Republic of the Union of Myanmar
Ministry of Health

REVIEW OF 200-BEDDED HOSPITALS IN MYANMAR: CHALLENGES AND RECOMMENDATION

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This report presents the review of 200-bedded General Hospitals in Myanmar – through assessment of their health service provision, health workers, financing and infrastructures and equipment.

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EXECUTIVE SUMMARY

The purposes of the review were to assess current conditions and challenges of 200-bedded State/Region General Hospital in Myanmar, so that information can be used 1) by the government of Myanmar for national planning and strategy for medical services, and 2) as a basis for future Japanese cooperation with Myanmar in health sector.

Field surveys began in August 2014 until February 2015, targeting 14 general hospitals that selected from 35 general hospitals with 200-bedded or more, in order to assess its infrastructure (building structure and facility), medical equipment, human resources and services they provide. Additional data via questionnaires were provided by 5 hospitals. Assessment was also complemented by the information provided through interviews of officials in the Ministry of Health, other donors and international organizations.

(1) Identified Challenges for State/Region General Hospitals to Become People-Centered Hospital

1) Medium-/Long-term Infrastructure Development Plan for Hospitals is Needed

a. In many hospitals, the several buildings were constructed on ad-hoc bases in order to respond to the demand because of the availability of fund. Different buildings are not situated with planning and consideration, and as a result, there are safety and quality of care concerns as well as loss in efficiency in delivering hospital services.

b. Currently, Ministry of Health develops the annual infrastructure investment plan based on request submitted by each State/Region General Hospitals. There is a need to develop a longer-term investment/master plan for each hospital, together with State/Regional Government, Ministry of Health and State/Regional General Hospital, in order to create environment that people-centered care can be delivered

2) Construction and Facility Standards are Needed for General Hospitals

a. Construction and facility standard for hospital building and other infrastructure need to be developed and enforced by the Ministry of Health, in order to improve safety in the delivery of care.

b. Many hospitals, even newly constructed buildings, have been observed water leakage from the roof; which makes hospitals a breeding ground for mold (obvious health hazard towards patients) and for long-term structural damage to the building.

c. Some buildings, especially ones built in 1960’s have relatively thin pillars and their resistance to earthquake is concern.

d. Many slopes are too steep (compared to Japanese standards) and some buildings do not even have slopes, but only steps; causing safety concerns for wheelchair and patients on stretcher.

e. Allocation of beds for different ward is not optimal in several hospitals: Ob and Gyn, pediatrics, medical and surgical wards tend to be crowded, while ophthalmology and otolaryngology wards have very few inpatients. In the crowded wards, there are too many beds in very limited space and some hospital have beds on the corridor or two babies /children sharing one cot/bed, which create concerns for safety and quality of care for patients.

f. Segregation of clean and dirty area is not standardized, and cleanness in operation theatre and the delivery rooms is not ensured. Infection control for post-operation room and critical care unit (ICU) are not sufficient. These can have critical consequences for patients' prognosis.

g. Medical store is so narrow and pharmaceuticals have been stacked in the staff rooms, causing inefficiency and danger in its working environment.

3) Equipment Distribution and Maintenance Needs Improvement

a. Distribution of medical equipment needs to be better managed – especially for large equipment (e.g. MRI, CT scanner, X-ray machine) – which require special buildings to be built or old-equipment to be removed before the installment of equipment.

b. There are several cases observed the medical equipment that is not requested by the hospitals are delivered and left unused in the hospital.

c. While CT scanner, X-ray, ultrasonography, infant incubator and laboratory equipment are distributed from CMSD last year, but there are insufficient number of equipment, such as patient monitor, ECG, ventilator, suction pump in many hospitals.

4) Improved Allocation of and Training for Health Workforce are Needed

a. There is a need to improve the match between services they can provide (with its infrastructure and equipment) and skills of health staff, especially consultants. Especially where referrals to tertiary hospitals are difficult due to distance, there are substantial needs to train and appoint consultants.

b. Emergency/ICU training is not provided for nurses; and there were request for such training including how to use medical equipment in Emergency/ICU.

c. There is no maintenance person of medical equipment in General Hospital, and laboratory technicians and nurses have to manage the maintenance of medical/laboratory equipment. However, they are not trained nor have skills to fix those issues, and they have to ask CMSD or Medical equipment agent even for minor breakdown. For short-term, there needs to be more proper training for health workers how to use those equipment, and for long-term assignment of medical equipment personnel (biomedical engineers) for each hospital should be considered.

(2) Assessment of 14 State/Region General Hospitals

State/Region	Hospital	Assessment
Ayeyawady	Pathein General Hospital	Hospitals are well-used and crowded, but there are buildings/wards that is not fully utilized. By reallocating patients between different departments, patient congestion can be improved.
Bago	Bago General Hospital	・ Overcrowded at surgical patient waiting area ・ Patients (even critically ill patients) and medical staffs need to be transferred or walk long way to reach their designated places because of fragmented allocation of rooms and equipment. ・ Due to water leakage and damaged structure, it is difficult to maintain high level of cleanness in delivery room and operation room. ・ Insufficient high care unit and isolation rooms in pediatric ward *(In order to build new building, land space needs to be secured)*
	Taungngu General Hospital	Pediatric ward are crowded, but there are buildings/wards that is not fully utilized. By reallocating patients between different departments, patient congestion can be improved. *(In order to build new building, land space needs to be secured)*
Kachin	Myitkyina General Hospital	Building of Maternal and Child Health department ・ Significant structural damage in the building (the cracks on the beam, floor deflection and a roof leak) ・ Insufficient operation rooms (5,000 surgeries per year with 4 operation rooms *(Security concerns exist)*
Kayin	Hpa-an General Hospital	3-story building is already in construction.
Magway	Magway General Hospital	・ Not enough space for inpatients (beds are placed on the corridor) ・ Insufficient space in delivery room and surgical department ・ Due to water leakage and damaged structure, it is difficult to maintain high level of cleanness in operation rooms ・ Significant damage in the outpatient department building (damage on the pillars) *(OT and MRI building is in construction)*
Mon	Mawlamyinaing General Hospital	Ob and Gyn and Pediatrics Ward ・ Extremely crowded; and not enough space for patients *(In order to build new building, land space needs to be secured)*
Rakhine	Sittwe General Hospital	Significant damage in the several buildings which houses pediatric wards, medical ward, surgical ward, ophthalmology ward, and orthopedic ward (Concrete has fallen off from pillars and reinforcing bars (rebar) is exposed.) (In order to build new building, land space needs to be secured; Security concerns exist)
Sagaing	Monywa General Hospital	Hospitals are well-used and crowded, but there are buildings/wards that are not fully utilized. By reallocating patients between different departments, patient congestion can be improved.
Shan	Kyaington General Hospital	The hospital was newly established in 2003 and additional building for CT scanner and laboratory is in construction.
	Loilem General Hospital	Since it is newly upgraded hospital (to 200-bedded hospital), there are several buildings that are relatively new. At the moment, not sufficient health staffs are allocated which limiting the type of services they can provide.
	Women and Children Hospital	There is a need for building update, but relatively well-equipped hospital. (There is a plan to upgrade this hospital to serve as teaching hospital and top referral hospitals for mother and child health)
Tanintharyi	Myeik General Hospital	・ Significant damage in the building (the cracks on the beam, floor deflection and a roof leak) ・ Not enough space for inpatients (patients/beds are placed on the corridor) ・ Water supply and sewage system need improvement ・ Mold and water leakage in the delivery room and the operation room
	Dawei General Hospital	Ob and Gyn and pediatric ward ・ Not enough space for inpatients (Beds/patients are placed on the corridor) ・ Structural damage in the building (Concrete has fallen off from pillars and reinforcing bars (rebar) has been exposed) (Thailand is planning to support the construction of emergency department building)

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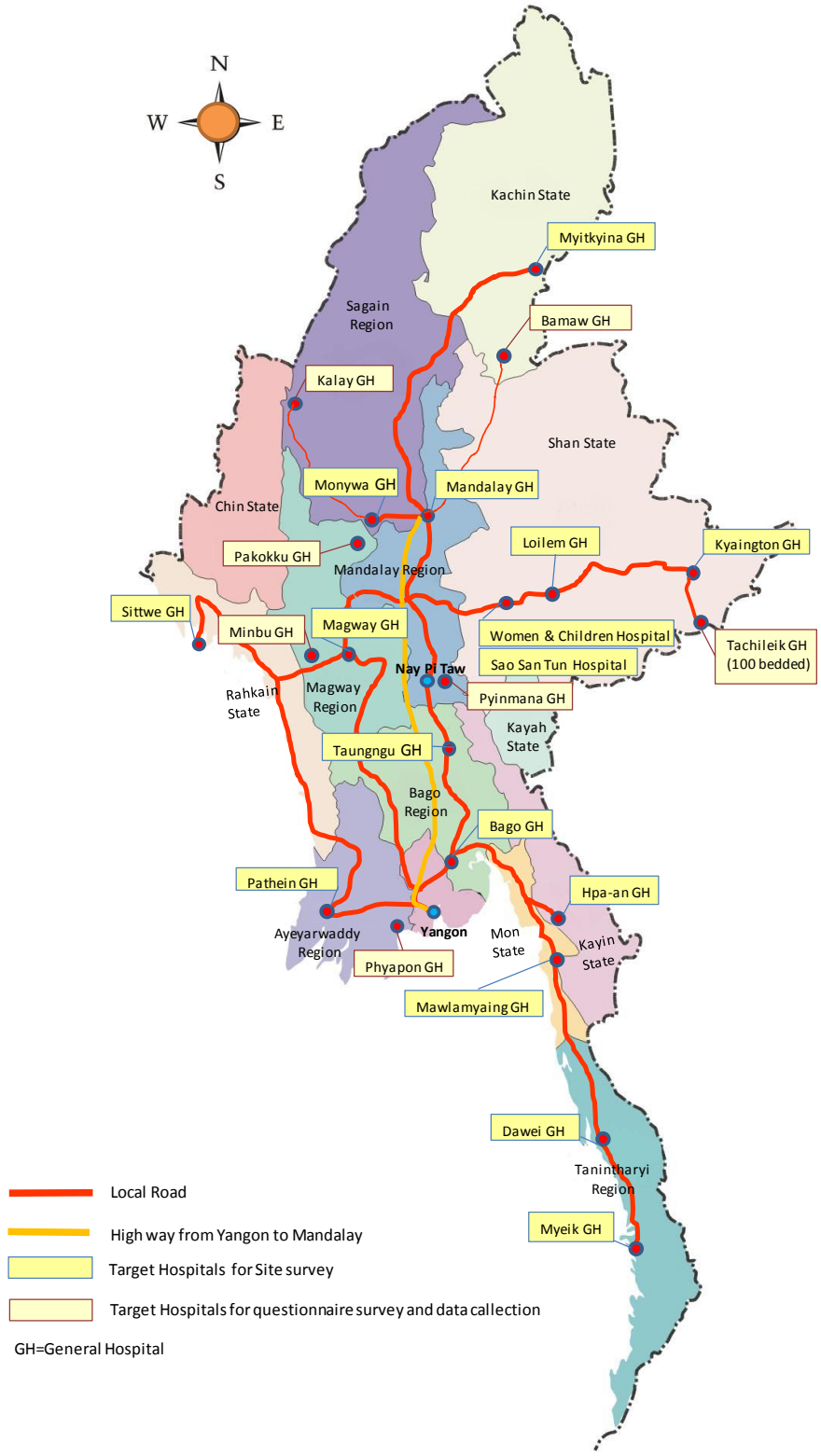


MAP OF LACATION FOR TARGET HOSPITALS

LIST OF AN ABBREVIATION

Abbreviation	General terms
CCSS	Community Cost Sharing System
CCU	Coronary Care Unit
CMSD	Central Medical Store Depot
ECG	Electro Cardio Graph
HIV/AIDS	Human Immunodeficiency Virus / Acquired Immune Deficiency Syndrome
ICU	Incentive Care Unit
ICRC	International Committee of Red Cross
MCH	Maternal Child Hospital
MOH	Ministry of Health
NGO	Non-governmental organizations
NHP	National Health Plan
Ob and Gyn	Obstetrics and Gynecology
RDFS	Revolving Drug Fund System
TS	Township
UNAID	Joint United Nations Programme on HIV and AIDS
WHO	World Health Organization

CHAPTER 1 PURPOSE OF THE REVIEW

1-1 PURPOSE AND BACKGROUND OF THE REVIEW

The purpose of this survey was to understand the current functions and challenges of state/regional general hospitals (henceforth referred to as 200-bedded hospitals) in efforts to identify necessary actions to be taken by the government of Myanmar as well as to consider future support from the government of Japan.

1-2 METHOD OF THE SURVEY

This survey in Myanmar began from 24th August 2014 until 1st March 2015, targeting General Hospitals with 200-bedded in 10 State and Regions. The survey team consisted of experts of hospital management, hospital facilities and medical equipment to assess conditions and challenges of infrastructure as well as in health service delivery.

Fourteen hospitals were selected for the site survey based on previous reports, health statistics, and consideration of efficacy of survey implementation. A questionnaire was also sent to hospitals not selected for the site survey. The following points were examined at each site: 1) facilities including buildings, water supply, sewage disposal and other essential infrastructure; 2) medical equipment; 3) health services provided, including hospital performance and finance and 4) hospital management.

1-3 METHOD FOR ASSESSMENT

Based on the results of the survey, we identified the challenges faced by 200-bedded hospitals. Those shortlisted for the site survey were assessed as follows:

(1) Hospitals that do not have any problems with basic infrastructure, but face other challenges with respect to buildings, equipment and human resources for health and for necessary huge output;

(2) Hospitals that do not have any problems with basic infrastructure, buildings and equipment, but provide limited health services due to lack of human resources;

(3) Hospitals that do not have any problems with basic infrastructure, human resources, buildings and equipment are probably very efficient;

(4) Hospitals that do not have any problems with basic infrastructure, buildings, equipment and human resources do not require support at the moment.

1-4 CONSIDERATIONS IN THE SURVEY

(1) Accuracy of the statistics

There is inconsistency between the data collected from the administrative department and each ward of 200-bedded general hospitals. The reasons for this inconsistency may be caused through collection and aggregation process between the wards to administrative department and we

mainly used data from administrative department of each hospital, and only used data from ward to describe ward specific activity.

(2) Duplication of data collected from questionnaire survey and site survey

Though five hospitals selected for the site survey also answered the questionnaire survey, there were differences in the information provided. This report lists data collected from the site surveys and data from the questionnaire survey if information from the site survey was unavailable.

CHAPTER 2 CURRENT SITUATION OF HEALTH SECTOR AND ITS CHALLENGES

2-1 HEALTH FINANCING

According to the World Health Organization (WHO), the total expenditure per capita on health in Myanmar was US$ 19.8 (2012) and the total expenditure on health was estimated to be approximately US$ 1,045,000,000 (2012). The total expenditure on health as a percentage of gross domestic product was 1.8% (2012) and the general government expenditure on health as a percentage of total expenditure on health was 23.9% (2012)[1]. Drastic increase in government health expenditure was observed in 2010–2011 and 2011–2012

Table 2-1-1 The Changes in Government Expenditure on Health per Capita

	1988-89	2007-08	2008-09	2009-10	2010-11	2011-12*	2012-2013**
Health Expenditure (Million Kyats)							
- Current	347.1	38,368.1	41,362.7	47,275.0	154,625.0	69,244.0	191,371.0
- Capital	117.0	10,379.2	10,080.7	16,521.0	24,744.0	26,708.0	251,832.0
Total	464.1	48,747.3	51,443.4	63,796.0	179,369.0	95,952.0	443,203
Per Capita Health Expenditure (Kyats)	11.8	847.8	881.2	1,078.9	3,000.5	1,589.0	7,268.5

* Provisional actual; **provisional figure.
Source: Health in Myanmar 2013, 2014

Table 2-1-2 The Change in Government Expenditure on Health by Service Providers

Providers (%)	2008-09	2009-10	2010-11	2011-12
Hospitals	70.33	67.89	69.39	69.80
Ambulatory health care	17.54	17.01	14.43	14.63
Retail sale and medical goods	3.84	3.79	3.45	3.86
Provision and administration of Public health programs	2.00	2.51	1.50	1.65
General health administration	0.51	0.50	2.46	3.14
Health related services	1.98	1.82	1.81	2.23
Others	3.80	6.48	6.96	4.69

Source: Health in Myanmar 2013.

Most of the income of general hospitals is funded by the Ministry of Health (MOH), according to the Department of Health Planning, and it covers personnel (labor) cost and fixed costs such as expenses for medical equipment and facilities. The Community Cost Sharing System (CCSS) introduced in 1996 made patients to share financial burden at the time of use and responsible for paying drugs, diagnostic examination and surgery). Of the CCSS's income, 25% is used for salary of staff, 25% for purchasing reagents and drugs and the remaining 50% are returned to the treasury. The poor are entitled to free treatment.

Some district and townships have introduced the Revolving Drug Fund System (RDFS) in addition to the CCSS. This system allows community to buy and sells essential drugs in accordance with the

[1] World Health Organization (WHO), Myanmar

CCSS, and the profits are used to purchase the next batch of drugs. However, with budget increase, quantity of drugs supplied to each health facility has increased and it became possible to provide many essential drugs free of charge since 2012. Since 2013, MOH has also devolved drug procurement duty to hospitals and health departments of State/Regions, so that these general hospitals can purchase necessary drugs according to its needs. However, procurement is a new task for hospital staff to conduct and it incurs logistic burden for them.

2-2 HUMAN RESOURCES FOR HEALTH

In accordance with the Development of Human Resources for Health Programs in NHP 2011–2016, the development plan for health workers, such as medical doctors, dentists, pharmacists, medical technicians and nurses, includes the following points. Approximately 2400 medical doctors and 300 dentists, pharmacists and medical technicians are trained annually. From the years 2018–2019, the enrolment capacity for medical doctors will be decreased to 1200 seats (50% reduction) in order to improve the quality of education provided. From the years 2015–2016, the number of nurses graduating annually will be increased to 1900.

Table 2-2-1 Number of Student admissions and Graduates (Doctors, Dentists, Pharmacists, Medical Technicians and Nurses)

No.	Object / Activity Indicator	Base Year 2010-11	5 Year Plan Period					Total
			2011-12	2012-13	2013-14	2014-15	2015-16	
Production of Human resources for Health								
(a) Production of different categories of medical doctors and allied professionals								
1	Medical doctors	2,036	2,109	2,244	2,311	2,438	2,368	11,470
2	Dental surgeons	269	289	328	274	308	338	1,537
3	Pharmacists	245	257	282	259	306	300	1,404
4	Medical technicians	243	251	282	255	310	300	1,398
	Total	2,793	2,906	3,136	3,099	3,362	3,306	15,809
(b) Yearly student intake in universities of medicine and allied universities								
1	Medical doctors	2,422	2,400	1,200	1,200	1,200	1,400	7,400
2	Dental surgeons	301	300	300	300	300	300	1,500
3	Pharmacists	306	300	300	300	300	300	1,500
4	Medical technicians	310	300	300	300	300	300	1,500
	Total	3,339	3,300	2,100	2,100	2,100	2,300	11,900
(c) Yearly production of nurses								
1	Nurses (B.N.Sc)	273	281	296	293	307	300	1,477
2	Nurses (Bridge)	147	92	100	100	100	100	492
3	Nurses (Diploma)	1,241	1,208	1,234	1,302	1,297	1,500	6,541
	Total	1,661	1,581	1,630	1,695	1,704	1,900	8,510
(d) Yearly student intake in universities of nursing and nursing training schools								
1	University of nursing (B.N.Sc)	307	300	300	300	300	300	1,500
2	University of nursing (Bridge courses)	136	100	100	100	100	100	500
3	Nursing schools (Diploma courses)	1,340	1,200	1,200	1,500	1,500	1,500	6,900
	Total	1,783	1,600	1,600	1,900	1,900	1,900	8,900

Source: National Health Strategic Plan 2011–2016.

The transition of the number of health workers in Myanmar is shown in Table 2-2-2. The total number of doctors is increasing every year, along with the number of doctors working in public sectors. The number of nurses is considered to be low compared to the number of medical doctors, and MOH is currently planning to increase the ratio of medical doctors and nurses to 1:3, which is similar to other ASEAN countries. MOH is also considering devolving the recruitment power of health staffs to State / Region Health Department in the near future in order to help recruit more health workers and decrease the vacancy rates.

The number of health staff in the remote areas is still insufficient. Therefore, government is planning to establish more teaching institutions in remote areas, as they have already done in establishing Myitkyina Nursing School. However, recruitment of students with proper basic academic skills is difficult in these areas because of language barriers, and it has been suggested that teachers who can speak the local language shall be appointed in these institutions so as to improve the knowledge and skills of students.

Table 2-2-2 Transition in number of health workers in Myanmar

Health Manpower	1988-89	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14*
Total No. Doctors	12,268	23,740	24,536	26,435	28,077	29,832	31,542
- Public	4,377	9,583	9,728	10,450	11,675	12,800	13,009
- Cooperative & Private	7,891	14,517	14,808	15,985	16,402	17,032	18,443
Dental Surgeon	857	2,092	2,308	2,562	2,770	3,011	3,219
- Public	328	777	703	756	774	802	782
- Cooperative & Private	529	1,315	1,605	1,806	1,996	2,209	2,437
Nurses	8,349	22,885	24,242	25,644	26,928	28,254	29,532
Dental Nurses	96	244	262	287	316	344	357
Health Assistants	1,238	1,822	1,845	1,883	1,893	2,013	2,062
Lady Health Visitors	1,557	3,238	3,278	3,344	3,371	3,397	3,467
Midwives	8,121	18,543	19,051	19,556	20,044	20,617	21,435
Health Supervisor (1)	487	529	529	541	612	677	652
Health Supervisor (2)	674	1,484	1,645	2,080	1,718	1,850	4,998
Traditional Medical Practitioners							
- Public	290	950	890	890	885	875	1,048
- Private	2,500	5,397	5,737	5,737	5,867	5,979	5,915

* Provisional actual.
Source: Health in Myanmar 2014.

2-3 STANDARDS FOR ESTABLISHMENT OF HEALTH FACILITIES

Regional and state departments of health as well as hospitals are notified about any amendments to the standards of health facilities, which specify departments, personnel, budget and medical equipment, by the MOH. The Hospital Upgrading Project Curative Service (2009) provides information on the standards for health facilities. While this standard of services and medical equipment has not been revised since its publication in 2009, there have been individual notices by the government to install CT scanner in every 200-bedded hospital.

The standards for health facilities, indicated by the Hospital Upgrading Project Curative Service, are described in Table 2-3-1. There are considerable differences between 16-bedded, 25-bedded hospitals, 100-bedded and 200-bedded hospitals. The 200-bedded hospitals have three times the number of sanctioned personnel, 3.9 times the number of administrative positions, 3.8 times the number of medical doctors and 3.4 times the number of nurses compared to 100-bedded hospitals. Additionally, administrative costs in 200-bedded hospitals are 3.3 times that of 100-bedded hospitals.

Table 2-3-1 Number of Health Workers by Hospitals

Category	16 bedded	25 bedded	50 bedded	100 bedded	200 bedded
Administrative positions	2	6	8	29	113
Other	15	49	73	172	481
Sub Total	17	55	81	201	594
Medical Doctor	2	5	7	27	102
Dentist	-	1	1	2	4
Nurse	6	16	23	87	298
Medical Technician	2	8	17	19	62
Other	7	25	33	66	128
Sub Total	17	55	81	201	594
Annual Expenditure (1,000 Kyat)	6,204	22,484	30,108	86,616	289,668

Source: Hospital Upgrading Project Curative Service (2009)

Additionally, the standards for required land size for each level's health facilities are shown in Table 2-3-2. At least 15 acres of land is required for a 200-bedded hospital.

Table 2-3-2 Required Area of Land for Establishment of Hospitals

Category	Approximate Acre of Land
16-bedded hospital	3– 4 acre
25-bedded hospital	4–6 acre
50-bedded hospital	6–8 acre
100-bedded hospital	8–10 acre
150-bedded hospital	10–12 acre
200-bedded hospital	15–20 acre
More than 200-bedded hospital	20–25 acre

(1 acre = approximately 4,050 square metre).
Source: Hospital Upgrading Project Curative Service (2009)

Furthermore, 200-bedded hospitals must have all the features described in Table 2-3-3, according to the answers from the questionnaires of the Division of Medical Care, Department of Health and MOH.

Table 2-3-3 Required Features for 200-bedded Hospitals

Sanctions for 200-bedded General Hospitals	
No. of staff	594
No. of Doctor	102
No. of Nurse	298
Type Clinical Department	Medicine, Surgery, OG Child, Anaesthesia, Orthopaedic, Ophthalmology, Otolaryngology, Radiology, Pathology Mental health, Dental, Forensic Microbiology, Physical medicine, Neuron-medicine, Neurosurgery,
No. of Operation Theatre	3
No. of ICU Bed	2 beds
Type of Laboratory / Imaging Diagnosis Service	Type A laboratory X-ray, CT scanner

2-4 MANAGEMENT AND CHALLENGES OF MEDICAL EQUIPMENT IN MYANMAR

1. Challenges of electricity

   Unstable supply of electricity was observed when a CT scanner was installed in the Hakha General Hospital in Chin State. Therefore, a generator was fitted and it had taken 2 years to complete installation of the CT scanner. However, hospitals may still face budget constraints for gasoline and insufficient solar power generation during the long rainy season in lower Myanmar.

2. Challenges of languages

   There are several local languages in upper Myanmar and other border states where the minorities reside. There is a need to dispatch engineers who can speak the local languages at the time of installation, training and maintenance, but training and retention of those engineers are challenging.

3. Collaboration with MOH

   The Ministry of Health usually purchases medical equipment and completes payment to local distributers before deciding and preparing the destination hospital. Therefore, the purchased medical equipment is often stored for a long time at the CMSD in Yangon until the destination hospitals have been identified. CMSD is responsible for transporting the equipment from Yangon to the hospital, while installation is taken care of by local distributors.

   However, sometimes the medical equipment agencies act on behalf of the transport business. Since the 10% of the payment were withheld by CMSD until the completion of the installation of the equipment and medical equipment distributors often face financial difficulties due to delayed payments. In addition, local distributers reported that the MOH seems to have no clear plan for installation, and sometimes sudden installations are requested by the MOH.

4. Transport of medical equipment

There is a need to consider transport routes carefully due to weather conditions as well as active conflict. In particular, the rainy season in lower Myanmar may cause hindrance for transportation, and security conditions must be considered in some areas. Though transport by airplane is costly, security situations and road conditions may make transport by road difficult. It is required that transport of medical equipment to the Kachin State Bamaw from Mandalay is by ship passing the Ayeyarwaddy river. Transport to Myitkyina is uses trains, while transport to Kyaington is done by land because of long distances. Due to poor road conditions, transport to Kyaington takes one full day. It also takes a long time to transport equipment to Hakha, Chin State by combination of air planes and trains.

5. Maintenance of artificial dialysis devices

The Ministry of Health purchases artificial dialysis and associated products for 1 billion MMK annually. If there are more patients who requires haemodialysis per day, the dialysis devices can be used more efficiently. However, a haemodialysis treatment in public hospital currently charges 15,000 MMK to patients, which is still costly for ordinal citizens (private hospitals charge 40 to 45,000 MMK). Therefore, the number of patients who can afford to continue treatment is still limited and devices are not frequency used, Hence, the hospitals has no incentive to are unable to purchase consumables for dialysis timely manner. Several medical equipment distributors reported that supply of basic medical equipment to all hospitals should be prioritised over haemodialysis because haemodialysis devises require high maintenance costs and infrequent use.

CHAPTER 3 CHALLENGES OF 200-BEDDED HOSPITALS: OVERALL ASSESSMENT

3-1 CHALLENGES OF HOSPITAL FACILITIES (BUILDING STRUCTURE AND ESSENTIAL INFRASTRUCTURE)

3-1-1 Building Structure and Facilities

(1) Exposed reinforcing bars of concrete buildings

1) Rain leakage and mold caused by unexecuted waterproofing work resulting in exposed reinforcing bars

Rooftop slab waterproofing has not been done on any of the reinforced concrete buildings at any hospital. Therefore, some rainwater penetrated into the concrete, causing rain leakage, mould growth and rusting of the concrete reinforcing bars. The reinforcing bars have expanded with the rust, resulting in cracked and spalling concrete and its exposure. This exposed reinforcing bars accelerates rusting and the subsequent damage, resulting in low durability of the building structure. This progression could cause very dangerous situations and potential building collapse, endangering patients and hospital staff.

The mold caused by rain leakage can increase the risk of infection for patients with low immune system function and allergies such as asthma. Some examples of exposed reinforcing bars on pillars and beams are observed in the following hospital buildings:

a. Building 6 (pharmacy, blood donation room and physical therapy room), Mawlamyaing General Hospital (completed in 1962)

b. Building C annex (radiology department), Pathein General Hospital (completed in 1962)

c. Building E (surgery ward), Sittwe General Hospital (completed in 1972)

d. Building 6 (medical care ward and outpatient department), Monywa General Hospital (completed in 1991)

e. Building 19 (Ob and Gyn ward), Myitkyina General Hospital (completed in 1966)

It is necessary to securely waterproof each concrete roof or cover it with a tin roof to protect these facilities.

2) Low strength and durability of the floor

In many hospitals, it was discovered that concrete that covers the reinforcing bars of floor (“a" in Figure 3-1-1) did not have enough depth (Generally, depth of the concrete to cover the reinforcing bars should be 3-4 cm). Some area of concrete of the floor was exfoliated and reinforcing bar of the floor was exposed, which contributes rapid oxidation (rusting) of reinforcing bar. This increases the risk for concrete floor to collapse.

The following hospital buildings were observed to be at risk:

a. Building 1 (the ground floor medical care ward and the first floor surgery ward), Mawlamyaing General Hospital (completed in 1995)

b. Building A (superintendent's office and the paediatric isolation ward), Sittwe General Hospital (completed in 1964)

c. Building 6 (medical care ward and outpatient department), Monywa General Hospital (completed in 1991)

d. Building 2 (surgery ward, emergency outpatient department and others), Myitkyina General Hospital (completed in 1990)

It is important to have proper planning and proper construction management for casting the concrete in order to improve durability as well as resistance against fire. It is also important that repair are done as quickly as possible when concrete exfoliation and cracks are discovered in order to stop the progression of oxidation (rusting) of reinforcing bars.

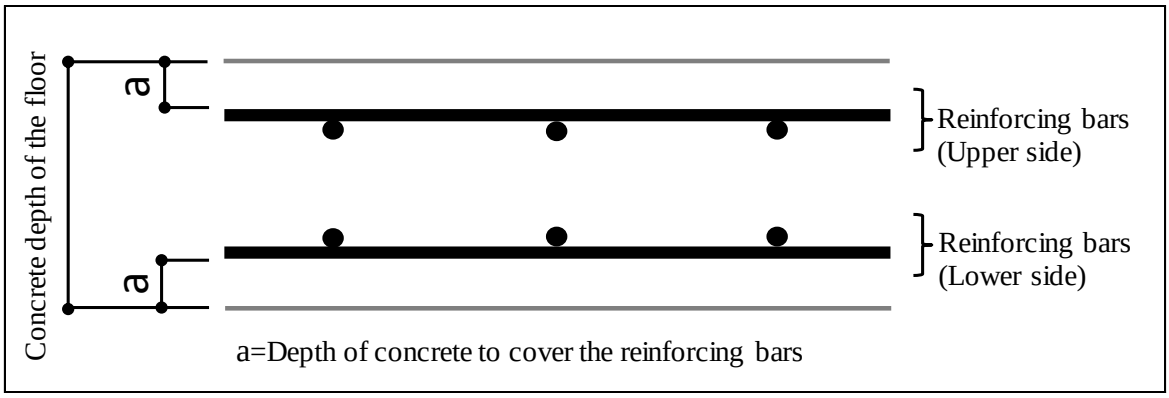


Figure 3-1-1 Cross-sectional view of concrete of the floor

(2) Some reinforced concrete (RC) building, especially those constructed after 1960's, have very thin pillars and its earthquake resistance is concern. The following Hospital buildings have notably thin pillars:

1) 5 buildings (Buildings A–E), Magway General Hospital
2) 9 buildings (Buildings 2–10), Mawlamyaing General Hospital
3) 3 buildings (Buildings A, B and D), Hpa-an General Hospital
4) 1 building (Building I), Sittwe General Hospital
5) 2 buildings (Buildings H and J), Loilem General Hospital
6) 3 buildings (Buildings 6–8), Monywa General Hospital

These pillars were approximately 250 mm square. While it depends on the disposition of earthquake-resistant walls, in general, pillar dimensions of 500-mm square are required at on first

floor of a two-story building. For those building, existing pillars must be reinforced or new facilities constructed to satisfy this requirement.

(3) The steep slopes of patient access

There are several buildings that lack access ramps or if the ramps exists, the slopes are too steep (much steeper than the Japanese standard, which defines safe slopes as being lower than 1:12). Not only that those infrastructure designs is not conductive to the provision of patient-centred care, it also poses threats for injury for patients and those who provides care, including medical staff and patient family members. Some examples of steep slope were observed in the following Hospital buildings:

1) The slope ratio is 1:3 at Building 4 (emergency department and outpatient reception), Dawai General Hospital
2) The slope ratio is 1:7–8 at Building J (outpatients and medical care ward), Loilem General Hospital
3) The slope ratio is 1:7–8 at Building 7 (delivery room and operation theatre), Kyaington General Hospital

(4) In some buildings, departments/wards that require close collaboration/coordination are located far from each other; for instance long distance between obstetrics and gynaecology ward and the delivery room; between the surgical ward, orthopaedic ward and operating theatre. Post-operation and post-delivery patients have to face unnecessary risk during transport between wards and it creates high burden for medical staffs, contributing to the inefficiency of service delivery.

Other examples are: at the Pathein General Hospital, the distance between main operating theatre and the ophthalmology operating theatre requires an anesthesiologist to move between operating theatres and does not allow quick response in case of emergency. These patterns are also observed in Bago general Hospital, Mawlamyaing General Hospital, Kyaington General Hospital and Myitkyina General Hospital.

(5) There is no connecting passage allowing safe movement of patients and medical staff between some buildings at Mawlamyaing Mother and Child Hospital, Loilem General Hospital, Myitkyina General Hospital and other hospitals. Patients are not sheltered from rain during the transfer between buildings, and it causes unnecessary risk of injury and worsening conditions. Therefore, it is important to consider patient flow and ensure safe passageways between buildings at the time of construction.

(6) X-ray facilities in some hospitals do not have appropriate protections against radiation. For example, ordinary steel sheet was used in the X-ray room partition screen at Taungngu General

Hospital instead of leaden doors or partitions. Therefore, it is urgent those insufficient protective doors or partitions to be replaced with those made of lead.

3-1-2 Water supply and sewage system

(1) Drain traps for drain piping such as U-shaped traps (see the following Figure 3-1-2) are not installed in all hospitals, and therefore the stench of sewage and harmful insects travels up the drain pipe and into the facility.

In addition, some sewage systems are not functioned, such as the blocked drain pipes and full septic tanks at the Kyaington and Monywa General Hospitals. In some cases, some sewage collects in side ditches on the outskirts of hospitals, resulting in a foul stench, possible unhygienic conditions and the proliferation of harmful insects. Therefore, all drain pipes should be well maintained to prevent sewage from remaining in the pipes.

- U-shaped trap is a kind of drain trap that has a U-shape in a gravity drain. Its location midway down the drain pipe creates a constant pool of water (termed seal water) in the drainage channel that prevents the escape of noxious odors and pest infestation.

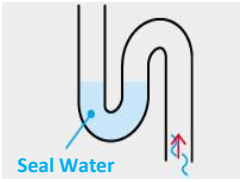


Figure 3-1-2 U-shaped drain trap

(2) Medical sewage from an operating theatre or laboratory is not segregated from the general sewage in most hospitals, with the exception of Myitkyina General Hospital. Infectious sewage, including patient blood or tissues, can leak into the neighbouring area near hospitals and could possibly become harmful to the health of residents and domestic animals. It is urgent to install septic tanks with sufficient storage capacity and sewage drainage systems that segregate medical sewage from general sewage.

3-1-3 Electricity and equipment

(1) There is currently no hospital with a private power generator that could operate automatically when a main electric power supply is disrupted. In particular, it is vital to install automatic backup generators to supply the operation theatres or ICU where medical equipment is used for patient operations or intensive care support. It is urgent to support the installation of domestic and automatic generators and automatic stabilisers (UPS) in the hospitals.

(2) Due to the insufficient number and inefficient disposition of electrical outlets, the multi-outlet extension was found at the operation theatres in all hospitals. This represents a risk of a possible

medical incident such as falling staff by entangling the feet into an electrical outlet and then, removing the outlet of life support equipment. Moreover, there is a danger of fire due to overloading the multi-outlet extensions. Metal equipment in the operation theatre and ventilators, ECG and others may malfunction due to electricity flow. Therefore, it is urgent the operation theatre electrical supplies are properly upgraded.

3-2 CHALLENGES FOR MEDICAL SERVICE DEPARTMENTS

3-2-1 Inpatient ward

(1) Space challenges

Due to increasing numbers of inpatients, especially in medical care, surgery and obstetric wards, hospitals are forced to add more beds than the sanctioned bed. With more beds in limited space create challenges to have sufficient space for appropriate patient treatment.

For example, at Dawei General Hospital of Paediatrics, there were 88 patients required hospitalization with only 65 sanctioned beds at the time of the survey; and some beds are placed on the landing of the hallway or stairwell. Staircase landings have bad ventilation, cleaning in these areas is not sufficient, creating a very unsanitary environment for patients. In addition, the noises due to people's movement are severe, and this noise contributes to an unsuitable environment for patients. In the surgical ward at Monywa General Hospital and surgical and orthopaedic wards at Bago General Hospital, some patients must stay on a bench due to insufficient beds. At Mawlamyaing General Hospital, paediatric patients that cannot be accommodated in the paediatric ward have been placed in other wards.

In Myanmar, some severe outpatients are treated in the ward corridor. This is not ideal environment for safe and quality care for both outpatient and inpatient

While it is not easy to estimate the future demand, it is important to consider how to allocate beds/spaces between different medical departments and consider how to manage the up/down of changing demand when hospital construction is planned.

(2) Shortage of medical equipment for the ICU

In several hospitals, the medical equipment currently installed in ICU (ventilators, patient monitors, defibrillators and others) has not been enough to properly manage patients' conditions. For example, due to insufficient sets of equipment, the ICU at the Monywa General Hospital has been used only once a year. At the paediatric ICU in Mawlamyaing General Hospital, there is only oxygen cylinder that is just for a private room and not for other ICU facilities, and the management of paediatric patients with respiratory infections has not been properly conducted.

While CMSD is increasing the provision of ICU beds, patient monitor ventilators, oxygen concentrators and other equipment, but the quantity is not sufficient and not necessary with other necessary equipment (defibrillator or infusion pumps), it is not well equipped to treat severe case. Provision of appropriate equipment for ICU is needed in order to fulfil its function as General Hospitals.

(3) Separate isolation wards or rooms are not well equipped

In the medical care ward at Taungngu General Hospital, patients with infectious and non-infected patients were in a room only divided by a wooden partition and a separate isolation ward had not been created. Although Loilem hospital has a building with an isolation ward, no patients occupied the facility due to a lack of equipment. It is essential to isolate infectious patients through preparing properly equipped isolation room/ward to control within-hospital infections.

(4) Insufficient attention for the patient centred services.

In all hospitals, there are large rooms without any partitions or curtains. In the surgical ward at Kyaington General Hospital, the genders are mixed and patients lack privacy. Furthermore, it is often that critically-ill or patients in acute phase and patients in recovery share the same room in surgical wards. It is not ideal to mix those patients in the same space – since one requires active treatment and other require rest and recovery. If possible, separate spaces for different type of surgical ward patients are optimal. While it may be difficult to devote substantial resources for non-life threatening of aspects of patient care environment, it is important to place patient-centred care as principle to adhere and considers way to address its challenges within their limited resources.

3-2-2 Operation theatre

(1) Cleanness

The operation theatres at some hospitals do not have a clearly separated clean area for storing disinfectant or sterilised instruments or clothes or specific dirty area for organising used instruments or clothes. In addition, the operation theatres at several hospitals only have one entrance and passage for both patients and medical staff, causing a potentially low level of sterilisation.

In Magway General Hospital, rooms for anaesthesiology consultants are in the clean area, which is beside the operating rooms, and there are frequent in-and-out of medical staff in these area. This is one risk against maintaining cleanliness of the operating room and does not provide sufficient infection control.

It is important to consider the routes/rooms to separate clean items/personnel and dirty items/personnel when new facility/OT are constructed, along with providing in-service training for hospital infection control.

(2) Lack of the space required for sterilisation and no sterilisation equipment in place

For example, at Taungngu General Hospital, there is a lack of sterilisation equipment and no room to perform sterilisation work. In addition, at Bago General Hospital, an autoclave was installed in the laundry room and it is difficult to prepare sterilization of medical tools and clothing. To prevent postoperative infection, there is an urgent need to prepare sterilisation spaces with proper equipment at the time of constructing new operation theatre.

3-2-3 Delivery room

(1) Separated of the delivery room and maternity ward.

At Bago General Hospital, the delivery room is located at the end of a hall that passes through the rehabilitation department on the ground floor. The maternity ward is located on the second floor and people have to pass through the two buildings from delivery room. Generally, relevant departments such as the delivery room and the obstetrics and gynaecology ward should be placed on the same floor to reduce movement for both patients and staff.

(2) The level of cleanness (division of clean and dirty areas, sterilisation of equipment) is low.

In Pathein General Hospital, the autoclave has been placed in the waiting room, which is often crowded and thus sterilised instruments cannot be kept clean. In addition, there are two consultation rooms within the delivery room, and it is difficult to maintain delivery room clean, creating a risk for post-operative infection.

3-3 CHALLEGES OF HOSPITAL MANAGEMENT

3-3-1 Planning and management

(1) Development of master plan for facility is needed

We have observed that many General Hospitals have undergone periodic renovations and extensions in order to address urgent needs to increase its capacity, but often those renovation/extensions are not with careful consideration of flow of patients, medical staffs and equipment. For example, at Taungngu General Hospital, administration buildings are separated from inpatient wards and outpatient departments by an old highway. Staff must cross the busy traffic on the highway without traffic signals. Similarly, at Loilem General Hospital, a building that houses the superintendent’s office and the hospital are separated by a road. It does not allow efficient hospital management loss of critical time in case of emergency.

The Taungngu General Hospital submitted a new construction proposal that included a CT scanner and oxygen plant to the MOH in September 2014. Construction of the oxygen plant has already been completed; however, the CT examination room has remained unapproved. The Women and Children's Hospital (Taunggyi) has applied for construction of new lecture rooms to strengthen its function as a teaching hospital. However, it is yet not clear whether the application has been approved, even though 1 year has passed since it was submitted. Generally, after a hospital has submitted an application for extension or renovation to the Ministry of Health, the Ministry of Health develops an annual architectural plan. However, hospitals are not informed of the longer-term plans formulated by the MOH, and they have no information regarding when the MOH plan will be executed. Therefore, hospitals improvise and conduct renovations or extensions using funds donated by a local government or other donors, sometime resulting non-optimal design of overall facility. It is important for MOH to inform each hospital their long-term plan with clearly outlined time-schedule, so that proper communication can be made with hospitals and other relevant stakeholders to develop master plan, which takes in to account both short- and long-term needs of hospital and allows efficient and effective hospital management.

(2) Capacity building of CMSD – procurement and distribution of medical devices and consumables

During the survey, we have found substantial mismatch between the request from hospital and what has been delivered by CMSD.

At Magway General Hospital, an MRI instrument was provided by CMSD in 2014 without notice and the MRI room is expected to finally be completed in June or July, 2015. At Bago General Hospital, the existing X-ray machine has not been removed, and thus a new X-ray machine has been stored under stairs and yet to be used. At Taungngu General Hospital and Kyaington General Hospital, CT scanners that were provided by CMSD; however, the CT rooms are not yet to be constructed; therefore, those instruments have been stored and unused.

In several hospitals such as the Pathein General Hospital, drugs and consumables were distributed in large quantities by CMSD without notice, and the delivered drugs could not completely fit in their designated warehouse. The staff had to improvise and use a nurse station and duty room for storage.

Furthermore, we found that in the neonatal unit of Myitkyina General Hospital, they applied for a neonatal ventilator to treat asphyxia at the time of delivery; however, they received a ventilator for children that they don’t need and it has been stored unused.

While a new CMSD warehouse has been under construction in Mandalay, the current CMSD warehouse in Yangon region is old and cannot store large amounts of equipment and medicine. Therefore, when large quantities of supplies are delivered, they must be sent to hospitals as soon

as possible. Moreover, all documents are managed using a handwritten record system and electronic record keeping has not been developed. In order to improve the current procurement and distribution function of CMSD, computer-based planning, ordering, storing and distribution system is needed.

Supply chain management projects are currently being conducted by the World Health Organization (WHO) and USAID. Computerised document management and distribution planning of equipment and drugs would help in securing new stores and to improve the physical problems of CMSD.

3-3-2 Management of human health resources

(1) Deployment of health workers and Available Health Services

Appointment rates (out of sanctioned number) for medical doctors at health facilities were as follows: senior consultants, 45%; junior consultants, 48%; assistant surgeons, 83% (in 2013) and for nurses, 61% (2011). The appointment rates varied between hospitals. For example, Sittwe General Hospital had a low rate of consultants (29%) and a high rate of nurses (79%). Conversely, Loilem General Hospital had a high rate of consultants (75%) and a low rate of nurses (24%).

In addition, at Loilem General Hospital, radiologist is absent due to transfer forced hospital to stop providing ultrasonography. In addition, there was no consultant in otolaryngology or ophthalmology; thus, those services were not available at that facility. At Sittwe General Hospital, there is no pathologist; therefore, pathology tests are not available. Therefore, medical services are limited due to the absence of consultants. As described below, the shortage of consultants and technicians makes it difficult to deploy sufficient number of health workers in each hospital. However, it is important to consider the alignment between skills of medical staffs and medical equipment, in order to utilize the limited resources effectively.

(2) Shortage of consultants

Although Myanmar has an insufficient number of neurology and neurosurgery consultants throughout the country, neurology and neurosurgery departments are designated as standard departments at 200-bedded general hospitals. Neurosurgery and neurology departments have not been set up at any of the hospitals and most patients have to be referred to tertiary care facilities. At Myitkyina General Hospital and Monywa General Hospital, general surgeons conduct the relatively easy surgery of subcutaneous haematoma removal surgery due to the long distances from the tertiary hospitals in Mandalay or Yangon.

In the case of a head trauma, cerebral infarction or cerebral haemorrhage, time between the incident and receiving care is critical for patients' survival and prognosis. Especially in the General Hospitals that are far away from the tertiary hospitals, neurologists and neurosurgeons

must be placed as priority to cope with critically ill patients or emergency patients. This specialty should be promoted to ensure the training and development of required consultants.

(3) Medical Equipment Maintenance personnel are needed

Maintenance personnel are not appointed as a sanction throughout all of Myanmar; therefore, there is no maintenance personnel assigned to general hospitals. Thus, laboratory technicians or nurses must improvise to perform equipment inspections and address equipment failures. However, these personnel have no specialty training in medical equipment management that of a biomedical engineer and they are not even aware of the inventory of hospital medical equipment.

Since there are no personnel on the site to repair medical equipment, it must be repaired by a CMSD engineer or directly repaired local agency engineer from Yangon or Mandalay. Onsite hospital equipment repair by and engineer sometimes takes a long time to complete.

The advanced medical equipment is increasingly installed in each General Hospital; thus, general engineers should be trained to perform simple equipment repairs such as infusion pumps and patient monitors and to manage the inventory of medical equipment.

Biomedical engineer training facilities have been developed in Mandalay and similar training schools should be expanded throughout the country to promote increased training of maintenance personnel.

(4) Facility maintenance personnel

Several hospitals have appointed personnel for maintaining electricity, water and sewage; however, building maintenance personnel are rare and are currently only appointed at Magway General Hospital, Sao San Tun Hospital and Monywa General Hospital. Even where personnel have been appointed, it is unclear whether periodic inspections of buildings and facilities have been carried out properly. Therefore, it is important to develop training curriculum and provide appropriate training for facility maintenance so that there are sufficient those personnel are available and appointed in General Hospitals.

(5) In-service training needs for nurses

From interviews of nurses, it was clear that they would like to receive training on severe trauma patient management and ICU patient management. A sister nurse who works in the Myitkyina General Hospital operation theatre and who has received JICA training on ICU management in Japan reported that training on critically ill patient management had not been implemented anywhere in the country; thus, there is an needs for this training. In addition, it was suggested that it would be beneficial for nurses to receive training for how to use medical equipment; since it

has been reported that erroneous operation of relatively simple equipment, such as infusion pumps or incubators, creating needs for equipment repair.

3-3-3 Management of information

(1) Discordant data provided at the medical record office and hospital ward

In Hpa-an General Hospital, the hospital death rate per thousand patients was reported to be 14.44 per 1000 inpatients. Since there were 15,160 inpatients in 2013, there should be more than 200 deaths in this hospital. However, the actual number of deaths reported with major causes of death was only 42.

Although ICD-10 coding is used for death classification, it is uncertain that a diagnosis and classification are done properly, especially performed only by assistant surgeons at night.

There is a well-established reporting system for data to be used in the Ministry of Health annual reports: hospital management department are able to collect and accumulate data by requiring assigned personnel in each medical department/wards of hospital to report data monthly.

However, when survey team asked to provide number of patients who comes from outside of hospital catchment areas, it was not possible to provide data since patient record was not organized to distinguish patients based on their addresses. Similarly, they do not collect the number of patients who were forced to make a purchase medicines or consumables, or frequency and name of drugs with out of stock. Those information are critical to improve services and hospital management.

Therefore, the introduction of an electronic inventory system can improve management of patient records, hospital statistics and procurement and management of inventory on medicines and medical consumables.

3-3-4 Safety Management

(1) Disposal of medical waste

Although guidelines for safe handling of medical waste are being formulated and a manual has being created, there are several hospitals that were not able to implement SOP due to break-down or insufficient capacity of incinerators or local governments' waste collection capacity.

At Sittwe General Hospital, one of the two incinerators is not functioning and the other one is operated daily to dispose needles and infectious medical waste. However, survey team has observed trace of material been burned elsewhere in the hospital compound, probably due to the insufficient capacity of incinerator.

For the case of Taungngu General Hospital, needles were disposed in a bucket with a lid to be taken to the incinerator. However, there is no colour bucket/bag or no other indication for proper segregation of other medical waste. In some hospitals, medical waste including blood and tissues were collected with other general trashes by the local government, while other hospitals dispose of all of their waste in their own facilities.

It is necessary to repeat and update staff training on the segregation and disposal of medical waste, particularly medical waste in order to prevent secondary infection, while equipping each hospital with proper medical waste disposal equipment/facility.

(2) Insufficient protection in X-ray rooms

As described in facilities section, there are X-ray facilities in some hospitals without proper protection against radiation. Furthermore, the X-ray machine control room is located within the examination room and operators are exposed to radiation at some hospitals, except for recently renovated X-ray room in Pathein General Hospital. While protective clothing is available for operators and patient family providing patient support were available at Pathein General Hospital, Bago General Hospital and Sittwe General Hospital, those gears were not available in other hospitals and patient family members has been exposed to radiation. Proper gears need to be provided in order to avoid unnecessary radiation exposure.

3-3-5 Management of medical equipment

(1) Lack of Medical Equipment Maintenance personnel

As it has been pointed out in the previous section, lack of medical equipment maintenance personnel is impacting low quality medical services as well as inefficient use of available resources. In the neonatal unit at Kyaington General Hospital, there is one broken incubator and they have requested a technician from the medical equipment distributors in Mandalay to repair it. However, 4 months have passed and at the time of this survey they are still waiting for the technician.

The closer communication and collaboration between hospital, MOH and CMSD are needed to improve equipment maintenance.

(2) Lack of knowledge and insufficient training on equipment installation, usage and maintenance

In the paediatric ward at Myitkyina General Hospital, an incubator was introduced in 2014 and ward nurses had received user training at the time of installation. However, one-time training was insufficient to understand how to operate machine, and small operative mistake had led breakdown of the machine and incubators were not utilized.

In the Women and Children Hospital (Taunggyi), it was reported that it is difficult to obtain support when equipment breakdowns. When an oxygen concentrator broke down, the hospital staff asked for an engineer from the medical equipment distributor in Mandalay and they have tried to repair the equipment themselves as instructed by the engineer without success.

In addition, in the operation theatre at Kyaington General Hospital, it was reported that a large autoclave was provided to the hospital through the NGO, and one-day training was conducted by the local medical equipment distributor. However, the instruction manual was written in French and improper usage of machine caused the breakdown.

Installation and user training are usually conducted by the local distributors of medical equipment that have a contract with the Ministry of Health, and training content and duration are determined based on the degree of difficulty in operating the equipment. When new medical equipment is introduced, it is necessary to request to local agency of medical equipment adequate introductory training and follow-up training for staff.

(3) Insufficient supply of basic medical equipment (such as sphygmomanometer, suction machine, nebulisers, oxygen concentrators, pulse oximeter, infusion and syringe pump, autoclave, incubator and others).

In almost all hospitals, services to treat several post-operative and trauma patients were limited due to a lack of basic medical equipment required. For example, in the surgical ward at Myeik General Hospital, despite a large number of patients with severe cases or traffic injuries, there is only a blood pressure metre and a steriliser, and the electrocardiograph had to be shared with other wards.

The delivery room at Myeik General Hospital has three delivery beds and there is no foetal monitor or infant warmer, which are required equipment for prenatal management. In addition, in many hospitals, the autoclave was not functioning and boiling steriliser was used instead. Thus, basic and necessary medical equipment should be provided in each inpatient ward in order to ensure timely quality services for patient care.

CHAPTER 4 RECOMMENDATIONS

4-1 AREAS OF IMPROVEMENT AND NECESSARY INVESTMENT

We have summarized the area of improvement and necessary investment needed for the 200-bedded general hospitals along with the following challenges as indicated in the table 4-1-1, 4-1-2 and 4-1-3. Detailed descriptions are provided in the following sections (4-2 to 4-3).

Table 4-1-1 The area of improvement and necessary investment for basic infrastructure and building

		Necessary improvement and urgent investment				
		Basic infrastructure		**Building**		
State/ Region	Name of hospital	**Improvement of Equipment of Electricity, water supply, Sewage**	**Secure the means of transportation for patients (from remote area)**	**New construction or renovation (for urgency)**	**Secure construction site for new buildings**	**Adjustment of space for efficient usage**
Kayah State	Hpa-an General Hospital	×	×	×	-	×
Tanintharyi Region	Dawei General Hospital	×	×	○ New construction for Ob and Gyn and Pediatrics ward, and renovation for existing wards	×	○ Adjustment of space for patient's beds among existing wards
	Myeik General Hospital	○ Water supply	×	○ New construction for Ob and Gyn and Pediatrics ward, Consultation room and Delivery room	×	○ Creation of space for sterilization at existing wards
Bago Region-East	Bago General Hospital	×	×	○ New construction for Emergency OPD, Operation theatre and Pediatrics and Ob and Gyn ward	○ Demolition of a part of buildings	○ Adjustment of space for patient's beds among existing wards
	Taungngu General Hospital	×	×	○ New construction for Pediatrics ward, Medical care ward and CT room	○ Demolition of a part of buildings	○ Adjustment of space for patient's beds among existing wards
Magway Region	Magway General Hospital	×	×	× (Already constructed)	-	×
Mon State	Mawlamyaing General Hospital	×	×	○ New construction for separated building for MCH including Ob and Gyn ward, Pediatrics ward, Neonatal uint, ICU and Laboratory	○	○ Rotation of patients at the time of construction period
Ayeyarwaddy Region	Pattein General Hospital	×	×	○ New construction for Operation theater, Dept. of Radiology and Medical store	×	○ Adjustment of space for patient's beds among existing wards
Rakhine State	Sittwe General Hospital	×	○	○ Necessary for Pediatrics, Medical care and Surgical ward, and OPD	○ Demolition of a part of buildings	×
Shan State-South	Loilem General Hospital	○ Drinking water, Medical gas (Oxygen)	○	○ Necessary for waterproofing of roofs and improvement of steep slope	-	×
	Women and Children Hospital	×	×	○ New construction for Ob and Gyn and Pediatrics ward	○ Demolition of existing X-ray room	×
Sagain State	Monywa General Hospital	×	×	×	-	○ Adjustment of space for patient's beds among existing wards
Shan State-East	Kyaington General Hospital	○ Electricity or Generator	○	×	-	×
Kachin State	Myitkyina General Hospital	○ Water supply, Electricity or Generator	○	○ New construction for Ob and Gyn, Surgical and Pediatrics ward, Neonatal unit, Delivery room and Operation theater	○ Demolition of a part of building	○ Adjustment of space for patient's beds among existing wards
Responsible organization		**MOH**	**MOH**	**DOH, GH**	**MOH,GH**	**GH**

The meaning of the symbols in the table;

○	Necessity for improvement and necessary investment
×	Unnecessary for improvement and necessary investment
-	Any information is not available

Table 4-1-2 The area of improvement and necessary investment for medical equipment

		Medical Equipment			
State/ Region	Name of hospital	**Provision of medical equipment for diagnosis and examination for new buildings**	**Supply of medical equipment for treatment and Furniture (Patient bed, Examination and treatment couch) for new buildings**	**Proper supply of medical equipment for existing buildings**	**Proper supply of drugs and medical consumables**
Kayah State	Hpa-an General Hospital	×	×	○ Equipment relevant to neonatal unit, Diathermy and drills of Orthopedics	○ Drugs such as Antibiotics and Steroid, and operation gloves
Tanintharyi Region	Dawei General Hospital	○ Ultrasound	○	○	-
	Myeik General Hospital	○ Equipment relevant to delivery room	○	○ Equipment relevant to Operation Theatre	-
Bago Region-East	Bago General Hospital	×	○	○	×
	Taungngu General Hospital	×	○	○ Equipment relevant to Operation Theatre	×
Magway Region	Magway General Hospital	×	× (Already supplied)	○	×
Mon State	Mawlamyaing General Hospital	○ CT scanner, X-ray and ultrasound for MCH (These need to be supplied, if new construction site for MCH is far.)	○	○ Suction machine, Incubator, Ultraviolet therapy and Autoclave	-
Ayeyarwaddy Region	Pattein General Hospital	×	○	○ Equipment relevant to Operation theater, Surgical and Medical care ward, Delivery room and Autoclave	○ A part of Antibiotics
Rakhine State	Sittwe General Hospital	×	○	○ Equipment relevant to Surgical and Medical care ward, and Delivery room	×
Shan State-South	Loilem General Hospital	○ CT scanner、X-ray apparatus, Anesthesia apparatus and Sterilizer	○ New construction	○ Equipment relevant to Medical care and pediatrics ward	○
	Women and Children Hospital	○ X-ray apparatus	○	○	×
Sagain State	Monywa General Hospital	×	×	○ Equipment relevant to Medical ward, Pulse oximeters, Infusion Pump, and set for thoracentesis	○
Shan State-East	Kyaington General Hospital	○ CT scanner	×	○ Equipment relevant to Medical ward (Oxygen concentrator, Patient monitor and others), Hemodialysis machine	○ Drugs such as antibiotics and vitamins
Kachin State	Myitkyina General Hospital	○ Mammography	○ Necessary for Operation theatre , delivery room and inpatient ward	○ Equipment relevant to Medical ward, Pulse oximeters, Stabilizer, Defibrillator, Refrigerator, air conditioner for medical store	○ Reagent of laboratory
Responsible organization		**MOH**	**MOH**	**MOH, GH**	**MOH**

The meaning of the symbols in the table;

○	Necessity for improvement and necessary investment
×	Unnecessity for improvement and necessary investment
-	Any information is not available

Table 4-1-3 The area of improvement and necessary investment for human resource for health

		Necessary improvement and urgent investment		
		Proper deployment of Human Resource for Health		
State/ Region	Name of hospital	**Medical Doctor (Consultant)**	**Nurse**	**Maintenance Personnel for medical equipment/ building and facility**
Kayah State	Hpa-an General Hospital	×	×	○ Maintenance personnel
Tanintharyi Region	Dawei General Hospital	○ Increasing no. of Pediatricians	-	○ Maintenance personnel
	Myeik General Hospital	-	-	○ Maintenance personnel
Bago Region-East	Bago General Hospital	○ Increasing no. of consultants	○ Increasing no. of nurses and user training of medical equipment	○ Maintenance personnel
	Taungngu General Hospital	○ Increasing no. of consultants	○ Increasing no. of nurses and training of ICU management	○ Maintenance personnel
Magway Region	Magway General Hospital	-	-	○ Maintenance personnel
Mon State	Mawlamyaing General Hospital	○ Increasing no. of Pediatricians	○ Training of ICU management	○ Maintenance personnel
Ayeyarwaddy Region	Pattein General Hospital	○ Increasing no. of consultants, especially Pathologist	○ Increasing no. of nurses for operation theatre and training of ICU management	○ Maintenance personnel
Rakhine State	Sittwe General Hospital	○ Increasing no. of consultant especially Anesthesiologist	○ Increasing no.of nurses	○ Maintenance personnel
Shan State-South	Loilem General Hospital	○ Increasing no. of consultants, especially Surgeons, Otolaryngologist, Ophthalmologist and Radiologist	○ Increasing no.of nurses	○ Maintenance personnel
	Women and Children Hospital	○ Increasing no .of consultants, especially for Ob and Gyn	×	○ Maintenance personnel
Sagain State	Monywa General Hospital	○ Increasing no. of consultants	○ User training of medical equipment	○ Maintenance personnel
Shan State-East	Kyaington General Hospital	○ Increasing no. of consultants	○ User training of medical equipment	○ Maintenance personnel
Kachin State	Myitkyina General Hospital	○ Increasing no. of consultants	○ User training of medical equipment	○ Maintenance personnel
Responsible organization		**MOH**	**MOH**	**MOH, GH**

The meaning of the symbols in the table;

○	Necessity for improvement and necessary investment
×	Unnecessity for improvement and necessary investment
-	Any information is not available

4-2 RECOMMENDATION TO THE MINISTRY OF HEALTH

(1) Revision of standards for hospital facilities and equipment

Following standards needs to be revised or established:

1) Standards for staffing levels based on the volume and type of services they provide (both outpatients and inpatients)

2) Standards for safety: proper protection from radiation, disposal and management of hospital waste (particularly infectious waste)

3) Standards for hospital infrastructure and equipment including the size of inpatient wards, separation of sterilised and unsterilized areas, guidelines to consider patient and staff movement between wards, and proper electrical and sewage system

Currently ‘Hospital Upgrading Project Curative Service’, which was issued in 2009 and has been officially notified by the DOH and MOH, functions as the current standard for hospital staffing, departments, areas and medical equipment. However, this guide has not been revised since it was issued and has not been adjusted to function with current 200-bedded hospitals.

(2) Development of Long-term Investment Plan

In many hospitals, repeated renovation was done as an improvisation response to address increasing patient numbers and it has led to complicated patient and staff movement between wards. The survey also demonstrated that old buildings have substantial structural damages and it is not conductive to provide patient-centre care in safe environment.

It is important for Ministry of Health to create medium to long-term plan for hospital construction and renovation, with clearly written criteria for prioritization. Those plans should be well formulated through communication with State/Regional government and hospitals. Once it has been determined that MOH would implement the hospital construction or renovation, an adequate budget should be allocated with clear time schedule so that necessary equipment can be purchased and installed on time and hospitals can prepare in advance.

(3) Capacity Building of CMSD

Under the current policy, medical equipment, furniture, and medical consumables will be provided to General Hospitals by the CMSD. The limited space of the CMSD's warehouse in Yangon makes it difficult to properly store all needed goods. In addition, all records and documents are not managed electronically. Therefore, it is difficult to properly distribute supplies because the assessment of consumption for each hospital are not properly monitored or recorded. If CMSD continue to serve as single provider of MOH for those items, information management should be computerised to improve inventory management and distribution planning.

(4) Support for hospital management

1) Deployment of hospital staff

While situations are different at each hospital, there are many hospital with substantial vacancy unfilled. While deployment of health workers in remote regions/states are not easy matter to be resolved, MOH should consider the prioritization and clear planning (with sufficient budget allocation) of staff deployment, through careful consideration of national and regional needs. The staff deployment, especially for consultants with specialized skills, should be considered carefully – whether their skills sets are matched up with the service demand and existence of other resources (medical equipment and other health personnel). For remote areas appointment, additional allowance or provision of staff quarters should also be considered.

2) Training for medical staff

Through this survey, there is both needs and demand from current medical staffs, especially nurses, to received proper training for operating medical equipment. As more advanced medical equipment are gradually introduced in each General Hospital, it is critical those trainings to be provided to team of staffs, medical doctors, nurses, laboratory technicians and others, to improve

its proper usage. Proper training can reduced the frequency of breakdown of medical equipment due to improper operation and allow certain services to be provided more continuously.

3) Medical equipment maintenance personnel

While a biomedical engineer is an ideal person to manage maintenance and inventory of medical equipment, no such person is currently available (thus not appointed) in 200-bedded General Hospitals. Currently, a pharmacist receives new medical equipment in the 200-bedded hospital and he or she distributes the equipment to each ward and department. After equipment was distributed, lab technicians or nurses take responsibility of its management, yet they are neither well-equipped nor trained for its management and maintenance.

It is recommended that proper inventory system to be organised and information to be shared with CMSD, so that distribution of equipment and necessary consumables are done with sufficient quantity in timely manner. For long run, it is desirable that medical equipment maintenance personnel be stationed at all hospitals, and strategy to train biomedical engineers within country should be considered.

However, training sufficient number of such personnel is not feasible in near future; other ways of creating a maintenance system in each State/Region can be considered. If only a few personnel are secured, a maintenance tour of medical equipment may be possible to cover all repairs, provide local instruction to transfer repair and maintenance skills and knowledge to each 200-bedded hospital in the State/Region to address long waits for engineers from local agency of the medical equipment.

4-3 RECOMMENDATIONS TO THE 200-BEDDED GENERAL HOSPITAL

(1) Development of Master Plan

It is recommended that 200-bedded General Hospitals to develop medium- to long-term master plan of their facility and services, with through assessment of current infrastructure situation of buildings/facilities, disease burden, patient demand and behaviours and physician access to the General Hospitals and distance to tertiary referral hospitals, so that future investment can be made based on the real needs and needed resources are properly allocated.

While building and facility standards should be provided by the Ministry of Health, it is recommended for hospital to consider following points when designing new building to improve quality and efficiency of services provision: 1) patient/staff movement between wards, 2) accessibility and risk for injury for connecting corridors and slopes, 3) isolation rooms and wards for infection control, 4) flexibility in allocation of beds between different departments (allowing some beds to share between different departments). Furthermore, it is critical to consider

developing the rolling plan as constructing new building requires well managed relocation of inpatients from existing facilities to new facility with minimal burden to patients.

(2) Information Management and Timely Communication with CMSD

Current records in hospitals are handwritten and data needs to be calculated by hand and using a calculator. Electronic record system needs to be gradually installed (with proper consideration of sufficient electricity) in order to improve provision and monitoring of health services. While management of inventory control or basic statistics can be introduced at first, patient record management should be also considered in long-run. Moreover, training on disease and death classification should be provided in order to improve the accuracy of the information on the leading causes of death in the hospital.

While it is important to improve capacity of CMSD to fix the current mismatch in procurement and distribution of medical equipment, the close communication and timely information sharing between General Hospital and CMSD can improve current situation.

(3) Safety Management

Some hospitals are not well equipped to implement standard waste management because of breakdown/low capacity of incinerator or waste disposal system performed by the local government. While the Ministry of Health is responsible to secure incinerator and warehouse for infectious waste to prevent secondary infection, it is important for General Hospital to address this issue to the necessary stakeholders. Furthermore, the hospital is responsible to handle medical waste properly within the hospital complex, through providing different box/bags for segregating medical waste.

It is also recommended that an X-ray examination room is constructed with proper partitions and doors made of lead in order to provide appropriate protection against radiation. For hospitals with no plan for new construction, the existing partitions and doors made of wood must be replaced. Furthermore, hospital should secure sufficient number of protective clothing for operator and patient.

(4) Health Worker Management

While deployment decisions are made by the Ministry of Health, it is important for General Hospital to demonstrate to MOH the skill needed in each hospital to provide appropriate care for the State/Region.

While properly trained bioengineers are ideal, it is important for hospital to manage and maintain the currently available medical equipment to the best of their ability. If quick deployment of medical equipment personal is not possible, medical staff, such as a pathologist, laboratory

technician, radiologist or others who are familiar with the equipment, should be appointed as medical equipment maintenance personnel and provided with proper training.

(5) User Training for Medical Equipment

It is important for manager of hospital (MS) to consider in-service training for operation of medical equipment, in order to improve effectiveness and efficiency in providing care. The training should be provided at the time of installation of medical equipment with proper follow-up for reminder and newly transferred staff. All personal who will use that equipment should receive those training, regardless of their cadre. If there is language barrier exists for training, proper trainer/translator should be assigned.

Appendix

1. **List of target hospitals**
2. **Schedule for the survey**
3. **List of Interviewees**
4. **Detail Assessment of site-surveyed General Hospitals**
5. **Questionnaires**
6. **Results of Questionnaires**

Appendix 1
List of target hospitals

Appendix 1 List of target hospitals

No.	State/Region	Name of Hospital	Number of beds		Site survey	Answer to the Questionnaire	Remarks
			Sanctioned	Available			
1	Kachin State	Bamaw General Hospital	200	200			Hospital information collected
2		Myitkyina General Hospital	300	420	○		
3	Kayah State	Loikaw General Hospital	200	220		○	Grant aid implemented by Japan
4	Kayin State	Hpa-an General Hospital	200	258	○		
5	Chin State	Falam General Hospital	200	150			
6		Hakha General Hospital	200	130			
7	Sagaing Region	Monywa General Hospital	200	406	○		
8		Kalay General Hospital	200	230			Hospital information collected
9		ShwebuGeneral Hospital	200				
10		Sagaing General Hospital	200	100		○	
11	Tanintharyi Region	Dawei General Hospital	200	250	○	○	
12		Myeik General Hospital	200	220	○	○	
13	Bago Region-East	Bago General Hospital	200	200	○		
14		Taungngu General Hospital	200	280	○		
15	Bago Region-West	Pyay General Hospital	200	280			
16	Magway Region	Magway General Hospital	200	340	○	○	
17		Minbu General Hospital	200	180		○	
18		Pakokku General Hospital	200	240		○	
19	Mandalay Region	Kyauks e General Hospital	200	200			
20		Meiktila General Hospital	200	166			
21		Pyinmana General Hospital	200	175		○	
22	Mon State	Mawlamyaing General Hospital	350	611	○	○	
23	Rakhine State	Sittwe General Hospital	200	298	○		
24	Yangon Region	East Yangon Hospital	200	280			
25		West Yangon General Hospital	200	331			
26		Taenhlyn General Hospital	200	150			
27	Shan State-South	Women & Children Hospital [Taunggyi]	200	200	○		
28		Loilem General Hospital	200	200	○		
29	Shan State-North	Lashio General Hospital	200	300			Grant aid implemented by Japan
30	Shan State-East	Kyaington General Hospital	200	215	○		
31	Ayeyarwaddy Region	Hinthada General Hospital	200	223			
32		Labutta General Hospital	200	200			
33		Maubin General Hospital	200	200			
34		Pathein General Hospital	250	315	○	○	
35		Phyapon General Hospital	200	200		○	

Appendix 2
Schedule for the survey

Appendix 2 Schedule for the survey

1st Field survey conducted from 24th August to 21st September 2014

	Day	JICA	JICA	JICA	Project Manager/ Health planning and Administration	Deputy Manager/ Medical Equipment Planner	Health facility Planner 1	Health facility Planner (Assistant 1)	Health facility Planner (Assistant 2)	Hospital Management and Logistics
		Ms. Hiroe ONO	Ms. Tomoko ONO	Ms. Chiharu HOSHIAI	Mr. Shuichi SUZUKI	Ms. Kyoko GOTO	Mr. Toshihiko SUZUKI	Mr. Kiyoshi UMEGAE	Mr. Terumasa SATO	Ms. Aki TAKAI
1	24, Aug (Sun)	Arrival in Yangon								
2	25, Aug (Mon)	Visit to JICA Myanmar Office			Visit to JICA Myanmar Office / Travel from Yangon to Nay Pi Taw					
3	26, Aug (Tue)	Travel from Yangon to Nay Pi Taw/ Join the meeting with DOH			Visit to Ministry of Health					
4	27, Aug (Wed)	Meeting with DHP/ Travel from Nay Pi Taw to Magway by car			Visit to Ministry of Health	Visit to Ministry of Health/ Travel from Nay Pi Taw to Magway by car				
5	28, Aug (Thu)	Visit to Magway General Hospital				Visit to Dep.of Health, Magway Region/ Survey at Magway general Hospital				
6	29, Aug (Fri)	Travel from Magway to Yangon by air/ Visit JICA Myanmar office/ Leave Yangon for Narita				Survey at Magwey General Hospital				
7	30, Aug (Sat)	Arrival in Narita			Travel from Nay pi Taw to Yangon by car	Travel from Magwey to Yangon by car				
8	31, Aug (Sun)				Documentation Work	Travel from Yangon to Hpa-an by car (Team B)			Documentation Work	
9	1, Sep (Mon)				Meeting at State Health Office/ Survey at Bago General Hospital	Visit to Dep.of Health, Kayin State/ Survey at Hpaan General Hospital			Visit to State Health Office	
10	2, Sep (Tue)				Visit to International organizations	Visit to Hpa-an General Hospital			Survey at Bago General Hospital	
11	3, Sep (Wed)					Travel from Hpa-an to Mawlamyaing by car/ Visit to Dep.Health, Mon State and Mawlamyaing General Hospital			Survey at Bago General Hospital	
12	4, Sep (Thu)					Survey at Mawlamyaing General Hospital			Survey at Taungngu General Hospital	
13	5, Sep (Fri)					Survey at MCH hospital, Hospital			Survey at Taungngu General Hospital	
14	6, Sep (Sat)				Market survey	Travel from Mawlamyaing to Yangon by air			Same schedule with Project Manager	
15	7, Sep (Sun)				Travel from Yango to Pathein by car	Travel from Yangon to Dawei by air				
16	8, Sep (Mon)				Meeting at Pathein General Hospital / Meeting at Regional Health Office	Visit to Regional Health Office Regional Health Office/ Survey at Dawei General Hospital				
17	9, Sep (Tue)				Survey at Pathein General Hospital	Survey at Dawei General Hospital				
18	10, Sep (Wed)				Survey at Pathein General Hospital	Travel from Dawei to Myeik by air/ Survey at Myeik General Hospital				
19	11, Sep (Thu)				Travel from Pathein to Yangon by car/ Market survey	Survey at Myeik General Hospital				
20	12, Sep (Fri)				Market survey	Survey at Myeik General Hospital		Travel from Myeik to Yangon by air		
21	13, Sep (Sat)				Final confirmation of Questionnaires	Travel from Myeik to Yangon by air		Same schedule with Project Manager		
22	14, Sep (Sun)				Internal meeting			Leave Yangon	Yangon to Sittwe by air	
23	15, Sep (Mon)				Internal meeting			Arrival in Narita	Visit Dep of Health, Rakhine State/ Survey at Sittwe General Hospital	
24	16, Sep (Tue)				Report on Summary of results of survey to JICA Myanmar Office/ Visit to International organizations				Survey at Sittwe General Hospital	
25	17, Sep (Wed)				Travel from Yangon to Nay Pi Taw by car				Survey at Sittwe General Hospital	
26	18, Sep (Thu)				Report on Summary of results of survey and discussion 2nd Mission to Ministry of Health				Travel from Sittwe to Yangon by air	
27	19, Sep (Fri)				Travel from Nay pi Taw to Yangon by car/ Final report to JICA Myanmar Office				Market Survey in Yangon	
28	20, Sep (Sat)				Internal meeting / Leave Yangon				Internal meeting / Leave Yangon	
29	21, Sep (Sun)				Arrival in Narita				Arrival in Narita	

2nd Field survey conducted from 1st February to 1st March 2015

	Day	Project Manager/ Health planning and Administration	Deputy Manager/ Medical Equipment Planner	Health facility Planner 1	Hospital Management and Logistics
		Mr. Shuichi SUZUKI	Ms. Kyoko GOTO	Mr. Toshihiko SUZUKI	Ms. Aki TAKAI
1	1, Feb (Sun)	Arrival in Yangon			
2	2, Feb(Mon)	Visit to JICA Myanmar Office/ Travel from Yangon to Nay Pi Taw by car			
3	3, Feb (Tue)	Visit to Department of Health, Ministry of Health			
		Visit to Department of Health, Ministry of Health	Travel from Nay Pi Taw to Taunnggy in Shan State-South by car		
4	4, Feb(Wed)		Visit to Dep of Health in Shan State South / Survey at Sao San Tun Hospital		
5	5, Feb (Thu)	Travel from Nay Pi Taw to Loilem by car	Travel from Taunggy to Loilem by car / Survey at Loilem General Hospital		
6	6, Feb (Fri)	Survey at Women and Children hospital in Taunggyi			
7	7, Feb (Sat)	Travel from Taunggyi to Mandalay by car			
8	8, Feb (Sun)	Documentation Work			
9	9, Feb (Mon)	Travel from Mandalay to Sagain by car/ Visit to Dep of Health in Sagain Region Travel from Sagain to Monywa by car/ Survey at Monywa General Hospital			
10	10, Feb (Tue)	Survey at Monywa General Hospital			
11	11, Feb (Wed)	Travel from Monywa to Mandalay by car/ Market survey in Mandalay	Survey at Monywa General Hospital		Same schedule with a Project Manager
12	12, Feb (Thu)	Market survey in Mandalay	Travel from Monywa to Mandalay by car		
13	13, Feb (Fri)	Visit to Mandalay General Hospital			
14	14, Feb (Sat)	Travel from Mandalay to Kyaintong in Shan State East by air			
15	15, Feb (Sun)	Internal meeting			
16	16, Feb (Mon)	Visit to Dep of Health in Shan State East / Survey at Kyaingtong General Hospital			
17	17, Feb (Tue)	Survey at Kyaingtong General Hospital			
18	18, Feb (Wed)	Survey at Kyaingtong General Hospital/ Travel from Kyaingtong to Yangon by air			
19	19, Feb (Thu)	Internal Meeting			
20	20, Feb (Fri)	Documentation Work / Leave Yangon	Travel from Yangon to Myitkyitina by air/ Visit to Myitykina General Hospital		
21	21, Feb (Sat)	Arrival in Narita	Survey at Myitykina General Hospital / Documentation work		
22	22, Feb (Sun)		Documentation work		
23	23, Feb (Mon)		Visit to Dep of Health in Kachin State/ Survey at Myitykina General Hospital		
24	24, Feb (Tue)		Survey at Myitykina General Hospital/ Travel from Mytikyina to Yangon by air		
25	25, Feb (Wed)		Documentation work		Market Survey in Yangon
26	26, Feb (Thu)		Final report to JICA Yangon office		
			Final report to Japan Embassy		
					Leave Yangon
27	27, Feb (Fri)		Travel from Yangn to Nay Pi Taw by air/ Final report to MOH/ Travel from Nay Pi Taw to Yangon by air		Arrival in Narita
28	28, Feb (Sat)		Leave Yangon		
29	1, Mar (Sun)		Arrival in Narita		

Appendix 3
List of Interviewees

Appendix 3 List of Interviewees

Ministry of Health

Department of Planning

Planning

Dr. San San Aye	Director
Dr. Thant Zin Htoo	Deputy Director

HMIS

Dr. Thet Thet Mu	Director
Dr. Ohnmar Kyi	Deputy Director

Department of Health

Dr. Than Win	Deputy Director General

Planning

Dr. New Ni Oo	Director
Dr. Myint Myint Wai	Deputy Director

Medical Care

Dr. Khin Win Than	Director
Dr. Moe Khaing	Deputy Director
Dr. Win Mih Thin	Assistant Director
Dr. Myint Zaw	Assistant Director

Finance

Mr. Win Oo	Deputy Director

Department of Medical Science

Dr. Tin Tin Lay	Deputy Director General

Nursing

Ms. Nwe Nwe Khin	Director

CMSD (Central Medical Supply Depot)

Dr. Aung Gyi Maung	Deputy Director
Dr. Kyaw Soe Min	Deputy Director

Region / State Health Department

Bago Region Health Department

Dr. Tun Min	Director

Ayeyarwaddy Region Health Department

Dr. Aung Kyi Swe	Director
Dr. Thiha Aung	Deputy Director

Kayin State Health Department

Dr.Aung Kyaw Htwe	Director

Mon State Health Department

Dr.Than Htun Aung	Director

Rakhine State Health Department

Dr. Aye Nyein	Director
Dr. Aung Thurein	Deputy Director

Thanintharyi Region Health Department

Dr. Kyaw Zay Ya	Director

Shan State-South Health Department

Dr.Sai Win Zaw Hlaing	Deputy Director

Sagain Region Health Department

Dr.Win Lwin	Deputy Director

Shan State-East Health Department

Dr.Win Kyaw	Director

Kachin State Health Department

Dr. Win Lwin.	Director

Target hospitals for the site survey

Magway General Hospital

Dr. Khin Oo Kyi.	Senior Medical Superintendent
Dr. Soe Myint Swe	Medical Superintendent

Bago General Hospital

Dr. Ye Myint Aung	Medical Superintendent
Dr. Saw Thura Aung	Deputy Medical Superintendent
Dr. May Thu Zaw	Assistant Medical Superintendent
Dr. Thet Paing	Assistant Medical Superintendent

Taungngu General Hospital

Dr. Khin Mg Htay	Medical Superintendent
Dr. Khin San Myint	Deputy Medical Superintendent
Dr. Thida Soe	Assistant Medical Superintendent
Dr. Aye Mya Win	Assistant Medical Superintendent

Hpa-an General Hospital

Dr. Cho Mae Kyun	Senior Consultant for Ob and Gyn
Dr. Hray Hray Win	Senior Consultant for Pediatrics

Mawlamyaing General Hospital

Dr.Naing Oo	Deputy Medical Superintendent

Pathein General Hospital

Dr. Tin Ngwe	Medical Superintendent
Dr. Win Win Khaing	Deputy Medical Superintendent

Sittwe General Hospital

Dr. Soe Tun Aung	Medical Superintendent

Dawei General Hospital

Dr. Myint Myint Khai	Medical Superintendent
Dr. San San Thi	Deputy Medical Superintendent

Myeik General Hospital

Dr. Thandan Myo Win	Medical Superintendent
Dr. Tin Aung Win	Deputy Medical Superintendent

Women and Children Hospital (Taunggyi)

Dr. San San Wai	Medical Superintendent

Loilem General Hospital

Dr. Aung Htwe	Senior Medical Superintendent

Monywa General Hospital

Dr. Nyunt Than	Medical Superintendent
Dr.Aye Aye Myint	Deputy Medical Superintendent

Kyaington General Hospital

Dr. Zaw Lin	Medical Superintendent

Myitkyina General Hospital

Dr. Aung Ngwe San	Medical Superintendent
Dr. Myo Wai	Deputy Medical Superintendent

Reference hospitals

Sao San Tun Hospital

Dr. Paw Htun	Medical Superintendent

Mandalay General Hospital

Dr.Thein Wynn	Medical Superintendent
Dr.Khin San Myint	Medical Superintendent
Dr.Win Maung Maung	Deputy Medical Superintendent
Dr.Zaw Win Htum	Assistant Medical Superintendent

International Organization

WHO Myanmar Office

Dr. Salma Burton	Public Health Administrator

UNICEF Myanmar Office

Dr. Maharajan Muthu	MNCH Specialist
Dr. Sarabibi Thuzarwin	MNCH Specialist

UNOPS Myanmar Office

Mr. Kyaw Sanda Min	
Mr. Jesus Pineda Tolentino	Infrastructure Specialist

3MDGs Foundation

Mr. Saw Lwin	Deputy Infrastructure Manager

World Bank Myanmar Office

Dr. Hnin Hnin Pyne	Senior Human Development Specialist

USAID (Embassy of USA)

Mr. William Slater	Director, Office of Health
Dr. Htoo Aung Cho	Project Management Specialist

Embassy of Australia

Dr. Linda Obrien	In-charge for development in Health

Supply Chain Management System (SCMS)

Dr. San San Min	Country Director
Mr. Marvin Couldwell	Deputy Country Director

Local agent for medical equipment

Myanmar Yutani Co. Ltd.

Mr. Yoshinori Komaru	Managing Director

Yee Shin Co. Ltd.

Ms.Hla Hla	Director
Dr. Tin War War Latt	Director in Medical Department

Okkar Thiri Co., Ltd.

Dr. San San Yi	Chairman
Dr. Yin Yin Myint	General Manager

Concodia Co., Ltd. (Mandalay Branch)

Dr. Aung Thein Aye	Branch Manager

Amtt Co., Ltd. (Mandalay Branch)

Mr. Kyaw Zan Hla	Assistant General manager
Mr. Aung Naing Win	Branch Manager

Lion Myanmar

Dr. Nan Yu Wai	Director in Sales department

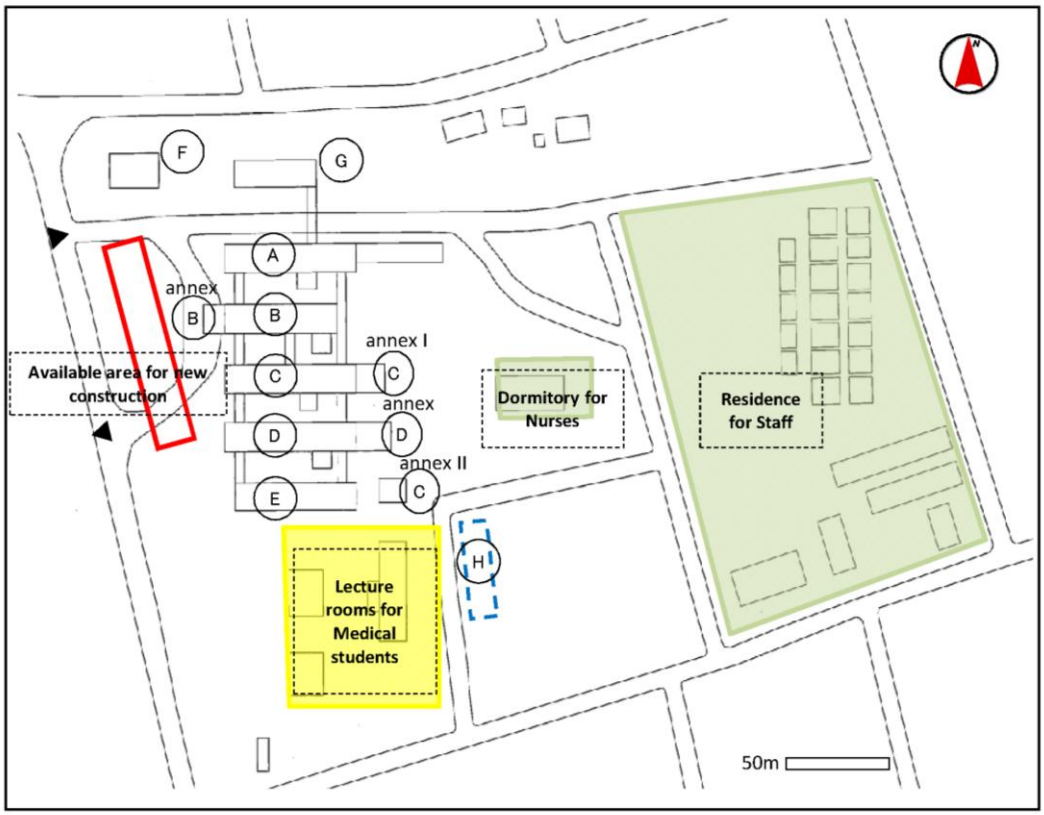
Appendix 4
Detail Assessment of site-surveyed General Hospitals

Appendix 4 Detail Assessment of site-surveyed General Hospitals

4. Outline of target hospitals for the site survey

4-1. Magway General Hospital (Magway Region)

Year of Establishment : 1966　　Site area (m²) : 159,796



Name of facility			
Name of building	Contents of facility Stories	Construction year	Type of structure
Building A	2 st. GF : Administration block / 1F : Orthopedic ward, Lecture room	1966	RC
Building B	2 st. GF : Surgical ward / 1F : Surgical ward	1966	RC
Building B annex	1 st. GF : Specialist outpatient ward	1966	Wood
Building C	2 st. GF : Surgical ward / 1F : Surgical ward	1966	RC
Building C annex I	2 st. GF : X-ray room / 1F : Operation Theater	1966	RC
Building C annex II	1 st. GF : CT scan room	2013	RC
Building D	2 st. GF : Ob and Gyn ward / 1F : Ob and Gyn ward	1966	RC
Building D annex	2 st. GF : Laboratory / 1F : Delivery room	1966	RC
Building E	2 st. GF : Pediatric ward / 1F : Ophthalmology and Otolaryngology ward	1966	RC
Building F	1 st. GF : Outpatient and Emergency ward, Physiotherapy room, Dental clinic	1990	Wood
Building G	1 st. GF : Monk ward	1966	RC
Building H	Planning for Otolaryngology ward (50 beds): (Blue frame)	Planned	—
(Red frame)	Available area for new construction		

Situation of Inflastructure	
Electricity	Electric power supply (Frequency of blackout : 2-3times/week in heavy rain or strong wind) + Generator (1×70kVA)
Water Supply	Water source : Public water supply (in case of shortage of water from the well) + Deep well Water supply system : 2 Elevated water tanks (Another 2 elevated water tanks are under construction)
Sewage	Septic tank
Communication	Fixed telephone line (2) + Mobile phone network + Internet connection

4-1. Magway General Hospital (Photos taken on 28th and 29th August 2014)

Magway General Hospital (Magway Region)
Established in 1966
(The photo shows of reception of OPD.)

Corrosion of Metal structure
of elevated water tank

Some beds placed on the passage at Surgical ward

Training for students of Medical school
at Surgical ward

Fracture of wooden pillar at reception and waiting
area for Outpatient department

Delivery room at Ob and Gyn ward

4-1. Outline of Magway General Hospital

(1) Health workers

There are 1Medical Superintendent, 1 Deputy Medical Superintendent, Consultants (9 Senior consultants and 4 junior consultants), 68 Assistant surgeons, 1 Dentist, 9 Sister Nurses, 97 Staff Nurses, 90 Trained Nurses, 2 Medical social workers, 3 Physiotherapists, 7 Radiologists, 2 Pharmacists, 10 Laboratory technicians, 1 technician for electricity, other staff and 355 staff in total.

(2) Financial situation

Table 4-1-1 Total budget from Government for Magway General Hospital

Unit: MMK

2012	2013
973,056,850	9,554,015,231

Source: Results from questionnaire survey

Table 4-1-2 Income of CCSS in Magway General Hospital

Unit: MMK

Item	2013	2014*
Pay room	4,519,200	2,042,000
Laboratory examinations	-[1]	3,379,800
X ray	-	1,640,000
Ultrasonography	2,935,000	1,360,000
CT scan	-	12,585,000
Total	-	21,009,800

* Data collected from January to July in 2014

Source: Annual hospital report of Magway General Hospital in 2014

(3) Hospital statistics

1) Indicators of hospital services

Table 4-1-3 Hospital indicators of Magway General Hospital

Indicators	2011	2012	2013	2014[1]
Total number of inpatients	11,906	12,485	13,261	8,390
Average number of inpatients	-	-	245.6	-
Total number of pediatric patients	-	-	2,447	-
Total number of outpatients[2]	11,485	14,606	22,086	15,790
Average number of outpatients	-	-	91	-
Total number of deliveries	-	1,263	1,442	807
Total number of cesarean section	-	-	735	-
Total number of operation	2,987	3,687	4,092	2,349
Bed occupancy rate (%) (Based on sanctioned beds)	-	-	101	-
Average duration of stay (in days)	-	-	6.7	-
Hospital deaths rate	-	-	2.68	-
Total number of maternity deaths	-	-	4	-

[1] Data collected from January to July 2014.

[2] Total number of outpatients for 2013 includes the number of outpatients in specialist outpatients department

Source: Annual hospital report of Magway General Hospital

[1] This shows that the survey teamcould not obtain data because of unavailability in the hospital. The followings are same

2) Morbidity and Mortality

Table 4-1-4 Major causes of morbidity in Magway General Hospital

	2013		2014 [1]	
No.	Cases	Patients	Cases	Patients
1	Injuries	811	Injuries	536
2	Cataract	712	Cataract	279
3	Dengue hemorrhagic fever	634	Acute appendicitis	130
4	Snake bite	268	Stroke	129
5	Acute viral infection	236	Tuberculosis	129

[1] Data collected from January to July 2014.
Source: Annual hospital report of Magway General Hospital

Table 4-1-5 Major causes of mortality in Magway General Hospital

	2013		2014 [1]	
No.	Cases	Patients	Cases	Patients
1	Snake bite	33	Stroke	33
2	Neonatal septicemia	21	Injuries	8
3	Cirrhosis of liver	18	Septicemia	8
4	Koch's lung	15	Congestive heart failure	6
5	Congestive heart failure	11	Koch's lung	6

[1] Data collected from January to July 2014.
Source: Annual hospital report of Magway General Hospital

(4) Situations of Medical Service Departments

1) Ob and Gyn ward/ Delivery room

At Ob and Gyn ward, there were 80 patients required hospitalization with only50 sanctioned beds and some beds were placed on the passage in the patient room due to a lack of space at ward. There is still insufficient space for approximately 700 normal deliveries and 750 cesarean sections per year. According to a sister nurses, when emergency case was received at the time of full of patients at ward, consultants allowed stable patients to discharge or placed additional beds on the corridor to provide the bed for the emergency case.1 bed was shared with 2 patients and thus there is need to enlarge the space for Ob and Gyn ward.

Most of the maternity death cases are emergency such as hypertension or hemorrhage.Those cases are preventable death if they arrived at hospital earlier. At the delivery room, there are 7 beds, labor rooms and two delivery beds. There are insufficient facilities and rooms for current number of normal delivery.

Table 4-1-6 Indicators of Ob and Gyn ward in Magway General Hospital (2013)

Year	The total number of inpatients	The total number of outpatient	Detail				Total number of birth	Total number of maternity deaths	Total number of gynecological operation
			Spontaneous delivery	Breech	Instruments delivery	Cesarean section			
2013	1,339	1,442	533	13	161	735	1,384	4	426

Source: Annual hospital report of Magway General Hospital

2) Pediatrics ward

At the pediatrics ward, there were 82 patients required hospitalization including 70 patients for pediatrics and 12 patients for neonatal unit with only 64 sanctioned beds including 50 for pediatrics and 14 for neonatal unit. Major causes of morbidity are dengue hemorrhage fever, pneumonia, convulsions, neonatal jaundice, neonatal septicemia and birth asphyxia. Seasonal diseases are shown on Table 4-1-7. For example, the number of dengue hemorrhage fever cases has increased during and after rainy season between June and November. Pneumonia cases also have increased during winter after October. Major causes of mortality are premature, neonate sepsis and birth asphyxia.Then, diseases related to neonates are high ranked and it shows 40 % of preterm low birth weight cases cause the death. Thus improving the building and equipment needs to care neonates and contribute the reduction of neonatal deaths.

Table 4-1-7 Detail of pediatrics patients in Magway General Hospital (2013)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	No.of patients	No.of deaths
Dengue hemorrhage fever	4	2	11	13	20	**85**	**142**	**144**	**149**	**84**	**51**	17	722	4
Pneumonia	14	14	4	8	8	4	21	31	19	**60**	**70**	**25**	278	3
Neonatal jaundice	42	37	39	23	15	8	16	11	13	16	12	10	342	1
Neonatal sepsis	5	3	14	28	25	26	26	13	9	11	20	8	188	14
Preterm low birth weigh	14	14	4	8	8	4	21	31	19	60	70	25	278	3
Birth asphyxia	5	1	5	6	3	3	7	9	12	8	9	3	71	25

Source: Medical record of Pediatric ward

3) Operation theatre

There were 1,156 elective operation cases and 1,817 emergency operation cases in 2013. (Total number of operation was 4,092). The number of major operation cases was 1,164 for surgical ward, 1,151 for Ob and Gyn and 841 for orthopedic ward. However, equipment and staff are not sufficient because there are only three operation beds operated and three anesthesiologists at the main operation theatre. Since neurosurgery consultant is not appointed, neurosurgical cases are transferred to tertiary hospitals, Yangon General hospital. According to the anesthesiologist, laparoscopic surgery has been introduced for two years, however, operation cases are a small number.Surgeons need some time to acquire appropriate skills for operating laparoscopy. He also mentioned that the number of laparoscopic surgery cases has been increasing year by year.

A building of operation theatre becomes obsolete with a leak of rain and there will be mold on the ceiling and walls in the near future. This situation makes operation theatre difficult to maintain cleanness. Moreover, there is no obvious separation of clean and unclean areas and

some rooms for consultants are located in the clean area and this situation causes difficulty in maintaining clean environment at the operation theatre due to a heavily passage.

(5) Referral system

1) Referral from lower facilities

According to the medical superintendent, 1 or 2 cases of dengue hemorrhage fever or neonatal cases were referred from the lower level of hospital per day.

2) Referral to tertiary hospitals

According to the medical superintendent, patients who need referral are transferred to tertiary hospitals in Yangon, Nay Pi Taw and Mandalay. Patients referred to Nay Pi Taw are the most frequent but rough road has been interfered with patient's transfer. In case of pediatric patients and congenital diseases and other severe cases are referred to Yangon Children Hospital and two patients were transferred there in August 2014. Referred patients can use hospital ambulances with a nurse when they can afford for fuel.

(6) Challenges of buildings and facilities

1) There is an insufficient space for patient's beds and some beds are placed between beds on the corridor at the obstetrics and gynecological ward.

2) A building of delivery rooms and operation theatre has a narrow space and deterioration. Water leakage was also observed at the building.

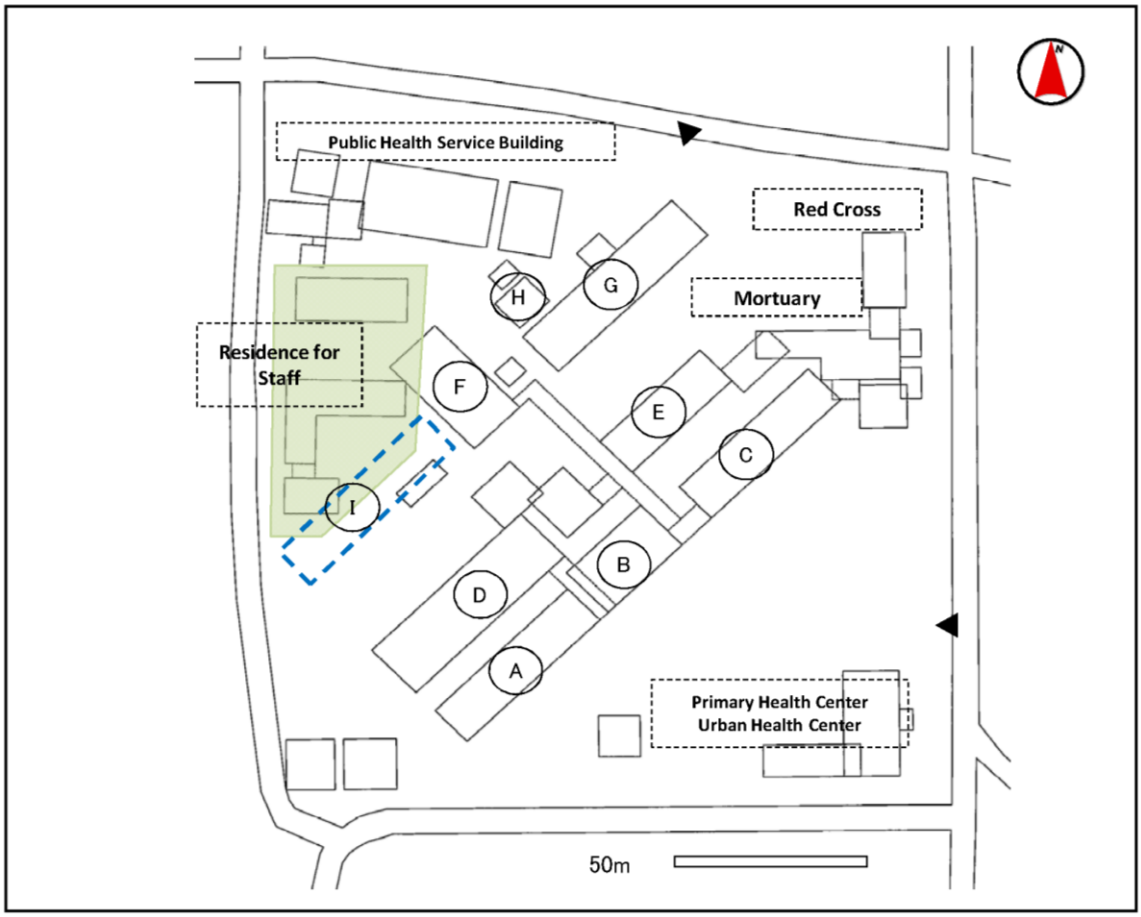
3) There are an insufficient number of patient's rooms.

4) There is no obvious separation for clean area and unclean area in the operation theatre.

5) A building of reception of outpatient department has some clacks on the wooden pillars.

4-2. Bago General Hospital (Bago Region)

Year of Establishment : Approximately 1930 Site area (m²) : 42,817



Name of facility				
Name of building	Stories	Contents of facility	Construction year	Type of structure
Building A	2 st.	GF : Medical care ward / 1F : Pediatric ward, Neonatal care unit	1995	RC
Building B	1 st.	GF : Outpatient and Emergency department	1930	RC
Building C	1 st.	GF : Administration office, Laboratory, Blood bank	1995	RC
Building D	2 st.	GF : Ob and Gyn ward, Delivery room / 1F : Ob and Gyn ward	1930	RC
Building E	2 st.	GF : Pay ward / 1F : Pay ward	1930	RC
Building F	2 st.	GF : Delivery room, Ultrasound room / 1F : Operation theater, ICU	1995	RC
Building G	2 st.	GF : Orthopedic ward / 1F : Surgical ward	2006	RC
Building H	1 st.	GF : CT scan room	2013	RC
Building I		Surgical ward (100beds) (Blue frame)	Applied for new construction	—

Situation of Inflastructure	
Electricity	Electric power supply（Frequency of blackout : 3-4times/week (Duration : 30-60min)) + Generator (2×Large type + 2×Small type)
Water Supply	Water source : Public water is supplied by the Reservoir of which water source is the well. Water supply system : Elevated water tank
Sewage	Septic tank (Sludge disposal by Municipal)
Communication	Fixed telephone line (3) + Mobile phone network + Internet connection

4-2. Bago General Hospital (Photos taken on 1st and 2nd September 2014)

Bago General Hospital (Bago Region)
Established in approximately 1930
(The photo shows the building
for general and emergency OPD.)

Damage of water leakage, mold and moss
on the eaves for entrance of Medical ward

Benches used as patient's beds because
of congestion at Surgical ward

Emergency treatment in the corridor
at Pediatrics ward

Mold on the wall and ceiling in the autoclave room
of the Delivery room (Constructed in 1995)

Doors of Operation theatre sealed with plastic tape
(Lack of airtightness of room)

4-2. Outline of Bago General Hospital

(1) Health workers

There are 1 Medical Superintendent, 1 Deputy Medical Superintendent, 17 Consultants (9 senior consultants and 12 junior consultants), 70 Assistant surgeons (including 3 Dentists), 162 Nurses (including sister nurses, staff nurses and trained nurses), 39 other technicians and other staff. There is no technician for maintenance of facility and equipment including medical equipment.

(2) Financial situation

There were 5.56milion MMK of total expenditure up to August 2013 and those included as follows: procurement of drugs: 300milion MMK, maintenance cost for facility and equipment including medical equipment: 60 million MMK and others. CCSS is one of the income sources of examination of ultrasonography, X-ray, CT scan, laboratory examination and pay ward fee. Total planned expenditure was 5.71 million MMK in 2014 and this will be spent for procurement of drugs (425 million MMK), maintenance cost for facility and equipment including medical equipment (6 million MMK) and others. Trust fund has been introduced in 2000. There was 1.34 million MMK of interest to 26.2milion MMK of capital stock. All interest was spent for medical service for the poor.

(3) Hospital statistics

1) Indicators of hospital services

Table 4-2-1 Hospital indicators of Bago General Hospital

Indicators	2011	2012	2013
Total number of inpatients	11,909	14,136	18,152
Total number of outpatients	19,113	24,721	40,332
Total number of normal deliveries	1,257	1,476	1,652
Total number of cesarean section	-	391	650
Total number of abortion	221	219	247
Total number of operation	2,560	3,625	4,734
Bed occupancy rate (%) (Based on sanctioned beds)	83.5	107	123
Average duration of stay (in days)	5	6	5
Hospital deaths rate	165	173	261

Source: Annual hospital report of Bago General Hospital

2) Morbidity and mortality

Table 4-2-2 Major causes of morbidity and mortality of the Bago General Hospital

	Major causes of morbidity (2013)		Major causes of mortality (2013)	
No.	Diseases	patients	Diseases	patients
1	Road traffic accident	1,680	Road traffic accident	33
2	Diarrhea	455	Septicemia	18
3	Accident and injuries	416	Neonatal jaundice	17
4	Tuberculosis	268	Birth asphyxia	11
5	Gastrointestinal tract diseases	114	Heart diseases	3

Source: Annual hospital report of Bago General Hospital 2013

(4) Situation of Medical Service Departments

1) Pediatrics ward

Pediatric ward was overcrowded.One treatment table for dressing for wound and intravenous needle for intravenous drip is placed in the corridor due to a lack of room for treatment. At the neonatal unit, one infant cot was shared for four neonates. According to the consultant, though many patients need exchange transfusion due to neonatal jaundice, there is a lack of a special room (high care unit) for exchange transfusion. He also mentioned that isolation room needs to be placed at the ward. At the neonatal unit, there are 4 neonates sharing one bed. Therefore, overcrowding due to a lack of space is a huge challenge of pediatric ward.

2) Ob and Gyn ward/ Delivery room

They have over 1,600 normal deliveries per year. The distance between Ob and Gyn ward and delivery room is a burden for patient to move. Medical staff also takes a time to move between delivery room and the ward. The delivery room is located at the end of corridor and physiotherapy rooms are also located at the same corridor. It is very inconvenient for expectant mothers to access to the delivery room when they are transferred by stretcher because of a heavily passage of corridor. At the delivery room, there are only old aspirators and staff have repaired and used them. Any other new equipment is not provided. There is an autoclave at sterilization room and the room is also used for washing surgical instruments.

3) Operation theatre

They have more than 4,700 operation cases per year. However, there is no recovery room for post-operative patients and waiting room for patients' family members. Thus the entrance of operation theatre and corridors in front of operation theatre were overcrowded by patient's family members. Postoperative patients lying on the stretcher were waiting in the corridors near the entrance of the operation theatre. Main operation theatre is located on the first floor of building however there is no slope to access to the first floor. Thus patient's family members or relatives carried their patients on their hands from outpatient department or patients wards to operation theatre even the patients are under the serious situation or on the stretcher.

In the operation theatre, there is no sterilization room for surgical instruments and one autoclave is placed in the laundry room for clothes. There is an insufficient number of equipment for sterilization. The survey team also observed some mold on the celling of laundry. Hence, there is difficult situation to maintain operation theatre clean.

(5) Referral system

1) Referral from lower facilities

According to the medical superintendent, referral cases are approximately 15 cases per day from lower level of facilities such as township and station hospitals.There are also 22 to 56 cases per month for Ob and Gyn. Those patients are mainly transferred from townships 80km away from Bago District (it takes for 1 to 1.5 hours by car). Major causes of diseases were related to perinatal period (such as eclampsia, premature rupture of the membrance, ectopic pregnancy, incomplete abortion and other severe cases) and road traffic accident. The followings were meningitis, chorionic renal failure, severe asthma, severe pneumonia, postoperative patients' management and any other cases.

2) Referral to tertiary hospitals

Only 1 to 5 referral cases for Ob and Gyn were reported.

(6) Challenges of buildings and facilities

1) The level of floor at each building is different and slope is set at corridor to solve difference in level. It is creating a risk of an obstruction of patients flow and work flow for staff.

2) Ambulance passes from the gate to the front of the building and new construction for car parking is under construction. There is overcrowding near the front gate of hospital and it is an obstruction to pass the ambulance.

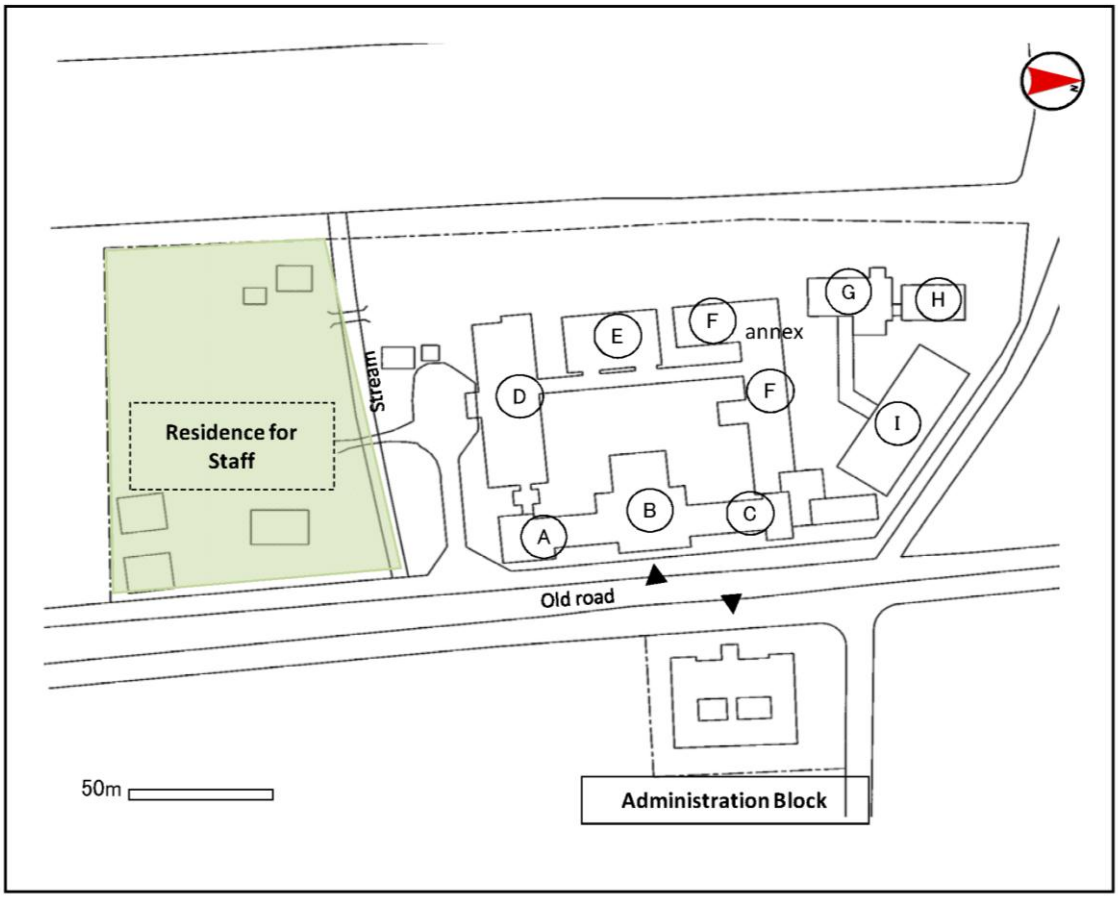
3) The reinforced concrete roofs are flat and a leak of rain was observed in the building.

4) Many puddles within the hospital compound become obstructions for patients to pass smoothly after raining.

5) At ward, there is not enough space to store the drugs provided by CMSD and many drugs are stored at medical store.

4-3. Taungngu General Hospital (Bago Region)

Year of Establishment : 1958 Site area (m²) : 51,651



Name of facility			
Name of building	Contents of facility Stories	Construction year	Type of structure
Building A	1 st. GF : Medical care ward (Male)	1958	RC
Building B	1 st. GF : Reception, Emergency patient's room etc.	1958	RC
Building C	1 st. GF : Medical care ward (Female), Medical store	1958	RC
Building D	2 st. GF : Ob and Gyn ward, Diagnostic room / 1F : Surgical ward, ICU	2001	RC
Building E	2 st. GF : Delivery room / 1F : Operation Theater	2001	RC
Building F	2 st. GF : Pediatric ward / 1F : Orthopedic ward	1973	RC
Building F annex	2 st. GF : Physiotherapy room, Pediatric ward / 1F : Operation Theater for Eye	1978	RC
Building G	1 st. GF : Pharmacy, Outpatient Department	1958	RC
Building H	1 st. GF : Specialist Outpatient Department (Surgical, Orthopedic, Pediatric, Physiotherapy etc.)	2002	RC
Building I	2 st. GF : X-ray room, Dental clinic, Sexual transmitted disease unit / 1F : Ophthalmology, Otolaryngology ward	2007	RC
Administration block		—	—

Situation of Inflastructure	
Electricity	Electric power supply（Frequency of blackout : 1-2times/month) + Generator (1×25kVA + 1×2.2kVA for pediatric ward)
Water Supply	Water source : Public water supply (well) + Well Water supply system : Elevated water tank
Sewage	Septic tank
Communication	Fixed telephone line (4) + Mobile phone network

4-3. Taungngu General Hospital (Photos Taken on 4th and 5th September 2014)

Taungngu General hospital (Bago Region)
Established in 1958
(The photo shows the Reception and Medical ward.)

Fracture in the pillar with 30mm's width
by uneven settlement at Surgical ward
(Constructed in 1973)

Some Patient's beds placed at corridor
under the stairs at Pediatrics ward

4 neonates laying on the baby cot
at Pediatrics ward

Toilet's roof with water tank
and sloped roof of Building D

Water leakage at the connection
between toilet's roof and sloped roof of Building D

4-3. Outline of Taungngu General Hospital

(1) Health workers

There are 1 Medical Superintendent, 1 Deputy Medical Superintendent, 22 Consultants (9 senior consultants and 13 junior consultants), 66 Assistant surgeons (including Dentists), 114 Nurses (including sister nurses, staff nurses and trained nurses), 69 other technicians, other staff appointed. There is no technician for maintenance of facility and equipment including medical equipment.

(2) Financial situation

Table 4-3-1 Annual expenditure of Taungngu General Hospital

Unit: MMK

	Maintenance costs of building/facility and equipment (including medical equipment)	Purchase costs of drugs
2009	8,347,338	17,464,880
2010	923,540	6,143,900
2011	2,010,800	5,883,100
2012	6,864,688	12,983,450
2013	3,085,775	11,050,000

Source: Answer of Questionnaires

The revenue in CCSS consists of the cost of selling drugs, pay room fee, laboratory examinations, X-ray, ultrasonography and ECG as Table 4-3-2 shows. Medical service for the poor are provided free of charge as well as expectant mothers. In 2013 from January and August, 1,715 of the poor received free medical services and it costed 1,626,150MMK.

Table 4-3-2 Revenue breakdown in CCSS of Taungngu General Hospital (2013)

Item	Total value of all revenue	Allocations		
		Refund to the fiscal budget (50% of the income)	Purchase for drugs and consumables (25% of the income)	Building repair cost (25% of the income)
Drugs	28,500	-	-	-
Pay room	1,827,600	913,800	456,900	456,900
Laboratory examinations	1,426,750	713,375	356,687	356,687
X-ray examination	1,578,000	2,850,577	5,709,933	1,425,288
Ultrasonography	9,985,800	1,346,750	231,250	-
ECG	49,250	24,625	12,312	12,312
Total	14,895,900	-	-	-

Source: Answer of Questionnaires

(3) Hospital statistics

1) Indicators of hospital services

Table 4-3-3 Hospital indicators of Taungngu General Hospital

Indicators	2011	2012	2013
Total number of inpatients	9,391	12,317	17,088
Total number of outpatients	16,109	19,291	47,357
Total number of all deliveries	648	1,108	1,479
Total number of cesarean section	270	602	819
Total number of operation	2,690	3,080	4,808
Bed occupancy rate (%) (Based on sanctioned beds)	77	91	119
Average duration of stay (in days)	6	5	5.2
Total number of hospital deaths	134	136	224

Source: Annual hospital report of Taungngu General Hospital

2) Morbidity and Mortality

Table 4-3-4 Major causes of morbidity of the Taungngu General Hospital

No.	2011		2012		2013	
	Diseases	Patients	Diseases	Patients	Diseases	Patients
1	Road traffic accident	928	Cataract	1,252	Cataract	1,533
2	Cataract	613	Head injuries due to road traffic accident	726	Head injuries	688
3	Acute respiratory infection	318	Acute respiratory infection	690	Acute respiratory infection	613
4	Cardio vascular diseases	299	Cardio vascular diseases	490	Dengue hemorrhage fever	600
5	Cerebral nerve system	225	Diarrhea	207	Diarrhea	223

Source: Annual hospital report of Taungngu General Hospital

Table 4-3-5 Major causes of mortality of the Taungngu General Hospital

Year	2011		2012		2013	
No.	Diseases	Patients	Diseases	Patients	Diseases	Patients
1	Road traffic accident	31	Head injuries due to road traffic accident	31	Road traffic accident	23
2	Cardio vascular diseases	14	Neonatal sepsis	13	Prematurity	18
3	Birth asphyxia	7	Birth asphyxia	11	Septicemia	12
4	Cerebral nerve system	5	Poisoning	4	Perforation with septicemia	8
5	Tuberculosis	3	Perforation	3	Birth asphyxia	6

Source: Annual hospital report of Taungngu General Hospital

(4) Situation of Medical Service Departments

1) Pediatrics Ward

There were 80 patients required hospitalization and the ward has still insufficient patient's rooms and space for beds. For example, six beds for stable pediatrics patients are placed at the landing. It is not suitable environment for patients to receive treatment. Because the wind blows against patients and their privacy cannot be protected. Staff treats neonates on the bed placed in the corridor. A part of the ward is shared 3 physiotherapy rooms and it causes a congestion of ward. Moreover, one consult mentioned that beds are placed in the corridor when the number of seasonal diseases has increased such as dengue hemorrhage fever.

There is a shortage of medical equipment especially phototherapy machines and infant warmers at the neonatal unit. Only 1 wooden phototherapy machine is shared with 4 to 5 neonates. 2 infant warmers are functioning, however, the number is still insufficient. In addition, at the pediatric ward, there is no sterilizer for medical instruments and thus staff has to utilize a sterilizer at the operation theatre daily. Therefore, there is a need for improving buildings because of overcrowding in the ward and deterioration of building.Provision of medical equipment also needs due to a lack of basic medical equipment.

2) Medical care ward

There are isolation beds for infectious patients at the medical care ward, however, they are separated only by wooden partitions in the room. The spacet is not completely separated and it is ineffective for infection control. More than 600 patients are suffering from septicemia or respiratory tract infection. Therefore, isolation rooms for infectious cases need to be improved to prevent from spread contact, droplet transmission and airborne infection among patients.

3) Radiology/ Physiotherapy rooms

There is no specialized room for CT scanner, ultrasound diagnostic apparatus and X-ray apparatus. 1 CT scanner is stacked at CMSD in Yangon and one X-ray apparatus and ultrasound diagnostic apparatus are unpacked on the corridor in the hospital. In addition, some equipment for physiotherapy are stored at the corner of room due to a lack of space.

4) Operation theatre and Delivery room

The distance between operation theatre is far from and each ward, Ob and Gyn ward and delivery room, outpatients department and each ward. It is difficult for patients to access to operation theatre. It is very convenient for patients because there is no approach which helps on rainy day and slope which helps transfer by stretcher in the hospital.

5) Other department

There is an insufficient number of patients beds and some beds are placed on the corridor or landing at the pediatrics and Ob and Gyn ward. Nurse station and assistant surgeon's rooms are used for storing drugs. All consultants' rooms are placed at each ward.

There is an imbalance number of inpatients among wards. For example, there were 56 patients required hospitalization with 50 sanctioned beds and the number of dengue fever and malaria patients increases after rainy season. On the other hand, patients for Ophthalmology and Otolaryngology departments are mainly outpatients.Their inpatients in the department are approximately 10 per month. Thus, vacant beds are observed at these inpatients wards. Furthermore, consultants of these departments sometimes treat outpatients at consultant's rooms at inpatients ward and it causes an overcrowding and obstruction to passage at ward which has a limited space. There are 60 to 80 outpatients for Ophthalmology and 40 outpatients for Otolaryngology.

(5) Referral system

1) Referral from lower level facilities

There are approximately 40 to 100 referral cases per month from township or station hospitals. At first, most of the patients of 25-bedded hospital are transferred to a 100-beded hospital and then they are sent to Taungngu General Hospital if the 100-bedded hospital cannot treat patients. There are also some cases from Kayin Sate. Major causes of referral are snake bites, cerebral hemorrhage (only diagnosed by clinical signs and symptoms), tuberculosis, eclampsia, breech delivery, obstructed labor, twin pregnancy, uterine injury, cesarean section cases, neonatal jaundice cases, dengue hemorrhage fever (including shock), cerebral malaria, low birth weight and so on.

2) Referral to tertiary hospitals

Approximately 40 to 100 cases are transferred to tertiary hospitals in Yangon or Nay Pi Taw per month as Table 4-3-6 shows. There are 3 ambulances and 1 ambulance is equipped for transferring patients to tertiary hospitals.

Table 4-3-6 The number of referral cases of Taungngu General Hospital

	2013	2014[1]
Referred cases from lower facilities	794 cases	539 cases
Referred cases to tertiary hospitals	344 cases	241 cases

[1] Data collected from January to July 2014.

Source: Annual hospital report of Taungngu General Hospital

(6) Challenges of buildings and facilities

1) Leakage of rain

a. There is a water leakage in roofs from an elevated water tank and the toilet is always getting wet in toilets. It adversely affects the framework of the buildings.

b. There is a water leakage at the canopy which connects with other buildings.

c. There is a water leakage at several patient's rooms.

d. There is a water leakage from connecting area between toilet building and main building on the first floor at the Building D.

2) The medical care ward is noisy affected by highway.

3) Infrastructure challenges

Horizontal cracks are observed on the wall for the middle of the F building for pediatrics and orthopedics ward, which was built in 1973. This is caused by falling the substructure of the building.

4) Separation of buildings of administration and medical services

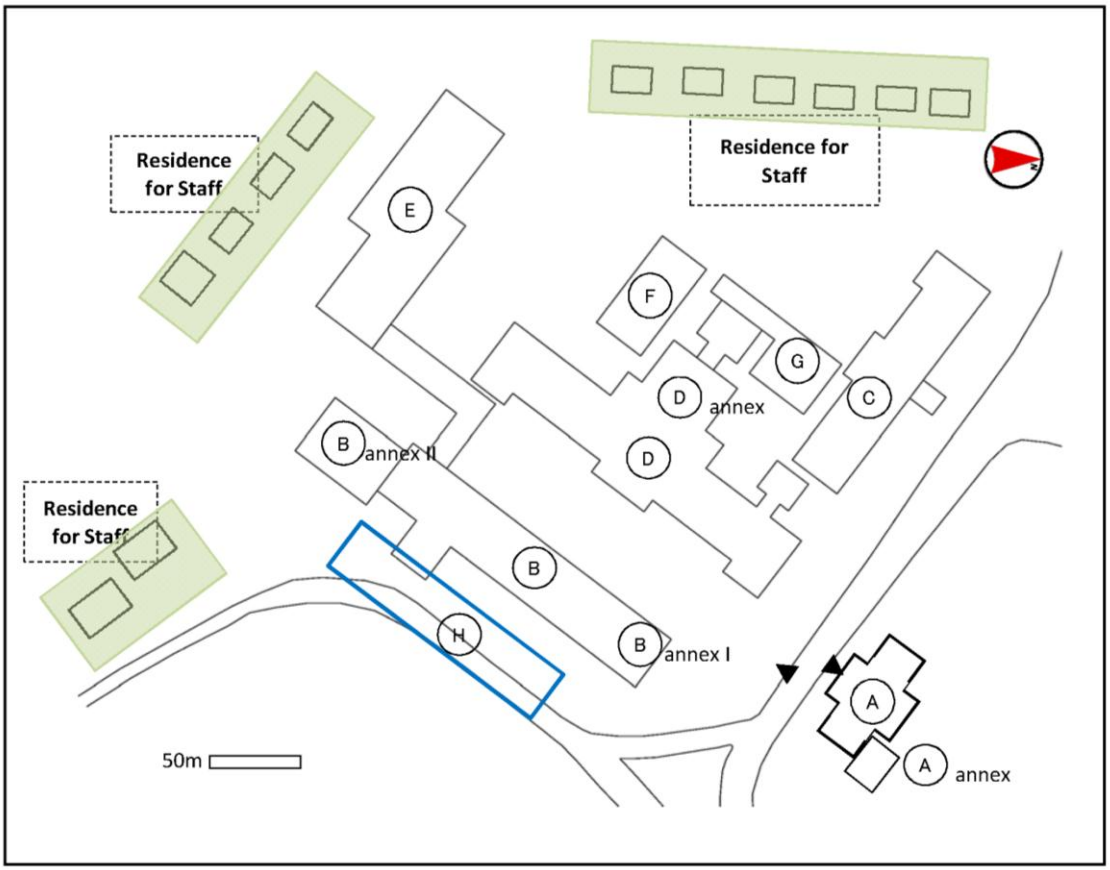
The highway separates the building of administration and medical services and thus health workers should cross the busy traffic on the highway without traffic signals.

5) Disposal of medical waste

Last year an incinerator was built to burn medical waste and other general waste. However, the survey team observed that the incinerator has had some cracks on the body of it and needles and ampules were not completely burned.

4-4. Hpa-an General Hospital (Kayin State)

Year of Establishment : 1959　　Site area (m²) : 59,572



Name of facility				
Name of building	Stories	Contents of facility	Construction year	Type of structure
Building A	2 st.	GF : Ophthalmology, Dental clinic, Matron's office / 1F : Medical Superintendant's office, Administration office	1995	RC
Building A annex	1 st.	GF : Rehabilitation department	2011	RC
Building B	1 st.	GF : Surgical ward, Ophthalmology, Otolaryngology ward / 1F : Surgical ward, ICU	1981	RC
Building B annex I	2 st.	GF : Outpatient and Emergency department / 1F : Pay ward	2010	RC
Building B annex II	2 st.	GF : Blood bank, Laboratory / 1F : Operation Theater	2010	RC
Building C	2 st.	GF : Medical care ward / 1F : Medical care ward	1962	RC+Wood
Building D	2 st.	GF : Pediatric ward, Orthopedic ward, Diagnostic Imaging center / 1F : Telephone operator's room	1959	RC
Building D annex	1 st.	GF : CT scan room, X-ray room	2013	RC
Building E	2 st.	GF : Ob and Gyn ward, Delivery room / 1F : Obstetrics ward	1988	RC
Building F	2 st.	GF : Psychiatric ward / 1F : Medical store	—	RC
Building G	1 st.	GF : Dermatology ward	—	RC
Building H (Blue frame)	3 st.	GF and 1F : Pediatric ward, Ophthalmology ward, Otolaryngology ward / 2F : Administration office	2015 Feb.	RC

Situation of Inflastructure	
Electricity	Electric power supply (Frequency of blackout : Once/month at time of engineering works) + Generator (2×Large type + Some small type)
Water Supply	Water source : Public water supply (in case of shortage of water from the well) + Deep well + Shallow well Water supply system : Elevated water tank
Sewage	Septic tank
Communication	Fixed telephone lines (2) + Mobile phone network + Internet connection

4-4. Hpa-an General Hospital (Photos taken on 30th August and 1st September 2014)

Hpa-an General Hospital (Kayin State)
Established in 1959
(The photo shows the newest building.)

Damage by water leakage and moss
on the exterior wall at Ob and Gyn ward

Some beds placed on the passage
at Pediatrics ward

The rooftop of the newest building is
not waterproofed (The building for Pediatrics
ward constructed in 2014)

Exfoliation of concrete of floor and exposed rebar
at Rehabilitation department (Constructed in 2011)

Degradation of exterior wall at Medical ward
(Constructed in 1962)

4-4. Outline of Hpa-an General Hospital

(1) Health worker

There are 1 Medical Superintendent, 11 Senior Consultants, 12 Specialist Doctors, 64 Assistant Doctors, 4 Matrons and Sister Nurses and 200 Nurses including Dental nurses and 387 staff in total.

(2) Financial situation

By trust fund, the poor are provided free medical services, laboratory examinations, X-ray, and ultrasonography. In fact, 17,679,550MMK was spent for 2,563 people in 2013.

(3) Hospital Statistics

1) Hospital Service and Administrative Indicators

Table 4-4-1 Hospital service indicator in Hpa-an General Hospital

Index	2009	2010	2011	2012	2013
Total No. of Outpatients*	18,459	19,348	20,518	25,604	25,402
Average No. of Outpatient per day	76.9	78.7	82.1	106.2	144.5
Total No. of Inpatients	9,301	11,070	9,675	12,466	15,160
Average No. of Inpatient per day	120.3	132.6	116.2	146.0	181.2
Average duration of Stay (in days)	4.7	4.3	4.4	4.4	4.4
Bed occupancy rate (%) (Based on sanctioned bed)	60.2	66.3	58.09	73.01	90.61
Total No. of Deliveries	854	1,077	1,074	1,214	1,208
Total No. of Deaths	64	54	50	49	46
Total No. of Abortions	334	264	270	258	245
Total No. of Maternity deaths	3	4	6	4	3
Total No. of under 1 year death	50	62	55	56	74
Total No. of under 5 year death	66	75	61	67	89
Death rate (per 1,000 patients)	22.7	24.3	28.6	21.0	14.4

* Total of No. of Patients includes patients for specialist OPD and general OPD
Source data: Answer of Questionnaires

2) Morbidity and Mortality

Table 4-4-2 Major causes of Morbidity in Hpa-an General Hospital

	2013		2014[2]	
	Disease	No.	Disease	No.
1	Delivery	2,057	Road traffic accident	2,358
2	Malaria	1,214	Dengue hemorrhagic fever (DHF)	1,709
3	Road traffic accident	407	Gastroenteritis	1,318
4	Gastroenteritis	283	Delivery	1,031
5	Dengue hemorrhagic fever (DHF)	0	Malaria	207

Source data: Answer of Questionnaires

[2] Date from January to November in 2014

Table 4-4-3 Major causes of mortality in Hap-an General Hospital

	2012		2013	
	Disease	No.	Disease	No.
1	Road traffic accident	32	Road traffic accident	29
2	Low birth weight	19	Low birth weight	4
3	Septicemia	17	Tuberculosis	4
4	Tuberculosis	9	Septicemia	3
5	Malaria	7	Malaria	2

Source data: Answer of Questionnaires

(4) Situation of Medical Service Departments

1) Ob and Gyn ward / Delivery room

At the time of survey, there were 38 patients required hospitalization with 53 sanctioned beds. The hospital is operating for 24 hours by 7 doctors and 4 nurses. Although 7 deliveries (cesarean section: 5, normal delivery: 2) were conducted per day, 5 baby cots were available. 1 infant-warmer and vacuum suction also are available and 2 delivery tables have been installed by CMSD in 2012. The number of cases in Gynecology increased in 2012.

Table 4-4-4 Ob and Gyn indicators in Hpa-an General Hospital

	2009	2010	2011	2012	2013
Total No. of Delivery	939	1,075	1,074	1,214	1,208
No. of Normal delivery	466	385	395	413	345
-Instrumental delivery	203	279	301	232	158
No. of cesarean section	270	411	378	617	442
No. of Miscarriage/Abortion	334	264	270	258	264
No. of Stillbirth	64	54	50	49	40
No. of Gynecological cases	182	186	181	310	405

Source data: Answer of Questionnaires

2) Pediatrics ward

At the site survey (September 2014), there were 9 for neonates and 49 for pediatric patients required hospitalization with only 27 for neonates and 65 for pediatric sanctioned beds. 3 consultants (1 specialist[3]), 10 assistant surgeons, 3 interns and 32 nurses are allocated. The major cases of morbidities of pediatric hospitalization are dengue fever, abdominal diseases, and pneumonia, and neonatal jaundice is frequently diagnosed. The morality under 1 year old in 2013 was 74 cases. 1 phototherapy machine and 2 infant warmers are available and the equipment needs to be installed considering the occurrence of 100 deliveries in some months.

[3] The meaning of a specialist is a doctor who has a sufficient clinical experience in his/ her specified field abroad. In this report, the survey team shows the number of specialists as the total sum of doctors such as Specialist、junior consultant and senior consultant.

3) Operation theatre

742 Ob and Gyn operations in total 2,389 operations were conducted in 2013. Since the operation theatre in Hpa-an General Hospital does not have any minor operation room, all operations are carried in major operation rooms. Operation rooms are operated by 2 anesthetists (1senior and 1 junior consultants), and assistant surgeons. Since a neurological surgeon is not assigned in Hpa-an General Hospital, neurosurgery cases are referred to the Yangon General Hospital. In terms of medical equipment, electrosurgical unit is out of order and needs to be repaired.

4) Surgical ward

There are 12 new patients required hospitalization per day with 50 sanctioned beds at the ward. The beds in the ward are consistently occupied, and it sometimes needs increasing around 10 beds by borrowing them from the other wards. 11 consultants, 3 assistant doctors and 18 nurses operate many traumatic patients of road traffic accident. The medical equipment and its condition are sufficient. On the other hand, sorting medicines is one of the challenges when a plenty of medicines are sent from CMSD.

(5) Referral System

Hpa-an general hospital accepts 15 to 25 referral cases from targeted area. The cases of fatal premature infant or congenital cardio disease are transferred to tertiary hospitals for children in Yangon taking 6hours by car, 1 to 2 times per month on average. Transportation in close distance by the hospital is free, however, 15gallon (960 MMK) is charged for the transportation to Yangon. When the family of the patient cannot afford, the fee is compensated by donation.

(6) Challenges of buildings and facilities

1) Beams and Pillars at medical care ward have cracks, and the hospital has a plan to be removed the building.

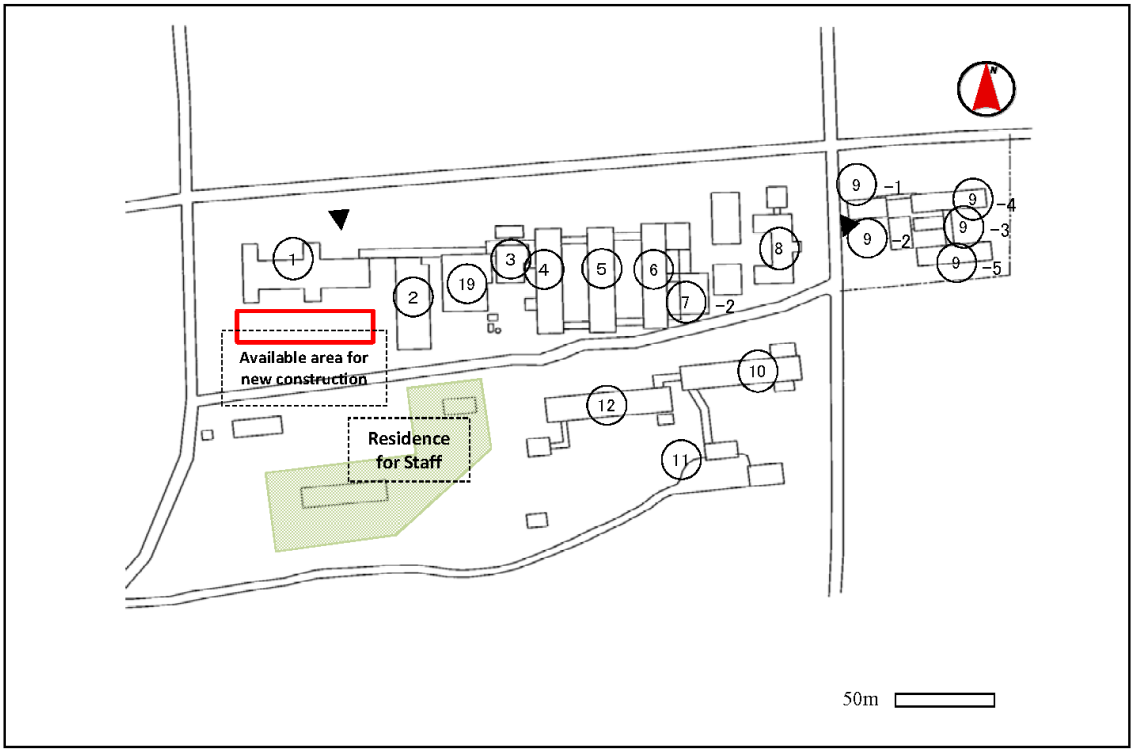
2) Beams in the administration building have small cracks, and the building will be newly reconstructed.

3) Most of the buildings have a water leakage in the roofs, but it does not influence to the structures of the buildings.

4-5. Mawlamyaing General Hospital (Mon State)

(1) Main buildings

Year of Establishment : 1924 Site area (m²) : 72,583



Name of facility			
Name of building	Contents of facility Stories	Construction year	Type of structure
Building ①	2 st. GF : Medical care, Oncology, Dermatoplogy, Dental clinic, Surgery / 1F : Pediatric, Ophthalmology, Otolaryngology ward, Medical superintendant's office, Conference room	1995	RC
Building ②	2 st. GF :Rooms for doctors / 1F : Pediatric, Ophthalmology, Otolaryngology ward, Pay ward	1994	RC
Building ⑲	2 st. GF : Conference room, Sterilization room / 1F : Pediatric, Ophthalmology, Otolaryngology ward, Operation Theater	2011	RC
Building ③	2 st. GF : Laboratory / 1F : Pediatric, Ophtalmology, Otolaryngology ward, ICU (ex-Operation Theater)	1962	RC
Building ④	2 st. GF : Prisoner ward / 1F : Surgical ward (Male)	1962	RC
Building ⑤	2 st. GF : Special ward for disaster / 1F : Surgical ward (Female)	1962	RC
Building ⑥	2 st. GF : Pharmacy, Blood donation room, Physiotherapy room / 1F : Orthopedic ward	1962	RC
Building ⑦-2	2 st. GF : X-ray room, Ultrasound room / 1F : Unused (Rain leaking)	1962	RC
Building ⑧	1 st. GF : Monk Ward	1962	RC
Building ⑨-1	1 st. GF : Outpatient department for Ophthalmology and Otolaryngology	1977	RC
Building ⑨-2,3	1 st. GF : Operation Theater for Ophthalmology and Otolaryngology	1981	RC
Building ⑨-4	1 st. GF : Ophthalmology ward	1981	RC+Wood
Building ⑨-5	1 st. GF : Otolaryngology ward	1981	RC+Wood
Building ⑩,⑫	1 st. GF : Medical care ward	1994	RC
Building ⑪	2 st. GF : Psychiatric ward / 1F : Psychiatric ward	1982	RC
(Red frame)	Available area for construction		

Situation of Inflastructure	
Electricity	Electric power supply (Frequency of blackout : 2-3times/month (Duration : 5-10min or 1hour)) + Generator (2×200kVA + 2×35kVA)
Water Supply	Water Source : Deep well Water supply system : Elevated water tank
Sewage	Septic tank (Sludge disposal by Municipal)
Communication	Fixed telephone line (5) + Mobile phone network + Internet connection

4-5. Mawlamyaing General Hospital

(1) Main buildings (Photos taken on 4th September 2014)

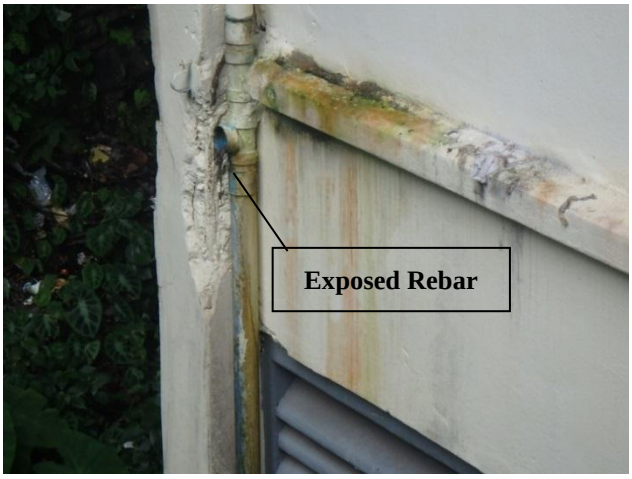
Mawlamyaing General Hospital
Established in 1924
(The photo shows the building
for Administration and OPD.)

Stairs connecting to Medical ward
(Constructed in 1994)

Stairs connecting between Psychiatric ward
(Constructed in 1982) and Medical ward
(Constructed in 1994)

Steep slope connecting
between ICU and Operation theatre

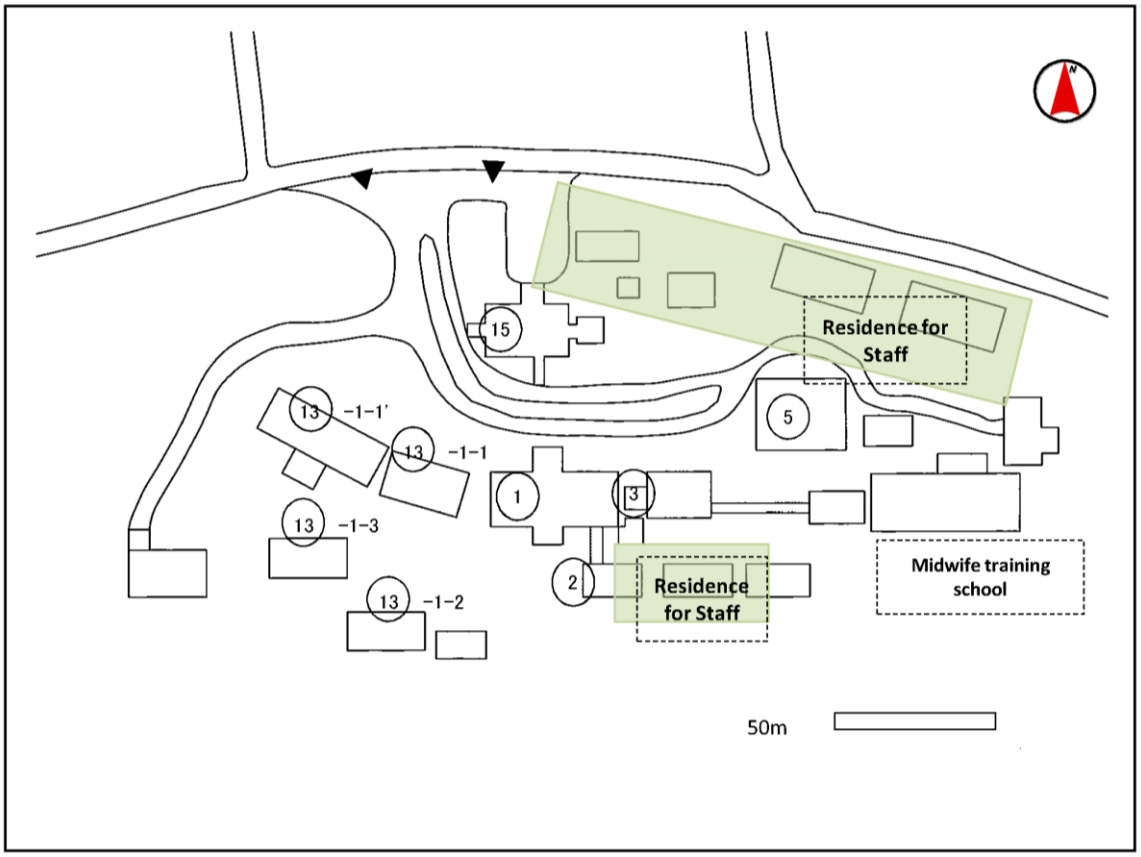
Exposed rebar of the beam
in the Orthopedics ward (Constructed in 1962)



Exposed rebar and a lack of hoop reinforcement
at X-ray department (Constructed in 1962)

(2) Maternal and Child Health Department

Year of Establishment: 1917 Site area (m²) : 31,134



Name of facility				
Name of building	Stories	Contents of facility	Construction year	Type of structure
Building ①	2 st.	GF : Obstetrics ward / 1F : Gynecologycal ward, Delivery room, Ultrasound room	1917	Brick
Building ②	2 st.	GF : Pediatric ward / 1F : Neonatal care unit	—	RC
Building ③	2 st.	GF : Outpatient department for Obstetrics, Laboratory / 1F : Operation Theater	1962	RC
Building ⑬-1-1	1 st.	GF : Pediatric ward	2010	RC
Building ⑬-1-1'	1 st.	GF : Pediatric ward	1965	RC
Building ⑬-1-2	2 st.	GF : Pediatric ward / 1F : Neonatal care unit, Rooms for mother's, Neonatal Intensive Care Unit	2003	RC
Building ⑬-1-3	1 st.	GF : Pediatric ward	1965	RC
Building ⑮	3 st.	GF, 1F and 2F : Pediatric ward	2009	RC
Building ⑤	2 st.	MOUNT HOPE : Unused	100 years ago	Brick

Situation of Inflastructure	
Electricity	Electric power Supply（Frequency of blackout : Daily）+ Generator (Equipped at each building)
Water Supply	Water Source : Public water supply (in case of shortage of well water) + Deep well Water supply system : Water receiving tank + Pump
Sewage	Septic tank (Sludge disposal by Municipal)
Communication	Fixed telephone line (1) + Mobile phone network

(2) Maternal and Child Health Department (Photo taken on 5th September, 2014)

Maternal and Child Health Department, Mawlamyaing Hospital, Established in 1917 (The photo shows the Ob and Gyn Department.)

MOUNT HOPE constructed a hundred years ago. Wooden parts of first floor have been getting rot and currently not used.

Stairs connecting to Pediatrics ward (Constructed in 1965)

Some beds placed on the passage and being crowded at Pediatrics ward

Wooden parts have been getting rot at Ob and Gyn ward (Constructed in 1917)

Degradation of ceiling and fracture of concrete

4-5. Outline of Mawlamyaing General Hospital

(1) Health worker

There are 1 Medical Superintendent, 23 Consultants, 68 Assistant surgeons, 2 Dentists, 1 Matron, 152 Staff nurse, 30 other medical staff such as medical social worker, physiotherapist, laboratory technicians and radiographer appointed and 463 staff in total.

(2) Financial situation

Table 4-5-1 Revenue in Mawlamyaing General Hospital Unit: MMK

	2009	2010	2011	2012	2013
Fiscal budget	275,155,000	278,874,000	285,682,000	512,279,000	1,184,355,000
CCSS	21,035,000	33,578,000	37,351,000	40,641,000	30,258,000
Total[1]	296,798,000	312,787,000	323,739,000	553,148,000	1,218,166,000

[1] This figure was based on the answer of questionnaires. A total cost was not accord with the total amount of fiscal budget plus CCSS.

Source: Answer of Questionnaires

CCSS is implemented for pay room fee, blood examinations, X-ray, ultrasonography, and urine examination. 50 % of income of CCSS is refund to the national bank account. 25% can be allocated for the purchase of drugs, and the other 25% can be allocated for the purchase of consumables and maintenance cost (See Table 4-5-2 and 4-5-3).

Table 4-5-2 CCSS breakdown in Mawlamyaing General Hospital (2013) Unit: MMK

Item		Revenue of CCSS	Distribution breakdown of the revenue in CCSS		
			Refund to the fiscal budget	Purchase of drugs	Purchase of consumables and maintenance cost
1	Pay room	10,839,000	5,419,500	2,709,750	2,709,750
2	Blood examination	6,120,400	1,338,200	669,100	669,100
3	X-ray	8,106,200	2,478,180	1,239,090	1,239,090
4	Ultrasonography	2,245,000	1,026,500	513,250	513,250
5	Urine examination	10,080,000	2,830,000	1,415,000	1,415,000
	Total	37,390,600	13,092,380	6,546,190	6,546,190

Source: Annual hospital report of Mawlamyaing General Hospital in 2013

Table 4-5-3 CCSS breakdown in Mawlamyaing General Hospital (2014)[1] Unit: MMK

Item		Revenue of CCSS	Distribution breakdown of the revenue in CCSS		
			Refund to the fiscal budget	Purchase of Drugs	Purchase of consumables and maintenance cost
1	Pay room	4,559,000	1,139,750	569,875	569,875
2	Blood examination	26,933,000	637,450	3,187,258	3,187,258
3	X-ray	-	-	-	-
4	Ultrasonography	1,995,000	948,250	474,125	474,125
5	Urine examination	5,552,000	1,579,500	789,750	789,750
	Total	14,799,300	4,304,950	2,152,475	2,152,475

[1] Data collected from January to June in 2014

Source: Annual hospital report of Mawlamyaing General Hospital in 2014

Besides, there was 43,591,420MMK of interest of the trust fund from January to June in 2014. This interest was spent for provision of medical services for the poor: 895 patients were covered by 10,554,175MMK for their medical services.

(3) Health statistics

1) Hospital Service and Administrative Indicators

Table 4-5-4 Hospital service indicator in Mawlamyaing General Hospital

Indicator	2010	2011	2012	2013	2014
Total No. of Outpatients	19,338	22,387	24,953	32,685	24,071
Average No. of Outpatient per day	-	-	-	143	-
Total No. of Inpatients	27,489	23,320	26,868	34,978	16,783
Average No. of Inpatient per day	-	-	-	505	-
Average duration of stay (in days)	-	-	-	6	-
Bed occupancy rate % (Based on sanctioned bed)	-	-	-	168	-
Total No. of Deliveries	1524	1636	1808	1891	1416
Total No. of Stillbirths	55	46	62	42	34
Total No. of Abortion	160	156	130	180	96
Total No. of Maternity deaths	-	-	-	-	-
Total No. of under 1 year death	-	-	-	-	-
Total No. of under 5 year death	-	-	-	-	-
Total No. of Deaths	417	442	462	469	264
Death rate (per 1000 patients)	-	-	-	14	-

Source data: Answer of Questionnaires

2) Morbidity and Mortality

Table 4-5-5 Major causes of morbidity in Mawlamyaing General Hospital in 2013

	Disease
1	Dengue hemorrhagic fever(DHF)
2	Acute Infectious Disease
3	Diarrhea
4	Lacerations
5	Bone fracture

Source data: Answer of Questionnaires

Table 4-5-6 Major causes of mortality in Mawlamyaing General Hospital in 2013

	2012
1.	Road traffic accident
2.	Cardiac insufficiency
3.	Hepatocirrhosis
4.	Tuberculosis
5.	Renal failure

Source data: Answer of Questionnaires

(4) Situation of Medical Service Departments

1) Ob and Gyn ward/Delivery room

It is reported that total number of inpatients in 2013 was 2,555 and the death was 8. There were 65 patients required hospitalization with only 50 sanctioned beds at the site survey. There are 70 deliveries monthly on average, and some patients are transferred from 200 miles (321km) away. At the time of survey, 5 cesarean sections and 2 normal deliveries were observed. There are 2 delivery tables, and one of them was installed in 2013 by individual donation. The other table was made in local and the hospital purchased by themselves.

The department has 1 vacuum machine (aspirator), 1 oxygen concentrator, and 1 sterilizer. Though there are 3 beds at the ICU, and it seems that essential equipment such as patient monitor, infusion pump, and oxygen concentrators are necessary.

There is a water leakage from the ceiling of the delivery room and the celling is molded. The water from the ceiling reaches to the floor.

The ward is operating for 24 hours by 2 specialists, 2 junior/senior consultants, and 20 nurses. It is difficult to operate many elective operations for gynecological cases (max: three per week) due to frequent occurrence of emergency operations and cesarean delivery (11 cesarean cases per day) (See Table 4-5-7).

At the gynecology ward, total hysterectomy, ovariectomy, various gynecologic disorders including the pelvic abscess cases are acceptable. They have total hysterectomy, parovariotomy, pelvic neoplasm and any other diseases at Gynecology ward. If patients need some examinations such CT scan, X ray and laboratory examinations, they are transferred to main building. There is necessity to be set medical equipment for laboratory examinations and other equipment, and allocation of technicians at sub buildings for MCH if MCH would become independent buildings.

Table 4-5-7 Indicators in Ob and Gyn ward of Mawlamyaing General Hospital (2013)

	2011	2012	2013	2014 (a half year)
Total delivery	-	-	-	-
Normal delivery	857	1,040	1,087	714
Instrumental delivery	160	211	385	124
Caesarian section	539	517	568	535
Miscarriage/Abortion	-	-	-	-
Stillbirth	-	-	-	-
Gynecological case	180	203	210	172

Source data: Answer of Questionnaires

2) Pediatric ward

There were 200 patients required hospitalization with only 50 sanctioned beds. Hospitalizing a child/infant to other department sometimes occurs and utilized beds for pediatric ward happen to be over 200 beds occasionally. At the time of site survey (August 2014), 289 children/infants are hospitalized, and 120 of them are fatal pneumonia. 1consultant, 9 assistant surgeons, 3 interns,[4] and 18 nurses are assigned in the ward. 2 on-call doctors from emergency department are also assigned based on necessity. There are 10 rooms and the ward is occupied with too many beds. 11 beds in ICU are fully occupied. When a fatal patient needs intensive care, one of the ICU patients has to be transferred to general ward. Since only oxygen supplier is installed in ICU, Installation of medical equipment such as monitor, oxygen concentrator, and nebulizer need to be supplied. Beds were fully occupied in rooms and some beds were spread out to corridor.

Infant less than 1.5kg are hospitalized in neonatal unit. Although there is a phototherapy machine provided by CMSD, essential equipment such as vacuum extractor and incubator has not been installed. Even sterilizer is not installed to pediatric unit but to newborn unit, nurses are required to borrow the equipment and it is time consuming.

3) Operation theatre

Total number of operation cases is 3,102 in 2013. 845 Ob and Gyn operations are majority in both major and minor operation. There were 778 general operations (surgical ward), 692 orthopedic operations, 523 ophthalmology operation, and 264 otolaryngology operations in 2013. The majority of eye operation is cataract, and the majority of otolaryngology operation is tumor on neck or face.

Operation room is managed by 2 anesthetists (1senior and 1 junior consultant), and 4 general surgeons and 13 nurses are assigned. 2 general operation rooms and 1 emergency operation room are utilized. After operation, a patient is monitored in recovery rooms about an hour, and transferred to each ward. Sterilizer provided by CMSD in 2014 has small capacity, and thus the department requests bigger capacity sterilizer.

4) Surgical ward

4 consultants (1 specialist included), 9 Assistant surgeons, and 21 nurses work in the department. Surgery due to head injury is majority (1,329 cases in 2013), appendicitis case follows.112 ileus was counted in 2013, and if fatal cases such as gastrointestinal hemorrhage need endoscopy, the patients are transferred to the Yangon General Hospital.

[4] House Surgeon is a medical student. He/She works for preparation of operation theatre, treatment or any other work for neonates and pediatric patients.

Table 4-5-8 Indicators in Surgical ward of Mawlamyaing General Hospital

Disease	2009	2010	2011	2012	2013
Head injury	1,005	1,165	1,222	1,407	1,329
Acute abdominal disease					
Digestive ulcer	184	280	100	104	117
Digestive bleeding	201	197	157	84	218
Appendicitis	131	133	81	92	655
Duodenal ulcer	82	130	102	137	179
Ileus	74	49	30	53	112
Kidney failure	160	111	120	91	143
Hernia	154	92	75	96	146

Source data: Answer of Questionnaires

Crank bed[5] is not installed and all utilized beds are old. Essential equipment such as IV stand, ECG, and patients monitor is insufficient.

5) Orthopedics ward

Operations for bone fracture due to road traffic accident and fall, amputation due to diabetes are carried out at the ward. 1 consultant, 3 assistant surgeons, 1 intern and 17 nurses are assigned. Inpatient treatment room and outpatient treatment room are organized in the ward. Outpatient service held on Tuesday and Friday. On average, the doctor examines 30 outpatients per day. Sterilizer in the ward has repaired time to time. Since there is no washing machine for gowns and sheets, it takes a time to wash them by hands.

6) Clinical laboratory department

Automatic analyzer has been installed in 2014. Laboratory examinations for blood, microbiology and biochemistry are available. 1 consultant and 4 assistant surgeons are allocated.

(5) Referral System

When endoscopy is necessary for patients, the patient is transferred to the Yangon General Hospital. The actual case occurred are a few per year.

(6) Challenges of buildings and facilities

1) Main buildings

a. There are cracks, spalling of the concrete caused by the rust of the reinforcing bar of floor, the exposed point of the reinforcing bar of floor on the pillars and beams. Even though Mawlamyaing area is not expected frequent earthquake occurrence, reconstruction will be preferable at an early stage since the cross section of pillars is considerably small.

[5] This type of bed is called Farrar's bed which can bring up legs or lower body of patients.

2) MCH building

a. The building was built in 1933. Spalling the arched beam and the wooden ceiling, leaks in the roof, damaged window frames due to rain and the exposed point of the reinforcing bar are observed.

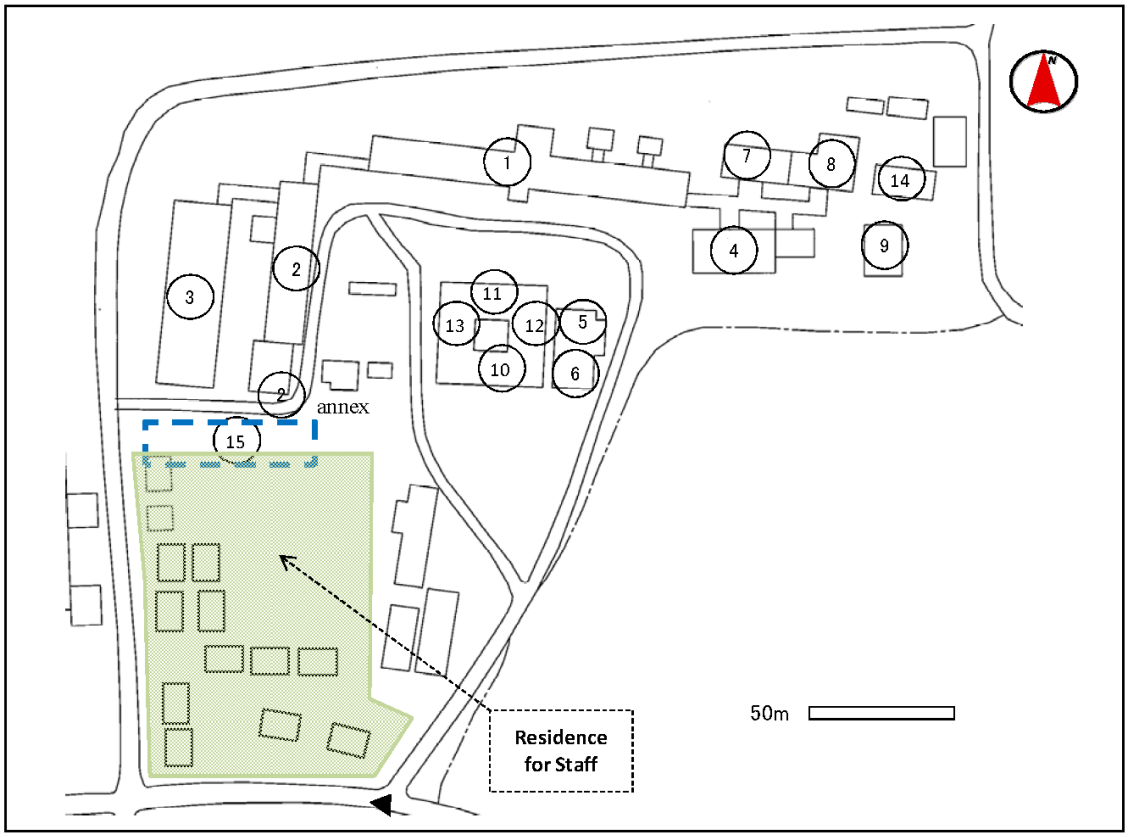
b. The operation theatre has been repaired. However, mold was observed in the hall at the operation thatre and the room for outpatients.

c. The buildings except the newly reconstructed ward have damaged water/sewage systems and the toilet cannot be utilized. Patients and staffs inconveniently have to go to another building for using toilets.

d. It is very inconvenient to access to the pediatric ward from main buildings and the ward is located on a higher area (3 to 4 m higher than main building).

4-6. Dawei General Hospital (Thanintharyi Region)

Year of Establishment: 1918　　Site area (m²) : 50,110



Name of facility				
Name of building	Stories	Contents of facility	Construction year	Type of structure
Building ①	2 st.	GF : Medical care ward, X-ray room, Ultrasound room / 1F : Pediatric ward, Orthopedic ward	1939	Brick
Building ②	2 st.	GF : Ob and Gyn ward / 1F : Ophthalmology, Otolaryngology ward	1981	RC
Building ② annex	2 st.	GF : Delivery room / 1F : OperationTheater for Ophthalmology and Otolaryngology	1981	RC
Building ③	2 st.	GF : Surgical ward, Minor Operation Theater / 1F : ICU, Operation Theater	1993	RC
Building ④	1 st.	GF : Outpatient and Emergency department	1998	RC
Building ⑤	1 st.	GF : Blood donation room	1919	Brick
Building ⑥	1 st.	GF : Laboratory	1989	RC
Building ⑦	1 st.	GF : Psychiatric ward	1955	RC
Building ⑧	1 st.	GF : Monk ward	1988	RC
Building ⑨	1 st.	GF : Isolation ward	2010	RC
Building ⑩-⑬	1 st.	GF : Medical Superintendant's office, Conference room etc.	1963/76	Wood
Building ⑭	1 st.	GF : Medical store	1993	RC
Building ⑮ (Blue frame)		New construction for three stories building for Medical care and pediatric ward	Applied for new construction	—

Situation of Inflastructure	
Electricity	Electric power Supply (Frequency of blackout : Daily (2-3min at 16:00) and the time of engineering works) + Generator (1×200kVA + 1×35kVA + 2×10kVA + Some small type)
Water Supply	Water source : Shallow well (3) Water supply system : Elevated water tank
Sewage	Septic tank (Sludge disposal by Municipal)
Communication	Fixed telephone line (6) + Mobile phone network

4-6. Dawei General Hospital (Photos taken on 8th September 2014)

Dawei General Hospital (Thanintharyi Region)
Established in 1918 (The photo shows the building for Medical ward, Pediatrics ward and laboratory.)

Laboratory was constructed 100 years ago and has been still used.

Steep slope to avoid connecting to the front road at OPD (Renovated in 2013)

Elevated water tank has been located next to the Laboratory and still used.

Some beds placed on the passage at Medical ward

Slope in the new building under the construction (Gradient on the slope is approximately 1/10)

4-6. Outline of Dawei General Hospital

(1) Health worker

There are 1 Medical superintendent, 23 Consultants, 54 Assistant surgeons, 2 Dentists, 1 Matron, 158 Staff nurses, 30 other medical staff such medical social worker, physiotherapist, laboratory technicians, radiographers, technicians and 309 hospital staff in total.

(2) Financial situation

Table 4-6-1 Revenue in Dawei General Hospital Unit: MMK

	2009	2010	2011	2012	2013
Fiscal budget	140,867,093	187,086,145	181,458,882	420,463,751	777,183,743
CCSS	15,574,220	17,570,320	17,469,788	21,567,096	31,369,253
Total	156,441,313	204,656,465	198,928,670	442,030,847	808,552,996

Source: Answer of Questionnaires

Dawei General Hospital has provided free medical service for the poor and it is covered by trust fund. In 2013, 2 million MMK was spent for free medical services for 3,504 people as Table 4-6-2 shows.

Table 4-6-2 Number of patient who has received free medical service and its expenditure in Dawei General Hospital

	Number of patients	Expenditure (MMK)
2011	157	100,000
2012	1,169	830,000
2013	3,504	2,000,000

Source: Annual hospital report in Dawei General Hospital in 2013

(3) Hospital statistics

1) Hospital Service and Administrative indicators

Table 4-6-3 Health indicators in Dawei General Hospital

Indicator	2010	2011	2012	2013	2014 (a half year)
Total No. of Outpatients *	13,630	13,227	14,457**		14,519
Average No. of Outpatient per day	37.3	36.5	45.4	84.5	123.04
Total No. of Inpatients	8,884	8,588	9,249**		6,898
Average No. of Inpatient per day	137.6	132.4	167.3	193.7	227.03
Average duration of stay (in days)	5.7	5.6	6.0	6.2	6.0
Bed occupancy rate % (Based on sanctioned bed)	68.8	66	83.6	96.9	113.5
Total No. of Deliveries	1,068	1,007	1,162**	-	-
Total No. of Stillbirths	-	-	-	-	-
Total No. of Abortion	106	123	86**	-	166
Total No. of Maternity deaths	-	-	-	-	-
Total No. of under 1 year death	-	-	-	-	-
Total No. of under 5 year death	-	-	-	-	-
Total No. of Deaths	-	-	-	-	96
Death rate (per 1,000 patients)	9.45	8.49	9.3	8.4	9.1

* The sum of outpatients includes for patients of Specialists OPD and Generals OPD.

** Data collected up to November 2012

Source data: Answer of Questionnaires

2) Morbidity and Mortality

Table 4-6-4 Major causes of morbidity in Dawei General Hospital

	2013		2014 (a half year)	
	Disease	No.of patients	Disease	No.of patients
1	Trauma	906	Trauma	489
2	Diarrhea	538	Dengue hemorrhagic fever(DHF)	331
3	Dengue hemorrhagic fever (DHF)	468	Acute respiratory disease	166
4	Pneumonia	352	Malaria	104
5	Malaria	219	Tuberculosis	77

Source data: Answer of Questionnaires

Table 4-6-5 Major causes of mortality in Dawei General Hospital

	2013		2014 (a half year)	
	Cause of death	No.of patients	Cause of death	No.of patients
1	Trauma	18	Trauma	20
2	Tuberculosis (complication of HIV)	7	Tuberculosis	2
3	Fatal pneumonia	2	Dengue hemorrhagic fever(DHF)	1
4	Stroke (due to high blood pressure)	2	Stroke	1
5	Malaria	1	-	-

Source data: Answer of Questionnaires

(4) Situation of Medical Service Departments

1) Ob and Gyn ward /Delivery room

There are 48 sanctioned beds and all beds were occupied at the time of site survey. 60% of deliveries were implemented cesarean section[6]. Transferring to Yangon by air occurred 2 to 3 times a year when artificial hemodialysis for kidney disease patients or chemotherapy for cancer is necessary.

Table 4-6-6 Indicators in Ob and Gyn ward in Dawei General Hospital (2013)

	Disease/operation
Caesarian section	1,025
Miscarriage/Abortion	135
Toxemia of pregnancy	20
Prepartum hemorrhage	16
Postpartum hemorrhage	10

Source data: Answer of Questionnaires

[6] The reason of high cesarean section rate may be controlling the date of birth along with the parent's birthday is preferable among parents in terms of religion as our investigation heard of.

Table 4-6-7 Number of patients in Obstetric ward of Dawei General Hospital

	2014 (a half year)
Normal delivery	163
Instrumental delivery	69
Cesarean section	261
Total No. of inpatients	848

Source data: Answer of Questionnaires

2) Pediatric ward

At the time of site survey (September 2014), there were 88 patients required hospitalization with only 65 sanctioned beds. The space is a shortage and patient's beds are placed on the corridor. 3 consultants (1 specialist included), 10 assistant surgeons, 3 interns and 32 nurses are assigned. Seeing Table 4-6-8 and 4-6-9, the top 2 high morbidities are due to acute respiratory infection and diarrhea, and the top causes of mortality are birth asphyxia and jaundice (these are included neonatal diseases and it is shown on Table 4-6-8 and 4-6-9). Considering frequent occurrence of respiratory infection, installing nebulizer and CPAP machine are desirable. As it is mentioned above, there is no space to place IV stand, hang IV bottle on the wire between walls.

Table 4-6-8 Major causes of morbidity in Pediatric ward of Dawei General Hospital

	2012	2013
Acute respiratory infection	640	663
Diarrhea	454	407
Neonatal disease	308	360
Malaria	144	76
Tuberculosis	63	69

Source data: Answer of Questionnaires

Table 4-6-9 Major causes of mortality in Pediatric ward of Dawei General Hospital

	2012	2013
Neonatal disease	21	11
Septicemia	3	0
Cardiac disease	2	0
Acute respiratory infection	1	2
Diarrhea	1	0

Source data: Answer of Questionnaires

3) Operation Theatre

In the 11 months of 2012, 2,722 cases were operated. 867 among those operations were Ob and Gyn operations. General operations were 682 cases as Table 4-6-10 shows. The operation theatre is managed by 2 anesthetists (1senior and 1 junior consultant), and several assistant surgeons are assigned.

Table 4-6-10 Number of operations in Dawei General Hospital

Department	2010	2011	2012
Total No. of operations	1,847	1,895	2,722
Ob and Gyn ward	748	831	867
Surgical ward	399	536	682
Orthopedic ward	92	91	176
Ophthalmology ward	608	449	448
Otolaryngology ward	-	13	44

Source data: Answer of Questionnaires

4) Surgical ward

At the time of survey, there were 53 patients required hospitalization with 50 sanctioned beds. Many emergency patients due to road traffic accident were transpired; the rate in all surgeries was 50% as Table 4-6-11 shows. Appendicitis and gastroenteritis follow. When chemotherapy for cancer or neurosurgery is necessary, patient is transferred to Yangon. 3 consultants, 8 assistant surgeons and 17 nurses are allocated to the ward.

Table 4-6-11 Major causes of morbidity in surgical ward of Dawei General Hospital

	2011	2012	2013
Head injury	569	795	906
Gastroenteritis (Including perforation and imperforation)	234	565	512
Urinary/Kidney disease	165	268	-
Appendicitis	109	237	186
Hernia (Including scrotal hernia)	116	119	190
Cancer	63	12	66

Source data: Answer of Questionnaires

(5) Referral System

93 referral cases were accepted in Dawei General Hospital in 2013, and 54 cases in 2014.There are 2 to 3 cancer patients of Ob and Gyn and 10 to 15 neurosurgical patients transferred to Yangon.

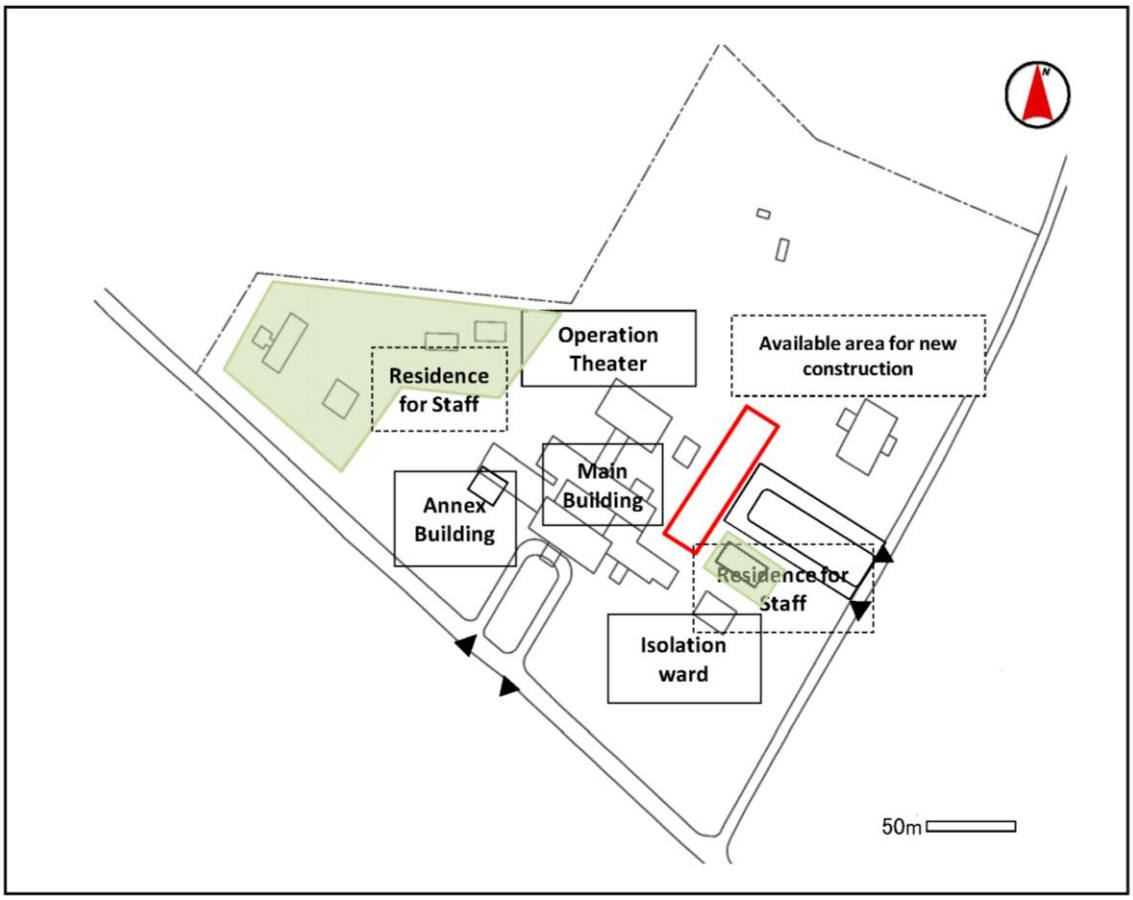
(6) Challenges of buildings and facilities

Spalling concrete of the pillar and exposure of the reinforcing pillars and reinforcing bars of floor are observed in the pediatric and the Ob and Gyn ward (including a delivery room).

4-7. Myeik General Hospital (Thanintharyi Region)

(1) Main buildings

Year of Establishment : 1933　　Site area (m²) : 76,893



Name of facility

Name of building	Stories	Contents of facility	Construction year	Type of structure
Main Building	2 st.	GF : Outpatient department, Orthopedic ward, Laboratory, Diagnostic Imaging Center, Outpatient department for Demartology and Ophthalmology / 1F : Ophthalmology, Otolaryngology ward, Surgical ward, Medical care ward, Monk ward, Psychiatric ward, Conference room	2003	RC
Annex	1 st.	GF : CT scan room	2013	RC
Operation Theater	2 st.	GF : Operation Theater / 1F : Pay ward	2005	RC
Isolation ward	1 st.	GF : Isolation ward	2010	RC
Red frame		Available area for new construction		

Situation of Inflastructure	
Electricity	Electric power Supply（Frequency of blackout:Daily (Duration:2-3min) and the time of engineering works) + Generator (1×200kVA + 1×90kVA)
Water Supply	Water Source : Deep well Water supply system : Elevated water tank
Sewage	Septic tank (Sludge disposal by Municipal)
Communication	Fixed telephone line (1) + Mobile phone network

4-7. Myeik General Hospital

(1) Main buildings (Photos taken on 11th September 2014)

Myeik General Hospital (Thanintharyi Region)
Established in 1933
(The photo shows the Main building.)

Corrosion of reinforcing bars of floor
(Constructed in 2003)

Damage by mold in the staircase
in the main building (Constructed in 2003)

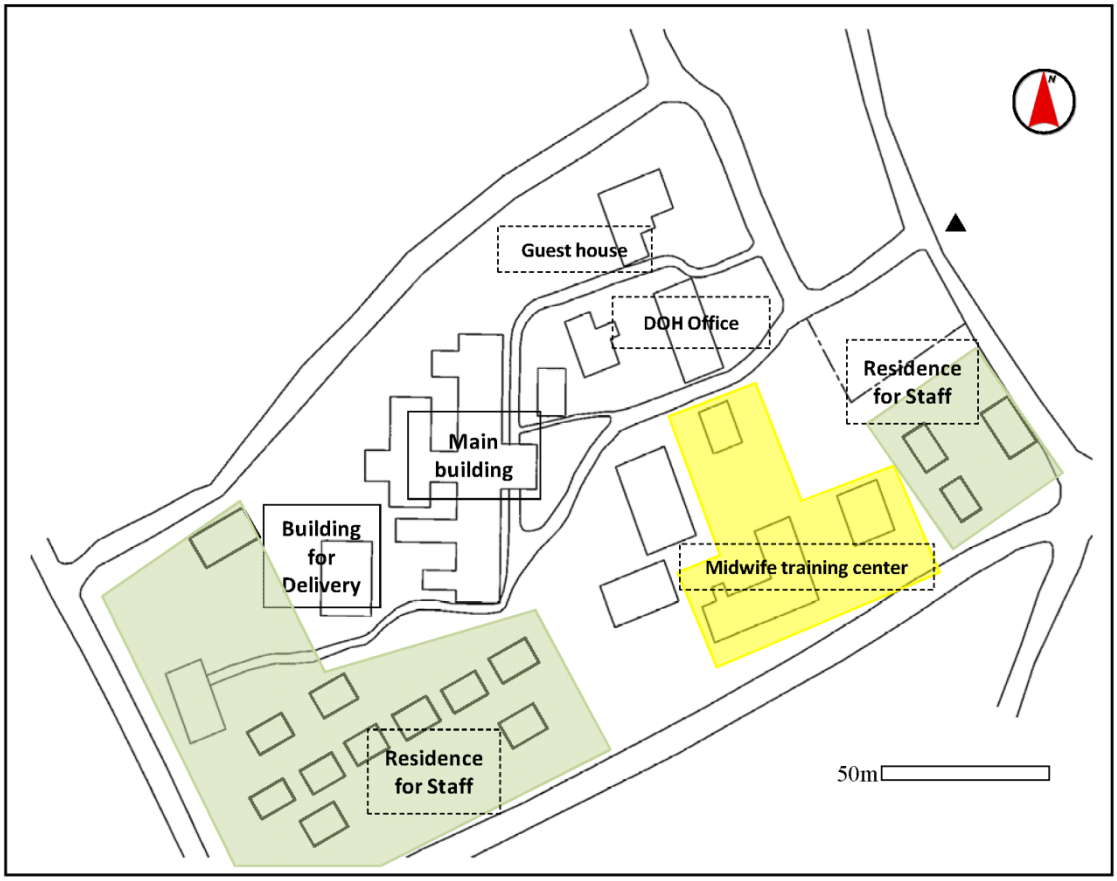
Fracture of baluster in the main building
(Constructed in 2003)

Room for distributing panel in the main building
(Constructed in 2003)

Termite damage in the main building
(Constructed in 2003)

(2) Maternal and Child Health Department

Year of Establishment : 1933 Site area (m²) : 32,376



Name of facility				
Name of building	Stories	Contents of facility	Construction year	Type of structure
Main building	2 st.	GF : Pediatric ward, Laboratory / 1F : Obstetrics ward, Operation Theater	1933	Brick
Delivery ward	2 st.	GF : Pediatric ward, NICU / 1F : Delivery room, Ultrasound room	1975	RC

Situation of Inflastructure	
Electricity	Electric power supply (Frequency of blackout : Only a few times per year) + Generator (1×90kVA)
Water Supply	Water source : Deep well Water supply system : Elevated water tank
Sewage	Septic tank (Sludge disposal by Municipal)
Communication	Fixed telephone line (1) + Mobile phone network

(2) Maternal and Child Health Department (Photos taken on 11th September, 2014)

Maternal and Child Health Department,
Myeik General Hospital, Established in 1933
(The photo shows the main building.)

Damage by mold on the ceiling
in operation theatre

Congestion at the outpatient department
at Obstetrics ward

Some beds placed on the corridor because of
full of patients at Pediatrics ward

Damage by cracks of concrete
on the exterior wall

Fracture of baluster in corridor

4-7. Outline of Myeik General Hospital

(1) Health worker

1 Medical superintendent, 23 Consultants, 64 Assistant surgeons, 2 Dentists, 4 Sister nurse, 200 Staff nurses, 11 Radiographers and Technicians for ultrasonography, 8 other medical staff such medical social worker, physiotherapists, and laboratory technicians are appointed and there are 387 staff in total.

(2) Financial situation

Table 4-7-1 Revenue of Myeik General Hospital Unit: MMK

	2009	2010	2011	2012	2013
Fiscal budget	116,430,000	131,090,000	177,580,000	200,930,000	432,360,000
CCSS	15,210,000	4,700,000	4,600,000	5,600,000	20,900,000
Donation	7,800,000	6,400,000	5,300,000	4,600,000	3,600,000
Total	139,440,000	142,190,000	187,480,000	211,130,000	456,860,000

Source: Answer of Questionnaires

Table 4-7-2 Number of patient who has received free medical service and the expenditure (2013) in Myeik General Hospital

	Number of patient	Expenditure (MMK)
X-ray	2,508	519,200
Ultrasonography	298	298,000
Laboratory examination	499	1,113,950
Assistance for drugs	105	112,700
Anesthesia	348	1,232,000
Total	3,758	3,275,850

Source: Annual health profile in Myeik General Hospital in 2013

(3) Hospital Statistics

1) Health Indicators

Table 4-7-3 Health Indicators in Myeik General Hospital

Indicator	2012	2013	2014
Total No. of Outpatients *		21,946	
Average No. of Outpatient per day	65	86	120
Total No. of Inpatients	-	11,022	-
Average No. of Inpatient per day	132	156	212
Average duration of stay (in days)	6	5	5
Bed occupancy rate % (Based on sanctioned bed)	66	78	106
Total No. of Deliveries	-	1,547	-
Total No. of Stillbirths	-	75	-
Total No. of Abortion	-	-	-
Total No. of Maternity deaths	-	-	-
Total No. of under 1 year death	-	-	-
Total No. of under 5 year death	-	-	-
Death rate (per 1000 patients)	2.1	2	1.4

* The sum of outpatients includes patients of Specialists OPD and General OPD.
Source data: Answer of Questionnaires

2) Morbidity and Mortality

Table 4-7-4 Major causes of morbidity in Myeik General Hospital

	2012		2013	
	Disease	No.of patients	Disease	No.of patients
1	Acute virus infection	569	Acute gastroenteritis	546
2	Acute gastroenteritis	531	Head injury	526
3	Acute respiratory infection	461	Dengue hemorrhage fever	472
4	Measles	307	Acute respiratory infection	465
5	Head injury	214	Non-infectious disease	231

Source data: Answer of Questionnaires

Table 4-7-5 Major causes of mortality in Myeik General Hospital

	2012		2013	
	Disease	No.of patients	Disease	No.of patients
1	Malaria	10	Mal-nutrition	16
2	Birth asphyxia	6	Head injury	12
3	Acute respiratory infection	3	Malaria	8
4	Mal-nutrition	3	Acute respiratory infection	7
5	-	-	Gastroenteritis	2

Source data: Answer of Questionnaires

(4) Situation of Health Service Departments

1) Ob and Gyn ward/Delivery room

The ward is located away from the other departments in Myeik General Hospital. The situation is resembled to Mawlamyaing Hospital. When the main buildings were moved and reconstructed in another property, Ob and Gyn ward remained in the old property as well as the operation theatre. Outpatients for obstetrics in 2013 was 4,986 and 932 patients were for the gynecology. At the time of site survey, there were 77 patients required hospitalization with only 52 sanctioned beds. Hospitalized 15 neonates were observed, and they sleep in the same bed with their mothers due to the insufficiency of number of baby cot. There are 3 delivery beds in the delivery room. One of the nurses in the ward mentioned there is no ECG and infant warmer, and examination light of the delivery room is out of order. Health indicators in Ob and Gyn ward are shown on Table 4-7-6, 4-7-7 and 4-7-8.

Table 4-7-6 Health Indicators in Ob and Gyn ward of Myeik General Hospital (2013)

Indicators	No.of patients
Total deliveries	1,622
Normal deliveries	1,097
Instrumental delivery	178
Cesarean section	340
Live births	1,547
Stillbirths	75

Source all data: Answer of Questionnaires

Table 4-7-7 Major cases of morbidity in Ob and Gyn ward of Myeik General Hospital in 2013

	Disease	No.of patients
1	Pregnancy-induced hypertension	62
2	Pre-eclampsia	52
3	Placenta previa	39
4	Eclampsia	27
5	Premature separation of the placenta	13

Source all data: Answer of Questionnaires

Table 4-7-8 Major causes of mortality in Ob and Gyn ward of Myeik General Hospital in 2013

	Disease	No.of patients
1	Miscarriage/Abortion	161
2	Sterilization operation	132
3	Dysfunctional uterine bleeding	18
4	Ovary cancer	14
5	Hydatidiform mole	13

Source all data: Answer of Questionnaires

2) Pediatric ward

Major causes of morbidity and mortality are shown on Table 4-7-9. 20 neonates need to take a phototherapy machine per day on average; however, the treatment is insufficient due to the lack of a phototherapy machine. At the time of site survey, 5 neonates were laid less than 1 phototherapy machine. A phototherapy machine made of wood in local was used with a usual baby cot. It is reported neonatal jaundice 2013 was 228 cases, and it is obviously due to the insufficiency of a phototherapy machine.

One oxygen concentrator provided by French NGO is out of order, and used a tube directly from oxygen cylinder to neonate's nasal cavity. Thus, installation of the phototherapy machine and oxygen concentrator is critically necessary in the ward.

Table 4-7-9 Major causes of morbidity and mortality for neonates in Myeik General Hospital (2013)

Disease	No.of patients	No. of deaths
Birth asphyxia	50	5
Neonatal jaundice	228	0
Neonatal septicemia	63	15
Low birth weight	32	4
Pneumonia	22	2
Nuclear jaundice	8	2
Others	87	4
Total	494	32

Source data: Answer of Questionnaires

3) Operation Theatre

Total Number of operations in 2013 was 2,380: 693 surgical cases include 386 emergency cases, and 580 cases in both orthopedic and Ob and Gyn wards including 312 for orthopedic and 198

for Ob and Gyn emergency cases. Operation theatre is managed by 2 anesthetists (1senior and 1 junior consultants), and several assistant surgeons are assigned. When an operation for head injury is necessary, the hospital does not refer to Yangon, and a skilled surgeon is able to operate. In otolaryngology, surgeries for oral cancer, natal cancer, throat cancer and trauma can be operated by their own. Moreover, orthopedic consultant performs operation for spinal cord.

Table 4-7-10 Number of operations in each ward of Myeik General Hospital (2013)

Departments	Major	Minor	Emergency	Total
Surgical ward	57	250	386	693
Ob and Gyn ward	103	165	312	580
Orthopedic ward	76	309	198	583
Ophthalmology ward	389	-	23	412
Otolaryngology ward	62	24	34	120

Source data: Answer of Questionnaires

4) Surgical ward

The ward has 50 sanctioned beds. Occurrence of inpatient due to road traffic accident is high. Hernia, appendicitis and bleeding follow. 264 outpatients were observed in August 2014, and the number increased from 2013. 10 consultants including specialists, 6 Assistant surgeons and 21 nurses are allocated in the ward.

There are only ECG, sphygmomanometer, trolley, sterilizer for one each, and the staff has to borrow ECG from other wards. Only very old wheelchair is available for the transfer of patients to an ultrasonography, X-ray, clinical laboratory examinations. There is no autoclave and surgical instruments are sterilized by boiling, but sterilizing work is conducted in a restroom for staffs because there is no place for the work.

(5) Referral System

In Kawthaung District Hospital which is the southernmost tip of region, only hernia surgery is operated, and 15 to 20 surgeries for other disease such as appendicitis or perforation are referred to Myeik General Hospital. Several cancer patients with fatal complications are referred to Yangon in each year by air. One lead poisoning child with lead was transferred to Yangon last year.

(6) Challenges of buildings and facilities

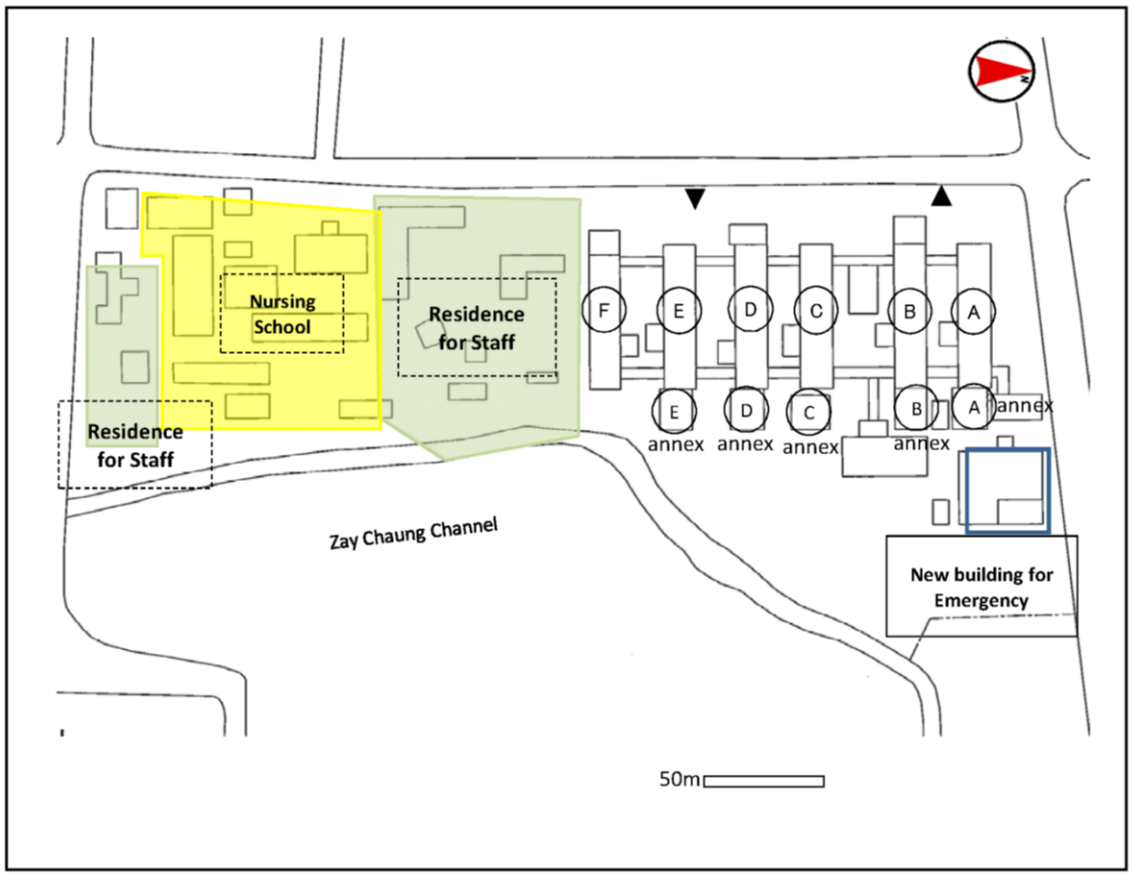
1) MCH building

a. There are cracks on the beams and bending of the floor of corridors due to old facilities.

b. System for water supply and sewage treatment is not completed and thus the wastewater of operation theatre and delivery room is discharged into the external gutter. There is a water leakage and mold on the celling at the delivery room and operation theatre.

4-8. Pathein General Hospital (Ayeyarwaddy Region)

Year of Establishment : 1885　　Site area (m²) : 59,343



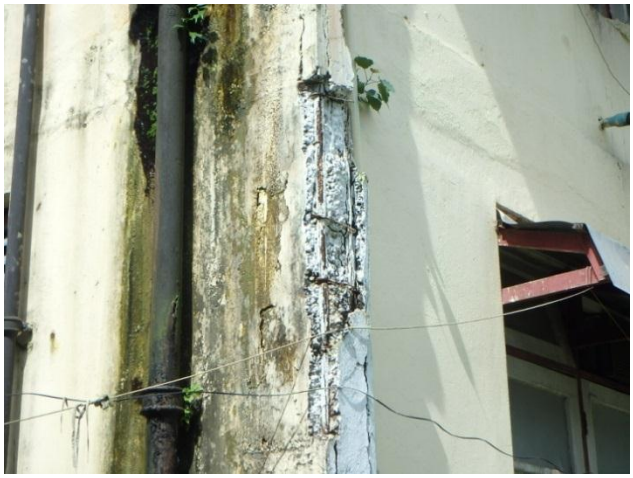
Name of facility				
Name of building	Stories	Contents of facility	Construction year	Type of structure
Building A	2 st.	GF : Medical care ward / 1F : Surgical ward (Male)	1962	RC
Building A annex	1 st.	GF : Monk ward	1981	RC
Building B	2 st.	GF : Medical care ward (Female), Outpatient department / 1F : Surgical ward (Female)	1962	RC
Building B annex	2 st.	GF : Medical store / 1F : Medical store	1962	Wood
Building C	2 st.	GF : Otolaryngology ward / 1F : Ob and Gyn ward	1962	RC
Building C annex	2 st.	GF : X-ray room / 1F : Operation Theater I	1962	RC
Building D	2 st.	GF : Ophthalmology ward, Dental clinic / 1F : Obstetrics ward	1962	RC
Building D annex	2 st.	GF : Isolation ward / 1F : Delivery room	1962	RC
Building E	2 st.	GF : Orthopedic ward, Blood Bank, Psychiatric ward / 1F : Orthopedic ward	1982	RC
Building E annex	2 st.	GF : Laboratry (Pathology) / 1F : Operation Theater II	1982	RC
Building F	2 st.	GF : Pediatric ward / 1F : Pay ward, Medical record room	1990	RC
New building for Emergency	2 st.	GF : Inpatient's room, Operation Theater, X-ray room, CT scan room / 1F : Undecided to use	Under construction	RC

Situation of Inflastructure	
Electricity	Electric power Supply (Frequency of blackout : 1-2times/week) + Generator (1×35kVA + 2×10kVA)
Water Supply	Water source : Deep well Water supply system : 4 Elevated water tanks
Sewage	Septic tank
Communication	Fixed telephone line (3) + Mobile phone network + Internet connection

4-8. Pathein General Hospital (Photos taken on 9th and 10th September 2014)

Pathein General Hospital (Ayeywaddy Region)
Established in 1885
(The photo shows the general OPD
and Medical ward.)

Cracks on the pillar concrete at Surgical ward
(Constructed in 1962)



Spalling and corrosion of pillar concrete
at Operation theatre (Constructed in 1962)

Wooden pillar of old building rotten and risk
of collapse at Medical store (Constructed in 1962)

Congestion at Surgical ward (Female)
(Constructed in 1962)

Beds placed in the corridor at Surgical ward
(Female)

4-8. Outline of Pathein General Hospital

(1) Health workers

There are 1 Medical Superintendent, 1 Deputy Medical Superintendent, 19 Consultants (8 Senior consultants and 11 junior consultants), 67 Assistant surgeons, 1 Dentist, 1 Matron, 12 Sister Nurses, 45 Staff Nurses, 75 Trained Nurses, 7 Nurse aids, 39 technicians (including Physiotherapists, Radiologists, Laboratory technicians), and 74 other staff. There are 340 staff in total.

(2) Financial situation

The total revenue consists of 890,399,770MMK provided by the government and 17,572,788MMK charged by lease for teashop and CCSS in 2013 to 2014. Total expenditure was 890,399,770MMK, and breakdown of expenditure were as follows: 75,000MMK was spent for repair and maintenance of equipment including medical equipment, 68,883,030MMK was for repair of the building and facility, and 300,000,000MMK was for purchase of drugs. Table 4-8-2 shows that the cost of repair has not been same amount every year and it means that the repair has not been carried out periodically.

CCSS has been conducted to X-ray, ultrasonography, laboratory examinations, and selling medicines. The amount of revenue was peaked in 2012, and then has decreased (Table 4-8-3). Free medicines are provided for children under 5 years old, expectant mothers and post-delivery mothers, the poor and victims of nature disaster.

Pathein General Hospital has introduced the trust fund since 1st December in 1998 and 464,852MMK interest has been spent for medical care for the poor in 2013.

Table 4-8-1 Breakdown of own revenue in Pathein General Hospital

Unit: MMK

Breakdown	Revenue
Medical service of CCSS	6,211,350
Pay room	2,316,500
Lease (Pharmacy and parking area)	8,325,000
Others	719,938
Total	17,572,788

Source: Document provided by Pathein General Hospital

Table 4-8-2 Maintenance cost in Pathein General Hospital Unit: MMK

	2009	2010	2011	2012	2013
Repair cost for the building and facility	1,000,000	−	−	−	63,883,030
Maintenance cost for medical equipment	2,257,000	100,500	1,510,000	15,500	75,000

Source: Answer of Questionnaires

Table 4-8-3 Total amount of CCSS in Pathein General Hospital Unit: MMK

	2009	2010	2011	2012	2013
CCSS	7,573,700	8,328,500	13,393,500	16,946,000	14,535,700

Source: Answer of Questionnaires

(3) Hospital statistics

1) Indicators of hospital services

Table 4-8-4 Hospital indicators of Pathein General Hospital

Indicators	2011	2012	2013
Total number of inpatients	12,067	13,772	16,889
Total number of pediatric patients	2,262	2,525	3,530
Total number of outpatients	22,147	28,877	50,980
Total number of normal deliveries	535	620	657
Total number of cesarean section	855	850	1,187
Total number of abortion	178	203	311
Total number of operation	1,780	1,792	2,652
Bed occupancy rate (%) (Based on sanction beds)	103	122	151
Average duration of stay (in days)	6	7	6
Total number of hospital deaths	-	-	612
Total number of maternity deaths	8	5	6
Total number of under 5 deaths	70	88	104

Source: Annual hospital report of Pathein General Hospital

2) Morbidity and mortality

Table 4-8-5 Major causes of morbidity of Pathein General Hospital

No.	2013		2014[1]	
	Cases	No. of Patients	Cases	No. of Patients
1	Accident and injury	-	Gastrointestinal diseases	1,590
2	Gastrointestinal diseases	-	Accident and injury	1,515
3	Dengue hemorrhage fever/ Dengue shock syndrome	-	Tuberculosis	224
4	Tuberculosis	-	Abortion	203
5	Abortion	-	Dengue hemorrhage fever/ Dengue shock syndrome	192

[1] Data collected from January to June 2014

Source: Annual hospital report of Pathein General Hospital

Table 4-8-6 Major causes of mortality in Pathein General Hospital

No.	2013		2014[1]	
	Cases	No. of Patients	Cases	No. of Patients
1	Hypertension	-	Cerebrovascular attack with hypertension	25
2	Gastrointestinal diseases	-	Gastrointestinal diseases	20
3	Tuberculosis	-	Accident and injury	13
4	Acute respiratory infection	-	Septicemia	11
5	Dengue hemorrhage fever	-	Tuberculosis	10

[1] Data collected from January to June 2014

Source: Annual hospital report of Pathein General Hospital

(4) Situations of Medical Service Departments

1) Ob and Gyn department/ Delivery room

At the obstetrics ward, there are 34 sanctioned beds and all beds were occupied at the survey. gynecology ward can hospitalize obstetrics inpatients in case of emergency. 2 wards are separately located at different buildings and it is inconvenient for staff assigned at obstetrics ward to monitor their patients in the gynecology ward due to a long distance.

There were 657 normal deliveries and 311 abortions in 2013, however, there are only 1 delivery bed and 2 beds for an abortion. One infant warmer, one suction machine and one mobile examination light are properly functioning. Most of the medical equipment are too old to use. New equipment need to be supplied. Staff sometime has to take and return the limited number of equipment to the delivery rooms. Since there is an autoclave placed at the waiting room for patients which is located at the entrance of delivery room, it is difficult to maintain sterilized instruments clean because there are frequent in-and-out of staff and patients. In addition, there are 2 rooms for senior consultants at the inside of delivery room and this is creating a risk for contamination of operation theatre.

2) Pediatric ward

Dengue hemorrhage fever (including shock), japanese encephalitis, malaria and acute virus infection are spread by the mosquito. The number of morbidities and mortalities caused by those diseases has increased after a start in rainy season every year. The demand for hospital care increases due to an increase of the seasonal patients as Table 4-8-7 shows. This causes a congestion of inpatient's rooms and the corridor.

Table 4-8-7 Morbidity and mortality for seasonal diseases of Pediatric ward in Pathein General Hospita[1]

	Dengue hemorrhage fever (including shock)		Japanese encephalitis /Meningitis		Malaria		Acute virus infectious disease	
	No.of inpatients	No. of death	No.of inpatients	No. of death	No.of inpatients	No. of death	No.of inpatients	No. of death
January	3	0	3	2	1	0	8	0
February	1	0	2	1	2	0	7	0
March	4	0	4	0	0	0	7	0
April	6	0	3	1	0	0	**13**	0
May	**34**	**1**	**9**	**4**	0	0	**18**	0
June	**116**	**1**	**7**	**1**	**4**	0	**43**	0
July	**223**	**4**	**5**	**2**	**10**	0	**59**	0
September	**129**	**1**	**16**	**4**	**3**	0	**71**	0

[1] Data collected from January to August 2014

Source: Medical report of pediatric ward at Pathein General Hospital

3) Operation theatre

There are 2 operation theatres (I and II) and 1 minor operation for ophthalmology are available. There are 1 operating table, 1 anesthesia apparatus, 1 patient monitor and 1 electro surgical unit in each operation room at the operation theatre Ⅰ. However, 1 of 3 rooms is very narrow, and staff and 1 operation table occupied the room.

Since there is no sterilization room, an autoclave is placed at the patient waiting room near the entrance of operation theatre. This is concerned about low cleanliness of the surgical instruments. There is an insufficient number of sterilizer and difficulty in secure of purified water for equipment. Furthermore, the mold damage on the wall and the ceiling is observed. There are 4 to 5 emergency operations and approximately 12 to 15 elective operations per day. However, there are only 2 anesthesiologists working at operation theatre for 24 hours and a patient is kept waiting for more than 4 hours in front of operation theatre for ophthalmology.

There is another operation theatre II built by the Government of French and it is located at different building. It is a nearly same structure as operating theatre Ⅰ, however, operation rooms are properly sealed up and kept cleaner than operation theatre Ⅰ. The Operation theatre Ⅱ is not for ordinary use only the time when a short program of mass operations for cleft lip and palate is implemented by the otolaryngology consultants .There are three electric operating tables donated by the Government of China and 1 respirator supplied by CMSD in 2013. Other medical equipment has not been installed yet. According to the deputy medical superintendent, it is difficult for the hospital to operate 2 operation theatres for the ordinary use due to a lack of manpower.

4) Ophthalmology and Otolaryngology

According to the ophthalmology consultant, the number of elderly cataract outpatients has increased, and there are 200 operations per month and 700 outpatients per month on average. There is also an increase of patients such as the diabetes retinopathy, detached retinas, and the glaucoma. The ophthalmology patients usually increase after a rainy season because the most of patients are formers and thus they come to be admitted for treatment or operation after the rainy season that the harvest time of rice was over.

At the ophthalmology and the otolaryngology ward, a doctor’s consultation for outpatients is conducted twice a week. The number of outpatients for the ophthalmology is approximately 60-80 per day and for the otolaryngology is 40-50 per day. The ward with limited space is crowded and it causes an obstruction for passengers at the corridor.

5) Others

There are some overcrowded wards such as surgery and medical care ward. At these wards, some beds are placed on the corridor and some patients use benches instead of beds.On the other hand, there is enough space at some wards such as ophthalmology and otolaryngology wards. It is necessary to adjust volume of sanctioned number of beds based on the number of inpatients in the hospital. There are some challenges: staff room has an insufficient space, there is no room for storing medicines and consumables and thus they are stored at nurse station and consultants rooms although all consultants' rooms are located in the ward. Type and location of rooms at ward need to be considered.

(5) Referral system

1) Referral from lower facilities

According to the Medical superintendent of Pathein hospital, there are approximately 37 to 40 referral cases per 1,000 populations in the region. Major causes of referral cases were traffic accident, neurology, neurosurgery, tumor, cardio vascular diseases, stroke, eclampsia and calculus.

2) Referral to tertiary hospitals

According to the medical record in the hospital, there were 59 referral cases to tertiary hospitals in Yangon in 2013. (The breakdown of the number was as follows: 5 to the Yangon Children Hospital, 2 to the Orthopedic Hospital, 52 to the Yangon General Hospital.) Major causes of referral cases were as follows; intestinal obstruction, blood malignancies, obstructive inguinal hernia, neonatal blood type RH negative for pediatric cases, malignance of the shoulder, homers fracture, multiple fracture, head injuries, spinal injuries for orthopedic cases, and neurological cases, malignant tumor, hepatic tumor, brain tumor, obstructive abdominal injury, tuberculosis meningitis, carcinoma of colon, dysphagia for surgical cases, and eclampsia and complications for obstetrics and gynecology cases.

(6) Challenges of buildings and facilities

1) At the some buildings built in 1962, the reinforced concrete pillars at the corridors of first floor connecting to the toilets are partly exfoliated and their reinforcing bars are completely rusted.

2) The reinforced pillars in the south side of the building C Annex (Radiology department and Operation theatre I) are exfoliated and reinforcing bars are completely rusted. A part of the pillars do not have strength and durability.

3) The wooden pillars of the south-west side in the building B Annex (Medical warehouse) are completely rotted away and do not have the strength and durability. The wooden pillars cannot

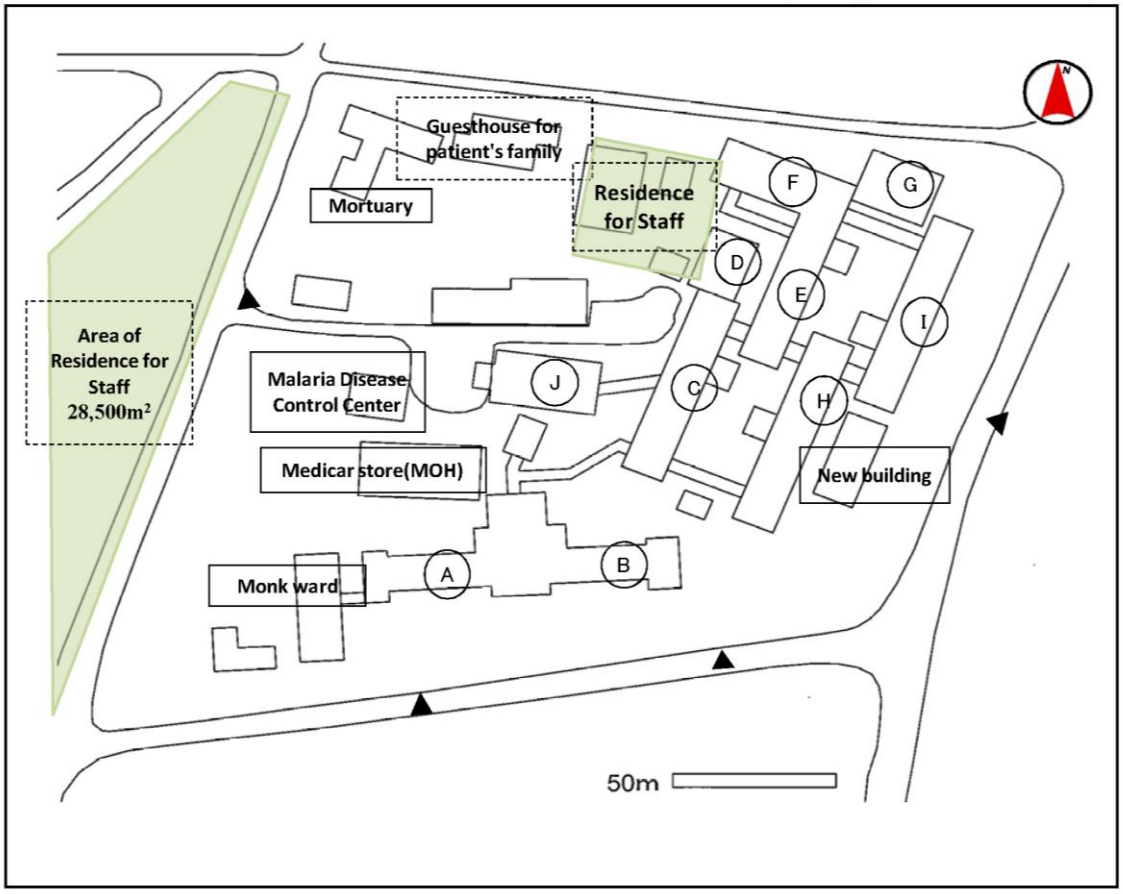
support the weight of a load of the upper floors and therefore the brick walls around these pillars have to support the weight. Consequently the walls have become curved and the building supported by these pillars is at risk of destroy at any moment.

4) Patients flows / Workflow for staff

There is some distance and complicated flow between Ob and Gyn ward and pediatrics ward, surgical ward and operation theatre, and outpatient department and CT scan room. In addition, there is no approach between buildings and no slope to transfer patients smoothly by stretchers. The complicated flow needs to be improved to transfer promptly emergency ceases such a traffic accident. Some distance between the related departments causes insufficient work even for staff because they take a time to move.As a result, patients have to wait for staff to come to examine them.

4-9. Sittwe General Hospital (Rakhine State)

Year of Establishment : 1864　　Site area (m²) : 40,468
(Excluding the area of residences for staff)



Name of facility			
Name of building	Contents of facility Stories	Construction year	Type of structure
Building A	2 st. GF : Medical Superintendant's office, Conference room, Pediatric Isolation ward	1964	RC
Building B	1 st. GF : Pediatric ward	1964	RC
Building C	2 st. GF : Ob and Gyn ward / 1F : Ob and Gyn ward	1972	RC
Building D	2 st. GF : Laboratory (Pathology) / 1F : Delivery room	1984	RC
Building E	2 st. GF : Surgical ward / 1F : Surgical ward	1972	RC
Building F	2 st. GF : X-ray room / 1F : Operation Theater	1984+1994	RC
Building G	2 st. GF : Special ward (for Muslim) / 1F : Otolaryngology ward	1994	RC
Building H	2 st. GF : Medical care ward / 1F : Medical care ward	1972	RC
Building I	2 st. GF : Ophthalmology ward / 1F : Orthopedic ward	1972	RC
Building J	1 st. GF : Outpatient Department	1994	Wood
New building	2 st. GF : X-ray room, CT scan room / 1F : Operation Theater	2014	RC

Situation of Inflastructure	
Electricity	Electric power Supply (Frequency of blackout : 1-2times/week) + Generator (1×125kVA + 1×40kVA + 2×10kVA)
Water Supply	Water source : Deep well + Shallow well Water supply system : 2 Elevated water tanks
Sewage	Septic tank (Sludge disposal by Private company)
Communication	Fixed telephone line (5) + Mobile phone network

4-9. Sittwe General Hospital (Photos taken on 15th and 16th September 2014)

Sittwe General Hospital (Rahkain State)
Established in 1864
(The photo shows the building
for Administration and Pediatrics.)

Right: Building J for Outpatient department, Dental clinic and Specialist Outpatient department (Constructed in 1994)
Left: Elevated water tank (Constructed in 1864)

Exposed rebar of lower part of beam at the building for Administration (Constructed in 1964)

Horizontal steel bars and brace of elevated water tank corroded (Constructed in 1864)

Fracture of pillar concrete at Surgical ward
(Constructed in 1972)

Damage by moss on the exterior wall
of building for Administration
(Constructed in 1964)

4-9. Outline of Sittwe General Hospital

(1) Health workers

There are 1 Medical Superintendent, 1 Deputy Medical Superintendent, 10 Consultants (7 Senior consultants and 3 junior consultants), 209 Nurses and 374 staff in total. Technician for maintaing building/facilities and medical equipment are not assigned.

(2) Financial situation

Revenue in 2013 to 2014 were as follows:1) 8 billion MMK allocated by government, 2) 16,000MMK donated by other societies, 3) 600,000MMK collected by CCSS. Expenditure in 2013 was as follows: 1) 300 million spent for drugs, 2) 5,790,000MMK spent for reagent, 3) 1 billion MMK spent for maintenance cost for facility and equipment including medical equipment. Sittwe General Hospital has introduced the trust fund, has been spent for free medical service for the poor. The interest in 2013 was 10.9million MMK and the capital stock was 35million MMK in 2013 /14.

Table 4-9-1 Breakdown of revenue in CCSS from 2013/14

Unit: MMK

Breakdown	Revenue
X-ray	482,100
Laboratory examination	687,900
Pay room	155,000
Total	1,325,000

Source: Answer of Questionnaires

(3) Hospital statistics

1) Indicators of hospital services

Table 4-9-2 Hospital indicators of Sittwe General Hospital

Indicators	2011	2012	2013
Total number of inpatients	10,097	10,061	11,999
Total number of outpatients	20,012	19,207	31,263
Total number of normal deliveries	983	1,212	1,783
Total number of cesarean section	343	391	650
Total number of abortion	279	238	357
Total number of operation	1,708	1,733	2,468
Bed occupancy rate (%) (Based on sanction beds)	74	73	86
Average duration of stay (in days)	5.6	5	5
Total number of hospital deaths	438	475	508
Total number of maternity deaths	5	4	12
Total number of under 5 deaths	84	81	85

Source: Annual hospital report of Sittwe General Hospital

2) Morbidity and Mortality

Table 4-9-3 Major causes of morbidity in Sittwe General Hospital

	Morbidity	No.of patients
1	Cataract	495
2	Diarrhea	356
3	Abortion	336
4	Gastritis	303
5	Neonatal jaundice	117

Source: Annual hospital report of Sittwe General Hospital

Table 4-9-4 Major causes of morality in Sittwe General Hospital

	Mortality	patients
1	Stroke	59
2	Septicaemia due to late perforation	22
3	Heart failure	21
4	Severe pneumonia	20
5	cirrhosis of the liver	17

Source: Annual hospital report of Sittwe General Hospital

(4) Situations of Medical Service Departments

1) Pediatric ward

The patients for acute respiratory infection and dengue haemorrhage fever are increasing during rainy season (May to November) and both of them were epidemic as Table 4-9-5 and 4-9-6 show. At the time of survey, 9 beds for dengue hemorrhage fever were occupied and some beds were placed on the passage. It will be observed that congestion of the ward occurs during the epidemic period.

Table 4-9-5 The number of ARI inpatients of pediatric ward in Sittwe General Hospital in 2013

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
No.of Admission	21	18	18	8	16	19	**42**	**69**	**42**	**27**	**29**	20

Source: medical report of pediatric ward in Sittwe General Hospital

Table 4-9-6 The number of DHF inpatients of pediatric ward in Sittwe General Hospital

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2011	0	0	0	0	2	**8**	**13**	**11**	**21**	**16**	**10**	4
2012	0	0	0	1	**13**	**42**	**63**	**67**	**18**	**21**	**8**	2
2013	0	0	0	0	1	**14**	**64**	**32**	**27**	**15**	**10**	5
2014	0	0	0	1	**22**	**178**	**195**	**47**				

Source: Medical report of pediatric ward in Sittwe General Hospital

2) Obstetrics and Gynecology ward/ Delivery room

There are 0 to 5 maternity deaths cases monthly. According to one consultant, one of factors of death is a late arrival at the hospital and many cases suffer from bleeding and eclampsia from islands of the state or remote areas. Furthermore, sepsis or septic shock after the delivery or caesarean section causes maternal deaths.

There is no autoclave at the delivery room and a pan was used for boiling instruments. There is a shortage of equipment for sterilization at the ward. There is some distance between the delivery room on the first floor and the maternity ward on the ground floor and no elevator. So that patients have to go up and down stairs by stretchers and are carried by patient's family members even if patients are post-delivery.It is very dangerous for both patients and family their members.

3) Operation theatre

There are 1 room for infectious patients, 1 room for ophthalmology operations and 3 rooms for general use. Medical equipment had been provided by the development partners such as Germany and ICRC for an aid for racial conflict. Those donors also donated a plenty of equipment: operating tables, ventilators, patient monitors, aspirators, syringe and infusion pumps, celling lamps, oxygen concentrators, diathermies and microscopes for otolaryngology and the ophthalmology, 5 autoclaves and 2 sterilizers. According to the senior anesthesiologist, there is enough medical equipment for approximately 1,400 operations per year. In the operating room is properly sealed however there is a challenge about a cleanness of the operation theatre because no obvious separation of clean areas and dirty areas.

There is an ICU attached to the operation theatre for post-operative patients and post-operat patients are hospitalized if they are not stable after operations. There are enough medical equipment such as ICU beds and the ICU-related equipment provided by CMSD and many donors. However, the utilization of ICU has been extremely, only 5 or less per month. When a patient is hospitalized at the ICU, an anesthesiologist and the nurse from the operation theatre care for post operated patients.

(5) Referral system

1) Referral from lower facilities

The hospital did not take the detailed record about referral cases. According to consultants, there was information that there were many referred cases from lower level hospital. For an example, there are cases of a stroke, a heart trouble and severe malaria for medical care cases, Japanese encephalitis, malignant tumors for pediatrics cases, protraction parturient (parturient stops), eclampsia, early placenta bleeding and post-operative infection for Ob and Gyn.

2) Referral to tertiary hospitals

Patients with severe cases are transferred to tertiary medical facilities to Yangon. Actually, there are many difficulties such as financial issue of patients, physical access to the Yangon due to long distance, patient's situation (more severe cases) and other reasons.

(6) Challenges of buildings and facilities

1) Insufficient space for outpatients department

There are the emergency department, dental clinic, and specialist outpatients department at the one building, which is the one-story and was made of wood in 1994. Outpatients were overcrowded at the OPD department and there were insufficient number of benches for the patients. The survey team observed that many patients sat on the floor in the corridor and it might be obstructed when emergency patient is carried by stretcher in the corridor.

2) Leakage of rainwater

There was a water leakage from straight roofs of buildings over the whole of the hospital. In addition, a building for administration and pediatric ward is exposed to rainwater. Mold and moss were observed on inner and outer walls of the building.

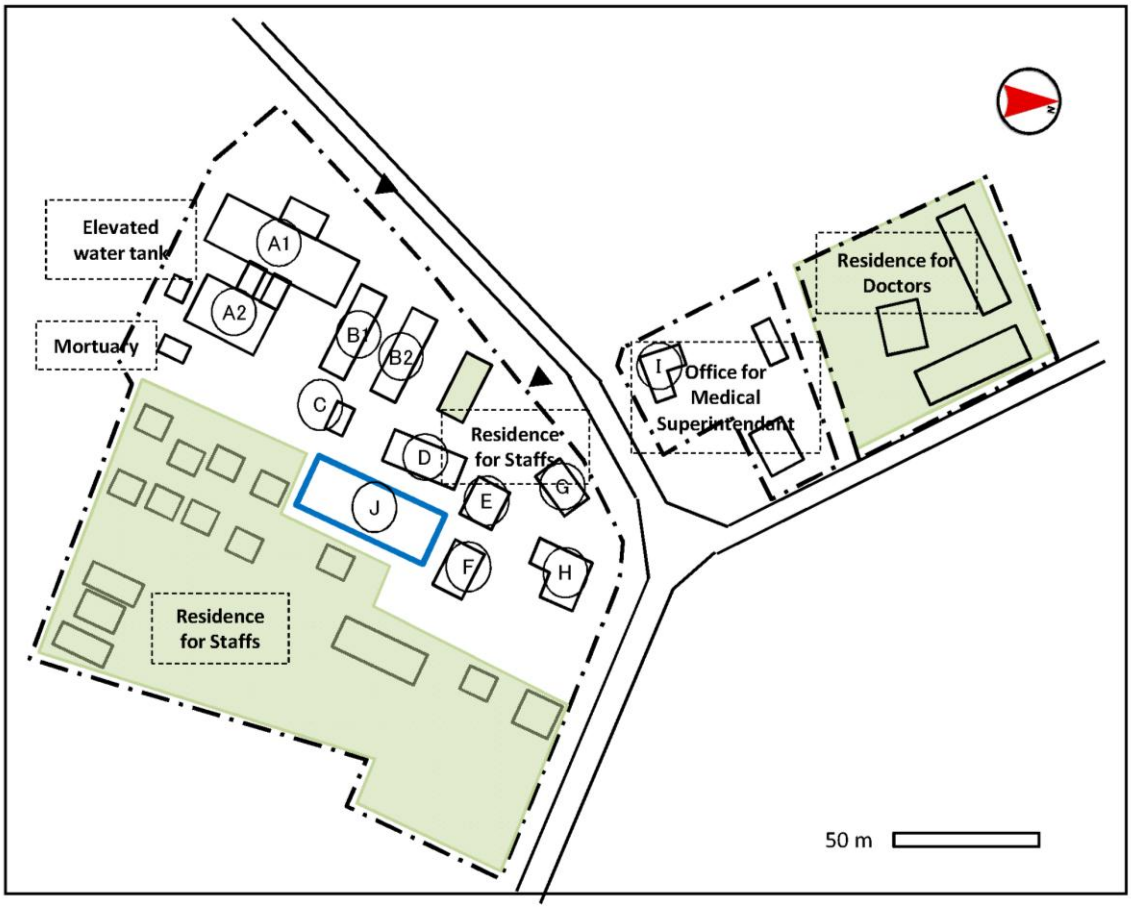
3) Structural issue

a. There are cracks on the pillars, beams and reinforcing bars of floor and exfoliation of the concrete, exposure of reinforcement bars in the buildings for administration and pediatrics ward and main buildings for surgical ward, medical care wards, ophthalmology and orthopedics ward.

b. The steel brace members of the elevated water tank made in 1864 were rotted, and they do not have the strength and durability to resist strong winds or seismic shock.

4-10. Loilem General Hospital (Shan State-Souh)

Year of establishment: 1946 Site area (m²) : 44,881



Name of facility				
Name of building	Stories	Contents of facility	Construction year	Type of structure
Building A1	2 st.	GF : Pediatric, Ob and Gyn ward / 1F : Orthopedic, Surgical ward	2004	RC
Building A2	3 st.	GF : Laboratory, Blood Bank, Warehouse / 1F : Delivery room / 2F : Operation Theater	2004	RC
Building B1	1 st.	GF : Medical care ward (Male)	1946	CB
Building B2	1 st.	GF : Medical care ward (Female)	1946	CB
Building C	1 st.	GF : Isolation ward	1946	CB
Building D	1 st.	GF : Conference room	1946	CB
Building E	1 st.	GF : Otolaryngology ward, Medical store	1946	CB
Building F	1 st.	GF : Outpatient Department, Dental clinic	1946	CB
Building G	1 st.	GF : Residence for midwife students (ex-Monk ward)	1985	Wood
Building H	1 st.	GF : X-ray room, Ultrasound room, Ophthalmology ward, Operation Theater, rooms for inpatients	1985	CB
Building I	1 st.	GF : Medical Superintendant's office, Administration office	1980	CB
Building J (Blue frame)	2 st.	GF : Outpatient Department / 1F : Medical care ward	Under Construction	RC

Situation of Inflastructure	
Electricity	Electric power supply (Frequency of blackout : Sometimes) + Generator (8 (5-2.3kVA))
Water Supply	Water source : Public water supply + Rain water Water supply system : Elevated water tank
Sewage	Septic tank (Sludge disposal by Municipal)
Communication	Fixed telephone line (4) + Mobile phone network (Unstable) + Internet connection

4-10. Loilem General Hospital (Photos taken on 5th February 2015)

Loilem General Hospital (Shan state-south)
Established in 1946
(The photo shows the building for Pediatrics, Ob and Gyn, Obstetrics and Surgical ward.)

Building for Medical care ward planned to be demolished
(Constructed in 1946)

Connecting corridor between Building A1 and A2
(Constructed in 2004)

Unused facility of Ophthalmology ward due to absence of Ophthalmologist
(Constructed in 1985)

New building for OPD (Ground floor) and Medical ward (1st floor) (Constructed in 2014)

Steep slope in the new building for OPD and Medical ward (Gradient on the slope is approximately 1/7 to 1/8.)

4-10. Outline of Loilem General Hospital

(1) Health Workers

There are 1 Medical Superintendent, 18 Consultant, 23, Assistant surgeon including Dentist, 60 Nurses and 171 staff in total.

(2) Hospital finance

Table 4-10-1 Income collected by CCSS in Loilem General Hospital (2014/15)

Unit: MMK

Income from CCSS	
Pay room	1,006,000
Laboratory examination	1,037,650
X-ray examination	528,000
ECG	282,500
Ultrasonography	957,000
Total amount	3,811,150

Source: Loilem General Hospital Annual Report 2014

(3) Hospital Statistics

1) Indicators of hospital services

Table 4-10-2 Hospital Indicators of Loilem General Hospital

	2011	2012	2013	2014
Total number of inpatients	1,935	2,147	2,719	3,656
Total number of outpatients	1,882	2,089	2,643	3,582
Total number of deaths	59	50	68	79
Total patient days	12,727	12,660	16,379	21,527
Total number of new outpatients	2,258	3,149	5,803	7,863
Total number of old outpatients	4,208	5,091	11,755	17,539
Total number of deliveries	158	173	224	276
Total number of stillbirths	0	3	0	4
Total number of abortions	36	29	35	43
Total number of operations (General anesthesia)	108	203	309	233
Total number of operations (Spinal anesthesia)	255	227	287	437
Total number of operations (Local anesthesia	190	205	147	136
Total number of operations (Others)	7	19	56	59
Number of outpatient per day	17	21	48	71
Number of inpatient per day	35	35	45	59
Average duration of stay (in days)	7	6	6	6
Bed occupancy rate (%) (Based on available bed)	18	18	23	30
Bed occupancy rate (%) (Based on sanctioned bed)	18	18	23	30
Average turnover rate of patient	10	11	14	19
Average turnover of interval (in days)	31	28	21	14
Mortality rate (per 1000 patients)	30	23	25	21

Source: Loilem General Hospital Annual Report

2) Morbidity and Mortality

Table 4-10-3 Major causes of morbidity and mortality in Loilem General Hospital (including inpatients and outpatients)

Morbidity	Mortality
Head injury	Low birth weight
Cranial nerve disease	Heart Failure
Diarrhea	Neonatal jaundice
Neonatal jaundice	Septicemia
Gastritis	Meningitis

Source: Loilem General Hospital Profile 2014

(4) Situations of Medical Service Departments

1) Ob and Gyn ward

There were 11 patients required hospitalization with 20 sanctioned beds at the time of survey. Ob and Gyn patients stay at same room. There is no private room and pay room. There are 10 to 20 mormal delivery cases on average and 10 cesarean section cases per month. According to the consultant, since women in this area tend to delivery at home supported by their family members or a traditional birth attendant, the ratio of hospital delivery is surprisingly low. Hospital maternal death is 0 to 1 case per year and the major cause was eclampsia.

For gynecology patients, major diseases are abortion, ovarian cyst and cervical cancer. Since only surgical operation is performed as treatment of cervical cancer, patients are transferred to other hospitals for radiotherapy or chemotherapy after the operation.

The building of delivery room is old. There are an incubator, infant warmer and mobile doppler supplied by CMSD in 2014 and have worked properly.

Infection management is a challenge at the ward because isolation rooms for infectious patients are not available, and additionally ultrasonography is not available due to absence of radiologist.

2) Pediatric ward

There were 9 patients required hospitalization including 6 neonates with 20 sanctioned beds at the time of survey. There are usually 40 to 80 patients required hospitalization per month at the ward. There are also baby cots with a phototherapy at the corner of beds and the area is separated by wooden partitions.

Although the seasonal diseases such as respiratory infection increases in dry season and diarrhea cases increases in rainy season, the major diseases are neonatal diseases (neonatal jaundice, low-birth-weight and birth asphyxia). In this hospital, since there is no device for blood examination, the patients who cannot receive the definitive diagnosis examination were categorized in ‘others’ in hospital statistical data. Major causes of mortality were neonatal

diseases and tuberculosis. According to one of assistant surgeons, late arrival to the hospital occurs sometime death cases.

Though neonatal diseases (low-birth-weight and neonatal jaundice) are one of the major causes of mortality, there is no isolation room for neonates. Additionally, most of the phototherapy devices and infant warmer were hand-made and made of wood with a LED light. For better treatment to neonates, securing room for neonatal care and supplying medical equipment are necessary.

3) Surgical ward

There were 10 patients required hospitalization with 32 sanctioned beds. Operations are implemented twice a week. There are 30 to 56 operation cases monthly and the number has been increasing year by year. Only 1 consultant and 1 assistant surgeon treat for all inpatients. Because of chronic shortage of the consultants, it is difficult for doctors to correspond to nighttime or emergency patients.

Major causes of disease are abdomen and chest injury due to traffic accident. There are appendicitis, perforation, chronic renal diseases, and alcoholic liver diseases patients and they are also included abdomen wound by mistaken shooting.

Major operation cases are for hernia, appendicitis and cancer (rectum and colon) in order. Mortality cases are peritonitis or perforation caused by appendicitis due to delay of arrival at the hospital. It happens 1 to 2 cases per month.

There is medical equipment as follows: 3 oxygen concentrators provided from CMSD, 1 suction machine, 1 sterilizer shared with orthopedic ward. Other basic equipment such as ECG and patients monitor is not provided but necessary to be equipped for a care for serious patient.

4) Operation theatre

There is only 1 operation theatre with 3 operation rooms for general surgery, ophthalmology. Major cases of operation are appendectomy, redressment of lower-limbs fracture, and cesarean section. According to the anesthesiologists, the most of operations take time less than 4 hours and longtime operation is not performed. However, there are many emergency cases. 1 anesthesiologist and 1 assistant surgeon work for 24 hours.

Old basic medical equipment has been worked properly. However, staff at the operation theatre has to use ambubag for manual respiration control because ventilator was not attached to the anesthesia apparatus. In addition, 2 sterilizers are available, however, the capacity of them is small for the number of operations cases and therefore those sterilizers are used many times a day. Since an insufficient number of medical equipment for intensive cares, ICU is not utilized.

5) Radiology department (X-ray room and ultrasonography room)

Since 1 X-ray apparatus manufactured in 1989 had been broken 2 months ago, X-ray examination was not available at the time of survey. In addition, ultrasonography was not available because of absence of radiologist (moved to other hospital in Taunggyi). Regarding X-ray, 1 of 3 private clinics in Loilem can provide the X ray examination, so that the patients are transferred to those clinics. The hospital has requested new X-ray apparatus to CMSD, however, it has not been approved yet. Before it was broken, the number of X-ray examination and ultrasonography was 70 cases and 90 cases per month respectively.

6) Ophthalmology and Otolaryngology ward

The wards have been closed because of absence of the consultants.

(5) Referral system

1) Referral from lower level facilities

For examples of obstetrics and gynecology patients, several emergency cases as follows: a prolonged labor, atonic hemorrhage, delay of placenta discharging, birth asphyxia were received from lower level hospitals. There are 10 to 20 transferred cases per month such as appendicitis, hernia, and traffic accidental injury and they were transferred from township hospitals which are located 20-30 kilometers away from the Loilem General Hospital.

2) Referral to tertiary hospitals

There is 2 to 3 cervical cancer or ovarian tumor patients and they were referred to Sao San Tun hospital, Taunggyi which is 95 kilometers away from Loilem. They are referred for postoperative chemotherapy or radiotherapy per month. Pediatric patients suspected to blood or heart diseases were referred to Mandalay General Hospital or Yangon Children's Hospital for further examination. Among the surgical patients, the case of serious injury, head injury, urinary diseases and, peritonitis were referred to Sao San Tun Hospital. There are many medical care patients suffering from diabetes, high blood pressure, ischemic heart diseases and renal failure due to heart failure and 10 cases were transferred to the Mandalay General Hospital last year.

Severe patients are usually transferred to other hospitals after the symptomatic treatment and stable condition of patients, and there are 1 to 2 cases per month. Actually, a lot of patient cannot be transferred to tertiary hospitals because of unaffordability of transportation fee or their family problem. Then, they have to receive continuously symptomatic treatment in Loilem General Hospital.

(6) Challenge of buildings and facilities

1) Deterioration and rain leakage

Buildings made of concrete blocks in 1946 when the hospital has been founded, are deteriorated but they have been properly maintained. Therefore, these building frames were solid and any other damage was not observed. However, the wooden roof structure with ventilation space and galvanized roof sheets is seriously damaged.

2) Delivery room and Operation theatre

The building for delivery room and operation theatre built in 2004 were constructed with viewpoint of obvious separation between clean and dirty area. The connecting passage ways are placed between delivery room, operation theatre, Ob and Gyn ward, surgical ward and orthopedic ward. It is convenient for patients to access easily. However, it will be a concern about the water leakage in the future due to a lack of waterproof of roof.

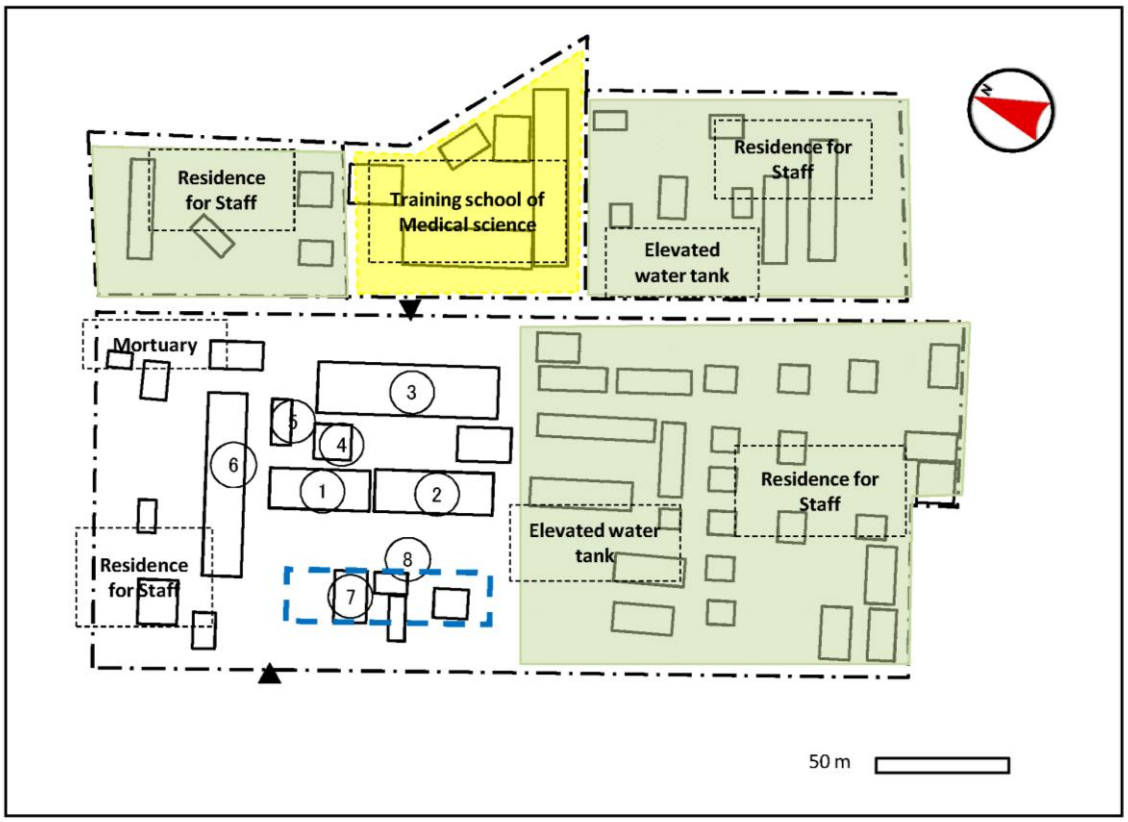
3) New Building completed in 2014

The building built in 2014 has not been installed medical equipment yet in the building. It would expect in February or March 2015. There are staircases at the both end side of building and slopes in the middle of building. The slope ratio is about one to fifth and it is steep. The galvanized roof sheet is protruding sufficiently over wall line, therefore, rain is unlikely to leak.

The planning and drawing of the building were designed by the Department of Health, Shan State-South. According to the medical superintendent, it would be opened in February or March, 2015.

4-11. Women and Children Hospital (Taunggyi, Shan State-South)

Year of establishment: 100 years ago　　Site area(m²) : 48,058



Name of facility				
Name of building	Stories	Contents of facility	Construction year	Type of structure
Building ①	1 st.	GF : Medical Superintendant's office, Administration office, Medical record office	1992	RC
Building ②	2 st.	GF : Medical store / 1F : Conference room	100 years ago	Brick
Building ③	4 st.	GF : Specialist outpatient and emergency Department / 1F : Delivery room, Obstetrics ward, rooms for inpatinets / 2F : Operation theater, Gynecological ward / 3F : ICU、Neonatal care unit	2007	RC
Building ④	1 st.	GF : Pay ward for Ob and Gyn	1989	Wood
Building ⑤	2 st.	GF : Pay ward for Ob and Gyn / 1F : Pay ward for Ob and Gyn	1998	RC
Building ⑥	2st.	GF : Pediatric ward, Outpatient Department, Medical store / 1F : Pediatric ward, Diagnostic room, Warehouse	100 years ago	Brick
Building ⑦	1 st.	GF : X-ray room	100 years ago	Brick
Building ⑧	1 st.	GF : Blood bank, Laboratory	100 years ago	Brick
(blue frame)	4 st.	OPD, X-ray Room, Blood Laboratory, Ob and Gyn ward, Pay ward	Applied	

Situation of Inflastructure	
Electricity	Electric power Supply (Frequency of blackout : Once/week (Duration : 30-60min) + Generator (1×75kVA + 1×35kVA + 3×5kVA)
Water Supply	Water source : 4×Deep well Water supply system : 3×Elevated water tanks
Sewage	Septic tank (Sludge disposal by Private company)
Communication	Fixed telephone line (5) + Mobile phone network + Internet connection

4-11. Taunggyi Women and Children Hospital (Photos taken on 5th and 6th February 2015)

Pediatrics ward at Women and Children Hospital (Taunggyi) was established 100 years ago and has been still used.

Building of X-ray department was constructed 100 years ago and has been still used.

Building no.3 for OPD, Operation theatre and Delivery room (Constructed in 2007)

Building no.2 for Conference room and Medical store (Constructed about 100 years ago)

Delivery room (Constructed in 2007)

Renovation work for Pediatrics ward (Constructed about 100 years ago)

4-11. Outline of Women and Children Hospital

(1) Health Workers

There are 1 Medical Superintendent, 7 consultants, 22 Assistant surgeons,118 Nurses ,19 Radiologists and Laboratory technician. Total number of staff is 236.

(2) Financial information of hospital

The budget has been increasing year by year, however, almost the entire budget was spent for employee's salary. CCSS has been implemented in X-ray examination, laboratory examinations and pay room fee. Trust fund has been spent mainly for free medical services for the poor.

Table 4-11-1 Financial information of Women and Children Hospital

Unit: MMK

	2012-13	2013-14	2014-15
General budget			
Salary	234,816,200	297,842,880	352,802,880
Transportation	878,730	945,560	1,000,000
Outsourcing	12,924,500	25,161,400	14,853,910
Maintenance	18,276,000	37,068,000	52,959,000
Others	215,000	220,000	240,000
Total	267,110,430	361,237,840	421,855,790
Others			
Medical supplies	50,000,000	300,000,000	150,000,000
CCSS			6,964,000
Trust fund			34,297,223
Donation from domestic NGOs			6,859,400
Donation from international NGOs			6,900,000

Sources: Women and Children Hospital's documents

(3) Hospital Statistics

1) Hospital indicators

Table 4-11-2 Hospital indicators of Women and Children Hospital

	2012	2013	2014
Total number of outpatient	5,811	4,934	10,920
Average number of outpatients per day	55.88	47.44	105
Total number of inpatient per year	7,326	8,734	8,396
Number of inpatients per day	20.16	23.92	23
Total patient days	38,388	44,709	46,940
Average inpatient per day	105.17	122.49	128.64
Total number of hospital deaths	145	191	167
Total number of operation	1,772	2,017	2,722
Bed occupancy rate (%) (Based on sanctioned beds)	52.58	61.24	64.3
Bed occupancy rate(%) (Based on available bed)	47.8	55.67	60.95
Average duration of patient/ bed/ year	5.27	5.13	5.58
Average turnover of patients/ bed/ year	33.06	39.58	39.87
Average turnover interval (in days)	5.76	4.08	3.53
Death rate (per 1000 patients)	19.93	21.93	19.85

Source: Women and Children Hospital profile 2014

2) Morbidity and Mortality

The morbidity and mortality were as the following paragraph shows.

(4) Situations of Medical Service Departments

1) Pediatrics ward

Inpatients ward is located on the ground and first floor in the building constructed one hundred years ago. There were 58 patients required hospitalization with 100 sanctioned beds at the time of survey. There are some rooms for several purposes in the ward as follows: 4 isolation rooms for immune diseases patients, outpatients' consultation rooms, outpatients' treatment rooms, consultation rooms for HIV patients (prescription medicine, counseling etc), general treatment room and special treatment room for lumber puncture and abdominocentesis.

As Table 4-11-3 shows, the reason why number of outpatients surprisingly decreased in 2013 was not obvious. There were 2,207 inpatients in total in 2014, and the major causes of morbidity were acute diarrhea. 'Others' was consists of 47% of total number of inpatients and it includes malignant tumor, hematological cancer and urinary tract infection. According to one of consultants for pediatrics, some diseases are seasonal and the diarrhea is tending to increase in winter, and dengue hemorrhage fever increases from June in rainy season. Moreover, acute respiratory infection tends to increase in transition of season.

Table 4-11-3 Health indicators of Pediatrics ward, Women and Children hospital

	2012	2013	2014
Total number of outpatients	2,108	891	2,734
Total number of inpatients	1,708	2,250	2,207
Bed occupancy rate(%) (Based on available beds)	30.77	35.62	35.05

Source: Women and Children Hospital profile 2014

Table 4-11-4 Major causes of morbidity of Pediatrics in Women and Children Hospital(2014)

No.	Major causes	Patients	Percentage (%)
1	Acute diarrhea	496	23
2	Acute respiratory infection	336	15
3	Acute viral infection	190	8
4	Dengue hemorrhagic fever	74	3
5	Tuberculosis	39	2
6	Malaria	35	2
	Others	1,039	47

Source: Women and Children Hospital profile (2014)

There are approximately 30 deaths per year at the ward (excluding neonatology ward). Some inconsistent data were observed between Table 4-11-5 and Table 4-11-6.The major causes of mortality excluding neonates are preventable diseases such as diarrhea and respiratory infection.

There is one ventilator provided by CMSD in 2014, however, it has not yet used because of a lack of the patient monitor which should be attached to the ventilator. There are 3 Infusion pumps, 1 ECG, 1 oxygen concentrator, 1 respirator and 1 centrifuge provided by CMSD in 2014 have been equipped. In winter season, 4 oxygen concentrators are insufficient for inpatients because of increasing the number of inpatient suffering from respiratory diseases.

Table 4-11-5 Major causes of mortality of Women and Children Hospital (including neonatology ward)

	2012	2013	2014
Neonatal jaundice	5	10	13
Diarrhea	3	4	7
Acute respiratory infection	15	11	5
Malnutrition	1	1	5
Meningitis	0	9	3

Source: Women and Children Hospital profile 2014

2) Neonatology ward

There were 20 patients required hospitalization with 20 sanctioned beds at the time of survey. The neonatology ward is independent from pediatrics ward and there are 2 neonatologists. The neonatology ward treats neonates less than 1 month old. The neonates who were born in the outside of the hospitals are also hospitalized.

There is an obvious separation of clean and unclean area.At the entrance of the neonatology ward, there are rooms for breastfeeding and consultants' room. Mothers are not allowed to enter the ward and only use the breastfeeding room. This situation is a better way to maintain and secure cleanness in the ward.

There were 973 neonatology inpatients in 2014. 378 of them were born outside of the hospital and 70% (263 patients) of them were born at their houses. The following (97 patients) were born in township hospitals or station hospitals and the rest (24 patients) was burn at clinic. They were transferred to the hospital for any serious problem.

Neonatal jaundice is the most popular disease at the ward. The followings are birth asphyxia, neonatal septicemia, low-birth-weight and congenital malformationseen. There are 20 to 40 death cases per month at the ward. The major causes of mortality were shown on Table 4-11-6. There are many cases suffering from respiratory disorder caused by prematurity.

Table 4-11-6 Major causes of mortality of neonatology ward in Women and Children Hospital in 2013

No	Major cause	No.of patients
1	Respiratory distress syndrome	36
2	Newborn hypoxia (caused by birth asphyxia)	27
3	Infection	23
4	Low-birth-weight	14
5	Congenital deformity	2

Source: Interview in neonatology ward, Women and Children Hospital

There are a lot of medical equipment supplied by CMSD and donated by Vietnamese association for supporting mothers and children. There are 15 oxygen concentrators, 9 infant warmers, 2 hand-made infant warmers, some suction machines, 2 autoclaves, 2 desktop sterilizers, 2 CPAPs, some infusion pumps, 4 patient monitors, and 6 phototherapy machines. The medical equipment has been enough equipped at the ward to treat sick neonates. One senior consultant had attended training courses for new equipment such as CPAP and she has already disseminated and trained nurses for usage.

3) Ob ward and Gyn ward

Obstetric ward and gynecology ward are separated and there are 2 consultants and 8 assistant surgeons appointed to manage both wards.

a. Obstetric ward

There were 66 patients required hospitalization with 80 sanctioned beds at the survey. Serious cases such as antepartum pregnancy hypertension, threatened miscarriage were cared at ICU attached to a delivery room. There are 4 labor beds and 2 delivery tables at the delivery room. According to one consultant, basic equipment for normal delivery is properly equipped at the moment.

Hospital Indicators in Obstetric ward are shown on Table 4-11-7. There are 8 normal deliveries and 4 cesarean sections per day on average. 70% of cesarean section cases are emergency case. The number of low-birth-weight had widely increased in 2014. There were 11 maternal death cases in 2014 and the causes of death were cerebral malaria, septicemia after abortion, disseminated intravascular coagulation syndrome (DIC), serious pulmonary embolism (PE), and others. Most of them were related to delivery or postoperative care.

Table 4-11-7 Hospital Indicators of Obstetric ward, Women and Children hospital

	2012	2013	2014
Total number of outpatients	2,952	2,805	4,301
Total number of inpatients	2,449	2,805	3,602
Total number of delivery	2,229	2,613	3,294
Total number of normal delivery	757	1,036	1,054
Total number of cesarean section	1,256	1,342	1,951
Total number of instrumental delivery	168	224	281
Total number of breech delivery	16	11	8
Total number of twin delivery	45	46	54
The number of low birth weight neonates	53	55	273

Source: Women and Children Hospital profile 2014

b. Gynecology ward

At the time of the survey, there were 11 patients required hospitalization with 15 sanctioned beds. Health indicators for gynecology ward are shown on Table 4-11-8, and morbidity is

shown on Table 4-11-9. Major operational cases are intrauterine curettage (abortion and miscarriage), abdominal total hysterectomy, vaginal pan hysterectomy (cervical cancer), polypectomy and vaginal removal operation of intrauterine contraceptive devices (IUD). Ovarian tumor patients are provided for chemotherapy after the operation.

Table 4-11-8 Hospital Indicators of Gynecology ward, Women and Children Hospital

	2012	2013	2014
Total number of outpatients	751	1,238	1,044
Total number of inpatients	818	960	1,097
Bed occupancy rate (%) (Based on available beds)	35.81	45.44	46.44

Source: Women and Children Hospital profile 2014

Table 4-11-9 Major causes of morbidity of Gynecology, Women and Children Hospital in 2014

	2012	2013	2014
Abortion	289	345	417
Fibroid	57	92	93
Sterilization	58	66	73
Cervical cancer	54	73	57
Extra uterine pregnancy	17	27	37
Malignant tumor	13	5	16

Source: Women and Children Hospital profile 2014

As a challenge of Ob and Gyn wards, there are an insufficient number of consultants and thus they said that it is very difficult to cover all inpatients including two wards, outpatients' ward, operations (elective and emergency cases) and also transferred case.

4) Operation theatre

There are 4 rooms including 1 general operation room, 2 minor operation rooms, and 1 septic room. At the time of the survey, there were cesarean section for twin cases and 9 operations. Total number of operation in 2014 was 2,722 cases and 70% of them were cesarean section (1,956 cases), which means more than 50% of total number of operation were emergency cesarean cases.

According to the anesthesiologist, medical equipment is fully equipped except for defibrillator at the operation theatre. However, it is a challenge to repair them at the time of malfunction due to a lack of technician. Even though staff consults with engineers of local medical equipment distributer in Mandalay on the phone, they cannot repair the equipment by themselves.

5) Radiology department / Clinical laboratory department

At the radiology department, X-ray apparatus was installed in 1983 which has been still function, however, it can be operated only for taking chest photography due to low resolution. The

department has been requesting a digital X-ray diagnostic device and a portable X-ray apparatus to CMSD. There are 6 patients per day for the examination.

Ultrasound diagnostic machine was provided by CMSD 2 months ago and there are 10 patients for the examination. Radiology technicians are not familiar with newest medical equipment and they are willing to participate in user training for CT scanner, MRI and Ultrasound Doppler.

Table 4-11-10 Number of image diagnosis in Women and Children Hospital (Taunggyi)

	2012	2013	2014
General X-ray examination	1,199	962	1,175
Ultrasonography	999	1,019	1,054

Source: Women and Children Hospital Profile 2014

At the clinical laboratory department, equipment for biochemistry, hematology and microbiology examination and blood bank are available. The number of examination is shown on Table 4-11-11. Transformer or UPS is necessary for blood refrigerator. However, autoclaves and blood refrigerator which was supplied by CMSD last year haven't been attached to voltage transformer or UPS. Thus staff have not been used these equipments yet.

Table 4-11-11 Number of laboratory examinations for Women and Children Hospital

	2012	2013	2014
Biochemistry	55	60	253
Microbiology	1,033	1,031	742
Hematology	2,224	2,236	2,465

Source: Women and Children Hospital Profile 2014

(5) Referral system

1) Referral from lower hospitals

The number of referral from lower hospitals is shown on Table 4-11-12. The hospital received the referral cases from township hospital and station hospital. Major referral cases are serious pneumonia, septicemia, meningitis, serious dengue hemorrhagic fever and neonatal asphyxia caused by prolonged labor. Obstetrics patients are mainly referred to this hospital during or after delivery in their own house. Most of those cases are prolonged labor caused by dangerous situation, inertia uteri and cephalic pelvic disproportion. Those cases are usually suitable cases for being operated cesarean section.

Table 4-11-12 Number of referral cases received at Women and Children Hospital

Department accepted	2014
Obstetrics	75
Gynecology	60
Neonatology	87
Pediatric	240

Source: Women and Children Hospital profile 2014

2) Referral to tertiary hospitals

The number of referral to tertiary hospitals was shown on Table 4-11-13. The pediatric and neonatology patients who need higher-level surgery (such as esophageal stenosis, intestinal wall explosion, gastrointestinal obstruction and pyloric stenosis) are transferred to the Sao San Tun Hospital. Some patients suffering from malignant tumor and heart diseases are transferred to the Mandalay General Hospital or Yangon General Hospital. Pediatric cardiac patients are transferred to the Yankin Children Hospital in Yangon. Regarding obstetrical patients, only obstetrics fistula case caused by prolonged labor is referred to the urology department, Mandalay General Hospital. Gynecology patients after operation of cervical cancer are referred to the Sao San Tun Hospital for radiotherapy. Additionally, the patients who need detailed examination such as upper gastrointestinal endoscopy and intravenous urography are referred to the Yangon General Hospital or Mandalay General Hospital.

Table 4-11-13 The number of referral cases from Women and Children Hospital to other hospital

	2010	2011	2012	2013	2014
Pediatrics	6	21	8	18	14
Neonatology	2	4	3	2	10
Obstetrics and gynecology	1	8	3	7	6

Source: Women and Children Hospital profile 2014

(6) Challenge for buildings and facilities

1) Water leakage

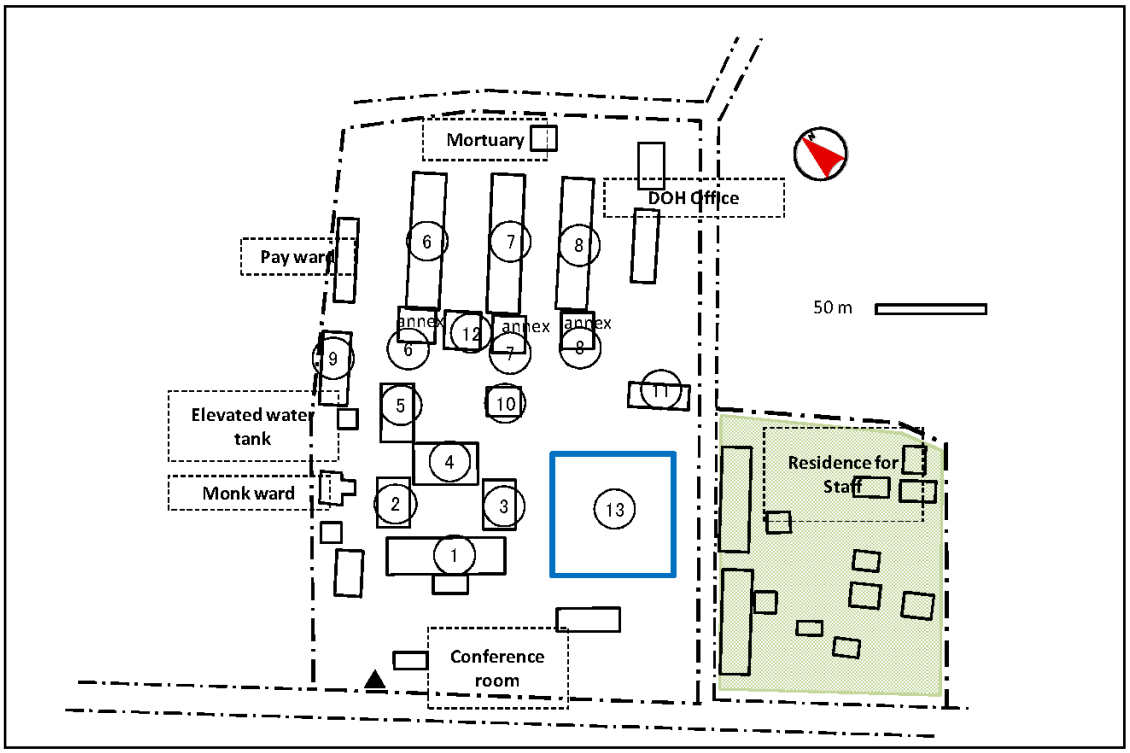
There is a water leakage at a connecting part between the buildings constructed in 1998 and the building constructed one hundred years ago. The buildings are properly maintained and thus any other remarkable damage is not observed.

2) Buildings damaged by pigeon

Even though four buildings were constructed approximately 100 years ago, they have been managed properly and in use cleanly. However, pigeons get into the attic of building from a little space made for the ventilation in spite of the installation of wiring net.

4-12. Monywa General Hospital (Sagaing Region)

Year of establishment: 1936 Site area(m²) : 55,792



Name of facility				
Name of building	Stories	Contents of facility	Construction year	Type of structure
Building ①	2 st.	GF : Pediatric ward / 1F : Surgical ward	2012	RC
Building ②	2 st.	GF : OG ward / 1F : Hemodialysis room, ICU	2012	RC
Building ③	2 st.	GF : OG ward / 1F : Orthopedic ward	2012	RC
Building ④	2 st.	GF : Delivery room / 1F : Operation Theater	2012	RC
Building ⑤	2 st.	GF : Ophthalmology ward / 1F : Operation Theater for Eye, Ophthalmology ward	2013	RC
Building ⑥	2 st.	GF : Medical care ward (male) / 1F : Medical care outpatient department, Spare rooms for inpatients	1991	RC
Building ⑥	1 st.	GF : CT scan room	2013	RC
Building ⑦	2 st.	GF : Medical care ward (Female) / 1F : Otolaryngology ward, Physiotherapy room	1981	RC
Building ⑦ annex	2 st.	GF : Dental Clinic, Dermatology ward / 1F : Blood donation room, Laboratory	1981	RC
Building ⑧	2 st.	GF : Outpedic ward / 1F : Ob and Gyn ward	1973	RC
Building ⑧	2 st.	GF : Warehouse, Medical record room / 1F : Operation Theater	1973	RC
Building ⑨	2 st.	GF : Warehouse / 1F : Medical Superintendant's office, Administration office	1996	RC
Building ⑩	1 st.	GF : Blood donation room, Laboratory	2003 Extension	RC
Building ⑪	1 st.	GF : Outpatient and Emergency Department	1995	RC
Building ⑫	1 st.	GF : X-ray room, Ultrasound room	1986	RC
Building ⑬ (Blue frame)		BF : Parking / GF : Outpatient and Specialist Outpatient Department, Dental Clinic, Diagnostic Imaging Center / 1F : Operation Theater, Rooms for inpatients / 2-5F : Rooms for inpatients	Under Construction	RC

Situation of Inflastructure	
Electricity	Electric power supply (Frequency of blackout : Sometimes (Duration : 5-30min)) + Generator (1×35kVA + 6×3-7kVA)
Water Supply	Water Source : Deep well (8) Water supply system : Elevated water tank
Sewage	Septic tank (Sludge disposal by Municipal)
Communication	Fixed telephone line (3) + Mobile phone network + Internet connection

4-12. Monywa General Hospital (Photos taken on 9th and 10th February 2015)

Monywa General Hospital (Sagain Region)
Established in 1936 (The photo shows the building for Pediatrics and Surgical ward.)

Corrosion of Metal pieces for structural joint of wooden elevated water tank

Beds for Medical ward placed in the staircase hall
(Constructed in 1991)

Sewage pipes were installed posteriorly
in the Delivery room (Constructed in 2012)

Cracks on the pillar concrete at Building no.7
(Constructed in 1981)

New 6 stories building under construction
for OPD and Operation theatre

4-12. Outline of Monywa General Hospital

(1) Health Workers

There are 1 Medical Superintendent, 1 Deputy Medical Superintendent, 26 Consultants, 66 Assistant surgeons, 170 Nurses, 18 Radiologists and Laboratory technicians. Total number of staff is 425.

(2) Financial situation of hospital

Initially, the budget for 2014/15 fiscal year was 350 million MMK, however, additional budget 391 million MMK was also provided due to installation of X-ray diagnosis and laboratory equipment. CCSS has been implemented in CT scan, X-ray examination, ultrasonography, clinical laboratory examination and pay ward fee.

Table 4-12-1 Budget for Monywa General Hospital Unit:MMK

	2011/2012	2012/13	2013/14	2014/15
Fiscal budget	-	75million	300million	741million
CCSS	17,471,760	21,153,170	38,736,070	

Source: Answer for questionnaire

(3) Health statistics

1) Hospital Indicators

Table 4-12-2 Hospital Indicators in Monywa General Hospital

	2009	2010	2011	2012	2013	2014
Total number of outpatient	49,288	52,315	52,296	51,179	84,044	89,042
Total number of inpatient	19,901	20,789	19,872	21,828	25,625	26,877
Total number of discharge and death	19,878	20,826	19,862	21,774	25,604	26,877
Total number of hospital death	274	252	279	264	356	437
Bed occupancy rate (%) (Sanctioned bed)	143	150	149	159	189	191
Bed occupancy rate (%) (Available bed)	73	74	71	72	86	68
Average length of stay	5	5	5	5	5	5
Average turnover of inpatients	54	51	49	50	58	48
Average turnover interval (in day)	2	2	2	2	1	3
Total number of under 1 year deaths	95	91	70	89	162	−
Total number of under 5 year deaths	105	102	82	102	172	−
Total number of maternity deaths	7	7	5	9	4	−

Source data: Answer of Questionnaires

2) Morbidity and Mortality

Major causes of morbidity and mortality were traffic accident injury and pediatric cases (including neonatology).

Table 4-12-3 Major causes of morbidity in Monywa General Hospital (inpatient and outpatient)

No	inpatient	No. of patients	outpatient
1	Head injury	1,519	Hypertension
2	Acute viral infection	1,428	Acute viral infection
3	Rapid respiratory infection	551	Dog biting wound
4	Gastritis	356	Traffic accident injury
5	Cerebral vascular accident	286	Expectant mothers care

Source data: Answer of Questionnaires

Table 4-12-4 Major causes of mortality in Monywa General Hospital(2013)

No	cause	No. of patient
1	Low-birth-weight	58
2	Head injury	41
3	Neonatal asphyxia	25
4	Septicemia	21
5	Retrovirus infection (HIV infection)	12

Source data: Answer of Questionnaires

(4) Situation of Medical Service Department

1) General outpatient department (OPD)

1 assistant surgeon is assigned and he treats all outpatients. Average number of outpatient is 35 to 50 per day including emergency case and the total number of outpatient in 2014 was 43,124. More than half of them had hospitalized and the rest of patients had gone back to their house after the treatment. Main OPD cases are traffic accident injury, delivery, and ophthalmology (cataract). Emergency patients are not transferred by ambulance but by NGO transport service or private car mainly. Medical equipment is limited in the department and there is a lack of basic equipment such as ECG, sphygmomanometer, and sterilizer. As unique system, patient notebook is given to patients for recoding treatment at the time of their first consultation, and hospital also keeps a record on patient registration book.

2) Radiology department

One consultant for radiology and one technician are assigned. There are 6 X-ray apparatus including mobile X-ray apparatus and they are properly working. One of them made in China was supplied by CMSD in 2010. On average 600 examinations have been conducted per month and more than half cases were injury patients from January to November 2014. 2 ultrasound diagnostic machine are fanctioning, and 168 poor patients have been examined free of charge from January to November 2014.

Fee for CT scan is 40.000 MMK and about 40 patients are examined on average per month. Most of patients are suffering from stroke and traffic accident.

Table 4-12-5 The number of examination for Radiology department in Monywa General Hospital

	2009	2010	2011	2012	2013	2014[2]
CT Scan[1]	-	-	-	-	170	-
X-ray examination	5,129	5,934	7,153	8,844	11,089	6,744
Ultrasonography	2,049	2,208	2,487	3,437	3,676	2,146

[1] CT Scanner was supplied by CMSD in August 2013
[2] Data from January to November 2014
Source: Answers of questionnaires

3) Clinical laboratory department

In the clinical laboratory, examination of biochemistry, hematology, microbiology, and pathology are available. Blood bank and emergency laboratory examination are available for 24-hours.

1 pathologist, 13 technicians and 4 technical assistants are assigned. At the time of survey, biology examination is not available since the microbiologist had been transferred to other hospital. However, the vacancy will be filled with new personnel soon

4) Orthopedic ward

Orthopedic ward consists with 2 wards, one is for general orthopedic patients, and the other one is for traffic accident or some other injury patients. There were 36 patients required hospitalization with 50 sanctioned beds in the ward at the time of survey.

Most of the inpatients are hospitalized for fracture due to traffic accident. The number of patients has been increasing as Table 4-12-6 shows. Average length of stay of injury patients is 10 to 15 days and is longer than the one of other ward. This is because many patients need to have operations and rehabilitation.

Table 4-12-6 Health indicators of Orthopedic ward in Monywa General Hospital

	Outpatient			Inpatient			Injury cases			Others	Operation
	male	female	total	Male	female	total	accident	others	total		
2013	-	-	-	1,212	707	1,919	737	1,076	1,873	128	1,117
2014	1,659	809	2,468	1,687	740	2,427	833	1,350	2,363	63	1,437

Source: Answers of questionnaires

5) Medical Ward

There were 39 for male and 41 for female patients required hospitalization with 50 sanctioned beds each in 2 wards at the time of survey.

Major causes of morbidity and mortality are shown on Table 4-12-7 and Table 4-12-8. There is High Dependent Care Unit (HDU) but it is not utilized because of shortage of necessary equipment. One of consultants of anesthesiology is willing to maintain Cardiac Care Unit (CCU).

Dialysis treatment has been available for 2 years and there are 2 dialyzers. 4 patients can be treated in a day.

They requested to CMSD some equipment such as infusion pump, syringe pump, pulse oximeter, set for thoracentesis and ECG monitor although approval from CMSD has not made yet.

Table 4-12-7 Major causes of morbidity in Medical ward, Monywa General Hospital (2014)

Cause	Number of patients
Stroke	464
Hypertension with ischemic heart disease	404
Congestive heart disease	339
Cirrhosis	336
Chronic alcoholism complication	266
Diabetes	243
Tuberculosis	227
HIV/ AIDS	223
Snake biting wound	211
Chronic obstructive pulmonary disease (COPD)	187

Source: Answers of questionnaire

Table 4-12-8 Major causes of mortality in Medical ward, Monywa General Hospital (2014)

Cause	Number of patients
Hepatic encephalopathy	10
Intoxication (e.g. Organophosphorus pesticide)	10
Cardiogenic shock	8
Septicemia due to HIV	6
Septicemia	6

Source: Answers of questionnaire

6) Surgical ward (male/female)

There were 56 patients required hospitalization with 59 sanctioned beds at the time of survey. The ward was not crowded. Securing 6 beds for for postoperative and emergency patient, some patients end up with staying in the corridor.

Major diseases are head injury, appendicitis, abdomen and chest injury as Table 4-12-9 shows.

Table 4-12-9 Major causes of morbidity in the Surgical ward, Monywa General Hospital (2014)

	Major causes of morbidity	Number of patients
1	Head injury	812
2	Appendicitis	120
3	Chest injury	59
4	Abdomen injury	46
5	Breast cancer	44
6	Ulcer	22
Others (Stomachache, gastritis etc.)		291

Source: Answers of questionnaire

Statistical data of major cause of mortality was not available but it was observed 2 death cases in January 2015. These deaths were caused by head injury and abdominal hemorrhage due to traffic accident or injury. The surgical operation is performed three days per week, and there are 57 operations are conducted per month on average.

There is an upper gastrointestinal endoscopy room and the endoscopy was donated by the influential person in Monywa. Gastrointestinal hemorrhage or inflammation cases were observed by the endoscopy examination. 1 senior consultant has participated in training course of endoscope supported by India, and is willing to disseminate the acquired skills.

Although ECG, oxygen concentrators and nebulizers were donated by foundation in Monywa, patient monitor, infusion pump and syringe pump are necessary to be equipped for postoperative care.

7) Ob and Gyn ward

There were 62 patients required hospitalization including 11 normal delivery cases and 51 cesarean section cases at the survey. 21 Gyn inpatients were also hospitalized including 19 inpatients required operations.

There are rooms for nursing station, consultants, miner operation room, labor room, normal delivery room, and delivery room for septic cases, treatment room for neonates and observation room for serious patients. Passage of delivery room and labor room were so crowded with outpatients waiting for internal examination and inpatients having labor pain. This condition results in difficulty in maintenance of hygiene for the delivery room.

3 wards for obstetrics inpatients are located separately, and moving the patients room to room due to inefficient bed control (bedding the patient with the most severe condition near by the nurse station) has become heavy burden for the patients. Some medical equipment for delivery control is properly equipped but only cardiotocomonitor for high-risk pregnancy is not equipped.The number of delivery and cesarean section is shown on Table 4-12-10.

Table 4-12-10 Indicators of Ob and Gyn ward in Monwa General Hospital

	2009	2010	2011	2012	2013	2014*
Total number of all delivery	2,572	2,634	2,656	2,156	3,432	3,888
Total number of normal delivery	1,198	1,829	1,420	1,281	1,019	885
Total number of cesarean section	1,439	1,366	1,200	1,339	2,489	2,980
- Emergency cesarean section	-	-	-	-	-	2,184
- Elective cesarean section	-	-	-	-	-	796
Total number of eclampsia	33	24	33	31	43	-
Total number of miscarriage	341	315	370	310	281	388
Total number of stillbirth	93	122	91	98	89	114

Source: Answers of questionnaire, *Ob and Gyn ward, Monywa General Hospital Profile2014

According to the patients' record of Ob and Gyn ward, major causes of morbidity were 422 for abortions, 93 for uterine myomata, 57 for cervical cancers, 30 for ovarian cysts and other diseases such as endometriosis, ovarian tumor and endometrial cancer. Cancer patients are transferred to medical care ward and treated in chemotherapy.

8) Operation Theatre

There are two operation theatres and one (OT1) is for Surgery, Ob and Gyn, and Ophthalmology operation. There are 4 rooms for operation including 2 for major operations, 1 for septic cases and the rest for minor operation. There are 10 to 20 operations performed per day including elective and urgent operation.

Some medical equipment are properly working such as anesthesia apparatus, respirator, patient's monitor, suction machine, ceiling light, operating table, infant warmer, autoclaves, sterilizer and washing machine. In addition, 2 anesthesia apparatuses, 2 respirators and 2 patient monitors were supplied by CMSD in 2014.

Operation theatre 2 is for Orthopedics and Otolaryngology operation. 3 major operation room and 1 minor operation room are available. The renovation of this operation theatre completed in December 2014 and central oxygen supply system is equipped. According to data of the theatre in January 2015, 38 emergency operations and 63 elective operations had performed.

Basic medical equipment for operation is mostly supplied and C-armed X-ray diagnostic devices were provided by CMSD. Other equipment was donated by local NGOs and monks. The anesthesiologist manages ICU but it is not function because of lack of necessary medical equipment for intensive care. There are only 3 patient's beds, 2 stretchers, 2 patient monitors, 2 respirators, 2 oxygen concentrator, and 3 side tables donated by CMSD in October 2014. It is necessary that some additional equipment should be provided to manage patient such as infusion pump, syringe pump and defibrillator.

In addition, most of consultants in the hospital expect functioning ICU. Actually, 2 anesthesiologists are busy to manage 6,000 operations per year (Table 4-12-11). It is necessary not only to provide medical equipment for ICU but also to consider staff allocation and training ICU management. Therefore, intensive care including post-operational care for serious or head injury patients could be available.

Table 4-12-11 Number of operations in Monywa General Hospital (2014)

	Obstetrics	Surgery	Orthopedics	Otolaryngology	Ophthalmology	Total
Major operation	3,279	455	721	42	25	4,522
Minor operation	443	312	739	19	7	1,520
						6,042

Source: Answers of questionnaire

9) Pediatric ward

Pediatric ward and neonatal room are divided into 2 wards. There were 30 patients required hospitalization with 60 sanctioned beds at the time of survey.

Two neonatal rooms were completely separated from the other rooms, and cleanness can be maintained. The patients under recovering and serious condition are bedded in the separated rooms. According to the consultant, medical equipment for neonatal diseases such as infant warmer, infant incubator, and phototherapy machine are donated. Major causes of diseases are shown on Table 4-12-12, and it is indicated that the number of neonatal jaundice was more than 400 cases annually. It is also indicated that half of patients are infectious diseases but there is no partition in the room so that patient isolation is incomplete.

Major causes of mortality were shown on Table 4-12-13. More than half of mortality is the diseases related to neonates. Therefore, priority of provision of medical equipment for neonatal treatment seems crucial.

Table 4-12-12 Major causes of morbidity in Pediatric ward, Monywa General Hospital

	2013		2014	
	Disease	No. of patient	Disease	No. of patient
1	Acute viral infection	1254	Acute viral infection	686
2	Acute respiratory infection	724	Acute respiratory infection	804
3	Dengue hemorrhage fever	546	Acute gastroenteritis	587
4	Acute gastroenteritis	405	Neonatal jaundice	498
5	Neonatal jaundice	381	Dengue hemorrhage fever	434

Source: Hospital record of Pediatric ward in Monywa General Hospital

Table 4-12-13 Major causes of mortality in Pediatric ward, Monywa General Hospital (2013)

	Cause of mortality	No of patients	Death ratio (%)
1	Low-birth-weight	61	24
2	Neonatal asphyxia	35	18
3	Neonatal jaundice	13	8
4	Acute respiratory infection	8	4
5	Dengue hemorrhage fever	2	1

Source: Hospital record of pediatric ward in Monywa General Hospital

(5) Referral system

1) Referral to tertiary facilities

There are many cases for referral to the Mandalay General Hospital as follows; serious head injury, traffic injury, snake bite, tumor operation, radiotherapy and endoscopic retrograde cholangiopancreatography cases. Obstetrics cases such as complication after abortion and prolonged labor cases are transferred to the Women's Hospital in Mandalay for further treatment.

Regarding pediatric cases, congenital cardiac cases are transferred to the Yankin Children Hospital, and tumor, suspected malignant lymphoma, cerebral hemorrhage and congenital deformity are transferred to the Children's Hospital in Mandalay.

Ambulance is not used but transportation service by NGO is commonly used for referral cases. Sometimes, the poor person is not willing to be transferred to tertiary facilities because of their unaffordability for transportation and accommodation fees. In such case, Monywa General Hospital provides the patients medical treatment as much as possible.

2) Referral from lower facilities

Many patients are transferred from neighboring hospitals. The major cases of referral cases are transferred for perforation, ileus, chest injury, abdomen injury and head injury. Moreover, any obstetrics or pediatric consultants are not appointed at most of Township Hospital and Station Hospital and thus all gynecology cases and placenta previa, prolonged labor, complicated pregnancy, premature delivery, serious atonic bleeding and all neonatal case (neonatal jaundice, septicemia, premature baby, meningitis) are transferred. Many patients suffering from snake biting wound, renal insufficiency, and cerebrovascular disease are also transferred for the dialysis treatment.

(6) Challenges of buildings and facilities

1) Rain leakage and exposed reinforcing bar

Most of buildings that completed before 2012 have many cracks on the beams and pillars, and exposure of reinforcing bars of floor. There is not any visible rain leakage for the moment because the rehabilitation work against rain leakage was carried out about three years ago.

2) Delivery room and Operation theatre

The drainage pipe in the delivery room was installed with making holes throughout the wall. It is suspected that it would have been forgotten to initially install during the construction. Therefore, there is a risk that some insects could get into the delivery room because the interstice around the piping is not sealed completely. When cesarean section is necessary for patient, family members have to carry her up to first floor because any elevator or slope is not installed. It would be at the risk of falling down and negative influence on patients.

There are 4 operation rooms on the first floor. The circulation for patients and hospital staff are properly separated. All corners in the operation rooms are rounded to avoid getting dust. However, the clean and dirty areas for medical function are not obviously separated.

3) Challenge of building structure

a. The structural condition of pillars and beams of the buildings completed around 1980's is deteriorated because of damage by rain leakage. When new ward building is completed, old buildings will be demolished and also all functions will be transferred.

b. The patients, the medical staffs and the family of patients are obliged to access the operation theatre located on first floor using only stairs. Patient's families have to carry the patient by themselves with stairs, and it is faced with heavy burden for them and the risk of falls. However, two elevators will be equipped in the new 6 story building.

4-13. Kalay General Hospital (Sagain Region) (for reference)

Kalay General Hospital is 200 bedded General Hospital located in Kalay TS, western of Sagain Region that is an important point for transport to Chin State and India. It has 230 kilometers far from Monywa and takes 4 hours by car. The latest health statistics of Kalay General Hospital given by Sagain regional health office is as follows.

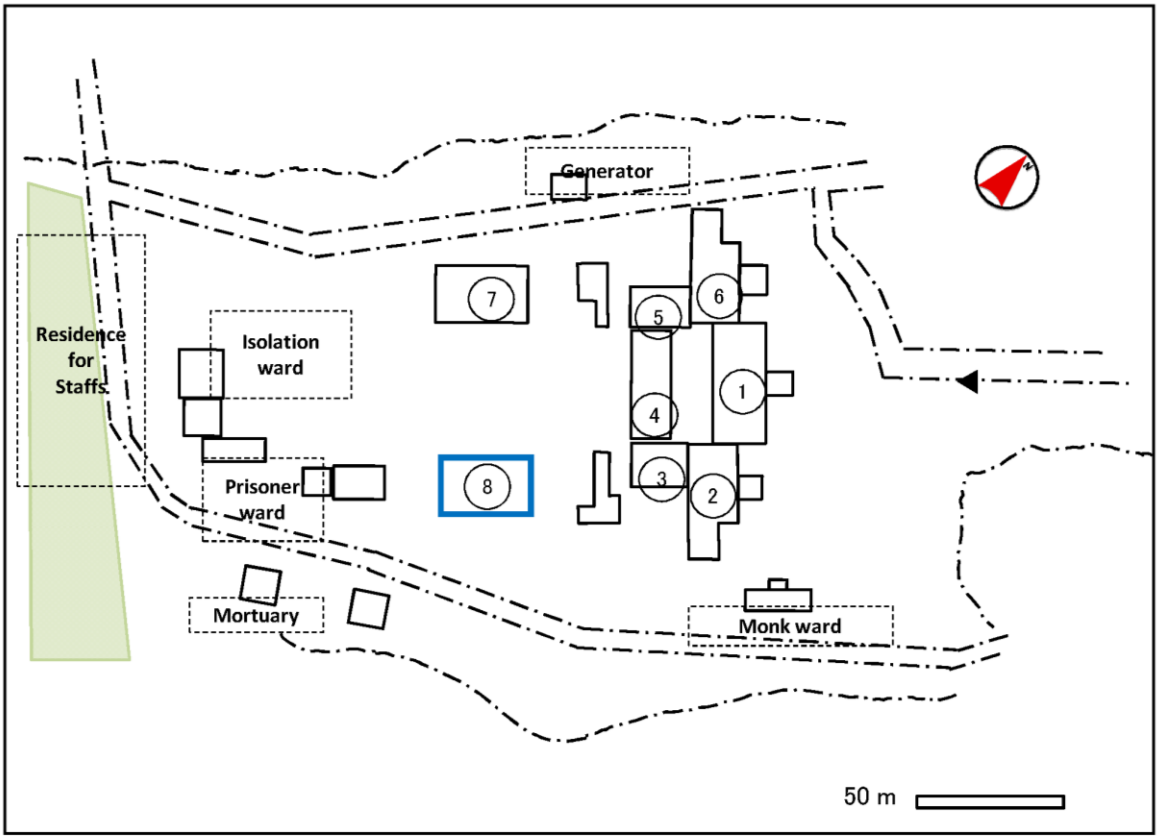
Table 4-13-1 Hospital Indicators in Kalay General Hospital (2014)

Indicator	Number of patients
Total number of outpatients	65,506
Total number of inpatients	12,650
Total number of patient discharge and hospital death	12,574
Total number of stay days	77,723
Total number of death	144
Total number of stillbirth	47
Total number of operation (general anesthesia)	697
Total number of operation (spinal anesthesia)	1,332
Total number of operation (local anesthesia)	276
Total number of operation (Others)	125
Total number of neonatal death	11
Total number of referral to other hospitals	334

Source: Data of Sagain regional health center

4-14. Kyaington General Hospital (Shan State-East)

Year of establishment: 2003 Site area (m²) : 164,996



Name of facility				
Name of building	Stories	Contents of facility	Construction year	Type of structure
Building ①	2 st.	GF : Conference room, Medical store, Specialist Outpatient Department, Blood Bank / 1F : Administration office, Medical Superintendant's office, Conference room	2003	RC
Building ②	2 st.	GF : Laboratory, X-ray room, Ultrasound room / 1F : Medical care ward (Male)	2003	RC
Building ③	2 st.	GF : Pediatric ward / 1F : Medical care ward (Female)	2003	RC
Building ④	2 st.	GF : Ob and Gyn ward / 1F : Surgical ward	2003	RC
Building ⑤	2 st.	GF : Laboratory, X-ray room, Ultrasound room / 1F : Medical care ward (Male)	2003	RC
Building ⑥	2 st.	GF : Dental Clinic, Emergency outpatient department, Pharmacy / 1F : Ophthalmology and Otolaryngology ward	2003	RC
Building ⑦	2 st.	GF : Delivery room / 1F : Operation Theater	2003	RC
Building ⑧	2 st.	GF : CT scan room, X-ray room / 1F : Laboratory	Under Construction	RC

Situation of Inflastructure	
Electricity	Electric power Supply (Frequency of blackout : Frequent in dry season) + Generator (A large number)
Water Supply	Water source : Deep well (4) Water supply system : Elevated water tank
Sewage	Septic tank (Sludge disposal by Municipal)
Communication	Fixed telephone line (2) + Mobile phone network + Internet connection

4-14. Kyaingtong General Hospital (Photos taken on 16th February 2015)

Kyaington General Hospital(Shan State East)
Established in 2003
(The photo shows of administration block
and specialist OPD)

Cracks on the wall of the Delivery room damaged
by earthquake
(Constructed in 2003)

Steep slope connecting to the Operation theatre
(Gradient on the slope is approximately 1/7 to 1/8.)

Damage by water leakage and mold at Expansion
joint between Building no.4 and 5
(Constructed in 2003)

Water leakage on the ceiling at Surgical ward
(Constructed in 2003)

New building under construction for CT scan room,
Radiology department and Laboratory

4-14. Outline of Kyaington General Hospital

(1) Health Workers

There are 1 Medical Superintendent, 12 Medical Specialist, 22 General Practitioner, 145 Nurses, 12 Radiologists and Laboratory technician. Total number of staff is 241.

(2) Financial situation of hospital

Budget of the hospital has been increasing year by year. CCSS has been implemented in section of clinical laboratory, X-ray examination, ultrasonography, ECG, and pay room fee. A CT scanner will be installed soon and CCSS will be also applied for CT scan.

Free medical services are provided for the poor. This is approximately 4 million MMK every year covered by interest of trust funds.

Table 4-14-1 Financial situation in Kyaington General Hospital

Unit: MMK

		2011/12	2012/13	2013/14	2014/15
Government		181,799,276	459,986,230	1,145,868,749	872,762,690
Trust Fund		-	-	61,766,813	63,300,490
CCSS	Examination room	-	-	112,800	11,220
	X-ray	-	-	230,600	198,200
	Ultrasonography	-	-	264,000	214,000
	ECG	-	-	24,000	40,500
	Pay room	-	-	414,000	271,000
	Total	-	-	1,045,400	734,920

Source: Answers for questionnaire

Table 4-14-2 Number of patients who received free medical service and its cost

	2013/14		2014/15	
	Number of patient	Cost	Number of patient	Cost
Free medical service	128	4,805,520	145	4,016,150

Source: Answer for questionnaire

(3) Hospital Statistics

1) Hospital Indicators

Table 4-14-3 Hospital Service Indicators in Kyaington General Hospital

	2010	2011	2012	2013	2014
Total number of outpatient	7,020	6,981	9,463	14,263	17,858
Average number of outpatient per day	28.8	28.6	39.0	58.2	87.1
Total number of inpatient	5,042	4,843	4,729	6,269	6,691
Total number of discharge and death	4169	3906	4009	5541	5439
Total number of stay (in days)	23,948	22,626	22,648	31,301	32,933
Average number of patients days per patient	65.6	62.0	62.0	85.8	108.3
Total number of death	81	88	102	89	77
Total number of operation	1,327	1,300	1,397	1,749	1,739

	2010	2011	2012	2013	2014
Bed occupancy rate (%) (based on sanctioned bed)	32.8	31.0	31.0	41.5	54.2
Bed occupancy rate (%) (based on available bed)	34	28.8	32.1	43	56.1
Average Duration of Stay days	5.0	5.0	5.0	5.0	6.0
Average turnover of inpatients per bed per year	19.8	18.6	21.3	29.2	28.6
Average interval (in day)	11.0	14.0	13.6	7.0	4.7
Hospital mortality rate per 1,000 discharging and death	18.0	22.0	24.8	15.6	14.0
Total number of delivery	461	433	441	588	764
Total number of stillbirth		16	17	27	20
Total number of abortion	81	54	54	84	71
Abortion rate per 100 deliveries	15.0	12.0	11.8	13.7	9.0

Source: Kyaington General Hospital Annual Report

2) Morbidity and Mortality

Table 4-14-4 Number of major causes of morbidity in Kyaington General Hospital

	2009	2010	2011	2012	2013	2014
Injury	378	471	574	452	625	790
Cataract	364	223	477	471	466	468
Acute diarrhea	229	212	234	228	235	305
Pneumonia	85	147	81	62	63	98
Malaria	67	28	6	5	8	22
Appendicitis	63	78	55	28	40	70
Abortion	81	81	54	54	84	71
Tuberculosis	57	79	58	64	61	55
Neonatal jaundice	40	50	17	134	223	110
Tharaccesmia (Mediterranean anemia)	111	74	61	68	80	81

Source: Kyaington General Hospital Annual report

Table 4-14-5 Major causes of morbidity and mortality (2014)

Order	Causes of morbidity	No.of patients	Causes of mortality	No.of patients
1	Injury	790	Heart diseases	19
2	Labor	755	Head injury	7
3	Appendicitis	468	Hepatic encephalitis	5
4	High blood pressure	448	Respiratory insufficiency/ Retrovirus infection	4
5	Diarrhea	305	Acute respiratory infection/ Low-birth-weight	2

Source: Kyaington General Hospital Annual report

(4) Situation of Medical Service Department

1) Surgical ward

The total number of patient in surgical ward was 2,753. There were 24 patients required hospitalization including 14 for male and 10 for female with 40 sanctioned beds at the time of survey. There is only 1 large room shared by both male and female and no private room or isolation room. Post operation patients suffering from head injury are observed near the nurse station.

Two consultants of surgery are assigned. Average number of outpatients is 40 per month and some patients are observed and treated in the ward when consultants are hectic.

There are 1 oxygen condenser, 1 ECG, 2 suction machines and 1 oxygen cylinder equipped. These are still insufficient to care for post-operation patient.

As Table 4-14-6 shows, most of patients in surgical ward need surgical operations. 2 to 3 operations per day are performed, and 2 days in a week are appointed for operation. Emergency operation is performed 1 to 2 cases per day on average. Major elective operations are for hernia and cancer. Major emergency operations are for perforation, serious appendicitis and head injury. Thrombectomy for trepanation is operated by a general surgeon and operation instruments are fully equipped.

Table 4-14-6 Indicators in Surgical ward, Kyaington General Hospital

	2011		2012		2013		2014	
	Major diseases	No. of patient	Major diseases	No.of patients	Major diseases	No.of patients	Major diseases	No. of patients
1	Head injury	139	Head injury	188	Head injury	175	Head injury	-
2	Acute appendicitis	66	Stomachache	98	Stomachache	92	Injury	-
3	Injury	65	Acute appendicitis	41	Acute appendicitis	39	Stomachache	-
4	Stomachache	61	Gastrointestinal hemorrhage	36	Perforation	28	Alcoholic hepatitis	-
5	Gastro intestinal hemorrhage	39	Inguinal hernia	28	Prostatomeg-aly	22	Hernia	-

Source: Record of Surgical Ward, Kyaington General Hospital

The number of death in 2014 was 47 inpatients caused by head injury, perforation and septicemia. There is no toilet inside the ward and moving from the ward to the toilet brings the patients physical burden because the nearest toilet is approximately 70 meters far from the ward.

2) Neonatology ward

At the time of survey, there were 5 neonates required hospitalization with 15 sanctioned beds. Outpatients take treatment in the ward and about 10 outpatients per day receive treatment.

Major causes of morbidity among inpatients in 2014 were neonatal jaundice (155 cases), neonatal asphyxia (99 cases) and neonatal infection (81 cases). Major causes of mortality are premature and serious neonatal asphyxia.

Most of the medical equipment for neonatal treatment have been provided by CMSD. There are new supplied medical equipment such as 2 incubators, 3 phototherapy machines, 3 portable pulse oximeters, 2 monitors for neonates, 2 low pressure suction machines and 2 oxygen concentrators.

Two day-user training for the incubator was conducted by the local distributor of medical equipment.

However, at the time of survey, one incubator was out of order and they asked the distributor to check on it for repair. It has been taken for 4 months and it remains broken.

3) Operation Theatre

There is one operation theatre that has 4 operation rooms managed by 2 anesthesiologists. Flows of the operation theatre are separated for patients, staffs and transport of used instruments and cloths. Although basic medical equipment for operation is almost equipped, ambubags for manual respiration control is necessary because of lack of ventilator for anesthesia apparatus.

The number of operation is shown on Table 4-14-7. Major elective operations in January 2015 were lymph node dissection and biopsy for breast cancer, hernia restoring, and cervical biopsy. Examples of major emergency operation were for appendectomy, cancer abdominal section, cesarean section and simple hysterectomy.

Table 4-14-7 Indicators in Operation ward, Kyaington General Hospital(2014)

	Surgery	Ob and Gyn	Orthopedics	Ophthalmology	Otolaryngology	Neonatology	Total
Number of operation	315	523	168	566	17	1	1,590

Source: Answers of questionnaires

ICU is attached to operation theatre. There are some medical equipment such as 3 ICU beds, 1 defibrillator, 1 respirator and 1 suction machine. There is a need for additional equipment such as patient monitor, infusion pump and syringe pomp for a proper function.Currently, ICU is operated only once or twice a year for serious patient.

There is another challenge. In dry season, electricity supplied by hydroelectric power station is insufficient to operate medical devices in the operation theatre. The blackout frequently occurs and duration of blackout becomes longer.

There are 2 generators only; however it can be covered only 1 set of electric surgical knives, anesthesia apparatus, suction machine and patients monitor. After operation of the generator, it needs to be cooled down every 2 to 3 hours. Ventilator is not available, and therefore manual respiration control used by ambubag is necessary.

According to the consultant, there are some challenges not only regarding medical equipment but also staff training for ICU management and experienced and knowledgeable staffs should be trained to make ICU properly function.

4) Pediatric ward

Pediatric ward treats children aged from 1 month to 12 years old. There were 15 patients required hospitalization with 24 sanctioned beds at the time of survey. Infection control on nosocomial infection is difficult because there is no private or isolation room.

Major causes of morbidity in 2014 were digestive organs infection (171 cases), thalassemia (93 cases), acute respiratory infection (72 cases) and others including acute viral infection, skin infection and fever convulsion patients. Some diseases such as thalassemia cannot be diagnosed by medical examination but only observation and hearing assessment due to a lack of facility. There was 9 deaths cases in 2014 and the cause of death were 4 serious pneumonia cases, 2 encephalitis cases, 1 septicemias case, 1 hepatic insufficiency case and 1 congenital heart disease case.

5) Orthopedics ward

There were 10 patients required hospitalization with 16 sanctioned beds at the time of survey. Treatment such as debridement of injury, bandage exchange and setting plastic cast are available in the minor treatment room. Only 1 oxygen concentrator was working and they have to borrow from other department when they need other medical equipment. They have been requesting to CMSD some medical equipment such as spot light, treatment table, ECG and oxygen concentrator.

One of major causes of morbidity in 2014 was traffic accident injury. When the number of patient is increased, benches have to be used for patients instead of patient‘s bed due to the shortage.

6) Ob and Gyn ward

There were 19 patients required hospitalization with 30 sanctioned beds at the time of survey. The ward consists of 1 large room, 1 room for postoperative patient, 2 private rooms that cost 2,000 MMK per day without bathroom. After operation, patient is observed at the postoperative room for one day and then the patient is transferred to the large room after being in stable situation. There are only oxygen concentrator and oxygen cylinder at the postoperative room and no special function just as like general patients room. At the delivery room, there is an autoclave and gas specification. New autoclave was supplied by CMSD last year but it has not been installed yet. Additionally, 2 delivery tables, 1 infant warmer, 1 low pressure suction machine and 1 suction machine have also been installed and they have requested some medical equipment to CMSD. Major causes of morbidity were miscarriage, pelvic inflammatory disease (PID), cervical cancer and ectopic pregnancy in order. Cancer patient can have operation and chemotherapy. Radiotherapy is not available here, and patients for radiotherapy have to be

transferred to the Sao San Ton Hospital. There were 3 death cases in 2014, caused by diabetic encephalopathy and ovarian cancer cases.

7) Radiology department

1 cardiologist and 4 technical staffs are appointed but there is an absence of radiologist for 3 months because of attending training .Therefore, a doctor dispatched from neighbor military hospital has conducted an ultrasonography. There are X-ray apparatus and 1 has just provided by CMSD in 2014, and still not installed yet. The number of examination at the radiology department is shown on Table 4-14-8. 70 % of X-ray examination is for chest. In summer season between March to June, water for developing film is insufficient because water is supplied only for 30 minutes daily. A CT scanner was provided by CMSD in April 2014, however, it has not installed yet due to incompletion of CT scan room at the time of survey. When patients need CT scan, he / she is transferred with family members to the military hospital with securing transportation.

Table 4-14-8 Number of examination in Kyaingtong General Hospital

	2011	2012	2013	2014
CT Scan	-	-	-	-
X-ray examination	-	857	1113	-
ECG	-	151	112	207
Ultrasonography	245	333	443	-
Upper endoscopy	-	-	-	51

Source: Answer of questionnaire

8) Clinical laboratory department

Biochemistry, hematology and microbiology examination are available. A pathology examination is not available due to the vacancy of the pathologist. An automatic blood cell a counter, colorimeter, an autoclave and an electrolyte analyzers were supplied by CMSD in December 2014, but some have already broken down and have been sent back to CMSD Yangon for repair. 70 to 80 samples were examined per day. Regarding pathology examination, the sample of patient's tissue is sent to private laboratory in Yangon or Mandalay by air

Table 4-14-9 Number of blood sample examined in the laboratory, Kyaingtong General Hospital

Month	Jan	Feb	Mar	Apr	May	Jan	Jun	Aug	Sep	Oct	Nov	Dec
No. of samples	533	486	388	133	473	649	275	-	371	272	426	236

Source: Hospital record of laboratory, Kyaingtong General Hospital

9) Medical care ward

There were 29 patients required hospitalization with 53 sanctioned beds at the time of survey. During rainy season, number of inpatient increases occupying the beds over 100 % because of endemic of infectious diseases. High care unit is available, but there was no serious patient

because provision of medical equipment, and the level of cleanliness are not much different from general rooms.

Major causes of morbidity in 2014 were 132 cases for diabetes, 120 cases for hypertension, 117 cases for COPD, 100 cases for ischemic heart diseases and 94 cases for congestive heart failure in order. Major causes of were cirrhosis, tuberculosis, stroke and congestive heart failure. The number of death cases was unknown.

There are 1 oxygen concentrator and 1 ECG supplied by CMSD in 2014. 1 defibrillator was out of order. Although CMSD had planned to provide one, hospital has not received yet. According to the Medical Superintendent, dialysis treatment is commonly provided for acute renal failure due to snake bite. For reference, there were 56 chronic renal failure patients in 2014.

(5) Referral system

1) Referral to tertiary hospitals

Cancer patient who needs radiotherapy was transferred to the Sao San Tun Hospital in Taunggyi. Case of some specialties such as urology, spinal injury, and neonatal surgery case (ileus, congenital digestive diseases), were transferred to the Mandalay or Yangon General Hospital. Since transferring the serious head injury patients to Taunggyi more than 200 kilometers distance far from Kyaington General Hospital is at the risk and negatively influential, they were treated as much as possible in Kyaington Hospital. Additionally, most of residents in Shan State-East commonly speak in Shan language that is similar to Thai language and therefore the Shan people often go to hospital in Chiang Mai, Thailand across the border without the referral form used in Myanmar.

Table 4-14-10 Number of referral cases to tertiary hospital in Kyaington General Hospital

	2012	2013	2014
Both legs bone fracture caused by traffic accident	2	-	-
Head injury	-	3	-
High blood pressure	-	2	-
Injury	-	-	5
Total	11	34	36

Source: Answers of questionnaire

2) Referral from lower facilities

For example, cancer suspected patients were transferred from lower level facilities for chemotherapy. Other cases such as premature babies, neonatal asphyxia, traffic accident, fibroid, prolonged labor and cesarean sections were also transferred. There are 2 to 3 outpatients per month for examination and treatment from township hospitals. In spite of 4 to 5 hours trip from the area named Mainen by car, transferred cases are also transferred.

(6) Challenge for buildings and facilities

1) Situation of the entire facility

This hospital made renovation and upgraded to 100-bedded hospital located in the center of town. These new facilities have been constructed between 1997 and 2003. The inside of the facility has been painted two years ago, and therefore it is relatively maintained clean.

2) Cracks damaged by earthquake and rain leakage

There are some cracks on the wall caused by earthquakes in March 2011 in Tachileik Region (Richter magnitude scale 6.9). However, there is not any visible crack on the pillars and the beams caused by the earthquake. Since some vertical cracks are observed on the pillars around the expansion joint between the buildings with mold, the crack on the pillars and the beams are considered to be caused by rusted rebar or the rain leakage.

3) Challenge of building structure

The cracks on the wall caused by earthquakes are possible to repair and it must be carried out soon.

The slope on the first floor is installed to access the operation theatre, however, the slope is very steep (slope ratio is 1:7 or 1:8).

4-15. Tachileik General Hospital (Shan State-East)

Tachileik General Hospital is a 100 bedded hospital located in Tachileik TS bordering with Thailand. It is 160 kilometers far from Kyaington General Hospital and it takes about 2.5 hours by car. The sub state health office, Shan State-East has applied for upgrading Tachileik General Hospital for 200 bedded hospitals. The department of health, Shan Stat-East provided health indicators of Tachileik General Hospital as follows.

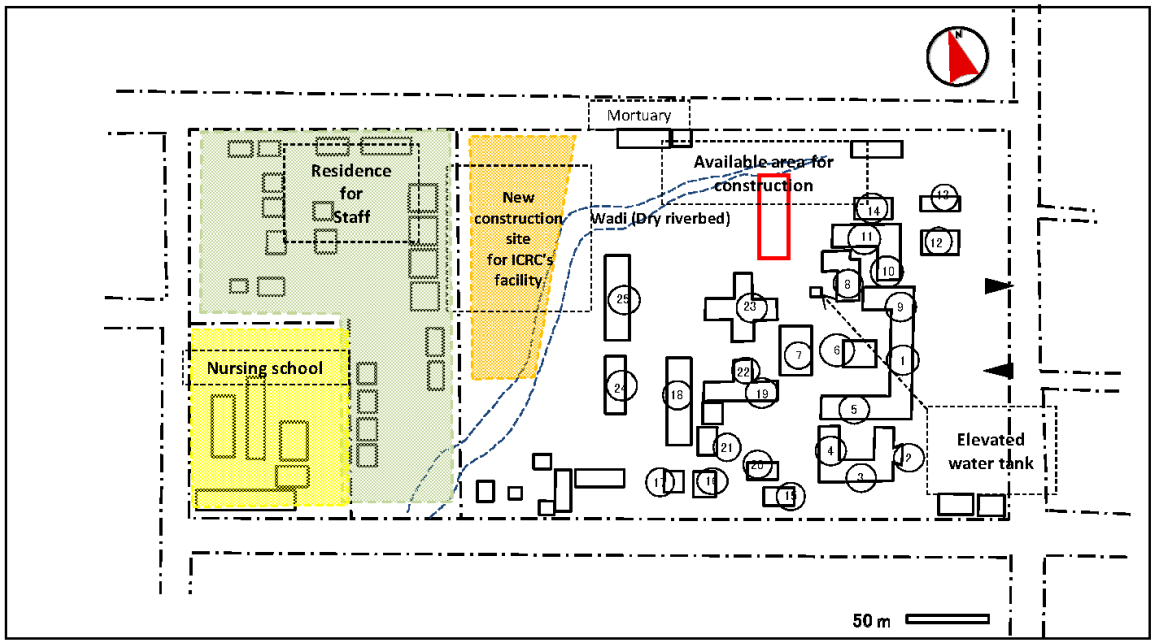
Table 4-15-1 Hospital indicators of Tachileik General Hospital (2013)

Indicators	Number
Number of sanctioned beds	100
Number of available beds	75
Total number of inpatients	7,143
Total number of deaths	108
Total number of patients discharge and hospital death	7,125
Total patients day	22,242
Total number of new outpatients	3,351
Total number of outpatients	10,379
Total number of abortion	214
Total number of deliveries	1,438
Total number of stillbirth	26
Total number of operation(general anesthesia)	111
Total number of operation (spinal aesthesia)	763
Total number of operation(local anesthesia)	40
Total number of operation(others)	320

Source: Documents from Shan State-East regional health office

4-16. Myitkyina General Hospital (Kachin State)

Year of establishment: 1938　　Site area(m²) : 129,492



Name of facility

Name of building	Contents of facility Stories	Construction year	Type of structure
Building ①	2 st. GF : Medical care ward / 1F : Surgical ward	1958	Brick
Building ②	1 st. GF : Outpatient and Emergency Department, Medical record office / 1F : Dermatology ward, Pay ward, Forensic department	1990	Brick
Building ③	2 st. GF : Physiotherapy ward, Medical social warker's room / 1F : Conference room	1990	Brick
Building ④	2 st. GF : Laboratory, Blood Bank / 1F : Medical Superintendant's office	1990	Brick
Building ⑤	2 st. GF : Orthopedic ward, Blood donation room / 1F : Orthopedic ward	1990	Brick
Building ⑥	2 st. GF : X-ray room, Ultrasound room / 1F : ICU, Pay ward	1958	Brick
Building ⑦	2 st. GF : Delivery room, Neonatal care unit / 1F : Operation Theater	around 2000	RC
Building ⑧	2 st. GF : Rooms for Anti Retrovirus Therapy / 1F : Surgery ward	2014	RC
Building ⑨	2 st. GF : Medical care ward (for TB) / 1F : Surgical ward (for Burn)	1958	Brick
Building ⑩	2 st. GF : Medical care ward (for cancer) / 1F : Otholaryngology ward	1990	Brick
Building ⑪	2 st. GF : Isolation ward / 1F : Ophthalmology ward	1990	Brick
Building ⑫	2 st. GF : Ophthalmology and Otholaryngology ward	1966	RC
Building ⑬	2 st. GF : Monk ward	1984	RC
Building ⑭	2 st. GF : CT scan room	2014	RC
Building ⑮	2 st. GF : Kitchen and Restaurant	1966	RC
Building ⑯	2 st. GF : Medical store	1965	RC
Building ⑰	2 st. GF : Medical store	1965	RC
Building ⑱	2 st. GF : Ob and Gyn ward	1966	RC
Building ⑲	2 st. GF : Ob and Gyn ward	1966	RC
Building ⑳	2 st. GF : Pay ward for Ob and Gyn	1994	RC
Building ㉑	2 st. GF : Pay ward for Ob and Gyn	1994	RC
Building ㉒	2 st. GF : Pediatric ward	1966	RC
Building ㉓	2 st. GF : Pediatric ward	1966	RC
Building ㉔	2 st. GF : Prisoner ward	1966	RC
Building ㉕	2 st. GF : Psychiatric ward	1966	RC
(Red frame)	2 st. Available area for construction		

Situation of Inflastructure	
Electricity	Electric power Supply (Frequency of blackout : Unknown) + Generator (1×200kVA + 1×100kVA)
Water Supply	Water Source : Deep well+Shallow well Water supply system : Elevated water tank
Sewage	Septic tank (Sludge disposal by Municipal)
Communication	Fixed telephone line (4) + Mobile phone network

4-16. Myitkyina General Hospital (Photos taken on 21th February 2015)

Myitkyina General Hospital (Kachin State)
Established in 1938
(The photo shows the medical and surgical ward.)

Steep slope at the entrance of Ob and Gyn ward
(Constructed in 1966)

Damage by water leakage and mold at connection between Building no.1 and 5

Cracks and mold on the concrete of floor in the toilet at Building no.2 (Constructed in 1990)

Damage by mold on the slab concrete and exposed rebar in the beam concrete (Constructed in 1966)

Building for CT scan room constructed by Japanese aid (Constructed in 2014) and Wadi passing in the hospital

4-16. Myityina General Hospital

(1) Health Workers

There are 1 Medical Superintendent, 12 Senior Medical Specialist, 10 Junior Medical Specialist, 52 General Practitioner, 3 General dentists, 1 Matron, 266 Nurses, 60 Radiologist and Laboratory technicians appointed. Compared to sanctioned number, the number of staff is extremely less, and total staff is 466.

(2) Financial situation

Table 4-16-1 Income from CCSS in Myitkyina General Hospital (2013)

Unit: MMK

CCSS	Income
Pay room	22,125,000
Laboratory examination	27,343,900
X-ray examination	9.704,110
Ultrasonography	1,185,000
CT scan	17,360,000
Total	68,013,900

Source: Myitkyina General Hospital Profile 2014

Table 4-16-2 Number and cost of free medical service in Myitkyina General Hospital(2013)

Free medical service	Number	Cost (MMK)
Ultrasonography	359	359,000
X-ray examination	3,191	3,663,600
Laboratory examination	1,421	8,635,770
Medical consultation fee	11	742,260
CCSS	24	3,189,180
Total	5,006	16,589,810

Source: Myitkyina General Hospital Profile 2014

(3) Hospital Statistics

1) Indicators of hospital services

Table 4-16-3 Hospital indicators in Myitkyina General Hospital

Indicators	2012	2013	2014
Bed Occupancy Rate (%) (Based on sanctioned bed)	75	89	115
Bed Occupancy Rate (%) (Based on available bed)	54	61	80
Average interval of empty beds (day)	6	4	2
Total number of outpatients	33,556	49,688	72,689
Average number of outpatients per day	92	136	199
Total number of inpatients	11,792	15,438	18,904
Average number of inpatients per day	226	226	345
Total number of death	259	289	284
Hospital mortality rate (per 1,000 patients)	30	19	15
Total patients days	82,458	97,070	126,080
Total number of abortion	196	228	349
Total number of major operation	1,416	2,059	2,745
Total number of minor operation	1,452	2,000	2,389
Total number of traffic accident	1,529	1,639	2,085

Source: Myitkyina General Hospital profile 2014

2) Morbidity and Mortality

Table 4-16-4 Morbidity and mortality in Myitkyina General Hospital (2014)

No	Morbidity	Number of patients	Mortality	Number of patients
1	Traffic accident	1,985	Tuberculosis	54
2	Hepatitis	804	Traffic accident	45
3	Tuberculosis	729	Hepatitis	20
4	Gastroenteritis (diarrhea)	733	Meningitis	13
5	High blood pressure	439	High blood pressure	6

Source: Myitkyina General Hospital profile 2014

(4) Situation of Medical Service Departments

1) Surgical ward

There were 63 patients required hospitalization with 50 sanctioned beds at the time of survey. There were male ward, female ward and also a high care unit beside nurse station, a burn unit, isolation rooms for tetanus and pay rooms.

There are 1 oxygen concentrator, 10 multifunctional beds for the high care unit, 1 infusion pump and 1 ECG at the ward and they were supplied by CMSD in 2014. There are also 3 oxygen concentrators, 1 pulse dosimeter and 3 suction machines available. According to the consultant, the ward has enough medical equipment but only equipment for resuscitation is still necessary.

Data regarding to major causes was not available and the consultant reported the major causes of morbidity was head fracture by traffic accident. Major cause of mortality is epidural hematoma due to traffic accident and perforation. Breakdown of causes of injured cases are as follows: 112 cases of traffic accident, 21 cases of violence, 17 cases of downfall, 12 cases of burn and 5 cases of occupational accident. There are many cancer patient cases, especially of breast and stomach cancer and 1 oncologist treats them in chemotherapy after operation.

There are many cases of emergency operation for acute appendicitis and head injury. In addition, general surgeon operates for perforation and removal of hematoma in the head as a primary emergency treatment. Half of post-operated patients for a removal of hematoma were alive. Normally patients are transferred to the Mandalay or Yangon General Hospital after their situations become stable.

In 2014, a laparoscope was provided by CMSD and one of senior consultants attended the workshop for a laparoscopy in Magway General Hospital. Additionally, he plans to participate in user training for the laparoscopy held by a local equipment distributor.

2) Operation Theatre

There is one operation theatre with 4 rooms including 1 room for septic cases. Number of operation cases is 300 to 400 per month and 15 to 20 per week. Total number of operation in

2014 was 5,134. Surgical ward has the large number of operations compared to other wards and has been conducting a surgical operation for the traffic accident, especially a head injury twice per day.

Table 4-16-5 Total number of operations in Myitkyina General Hospital 2014

	Surgery	Obstetrics and gynecology	Orthopedics	Ophthalmology	Otolaryngology	Total
Major operation	519	1,018	284	770	154	2,745
Minor operation	861	222	951	265	90	2,389
Total number of operation	1,380	1,240	1,235	1,035	244	5,134

Source: Myitkyina General Hospital profile 2014

In operation room for ophthalmology, there is a surgical microscope for ophthalmology and this is mainly used for the cataract operation. According to an anesthesiologist, many medical types of equipment for operations are provided but a ventilator is equipped only one unit. Hence, when there are some operations at the same time, staff have to use a manual respiration control with ambubag. Therefore, additional ventilator needs to be supplied urgently. There are also many infectious cases but only 1 operation room for septic cases and thus a patient sometimes is kept waiting for the operation. Additional operation rooms for septic cases need to be constructed.

Oxygen, suction and nitrous oxideare are available by the central supply systems in the hospital. Room for sterilization is located at different floors from operation theatre. Operation gowns and instruments have to be carried to the downstairs for sterilization from the operation thatre. There are 2 autoclaves equipped. One was provided by CMSD and the other one was provided by the NGO of French in 2009. However, this was already broken due to a misoperation by staff because the instruction for the autoclave is written in French. Some generators for operation thatre are installed and there is no inconvenience at the time of suspension of electricity.

ICU is beside the operation theatre and there are 2 ICU beds, 2 patient monitors, 1 ventilator, 1 infusion pump, 1 syringe pump, 2 oxygen concentrators, 2 suction machines, 1 defibrillator and 1 cleaning machine for floor at the ICU.

There are 2 anesthesiologists at the operation theatre and 1 sister nurse, who participated in the patient management training in Japan supported by JICA. She mentioned that it is difficult for staff working at the operation theatre to cover to treat pre and post-operated patients at the operation theatre and ICU patients at the same time. Because there are only 2 anesthesiologists appointed and it is a shortage of staff. Serious patients are hospitalized at ward and t is a low usage of the ICU twice a month.

3) Ob and Gyn ward

A number of sanctioned beds is unknown but there were 61 patients required hospitalization including 15 gynecology patients and 40 obstetric patients at the time of survey. The building of Ob and Gyn ward was old and narrow. Thus inpatients beds are closely placed and some beds are placed even in the corridor. There are private rooms separated with wooden partitions. There is a high care unit and room for intrauterine curettage and these rooms were as delivery rooms before. At the both rooms, it is difficult to maintain these rooms clean because there is congestion and frequent in-and-out of patient's family members.

The major causes of morbidity for gynecology patients were abortion, ectopic pregnancy and cervical cancer and for obstetrics patients were normal delivery, cesarean section, eclampsia, post-postpartum hemorrhage (PPH), and abnormal placenta. There was one maternal death case in 2014 and it caused by eclampsia due to hypertension as Table 4-16-6 shows. There are 7 normal deliveries and 3 cesarean sections per day.

Table 4-16-6 Indicators in Ob and Gyn ward, Myitkyina General Hospital 2014

	2014
Number of antenatal care	5,100
Total number of gynecological inpatients	912
Total number of obstetrics inpatients	2,445
Total number of normal delivery	1,431
Total number of vacuum extractor delivery	14
Total number of instrumental delivery	11
Total number of emergency caesarian section	486
Total number of elective caesarian section	356
Total number of maternal death	1

Source: Documents provided by Ob and Gyn wards in Myitkyina General Hospital

The delivery room connects the Ob and Gyn and neonatal unit by a connecting corridor. At the delivery room, there are 3 delivery tables, oxygen concentrators, vacuum extractor, and suction machines for neonates, mobile spotlights. However, one sterilizer was out of order and additionally, a neonatal monitor, infant warmers and automatically suction machines need to be equipped for resuscitating neonates. .

4) Orthopedic ward

There were 42 patients required hospitalization including 32 for male and 10 for female with 45 sanctioned beds at the time of survey. There are 2 consultants but one of them has been absent due to studying abroad.

Major causes of morbidity for inpatients are fracture due to traffic accidents, violence and occupational accident of mining. Additionally, leg amputation cases due to diabetic gangrenous cases are also hospitalized. More than half of injured inpatients in 2014 (1,155 cases) were

hospitalized for traffic accidents (626 cases). There are also maxilla facial fracture cases and chest and abdominal injured cases and the consultants discuss a policy of treatment with other consultants for otolaryngology and surgical ward. The consultants sometimes transfer post-operated patients and patients suffering from low back pain to the rehabilitation ward. International Redcross Committee is planned to construct a rehabilitation center attached to prosthetic appliance workshop in 2016. In connection with this, medical superintendent would like to establish an emergency trauma department because he reports traffic accident cases are increasing in Kachin State compared to other State/ Region and demand of rehabilitation will be increasing in the future.

5) Pediatric ward (including neonatal unit)

Pediatric ward treats patients aged from 29 days at birth to 12 years old and neonatal unit covers neonates less than 29 days at birth. At the time of survey, there were 39 patients required hospitalization with 30 sanctioned beds at the pediatric ward and 12 patients required hospitalization with 20 sanctioned beds at the neonatal unit. At the ward, there are observation rooms for emergency cases from outpatients department. .2 consultants have worked for both the pediatric ward and neonatal unit.

There are a plenty of medical equipment such as incubators, patient monitors, infant warmers and they were provided by CMSD. However, CMSD supplied 1 ventilator for pediatrics even though the consultant requested 1 ventilator for neonates for birth asphyxia. There is no patient who needs for a ventilator, no consultant has been trained and experienced using the ventilator for pediatric patients and thus this has not been used and kept at the store.

During rainy season between June and September, there is an increase of patients and major causes of admission in the season are diarrhea, dengue fever and malaria. At the time of survey, it was in winter and the survey team observed many viral infection and respiratory infection patients.

Table 4-16-7 Number of major causes of morbidity in Myitkyina General Hospital

	2012	2013	2014
Acute diarrhea	400	209	495
Acute viral infection	-	-	360
Acute respiratory infection (ARI)	427	293	413
Retrovirus infection (RVI)	29	17	28
Febrile convulsions	-	-	169
TB	-	-	83
Malaria	101	53	56
Encephalitis/meningitis	43	32	28
Dengue hemorrhage fever (DFS)	4	221	43
Total No of pediatric inpatient	1,690	2,062	2,319

Source: Answers of questionnaire

Table 4-16-8 Total number of outpatients in Mytkyina General Hospital (2014)

	No of patient
Acute viral infection	172
Acute respiratory infection	171
Diarrhea	46
Skin infection	30
Other	360
Total No of pediatric outpatient	779

* Data collected from January to August in 2014
Source: Answers of questionnaire

As Table 4-16-9 shows, all pediatric mortality cases were caused by infection in 2014. According to the consultant, almost all situations of death patients got already worse at the arrival of the hospital.

Table 4-16-9 Major causes of mortality (except neonates) in Pediatric ward, Myitkyina General Hospital (2014)

	Number of patient	Percentage of patients (%)
Septicemia	12	32
Pneumonia	8	21
HIV	5	13
Encephalitis/Meningitis	5	13
Malaria	4	10
Total number of mortality	38	-

Source: Answers of questionnaire

Most of the inpatients hospitalized in neonatal room were born in the hospital and a few came from the outside after birth. There are rooms for hospitalization for sick children, a phototherapy room and rooms for premature baby are available at the neonatal unit. It is difficult to maintain the neonatal unit clean because there is frequent in-and-out of patient's family members.

Major causes of morbidity are shown on Table 4-16-10. The neonate is able to discharge when he / she sucks breast milk well. Other low birth weight neonates are able to discharge when they put on weight more than 2.5kg.

Table 4-16-10 Major causes of morbidity in neonatal unit, Mytkyina General Hospital

	2012	2013	2014
Neonatal septicemia	141	173	212
Neonatal jaundice	155	92	105
Neonatal asphyxia	127	114	119
Low birth weight	38	74	74
Hypoglycemia	0	0	26
Skin infection	0	0	12
Others	0	0	31
Total No of impatient	486	471	579

Source: Answers of questionnaire

Major causes and number of mortality are shown on Table 4-16-11. They are low birth weight and neonatal asphyxia. Both of them need to be treated intensive care.

Table 4-16-11 Major causes of mortality and number of morality in Neonatal unit, Myitkyina General Hospital (2014)

Cause of mortality	No of death patient
Low birth weight	23
Neonatal asphyxia	15
Neonatal jaundice	7
Neonatal sepsis	6
Congenital abnormalities	2
Total No of neonatal mortality	15
Mortality rate (%)	1.70

Source: Answers of questionnaire

Compared to other wards, neonatal care needs a lot of medical equipment for specialized care. However, user training of medical equipment for staff is insufficient as the consultant mentioned. For example, 1 infant incubator was broken soon after destitution because nurses misoperated the incubator and set up its temperature. The consultant reported that user training for new equipment needs to be not only for medical doctors but also nurses who are main users of medical equipment at the ward.

There are many transferred cases from other hospitals surrounding Myitkyina General Hospital. In fact, it is difficult for some patients to be referred to tertiary hospitals in Mandaly because of geographic and economic burden. Thus it is crucial that basic medical equipment need to be equipped and this hospital needs to be strengthened hospital function to provide and conclude complementary services.

Major causes of morbidity of neonatal inpatient and outpatient are neonatal sepsis, neonatal asphyxia, neonatal jaundice and low birth weight.

There is a need for not only provision of medical equipment in the pediatric ward and neonatal unit but also conducting proper user training and improvement of cleanliness of neonatal unit.

(5) Referral system

1) Referral to tertiary hospitals

At the surgical ward, head injury patients were transferred to the Mandalay and Yangon General Hospital where consultants of neurosurgery are assigned. These patients were transferred after the primary treatment. The consultant transfers patients who were not in emergency and willing to be operated by laparoscopic surgery. There are some patients who have social problems (e.g. family lives in Yangon) and they are also transferred to the tertiary hospital.

At pediatrics ward, the consultant transfers cases of congenital diseases, hydrocephalus, central nervous system disorder, encephalopathy cases to the Yangon or Mandalay children's Hospital for further examination and treatment. Cardiac patients are transferred to cardiac surgery or cardiology ward at the Yankin Children Hospital in Yangon.

Regarding to tumor patients who need radiotherapy, they are transferred to the Sao San Tun Hospital once a month. The patient who needed an operation for obstetrics fistula was transferred to the urology at the Mandalay General Hospital. These cases traveled to Mandalay by train with her family members. The patient who needs a spinal cord operation was transferred to Mandalay because the Myitkyina General Hospital does not have C-armed type x-ray device for its inspection.

2) Referral from lower hospital

Major cases received from neighboring township hospitals were perforation, chest injury that needs puncture drainage, neonatal jaundice, neonatal septicemia, birth asphyxia, low birth weight, serious dengue hemorrhage fever, and central nervous system disorder. There is no pediatrician appointed in a small hospital and therefore there are 10 to 15 referral cases to this hospital. For obstetrics cases, this hospital has received approximately 50 cases per month.

(6) Challenge for buildings and facilities

1) Situation of the entire facility

In general, the survey team observed that many old buildings were deteriorated and the pillars of brick masonry buildings are solid. However, some explosion of concrete are observed on the beams and reinforcing bars of floor, and it was caused by a corrosion of the concrete. The survey team also found that incline of the ramps is very steeps and the different floor levels between buildings.

It is considerable for extension of new buildings because there is "Wadi[7]" in the hospital compound. The hospital does not have any document that indicates the construction year of all buildings.

In the general condition of inside of the buildings, staff mentioned that the beds are all occupied by a lot of inpatients. However, at the time of the survey, the survey team observed not much congestion at wards because of seasonal variation in the dry season. In the rainy season, the number of patients is increased; and therefore some inpatients are placed on the corridor.

[7] Wadi is a channel that is dry except in the rainy season.

2) Obstetrics and Gynecological ward, and Pediatric Ward

The survey team observed that the corrosion of rebar of pillars and beams due to a rain leakage, and therefore the concrete need to be repaired immediately. Additionally, there are many parts of exposed rebar due to insufficient depth of concrete to cover the reinforcing bars of floor.

3) Challenge of building structure

The survey team observed that the brick masonry buildings have large scale pillars (1000mm×600mm) and are solid. However, molds caused by the rain leakage are observed on the pillars and the beams at the expansion joint between buildings.

4-17. Bamaw General Hospital (Kachin State) (for reference)

Bamaw General Hospital is located in Bamaw district, southern part of Kachin State. The hospital is located 200 kilometers away from the Myitkyina General Hospital and it takes 2.5 to 3 hours by car. Ob and Gyn ward was built by grass roots grant aid of the government of Japan in 2014. CT scan room was built by the Ministry of Health. The survey team indicated information for the hospital as below. Annual report of Bamaw General Hospital was given by the department of health, Kachin State.

(1) Health Workers

There are 1 Medical Superintendent, 1 deputy Medical Superintendent, 12 Consultants, 28 Assistant surgeons, 2 Dentist , 1 Matron, 132 Nurses , 27 Assistants and 30 Clerks.

(2) Hospital Statistics

1) Hospital Indicators

Table 4-17-1 Hospital indicators in Bamaw General Hospital

Indicators	2011	2012	2013
Average number of outpatients per day	6.9	18.4	47.3
Average number of inpatients per day	71.8	76.9	80
Average duration of stay (in days)	6.1	5.1	4.0
Bed Occupancy rate (%) (Based on available bed)	34.9	38.4	40
Average turnover of bed	21.8	27	29.5
Average turnover interval (in day)	9.2	8.2	7.4
Death rate(per 1000 patients)	27	35	32

Source: Bamaw General Hospital Annual Report 2013

Table 4-17-2 Number of patients for each ward in Bema General Hospital

Wards	2011	2012	2013
Surgery	1,145	1,270	1,301
Medical care	1,264	1,690	1,582
Orthopedics	454	466	445
Ob and Gyn	426	504	645
Pediatrics	1,117	1,706	1,565
Ophthalmology	15	166	154
Psychiatry	13	10	12
Otolaryngology;	0	16	34
Outpatient	4,354	6,859	10,631
Dentistry	879	846	902
Physiotherapy	0	86	48

Source: Bamaw General Hospital Annual Report 2013

2) Major cause of Morbidity and Mortality

Table 4-17-3 Major causes of morbidity in Bamaw General Hospital

	2011		2012		2013	
1	Malaria	417	Malaria	403	Acute respiratory infection	337
2	Traffic accident	384	Traffic injury	392	Traffic accident	322
3	Other injury	237	Gastroenteritis (diarrhea)	295	Malaria	248
4	Acute respiratory infection	226	Other injury	264	Gastroenteritis(diarrhea)	231
5	HIV infection	216	Acute respiratory infection	217	HIV infection	225

Source: Bamaw General Hospital Annual Report 2013

Table 4-17-4 Major causes of mortality in Bamaw General Hospital

	2011		2012		2013	
1	HIV/ AIDS	14	HIV/ AIDS	29	HIV/ AIDS	46
2	Congestive heart failure	7	Traffic accident	13	Traffic accident	16
3	Malaria	6	Congestive heart failure	10	Cirrhosis of the liver	9
4	Cirrhosis of the liver	5	Malaria	10	Cerebrovascular disease	9
5	Traffic injury	3	Cirrhosis of the liver	6	Congestive heart failure	8

Source: Bamaw General Hospital Annual Report 2013

Table 4-17-5 Number of operations in Bamaw General Hospital

	2011			2012			2013		
	Major	Minor	Total	Major	Minor	Total	Major	Minor	Total
Surgery	187	178	365	266	128	394	282	160	442
Orthopedics	77	197	274	123	175	298	96	196	292
Ob and gym	112	44	156	144	34	178	241	21	262
Ophthalmology	0	0	0	176	32	208	153	138	291
Otolaryngology	0	0	0	10	12	22	25	21	46
Total	376	419	795	719	381	1,100	797	536	1,333

Source: Bamaw General Hospital Annual Report 2013

4-18. Outline of hospitals visited to confirm referral system

4-18-1. Sao San Tun Hospital (Shan State-South)

Sao San Tun Hospital (Shan State South)
Established in 1961

(The photo shows the Main building.)

Elevator constructed in 1961 and still properly working in the main building

(Photos taken on 4th February 2015)

4-18-1. Outline of Sao San Tun Hospital

(1) Number of beds

Number of sanctioned beds: 200, Number of available beds: 300

(2) Health worker

There are 1 Medical Superintendent, 6 Senior consultants and 10 Junior consultants (sanctioned number is 18 and 24 respectively), 63 Assistant surgeons (sanctioned number is 68), 2 Dentists (sanctioned number is 2), 1 Matron (sanctioned number is 1), 101 Nurses (sanctioned number is 183), 8 Nurse aids (sanctioned number is 12) and 368 staff in total (sanctioned number for all staff is 600).

(3) Medical service Departments

Following departments are available: medical care, surgery, orthopedics, radiotherapy, psychiatry, physiotherapy, dentist, specialized outpatients department, radiology (CT scan, X-ray, and ultrasonography) and clinical laboratory department.

(4) Buildings and infrastructure

1) Buildings

Main structure: Reinforced concrete and Brickwork
Roof structure: Wood

a. Building 1 (1961) Reinforced concrete, One story building
Outpatient Department

b. Building 2 (1961) Reinforced concrete, Three stories building,
G: Administration section, 1st F: Operation Theatre, 2nd F: Otolaryngology ward

c. Building 3 (1961) Reinforced concrete, Two stories building,
G: Surgical and Orthopedic ward(Male), F: Surgical and Orthopedic ward (Female)

d. Building 4 (1961) Reinforced concrete, Two stories building,
G: Medical Care ward (Male), F: Medical Care ward (Female)

e. Building 5 (2014) Reinforced concrete, One story building
Infectious diseases control unit

f. Building 6 (1975) Reinforced concrete, One story building
Treatment center for drug abuse

g. Building 7 (Under construction) Reinforced concrete, One story building
Department of Radiology (CT scan room, MRI room, X-ray room)

h. Building 8 (Under construction) Reinforced concrete, One story building
Linear accelerator room
Boiler Building, Electrical equipment building, Pumping room, Residence for Staff

2) Infrastructure

a. Electricity
The suspension of the electric power supply occurs sometimes.
There is 1 generator (35kVA) in the hospital.

b. Water supply
Public water supply and tube well are available.
4 wells and elevated water tank are equipped in the hospital compound.

c. Sewage system
All sewage including medical sewage are collected to the sewage tank and discharged into the public sewage piping system using the septic tank with a filtering system.
The sludge disposal is operated every 10-15years by public service and it is paid by the hospital.

d. Communication
4 telephone lines are fixed and telephone network for mobile phone is available.
Internet connection is available in the hospital.

(5) Hospital Statistics

1) Indicators of Hospital Services

Table 4-18-1 Hospital indicators of Sao San Tun Hospital (2014)

Indicator	Number of patients
Total number of outpatients	46,698
Total number of inpatients	12,157
Total number of discharge	11,706
Total number of death	317
Total patient days	66,822
Average number of outpatients per day	174
Average number of inpatients per day	183
Average duration of stay (in day)	6
Bed occupancy rate(%)(Based on available bed)	50.83
Bed occupancy rate(%)(Based on sanctioned bed)	91.5
Average turnover rate of patients per bed (per year)	40
Average turnover interval (in day)	5
Death rate (per 1,000 patients)	26

Source: Sao San Tun Hospital Profile

Table 4-18-2 Number of operations in Sao San Tun Hospital

	2010	2011	2012	2013	2014
Major	883	937	1,078	1,185	1,532
Minor	1,871	1,754	1,843	1,959	2,244
Total	2,754	2,691	2,921	3,144	3,776

Source: Sao San Tun Hospital Health Profile 2014

2) Major causes of Morbidity and Mortality

Table 4-18-3 Major causes of morbidity and mortality in Sao San Tun Hospital(2014)

Morbidity		No.of patients	Mortality		No.of patients
1	Heart diseases	284	1	High blood pressure	33
2	High blood pressure	257	2	Heart diseases	18
3	Alcohol dependency	167	3	Liver cancer	17
4	Tuberculosis	157	4	Malaria	14
5	Liver cancer	153	5	Tuberculosis	12
6	Viral hepatitis	131	6	HIV/AIDS	10
7	Diabetes	124	7	Alcohol dependency	10
8	Malaria	97	8	Diabetes	9
9	HIV/AIDS	96	9	Viral hepatitis	8
10	Mental disorder	34	10	-	-

Source: Sao San Tun Hospital Health Profile 2014

(6) Situations of Medical Service Departments

1) Radiology department and clinical laboratory department

At the radiology department, there are 1 consultant of radiology and 3 technical staff who have a bachelor of medical technology, and 2 technical staff. The department has 1,200 to 1,500 examinations per year. 80 % of examinations are taken for chest. The radiologist conducts an

ultrasonography for 15 to 40 per day. CT scan room has been under construction and patients who need CT scan have to transfer private hospitals for a fee.

At clinical laboratory department, the examinations for chemical biology, hematology, pathology, and microbiology are available. Blood Bank is also attached to the clinical laboratory department and it opens for 24 hours.

2) Surgical ward

There are 2 consultants and 7 surgeons appointed at the ward. There were 52 patients required hospitalization with 70 sanctioned beds at the time of survey.

There are multiple rooms such as 2 isolation beds for tetanus, 2 beds for HCU for post-operative patient, 2 beds for neonates and 18 pay rooms. Major causes of morbidity are abdominal hemorrhage and appendicitis. There are 114 to 175 operation cases per month performed and major operations performed in 2014 were, for examples, for herniotomy, excision of enteron, omentoplasty and appendectomy.

There are pulse oximeters, oxygen concentrators and ECGs at the ward but the ward needs provision of a patient monitor and a defibrillator, an infusion pump and syringe pump for caring post-operative patient.

3) Orthopedic ward

There were 54 patients required hospitalization with 65 sanctioned beds. The building of ward was independent and has own operation theatre with 2 operation rooms. There are 2 consultants of orthopedics and 6 assistant surgeons and additionally one anesthesiologist are assigned at the operation theatre.

According to the consultant, major causes of admission are lower limbs open fracture due to traffic accidents and downfall, necrosis due to diabetes and osteosarcoma. He reported that the ward has 3 to 4 operations cases per day.

4) Radiotherapy Department

There are a few public hospitals that can provide radiotherapy in Myanmar and it is only available at Sao San Tun Hospital and Mandalay General Hospital in Upper Myanmar. Comparing to other hospitals in Yangon or Mandalay, the hospital has a short waiting list for radiotherapy and it takes about one month for new patients to receive treatment. Therefore, patients visit this hospital from all over the country for radiotherapy.

The average number of outpatients for radiotherapy is 50 per day. There are 40 hospitalization required with 20 sanctioned beds and therefore the ward was so crowded at the time of the

survey. Gamma knife and superficial radiotherapy are available at the moment. The device for brachytherapy was provided by CMSD in 2015, however, the device has been unused at the time of the survey because of no construction of specialized examination room. According to the senior consultant, she is willing to establish day-care center for chemotherapy and it will result in reduction of inpatients for chemotherapy and receiving more patients for radiotherapy at the ward effectively because the number of cancer patients who need the radiotherapy have been increased.

As Table 4-18-4 shows, most of the patients were occupied by cervical cancer patients and the following were oral mucosal diseases and then head and neck cancer patients who need to be treated by the Gamma knife.

Table 4-18-4 The number of patients who need radiotherapy in Sao San Tun Hospital (2014)

		Total	Male	Female
1	Cereal cancer	226	-	226
2	Oral mucosal diseases	147	94	53
3	Head and neck neoplasm	143	98	45
4	Gynecological cancer (Except for cereal cancer)	94	11	83
5	Breast cancer	64	-	64
6	Digestive organ cancer (Except for colon and rectum)	49	20	29
7	Lung cancer	47	34	13
8	Uropathy	33	16	17
9	Other cancers	24	9	15
10	Colorectal cancer or rectal cancer	17	9	8

Source: Sao San Tun Hospital Health Profile 2014

(7) Referral system

Serious cases (head injury, thoracic abdominal part injury) are transferred to the Yangon or Mandalay General Hospital after they take CT scans. Approximately ten cases are transferred monthly.

Referral cases transferred from the Loilem General Hospital is a few. There are referred cases such as peritonitis, perforation, injury, intestinal inflammation from Anba SH, Loilem GH, Monle SH and Hobo TSH.

(8) Challenges of buildings and facilities

The buildings constructed by the Soviet Union are solid and properly maintained. For example, the hospital has repainted the buildings every two years. Moreover, the survey team did not observe the rain leakage and the cracks.

However, there was the rain leakage observed in the new building for psychiatric ward constructed by the Ministry of Health. It is not convenient for patients to access hospital facilities because each ward/department is scattered.

The beds of surgical ward were fully occupied by many inpatients and conversely there were some empty beds with a few patients at medical ward. There is an inequity of the number of inpatients among the wards. The slopes between the buildings have been inclination smoothly.

4-18-2. Mandalay General Hospital (Mandalay region)

Mandalay General Hospital (Mandalay Region)
Established in 1925
(The photo shows the department of hematology and pulmonary medicine)

Operation Theatre
for Emergency Outpatient Department

(Photos taken on 13th February 2015)

4-18-2. Outline of Mandalay General Hospital

(1) Number of beds

Number of sanctioned beds: 1000, Number of available beds: 1350

(2) Medical service Departments

The following departments are available: medical care, surgery, traumatology, maxillofacial plastic surgery, oncology (radiotherapy), cardiology, cardio surgery, thoracic internal, thoracic surgery, neurosurgery, nephrology, nephrology surgery, gastroenterology, hematology, rehabilitation/physiotherapy, dermatology, hematology, radiology, nuclear medicine department, anesthesiology, density, nutrition and preparing medicine department and leprosy department

(3) Health Workers

Sanctioned number of health workers in Mandalay General Hospital is shown on Table 4-18-5, however, the survey team could not confirm the current number of health workers.

Table 4-18-5 Sanctioned number of health workers in the Mandalay General Hospital

	Sanctioned number
Medical doctors including consultants	289
Office worker	23
Nurse	825
Nurse aid	37
Technician	138
Clerk	83
Machinery technician	419
Staff for electrical engineer department	15
Staff for water and sanitation section	45
Total	1,892

(4) Facilities

a. Electricity

Electric power supply: The suspension of the electric power supply occurs sometimes. There are 7 transformers (1 for 750kVA、3 for 500kVA×3 and the other 3 for 315kVA) in the hospital.

Generator: There are more than 7 generators operated. Principal generators are 2 for 250kVA, 3 for 200kVA and the other one for 35kVA. They are operated every week for maintenance.

b. Water supply

Public water supply is available in hourly program. There are 10 deep wells (850feet~450feet) in the hospital compound.

Water supplied by public and 2 wells is stored inside of underground reservoir. Then, water is pumped up by booster pumps and stored in the elevated water tank.

Water quality examination is carried out at the National Laboratory in Mandalay every year.

c. Sewage system

The effluent of sewage is discharged into the piping of public sewage system through the septic tank. The medical (infectious) sewage drained from the operation theatre and laboratory is treated by the equipment for a treatment system before discharging into the pipes of public sewage system. Hospital staff carries out the sludge disposal from septic tank.

d. Communication

15 telephone lines are fixed and telephone network for mobile phone is available. Internet connection is available even in the hospitalization room.

(5) Health Statistics

1) Hospital Indicators

Table 4-18-6 Hospital indicators of Mandalay General Hospital

Indicators	2010	2011	2012	2013	2014
Total number of outpatient	125,560	132,109	140,783	170,285	196,766
Average number of outpatient per day	515.6	508.7	581.7	697.9	806.4
Total number of inpatient	38,526	41,758	47,084	52,776	55,099
Average number of admission per day	105.6	114.4	128.6	144.6	150.9
Average number of inpatient per day	874.3	835.8	910.6	1,058.9	1,057.3
Bed occupancy rate (%) (Based on sanctioned bed)	109.3	104.5	91.9	105.9	105.7
Average duration of stay (day)	8.3	7.3	7.1	7.4	7.0
Average turnover interval (in days)	31.5	33.9	38.4	42.5	40.7
Death rate(per 1000 patients)	24.1	25.3	3.8	26.7	25.7

Source: 1000 bedded Mandalay General Hospital Health Profile2015

2) Morbidity and Mortality

The reason why many malignant tumor patients visit is that radiotherapy is available in the Mandalay General Hospital. In same reason, the hospital has snakebite patients because of availability of an artificial hemodialysis treatment.

Table 4-18-7 Major causes of morbidity in the Mandalay General Hospital (2014)

Order	Diseases	Number of patients	Percentage of patients (%)
1	Injury (head,face,ear,nose,forehead,mouth)	2,440	4.56
2	Cirrhosis of the liver	1,536	2.87
3	Breast cancer	1,107	2.07
4	Injury (abdomen, chest, haunch)	938	1.75
5	Acute appendicitis	925	1.72
6	Lung cancer/Bronchial cancer	880	1.64
7	Snake bite	822	1.54
8	Congestive heart failure/Insufficiency of right heart	808	1.51
9	HIV /AIDS	702	1.31
10	Colitis/ Diarrhea / Dysentery. / Gastroenteritis /Ileitis	684	1.28

Source: 1,000 bedded Mandalay General Hospital Health Profile 2015

Table 4-18-8 Major causes of mortality in the Mandalay General Hospital (2014)

Order	Disease	Number of patients	Percentage of patients (%)
1	Cerebral contusion	301	21.24
2	Traumatic subdural bleeding	188	13.26
3	Epidural hematoma	98	6.91
4	Cirrhosis of the liver	62	4.27
5	Cerebrovascular disease	41	2.89

Source: 1,000 bedded Mandalay General Hospital Health Profile 2015

Table 4-18-9 Number of inpatient and outpatient in each ward/department in the Mandalay General Hospital (2014)

Order	Department	Number of inpatient	Number of outpatient
1	**Internal medicine**	**15,425**	**13,385**
2	**Surgery**	**11,438**	**8,962**
3	**Traumatology**	**7,014**	**15,213**
4	**Neurosurgery**	**4,989**	**12,462**
5	**Radiotherapy**	**4,018**	**16,387**
6	Cardiology	2,512	7,075
7	Gastroenterology	1,739	6,314
8	Hematology	1,340	1,587
9	Urologic surgery	1,254	6,137
10	Pulmonary medicine	927	2,963

Source: 1,000 bedded Mandalay General Hospital Health Profile 2015

Table 4-18-10 Number of operation cases in the Mandalay General Hospital (2014)

Order	Department	Number of operation
1	**Traumatology**	**5,085**
2	**Maxillofacial plastic surgery**	**3,794**
3	**Emergency Medical Center**	**3,068**
4	**Surgery**	**2,961**
5	**Urologic Surgery**	**2,448**
6	**Neurosurgery**	**1,033**
7	Thoracic surgery	550
8	Cardiac Surgery	415
9	Radiotherapy	182
10	Dentistry	146
	Total number of operation	19,682

Source: 1,000 bedded Mandalay General Hospital Health Profile 2015

(6) Situation of Medical Service Departments

There are cardiac catheter, pathology examinations, CT scan and MRI examination available at the radiology department and clinical laboratory department.

Hemodialysis room is situated in the new 9-story building. There are 11 hemo dialyzers operated for 18 patients per day and were 160 patients monthly last year.

There are 2 Cobalt 64 radiation apparatus and 1 linear accelerator available at the radiology department. Additionally, another 2 linear accelerators are planned to be installed. The equipment for brachytherapy has been supplied by CMSD, however, the specialized room for it has not been constructed yet.

(7) Challenges of hospital

1) Challenge of buildings and facilities

a. Situation of the entire facility

There are 2 brick masonry buildings constructed in 1925. The survey team observed thickness of the wall is 400mm and some cracks on the wall, which is not crucial. However, a single part of exposed reinforcing bars of the floor is observed.

Regarding to medical care ward, the building is planned to be transfered to new building and the other ward will be transferred to the space of the current medical ward after renovation. The building is properly maintained and a rain leakage is not observed.

b. Congestion in the ward

There are many patients and congestion at the medical and surgical wards and therefore some beds are placed in the corridor.

2) Other challenges

There is a workshop for biomedicine, however, no biomedical engineer is assigned in the hospital to maintain and repair medical equipments. Staff always faces a difficulty in maintenance of medical equipment.

Appendix 5
Questionnaires

Please fill out ✔mark in the if applicable, fill out proper data in the blanks of the tables and describe your situation and/or procedure in the space of Questionnaire

Appendix 5 Questionnaires

Questionnaire on Data collection survey for State/

Region General Hospitals over 200 beds in Republic of the Union of Myanmar

Date: September 2014

Due Date: 13th September 2014

State・Region Hospital

Name of Reporter :	**Position :**
Mobile Phone No. :	**E-Mail Address :**
Name of Director :	**Mobile Phone No. :**
E-Mail Address :	
Name of Chief Engineer :	**Mobile Phone No. :**
E-Mail Address :	

1. General information of the hospital

(1) Name of Hospital (in Block letters):_____

(2) Address:_____

(3) Year of Establishment:_____ Construction Year: _____

(4) Site area:_____ m^2

(5) Design Drawings of the Entire Facility: ☐Exist ☐Partially Exist ☐Not Exist

(6) Urban/Rural: ☐Urban ☐Rural

(7) Target Population _____People

(8) Number of Townships _____Townships

(9) Distance to Top referral Hospital (✔) _____km or _____min・
Hrs by car To ( ) Hospital in □ Nay Pi Taw □ Yangon □ Mandalay □ other ( )

(10) Medical Services that are offered and are available in your Hospital (✔):

- □ Internal Medicine □ Surgery □ Obstetrics and Gynecology □ Pediatrics
- □ Orthopedics □ Neurosurgery □ Ophthalmology □ ENT(Otolaryngology)
- □ Emergency Department Blood transfusion service □ Dental Clinic
- □ EPI □ ANC □ PMTCT (HIV) □ HIV and STIs treatment □ TB diagnosis and treatment □ Family Planning □ others _____

Please fill out ✔mark in the if applicable, fill out proper data in the blanks of the tables and describe your situation and/or procedure in the space of Questionnaire

2. Installation

Please fill the following table.

Department	IF Exist Check ✔	Questions	✔	Answers
OPD		Insufficient points		□No. of Room □Small space □Other ( )
		NUMBER of **OPD room**		
		Inconvenience		□Water leakage □Mold
Surgery		Insufficient points		□No. of Room □Small space □Other ( )
		NUMBER of **Operating room**		
		Inconvenience		□Water leakage □Mold
Obstetrics and Gynecology		Insufficient points		□No. of Room □Small space □Other ( )
		NUMBER of **Delivery room**		
		Inconvenience		□Water leakage □Mold
Internal Medicine		Insufficient points		□No. of Room □Small space □Other ( )
		Inconvenience		□Water leakage □Mold
Pediatrics		Insufficient points		□No. of Room □Small space □Other ( )
		Inconvenience		□Water leakage □Mold
Orthopedics		Insufficient points		□No. of Room □Small space □Other ( )
		Inconvenience		□Water leakage □Mold
Neurosurgery		Insufficient points		□No. of Room □Small space □Other ( )
		Inconvenience		□Water leakage □Mold
Ophthalmology		Insufficient points		□No. of Room □Small space □Other ( )
		Inconvenience		□Water leakage □Mold
ENT (Otolaryngology)		Insufficient points		□No. of Room □Small space □Other ( )
		Inconvenience		□Water leakage □Mold
Emergency Department		Insufficient points		□No. of Room □Small space □Other ( )
		Inconvenience		□Water leakage □Mold
Blood Transfusion Service		Insufficient points		□No. of Room □Small space □Other ( )
		Inconvenience		□Water leakage □Mold
Dental Clinic		Insufficient points		□No. of Room □Small space □Other ( )
		Inconvenience		□Water leakage □Mold

Please fill out ✔mark in the if applicable, fill out proper data in the blanks of the tables and describe your situation and/or procedure in the space of Questionnaire

(1) Site condition

1) Land space for additional space in the premises □Yes □No

2) Drainage of rain water: □Good □Problem

3) Access to hospital

→ Type of Access road: □Asphalt pavement □Gravel road □Without pavement

→ Condition of access: □Possible in yearlong
□Difficulty of Vehicle in rainy season→ □Block up road
□Other (Specify) _____

(2) Situation of the infrastructure of the entire facility

1) Person in charge of facility maintenance:
Engineer: □Appointed □Not Appointed
Technician: □Appointed □Not Appointed

2) Electricity

i) Source of Electricity: Multiple answers are possible.
□ Government □ Generator in hospital □Other ( )

ii) Frequency of Power failure by government sources:
□Everyday □3or4 times a week □1or2 times a week □almost no

iii) Exist of Generator □Yes □No

→ Type of generator: □Diesel fuel generator □Heavy fuel oil generator
□Other (Specify)_____

→ Number of generator:_____Unit(s) Capacity:_____kVA ~_____kVA

→ Frequency of utilization: □Everyday □3or4 times a week □1or2 times a week
□almost no

3) Water supply

What types of water supply are available? Multiple answers are possible.

- Water source: □Public Water System □Well □Tube well □Others ( )
- Suspension of Water Supply: □Exist →□Everyday □3or4 times a week
□1or2 times a week □almost no □Not Exist

4) Sewage

□Exist of Public sewage → Medical sewage separated
□Exist of septic tank → Medical sewage separated

Please fill out ✔mark in the if applicable, fill out proper data in the blanks of the tables and describe your situation and/or procedure in the space of Questionnaire

3. Medical Devices (E.g.: CT scanner, X-Ray, Ultrasound, etc.)

(1) Provide, if available, device inventory of existing medical device in your hospital.

(2) Maintenance of Medical devices

1) Name of department in charge of maintenance of medical device

2) Qualification of technical staff and each number of qualified technical staff

3) If available, please provide us a list of medical devices agents/dealers with contract.

4. Financial information and Support plan

(1) Revenue of your facility/hospital in past five years. (unit =)

Income	2009	2010	2011	2012	2013
From government					
Cost shared by patients					
Donation ( )					
Others ( )					
Total					

(2) Approved Plan

If you have any approved plan to reconstruct building and/or procure Medical Device in the near future, fill in the table below.

Year	the contents	Estimate amount (US$/)

Please fill out ✔mark in the if applicable, fill out proper data in the blanks of the tables and describe your situation and/or procedure in the space of Questionnaire

5. Number of the staff

Classification	Total No. of Sanction	Total No. of Available	Note
Medical Doctor (General)			
Consultants Surgery Pediatrics Obstet. and Gyn. Neurosurgery Orthopedics Dentist Others	....	....	
Sister Nurse			
Staff Nurse			
Trained Nurse			
Midwife			
Laboratory Technician			
Pharmacist			
Engineer (Civil and Architectural Engineer)			
Biomedical Engineer			
Physiotherapist			
Administrator			
Driver of Ambulance			
Others			
Total			

Please fill out ✔mark in the if applicable, fill out proper data in the blanks of the tables and describe your situation and/or procedure in the space of Questionnaire

6. Health Indicators

(1) Could you provide us the Health Profile from 2010 to 2013?

(2) If you cannot provide us the Health Profile, Please fill out following blank

	2009	2010	2011	2012	2013
No. of in-patient					
No of Pediatric inpatient					
No. of Maternity ward inpatient					
No. of Normal delivery					
No. of Cesarean Operation					
No. of Eclampsia,					
No. of Premature labor					
No. of Abortion					
No. of Still birth					
No. of Maternal death					
No. of Surgical Operation					
Bed occupancy rate (Sanctioned Bed)					
Bed occupancy rate (Available Bed)					
Average stay in hospital					
Total No. of out-patient					
Hospital Death rate (Mortality rate)					
No. of death (under 1 year old)					
No. of death (under 5 years old)					

(3) Health Indicators, not included in Health profile

1) Major diseases and number of in-patient

(If the data in 2013 is not available, please give us the data in 2012).

No.	Name of diseases (in-patient)	No. of Patients
1		
2		
3		
4		
5		

2) Major diseases and number of out-patient

No.	Name of diseases (out-patient)	No. of Patients
1		
2		
3		
4		
5		

Please fill out ✔mark in the if applicable, fill out proper data in the blanks of the tables and describe your situation and/or procedure in the space of Questionnaire

3) Major cause of mortality in your hospital in 2013

No.	Name of diseases	No. of Patients
1		
2		
3		
4		
5		

4) Number of Clinical Examination implemented in last five years

Types of Investigation	Number of device	2009	2010	2011	2012	2013
CT inspection						
X-ray inspection						
ECG examination						
Ultrasonography Fetal Ultrasonic cardiography FAST[*1]						
Endoscopy						

* 1 Focused Assessment with Sonography for Trauma Focused Assessment with Sonography for Trauma

Please fill out ✔mark in the if applicable, fill out proper data in the blanks of the tables and describe your situation and/or procedure in the space of Questionnaire

7. Referral System

Major disease of patients referred to your hospital from other hospital and referred from your hospital to the Top referral hospital If it is difficult to fill name of disease, please describe on following categories; LCCS, Severe Injury, Neonatal Diseases and other diseases.

	Major disease of patients **referred to your hospital** from other facilities/ hospital		Major disease of patients **referred from your hospital** to the top referral hospital	
No.	Name of diseases (2009)	No. of Patients	Name of diseases (2009)	No. of Patients
1				
2				
3				
4				
5				
No.	Name of diseases (2010)	No. of Patients	Name of diseases (2010)	No. of Patients
1				
2				
3				
4				
5				
No.	Name of diseases (2011)	No. of Patients	Name of diseases (2011)	No. of Patients
1				
2				
3				
4				
5				
No.	Name of diseases (2012)	No. of Patients	Name of diseases (2012)	No. of Patients
1				
2				
3				
4				
5				
No.	Name of diseases (2013)	No. of Patients	Name of diseases (2013)	No. of Patients
1				
2				
3				
4				
5				

Please fill out ✔mark in the if applicable, fill out proper data in the blanks of the tables and describe your situation and/or procedure in the space of Questionnaire

8. <u>Medical Waste Management</u>

(1) Do you use Safety box for disposal of needles and/or sharps?

1. Yes 2. No

(2) Do you have Incinerator (Incineration system) for disposal of infectious waste in your hospital?

1. Yes 2. No

If Yes, How often use the Incinerator for disposition of medical waste?

_____Times/ Week

If no, please explain how to disposal of medical waste and infectious waste in your hospital.

(3) Do you have a Warehouse for keeping and isolating of medical waste from the other waste in your hospital?

1. Yes 2. No

If No, Please explain how you keep medical waste and/or infectious waste in your hospital.

Thank you for your cooperation

Appendix 6
Results of Questionnaires

Appendix 6 Results of Questionnaires

Table1: Answer to questions about general information for each hospital

State/Region	Name of Hospital	Field survey	Grant Aid	Year of Establishment	Year of Construction	Site Area (Acre)	Drawings	Urban/ Rural	Target Population	No. of Township
Sagaing Region	Sagaing General Hospital	×	×	1956	1955-562007	12.359	partially available	Urban	295,664	-
Ayeyarwaddy Region	Phyapon General Hospital	×	×	1905	-	16.47 (66,642m^2)	-	Urban	322,361	4
	Pathein General Hospital	○	×	1885	196219821990	14.539	no	Urban	-	-
Magway Region	Minbu General Hospital	×	×	-	1949	7.474	-	Urban	174,610	5
	Pakokku General Hospital	×	×	-	1955	9.65	-	Urban	300,689	5
	Magway General Hospital	○	×	1964	May-05	94619.54m2	no	Urban	1,418,466	6
Mandalay Region	Pyinmana General Hospital	×	×	-	1993	8.88 (35,936m^2)	-	Urban	159,663	1
Tanintharyi Region	Dawei General Hospital	○	×	1918	1938	12.328	-	Urban	524,869	4
	Myeik General Hospital	○	×	2003	1999	19.8	Partially available	Urban	267,578	-
Kayah State	Loikaw General Hospital	×	○	150 years ago	-	11731.09km^2	Partially available	Urban	277,428	7
Mon State	Mawlamyaing General Hospital	○	×	1924	-	25.89	partially available	-	2,000,000	12

Table 2: Answer to questions about available medical services

State/Region	Name of Hospital	Hospital department / service (○ available, × unavailable)																	
		Medical care	Surgery	Ob and Gyn	Pediatrics	Orthopedics	Neurosurgery	Ophthalmology	Otolaryngology	Emergency	Blood Bank	Dental	EPI	ANC	PMTCT	HIV/ STIs	TB	FP	Others
Sagaing Region	Sagaing General Hospital	○	○	○	○	○	×	○	○	○	○	○	○	○	○	○	○	○	
Ayeyarwaddy Region	Phyapon General Hospital	○	○	○	○	○	×	×	×	×	×	○	○	○	○	○	○	○	Leprosy disease Malaria
	Pathein General Hospital	○	○	○	○	○	×	○	×	○	○	○	○	○	○	○	○	○	
Magway Region	Minbu General Hospital	○	○	○	○	○	×	○	○	○	○	○	○	○	○	○	○	○	
	Pakokku General Hospital	○	○	○	○	○	×	○	○	○	○	○	○	○	○	○	○	○	
	Magway General Hospital	○	○	○	○	○	×	○	○	○	○	○	○	○	○	○	○	○	Rehabilitation, Dialys is, Forensic medicine
Mandalay Region	Pyinmana General Hospital	○	○	○	○	○	×	○	○	○	○	○	○	○	○	○	○	○	
Tanintharyi Region	Dawei General Hospital	○	○	○	○	○	×	○	○	○	○	○	○	○	○	○	○	○	
	Myeik General Hospital	○	○	○	○	○	×	○	○	○	○	○	○	○	○	○	○	○	
Kayah State	Loikaw General Hospital	○	○	○	○	○	×	○	×	○	○	○	○	○	○	○	○	○	
Mon State	Mawlamyaing General Hospital	○	○	○	○	○	×	○	○	○	○	○	○	○	○	○	○	○	

Table 3: Answer to questions about annual revenue and expenditure of each hospital

(1) 2009 Unit: MMK

State/Region	Name of hospital	revenue				
		Governmental budget	Cost sharing	Donation	Others	Total
Sagaing Region	Sagaing General Hospital	151,769,300	3,230,736	-	-	-
Ayeyarwaddy Region	Phyapon General Hospital	2,059,759,000	158,300	-	-	-
	Pathein General Hospital	-	7,573,700	-	-	-
Magway Region	Minbu General Hospital	-				
	Pakokku General Hospital	-	2,563,700	1,362,000	87,971,130	-
	Magway General Hospital	-	-	0	-	-
Mandalay Region	Pyinmana General Hospital	185,872,390	8,731,035	520,000	6,117,900	201,241,325
Tanintharyi Region	Dawei General Hospital	140,867,093	15,574,220	-	-	-
	Myeik General Hospital	116,430,000	15,210,000	7,800,000	-	-
Kayah State	Loikaw General Hospital	129,224,090	7,443,150	100,000	2,300,000	139,067,240
Mon State	Mawlamyaing General Hospital	275,155,000	21,035,000	1	-	296,798,000

(2) 2010 Unit: MMK

State/Region	Name of hospital	revenue				
		Governmental budget	Cost sharing	Donation	Others	Total
Sagaing Region	Sagaing General Hospital	207,421,550	3,658,649	-	-	-
Ayeyarwaddy Region	Phyapon General Hospital	213,451,800	2,093,500	-	-	-
	Pathein General Hospital	-	8,328,500	-	-	-
Magway Region	Minbu General Hospital	N.A				
	Pakokku General Hospital	-	2,450,200	30,648,000	21,061,398	-
	Magway General Hospital	-	-	-	-	-
Mandalay Region	Pyinmana General Hospital	252,088,850	18,455,268	580,600	5,280,498	276,405,216
Tanintharyi Region	Dawei General Hospital	187,086,145	17,570,320	-	-	-
	Myeik General Hospital	131,090,000	4,700,000	6,400,000	-	-
Kayah State	Loikaw General Hospital	136,961,310	3,319,790	1,000,000	2,505,000	143,786,100
Mon State	Mawlamyaing General Hospital	278,874,000	33,578,000	0	-	312,787,000

(3) 2011 Unit: MMK

State/Region	Name of hospital	revenue				
		Governmental budget	Cost sharing	Donation	Others	Total
Sagaing Region	Sagaing General Hospital	217,128,990	4,984,904	-	-	-
Ayeyarwaddy Region	Phyapon General Hospital	230,962,734	1,998,400	-	-	-
	Pathein General Hospital	-	13,393,500	-	-	-
Magway Region	Minbu General Hospital	N.A				
	Pakokku General Hospital	-	2,766,100	3,127,300	29,151,912	-
	Magway General Hospital	-	-	-	-	-
Mandalay Region	Pyinmana General Hospital	286,013,765	14,932,900	1,134,500	5,281,080	307,362,245
Tanintharyi Region	Dawei General Hospital	181,458,882	17,469,788	-	-	-
	Myeik General Hospital	177,580,000	4,600,000	5,300,000	-	-
Kayah State	Loikaw General Hospital	206,176,320	3,321,480	1,027,000	2,400,000	212,924,800
Mon State	Mawlamyaing General Hospital	285,682,000	37,351,000	1	-	323,739,000

(4) 2012

Unit: MMK

State/Region	Name of hospital	revenue				
		Governmental budget	Cost sharing	Donation	Others	Total
Sagaing Region	Sagaing General Hospital	427,213,330	4,905,465	-	-	-
Ayeyarwaddy Region	Phyapon General Hospital	773,166,900	884,000	-	-	-
	Pathein General Hospital	-	16,946,000	-	-	-
Magway Region	Minbu General Hospital	N.A				
	Pakokku General Hospital	-	3,900,075	3,127,300	29,151,912	-
	Magway General Hospital	973,056,850	-	-	-	973,056,850
Mandalay Region	Pyinmana General Hospital	478,262,660	8,596,160	1,136,700	3,491,000	491,486,520
Tanintharyi Region	Dawei General Hospital	420,463,751	21,567,096	-	-	-
	Myeik General Hospital	200,930,000	5,600,000	4,600,000	-	-
Kayah State	Loikaw General Hospital	495,449,520	4,418,712	1,200,000	1,955,440	503,023,672
Mon State	Mawlamyaing General Hospital	512,279,000	40,641,000	0	-	553,148,000

(5) 2013

Unit: MMK

State/Region	Name of hospital	revenue				
		Governmental budget	Cost sharing	Donation	Others	Total
Sagaing Region	Sagaing General Hospital	562,322,390	7,396,395	-	-	-
Ayeyarwaddy Region	Phyapon General Hospital	895,241,250	2,499,400	-	-	-
	Pathein General Hospital	-	14,535,700	-	-	-
Magway Region	Minbu General Hospital	N.A				
	Pakokku General Hospital	-	2,870,375	13,381,900	27,834,901	-
	Magway General Hospital	9,554,015,231	-	-	-	9,554,015,231
Mandalay Region	Pyinmana General Hospital	970,797,415	4,026,700	867,600	3,512,000	979,203,715
Tanintharyi Region	Dawei General Hospital	777,183,743	31,369,253	-	-	-
	Myeik General Hospital	432,360,000	20,900,000	3,600,000	-	-
Kayah State	Loikaw General Hospital	1,019,224,880	8,838,600	12,370,750	6,809,571	1,047,243,801
Mon State	Mawlamyaing General Hospital	1,184,355,000	30,258,000	4	-	1,218,166,000

Table 4: Answers to questions about the situation of hospital facilities

(1)

State/Region	Name of hospital	Outpatients department					Surgical ward					Ob and Gyn ward					Medical care ward				Pediatrics ward			
		Sufficiency of room	Sufficiency of s pace	Rain leaking	Mold	Number of consultation room for outpatients	Sufficiency of room	Sufficiency of s pace	Rain leaking	Mold	Number of operation room	Sufficiency of room	Sufficiency of s pace	Rain leaking	Mold	Number of delivery room	Sufficiency of room	Sufficiency of s pace	Rain leaking	Mold	Sufficiency of room	Sufficiency of s pace	Rain leaking	Mold
Sagaing Region	Sagaing General Hospital					2					3					1								
Ayeyarwaddy	Phyapon General Hospital	×	×			1	×	×			1	×	×			1	×	×			×	×		
Region	Pathein General Hospital		×	×		4					5					2								
	Minbu General Hospital					4					3					1								
Magway Region	Pakokku General Hospital		×			3							×		×		×	×			×	×		
	Magway General Hospital		×					×			3		×					×				×		
Mandalay Region	Pyinmana General Hospital	×	×				×					×	×				×	×			×	×		
Tanintharyi	Dawei General Hospital		×			8		×			1		×					×				×		
Region	Myeik General Hospital		×			1					2					1			×	×	×	×		
Kayah State	Loikaw General Hospital	×	×	×		1			×			×	×	×		1			×					
Mon State	Mawlamyaing General Hospital		×			4		×			4	×	×			1		×				×		

(2)

State/Region	Name of hospital	Orthopedics ward				Ophthalmology ward				Otolaryngology ward				Emergency department				Blood bank				Dental			
		Sufficiency of room	Sufficiency of s pace	Rain leaking	Mold	Sufficiency of room	Sufficiency of s pace	Rain leaking	Mold	Sufficiency of room	Sufficiency of s pace	Rain leaking	Mold	Sufficiency of room	Sufficiency of s pace	Rain leaking	Mold	Sufficiency of room	Sufficiency of space	Rain leaking	Mold	Sufficiency of room	Sufficiency of s pace	Rain leaking	Mold
Sagaing Region	Sagaing General Hospital									no department															
Ayeyarwaddy	Phyapon General Hospital	×	×			×	×			no department				no department				no department				×	×		
Region	Pathein General Hospital																								
	Minbu General Hospital																								
Magway Region	Pakokku General Hospital	×													×				×						
	Magway General Hospital		×				×				×				×				×			×			
Mandalay Region	Pyinmana General Hospital	×	×				×			no department				×	×			×	×						
Tanintharyi	Dawei General Hospital		×				×				×				×				×				×		
Region	Myeik General Hospital			×	×																				
Kayah State	Loikaw General Hospital	×	×					×			×	×		×	×	×		× (ware house)	× (ware house)	×			×	×	
Mon State	Mawlamyaing General Hospital		×												×				×				×		

Table 5: Answer to questions about the buildings and facilities/infrastructure

State/Region	Name of hospital	Building				Facilities/Infrastructure												
				Access to hospital		staff		Electricity			Generator			Water supply		Drainage		
		Secure of Land space for additional space in the premises	Drainage of rain water	Type of Access road	Situations of access	Engineer	Technician	Power supply	Frequency of suspension of electricity	Existence of generator	Number of generator (Capacity)	Fuel for generator	Frequency of use	Water supply	Frequency of suspension of water supply	Public drainage	Septic tank	Separation of medical wastewater
Sagaing Region	Sagaing General Hospital			Asphalt pavement	Possible in yearlong	×	×	Public, Generator	Once or twice per week	○	1 (5-10kVA)	Diesel	Once or twice per week	Deep well	Daily	○	○	○
Ayeyarwaddy Region	Phyapon General Hospital	yes	Good	Asphalt pavement	Possible in yearlong	×	×	Public, Generator	Daily		N.A (25kVA)	Diesel	Daily	Public water	Once or twice per week	-	○	○
	Pathein General Hospital	yes	Good	Asphalt pavement	Block up road in rainy season	×	×	Public, Generator	-	○	4 (2 100kVA, 35kVA, 10kVA)	-			Yes	-	○	×
Magway Region	Minbu General Hospital	yes	Good	Asphalt pavement	Possible in yearlong	×	×	Public, Generator	Rarely	○	1	Diesel	Rarely		Sometimes	-	○	×
	Pakokku General Hospital	No	Good	Without pavement	-	×	×	Public, Generator	Once or twice per week	○	3 (2 25kVA, 20kVA)	Diesel	Once or twice per week	Public water/ Deep well	Daily	-	○	×
	Magway General Hospital	yes	Good	Asphalt pavement	-	×	-	Public, Generator	-	○	N.A (75kVA)	-	Once or twice per week	Shallow well	Daily	-	○	×
Mandalay Region	Pyinmana General Hospital	No	Good	Asphalt pavement	Possible in yearlong	×	○	Public, Generator	Twice or three times per week		3 (60kVA, 2kVA, 60kVA)	Diesel	Three or four times per week	Deep well	Once or twice per week	○	○	-
Tanintharyi Region	Dawei General Hospital	yes	Good	-	Possible in yearlong	×	×	Public, Private (460MMK */ 1 unit)	0		5 (200kVA, 35kVA, 35kVA,10kVA)	Diesel	Once or twice per week	Shallow well/ Deep well	Daily	-	○	○
	Myeik General Hospital	yes	Good	Asphalt pavement	Possible in yearlong	×	×	Generator, Private	-		2 (70kVA, 90kVA)	Diesel	Three or four times per week	Deep well	None	○	-	-
Kayah State	Loikaw General Hospital	yes	Good	Gravel road	Possible in yearlong	×	×	Public, Generator	None		N.A	Diesel	Rarely	Public water	None	○	○	○
Mon St ate	Mawlamyaing General Hospital	yes	Good	-	Possible in yearlong	×	×	Public, Generator	-		3 (35-200kVA)	Diesel	Three or four times per week	Deep well	None	○	○	○

Table 6: Answer to questions about the buildings and facilities /infrastructure

State/Region	Name of hospital	Facilities/infrastructure												
		staff		Electricity		Generator				Water supply		Drainage		
		Engineer	Technician	Power supply	Frequency of suspension of electricity	Existence of generator	Number of generator (Capacity)	Fuel for generator	Frequency of use	Water supply	Frequency of suspension of water supply	Public drainage	Septic tank	Separation of medical wastewater
Sagaing Region	Sagaing General Hospital	×	×	Public, Generator	Once or twice per week	○	1 (5-10kVA)	Diesel	Once or twice per week	Deep well	Daily	○	○	○
Ayeyarwaddy Region	Phy ap on General Hospital	×	×	Public, Generator	Daily		N.A (25kVA)	Diesel	Daily	Public water	Once or twice per week	-	○	○
	Pathein General Hospital	×	×	Public, Generator	-	○	4 (2 100kVA, 35kVA, 10kVA)	-			Yes	-	○	×
Magway Region	Minbu General Hospital	×	×	Public, Generator	Rarely	○	1	Diesel	Rarely		Sometimes	-	○	×
	Pakokku General Hospital	×	×	Public, Generator	Once or twice per week	○	3 (2 25kVA, 20kVA)	Diesel	Once or twice per week	Public water/De ep well	Daily	-	○	×
	Magway General Hospital	×	-	Public, Generator	-	○	N.A (75kVA)	-	Once or twice per week	Shallow well	Daily	-	○	×
Mandalay Region	Pyinmana General Hospital	×	○	Public, Generator	Twice or three times per week		3 (60kVA, 2kVA, 60kVA)	Diesel	Three or four times per week	Deep well	Once or twice per week	○	○	-
Tanintharyi Region	Dawei General Hospital	×	×	Public, Private (460MMK */ 1unit)	0		5 (200kVA, 35kVA, 35kVA,10kVA)	Diesel	Once or twice per week	Shallow well/ Deep well	Daily	-	○	○
	Myeik General Hospital	×	×	Generator, Private	-		2 (70kVA, 90kVA)	Diesel	Three or four times per week	Deep well	None	○	-	-
Kayah State	Loikaw General Hospital	×	×	Public, Generator	None		N.A	Diesel	Rarely	Public water	None	○	○	○
Mon State	Mawlamyaing General Hospital	×	×	Public, Generator	-		3 (35-200kVA)	Diesel	Three or four times per week	Deep well	None	○	○	○

Table 7: Answers to question about the approval plan for new construction and rehabilitation of hospital facilities and procurement of medical equipment

State/Region	Name of hospital	Year	Details	Estimated price (USD)
Sagaing Region	Sagaing General Hospital	no plan		
Ayeyarwaddy Region	Phy ap on General Hospital	N.A		
	Pathein General Hospital	N.A		
Magway Region	Minbu General Hospital	N.A		
	Pakokku General Hospital	2013-2014/ 2014-2015	two-storied building for inpatients' ward	365,625*
			two-storied building for inpatients' and outpatients' ward	365,625*
			two-storied for operation theatre and inpatients' ward	366,145*
			four-storied building with 6 rooms per floor for staff house	500,468*
			four-story(4 rooms per floor) staff house	323,489*
	Magway General Hospital	2015	Upgrading to 500 beds hospital	-
Mandalay Region	Pyinmana General Hospital	2014	Procurement of transformer	46,000
Tanintharyi Region	Dawei General Hospital	2015-2016	first-storied budding for inpatients' ward (22,512sq/ft)	0.58
		2015-2016	two-storied building for office, outpatient' ward, clinical examination room, conference room and training room (48,960sq/ft)	
		2015-2016	Digital apparatus for radiology	6,000
		2015-2016	Automatic hemanalysis machine	1,000
		2015-2016	Electric sterilizer (310 Liter)	2,000
		2016-2017	Building for radiology department (2,400sq/ft)	
	Myeik General Hospital	N.A		
Kayah State	Loikaw General Hospital	2015-2016	New buildings supported by JICA	-
Mon State	Mawlamyaing General Hospital	N.A		

* There is possibility that they answered in MMK.

Table 8 : Answer to questions about the number of medical doctors

(1) Number of medical doctors

State /Region	name of hospital	Medical Officer	Consultant (Total)	Surgery	Pediatrics	Obs And Gyn	Neurology/ Neurosurgery	Orthopedic	Dental	Internal Medicine	Others	(details of others)
Sagaing Region	Sagaing General Hospital	67	14	2	2	1	0	1	1	0	7	
Ayeyarwaddy Region	Phyapon General Hospital	62	7**	2	1	2	0	1	1	-	-	
	Pathein General Hospital	67*	-	2***	2****	2****	2****	0	2****	-	2	1 General dentist, 2 (Other Specialist) Anesthesiologist , 1 Ophthalmologist , 1Otolaryngologist , 1 Forensic medicine, 1 Pathologist (Assist ant consult ant) , 1Psychiatrist , 1 Radiologist
Magway Region	Minbu General Hospital	68	11	2	1	1	0	1	2	2	-	
	Pakokku General Hospital	80	15	2	2	2	0	1	2	-	7	Ophthalmologist, Otolaryngologist, Radiologist, Pathologist, Anesthesiologist, Psychiatrist, Radiologist
	Magway General Hospital	67	10	2	3	2	0	2	1	-		Some doctors are dispatched from Magway medical school
Mandalay Region	Pyinmana General Hospital	68	14	-	-	-	-	-	-	-	-	
Tanintharyi Region	Dawei General Hospital	52	8	1	1	2	0	2	1	-	37	
	Myeik General Hospital	28	15	2	2	2	0	1	2	-	-	
Kayah State	Loikaw General Hospital	70	16	2	2	1	0	1	1	-	9	
Mon State	Mawlamyaing General Hospital	65	22*	2	2	2	0	1	3		12	

* 9 Specialist Assistant Surgeons and 58 Assistant surgeons included

** Total number of consultant wasn't written on the questionnaire and therefore we calculated the number of consultant of each department.

*** 1Specialist Assistant Surgeons, 1 Specialist Assistant Surgeons (Oncology), 1Specialist Assistant Surgeons (Dermatology)

*** 1Specialist Assistant Surgeons included

(2) Number of nurse and other staff

State/Region	name of hospital	Matron/ Sister nurse	Staff Nurse	Trained Nurse	Midwife	Laboratory Technician	Pharmacist	Civil engineer	Medical engineer	Physiotherapist	Administrator	Driver of ambulance	Nurse Aid	others	Total number of staff in hospitals
Sagaing Region	Sagaing General Hospital	11	21	22	-	8	2	0	0	3	2	1	-	0	165
Ayeyarwaddy Region	Phyapon General Hospital	2	24	35	-	9	1	0	0	2	0	0	69	-	-
Magway Region	Minbu General Hospital	8	75	70	43**	10	5	0	0	2	2	1	-	5	300
Magway Region	Pakokku General Hospital	14	56	46	39**	12	0	0	0	2	2	0	-		223
Mandalay Region	Pyinmana General Hospital	7	21	66	0	11	2	0	0	3	2	2	-	73	269
Tanintharyi Region	Dawei General Hospital	14	63	77	-	17	0	0	0	1	1	1	-	68	312
Kayah State	Loikaw General Hospital	16	94	171	-	15	2	0	0	1	1	1	-	92	445
Ayeyarwaddy Region	Pathein General Hospital	10*	45	74	-	20	4	0	0	3	2	0	7	76	338
Tanintharyi Region	Myeik General Hospital	14	56	46	39**	12	0	0	0	2	2	0	-	-	223
Magway Region	Magway General Hospital	9	77	90	0	1	2	0	0	1	1	2	-	98	359
Mon State+A55:A67	Mawlamyaing General Hospital	14	92	163	-	18	3	-	-	4	1	1		108	491

* 1 Matron included

Table 9: Health Indicators

(1) 2009

State/Region	Name of hospital	Total number of inpatients	Total number of pediatric patients	Total number of Ob and Gyn patients	Total number of normal delivery	Total number of Cesarean Section	Number of eclampsia cases	Number of premature delivery	Number of abortion	Number of stillbirth	Number of maternal death	Number of operation	Bed occupancy rate (based on sanctioned beds)	Bed occupancy rate (Based on available beds)	Average duration of stay	Total number of outpatients	Hospital mortality rate	Number of deaths under1 year	Number of deaths under 5 year
Sagaing Region	Sagaing General Hospital	3,916	707	782	422	305	3	17	66	20	-	49	25	50	5	4,579	1	5	5
Ayeyarwaddy Region	Phyapon General Hospital	5,085	779	1,134	93	527		125	141	45	3	1,521	70	62	5	2,085	1	9	13
	Pathein General Hospital	12,056	3,444	1,335	478	631			231	76	5	1,488	101	64	6	18,902	32	12	72
Magway Region	Minbu General Hospital	11,962	1,640	448	72	400	30		175	30	1		62	62	4	12,634	1	28	31
	Pakokku General Hospital	7,483	2,186	1,020	325	310	52	38	123	42	0	2,455	64	56	6	26,514	4	2	0
	Magway General Hospital																		
Mandalay Region	Pyinmana General Hospital	5,938	1,449	1,101	308	294	10	33	170	33	1	369	37	51	4	4,840	1	11	13
Tanintharyi Region	Dawei General Hospital	8,134	2,967	1,431	1,014	451	17	30	117	27	-	960	72	51	7	12,366	9	20	5
	Myeik General Hospital	8,222	3,105	1,787	1,041	282	55	-	155	42	6	177	55	56	4	9,726	2	61	70
Kayah State	Loikaw General Hospital	7,208	2,086	1,275	401	410	7	25	169	51	2	1,615	68	65	6	11,516	18	35	8
Mon State	Mawlamyaing General Hospital	23,222	11,862	2,244	879	782	18	11	149	54	6	3,439	95	55	5	20,328	2	160	173

(2) 2010

State/Region	Name of hospital	Total number of inpatients	Total number of pediatric patients	Total number of Ob and Gyn patients	Total number of normal delivery	Total number of Cesarean Section	Number of eclampsia cases	Number of premature delivery	Number of abortion	Number of stillbirth	Number of maternal death	Number of operation	Bed occupancy rate (based on sanctioned beds)	Bed occupancy rate (Based on available beds)	Average duration of stay	Total number of outpatients	Hospital mortality rate	Number of deaths under1 year	Number of deaths under 5 year
Sagaing Region	Sagaing General Hospital	4,071	605	1,010	236	324	4	20	88	18	-	58	24	48	4	4,186	0	2	3
Ayeyarwaddy Region	Phyapon General Hospital	7,565	1,228	1,332	284	979		92	174	45	2	2,414	97	71	5	6,708	1	9	12
	Pathein General Hospital	13,293	3,340	1,658	411	498			222	69	4	1,694	107	68	5	20,887	21	21	79
Magway Region	Minbu General Hospital	12,805	1,371	509	87	431	36		152	16	2		63	63	4	13,004	1	25	29
	Pakokku General Hospital	6,643	1,181	1,163	393	329	60	42	112	49	2	2,748	63	52	7	13,915	20	13	1
	Magway General Hospital																		
Mandalay Region	Pyinmana General Hospital	6,646	1,580	1,207	419	316	13	53	185	42	4	464	43	9	5	6,776	1	16	18
Tanintharyi Region	Dawei General Hospital	8,902	3,283	1,395	1,068	666	18	32	106	20	3	1,099	69	49	6	13,630	9	19	8
	Myeik General Hospital	9,141	3,839	1,865	1,076	294	65	2	105	40	6	376	56	47	5	6,088	2	73	25
Kayah State	Loikaw General Hospital	8,086	2,044	1,658	349	593	3	21	328	29	0	1,878	63	59	6	13,299	14	18	6
Mon State	Mawlamyaing General Hospital	27,489	17,199	2,123	659	517	17	-	160	55	12	2,474	120	64	5	19,520	2	186	199

(3) 2011

State/Region	Name of hospital	Total number of inpatients	Total number of pediatric patients	Total number of Ob and Gyn patients	Total number of normal delivery	Total number of Cesarean Section	Number of eclampsia cases	Number of premature delivery	Number of abortion	Number of stillbirth	Number of maternal death	Number of operation	Bed occupancy rate (based on sanctioned beds)	Bed occupancy rate (Based on available beds)	Average duration of stay	Total number of outpatients	Hospital mortality rate	Number of deaths under1 year	Number of deaths under 5 year
Sagaing Region	Sagaing General Hospital	4,177	780	1,064	215	344	3	21	112	18	-	58	24	49	4	5,433	0	2	2
Ayeyarwaddy Region	Phyapon General Hospital	5,890	1,349	1,952	258	427		154	92	25	2	2,451	49	69	6	5,143	1	6	10
	Pathein General Hospital	12,067	2,262	1,671	535	855			178	70	8	1,780	103	72	6	22,147	29	18	70
Magway Region	Minbu General Hospital	9,647	1,389	653	171	381	34		143	29	2		50	50	4	12,447	2	11	14
	Pakokku General Hospital	6,947	1,263	1,184	393	358	50	58	96	48	2	2,538	59	50	6	14,118	11	11	2
	Magway General Hospital																		
Mandalay Region	Pyinmana General Hospital	7,529	1,462	1,461	444	476	11	65	258	31	2	529	46	63	5	12,100	1	18	23
Tanintharyi Region	Dawei General Hospital	8,588	2,790	1,409	1,007	1,025	20	42	123	23	1	1,064	66	47	6	13,227	9	15	2
	Myeik General Hospital	7,807	2,769	1,743	1,199	264	79	4	127	43	5	377	55	46	6	11,368	2	43	54
Kayah State	Loikaw General Hospital	7,320	1,604	1,730	633	620	2	22	249	32	1	1,808	50	45	5	14,986	17	25	2
Mon State	Mawlamyaing General Hospital	23,320	12,508	2,080	857	539	14	4	156	46	5	2,434	102	59	6	21,287	2	146	15

(4) 2012

State/Region	Name of hospital	Total number of inpatients	Total number of pediatric patients	Total number of Ob and Gyn patients	Total number of normal delivery	Total number of Cesarean Section	Number of eclampsia cases	Number of premature delivery	Number of abortion	Number of stillbirth	Number of maternal death	Number of operation	Bed occupancy rate (based on sanctioned beds)	Bed occupancy rate (Based on available beds)	Average duration of stay	Total number of outpatients	Hospital mortality rate	Number of deaths under1 year	Number of deaths under 5 year
Sagaing Region	Sagaing General Hospital	6,530	1,242	793	142	366	3	18	105	7	-	78	39	35	4	12,328	0	1	2
Ayeyarwaddy Region	Phyapon General Hospital	6,182	1,572	1,286	273	450		123	143	139	2	2,101	43	39	6	7,131	1	12	19
	Pathein General Hospital	13,772	2,525	1,755	620	850			203	65	5	1,792	122	77	7	28,874	37	20	88
Magway Region	Minbu General Hospital	15,424	1,488	743	235	485	25		161	18	1		73	73	4	16,253	1	8	10
	Pakokku General Hospital	10,203	1,628	1,321	458	385	76	83	83	53	2	3,226	71	59	5	18,795	13	25	3
	Magway General Hospital																		
Mandalay Region	Pyinmana General Hospital	8,532	1,555	1,707	545	541	4	47	216	34	5	596	49	72	5	14,910	1	23	27
Tanintharyi Region	Dawei General Hospital	10,242	2,935	1,646	1,259	1,090	10	30	94	31	1	1,575	84	60	6	16,589	9	21	8
	Myeik General Hospital	9,096	3,448	1,801	748	418	22	31	159	18	5	434	66	55	6	14,622	2	57	16
Kayah State	Loikaw General Hospital	7,656	1,834	1,495	350	488	5	27	195	46	1	1,658	59	54	6	20,706	17	21	3
Mon State	Mawlamyaing General Hospital	26,868	14,450	2,343	1,040	517	23	62	130	62	10	2,642	137	68	4	24,953	2	170	194

(5) 2013

State/Region	Name of hospital	Total number of inpatients	Total number of pediatric patients	Total number of Ob and Gyn patients	Total number of normal delivery	Total number of Cesarean Section	Number of eclampsia cases	Number of premature delivery	Number of abortion	Number of stillbirth	Number of maternal death	Number of operation	Bed occupancy rate (based on sanctioned beds)	Bed occupancy rate (Based on available beds)	Average duration of stay	Total number of outpatients	Hospital mortality rate	Number of deaths under1 year	Number of deaths under 5 year
Sagaing Region	Sagaing General Hospital	7,605	1,944	1,474	328	496	4	20	163	3	-	120	46	45	4	27,033	0	1	1
Ayeyarwaddy Region	Phyapon General Hospital	9,249	1,639	1,463	397	581		140	158	19	2	2,640	49	45	5	8,502	1	7	11
	Pathein General Hospital	16,889	3,530	2,096	657	1,187			311	78	6	2,652	151	96	6	50,980	36	21	104
Magway Region	Minbu General Hospital	17,570	1,820	703	308	349	53		156	18	0		78	78	4	19,704	1	13	15
	Pakokku General Hospital	13,352	2,876	1,729	598	570	84	48	225	87	0	3,942	90	75	5	24,194	1	26	1
	Magway General Hospital																		
Mandalay Region	Pyinmana General Hospital	10,793	2,146	2,121	965	465	11	157	241	30	5	534	55	80	5	32,940	1	19	23
Tanintharyi Region	Dawei General Hospital	11,400	2,920	1,836	1,320	701	20	35	166	39	1	1,742	69	97	6	20,537	8	8	5
	Myeik General Hospital	11,024	3,759	2,184	964	387	34	33	164	75	5	693	78	65	5	18,996	2	44	24
Kayah State	Loikaw General Hospital	9,280	2,912	1,688	445	481	3	20	212	21	2	1,923	78	70	6	24,104	18	57	3
Mon State	Mawlamyaing General Hospital	33,071	19,678	2,555	1,087	568	7	54	180	66	8	3,102	168	84	6	34,978	1	145	158

Table 10: Answer to questions about major causes of inpatients' morbidity (2013)

State/Region	Name of hospital	1		2		3		4		5	
Sagaing Region	Sagaing General Hospital	Cataract	1,686	Neonatal jaundice	386	Dengue hemorrhage fever	381	Acute respiratory infection	215	Acute gastroenteritis and dehydration	180
Ayeyarwaddy Region	Phyapon General Hospital	Cataract	748	Injury	196	HIV infection	96	Dengue hemorrhage fever	89	Gastritis	84
	Pathein General Hospital	Traffic accident	2,998	Enteritis	1,968	Tuberculosis	619	Acute respiratory infection	364	Malaria	260
Magway Region	Minbu General Hospital	Cataract		Injury		Severe pneumonia		Snake bite		Septicemia	-
	Pakokku General Hospital	Traffic accident (1280cases) / Other injury (237cases)	1,517	Cataract	1,376	Acute respiratory infection	513	Anxiety dis order	213	Acute gastroenteritis	193
	Magway General Hospital	-									
Mandalay Region	Pyinmana General Hospital	Delivery	1,356	Injury	861	Cataract	608	Dengue hemorrhage fever	492	Traffic accident	485
Tanintharyi Region	Dawei General Hospital	Head injury	906	Diarrhea	538	Dengue hemorrhage fever	468	Severe pneumonia	352	Malaria	219
	Myeik General Hospital	Acute diarrhea	546	Head injury	526	Dengue hemorrhage fever	472	Acute respiratory infection	465	Non communicable disease	231
Kayah State	Loikaw General Hospital	Injury	664	Diseases related to Pediatrics	583	Diarrhea	528	Acute respiratory infection	393	High blood pressure	391
Mon State	Mawlamyaing General Hospital	Acute diarrhea	2,825	Acute respiratory infection	2,643	Acute viral infection	2,060	Lacerations	1,652	Fracture and dis location	745

* Number of patients is indicated in the table.

Table 11: Answer to questions about major causes of outpatients' morbidity (2013)

State/Region	Name of hospital	1		2		3		4		5	
Sagaing Region	Sagaing General Hospital	High blood pressure	528	Congestive heart failure	228	Diabetes	156	Acute viral infection	120	Cirrhosis	108
Ayeyarwaddy Region	Phyapon General Hospital	Acute respiratory infection	1,192	High blood pressure	912	Slight injury	733	Cataract	492	Gastritis	326
	Pathein General Hospital	Injury	84	Acute viral infection	38	Dizziness	13	Dengue hemorrhage fever, Gastroenteritis	11	Acute stress disorder	10
Magway Region	Minbu General Hospital	-									
	Pakokku General Hospital	-									
	Magway General Hospital	-									
Mandalay Region	Pyinmana General Hospital	Dengue hemorrhage fever	504	Diarrhea	209	Acute respiratory infection	202	Tuberculosis	156	Malaria	56
Tanintharyi Region	Dawei General Hospital	Traffic accident	1,200	Acute viral infection	420	Gastroenteritis	360	Dog bite	360	High blood pressure	240
	Myeik General Hospital	-									
Kayah State	Loikaw General Hospital	Injury	674	Acute respiratory infection	222	Dog bite	181	Gastroenteritis	180	Kidney disease	145
Mon State	Mawlamyaing General Hospital	Injury	2,003	Esophagodynia	205	Diabetes	180	Dizziness	153	Low back pain	130

* Number of patients is indicated in the table.

Table 12: Answer to questions about major causes of mortality of each hospital (2013)

State/Region	Name of hospital	1		2		3		4		5	
Sagaing Region	Sagaing General Hospital	Hepatic encephalopathy	5	Head injury due to traffic accident	4	Cirrhosis	3	Respiratory infection	2	Retrovirus infection	1
Ayeyarwaddy Region	Sagaing General Hospital	Cirrhosis	14	Cerebral infarction	8	Gastric epithelium cancer	8	Renal failure	8	Injury by traffic accident	8
	Pathein General Hospital	Cerebral infarction		Gastroenteritis		Tuberculosis	-	Acute respiratory infection	-	Dengue hemorrhage fever/dengue shock syndrome	-
Magway Region	Minbu General Hospital	Acute respiratory infection		Congestive heart failure		Low-weight-birth		Septicemia		Respiratory infection	
	Pakokku General Hospital	Nao natal asphyxia caused by low-weight-birth	21	Myocardial infarction	15	Injury by traffic accident	14	Retrovirus infection	13	Cirrhosis with hepatocellular carcinoma	12
	Magway General Hospital	Stroke	20	Injury	8	Septicemia	8	Tuberculosis	6	Acute myelogenous leukemia	6
Mandalay Region	Pyinmana General Hospital	Low-weight-birth caused by premature	10	Septicemia	8	HIV/ AIDS	4	Neonatal asphyxia	4	Severe pneumonia	4
Tanintharyi Region	Dawei General Hospital	Injury	21	Tuberculosis	7	Severe respiratory infection	2	High blood pressure	2	Malaria	1
	Myeik General Hospital	Premature birth/low-weight-birth (PEM)	16	Head injury	12	Malaria	8	Acute respiratory infection	7	Gastroenteritis	2
Kayah State	Loikaw General Hospital	Premature birth/ low-weight- birth	20	Injury	19	High blood pressure	13	Cirrhosis	7	Tuberculosis	6
Mon State	Mawlamyaing General Hospital	Traffic accident	72	Heart failure	41	Tuberculosis	25	Cirrhosis	24	Neonatal jaundice	12

* Number of patients is indicated in the table.

Table 13: Answer to question about the number of examination.

(1) 2009

State/Region	Name of hospital	CT scanner	X-ray	ECG	Ultrasonography	Endoscopy
Sagaing Region	Sagaing General Hospital	213	-	-	-	-
Ayeyarwaddy Region	Phyapon General Hospital			-		
	Pathein General Hospital	-	6,583	-	2,428	-
Magway Region	Minbu General Hospital			-		
	Pakokku General Hospital	-	1,107	-	-	-
	Magway General Hospital	-	-	For All inpatients	-	-
Mandalay Region	Pyinmana General Hospital	1,732	841	-	-	-
Tanintharyi Region	Dawei General Hospital			-		
	Myeik General Hospital	-	-	-	-	-
Kayah State	Loikaw General Hospital	0	1,300	395	900	53
Mon State	Mawlamyaing General Hospital	-	4,498	3,633	910	-

(2) 2010

State/Region	Name of hospital	CT scanner	X-ray	ECG	Ultrasonography	Endoscopy
Sagaing Region	Sagaing General Hospital	215	-	-	-	-
Ayeyarwaddy Region	Phyapon General Hospital			-		
	Pathein General Hospital	-	7,121	-	1,958	
Magway Region	Minbu General Hospital			-		
	Pakokku General Hospital	-	1,213	-	-	-
	Magway General Hospital	-	-	-	-	-
Mandalay Region	Pyinmana General Hospital	1,639	1,360	-	-	-
Tanintharyi Region	Dawei General Hospital			-		
	Myeik General Hospital	-	3,084	-	1,737	-
Kayah State	Loikaw General Hospital	0	1,308	480	985	1
Mon State	Mawlamyaing General Hospital	-	3,912	4,319	1,004	-

(3) 2011

State/Region	Name of hospital	CT scanner	X-ray	ECG	Ultrasonography	Endoscopy
Sagaing Region	Sagaing General Hospital	220	-	-	-	-
Ayeyarwaddy Region	Phyapon General Hospital			-		
	Pathein General Hospital	-	9,736	-	1,935	-
Magway Region	Minbu General Hospital			-		
	Pakokku General Hospital	-	1,217	-		-
	Magway General Hospital	-	4,225	-		-
Mandalay Region	Pyinmana General Hospital	1,764	1,651	-		-
Tanintharyi Region	Dawei General Hospital			-		
	Myeik General Hospital	-	2,776	-	2,013	-
Kayah State	Loikaw General Hospital	0	1,072	582	1,139	1
Mon State	Mawlamyaing General Hospital	-	5,588	3,840	738	-

(4) 2012

State/Region	Name of hospital	CT scanner	X-ray	ECG	Ultrasonography	Endoscopy
Sagaing Region	Sagaing General Hospital	176	-	-	-	-
Ayeyarwaddy Region	Phyapon General Hospital			-		
	Pathein General Hospital	-	10,462	651	1,776	-
Magway Region	Minbu General Hospital			-		
	Pakokku General Hospital	-	1,580	-	-	-
	Magway General Hospital	-	4,111	-	-	-
Mandalay Region	Pyinmana General Hospital	1,818	2,123	-	-	-
Tanintharyi Region	Dawei General Hospital			-		
	Myeik General Hospital	-	3,186	-	1,770	-
Kayah State	Loikaw General Hospital	0	1,210	650	1,210	4
Mon State	Mawlamyaing General Hospital	-	6,979	4,254	2,077	-

(5) 2013

State/Region	Name of hospital	CT scanner	X-ray	ECG	Ultrasonography	Endoscopy
Sagaing Region	Sagaing General Hospital	172	568 *	-	-	-
Ayeyarwaddy Region	Phyapon General Hospital			-		
	Pathein General Hospital	-	13,236	693	2,635	8
Magway Region	Minbu General Hospital			-		
	Pakokku General Hospital	-	3,095	-	-	-
	Magway General Hospital	659	4,352	-	-	-
Mandalay Region	Pyinmana General Hospital	2,149	3,192	-	-	-
Tanintharyi Region	Dawei General Hospital			-		
	Myeik General Hospital	114**	4,912	-	2,602	-
Kayah State	Loikaw General Hospital	0	3,949	662	1,600	1
Mon State	Mawlamyaing General Hospital	-	8,796	4,587	2,931	-

* The number of examination calculated from August 2013 to December 2013.

** The number of examination calculated from October 2013 to December 2013 after installation of CT scanner.

Table 14: Answers to questions about referral system

State/Region	Name of hospital	Referral hospital (out case)			
		Distance (km)	Time taken (hour)	Transportation	Destination
Sagaing Region	Sagaing General Hospital	23km	0.5	car	Mandalay
Ayeyarwaddy Region	Phyapon General Hospital	64km	2	car	Yangon
	Pathein General Hospital	98km	2.5	car	Yangon
Magway Region	Minbu General Hospital	-	4	car	Nay Pi Taw
	Pakokku General Hospital	147km	4	car	Nay Pi Taw
	Magway General Hospital	100-200km	3- 4	car	Nay Pi Taw, Mandalay
Mandalay Region	Pyinmana General Hospital	12km	0.25	car	Nay Pi Taw
Tanintharyi Region	Dawei General Hospital	300km	14	car	Yangon (Yangon General Hospital)
	Myeik General Hospital		24	car	Yangon
Kayah State	Loikaw General Hospital	-	5	car	Nay Pi Taw (1000 bed hospital)
Mon State	Mawlamyaing General Hospital	280km	7	car	Yangon

Table 15: Answer to question about the number of referral cases (Incase)

State/Region	Name of hospital	Year	1		2		3		4		5	
Sagaing Region	Sagaing General Hospital	2009	-									
		2010										
		2011										
		2012										
		2013										
Ayeyarwaddy Region	Phyapon General Hospital	2009	-									
		2010										
		2011										
		2012										
		2013										
	Pathein General Hospital	2009	-									
		2010										
		2011										
		2012										
		2013										
Magway Region	Pakokku General Hospital	2009	Head injury	5	Acute diarrheal	3	Fever/ Vomit	2	Low-birth-weight	1	Snake bite	1
		2010	Head injury	6	Troch antric # (H) *	2	Retrovirus infection	3	Severe anemia	2	Tuberculosis	1
		2011	Head injury	8	Malaria	4	Burn	4	Abdominal tuberculous lymphadenitis	3	Gastritis	2
		2012	Head injury	12	Ear injury	2	Dengue hemorrhage fever	2	Malaria	1	RIH *	1
		2013	Head injury	17	# NOF (Rt) *	4	Low-birth-weight	3	Phimosis / Vaginal atresia	2	Encephalitis	1
	Minbu General Hospital	2009	-									
		2010										
		2011										
		2012										
		2013										
	Magway General Hospital	2009	-									
		2010	-									
		2011	Injury/ head injury	24	Snake bite	11	Acute stomachache	6	-	-	-	-
		2012	Injury/ head injury	52	Snake bite	10	-	-	-	-	-	-
		2013	Injury/ head injury	60	Acute stomachache	50	Snake bite	20	-	-	-	-
Mandalay Region	Pyinmana General Hospital	2009	Delivery	150	Injury	100	Traffic accident	90	High blood pressure	80	Diarrhea	70
		2010	Delivery	250	Injury	230	Traffic accident	200	Gastrointestinal disease	150	Acute respiratory infection	100
		2011	Delivery	280	Injury	250	Gastrointestinal disease	200	Traffic accident	180	High blood pressure	150
		2012	Delivery	300	Injury	240	Traffic accident injury	200	Cataract	150	Gastrointestinal disease	100
		2013	Delivery	400	Injury	250	Cataract	200	Dengue hemorrhagic fever	180	Traffic accident	150
Tanintharyi Region	Dawei General Hospital	2010	Cerebrovascular disorder	1	-	-	-	-	-	-	-	-
		2011	Cytopenia	1	Chronic renal failure with heart diseases	1	Acute myocardial infarction	1	Type 2 diabetes with miofibrosis	1	-	-
		2012	Lung cancer	1	Lymphadenia	1	Head injury	1	Tremor	1	Overdose of psychotropic drug	1
		2013	Stomach cancer	1	Lung cancer	1	Cerebrovascular disorder with malignant hypertension	1	Total hysterectomy	1	Anemia/ Neutropenia	1
	Myeik General Hospital	2009	-									
		2010	-									
		2011	-									
		2012	-									
		2013	Accident	38	Violence (police case)	36	Hypertension/ Diabetes	91	-	-	-	-
Kayah State	Loikaw General Hospital	2009	Cesarean section	103	Abortion	20	Traffic accident	11	Ectopic pregnancy	3	Neonatal diseases	2
		2010	Cesarean section	120	Abortion	23	Gastroenteritis	13	Traffic accident injury	4	Neonatal jaundice	1
		2011	Cesarean section	100	Traffic accident	11	Abortion	10	Ectopic pregnancy	8	Neonatal jaundice	1
		2012	Cesarean section	61	Traffic accident	21	Ectopic pregnancy	5	Chronic renal failure	2	Neonatal jaundice	1
		2013	Cesarean section	113	Abortion	18	Traffic accident injury	17	Ectopic pregnancy	11	Neonatal jaundice	1
Mon State	Mawlamyaing General Hospital	2009	Head injury	1315	Hypertension	765	Stomachache	415	Heart diseases	390	Hematemesis /Melena	150
		2010	Head injury	1360	Hypertension	750	Stomachache	400	Heart diseases	360	Hematemesis /Melena	125
		2011	Head injury	975	Hypertension	650	Stomachache	390	Heart diseases	350	Hematemesis /Melena	124
		2012	Head injury	960	Hypertension	600	Stomachache	335	Heart diseases	320	Hematemesis /Melena	130
		2013	Head injury	1440	Hypertension	750	Stomachache	435	Heart diseases	405	Hematemesis /Melena	195

* These could be abbreviations and we couldn't find the exact name of diseases.

Table 16: Answer to question about the number of referral cases (Outcase)

State/Region	Name of hospital	Year	1		2		3		4		5	
Sagaing Region	Sagaing General Hospital	2009	Head injury	30	Acute retention of urine (AROU)	15	Cerebrovascular disorder	9	Neonatal jaundice	7	-	6
		2010	Head injury due to traffic accident	45	Acute retention of urine (AROU)	17	-	8	Neonatal asphyxia	7	Cerebrovascular disorder	5
		2011	Head injury due to traffic accident	62	Acute retention of urine (AROU)	9	Heart failure	8	Neonatal asphyxia	7	Toxicosis	6
		2012	Head injury due to traffic accident	50	Neonatal jaundice	21	Neonatal asphyxia	15	Acute retention of urine (AROU)	13	Heart failure	9
		2013	Head injury due to traffic accident	73	Low-birth-weight	21	Neonatal jaundice	20	Acute respiratory infection	11	Cerebrovascular disorder	11
Ayeyarwaddy Region	Phyapon General Hospital	2009	Head injury	10	Hepatoma (HCC)	3	Lung cancer	2	HIV infections	1	Diabetes	1
		2010	Head injury	12	Submandibular gland neoplasm	2	Burn	2	Cervical cancer	1	Renal failure	1
		2011	Head injury	13	Lung cancer	3	Idiopathic Thrombocytopenic Purpura	2	Hematemesis/ Melena	1	Tetanus	1
		2012	Head injury	16	Renal failure	2	Cervical cancer	2	Tetanus	2	Vertebral fracture	1
		2013	Head injury	16	Renal failure	2	Cervical cancer	2	Tetanus	2	Multidrug-resistant tuberculosis	1
	Pathein General Hospital	2009	-									
		2010	-									
		2011	Traffic accident head injury and multiple injury	5	Choriocarcinoma	1	Accident ingestion	1	Intussusception of intestine	1	Is chemic heart disease/ hypertension	1
		2012	Head injury	1	Head and abdomen injury	1	Neck tumor	1	Urethral stricture	1	-	-
		2013	Multiple injury	25	Malignant tumor	10	Intussusception of intestine	4	Hemorrhage s hock	3	Congenital malformation	2
Magway Region	Minbu General Hospital	2009	-									
		2010										
		2011										
		2012										
		2013										
	Pakokku General Hospital	2009	Head injury	17	Cervical cancer	5	Uterine sarcoma	2	Rectal cancer	2	Cirrhosis	2
		2010	Head injury	11	Lung cancer	3	Multiple injury	2	Cervical cancer	1	Liver abscess	1
		2011	Head injury	20	Fracture of femur	5	Ovarian tumor	4	Snake bite	4	Acute leukemia	3
		2012	Head injury	28	Snake bite	9	Acute retention of urine (AROU)	6	Multiple injury	5	Non-opening chest injury	5
		2013	Head injury	33	Multiple injury	7	Fracture of femur	4	#SOP (Rt)*	2	Breas t cancer	2
	Magway General Hospital	2009	-									
		2010	-									
		2011	Head injury	20	Lung cancer	5	-	-	-	-	-	-
		2012	Cervical cancer	24	Head and abdomen injury	17	Lung cancer	6	-	-	-	-
		2013	Head injury	28	Cervical cancer	26	Lung cancer	10	-	-	-	-
Mandalay Region	Pyinmana General Hospital	2009	Head injury	26	Thoracic injury	5	Snake bite	4	Malaria complication	4	Acute myocardial infarction	3
		2010	Head injury	36	Hemiplegia due to cerebrovascular disease	9	Acute gastroenteritis	7	Burn	7	Tuberculosis	6
		2011	Head injury	37	Acute myocardial infarction	9	Hemiplegia due to cerebrovascular disease	5	Snake bite	4	Tuberculosis	4
		2012	Head injury	43	Acute myocardial infarction	11	Retrovirus infection	5	Facial injury	5	Snake bite	4
		2013	Head injury	29	Snake bite	9	Hypertension	7	Hemiplegia due to cranial nervedis order	6	Retrovirus infection	6
Tanintharyi Region	Dawei General Hospital	2009	Head injury	12	Colon cancer	3	Unilateral Leg Ulcer	1	Forehead fracture	1	Ireus	1
		2010	Head injury	14	BPH*	4	Fracture of femur	1	Stomach cancer	1	Cirrhosis	1
		2011	Head injury	35	Nephrolith	3	Fever due to infection	1	Ventricular septum defect(VSD)	1	Astragal fracture	1
		2012	Head injury	55	Nephrolith	5	Osteosarcoma	1	Dengue hemorrhage fever	1	Pathological examination of femur	1
		2013	Head injury	34	Neonatal jaundice	1	Auricular flutter	1	Respiratory infection	1	Gunfire wound	1
	Myeik General Hospital	2009	Intracranial hypertension	12	Heart attack	9	Hemal disease	7	Cranial nerve disease	5	Others	21
		2010	Intracranial hypertension	15	Heart attack	11	Cranial nerve disease	7	Liver disease	6	Others	19
		2011	Heart attack	12	Cranial nerve disease	11	Intracranial hypertension	11	Hemal disease	5	Others	14
		2012	Intracranial hypertension	15	Heart failure	12	Hemal disease	7	Cranial nerve disease	5	Others	15
		2013	Heart attack	21	Renal failure	11	Cranial nerve disease	5	Hemal disease	8	Others	52
Kayah State	Loikaw General Hospital	2009	Cerebrovascular disease	1	F/B Aspiration*	1	Severe anemia	1	Pathological examination	1	Malignant hypertension	1
		2010	Cerebrovascular disease	1	Clavicular and vertebral fracture	1	-	1	Stomach cancer	1	Hydrocephalus	1
		2011	Cerebrovascular disease	1	Severe PE*	1	Duodenum cancer	1	Cancer of the esophagus	1	Hematemesis/ Melena due to hepatitis sufficiency	1
		2012	Cerebrovascular disease	12	Chronic renal failure	6	Acute renal failure	3	Fall	2	Lung cancer	2
		2013	Cerebrovascular disease	5	Hydrocephalus	5	Lung cancer	2	Acute myocardial infarction	2	Chronic renal failure	2
Mon State	Mawlamyaing General Hospital	2009	Traffic accident	30	Both lower extremities fracture	10	Acute renal failure	2	Fracture of femur	2	Multiple fractures	2
		2010	Traffic accident	32	Acute renal failure	3	Fracture of femur	3	Both lower extremities fracture	2	Femoral neck fracture	2
		2011	Traffic accident	21	Acute renal failure	6	Radiotherapy for cancer	5	Vertebral fracture	5	Femoral neck fracture	4
		2012	Fracture of femur	19	Acute renal failure	16	Multiple injury	12	Head injury	8	Radiotherapy for cancer	7
		2013	Acute renal failure	20	Fracture of femur	9	Radiotherapy for cancer	8	Head injury	6	Multiple injury	5

Table 17: Answers to questions about waste management of each hospital

State/Region	Name of hospital	Waste management (○ available, ×unavailable)					
		use of safety box	use of incinerator	frequency in operation per week	if incinerator is not available, how to waste	warehouse for waste	if waste warehouse is not available, how to keep the waste
Sagaing Region	Sagaing General Hospital	○	○	once to twice		×	collect by local government
Ayeyarwaddy Region	Phyapon General Hospital	○	○	daily		×	-
	Pathein General Hospital	○	○	3 to 4 times	burial to community burial ground (placenta, tissue)	○	Size of warehouse (3m×3m)
Magway Region	Minbu General Hospital	○	×	-	collected by local government	○	
	Pakokku General Hospital	○	○	once to twice		×	-
	Magway General Hospital	○	×		collected twice a week by local government	○	
Mandalay Region	Pyinmana General Hospital	○	○	twice		×	general and hospital waste is collected by local government everyday
Tanintharyi Region	Dawei General Hospital	○	○	-		○	
	Myeik General Hospital	○	○	once to twice		×	hospital waste is disposed immediately
Kayah State	Loikaw General Hospital	○	×		collected by local government	×	burial
Mon State	Mawlamyaing General Hospital	○	○	twice		×	hospital waste is stored before burial general waste is disposed everyday