is expected that the cooperation will lead to improvement of the standard of community medicine all over Vietnam.

18-2-2. JICA Regional and Provincial Hospital Development Project (II)

The project includes both equipment procurement and a training program for capacity building.

The targets of the training include several provincial hospitals in the south, and Cho Ray Hospital will accept the project trainees. The project is also based on almost the same concept of the Project for Improvement of the Quality of Human Resources in the Medical Service System, aiming to raise the standard of the medical service level in local areas. Accordingly, close cooperation with the project for Cho Ray Second Hospital is essential.

18-2-3. Study on Project for Construction of Advanced Japanese Perinatal Medical Center in Vietnam by the Ministry of Economy, Trade and Industry

The project is still in the investigation stage. Further studies are necessary to develop a strategy to establish medical connection between Cho Ray Second Hospital as the top referral hospital of general hospitals and specialty hospitals.

In the sector of obstetrics and gynecology, TUDU Hospital is positioned as the top referral hospital in the south. The project is designed on the premise that perinatal care centers will be constructed in Hanoi, Ho Chi Minh, and Da Nang. It is expected that the perinatal care center of Ho Chi Minh will operate as TUDU Hospital secondary hospital. The project for Cho Ray Second Hospital also includes perinatal care, and accordingly, will place importance on the sector of neonatal care (pediatrics). If complication cases of pregnant women and newborns with diseases, such as cardiovascular disorder, occur at TUDU Hospital or the perinatal care center, it is thought that the patients will need to be transferred to Cho Ray Second Hospital.

18-2-4. JICA Data collection survey on Social Security country report the Socialist Republic of Viet Nam

This investigation organizes information on the social security sector in Vietnam, particularly, information on the situation related to the aging society and the achieved level of and issues with universal health coverage. In the process of progressing the construction project of Cho Ray Second Hospital, it is necessary to adapt the construction project to the result of this investigation. Measures against lifestyle-related illnesses accompanied by the progress of the aging society are also regarded as an important issue for Cho Ray Second Hospital. In addition, this investigation also covers both measures that Vietnam needs to take in the social security sector and the cooperation that Japan will provide to support the measures; these factors will also have a significant influence on the construction project of Cho Ray Second Hospital.

In March, 2014, President Sang of Vietnam and the Cabinet ministers of relevant ministries visited Japan, and a memorandum on the health and medical sector was signed between Japan and Vietnam. To support the health and medical sector of Vietnam comprehensively and continuously in the future, it is necessary to establish an environment in the supporting system of Japan so that JICA and other relevant ministries can share information. Such an environment also needs to be able to promote collaboration and cooperation among organizations implementing the investigations.

18-2-5. The World Bank Tokyo Developmen Learning Center “Vietnam Nurse Traingn Program”

The Tokyo Development Learning Center (TDLC) conducted a new blended learning program enter (TDLC) rganizations implem in collaboration with Vietnam Development Information Center (VDIC) and AHP Network in October-November 2011. This program focused on three subjects which are not covered by the current nursing education curriculum of the Vietnam; rsing education curriculum of the VietnamC) and AHP Network ementing the investigations.can share informationect is designed on the premise that perinatal care centers wgrow the capacity of the overall health sector in Vietnam through innovative learning program design and methods. The perticipants could learn systematically basic knowledges that can not learn in normal and applicable techniques through this program focused on the specific subjects that are not part of the standard nurse education curriculum in Vietnam. Target participants were nursing educators and nurses of phychiatric hospitals in Hanoi and Danang, and participants received a program participation certificate upon completing the program.

This program is expected to contribute to development of nursing human resources for that demand is considered to increase in the coming ageing society through a nurcing education in the missing field in Vietnam, and will contribute in future to nursing of lifestyle-related diseases that the Cho Ray Second Hospital is going to challenge.

18-2-6. Japan Vietnam Culture Association “Da Nang Cancer Hospital Project Support”

This foundation supported the project in cooperation with Da Nang City and Capital Partners Securities Co., Ltd., to establish the first cancer treatment center in the region.

They are going to continue the acitivity of medical equipment donation and mediation linking the Cancer Hospital and Japanese medical businesses.

This is also hospital project by cooperation of Japan and Vietnam, so can be refered as a model for

the construction and operation of the hospital in cooperation with Japan aimed at Cho Ray Second Hospital.

18-2-7. Korea International Cooperation Agency (KOICA) "Construction, Human Resource Development, and Management Support for Quang Nam General Hospital"

Korea International Cooperation Agency (KOICA) announced that they had opened the General Hospital with 500 beds in Quang Nam province in central Vietnam on July 19, 2012.

The hospital, which KOICA has supported the budget of total 35 million dollars (about 2.75 billion yen) and completed through 6 years, is a modern medical facility with latest medical equipments and 450 medical staffs. It is the largest among the grant aid pojects KOICA dealt. The opening of this hospital made it possible to provide a high-quality medical services as well as Quang Nam Province, also residents of 6 provinces of the central Vietnam where health service was not sufficient before.

KOICA actively suppoted also human resource development providing education tailored to the local situation for personnels involved in the health and medical care in the field of clinical madicine, hospital management, health policy, etc. They are going to continue the support of human resource development and management of the Hospital until 2017.

The project can be a reference as amodel for Cho Ray Second Hospital Implementation Project because of the similarity with the direction of the JICA's aim at the support of Cho Ray Second Hospital.

18-3. International Collaboration

Cho Ray Hospital has developed International Collaborations with following institutes.

Table 18-3 Institutions with which Cho Ray Hospital has cooperated

Country	Institutions
Japan	NCGM,Tsukuba Uni.,IUHW, Shiga Uni.,Toranomon Hosp.,Tokyo Metoropolitan Uni.
Korea	Asan Medical Center, Chung Hosp.,Kyung Hee Uni.
Holland	Amsterdam Hosp.
Taiwan	NTUH
France	Montpellier Uni.
USA	Uni. of Wisconsin, India Uni.
Australia	Montpellier Uni.
Singapore	SGH, NUH
Thailand	BGH

18-4. Conclusions

It has been judged, based on the following respects, that the project is valid as a cooperation target project using a loan from Japan.

- The Five-year Plan for Health Sector Development, a Vietnamese health and medical policy, includes various elements, such as preventive medicine, human resources development for the health and medical sector, the development of the health and medical information system, and the enhancement of management capability in the health and medical sector. The project will contribute to these elements.

- The project will accelerate technical transfer to lower level hospitals in the south of Vietnam, and thereby, will contribute to the enhancement of the referral system in Vietnam.

- The project will mitigate the overload on Cho Ray Hospital significantly to improve service for patients. It can be expected, therefore, that the project will contribute to the improvement of the patient satisfaction in the south of Vietnam.

- The introduction of Japanese-style hospital management and operations, the promotion of ICT, and the use of advanced medical equipment in the project will make the hospital a model of quality control in Vietnam. It is expected that the achievements of the hospital will have a ripple effect on

lower level hospitals.


JICA