Federal Democratic Republic of Nepal

DATA COLLECTION SURVEY ON EMERGENCY MEDICAL SERVICE AND DISASTER MEDICAL SERVICE IN FEDERAL DEMOCRATIC REPUBLIC OF NEPAL

FINAL REPORT

October 2017

Japan International Cooperation Agency (JICA)

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Introduction

Background of the Survey

In April 2015, about 9,000 people lost their lives due to a huge earthquake in Nepal. This disaster underlined the importance of disaster medical services as well as emergency medical services. It is reflected in the Strengthened Management of Public Health Emergencies, which is one of the outputs of the Nepal Health Sector Strategy 2015-2020.

Recently, mortalities from non-communicable diseases and injuries have increased. In particular, injuries account for 10% of the causes of death in Nepal (WHO, 2013). Accordingly, a medical system that can provide adequate and quick medical services to injured patients is required. Such services, however, are hindered by the heavy traffic congestion especially in Kathmandu. The lack of medical facilities for trauma care is another reason for the difficulty.

Generally, trauma care is part of emergency services, and it forms the core of medical services during a disaster that injures many people. In terms of the disaster resilience of a nation, it is necessary to establish a health facility in a place with easy access from areas surrounding the crowded centre of Kathmandu, which can be a base for disaster medical services.

The Japan International Cooperation Agency (JICA) has supported efforts by the government of Nepal (GoN) to improve disaster preparedness over the last several years, and decided to conduct a data collection survey on emergency and disaster medical services to continue the provision of effective assistance to GoN.

Objectives of the Survey

-To understand the latest health policies and strategies of GoN, and to grasp the current situation of the overall health system and emergency and disaster medical services

-To understand the government's priority of emergency and disaster medical services

-To examine necessary and possible future assistance by JICA regarding emergency and disaster medical services in Nepal

Selection of Target Hospitals

The survey team visited the six target hospitals in addition to the government, international and private organizations concerned in the survey.

Because most health facilities that can provide tertiary medical services for severe trauma and emergency patients are located in Kathmandu, four tertiary hospitals in Kathmandu, namely Tribhuvan University Teaching Hospital (TUTH), Bir Hospital, the National Trauma Centre, and Paropakar Maternity & Women's hospital, were initially selected as target hospitals in this survey to grasp the current situation of emergency medical services in hospitals. These hospitals

accepted many victims at the time of the Gorkha earthquake in 2015, so information regarding disaster medical services could also be collected in the hospitals. Moreover, the achievements and challenges of JICA's assistance in the health sector and its evaluation by the Nepalese were confirmed in TUTH, Bir Hospital, and Paropakar Maternity & Women's hospital, in which Japan's grant aid projects were being implemented as of August 2017.

From the experience of the Gorkha earthquake, the need for the establishment of a health facility in a place with easy access from the areas surrounding Kathmandu has increased, and consequently Dhulikhel Hospital, which is a tertiary hospital located in a suburb of Kathmandu, was also added to the target hospitals.

Moreover, Hetauda Regional Hospital, which is a secondary hospital located in the central region, was also included in the target hospitals to compare emergency and disaster medical services in tertiary hospitals with those in secondary hospitals.

Summary

1. Introduction

In April 2015, about 9,000 people lost their lives due to a huge earthquake in Nepal. This disaster underlined the importance of disaster medical services as well as emergency medical services. In terms of disaster resilience of a nation, it is thought necessary to improve the emergency preparedness and response.

The objects of this survey were (1) To understand the latest health policies and strategies of the government of Nepal (GoN), and to grasp the current situation of the overall health system and emergency and disaster medical services, (2) To understand the government's priority of emergency and disaster medical services, (3) To examine necessary and possible future assistance by JICA regarding emergency and disaster medical services in Nepal.

Because most health facilities that can provide tertiary medical services for severe trauma and emergency patients are located in Kathmandu, four tertiary hospitals in Kathmandu, namely Tribhuvan University Teaching Hospital (TUTH), Bir Hospital, the National Trauma Centre, and Paropakar Maternity & Women's hospital, were initially selected as target hospitals in this survey to grasp the current situation of emergency medical services in hospitals. Dhulikhel Hospital, which had a plan to establish a trauma centre, was also added to the target hospitals. Moreover, Hetauda Regional Hospital, which is a secondary hospital located in the central region, was also included in the target hospitals to compare emergency and disaster medical services in tertiary hospitals with those in secondary hospitals.

2. General Situation

Nepal is a landlocked country bordered by India and China. The country is located in the southern part of the Himalayas, and the total land area is approximately 147,000 km^2. Climatic conditions of Nepal vary from one place to another in accordance with the geographical features. Administratively, Nepal is divided into 14 zones and 75 districts. Currently, five development regions are settled, but this will be abolished, and seven new provinces will be established.

According to an estimate by the World Bank, the total population of Nepal was approximately 29 million in 2016. The rural population accounted for 81% of the total population. A total of 31.8% of the population was under 15 years old, 62.5% was between 15 to 64 years old and 5.7% was 65 years old or over. According to the National Population and Housing Census in 2011, the average population density in Nepal amounted to 180 people/km^2, while it was 4,416 people/km^2 in Kathmandu. The population density was relatively higher in the southern part of the country near the border with India.

According to the Economic Survey Fiscal Year 2016/17, the gross domestic product per

capita was Rs. 90,521. Agriculture remains Nepal's principal economic activity, employing about 65% of the population. The top export and import destination of Nepal is India. The number of new migrant workers leaving Nepal and the amount of remittances from abroad reached 528,000 and Rs. 5,430 billion, respectively in 2013/14.

3. Current Situations of the Health Sector

The health-related Millennium Development Goals were almost achieved in Nepal in 2015. The goals of reducing child mortality was achieved, and the rate of maternal mortality was also considerably decreased. The basic health indicators show an improvement in the health situation of Nepal during the last 15 years.

The top ten morbidities of inpatients shown by the health statistics of 2015/16 by the Ministry of Health (MoH) were mainly common infectious diseases, although they included injury and some NCDs. The chronic obstructive pulmonary disease was the highest cause of inpatient mortality, and diabetes mellitus and essential hypertension were also included in the main causes of death. These statistics suggested a critical disease burden of NCDs in Nepal

MoH developed the National Health Policy 2014 based on a national development plan with the goal, namely to ensure health for all citizens as a fundamental human right by increasing access to quality health services through a provision of equitable and accountable health system. In addition, MoH has developed the Health Sector Strategy 2015-2020 to achieve the goal set by the National Health Policy 2014 with nine outcomes.

The health budget in 2015/16 was Rs. 36.7 billion, which was one-and-a-half times as much as the amount in 2011. Most of the health budget is used for the implementation of public health programmes for maternal and child health, infection control, primary health care, etc.

Health facilities are classified by size and service provision into primary to tertiary facilities. Health posts are the first point of contact for patients, and patients are referred to a higher-level facility when necessary. Higher-level facilities do not recognize a way to adequately accept patients as referred cases from a lower level. Furthermore, basic health services are free of charge at any level of facility. All these factors result in the patient behaviour of visiting a secondary or tertiary hospital for any case from the beginning.

The existing system of health administration is currently being reformed in line with the renewed administration outlined in the new constitution promulgated in 2015. A referral system will be established in each province, and health facilities in a province will be classified into hospitals at the primary to tertiary levels or health posts. Difficult cases that cannot be covered by the tertiary level of a province will be referred to the specialty hospitals at the central level. In this context, upgrading some hospitals and establishing new hospitals are planned, although a budget plan has yet to be drafted.

Courses for bachelor of medicine and bachelor of surgery are available at 20 universities in the country. The duration of a medical course is five and a half years including a one-year internship. A graduate takes the examination of the Nepal Medical Council to obtain a medical license. As of September 2016, the number of doctors, nurses, and midwives in Nepal was 3.15 per 1,000 population. In particular, the number of doctors needs to be increased.

In addition, the survey on health workers conducted in 2011 showed that the number of physicians per 1,000 population was the highest in the central region (1.56) and lowest in the far-western region (0.25). In this regard, MoH developed the Human Resources for Health Strategic Plan 2011-2015 to ensure the equitable distribution of health workers and to improve health worker performance.

4. Emergency and Disaster Medical Services

Since Nepal has suffered from several natural disasters, policies on disaster management were developed as a priority with the support of development partners. However, policies on emergency medical services under normal conditions have yet to be fully established. Due to the shortage of human and financial resources, Nepal does not yet have an official emergency transportation system, and currently it depends on services provided by local communities, NGOs, and the private sector.

According to interviews at the target hospitals, common reasons for consultations at emergency departments include digestive diseases and respiratory diseases such as difficulty in breathing and acute gastroenteritis, and trauma cases accounted for less than 20%. The leading cause of injury is road traffic accident (RTA) and followed by falls. The number of RTAs and fatalities increased by 3.5 times and 1.5 times, respectively, for 12 years since 2000. The improvement of emergency medical services for trauma patients is highly needed.

Although the development of specialists in emergency medicine and emergency medical technicians (EMTs) has started, there are no colleges providing an education in emergency medicine for nurses in Nepal. Because of the shortage of human resources, emergency medical services are provided by young doctors fresh from medical college, paramedics without training on emergency medicine and nursing students in most hospitals. The quality of emergency medical services needs to be improved.

Nepal has been suffered from many natural disasters. About 500 incidents occurred annually. Fire was the leading case of natural disasters, followed by floods, epidemics and landslides. Although the frequency of earthquakes is low, the damage from the Gorkha earthquake was enormous.

The Ministry of Home Affairs (MoHA) plays the main role of disaster management including enhancing preparedness in Nepal. The formulation of natural disaster relief

committees at each level is mandated by the Natural Calamity Relief Act for overall disaster response in Nepal. The National Emergency Operation Centre established in MoHA works as the secretariat for disaster management and response, and collects and analyses information about disasters. As the coordinating body of the health sector, the Health Emergency Operation Centre (HEOC) was established in MoH. In case of a disaster, HEOC would coordinate with the departments of MoH, health facilities, international agencies and other ministries.

As of August 2017, MoH has implemented three major activities for improving emergency and disaster medical services, namely establishment of trauma centres, strengthening emergency response capacity of hub hospitals and establishment of ambulance network system.

5. Emergency and Disaster Medical Services in Target Hospitals

TUTH is the highest level of health facility in Nepal with 665 beds and accepts patients transferred from all over the country. It accepts about 24,000 inpatients per year, an average of 1,500 outpatients, and 140 emergency patients a day. Main reasons for visiting the emergency department were abdominal pain and breathing difficulties, and the number of trauma patients accounted for about 12% of the total.

Bir Hospital is the oldest general hospital in Nepal with 460 beds and is under the control of MoH. It also has a function as teaching hospital of the National Academy of Medical Sciences. The hospital accepts about 9,000 inpatients annually, an average of 900 to 1,000 outpatients, and about 90 emergency patients daily. Trauma patients are transported to the National Trauma Centre and there are specialty hospitals for obstetrics and gynaecology, paediatrics and heart diseases in Kathmandu City, and hence main reasons for visiting the emergency department in Bir Hospital are breathing difficulties and abdominal symptoms.

The National Trauma Centre was established as the first trauma centre in Nepal. Providing health services in the centre started right after the Gorkha earthquake in 2015. The centre has 200 beds and accepts about 2,500 inpatients per year, an average of 60 to 70 outpatients, and 50 to 60 emergency patients per day. The most common case of emergency patients is traffic injuries, followed by fall injuries. The degree of injury varies from fractures to internal organ and brain injuries.

Paropakar Maternity & Women's Hospital is the only public maternity specialty hospital in the country with 320 beds and accepts patients from all over the country as a tertiary hospital. It accepts about 23,000 inpatients annually, an average of 400 to 500 outpatients, and about 70 emergency patients per day. Most of them are patients with preterm labour, bleeding, abdominal pain, and gynaecologic diseases.

Dhulikhel Hospital, which is a non-profit and community-based hospital, provides health services to community residents as a tertiary hospital. The hospital is located at the entrance of

Sindhuli highway, about 30 km east from Kathmandu, and mainly covers six districts (population approximately 1.6 million people) on the east side of the central region and the west side of the eastern region. It has 425 beds and accepts about 15,000 inpatients annually, an average of 600 to 700 outpatients, and about 40 emergency patients per day. The most common reason for visiting the emergency department in 2016 was trauma, followed abdominal pain and respiratory difficulties.

Hetauda Regional Hospital is a public secondary hospital with 85 beds, which is located about 75 km south of Kathmandu. It accepts approximately 7,000 inpatients annually, an average of 200 outpatients, and about 50 emergency patients per day. It is presumed that there are many emergency patients who visit outside of working hours and who are mild cases such as for injections, infusions and drugs. Compared with the other target hospitals, the seriousness of emergency patients is obviously different.

6. Japanese Cooperation in the Health Sector

Japan has implemented a variety of assistance programmes in the health sector in Nepal as a main donor since 1969. Japan's assistance for tuberculosis control and medical education as the two main pillars was implemented from 1980 to 2005 through the programme approach, which combines technical cooperation and grant aid. The grass-roots technical cooperation and the human security projects have mainly been implemented since 2000; the former focused on the field of maternal and child health, and the latter focused on the improvement of health facilities and medical equipment.

From the achievement and lessons of Japan's past assistance, it is thought to be appropriate to consider future assistance through the programme approach such as grant aid projects including soft components and projects combining technical cooperation and grant aid. In addition, it is important to implement continuous assistance in various fields to contribute to solving problems in the health sector. Moreover, the assessment of the implementation of a project should be properly performed, and follow-up projects and future assistance should be considered based on the results of the assessment.

7. Development Cooperation in the Health Sector

Many development partners have contributed to the health sector in Nepal. The ratio of their assistance to the total health budget accounted for about 20% in the fiscal year 2015. In addition to direct assistance, the pool fund is there to support Nepal's health sector development, and the World Bank, DFID, GAVI and KfW contribute to the fund. Currently, most of development partners are heavily involved in supporting the implementation of the Health Sector Strategies 2015-2020 through the sector-wide approaches.

8. Recommendations for Future Assistance

From the experience of the Gorkha earthquake and an increase in traffic accidents, improvement of emergency medical services for trauma patients is greatly needed in Nepal. In addition to trauma care, medical services for NCD emergency patients such as heart attack and stroke should be strengthened. Considering such circumstances, the survey team analysed the challenges of emergency and disaster medical services from three aspects: pre-hospital care, in-hospital care and post-hospital care. The priority challenges were selected as follows.

Pre-Hospital Care
- Undeveloped emergency transportation system
- Shortage of ambulances which meet the national standards
- Lack of EMTs providing pre-hospital care

In-Hospital Care
- Disparity in emergency medical services between central and regional levels
- Insufficient medical equipment necessary for emergency medical services
- Lack of health professionals in emergency medicine in health facilities
- Lack of capacity of management and bed control in emergency departments

Post-Hospital Care
- Lack of human resources and equipment related to rehabilitation

From the achievements and lessons of Japan's past assistance, it is expected to be more effective to implement relevant projects through the programme approach. Some assistance plans which can be combined with each other are proposed as follows.

(1) Project for strengthening the emergency transportation system
(2) Project for the provision of ambulances
(3) Project for the development of EMTs
(4) Project for the improvement of medical equipment and the expansion of trauma/emergency departments in hub hospitals
(5) Project for strengthening the management of trauma/emergency departments
(6) Project for capacity building of doctors and nurses in the emergency departments
(7) Project for capacity building on diagnostic imaging of trauma/emergency patients
(8) Project for capacity building on bed control in the trauma/emergency departments
(9) Project for the improvement of medical equipment and the expansion of rehabilitation departments
(10) Project for the development of physiotherapists

As a result of consideration from the five perspectives, namely necessity, validity, urgency, request by GoN and feasibility, proposed plans (1) and (4) took high priority. MoH has also developed plans that are the same as these two proposed plans based on national health policies and considered the details of the plans, so it is thought assistance for proposed plans (1) and (4) are a high priority for MoH. In addition, other proposed plans can be combined with these two priority plans.

Data Collection Survey on
Emergency Medical Service and Disaster Medical Service
in Federal Democratic Republic of Nepal

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Abbreviation

AED	Automated External Defibrillator
ALS	Advanced Life Support
AMC	Annual Maintenance Contract
ARI	Acute Respiratory Infection
ART	Antiretroviral Therapy
BLS	Basic Life Support
BTSC	Blood Transfusion Service Centre
CB-IMCI	Community Based Integrates Management of Childhood Illnesses
CB-IMNCI	Community Based Integrates Management of Neonatal and Childhood Illnesses
CCU	Coronary Care Unit
CMC	Comprehensive Maintenance Contract
CNDRC	Central Natural Disaster Relief Committee
CT	Computed Tomography
DFID	Department for International Development
DOTS	Direct Observed Treatment, Short-course
EDPs	External Development Partners
EMT	Emergency Medical Technician
ENT	Ear, Nose and Throat
FCHVs	Female Community Health Volunteers
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GoN	Government of Nepal
HEOC	Health Emergency Operation Centre
HIV	Human Immunodeficiency Virus
HMIS	Health Management Information System
ICU	Intensive Care Unit
INGO	International NGO
IOM	Institute of Medicine
IUCD	Intrauterine Contraceptive Device
JICA	Japan International Cooperation Agency
KfW	Kreditanstalt fur Wiederaufbau
KUSMS	Kathmandu University School of Medical Sciences
MBBS	Bachelor of Medicine and Bachelor of Surgery
MDGs	Millennium Development Goals

MDR-TB	Multidrug-Resistant Tuberculosis
MoE	Ministry of Education
MoF	Ministry of Finance
MoH	Ministry of Health
MoHA	Ministry of Home Affairs
MoPIT	Ministry of Physical Infrastructure and Transport
MRI	Magnetic Resonance Imaging
NAMS	National Academy of Medical Sciences
NAS	Nepal Ambulance Service
NCDs	Non-Communicable Diseases
NEOC	National Emergency Operation Centre
NGO	Non-Governmental Organization
NICU	Neonatal Intensive Care Unit
NHSS	National Health Sector Strategy
NRCS	Nepal Red Cross Society
OBGYN	Obstetrics and Gynaecology
OCHA	Office for the Coordination of Humanitarian Affairs
ODA	Official Development Assistance
OOP	Out-of-pocket
OPD	Out-Patient Department
PEN	Package of Essential Non-Communicable Diseases
PMTCT	Prevention of Mother to Child Transmission
PPICD	Policy, Planning and International Cooperation Division
Rs.	Nepalese Rupee
RTA	Road Traffic Accident
SBA	Skilled Birth Attendant
SDGs	Sustainable Development Goals
SLC	School Leaving Certificate
SWAps	Sector-Wide Approach
TB	Tuberculosis
TUTH	Tribhuvan University Teaching Hospital
UN	United Nations
UNDP	United Nations Development Programme
UNDAF	United Nations Development Assistance Framework
UNFPA	United Nations Population Fund
UNICEF	United Nations Children Fund

USAID	United States Agency for International Development
WFP	World Food Programme
WHO	World Health Organization
5S-KAIZEN (CQI)-TQM	5S-KAIZEN (Continuous Quality Improvement)-Total Quality Management

Chapter 1 General Situation

Chapter 1 General Situation

1-1 Overview of the Country

The Federal Democratic Republic of Nepal (Nepal) is a landlocked country bordered by India and China. The country is located in the southern part of the Himalayas, and the total land area is approximately 147,000 km^2. Climatic conditions of Nepal vary from one place to another in accordance with the geographical features. In the northern mountainous area, summers are cool and winters are severe, while in the southern low-lying areas, summers are tropical and winters are mild. Nepal has a monsoon season from June to September, and a dry season is from October to May.

Administratively, Nepal is divided into 14 zones and 75 districts. Currently, there are five development regions (Eastern, Central, Western, Mid-Western, and Far-Western), but these will be abolished, and seven new provinces will be established (see Figure 1-1).

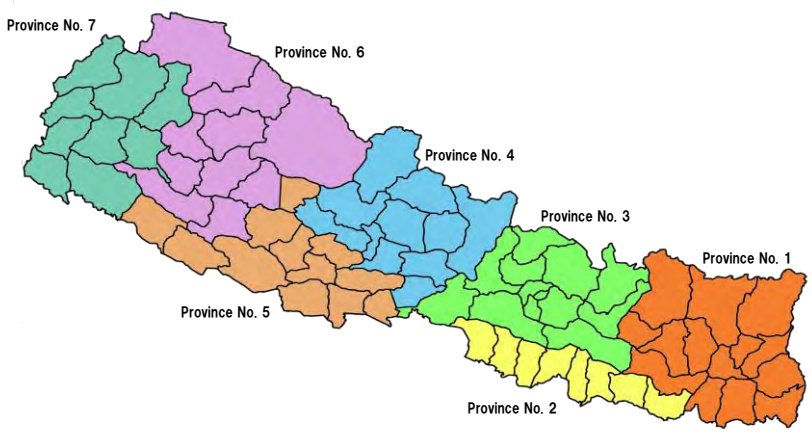

Figure 1-1 New provinces in Nepal
Source: Comparative Constitutions Project, *Nepal's Constitution of 2015*

1-2 Demographics

According to an estimate by the World Bank, the total population of Nepal was approximately 29 million in 2016 with a population growth rate of 3.2% in the urban areas and 0.7% in the rural areas. The rural population accounted for 81% of the total population. A total of 31.8% of the population was under 15 years old, 62.5% was between 15 to 64 years old and 5.7% was 65 years old or over[1]. The population aged 65 years or over has been increasing slowly and a sing of aging already can be seen.

According to the National Population and Housing Census in 2011, the average population density in Nepal amounted to 180 people/km^2, while it was 4,416 people/km^2 in Kathmandu. As Figure 1-2 shows, the population density was relatively higher in the southern part of the country near the border with India.

Table 1-1 Demographics

Index	2000	2005	2010	2016
Total population (million)	23.74	25.64	27.02	28.98
Urban population (%)	13	15	17	19
Rural population (%)	87	85	83	81
Crude birth rate per thousand population	32.1	27.5	22.9	20.2
Crude death rate per thousand population	8.5	7.3	6.7	6.3
Population growth rate （%）	1.85	1.30	1.05	1.13
Urban population growth rate (%)	6.0	3.4	3.1	3.2
Rural population growth rate (%)	1.2	0.9	0.6	0.7
Population under 15 years (%)	41.0	39.8	37.2	31.8
population between 15 to 64 years (%)	55.2	55.8	57.9	62.5
Population over 65 years (%)	3.8	4.4	5.0	5.7

Source: World Bank, *World Development Indicators*

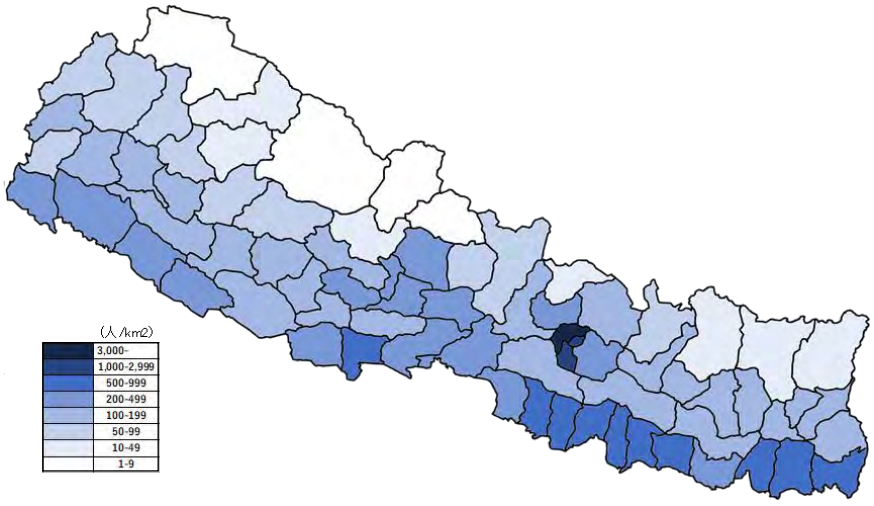

Figure 1-2 Population density by district

Source: Central Bureau of Statistics, *National Population and Housing Census 2011*

1-3 Socio-economic Situation

According to the Economic Survey Fiscal Year 2016/17, the gross domestic product (GDP) amounted to Rs. (Nepalese Rupee) 2,599,234 million, while GDP per capita was Rs. 90,521[2]. The economy of Nepal has grown steadily, with these annual growth rate of GDP remaining at about 3-6%. The annual growth rate fell to 0.56% in 2016, but recovered to 5.53% in 2017[3].

Agriculture remains Nepal's principal economic activity, employing about 65% of the population and providing 28% of GDP. Major export items are industrial products, ready-made clothes, carpets and food. The top export destinations of Nepal are India (60%), the United

States (10%), and Germany (4%), and the top import origins are India (60%), China (15%), and the United Arab Emirates (4%). The total trade value in 2015/16 was 7,315 million US dollars for imports; however, there was a trade deficit of about 6,650 million dollars because the value of exports was only 666 million dollars[4].

As shown in Figure 1-3, the number of new migrant workers leaving Nepal reached 528,000 in 2013/14; this figure is five times larger than that of 2001/02. In the same period, the amount of remittances from abroad has increased more than 10 times from Rs.480 billion (2001/02) to Rs. 5,430 billion (2013/14). The ratio of remittances from abroad to GDP in 2013/14 accounted for 28.2%; this figure is relatively higher than surrounding countries like Bangladesh (10.8%), India (3.4%), and Bhutan (0.6%)[5]. This shows that the economy of Nepal relies on remittances from abroad.

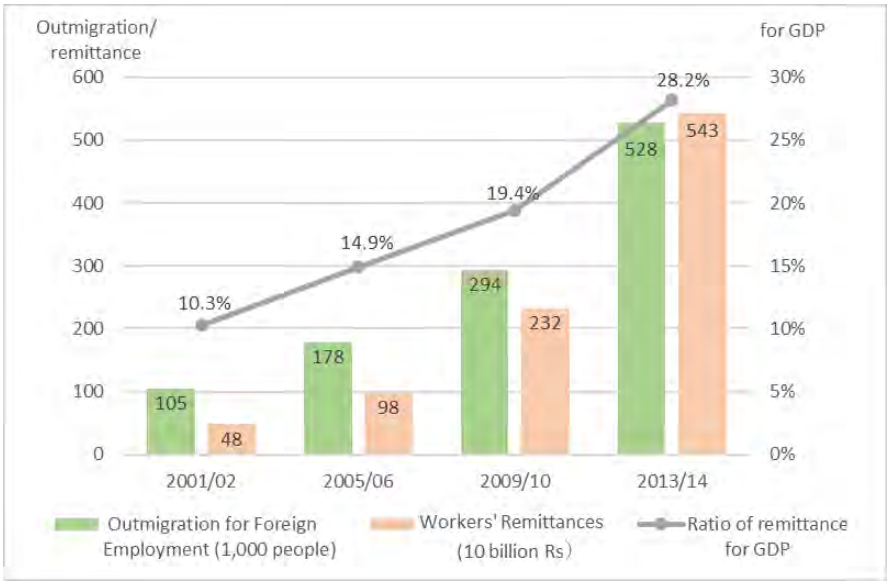

Figure 1-3 The number of new migrant workers and the transition of remittance
Source: Nepal Rastra Bank, *Current macro Situation Nepal*

References

1 World Bank, *World DevelopFment Indicators*
2 Government of Nepal, *Economic Survey Fiscal Year 2016/17*
3 International Money Fund, *World Economic Outlook Database, April 2017*
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5 United Nations Development Programme, *Human Development Report 2013* (Figures are as of 2011)

Chapter 2 Current Situations of the Health Sector

Chapter 2 Current Situations of the Health Sector

2-1 Health Situation in Nepal

2-1-1 Health Indicators

The health-related Millennium Development Goals (MDGs) were almost achieved in Nepal in 2015. The goals of reducing child mortality was achieved, and the rate of maternal mortality was also considerably decreased. The basic health indicators show an improvement in the health situation of Nepal during the last 15 years. As shown in Table 2-1, the health situation in Nepal did not differ from other countries in the region as of 2015. Maternal mortality, however, was higher than neighbouring countries, and the rate of deliveries attended by skilled birth attendants[i] was lower. It is still necessary to improve health services related to safe motherhood.

Table 2-1 Basic health indicators

	Nepal		Bhutan	Bangladesh	India
	2000	2015	2015		
Life Expectancy at Birth (years)	62.3	70.0	69.8	72.0	68.3
Neonatal Mortality Rate (per 1,000 live births)	39.3	22.2	18.3	23.3	27.7
Infant Mortality Rate (per 1,000 live births)	59.6	29.4	27.2	30.7	37.9
Under-5 Mortality Rate (per 1,000 live births)	80.6	35.8	32.9	37.6	47.7
Maternal Mortality Rate (per 100,000 live births)	548	258	148	176	174
Deliveries attended by SBA (% to total deliveries)	11.9	55.6*	86.1**	42.1*	81.4*
Total Fertility Rate (per woman)	4.00	2.17	1.98	2.14	2.40
Immunization Coverage, Hep-B (%)	74	91	99	94	87
Immunization Coverage, DPT (%)	-	91	99	94	87
Immunization Coverage, measles (%)	71	85	97	88	87

*2014, **2012 Source: World Bank, *World Development Indicators*

2-1-2 Trends in Diseases

Through the Health Management Information System (HMIS), health statistics are reported to the Ministry of Health (MoH) by 407 organizations, including 113 public health organizations at the district level and higher, as well as another 294 operated by the private sector, communities and NGOs (Non-Governmental Organizations). Based on this data and information, MoH develops an annual report on health services in the country.

The total number of inpatients of the health facilities registered with HMIS was about 970,000 in 2015/16, of which 400,000[ii] were cases specifically reported and classified into communicable and non-communicable diseases (NCDs). As shown in Table 2-2, the number of

[i] Skilled birth attendants are those who have a specialist skill in childbirth such as physicians, midwives and nurses.
[ii] Another 570,000 patients, who took infusion, injection and wound management, were not added to the analyse of communicable and non-communicable diseases.

cases of NCDs was six times that of communicable diseases, while deaths from NCDs was five times higher.

Table 2-2 Communicable and non-communicable cases and deaths (inpatient), 2015/16

Diseases	Cases	Deaths
Communicable	59,998	664
Non-communicable diseases	345,308	3,177
Total	405,306	3,841

Source: MoH, DoHS, *Annual Report 2015/16*

The top ten morbidities of inpatients shown by the health statistics of 2015/16 by the Department of Health Services (DoHS) of MoH were mainly common infectious diseases, although they included injury and some NCDs such as chronic obstructive pulmonary disease, cholecystitis and urinary disorders. Chronic obstructive pulmonary disease was the top cause of inpatient mortality, and diabetes mellitus and essential hypertension were also included in the top ten causes. These statistics suggested a critical disease burden of NCDs in Nepal (see Tables 2-3 and 2-4).

Table 2-3 Top ten morbidities of inpatients, 2015/16

	Diseases	Cases
1	Diarrhoea and gastroenteritis of presumed infectious origin	16,830
2	Other chronic obstructive pulmonary disease	13,202
3	Injury of unspecified body region	12,415
4	Cholecystitis	10,962
5	Other disorders of urinary system	9,366
6	Pneumonia, organism unspecified	8,909
7	Typhoid fever	8,455
8	Unspecified acute lower respiratory infection	7,837
9	Fever of other and unknown origin	6,854
10	Typhoid and paratyphoid fever	6,474
	Total	101,304

Source: MoH, DoHS, *Annual Report 2015/16*

Table 2-4 Top ten causes of death among inpatients, 2015/16

	Causes	Deaths
1	Other chronic obstructive pulmonary disease	403
2	Unknown and unspecified causes of morbidity	354
3	Pneumonia, organ unspecified	134
4	Injury of unspecified body region	107
5	Diarrhoea and gastroenteritis of presumed infectious origin	90
6	Unspecified diabetes mellitus	81
7	Pneumonia, organism unspecified	80
8	Essential (primary) hypertension	76
9	Motor- or nonmotor-vehicle accident, type of vehicle unspecified	70
10	Other disorders of urinary system	64
	Total	1,459

Source: MoH, DoHS, *Annual Report 2015/16*

The total number of outpatients of the health facilities registered with HMIS was about 19 million, or 65% of the total population, of which 44% were cases of infectious diseases, and 56% were NCDs (see Table 2-5).

Table 2-5 Communicable and non-communicable cases of outpatients, 2015/16

Diseases	Cases	Rate (%)
Communicable	8,186,591	44
Non-communicable diseases	10,580,430	56
Total	18,767,021	100

Source: MoH, DoHS, *Annual Report 2015/16*

Table 2-6 Top ten reasons (%) for outpatient consultations, 2015/16

	Reasons	%
1	Upper Respiratory Tract infection Cases	5.7
2	Other Diseases & Injuries-Gastritis	5.3
3	Other Diseases & Injuries-Headache	5.2
4	ARI/Lower Respiratory Tract Infection Cases	4.8
5	Presumed Non-Infectious Diarrhoea Cases	2.9
6	Water/Food Borne-Intestinal Worms Cases	2.8
7	Water/Food Borne-Typhoid (Enteric Fever) Cases	2.6
8	Skin diseases-Scabies Cases	2.4
9	Amoebic Dysentery/Amoebiasis Cases	2.2
10	ENT infection-Acute Tonsillitis Cases	2.2
	Total	36.1

Source: MoH, DoHS, *Annual Report 2015/16*

The top ten reasons for outpatient consultations were mainly infectious diseases, while the total number of cases of those top ten reasons shared only 36% of all reasons. The rest consisted of various NCDs, without sharing a large portion as a single reason.

In fact, the importance of medical services for NCDs is increasing among both inpatients and outpatients in Nepal, while the incidence of common infectious diseases remains high. Among these diseases, both NCDs and infectious diseases account for a serious disease burden in Nepal.

2-1-3 Maternal and Child Health

(1) Immunization

Access to quality immunization services is a constitutional right of every child in Nepal, and accordingly the National Immunization Programme is one of the highest priority programmes[1]. The coverages, however, were lower in 2015 than preceding years due to the earthquake. In 2015, the coverages were 87% for BCG, 82% for DPT-HepB-Hib 3, and 79% for Polio 3. In the same year, the coverage of Measles/Rubella was 77% for dose one, but only 24%

for dose two. A campaign has been implemented to raise the coverage[1].

The allocation of human resources, management of immunization records and a stock control and supply system for vaccines are challenges to improving the quality of the current immunization programme.

(2) Nutrition

The National Nutrition Programme is also highly prioritized targeting women and children[1]. In 2015/16, 78% of children aged 0 to 11 years old were newly registered for growth monitoring. Among these children, the prevalence of underweight children was 2.7% of infants 0 to 11 months old and 4.2% of children 12 to 23 months old. It was also reported that 31.7% of infants aged 0 to 12 months old were exclusively breast-fed and that 32.3% of infants aged six to eight months old were given complementary food[1]. The population and health survey in 2016 reported that anaemia occurred in 41% of women aged 15 to 49 years old, 46% of pregnant women and 53% of children under five years old.

Activities regarding growth monitoring, health education on breast feeding and complementary food, supplying Vitamin A supplements, the promotion of iodized salt, deworming, nutrition education at school, and suppling folic acid and iron tablets for pregnant women have been implemented in the framework of the National Nutrition Programme.

(3) Community Based Integrated Management of Neonatal and Childhood Illnesses

Community Based Integrated Management of Childhood Illness (CB-IMCI) has been implemented focusing on acute respiratory infection (ARI), digestive infections, parasitosis, vaccine-preventable diseases and malnutrition. Health workers and female community health volunteers (FCHV) have been mobilized for community-based diagnosis, treatment and case management. CB-IMCI commenced in 1999, and covered 41 districts as of 2014. The incidence of pneumonia and diarrhoea among children decreased as a result.

In 2015, CB-IMCI was renewed Community Based Integrated Management of Neonatal and Childhood Illnesses (CB-IMNCI) to integrate neonatal care. Programme management at the levels of district and region, the supply of necessary materials for the programme, the supply of essential medical equipment, and a system of patient referral are challenges to improving the quality of child and neonatal care through the programme.

(4) Family Planning

FCHVs, of which there are about 50,000 in Nepal, play an important role in the National Family Planning Programme. They provide oral pills, condoms and counselling to clients, and

refer their clients to health facilities when necessary. Depo[iii] is available at primary health care centres, health posts, and outreach clinics, while Intrauterine Contraceptive Device (IUCD) and implants are available at health facilities staffed with health workers who have received the necessary training. As shown in Table 2-7, the total number of clients of these family planning services was 696,534 in 2015/16. Voluntary surgical contraception is also available at health facilities and outreach programmes, and 28,381 clients used the service in 2015/16[1].

Table 2-7 New acceptors of family planning spacing by method

Method	New acceptors	%
Depo	242,051	35
Condom	219,996	32
Pill	119,035	17
Implant	83,557	12
IUCD	31,895	4
Total	696,534	100

Source: MoH, DoHS, *Annual Report 2015/16*

(5) Safe Motherhood

The Safe Motherhood Programme is being implemented to decrease the morbidities and mortalities of pregnant women and neonates. The programme aims at the enhancement of preparedness for delivery and complications, the promotion of antenatal care and institutional delivery, and the improvement of maternal centres and emergency obstetric care 24 hours a day in all districts. MoH also implements training of skilled birth attendants and advanced skilled birth attendant collaboration with health training centres and educational organizations.

Government of Nepal (GoN) commenced the Aama Programme providing benefits to pregnant women, health facilities and their staff. A pregnant woman can receive Rs.400 at each of four visits for antenatal care and Rs.500 to Rs.1,500 in transportation costs for her delivery at a health facility. A health facility can receive a benefit of Rs.1,000 to Rs.7,000 for delivery care and Rs.1,000 to Rs.8,000 for neonatal care depending on the services provided. Health workers attending a child delivery can receive Rs.300 per delivery. Nevertheless, the usage rates of benefits for institutional delivery and relevant transportation were only 49% and 48%, respectively, in 2015/16. In the same year, the number of institutional deliveries was 227,907, of which normal deliveries accounted for 73%, caesarean sections 24%, and instrumental delivery 3%[1].

Antenatal care at the fourth, sixth, eighth and ninth month of gestation, as well as post-natal care on the first, third and seventh day after delivery are recommended. The rates of visits, however, were only 76% for the first visit and 51% for the fourth visit for antenatal care,

[iii] Depo: contraceptive injection containing progestogen

and 52% for the first and 18% for the third visit for post-natal care in 2015/16. The rate of institutional delivery was 55% in the same year.

The low rate of service utilization despite various efforts is a challenge for reducing maternal mortality in Nepal.

2-1-4 Infectious Diseases

(1) Malaria

The incidence of and mortalities caused by malaria were halved in Nepal during the ten years after 2000. The number of cases of malaria sharply decreased from 1,674 in 2013 to 991 in 2015. This is thought to be due to the effects of the promotion of rapid testing and microscopy at basic health facilities and insecticide-treated bed nets in malaria endemic areas in the country, and the improvement of the socio-economic situation[1].

(2) Kala-azar

Kala-azar remains an important health problem among 18 districts in the Terai region, although its incidence is decreasing in the country. In 2015, 228 new cases were reported, and most cases were caused by domestic infection[1].

(3) Lymphatic Filariasis

The prevalence rate of lymphatic filariasis is 13%; it is somewhat higher in Terai and drainage areas than mountain areas. A relatively higher prevalence is reported in poorer rural areas. Annual mass medication has continued in those areas since 2003. Some 8.9 million people in 35 districts were medicated in 2016[1].

(4) Dengue

An outbreak of dengue fever occurred in 2010 and 917 cases were reported. It showed a decreasing tendency after that, and the number of cases in 2015 was 134, which were reported from 26 districts. Among them, Chitwan district reported 70 cases. Currently, Nepal's Dengue Control Programme is being implemented[1].

(5) Zoonoses

In Nepal, 60 kinds of zoonoses have been reported. The National Zoonosis Control Programme is being implemented, focusing on rabies and snake bites. In 2015, some 20,000 bites were reported; 88% of them were dog bites including six cases of mortality from rabies. Snake bites account for 3,000 cases, of which 663 cases were by venomous snakes including 20 cases of mortality[1].

(6) Leprosy

A total of 3,000 new cases of leprosy have been reported annually. The number of newly registered cases was 3,054 in 2015/16, and all of them were treated with combination chemotherapy. The prevalence rate of leprosy is 0.89 per 10,000 population, lower than the target set by World Health Organization (WHO) or one per 10,000 population, but the prevalence is showing an increase. Currently, the Leprosy Control Programme is being implemented[1].

(7) Tuberculosis

The National Tuberculosis Programme is being implemented. The number of new cases was 32,000 in 2015, and more than 70% of them were pulmonary. Among new cases, the ratio of population aged 15 to 24 years old was the highest. Mortality from tuberculosis accounted for 919 cases in the same year.

The directly observed treatment, short course (DOTS), was introduced in 2001. There are 4,344 DOTS centres in the country. The success rate of treatment of newly detected cases was 91.3 % in 2015/16.

Multidrug-resistant tuberculosis (MDR-TB) is one of the most critical health problems in Nepal. A survey in 2011 reported 2.2% of newly detected cases and 15.4% of retreated cases were MDR-TB, and 308 MDR-TB cases were reported in 2015/16[1].

(8) HIV/AIDS and STI

The new National HIV Strategic Plan 2016-2021 was launched with an ambitious 90-90-90 goal: by 2020, 90% of all people living with HIV know their HIV status, 90% of all people with diagnosed HIV infection receive sustained Antiretroviral Therapy (ART) and 90% of all people receiving ART have viral suppression.

The trend of new infections is declining after reaching its peak in 2000 to 2003, and the number of new HIV infections has decreased from 7,500 estimated cases in 2003 to 1,331 cases in 2015. As of 2015, the estimated number of people living with HIV (PLHIV) was 39,397, of which 76% were people aged 15 to 49 years old, and 62% were male. A total of 2,263 deaths from AIDS were reported in the same year.

ART is available at 65 sites in 59 districts, and the total cumulative number of PLHIV who have received ART was 12,446 as of 2015/16. A programme of prevention of mother-to-child transmission (PMTCT) commenced in 2005, and a community-based PMTCT programme also started in 2009. On the other hand, the coverage of PMTCT services was only 35% as of 2015[1]. Given the low coverage, the government's strategy envisages the PMTCT programme to be integrated and delivered through reproductive health and child health services.

2-1-5 Non-Communicable Diseases

According to the estimation by WHO, NCDs accounted for 60% of the causes of mortality in Nepal. As shown in Figure 2-1, cardiovascular diseases accounted for 22% of all causes, cancers 8%, chronic respiratory diseases 13%, diabetes 3% and other NCDs 14%.

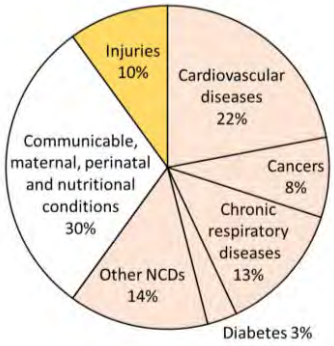

Figure 2-1 Proportion of mortality
Source: WHO, *NCDs Country Profile 2014, Nepal*

Table 2-8 shows that the proportion of NCDs in the causes of mortality is around 60% in neighbouring countries. However, the proportion of NCDs not diagnosed as the four major NCDs is higher in Bhutan (32% of all NCDs) and Bangladesh (31%), suggesting a relatively lower level of diagnostic services in those countries. That proportion in Nepal is 23%, being close to that of India (20%).

Table 2-8 Proportion mortalities of Nepal and neighbouring countries

	Nepal	Bhutan	India	Bangladesh
a. Cardiovascular diseases	22	18	26	17
b. Cancers	8	8	7	10
c. Chronic respiratory diseases	13	10	13	11
d. Diabetes	3	3	2	3
e. Other NCDs	14	18	12	18
f. Communicable, maternal, perinatal and nutritional conditions	30	24	28	32
g. Injuries	10	19	12	9
All NCDs (a+b+c+d+e)	60	57	60	59
Proportion of other NCDs (e÷(a+b+c+d+e))	23	32	20	31

Source: WHO, *Non-communicable diseases, Country Profile 2014, Nepal, Bhutan, India and Bangladesh*

In Nepal, a survey on NCDs risk factors with the STEPwise approach to surveillance (STEP) by WHO has been conducted since 2003. The survey in 2013 reported that hypertension was observed among one-fourth of the population aged 15 to 69 years old, and the prevalence of diabetes was 3.6%. Those proportions were higher for men than women. Common cancers were oral and lung cancers among men, and breast and cervix cancers among women.

The STEP surveys clarified the risk factors of NCDs: overweight (17.7% of the population), obesity (4%), harmful use of alcohol (18.6%), current tobacco smoking (15.8%) and solid fuel use (74% of households). The problem of automobile exhaust and other exhaust fumes from industry in Kathmandu due to rapid urbanization has also been recognized, because it is reported that the odds of having chronic obstructive pulmonary diseases are 1.96 times higher for residents in the Kathmandu Valley compared to residents outside the valley.

In Nepal, measures for NCD prevention have yet to be taken other than an obligatory clear statement on tobacco packages warning of health problems caused by tobacco use. In 2013, a multi-sectoral committee was established for the first time, and the Multi-sectoral Action Plan for the Prevention and Control of NCDs 2014-2020 was developed, targeting seven diseases/areas and five risk factors (Table 2-9) with the goals of the actions shown in Table 2-10. The main activities were planned in four areas (Table 2-11), and MoH and other relevant organizations implement the activities in collaboration with each other.

Table 2-9 Target diseases/areas and risk factors

Target diseases/areas	Risk factors
Cardiovascular diseases	Tobacco use
Chronic respiratory diseases	Harmful use of alcohol
Cancers	Unhealthy diet
Diabetes	Physical inactivity
Road safety	Indoor air pollution
Oral health	
Mental health	

Source: The government of Nepal, *Multi-sectoral Action Plan on the Prevention and Control of NCD in Nepal 2014-2020*

Table 2-10 Goals of Multi-sectoral Action Plan on the Prevention and Control of NCD in Nepal 2014-2020

1	25% relative reduction in overall mortality from cardiovascular disease, cancers, diabetes, or chronic respiratory diseases
2	10% relative reduction in the harmful use of alcohol
3	30% relative reduction in prevalence of current tobacco use in persons aged over 15 years
4	50% relative reduction in the proportion of households using solid fuels as the primary source of cooking
5	30% relative reduction in mean population intake of salt/sodium
6	25% reduction in prevalence of raised blood pressure
7	Halt the rise in obesity and diabetes
8	10% relative reduction in prevalence of insufficient physical activity
9	50% of eligible people receive drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes
10	80% availability of affordable basic technologies and essential medicines, including generics, required to treat major NCDs in both public and private facilities

Source: The government of Nepal, *Multi-sectoral Action Plan on the Prevention and Control of NCD in Nepal 2014-2020*

Table 2-11 Activities of Multi-sectoral Action Plan on the Prevention and Control of NCD in Nepal 2014-2020

Action area 1 Leadership, advocacy and partnership
- Establish of National Steering Committee, NCD unit at the MoH and regional/district NCD committees
- Encourage review of work plans and sharing lessons of implementation
- Raise awareness about NCDs through social marketing and mass media
- Hold regular meetings and implement the action plans in collaboration with NGO and INGO

Action area 2 Health promotion and risk reduction
- Enforce of the existing tobacco regulations
- Encourage implementation of alcohol policies
- Promote healthy diet and physical activity
- Implement the project for reducing indoor air pollution at the community level

Action area 3 Health systems strengthening for early detection and management of NCDs and their risk factors
- Implement the PEN programme in the pilot districts and expand nationwide
- Define essential drugs and diagnostic services for NCDs and develop the procurement supply mechanism of the drugs and diagnostic equipment
- Capacity building of health workforce for management of common NCDs (including development of guidelines and conducting training)
- Upgrade the facilities to respond to tertiary NCD care
- Strengthen referral system from primary to tertiary level (including development of referral guidelines)

Action area 4 Surveillance, monitoring and evaluation, and research
- Integrate NCD information in the HMIS and improve availability and use of data for evidence-based policy and programme development
- Conduct the STEPS survey every five year for assessment of NCD action plan
- Review the vital registration systems to improve the data collection and quality
- Advance research skills through conducting the research on NCDs with national and international teams

Source: The government of Nepal, *Multi-sectoral Action Plan on the Prevention and Control of NCD in Nepal 2014-2020*

In the health sector, NCD prevention and control are integrated into primary health care in the framework of the Nepal Health Sector Strategy 2015-2020. A pilot programme based on the package of essential NCDs (PEN) of WHO was implemented in the Ilam district and Kailali district. Medical equipment to be used for the diagnosis of NCDs including CT scanners is provided to secondary health facilities. In 2016, the Emergency Trauma Management Guidelines were developed. Other guidelines on care for NCDs are expected to be developed in the near future. MoH plans to implement training courses on NCD management in line with these guidelines. The guidelines regarding ambulance services have been revised and the establishment of an emergency transportation network of ambulance vehicles is underway.

"Action area 3: Health systems strengthening for early detection and management of NCDs and their risk factors" is highlighted in the health sector, although the activities have just recently started. The smooth implementation and rapid progress of these activities are indispensable to fight the burden of NCDs, which is already significant in Nepal.

2-2 Policies in the Health Sector

2-2-1 National Development Plans

A five-year development plan was initiated in 1956 in Nepal, and changed to a three-year plan from 2007 onwards. The tenth national five-year plan 2002/3-2007/8 was a poverty reduction strategy paper with the four pillars of broad-based economic growth, social sector development including human development, social inclusion and good governance. The Approach Paper of the Fourteenth Plan 2016/17-2019/20 is oriented toward building a prosperous country through reconstruction after the damage caused by the devastating earthquake in 2015 and building a self-reliant and independent economy. In addition, the plan should be formulated to achieve the sustainable development goals (SDGs) by 2030 along with the target to reach the level of middle-income countries by the same time. The achievement of the MDGs and targets of the SDGs of Nepal are shown in Tables 2-12 and 2-13.

Table 2-12 Nepal's achievement of the MDG targets in the health sector, 1990 – 2015 (Excerpt)

		Base year 1990	Target for 2015	Status in 2015
4. Reduce Child Mortality				
4.A	Reduce under-five mortality by two thirds between 1990 and 2015			
	Infant mortality rate (per 1,000 live births)	108	36	33
	Under-five mortality rate (per 1,000 live births)	162	54	38
	Proportion of one-year old children immunized against measles (%)	42	>90	92.6
5. Improve maternal health				
5.A	Reduce the maternal mortality ratio by three-quarters between 1990 and 2015			
	Maternal mortality ratio (per 100,000 live births)	850	213	258
	Proportion of births attended by skilled birth attendants (%)	7	60	55.6
5.B	Achieve universal access to reproductive health by 2015			
	Contraceptive prevalence rate (modern methods) (%)	24	70	49.6
	Antenatal care coverage: at least one visit (%)	-	100	68.3
	Antenatal care coverage: at least four visits (%)	-	80	59.5
6. Combat HIV/AIDS, Malaria and tuberculosis				
6.A	Have halted by 2015 and began to reverse the spread of HIV/AIDS			
	HIV prevalence among men and women aged 15-24 years (%)	-	Halt and reverse the trend	0.03
6.B	Achieve universal access to treatment for HIV/AIDS for all those who need it by 2015			
	Proportion of population with advanced HIV infection receiving antiretroviral combination therapy (%)	-	80	26.5
6.C	Have halted by 2015 and began to reverse the incidence of malaria and other major diseases			
	Clinical Malaria incidence (per 1,000 population)	-	Halt and reverse the trend	1.74
	Annual parasite incidence (per 1,000 population)	-	0.06	0.11
	Prevalence rate associated with TB (per 100,000)	460	Halt and reverse the trend	211
	Death rate associated with TB (per 100,000)	43	Halt and reverse the trend	20
	Proportion TB cases detected	-	85	83
	Proportion of TB cases cured under DOTS	40	91	91

Source: National Planning Commission (20016) *Nepal and the MDGs Final Status Report 2000-2015*

Table 2-13 Nepal's targets with proposed indicators for SDG 3 (Excerpt)

			Base year 2014	Target for 2030
SDG 3. Ensure healthy lives and promote well-being for all at all ages				
3.1	By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births			
	3.1	Maternal mortality ratio (per 100,000 live births)	258	70
3.2	By 2030, end preventable deaths of newborns and children under 5 years of age			
	3.2a	Neonatal mortality rate (per 1,000 live births)	23	1
	3.2b	Under-five mortality rate (per 1,000 live births)	38	1
3.3	By 2030, end the epidemics of AIDS, tuberculosis, malaria, and neglected tropical diseases, and combat hepatitis, water-borne diseases and other communicable diseases			
	3.3a1	HIV prevalence for the overall population aged 15-49 year (%)	0.2	0
	3.3a2	HIV prevalence among men and women aged 15-24year (%)	0.03	0
	3.3b	Prevalence of tuberculosis per 100,000 population	211	0
	3.3c	Confirmed malaria cases (number)	211	0
	3.3f	Annual incidence of diarrhoea (per 1,000 under 5 years children)	578	0
3.4	By 2030, reduce by one-third premature mortality from NCDs through prevention and treatment and promote mental health and well being			
	3.4a	Deaths (ages 30-70 years) from cardiovascular diseases, cancers, chronic respiratory diseases and diabetes (%)	22	7.3
3.6	By 2020, halve the number of global deaths and injuries from road traffic accidents			
	3.6a1	Road traffic accident mortality (per 100,000 population)	33.7	-
	3.6b	By 2020, halve the number of injuries from road traffic accidents		
	3.6b1	Serious injuries (per 100,000 population)	71.7	-
	3.6b2	Slight injuries (per 100,000 population)	163.7	-
3.7	By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes			
	3.7b	Proportion of births attended by SBA (%)	55.6	90
	3.7d	Antenatal care coverage (at least four visits) (%)	59.5	90
	3.7e	Institutional delivery (%)	55.2	90

Source: National Planning Commission (2015) *Sustainable Development Goals 2016-2030 National (Preliminary) Report*

2-2-2 Health Policy

A long-term health sector programme has been developed since 1975 in the framework of the national development plans. In line with the long-term plans, a five-year health strategy has been developed since 2004 (see Figure 2-2).

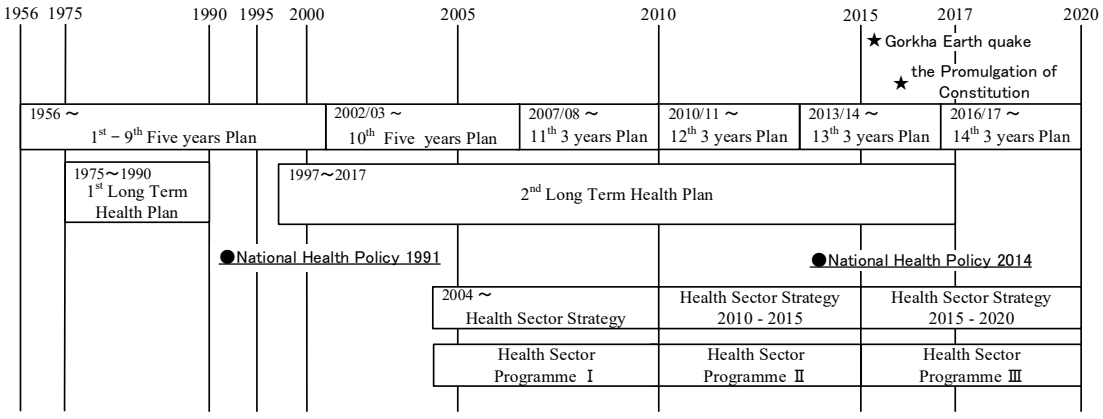

Figure 2-2 Health policy and programmes

Source: Government of Nepal, *An Approach Paper of the Fourteenth Three-Year Plan*,
MoH, DoHS, *Annual Report 2015/16*

(1) Health development strategy in national development plan

The fourteenth three-year national development plan 2016/17-2019/20 sets the vision for the health sector as "healthy and strong citizens through access to quality health services for all." Its operation policies include human resources development, the expansion of health insurance, the improvement of health facilities all over the country to provide preventive and curative services for infectious diseases, as well as NCDs, the promotion of public-private partnerships and the enhancement of necessary service deliveries and research.

(2) National Health Policy 2014

The National Health Policy 2014 sets the goal of ensuring health for all citizens as a fundamental human right by increasing access to quality health services through a provision of equitable and accountable health system. The policy also shows three objectives, namely to provide basic health services free of charge, to establish effective and accountable health services and to promote the participation of people and the involvement of the private sector and NGOs in health service provision.

(3) Health Sector Strategy 2015-2020

MoH has developed the Health Sector Strategy 2015-2020 to achieve the goals set by the National Health Policy 2014, with the outcomes shown in the following table.

Table 2-14 Goal and outcomes of the Nepal Health Sector Strategy 2015-2020

Goal	Improved health status of all people through accountable and equitable health service delivery system
Outcome 1	Rebuilt and strengthened health systems: Infrastructure, HRH management, Procurement and Supply chain management
Outcome 2	Improved quality of care at point-of-delivery
Outcome 3	Equitable utilization of health care services
Outcome 4	Strengthened decentralized planning and budgeting
Outcome 5	Improved sector management and governance
Outcome 6	Improved sustainability of health sector financing
Outcome 7	Improved healthy lifestyles and environment
Outcome 8	Strengthened management of public health emergencies
Outcome 9	Improved availability and use of evidence in decision-making processes at all levels

Source: MoH (2015) *Nepal Health Sector Strategy 2015-2020*

The Health Sector Strategy states that the challenges are strengthening the health system to meet the epidemiological transition and rapid urbanization, improving health services access and correcting the gender discrepancy. It is also mentioned that these challenges should be solved through multi-sectoral interventions, based on the outcomes in the health sector during the last 20 years. Table 2-15 shows the goal level indicators of the health sector strategy.

Table 2-15 Goal level indicators of the Nepal Health Sector Strategy 2015-2020

Indicators	Base line		Milestone/Target	
	Data	Year	2017	2020
Maternal mortality ratio (per 100,000 live births)	190	2013	148	125
Under five mortality rate (per 1,000 live births)	38	2014	34	28
Neonatal mortality rate (per 1,000 live births)	23	2014	21	17.5
Total fertility rate (births per women aged 15-49 years)	2.3	2014	2.2	2.1
% of children under-5 years who are stunted	37.4	2014	34	31
% of women aged 15-49 years with body mass index less than 18.5	18.2	2011	13	12
Life lost due to road traffic accidents per 100,000population	34	2013	23	17
Suicide rate per 100,000 population	16.5	2014	15	14.5
Disability adjusted life years lost due to Communicable, maternal & neonatal, non-communicable and injuries	8,319,695	2013	7,487,726	6,738,953
Incidence of impoverishment due to OOP expenditure in health	NA	-	-20%	

Source: MoH (2015) *Nepal Health Sector Strategy 2015-2020*

2-3 Health Administration

2-3-1 Organization of Ministry of Health

(1) Central Level

MoH has five divisions, three departments, six national centres, and six professional councils. The Curative Service Division and the Department of Health Services (DoHS) supervise health facilities in the country. The former is in charge of hospitals at the zonal level and above, and the latter, facilities at the district level and below. Accordingly, they are responsible for emergency and disaster medical services. Control of outbreaks is the responsibility of the Epidemiology and Disease Control Division in the DoHS.

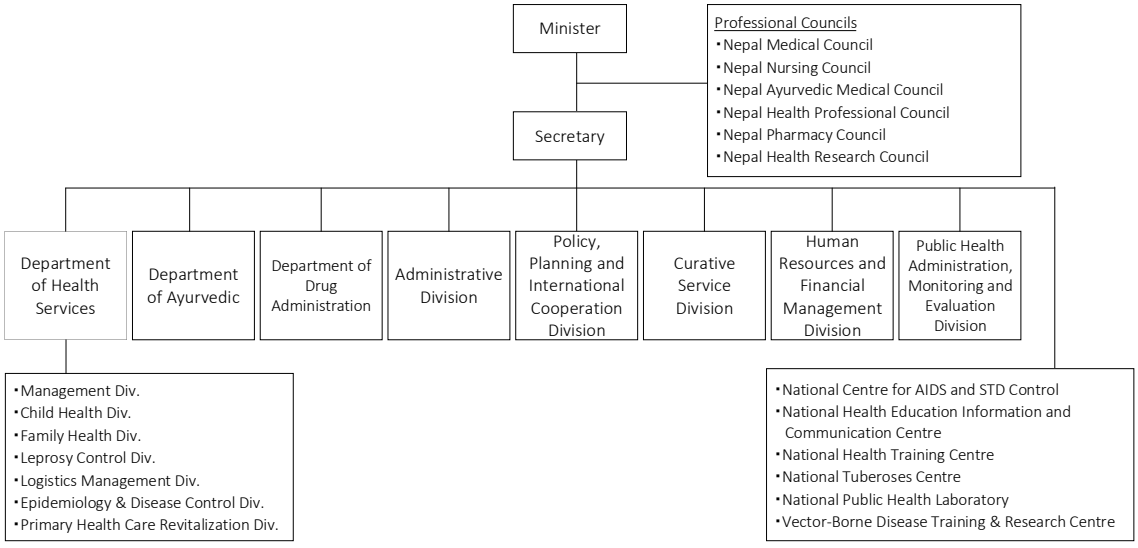

Figure 2-3 Organogram of MoH
Source: MoH, *Annual Report 2015/16 and Information provided by MoH*

(2) Regional Level

A regional health directorate is located in each development region. The directorate is under the control of DoHS, and supervises and monitors the district level. Accreditations of budgets and the construction and management of health facilities in the region are also the responsibility of the directorate.

(3) District Level

A district health office or a district public health office is located in each district. The office is under the control of a regional health directorate. The district health office is in charge of medical and public health services, while the district public health office is only responsible for public health services.

2-3-2 Reform of Health Administration

Health services are delivered in line with the administrative divisions with five regions, 14 zones and 75 districts. The existing system is currently being reformed in line with the renewed administration outlined in the new constitution promulgated in 2015. It has been decided, under the constitution, to abolish the development regions and to establish seven provinces and 744 local governments.

The seven provinces will be the basic unit of health administration, and the provincial branch of MoH will supervise the provision of health services in each province. The lower administration, which has been responsible for the district health offices and the district public health offices, will be manged by the local governments.

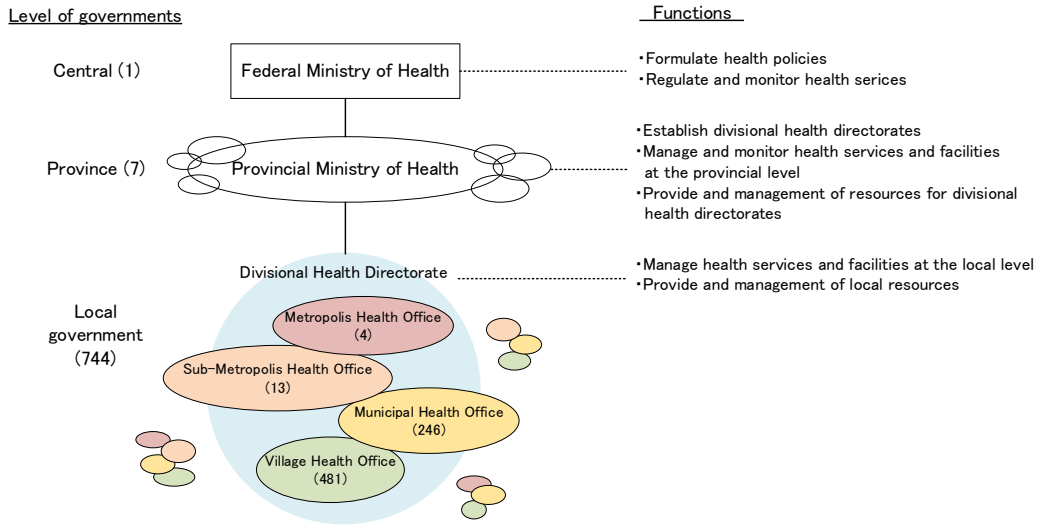

Figure 2-4 Reform of health administration

Source: MoH, *Integrated Health Infrastructure Development Project Concept Presentation*

2-3-3 Health Budget

The health budget in 2015/16 was Rs.36.7 billion, which was one-and-a-half times as much as the amount in 2011. The proportion of the health budget against the national budget has been around five percent (see Table 2-16). As shown in Table 2-17, health expenditure by DoHS accounts for some 70% of the total. Most of the health budget is used for the implementation of public health programmes for maternal and child health, infection control, primary health care, etc., through DoHS.

Table 2-16 Health budget (Unit: Billion Nepal Rupee)

	2011/12	2012/13	2013/14	2014/15	2015/16
GDP	1,527	1,693	1,929	2,120	2,248
National government budget	385	405	517	618	819
Health budget	24.9	20.2	30.4	33.5	36.7
Health budget as a percent of the national government budget	6.5	4.9	5.8	5.4	4.5

Source: MoH, *Annual Progress Report of Health Sector Fiscal Year 2015/16*

Table 2-17 Health expenditure by MoH organizations (Unit: Billion Nepal Rupee)

	2011/12	2012/13*	2013/14	2014/15	2015/16
Ministry of Health	1.4	-	2.0	1.7	2.1
Department of Health Services	14.8	-	14.9	16.5	19.3
Department of Drug Administration	0	-	0.1	0.1	0.1
Department of Ayurvedic	0.5	-	0.7	0.7	0.7
National Centres	1.3	-	1.6	1.2	0.7
Hospitals	2.2	-	3.6	4.3	6.2
Total	20.3	19.0	22.9	24.5	29.2
Budget execution rate (%)	81.2	94.1	75.1	73.2	79.6

*No breakdown data in 2012/13 Source: MoH, *Annual Progress Report of Health Sector Fiscal Year 2015/16*

The amount of funding by the development partners is shared at about 20 to 30% of the health budget in Nepal. The World Bank, the Department for International Development (DFID) and the Kreditanstalt fur Wiederaufbau (KfW) implement their funding as pooled funds. According to the Annual Progress Report of Health Sector 2015/16 by MoH, the rate of disbursement of the health budget was around 80%.

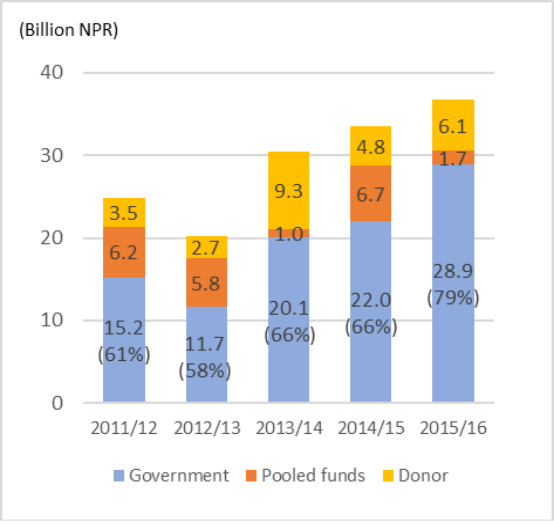

Figure 2-5 Sources of health budget
Source: MoH, *Annual Progress Report of Health Sector Fiscal Year 2015/16*

2-4 System of Health Service Delivery

2-4-1 Health Facilities

(1) Health facilities in the current system

Public facilities include hospitals, primary health care centres and health posts as shown in Table 2-18.

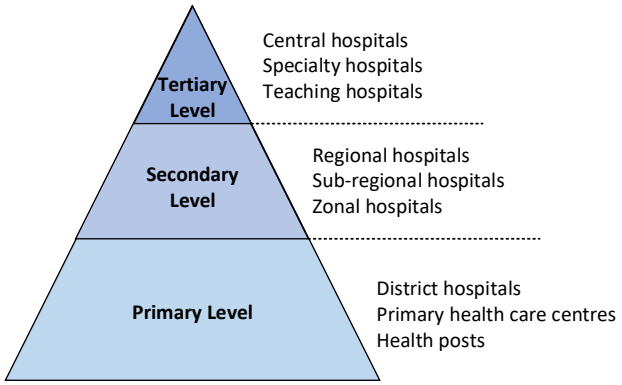

Figure 2-6 Service delivery framework

Source: Information provided by MoH

Table 2-18 Health facilities

Type	Units
Central/Specialty hospital	13
Teaching hospital	5
Ayurveda/Homeopathic hospital	2
Regional hospital	3
Sub-regional hospital	3
Zonal hospital	10
District hospital	58
Hospital (district level)	29
Primary health care centre	202
Health post	3,803
Total	4,128

Source: Information provided by MoH

Health facilities are classified by size and service provision into primary to tertiary facilities. Health posts are the first point of contact for patients, and patients are referred to a higher-level facility when necessary. The primary facilities, however, are insufficiently equipped and staffed. Higher-level facilities do not recognize a way to adequately accept patients as referred cases from a lower level. On the other hand, basic health services are free of charge at any level of facility. All these factors result in the patient behaviour of visiting a secondary or tertiary hospital for any case from the beginning. Accordingly, higher-level facilities, especially tertiary hospitals, which provide basic to tertiary care, are always crowded with patients with a variety of complaints.

- Tertiary level

Tertiary hospitals, being equipped with magnetic resonance imaging (MRI) devices, computed tomography (CT) scanners, angiographic apparatuses, mammographic apparatuses, gamma-cameras, etc., provide specialized medical care that is not available at the secondary level. Most tertiary hospitals, namely central, specialty and teaching hospitals, have 100 to 400 beds, as do those in Kathmandu (see Table 2-19). Specialty hospitals include those for paediatrics, obstetrics/gynaecology, cardiology, oncology, respiratory system problems, psychiatrics, tropical medicine/infectious diseases and transplantation. Central hospitals include those for government, military and police employees and their families. Teaching hospitals are those attached to universities. Tribhuvan University Teaching Hospital (TUTH), Bir Hospital, and Patan Hospital function as teaching hospitals, as well as central hospitals.

Table 2-19 Public tertiary hospitals

Type	Name of facilities	Location	
Speciality hospital	Kanti Children Hospital	Central region	(Kathmandu district)
	Paropakar Maternity & Women's Hospital	Central region	(Kathmandu district)
	National Trauma Centre	Central region	(Kathmandu district)
	Shahid Gangalal National Heart Centre	Central region	(Kathmandu district)
	Tropical & Infectious Disease Hospital	Central region	(Kathmandu district)
	Human Organ Transplant Centre	Central region	(Bhaktapur district)
	Mental Hospital	Central region	(Lalitpur district)
	B.P. Koirala Cancer	Central region	(Chitwan district)
	GP Koirala Respiratory Hospital	Western region	(Tanahun district)
	Sushil Koirala Prakhar Cancer Hospital	Mid-western region	(Banke district)
Central hospital	Civil Services Hospital	Central region	(Kathmandu district)
	Nepal Army Hospital	Central region	(Kathmandu district)
	Nepal Police Hospital	Central region	(Kathmandu district)
Teaching hospital	Tribhuvan University Teaching Hospital	Central region	(Kathmandu district)
	Bir Hospital	Central region	(Kathmandu district)
	Patan Hospital	Central region	(Kathmandu district)
	B.P. Koirala Institute of Health Sciences	Eastern region	(Sunsari district)
	Karnali Academy of Health Science	Mid-western region	(Jumla district)

Source: Information provided by MoH

- Secondary level

Secondary hospitals are regional, sub-regional and zonal hospitals, that have 50 to 350 beds (see Table 2-20). They provide basic medical services of internal medicine, surgery, obstetrics/gynaecology, paediatrics, orthopaedics and dentistry, including diagnosis, treatment and operations that are not available at the primary level. Most secondary hospitals are equipped with image diagnostic apparatuses for general X-ray and ultrasound, but a few of them have CT scanners.

Table 2-20 Public secondary hospitals

Type	Name of facilities	Location	
Regional hospital	Hetauda Regional Hospital	Central region	(Makwanpur district)
	Pokhara Regional Hospital	Western region	(Kaski district)
	Surkhet Regional Hospital	Mid-western region	(Surkhet district)
Sub-regional hospital	Narayani Sub-Regional Hospital	Central region	(Parsa district)
	Rapti Sub-Regional Hospital	Mid-western region	(Dang district)
	Dadeldhura-Sub Regional Hospital	Far-western region	(Dadeldhura district)
Zonal hospital	Mechi Zonal Hospital	Eastern region	(Jhapa district)
	Koshi Zonal Hospital	Eastern region	(Morang district)
	Sagarmatha Zonal Hospital	Eastern region	(Saptari district)
	Janakpur Zonal Hospital	Central region	(Dhanusha district)
	Lumbini Zonal Hospital	Western region	(Rupandehi district)
	Dhaulagiri Zonal Hospital	Western region	(Baglung district)
	Rapti Zonal Hospital	Mid-western region	(Dang district)
	Bheri Zonal Hospital	Mid-western region	(Banke district)
	Seti Zonal Hospital	Far-western region	(Kailali district)
	Mahakali Zonal Hospital	Far-western region	(Kanchanpur district)

Source: Information provided by MoH

➢ Primary level

Facilities at the primary level are district hospitals, primary health care centres and health posts. Each district hospital has 15 to 25 beds on average. Some patients of other primary facilities are referred to district hospitals, which are equipped with general X-ray and ultrasound image diagnostic apparatuses, and provide services of caesarean sections and general surgery. Some public hospitals, which are not district hospitals but provide equivalent services, are included in the same level as district hospitals.

Primary health care centres have one physician each and a number of beds. They can accept inpatients for a short period. Health posts, which are people's first point of contact, do not have a physician but have nurses and paramedics, and accept outpatients only. These facilities are basically allocated based on the size of the population (see Table 2-21).

Table 2-21 Public primary hospitals by region

Type	Total	Eastern	Central	Western	Mid-western	Far-western
Estimated population	2,862,1714	6,149,165	10,634,503	5,181,967	3,874,100	2,781,979
District hospital	58	13	13	15	11	6
Other hospital, district level	29	6	8	6	5	4
Primary health care centre	202	49	70	40	27	16
Health post	3,803	863	1,167	842	556	375
(per 10,000 pop.)		(1.4)	(1.1)	(1.6)	(1.4)	(1.3)

Source: Number of facilities, Information provided by MoH,
Estimated population, MoH/DOHP *Annual Report 2015/16*

The Nepal Facility Survey 2015 reported there were a total of 364 facilities that were not public, but were operated by the private sector, communities or NGOs. The detailed profile of these hospitals was not clarified. The establishment of a health facility is subject to the approval of an organization of MoH based on the size of the facility to be established (see Table 2-22).

Table 2-22 Size of new facility and approving organization

Size of facility	Approving Organization
more than 200 beds	Ministry of Health
51 to 200 beds	Department of Health Service
26 to 50 beds	Regional Health Directorate
25 beds or less	District Health Office

Source: Information provided by MoH

(2) Allocation of Health Facilities under the Administrative Reform

A referral system will be established in each province, and health facilities in a province will be classified into hospitals at the primary to tertiary levels or health posts (see Figure 2-7). Difficult cases that cannot be covered by the tertiary level of a province will be referred to the specialty hospitals at the central level. The establishment of at least one teaching hospital in each province is being discussed. The specialty hospitals and the teaching hospitals will be

under the control of the federal MoH. The hospitals at the secondary and tertiary levels in a province will be directly controlled by the provincial MoH, while primary hospitals and health posts will be supervised by local governments. In this context, upgrading some hospitals and establishing new hospitals are planned, although a budget plan has yet to be drafted. Table 2-23 shows the services to be provided by each facility in the new system.

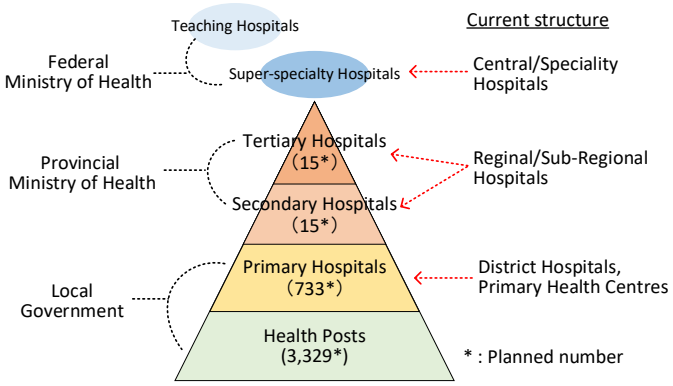

Figure 2-7 Provincial referral system with newly classified facilities

Source: Information provided by MoH

Table 2-23 Services to be provided in the new system

Type	Services
Teaching hospital at least one in each province	- 24hrs emergency services with operation theatre - Dialysis, ICU, Coronary Care Unit, NICU - Neurology, cardiac surgery, plastic surgery, as per demand - General/OBGYN/orthopaedic/urology/ophthalmology/neuro/ENT operations - OPD services - General medical/surgical/OBGYN/neonatal/paediatric/dental/orthopaedic/ENT/ urological/dermatological/psychiatric/ophthalmological/cardiology/neurosurgery and other specialised services as per need of teaching hospital - Preventive/promotion services
Super-specialty hospital	- 24hrs emergency services with operation theatre - Dialysis, ICU, CCU, NICU (Neonatal Intensive Care Unit) - Neurology, cardiac surgery, plastic surgery, as per demand - General/OBGYN/orthopaedic/urology/ophthalmology/neuro/ENT operations - OPD services - General medical/surgical/OBGYN/neonatal/paediatric/dental/orthopaedic/ENT/ urological/dermatological/psychiatric/ophthalmological/cardiology/neurosurgery and other specialised services - Awareness/preventive services
Tertiary hospital at least one in each province	- 24hrs emergency services with operation theatre - Dialysis, ICU, NICU - Neurology, cardiac surgery, plastic surgery, as per demand - General/OBGYN/orthopaedic/urology/ophthalmology/neuro/ENT operations - OPD services - General medical/surgical/OBGYN/neonatal/paediatric/dental/orthopaedic/ENT/ urological/dermatological/psychiatric/ophthalmological/cardiology/neurosurgery and other specialised services - Awareness/preventive services
Secondary hospital 100-200 beds 100,000-300,000 population	- 24hrs emergency services with operation theatre - Dialysis, ICU, NICU - General/OBGYN/orthopaedic/ENT operations - OPD services - General medical/surgical/OBGYN/neonatal/paediatric/dental/orthopaedic/ENT (up to 150 beds), and urological/dermatological/psychiatric/ophthalmological services (>150 beds) - Awareness/preventive services - Public health (Basic health services) including X-ray

Primary hospital Type A1 50-100 bed 80,000-100,000 population	- 24hrs emergency services - Neonatal and general high dependency service - Caesarean sections, major/minor general/gynaecological surgery - OPD services by family physician/medical officers - General medical/surgical/OBGYN/neonatal/paediatric/dental services, others - Promotive/preventive services - Public health (Basic health services) including X-ray
Primary hospital Type A2: 25-50 beds 60,000-80,000 population	- 24hrs emergency services - Neonatal and general high dependency service - Caesarean sections, major/minor general/gynaecological surgery - OPD services by family physician/medical officers - General medical/surgical/OBGYN/neonatal/paediatric/dental services - Promotive/preventive services - Public health (Basic health services) including X-ray
Primary hospital Type A3: 15-25 beds 50,000-60,000 population	- 24hrs emergency services - Neonatal and general high care service - Caesarean sections and major/minor operation - OPD services by family physician/medical officers - General medical/surgical/OBGYN/neonatal/paediatric(optional) services by family physician - Promotive/preventive services - Public health (Basic health services) including X-ray
Primary hospital Type B1: 15 beds 40,000-50,000 population	- 24hrs emergency services - Caesarean sections, etc., by family physician - OPD services by family physician/medical officers - General medical/surgical/OBGYN services by family physician - Public health (Basic health services)
Primary hospital Type B2: 10 beds 30,000-40,000 population	- Caesarean sections (optional) - OPD services by medical officers - General medical/surgical services by MBBS - Public health (Basic health services)
Primary hospital Type B3: 5 beds 20,000-30,000 population	- OPD services by medical officers - General medical/surgical services by MBBS - Public health (Basic health services)
Health post A: 12,000-20,000 pop. Health post B: 7,000 - 12,000 pop. Health post C: 3,000 - 7,000 pop. Health post D: 3,000 pop.	- Public health (Basic health services): Immunization, family planning, antenatal/postnatal check-up, normal delivery, Integrates management of childhood illnesses, newborn care, TB treatment, leprosy, nutrition, mental health, NCDs, counselling/ control/ prevention of locally endemic communicable diseases, dispensary, pathology lab., etc.

Source: MoH, *Integrated Health Infrastructure Development Project Concept Presentation*

2-4-2 Medical Education and Human Resources for Health

(1) Medical Education

Basic education for eight years and secondary education for four years is the general education in Nepal, which is obligatory and free of charge. Students take a secondary education examination at the completion of the 10th grade and a national examination for a school leaving certificate (SLC) at the completion of the 12th grade. After getting SLC, the students take a university entrance examination.

Courses for Bachelor of Medicine and Bachelor of Surgery (MBBS) are available at 20 universities in the country, including four public universities: the Institute of Medicine (IOM) of Tribhuvan University, B.P. Koirala Institute of Health & Sciences, Patan Academy of Health Sciences and Nepalese Army Institute of Health Sciences. Public universities accept more recipients of scholarships by the Ministry of Education (MoE) than private universities. Out of a total of 20 universities, three are in the eastern region, 11 are in the central region, four are in the western region and two are in the mid-western region. In the central area, four out of 11 are

in Kathmandu. There are none in the far-western region (see Table 2-24).

The IOM of Tribhuvan University and Kathmandu University School of Medical Sciences (KUSMS) are representative institutes of medical schools. The curriculum of either university is applied to the medical education at other affiliated private schools.

Table 2-24 Medical universities providing MBBS course

Organization (establishment)	Affiliation*	Location	Region
Institute of Medicine of T.U., Maharajgnj Medical Campus (1978)	-	Kathmandu	Central
B.P. Koirala Institute of Health Sciences (1994)	-	Dharan	Eastern
Manipal College of Medical Science (1994)	KU	Pokhara	Western
College of Medical Sciences (1995)	KU	Chitwan	Central
Nepal Medical College (1996)	KU	Kathmandu	Central
Kathmandu Medical College (1996)	KU	Kathmandu	Central
Nepalgunj Medical College (1996)	KU	Nepalgunj	Mid-Western
Universal College of Medical Sciences (1998)	TU	Bhairahawa	Mid-Western
Kathmandu University, School of Medical Sciences (2001)	KU	Kabhre	Central
National Medical College (2001)	TU	Birgunj	Central
Janaki Medical College (2003)	TU	Janakbur	Central
Nobel Medical College (2007)	KU	Biratnagar	Eastern
Kist Medical College (2008)	TU	Lalitpur	Central
Lumbini Medical college & Research Center Pvt. Ltd. (2009)	KU	Palpa	Western
Chitwan School of Medical Sciences, (2009)	TU	Chitwan	Central
Patan Academy of Health Sciences (2010)	-	Lalitpur	Central
Gandaki Medical College (2010)	TU	Pokhara	Western
Nepalese Army Instate of Health Sciences (2011)	TU	Kathmandu	Central
Birat Medical College & Teaching Hospital (2014)	KU	Biratnagar	Eastern
Devdaha Medical College & Research Institute (2014)	KU	Rupandehi	Western

*KU: Kathmandu Univ., TU: Tribhuvan Univ. Source: Information provided by the Nepal Medical Council

The duration of a medical course is five and a half years at both public and private schools including a one-year internship. A graduate takes the examination of the Nepal Medical Council to obtain a medical license. Some students study in foreign universities because they are relatively easy to enter, and their tuition fees are cheaper. Medical universities in China and Bangladesh in particular accept 200 to 300 Nepalese medical students every year. These students can also be qualified through the examination of the Nepal Medical Council. Recipients of scholarships studying in public universities are obliged to work at public facilities for at least two years. Medical students, once qualified, can take a three-year specialization course after one year of clinical experience at hospitals. A doctoral degree is available in the three to five-year courses of universities in the country.

(2) Teaching Hospitals

Teaching hospitals are obliged to assure the equipment, facilities and medical personnel necessary for clinical training. Medical internships must be accepted by teaching hospitals attached to universities. Therefore, teaching hospitals are tertiary or secondary facilities having the same scale, and they not only foster health workers, but also provide medical services for community residents.

There are various relationships between a medical institute and a teaching hospital, such that a medical institute obtains permission from a health facility to use it as a teaching hospital, that a medical institute establishes its own teaching hospital, and that a health facility establishes its own medical institute. In any case, the establishment of an educational institute and health facility is subject to the approval of an organization of MoE and MoH, respectively. Generally, medical institutes and teaching hospitals are under the control of MoE and MoH, respectively, but only TUTH is under the control of MoE among health facilities in the country.

The University Grants Commission set up within MoE provides subsidies to 10 public and private universities and four academies, and some medical institutes use them for administration of teaching hospitals.

When developing curriculums, policies and guidelines on the development of health workers, members of MoH, MoE and professional councils concerned gather to hold discussions.

(3) Health Workers

In Nepal, health workers are authorized and registered by any of six medical professional councils under MoH. The number of health workers registered with the medical council, the nursing council, the ayurvedic medical council, the pharmaceutical council are shown in Table 2-25.

Table 2-25 Number of registered personnel by council

Council	Category	Registered number	Total No.
Nepal Medical Council (as of December 2016)	Specialist	5,159	19,409
	Physician	12,521	
	Dentist	1,729	
Nepal Nursing Council (as of June 2017)	Nurse	43,139	71,861
	Auxiliary nurse-midwife	27,891	
	Foreign nurse	831	
Nepal Ayurvedic Medical Council (as of December 2016)	Ayurvedic doctor	531	3,164
	Ayurveda Health Assistant	1,356	
	Auxiliary Ayurveda Health Worker	1,277	
Nepal Pharmaceutical Council (as of January 2017)	Pharmacist	2,712	8,132
	Auxiliary pharmacist	5,420	

Source: MoH, Annual Report 2015/2016 and information provided by councils

As of 2016, the number of physicians was 0.67 per 1,000 population. There were 5,159 registered specialists covering 50 areas of specialization. There were 547 specialists of internal medicine followed by obstetrics/gynaecology (535), general surgery (469), paediatrics (424) and orthopaedics (402). There were a few specialists of neurosurgery (26), surgical oncology (19), paediatric surgery (9) and cardiac surgery (1) (see Table 2-26). The number of doctors needs to be increased, not only in terms of the total number, but also in the number of specialists and specializations.

Table 2-26 Number of specialists

Specialty	Total No.	Specialty	Total No.
Internal medicine	547	Anaesthesiology	317
Obstetrics/gynaecology	535	Radiology	279
General surgery	469	Ophthalmology	256
Paediatrics	424	General Practice	254
Orthopaedics	402	Stomatology	231
		Others	1,445
		Total	5,159

Source: Information provided by Nepal Medical Council

There are two types of nursing qualifications: a nursing license and a license of auxiliary nurse-midwife. Graduates of four-year Bachelor courses can take the examination for the former run by the nursing council, while those who complete three-year courses can take another examination by the council for the latter. A bachelor course of midwifery has been offered for the first time at the National Academy of Medical Sciences (NAMS) and Kathmandu University since 2017. The nursing council plans to increase the number of health workers with a bachelor's degree. The number of nurses and auxiliary nurse-midwives was 2.48 per 1,000 population as of June 2017.

According to WHO, it is necessary to secure the minimum number of doctors, nurses and midwives at 4.45 per 1,000 population[2], but the index of Nepal is 3.15 with 0.67 doctors, 2.48 nurses and midwives. In particular, the number of doctors needs to be increased.

Health workers of 29 categories are registered with the Nepal Health Professional Council, including the main categories shown in Table 2-27. The workers in each category are registered by a four-step classification. Paramedics, who are also medical professionals, play an important role in health services because of the insufficient number of doctors. They provide basic medical care such as issuing prescriptions and the suturing of wounds for outpatients in a health post, and assist in medical examinations and treatments following a doctor's instructions in a hospital where a doctor is present.

Table 2-27 Number of health professionals registered with the Nepal Health Professional Council

Category	Specialization	First Class	Second Class	Third Class
Medicine (Paramedics)	-	-	9,595	47,655
Public health	554	2,756	-	-
Laboratory	13	1,671	4,193	10,240
Medical microbiology	98	87	-	-
Biochemistry	126	50	-	-
Radiography	10	303	878	43
Physiotherapy	83	546	104	62
Dental assistant	-	-	716	570
Ophthalmology	2	153	642	-
Others	41	238	152	38
Total	927	5,804	16,280	58,608

Source: MoH, DoHS, *Annual Report 2015/16*

(4) Distribution of Health Workers

A survey was conducted on health workers both in the public and private sectors in 2011. The survey found the distribution of physicians and nurses by region as shown in Table 2-28. The number of physicians per 1,000 population was the highest in the central region (1.56) and lowest in the far-western region (0.25). According to the medical council, it is difficult to secure physicians in the far-western and mid-western regions with a monthly salary of Rs.80,000 which is twice the average.

Table 2-28 Distribution of physicians and nurses (2011)

	Central	Eastern	Western	Mid-Western	Far-Western	Total
Physician	2,875	528	751	177	70	4,401
Nurse*	6,214	2,938	2,588	1,016	567	13,323
Total of physician and Nurse	9,089	3,466	3,339	1,193	637	17,724
Regional Population	5,812	9,657	4,927	3,547	2,552	26,495
Physician and Nurse per 1,000 pop.	1.56	0.36	0.68	0.34	0.25	0.67

*Total of nurse and auxiliary nurse-midwife

Source: Number of physicians and nurses, MoH (2013) *Human Resources for Health Nepal Country Profile*
Regional population, Central Bureau of Statistics (2012) *National Population and Housing Census 2011*

The distribution of physicians and nurses by region indicated that there were more physicians in the public sector in the mid-west and far-west regions, while there were more in the private sector in the other regions. On the other hand, there were more nurses in the public sector in all regions, and the proportion of nurses in the public sector was higher in rural areas. In total, the distribution of physicians in the public and private sectors was 40 and 60%, respectively, and nurses 62 and 38%, respectively.

Generally, the amount of salary differs in the public and private sectors, and it is common that a physician working in a public hospital also works in a private hospital or his or her own clinic when off duty.

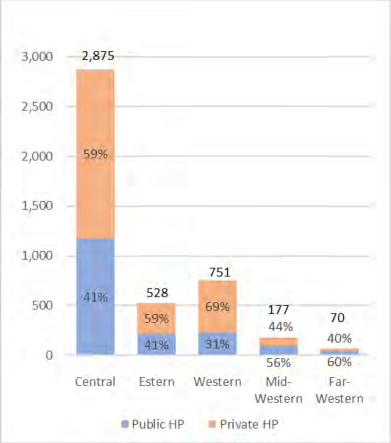

Figure 2-8 Distribution of physicians
Source: MOH, *Human Resources for Health Nepal Country Profile*

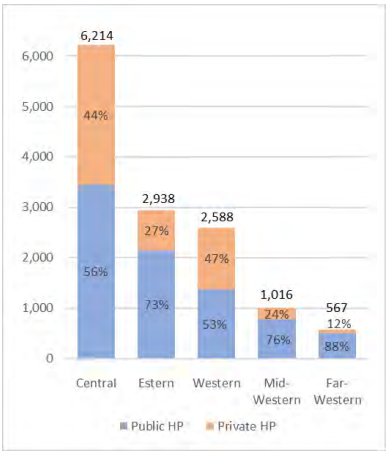

Figure 2-9 Distribution of nurses
Source: MOH, *Human Resources for Health Nepal Country Profile*

(5) Strategic Plan for Health Workers

MoH developed the Human Resources for Health Strategic Plan 2011-2015 to ensure the equitable distribution of health workers and to improve health worker performance. The four outcomes and the main activities of the strategic plan are shown in Table 2-29. A terminal evaluation and a follow-up plan were not confirmed in this survey.

Table 2-29 Main activities of Human Resources for Health Strategic Plan 2011-2015

Output 1 Appropriate supply of health workers for labour market needs
- Strengthen leadership and capacity in human resources planning in MOH and at regional and district levels
- Strengthen human resources information system
- Produce Health Workforce Plan for service delivery needs
- Improve recruitment and deployment process and systems
- Improve attractiveness of job for increased recruitment and retention
- Ensure pre-service training and support after the training

Output 2 Equitable distribution of health workers
- Review current situation and ensure deployment systems for equitable distribution of health workers
- Make jobs/postings in rural areas more attractive
- Review existing retention schemes
- Improve working and living environment and social securities in rural areas
- Review and assess compulsory service experiences in rural areas
- Use NGOs and private health providers for service delivery in most difficult areas

Output 3 Improved performance of health workers
- Develop performance appraisal/management systems
- Strengthen institutional training capacity
- Ensure effective reward and sanction system
- Improve management of human resources and reduce staff absence
- Ensure an enabling work environment
- Strengthen team working approaches

Output 4 Effective human resources planning, management and development across the health sector
- Review existing human resources policies
- Strengthen organizational structures, system and capacity to support the human resources functions
- Review coordination mechanisms in place at all levels within the health system

Source: MoH, *Human Resources for Health Strategic Plan 2011-2015*

2-4-3 Medical Equipment and Drugs

(1) Procurement and Supply of Medical Equipment and Drugs

A public health facility procures medical equipment and drugs by inviting bids for tender based on the budget allocated by MoH. Equipment that costs Rs.50 million can be procured directly from an agent. The medical equipment necessary to implement an improvement plan under the health policy is procured by MoH and supplied to relevant facilities.

Bidders are mainly the agents of foreign manufacturers located in Kathmandu. The import of equipment such as MRI devices, CT scanners and X-ray machines is subject to the approval of MoH in advance. There is no registry system for medical equipment in Nepal.

(2) Market Situation of Medical Equipment

There are some 50 CT scanners and 25 MRI devices in hospitals in the entire country, and most of these equipment are installed in private and public tertiary hospitals. CT scanners are found also in secondary hospitals.

(3) Maintenance of Medical Equipment

A biomedical engineer course is available at a few universities; a bachelor course at the College of Biomedical Engineering and Applied Sciences of Purbanchal University and a diploma course of biomedical engineering at a vocational training school. Biomedical engineer is a new job category in Nepal, and most current workers are those who graduated from electrical engineering courses, and learned about medical equipment on the job.

At present, hospitals have difficulties in preventive maintenance without sufficient engineers for maintenance of medical equipment. Some basic equipment can be repaired by the engineers of hospitals, while repairs of radiological equipment and laboratory analytical equipment are requested to agents of medical equipment manufacturers under a maintenance contract.

(4) Maintenance Contract of Medical Equipment

There are two types of maintenance contracts for medical equipment in Nepal: an annual maintenance contract (AMC) and a comprehensive maintenance contract (CMC). Periodical check-ups and on-call technical services including repair are free of charge, while spare parts are charged under AMC. Technical services and spare parts are all free of charge in the case of CMC. Generally, medical equipment carries a two-year warranty, but regular check-ups are not included under such warranties. Accordingly, hospitals conclude CMC for complicated equipment including MRI devices, CT scanners and angiography equipment, and AMC for autoclaves, analysers and basic X-ray machines. Technical services under CMC or AMC are

provided by local agents in Nepal. The delivery of spare parts from abroad, however, takes time, and accordingly some private hospitals and public hospitals, which have many patients, order X-ray tubes before they blow out depending on the operating count.

2-4-4 Social Health Security and Medical Fee

(1) Social Health Security

GoN developed a national health security policy in 2014 with the purposes of equal access to health services and the mitigation of the burden of out-of-pocket payment. The Social Health Security Committee was established in 2015, and the National Health Insurance Programme was started. A family with five members or less pays Rs.2,500 per year, and they can receive a benefit up to Rs.50,000 per year. A larger family pays Rs.425 per additional person and can get up to Rs.100,000 annually. The amount of payment is lower for poor families.

The insured visit a public hospital or a designated hospital first, and they can be referred to a higher-level hospital if necessary. In this case, a patient pays 15% of the cost, but 50% will be borne if the patient is not referred. In 2016, the national program was introduced in three districts, Kailali, Ilam and Baglung, and covers 12,623 people or one percent of the total population of these districts. It is planned to expand the programme to other districts.

(2) Medical Costs

In Nepal, there is no law to regulate medical costs or fees for diagnoses and treatments, so respective hospitals set their own tariff schedule. Generally, the cost is higher at private hospitals. Services for immunization and family planning are provided free of charge at public facilities, as are treatments for tuberculosis, leprosy and malaria. A patient receives a benefit of Rs.200,000 for a kidney transplant, and up to Rs.100,000 for the treatment of cancer, heart disease, head/spinal injuries, Alzheimer's disease, Parkinson syndrome, sickle cell anaemia and post-kidney transplantation. Dialysis is free of charge up to 104 times. The poorer members of the population, with references issued by districts, are exempted from the payment of medical costs. Hospitals at the zonal level or higher have a social services unit to assess the exemption for such people.

References

1 DoHS, MoH, *Annual Report 2015/16*
2 WHO, *Global Strategy on Human Resources for Health: Workforce 2030*

Chapter 3 Emergency and Disaster Medical Services

Chapter 3 Emergency and Disaster Medical Services

3-1 Definitions of Emergency and Disaster Medical Services

(1) Emergency Medical Services

The emergency medical service is an ordinary service for patients visiting after consultation hours with illnesses or injuries requiring immediate medical attention. Emergency cases are divided into external and internal causes. The major external causes of emergency cases are injuries resulting from traffic accidents, drowning, poisoning, falls, burns, violence, etc. On the other hand, cardiovascular diseases, cerebrovascular diseases, respiratory diseases and metabolic diseases are the internal causes of emergency cases.

(2) Disaster Medical Services

A disaster is a calamitous event, especially one occurring suddenly, causing a great loss of life and damage to social life. Natural disasters and man-made disasters are the main types of disasters, while complex humanitarian emergencies remain special disaster cases (see Table 3-1). Although man-made disasters occur more frequently, natural disasters result in greater damage. The United Nations (UN) defines a complex humanitarian emergency as "a humanitarian crisis in a country, region, or society where there is total or considerable breakdown of authority resulting from internal or external conflict and which requires an international response that goes beyond the mandate or capacity of any single and/or ongoing UN country program."

At the time of a disaster, the rapid increase in medical demand causes a serious shortage of medial resources (health workers, drugs, equipment, etc.) used to provide ordinary medical services. Therefore, in the field of disaster medical services, it is important to make decisions about the treatment and transportation of victims with priority theory for providing the best medical services with fewer resources for more clients. Once a disaster occurs and it is officially declared and announced, health facilities switch their services from ordinary medical services to disaster medical services[1].

Table 3-1 Type of disasters

Natural Disaster	Earthquake, typhoon, tornado, tsunami, flood, land-slide, eruption of volcano, drought, emerging/re-emerging infectious diseases, hunger
Man-made Disaster	Fire, explosion, plane/train accident, vehicle accident, building collapse and others caused by social, industrial and/or scientific development
Complex Humanitarian Emergency	War, conflict, refugees/displaced

Source: Japanese Association for Disaster Medicine, *Standard Textbook of Disaster Medical Assistance Team* (Japanese)

3-2 Current Situation and Challenges of Emergency Medical Services

3-2-1 Emergency Transportation

(1) Emergency Transportation System

Since Nepal has suffered from several natural disasters, policies on disaster management were developed as a priority with the support of development partners. However, policies on emergency medical services under normal conditions have yet to be fully established. Due to the shortage of human and financial resources, Nepal does not yet have an official emergency transportation system, and currently it depends on services provided by local communities, NGOs and the private sector. Therefore, there is not a unified emergency call number, and when patients need to be transported to health facilities, the patients or their attendants have to directly call the numbers of ambulance drivers, which are posted on websites of police stations, newspapers and health facilities. In the case of a traffic accident, police officers usually call an ambulance.

In order to manage the private ambulance services, MoH developed the Ambulance Service Operational Guidelines to provide regulations on the ambulance service operational committee, qualifications of service providers, drivers and ambulances. In 2016, the guidelines were revised to strengthen pre-hospital care while reviewing the standard equipment of ambulances. The qualifications of ambulance crews are also mentioned in the guidelines. Ambulances are divided into grades of A, B and C as shown in the table below.

Table 3-2 Type of ambulances

Type	Ambulance Crew	Equipment
Grade A (Advance Life Support)	・Driver with basic training on first aid ・Advanced EMT* or Doctor trained in emergency medical services	In addition to equipment of Grade B; Traveling ventilator, AED, haemostatic set and chest drainage tubes
Grade B (Basic Life Support)	・Driver with basic training on first aid ・EMT*	In addition to equipment of Grade C; IV drops, electrocardiogram monitor, incubation set, various intubation tubes and laryngeal tube, ambu bag, cardiopulmonary resuscitation board, cervical collars, nebulizer set, obstetric care set and catheterizations set
Grade C (Common Life Support)	・Driver with basic training on first aid	Stethoscope, blood pressure apparatus, torchlight, tongue depressor, oxygen cylinder, IV injection and stretcher

*Qualification and training for advanced EMT/EMT are not defined in Nepal as of August 2017

Source: MoH, *Ambulance Service Operation Guidelines 2016*

In the Ambulance Service Operational Guidelines, it is specified that hospitals with less than 100 beds should have one ambulance, and hospitals with more than 100 beds should have at least two ambulances (one of them should be grade A or B). Ambulances owned by hospitals are utilized for transporting patients between hospitals, but basically not for picking up patients at home or accident sites and delivering them to health facilities. As per the interview with the Policy, Planning and International Cooperation Division (PPICD) of MoH, most ambulances, not just privately-owned but also hospital-owned, do not have sufficient medical equipment and they

do not even meet the standard of grade C.

Ambulances are registered by PPICD of MoH. As of August 2017, 1,419 ambulances were registered. Although the ambulance distribution by region is unknown, the ratio of the number of ambulances to the total population is 1/20,000, and this is comparable to the Japanese standard. However, most ambulances in Nepal are graded as C or lower and are insufficient for providing appropriate pre-hospital care. Therefore, there are many deaths during transport.

While there are free emergency transportation services provided by local communities, patients need to bear the cost when they use the services provided by NGOs or private companies. Usually it costs about Rs.500-1,000 for emergency transportation within Kathmandu and the cost of transportation between cities depends on the distance. Patients in rural areas are delivered to the nearest health facilities first, and if necessary, they are referred to the central/specialty hospitals in Kathmandu. Especially for patients referred far from Kathmandu, the cost of emergency transportation can be a heavy financial burden.

As for far distance emergency transportation, helicopter services are available, but most users are foreign climbers. In such cases, scheduled domestic flights are usually used and ambulances or taxis are used between airports and hospitals. In cases of disasters and/or mass casualties, the Nepalese army dispatches their helicopters for the transportation of victims.

(2) Nepal Ambulance Service

The Nepal Ambulance Service (NAS) is a non-profit organization that provides emergency transportation services including pre-hospital care. NAS was established in 2011 in Kathmandu by professors and medical doctors of public universities and hospitals, with the aim to save lives during transportation and link pre-hospital care to in-hospital care. As of August 2017, NAS has three doctors, 35 Emergency Medical Technicians (EMTs), six call centre staff and 11 ambulance drivers.

NAS is allocated "102" for an emergency toll free number by GoN. A call centre in Kathmandu receives phone calls and dispatches ambulances equipped with GPS. The call centre is operated by nurses and paramedics 24-7 on three shifts. When the service was started in 2011, there was no training institution for EMTs in the country. Therefore, NAS trained their EMTs by inviting instructors from the division of Emergency Medicine, Stanford School of Medicine. NAS also provides training on first aid and basic life support (BLS) to the ambulance drivers.

Initially their service was provided only in Kathmandu, but they started operation in Chitwan in 2011, and in Pokhara in 2017. In 2017, NAS is going to start operation in Kavre, Dhading and Butwal, which are located along highways with frequent traffic accidents (see Figure 3-1). NAS owns a total of 11 ambulances (five in Kathmandu, and one each in Chitwan, Pokhara, Kavre, Dhading and Butwal), and all of them are graded as A.

The number of dispatches of ambulances has increased every year, and it reached 4,232 times per year in 2016. A total of 66% of the transported patients were aged between 18 and 64, and the major reasons were breathing problems, abdominal pain, fainting/syncope, pregnancy-related issues and vehicular trauma. Patan Hospital, TUTH, Paropakar Maternity & Women's Hospital and Bir Hospital are the main recipients of these patients.

Figure 3-1 NAS coverage area

In addition, NAS provides support for policy development on strengthening emergency medical systems and conducts training on first aid and BLS to FCHVs, staff of health facilities and international NGOs (INGOs). In case of a disaster, NAS transports patients based on requests from the Health Emergency Operation Centre (HEOC), and transported about 700 patients at the time of the Gorkha earthquake.

Ambulances owned by NAS

Inside the ambulance

Call centre

(3) Nepal Red Cross Society

The Nepal Red Cross Society (NRCS) provides support on developing health policies and plans, emergency responses, and post disaster management to MoH. NRCS owns 215 ambulances and provides emergency transportation services. In 2015, eight ambulances were provided NRCS by the Grant Aid for Grassroots Human Security of the Embassy of Japan in Nepal. Since owning a grade A and B ambulance costs more for the employment of EMTs and the maintenance of equipment, NRCS only owns grade C ambulances. These ambulances are distributed near health facilities and operated by each district branch of NRCS. Their ambulances are dispatched based on phone requests to the ambulance drivers, and patients are only charged the minimum cost for maintenance of the ambulances.

3-2-2 Trend of Emergency Patients

According to the Annual Report of DoHS, the total number of emergency patients of health facilities registered with HMIS was about 1,200,000 in 2015/16. Although the numbers of emergency patients and surgical operations are available at health facilities, the statistical data by disease and mode of transportation of emergency patients is rarely kept.

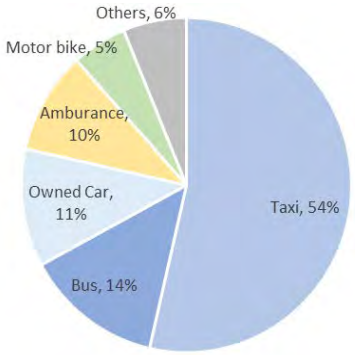

Figure 3-2 Mode of transportation of emergency patients at the Patan Hospital

The survey conducted at the Patan Hospital in Kathmandu in 2006 showed that more than half of emergency patients used taxis and less than 10% used ambulances to come to the hospital (see Figure 3-2)[2].

In Kathmandu, emergency patients are transported to general hospitals such as TUTH, Bir Hospital and Patan Hospital, or to specialty hospitals based on their conditions. According to interviews conducted at the general hospitals in Kathmandu, common reasons for consultations at emergency departments included digestive diseases and respiratory diseases such as difficulty in breathing and acute gastroenteritis, and trauma cases accounted for less than 20%. The most common operation in the emergency department was appendectomy at TUTH, Bir Hospital and Dhulikhel Hospital. Table 3-3 below shows the number and characteristics of emergency patients in target hospitals and NAS.

Table 3-3 Numbers and characteristics of emergency patients in target hospitals and NAS

Organisation	No. of patients	Characteristics
NAS	approx. 4,000/year* (avg. 12/day)	-Main reasons of transportation are breathing difficulty, abdominal pain, fainting/syncope, pregnancy related and vehicular trauma -Trauma patients are 10% of the total
Tribhuvan University Teaching Hospital	approx. 50,000/year (avg. 140/day)	-Main reasons of visit are abdominal pain and breathing difficulty -Trauma patients are 12% of the total. -10% of the total are admitted -No. of operations is 7 cases/day and most frequent operation is the appendectomy
Bir Hospital	approx. 30,000/year (avg. 90/day)	-Main reasons of visit are abdominal pain and breathing difficulty -Trauma, paediatric, cardiology, obstetrics and gynaecology patients are referred to speciality hospitals -No. of operations is 1-2 cases/day -Most frequent operation is the appendectomy
National Trauma Centre	approx. 8,000/year (avg. 50-60/day)**	-Main reasons of visit are injuries by traffic accident and fall -Range in seriousness form scratch and fracture to brain injury -30% of the total are admitted -No. of operations is 1 case/day and most frequent operation is fracture repair
Paropakar Maternity & Women's Hospital	approx. 24,000/year (avg. 70/day)	-Main reasons of visit are preterm labour, bleeding and abdominal pain. -Only the obstetrics and gynaecology patients can be treated -Patients with complication of brain bleeding and cardiac diseases, etc., are referred to speciality hospitals
Dhulikhel Hospital	approx. 16,000/year (avg. 40/day)	-Main reasons of visit are trauma (22%), abdominal pain (12%) and breathing difficulty (9%) -Most frequent operations are fracture repair and appendectomy.
Hetauda Regional Hospital	approx. 18,000/year (avg. 50/day)	-Most patients only receive injection, infusion and prescription -Severe patients are referred to hospitals in Kathmandu and Chitwan

*No. of patients transported by ambulance ** Avg. 30 persons/day in the last year

Source: Questionnaires and interviews by survey team

Based on the study on injury and violence in Nepal conducted in 2008 [3], the total number of injured patients of the 11 tertiary referral hospitals in the country was 37,973, and the age group of 15 - 29 years was highest at 38 % of the total (see Figure 3-3). By gender, males accounted for 68% and, females 32%. The leading causes of injury were road traffic accidents (RTAs) (29%) and followed by falls (27%) and violence (22%) (see Figure 3-4). Because of its mountainous terrain, falls from trees and cliffs are common causes of injury in Nepal.

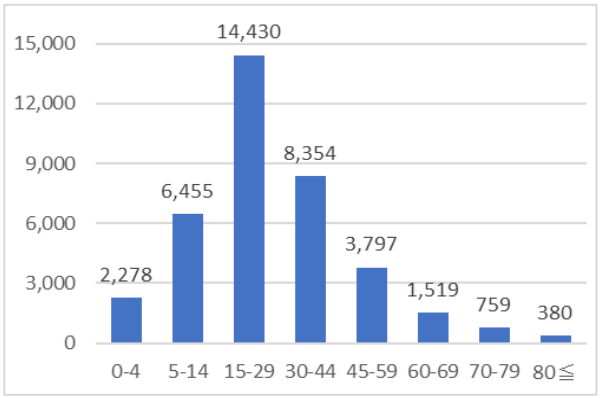

Figure 3-3 Number of trauma patients by age group (2008)
Source: Survey by Nepal Health Research Council

Figure 3-4 Cause of injuries (2008)
Source: Survey by Nepal Health Research Council

3-2-3 Road Traffic Accidents

(1) Present Situation of Road Traffic Accidents

Road transport in Nepal is the most widely used means of transportation. According to the information provided by the Ministry of Physical Infrastructure and Transportation (MoPIT), the number of motorcar registrations has increased yearly from about 300,000 in 2000 to 1,500,000 in 2012 [4].

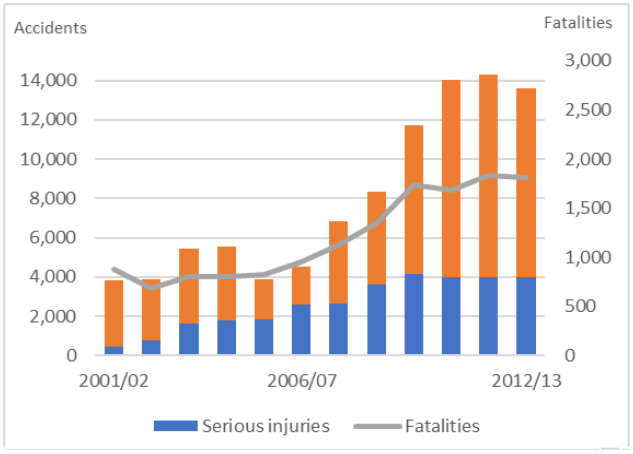

Figure 3-5 Number of accidents and fatalities
Source: Information provided by MoPIT

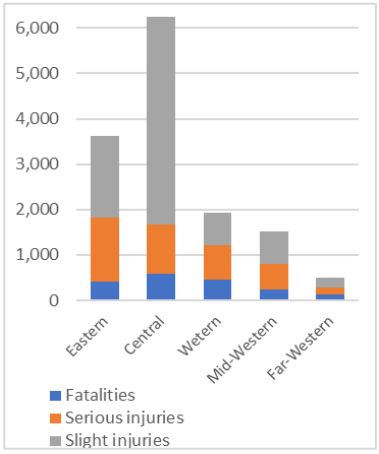

Figure 3-6 Accidents by areas
Source: Information provided by MoPIT

The increase in the number of motorcars is causing an increase in RTAs. As Figure 3-5 shows, from 2001/2 to 2012/3, the number of RTAs and fatalities increased by 3.5 times (to about 14,000 cases) and 1.5 times (to about 1,800 cases), respectively. Accidents with serious injuries accounted for about 30 % of all RTAs. By region, the eastern region had a higher ratio of serious injuries and fatalities, while the total number of RTAs was highest in the central region.

As per the information provided by MoPIT, RTAs frequently occur in the central part of the Kathmandu valley and on the major highways that cross the southern part of the country. In particular, the road between Mugling and Kathmandu and the Sindhuli Road are accident black spots (see Figure 3-7), because these roads connect Kathmandu to the east and west with a large traffic volume of several kinds of cars and bikes.

Figure 3-7　Major highways with frequent traffic accidents

(2) Traffic Safety and Accident Prevention

The Department of Roads of MoPIT is mandated to improve road safety and to enhance preparedness for RTAs in the country. The Nepal Road Safety Action Plan 2013-2020 was developed to provide guidance for the country's response to traffic safety and accident prevention. The plan consists of five pillars, namely 1) Road Safety Management, 2) Safer Roads and Mobility, 3) Safer Vehicles, 4) Safer Road-Users, and 5) Post-Crash Response, with activities such as reviewing/revising related laws, regulations and guidelines, installing steel guard-rails, raising public awareness, and improving vehicle inspection procedures. In the plan, it is mentioned that the activities of pillar 5) Post-Crash Response should be implemented in cooperation with MoH (see Table 3-4). MoH already revised the Ambulance Service Operational Guidelines and conducts training on trauma care with WHO. MoH has also developed plans for introducing a unified emergency call number and establishing an ambulance network system.

Table 3-4 Action matrix for pillar 5) Post-Crash Response

Activity	Target Commencement Date	Budget (Million Rs.) Short-Term (2013 ~ 2014)	Med-Term (2013~ 2016)	Long-Term (2013~ 2020)
* Introduce a toll-free telephone number for medical emergencies	14 April, 2013	0.70	1.53	4.43
* Develop a national ambulance policy with: □ Directives for response to post-crash victims □ Measures to improve the response time.	End 2013	1.36	-	-
* Provide trauma-care training to medical personnel at all levels (primary, secondary, tertiary) with expertise on treatment of road accident victims.	2015	11.27	37.32	114.17
Investigate funding sources to assist rehabilitation of crash victims such as: Health insurance Third-party cover in vehicle insurance Mutual recognition of other insurance (green card system) Other sources	End 2013	1.01	-	-
Conduct medical research on major injuries of crash victims and prioritise care for such injuries at trauma centres.	1 March 2013 onwards	21.24	33.48	65.62
Ensure people with disabilities are not deprived from employment opportunities.	Continuous	-	-	-
Develop and maintain a comprehensive injury surveillance system in hospitals and health centres with the following. Uniform, standard entry in trauma registry Expand control policy on drunk-driving Improved RTA reporting	Develop: 14 April 2013 + update	9.25	19.35	41.71
Establish road-safety unit at MoH and provide the following institutional support. Inter-agency referral system (e.g., hospital referral of potential accident-blackspots) Networking with focal persons at the related agencies	14 April 2013	2.98	6.43	17.10
Train the emergency agencies (e.g., Traffic Police, Civilian Police Army, Fire-brigade, paramedics, etc.) to improve post-crash response to RTA victims.	14 April 2013	3.42	11.32	24.75
* Set up a network of ambulance services along the major highways, urban and rural roads.	14 April 2013	3.69	9.79	15.46
Develop a strategy and policy to fund medical rehabilitation and disability from RTAs	End 2013	1.36	-	-

* Activities which MoH currently plan/implement Source: MoPIT, *Nepal Road Safety Action Plan (2013-2020)*

3-2-4 Health Workers Providing Emergency Medical Services

Recently, MoH has put efforts into building the capacity of health professionals in emergency medicine.

- Specialist in Emergency Medicine

Emergency medicine is one of the youngest recognized specialties in Nepal. Therefore, standardised post-graduate emergency medical training has not yet been established. The Nepal Medical Council, the governing body for medical doctors in Nepal, first recognised emergency medicine as a specialty in December 2013, after they received their first two trained physicians from abroad. Some public medical institutions provide training on emergency medicine with their own curriculums (see Table 3-5).

In the emergency departments of hospitals in Nepal, more orthopaedists and general surgeons are assigned. While the emergency trauma management guidelines were developed in 2016, decisions on procedures of diagnosis and treatment for emergency patients are left to doctors, due to the lack of clinical guidelines. Doctors of the emergency departments in TUTH and Dhulikhel hospital mentioned that it was better for them to undertake clinical training on diagnosis and treatment for emergency cases including multiple trauma.

Table 3-5 Emergency medicine certification

Programme	Duration	Place	Pre-requisite	First students Number(year)
Residency in EM	3 yrs.	Abroad	-MBBS -Nepal Medical Council registration	2 persons (2013)
Fellowship in EM	1.5 yrs.	-B.P. Koirala Institute of Health Sciences -Patan Academy Institute of Health Sciences	-Post-graduate degree -Nepal Medical Council registration -Emergency department work experience of 1 year	6 persons (2015)
Doctor in EM	3 yrs.	-Tribhuvan University Institute of Medicine	-3-year accredited post-graduation training	2 persons (2015)

Source: Nishant Raj Pandey, 2016. 'Emergency medicine in Nepal: present practice and direction for future' *International Journal of Emergency Medicine*

- Emergency Medical Technician (EMT)

In 2016, The Patan Academy of Health Sciences initiated the country's first EMT training with the support of NAS. The subject of this three-month training course consists of the skills and knowledge on life support of emergency cases such as trauma, heart attack, breathing difficulties, convulsions and pregnancy complications, for students aiming at becoming nurses and paramedics. In addition, some health facilities provide training to develop human resources of EMT with original curriculums. However, currently there is no national qualification system for EMTs in Nepal, and the curriculum and guidelines for developing EMTs have yet to be standardised. Therefore, the quality of emergency medical services varies among EMTs.

Although the development of specialists in emergency medicine and EMTs has started, there are no colleges providing an education in emergency medicine for nurses in Nepal. Although all drivers of ambulances should be taken basic training on first aid, the training for drivers has not been officially conducted. Because of the shortage of human resources, emergency medical services are provided by young doctors fresh from medical college, paramedics without training on emergency medicine and nursing students in most hospitals. The quality of emergency medical services needs to be improved.

3-3 Current Situation and Challenges of Disaster Medical Services

3-3-1 Past Major Disasters in Nepal

Nepal has suffered from many natural disasters (see Table 3-6). About 500 incidents occurred annually. Fire was the leading case of natural disasters, followed by floods, epidemics and landslides. Because of the geographical conditions, the types of disasters differ by district. Floods occur frequently in the Terai area near the border with India, landslides in the hills and mountainous areas, and earthquakes in central Nepal running in an east-west direction. The number of deaths due to epidemics was larger than those due to the other disasters. Although the frequency of earthquakes is low, the number of deaths, persons injured and houses damaged is very large. As shown in Table 3-7, the damage from the Gorkha earthquake was enormous.

Table 3-6 Damage and losses of major disasters in Nepal (1971-2015)

	No. of deaths	No. of persons missing	No. of persons injured	No. of houses damaged	No. of affected families	NO. of incidents
Epidemic	16,564	-	43,076	-	512,970	3,448
Earthquake	9,771	-	29,142	982,855	890,995	175
Landslide	4,832	165	1,727	32,819	556,774	3,012
Flood	4,344	6	527	215,427	3,702,942	3,720
Fire	1,541	-	1,379	83,527	256,445	7,187
Thunderbolt	1,502	129	2,444	952	6,880	1,505
Cold wave	515	-	83	-	2,393	390
Snow storm	87	7	-	-	-	-
Others	1,108	3	9	15,331	10	2,916
Total	40,264	310	73,387	1,330,913	5,932,012	22,372

Source: MoHA, *National Position Paper for the AMCDRR 2016*

Table 3-7 Outline of the Gorkha earthquake

Main shock	Date:	25 April 2015
	Epicentre:	Barpak village of Gorkha district (81km northwest from Kathmandu)
	Magnitude:	7.6
After shock	Date:	12 May 2015
	Epicentre:	Sunkhani village of Dolkha district (76km northeast from Kathmandu)
	Magnitude:	6.8
Losses and damage	Persons dead:	8,896
	Missing:	198
	Injured:	22,302
	Houses damaged (Fully):	604,930
	(Partially):	288,856
	Affected families:	886,456

Source: MoHA, *Nepal Disaster Report 2015*

3-3-2 Disaster Preparedness

(1) Related Laws, Regulations and Strategies of Disaster Management

The Ministry of Home Affairs (MoHA) plays the main role of disaster management including enhancing preparedness in Nepal. The Natural Calamity Relief Act, 1982 and the Local Self Government Act, 1999 are the legal foundation for the country's disaster management. The Natural Calamity Relief Act, as the basic legal framework of national disaster management, determines the roles, responsibilities and related authorities at the central and regional levels regarding disaster preparedness. The act was revised in 1989 and 1992 to include industrial accidents and artificial calamities. The Local Self Government Act determines the function, responsibilities and authority of local governments, and it grants authority for disaster management at each level for an effective and swift response to disasters.

Table 3-8 Related laws, regulations and strategies of disaster management

Year/Month	Relevant regulations and frameworks
1982	Natural Calamity(Relief) Act
1989	Natural Calamity (Relief) Act/1st Revised
1992	Natural Calamity (Relief) Act/2nd Revised
1993	National Building Code
1994, May	First UN World Conference on Disaster Risk Reduction (in Yokohama) Yokohama Strategy and Plan of action for a Safer World
1996	National Plan of Action on Disaster Management
1997	Establishment of Disaster Preparedness Network-Nepal
1999	Local Self-Governance Act.
2005, Jan	Second UN World Conference on Disaster Risk Reduction (in Hyogo) Hyogo Framework for Action 2005-2015
2006, May	Model agreement for the coordination of humanitarian affairs to expedite customs procedures during emergencies
2007	National Plan of Action on Disaster Management/Revised
2009	National Strategy for Disaster Risk Management
2010, Sep	National Adaptation Plan of Action
2010, Dec	National Emergency Operation Centre
2011	Local Disaster Risk Management Planning Guidelines 2011
2013	National Disaster Response Framework
2015, Mar	Third UN World Conference on Disaster Risk Reduction (in Sendai) Sendai Framework for Disaster Risk Reduction 2015-2030
2015, Apr	Gorkha Earthquakes

In 2009, the National Strategy for Disaster Risk Management was developed with the support of the United Nations Development Programme (UNDP). This document outlines the strategic interventions for disaster management in order to achieve the vision of a "Disaster Resilient Nepal." Those interventions were developed following the five priority actions and 29 strategic activities mentioned in the "Hyogo Framework for Action 2005-2015." The National Disaster Response Framework (2013) was prepared for the effective coordination and implementation of disaster preparedness and response activities. The framework clarifies the roles and responsibilities of government and non-government agencies involved in disaster risk management in the country. Table 3-8 shows a list of related laws, regulations and strategies of disaster management.

(2) Disaster Prevention System

The formulation of the Central Natural Disaster Relief Committee (CNDRC), Regional Disaster Relief Committee, District Disaster Relief Committee and Local Disaster Relief Committee is mandated by the Natural Calamity Relief Act for overall disaster response in Nepal. CNDRC is chaired by MoHA and it consists of members of other ministries, NGOs and the private sector. The National Emergency Operation Centre (NEOC) works as the secretariat of CNDRC and acts as the coordination centre. There are respective focal persons in the aforementioned coordinating agencies. Those focal persons have regular meetings to review, analyse and evaluate the situation in a disaster.

As the coordinating body of the health sector, the HEOC was established in MoH. In case of a disaster, according to the instructions of NEOC, HEOC would coordinate with the departments of MoH, health facilities, international agencies and other ministries.

(3) Disaster Response

During a large-scale disaster, the UN Humanitarian Coordinator will activate the UN cluster system of Nepal. GoN will nominate a full-time focal person to the respective cluster in order to respond to the disaster through a coordinated cluster approach[iv] (see Figure 3-8).

This cluster approach was activated at the time of the Gorkha earthquake, and in the health sectors, HEOC took the lead in transporting patients, delivering relief supplies and dispatching disaster relief teams. In Kathmandu, disaster victims were transported to six hub hospitals, namely TUTH, Bir Hospital, Patan Hospital, Civil Services Hospital, Nepal Army Hospital, and Bhaktapur Hospital. In other affected areas, HEOC coordinated with its regional health directorates, district health offices and public health offices to transport victims to the appropriate health facilities. In addition to ambulances, helicopters of the military and the private sector were utilized for transporting patients and relief supplies.

After the Gorkha earthquake, more than 4,000 international search and rescue personnel arrived in Nepal; however, they were not utilized efficiently because the number of them was much too large. MoHA plans to introduce a pre-registration system for better coordination and utilization of international relief teams.

[iv] The cluster approach aims to strengthen coordination among multi sectors to provide the assistance meeting the needs of targets effectively by defining clearly roles and responsibilities of each sector in humanitarian aid.

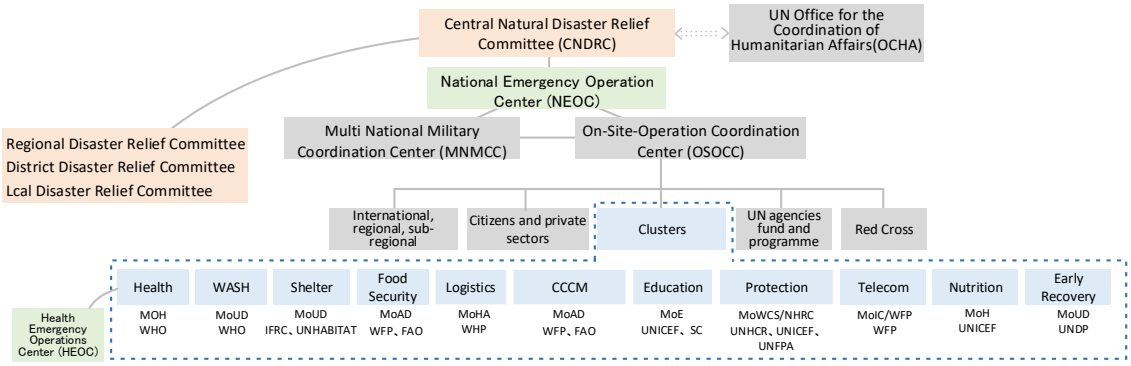

Figure 3-8 Structure of disaster response
Source: Country Profile: Nepal, Disaster Risk Management: Policies and Practices in Nepal (ADRC 2014) National Disease Response Framework

3-4 Policies and Projects of Emergency and Disaster Medical Services

In the National Health Sector Strategy (NHSS) 2015-2020, the "improvement of preparedness for public health emergencies and disasters" is included as one of the outputs. The related activities for this output are listed in the table below.

Table 3-9 Main activities for strengthened management of public health emergencies

Improvement of preparedness for public health emergencies and disaster
-Update national level protocols and operational guidelines for emergency situations with clear roles and responsibilities
-Develop protocols and operational guidelines for emergency operations at provincial and regional level
-Establish trauma management capacity in hospitals near highways and in major urban centres
-Establish provincial emergency health management centres
-Preposition buffer stocks of essential supplies and medicines for emergencies at central and regional level
-Establish the disease surveillance system
-Improve readiness of health emergency operation centre on coordination with line ministries
-Facilitate hospitals to set-up triage system
-Develop human resources mobilization plan during emergencies
-Design and conduct training on public health emergencies and disaster management
-Establish emergency response funds at federal, provincial and local levels
Strengthening of response to public health emergencies
-Capacitate Rapid Response Teams at all levels, to respond to public health emergencies
-Develop Mass Casualty Management plan for all hospitals above 50 beds and test those plans periodically
-Mobilize and manage trained human resources during emergencies with financial and non-financial incentives
-Implementation disease surveillance

Source: MoH, *NHSS Implementation Plan 2016-2021*

MoH has implemented the following major activities for improving emergency and disaster medical services as of August 2017.

(1) Establishment of Trauma Centres

The increasing number of RTAs has raised the need for trauma care nationwide. However, well-equipped health facilities that can provide trauma care for severe RTA patients are still limited, and most of them are in Kathmandu. Although cases of head or visceral injury require rapid treatment, heavy traffic and the weak emergency transportation system have hindered prompt patient transportation to facilities in Kathmandu.

Under these circumstances, MoH developed a plan for the establishment of trauma centres based on NHSS 2015-2020. As shown in Figure 3-9, there are 11 candidate sites for the establishment of trauma centres, and at least one trauma centre is planned to be established in each province. These trauma centres will be established in addition to the existing hospitals, and their size and equipment will be considered based on the local needs and the situation of the existing hospitals. A trauma centre is not necessarily a large-scale facility, but it can be one unit of an existing hospital. MoH puts priority on the Dhaulagiri zonal hospital in the western region, where outdoor leisure activities like trekking attract many tourists, as well as Bharatpur district hospital, which is located in an important traffic point on the main highway that crosses the Terai area. MoH plans to conduct a survey to consider the size and construction cost for trauma centres in these two hospitals. It is also important for MoH to establish trauma centres in the far-western and mid-western regions.

The establishment of emergency health management centres is also included in the planned activities of NHSS 2015-2020. However, it has not yet been planned in detail, and MoH aims to establish the trauma centres first. So far, trauma centres and emergency health management centres are regarded separately based on their specified function, but more consideration is required for integrating one with the other for efficient resource management.

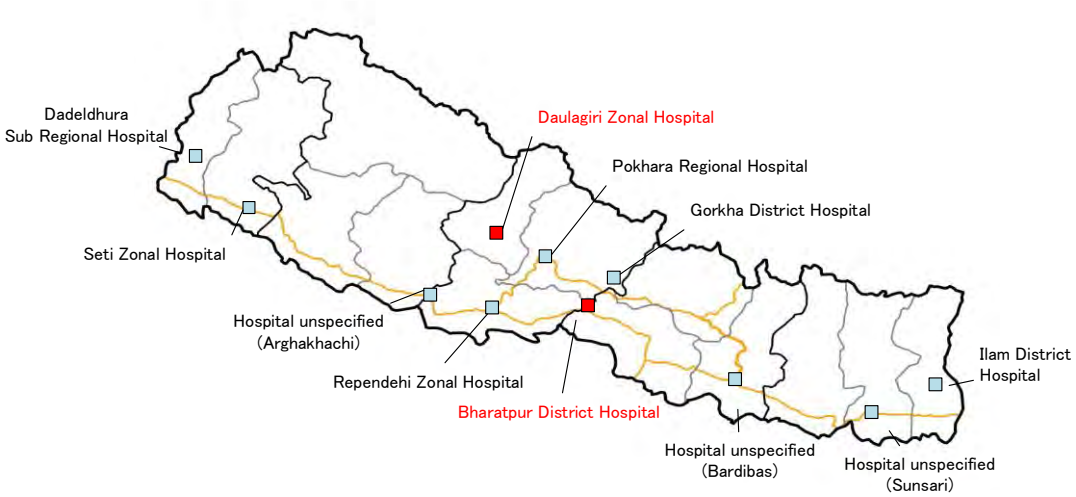

Figure 3-9 Planned locations for the trauma centres

Source: Information provided by MoH

(2) Project for Strengthening Emergency Response Capacity of Hub Hospitals

MoH, with the support of WHO, has implemented a project for strengthening the emergency response capacity of hub hospitals. This project aims to reduce morbidity and mortality, and to prevent disability through better response to emergencies and disasters by strengthening the link between pre-hospital and post-hospital care services, and between the community and health facilities.

MoH has appointed 25 hub hospitals as shown in Figure 3-10. As of August 2017, this project has targeted four hub hospitals in the mid-western and far-western regions, and will expand activities to all hub hospitals in five to six years. The main activities of this project are shown in Table 3-10.

As one of the project activities, the Emergency Trauma Management Guidelines were developed in 2016. Training for health workers has been conducted in the national health training centre and health facilities with the guidelines. In addition, warehouses were established with support of some donors in six hub hospitals, namely TUTH, Bir Hospital, Patan Hospital, Civil Services Hospital, Nepal Army Hospital and Bhaktapur Hospital, based on the project. Many kinds of kits for surgical, trauma and maternity care, as well as tents, are stocked in the warehouses.

Table 3-10 Activities for strengthening emergency response capacity of hub hospitals

Activity 1 Strengthening hub hospital networks
-Assessment of hub hospitals to determine resilience to seismic events
-Conduct hospital preparedness for emergencies training for hospital staff
-Organize mass casualty and outbreak management planning workshop
-Identify and establish the warehouse in hub hospitals for prepositioning of medical supplies and logistics
-Ensure functionality of Regional Health Emergency Operations Centres
-Periodic review of the preparedness status
-Develop/adapt technical guidelines, integrated training and service package
-Enhancing partnerships with stakeholders and documentation of lessons learned and best practices
Activity 2 Strengthening community capacity
-Adaptation of the national referral guidelines into emergency referral protocols in the four targeted districts
-Dissemination and roll out of emergency referral protocol in the 4 target districts
-Conduct training for EMTs and drivers in first aid/basic life support
-Improvement of coordination between ambulance service providers, ambulance committees and DPHO/hub hospitals
-Conduct training for health staff and volunteers in first aid/basic life support, triage and emergency referral
-Development of roster of qualified emergency health volunteers to support hub and satellite hospitals and DPHO in health emergency situation
-Development of an emergency health volunteers' early deployment and coordination mechanism contextualized to the four target districts
Activity 3 Strengthening trauma care capacity of hub hospitals & functional preparedness mechanisms
-Conduct training for health staff in primary trauma care, emergency trauma care management and psycho social first Aid
-Orientation of vulnerability focal point network approach in local health sector preparedness mechanism
-Pre-positioning of assistive/mobility devices based on estimates and types of injuries
-Develop IECs material on trauma management, emergency preparedness and response
-Conduct orientation on emergency operations to hospital administrators
-Coordinate workshops and documentation and dissemination relevant protocols/guidelines

Source: WHO Nepal, *Presentation on strengthening emergency response capacity of hub hospitals*

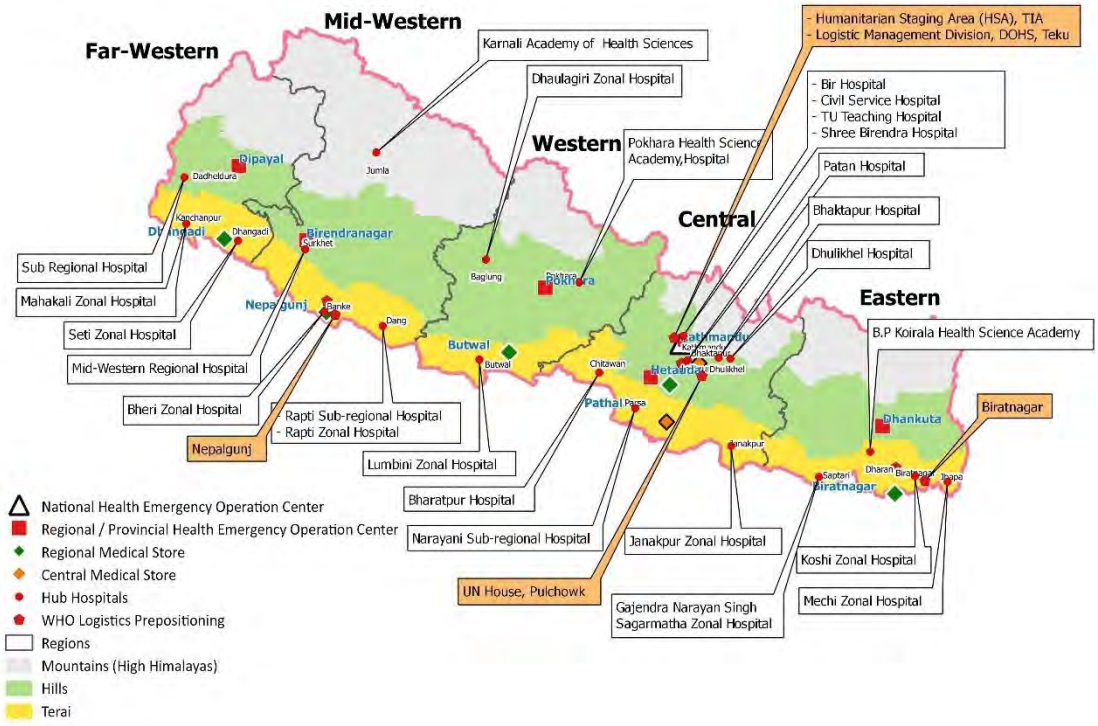

Figure 3-10 Location map of hub hospitals
Source: WHO Nepal Office

(3) Establishment of Ambulance Network System

MoH plans to introduce a new ambulance network system, and a budget for the plan has already been allocated. Under the plan, MoH is supposed to manage all the ambulance services in the country by equipping all the ambulances with GPS, and by integrating the NAS ambulance system with the national management system. It is also planned to introduce a unified emergency call number for ambulances, and to establish operation centres for responding to calls and dispatching ambulances in each development region, while NAS operates only one call centre in Kathmandu. New call centres will be set up in existing public offices.

References

1 Japanese Association for Disaster Medicine, *Standard Textbook of Disaster Medical Assistance Team* (Japanese)
2 Gongal R et al., 2009. *'Need of Improvement in Emergency Medical Service in Urban Cities'* J Nepal Assoc 2009, 48(174), 139-143
3 Nepal Health Research Council (2009), *Epidemiological Study on Injury and Violence in Nepal*
4 MoPIT, *Road Safety Status of Nepal 2013*Source:

Chapter 4 Emergency and Disaster Medical Services in Target Hospitals

Chapter 4　Emergency and Disaster Medical Services in Target Hospitals

The survey team selected six target hospitals namely, TUTH, Bir Hospital, the National Trauma Centre, Paropakar Maternity & Women's Hospital, Dhulikhel Hospital and Hetauda Regional Hospital to grasp the current situation of emergency and disaster medical services in hospitals.

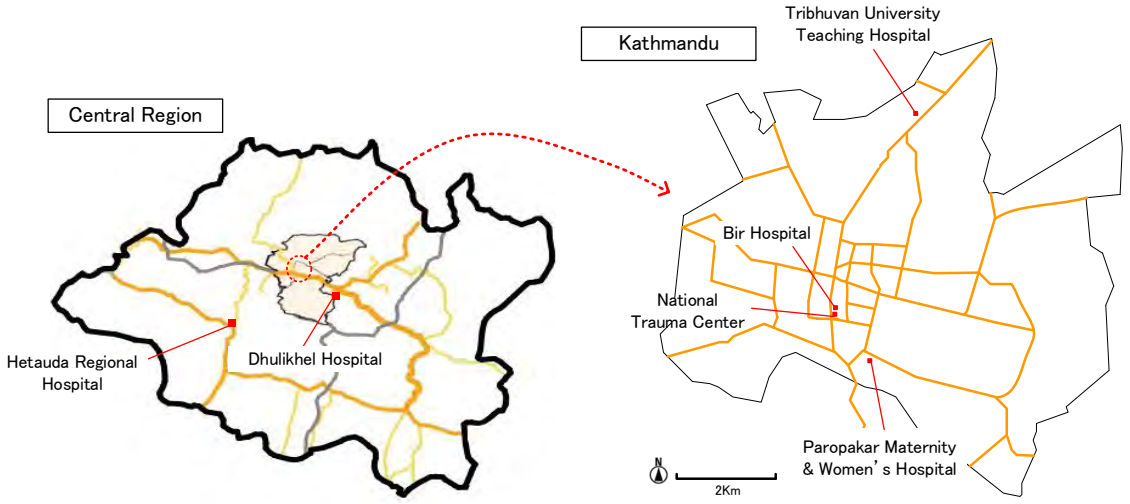

Figure 4-1　Location of target hospitals

4-1　Tribhuvan University Teaching Hospital

(1) Outline of the Hospital

Tribhuvan University, which was established in 1959, is the first national institute of higher education in Nepal and has nine faculties including medicine. IOM was established in 1972, and has trained many medical professionals such as doctors, nurses, pharmacists, and technicians. Currently it has seven campuses across the country and provides 49 programmes in total including certification level, bachelor's degree, master's degree and doctoral courses.

TUTH was established as the teaching hospital of the IOM of Tribhuvan University in 1982 through Japan's grant aid project. TUTH is under the control of the MoE. During the 1980s and 1990s, some Japan's technical cooperation and grant aid projects were implemented to strengthen medical education and the provision of medical services in TUTH. As of August 2017, the Project for Improvement of Medical Equipment in TUTH was being implemented through Japan's grant aid for the first time in about 25 years.

TUTH has 665 beds and more than 1,200 employees including 225 physicians and about 500 nurses and midwives. It consists of multiple buildings such as those for outpatients, inpatients, examinations, and operations/Intensive Care Unit (ICU), and has 25 curative departments including internal medicine, surgery, paediatrics, obstetrics and gynaecology, and seven preventive departments such as vaccination, family planning and health check-ups. It is

the highest level of health facility in Nepal, and accepts patients transferred from all over the country.

(2) Situation of Medical Service Delivery

TUTH is one of the biggest hospitals in Nepal, and plays an important role as a tertiary hospital. It accepts about 24,000 inpatients per year, an average of 1,500 outpatients and 140 emergency patients a day (see Table 4-1). The number of patients is overwhelmingly large compared to other hospitals. TUTH provides health services for the poor free of charge and the cost of the services accounts for 0.5% of the annual hospital expenditure.

Table 4-1 Number of patients

	2014	2015	2016
In-patients	23,332	22,492	24,056
Out-patients	483,375	459,685	469,926
Emergency patients	46,487	48,101	51,461

Source: TUTH, Questionnaire

As shown in Table 4-2, the top ten diseases of inpatients in 2016 were almost all NCDs and most of them were urinary and kidney diseases. Chronic obstructive pulmonary disease, stroke and fracture were also included among the top ten diseases. Most of the top ten causes of death in 2016 were also NCDs, and heart disease and head injuries were included (see Table 4-3).

Table 4-2 Top ten morbidities of inpatients (2016)

	Diseases
1	Cholelithiasis
2	Chronic obstructive pulmonary disease
3	Septicaemia
4	Pneumonia
5	Calculus of kidney
6	Disorder of kidney and ureter
7	Chronic nephritic syndrome
8	Neonatal jaundice
9	Fracture of femur
10	Stroke

Source: Interview by survey team

Table 4-3 Top ten causes of death among inpatients (2016)

	Causes
1	Septicaemia
2	Cardiac arrest (unspecified)
3	Pneumonia
4	Cardiogenic shock
5	Heart failure (unspecified)
6	Chronic obstructive pulmonary disease
7	Haemorrhage (unspecified)
8	Stroke
9	Chronic nephritic syndrome
10	Injury of head

Source: Interview by survey team

TUTH has 17 operating theatres (for major operations: 14 rooms, for minor operations: 3 rooms), and the number of operations in 2013 reached 13,588. About 70% of them were major operations, and caesarean sections accounted for about 10% of all operations. In addition, cholecystectomy, fracture reduction and appendectomy were performed in more than 200 cases in 2013/14 (see Table 4-4).

Table 4-4 Top ten operations (2013/14)

	Operations	Cases
1	Caesarean	1,574
2	Cholecystectomy	234
3	Open reduction and internal fixation	229
4	Abdominal and lumbar incision (for diagnosis)	216
5	Appendectomy	215
6	Abdominal total hysterectomy	135
7	Split-thickness skin graft	110
8	Vaginal hysterectomy & pelvic floor reconstruction	90
9	Surgical cleaning; debridement	89
10	Percutaneous nephrolithotomy	60
	Total	2,952

Source: JICA (2016), *Preparatory Survey Report on The Project for Improvement of Medical Equipment in TUTH*

(3) Medical Equipment

TUTH has a 0.5-tesla MRI, 128-slice and 16-slice CTs, an angiography apparatus, fluoroscopies, general X-ray apparatuses, portable X-ray apparatuses, C-arm X-ray apparatuses, ultrasound apparatuses, endoscopes, etc. About 4,000 MRI examinations and about 12,000 CT examinations are performed annually. In addition to these diagnostic imaging devices, TUTH has various types of diagnosis devices such as blood and virus analysers. However, the shortage of equipment due to the expansion of medical services and the aging of equipment are challenges. Therefore, Japan's grant aid project is being implemented, and diagnostic imaging systems such as a 1.5-tesla MRI and a digital mammography, endoscopes, laboratory equipment, sterilizers and other items will be provided in the project.

The maintenance of medical equipment is conducted by a biomedical engineer and three technicians; however, the maintenance department suffers from shortages of personnel. For the maintenance of radiation equipment such as MRI, CT and angiography, TUTH concludes a CMC and local agents of medical equipment manufacturers maintain the equipment.

(4) Emergency and Disaster Medical Services

- Emergency Medical Services

As mentioned earlier, TUTH deals with about 50,000 emergency patients, averaging 140 patients a day. The main reasons for visiting the emergency department were abdominal pain and breathing difficulty, and the number of trauma patients accounted for about 12% of the total. About 10% of emergency patients are admitted to the wards, and the number of surgical cases averages seven per day. The number of operations for emergency patients is shown in Table 4-5, and orthopaedic and general surgeries accounted for the majority.

Table 4-5 Number of operations of emergency patients by specialty

	2014	2015	2016
Orthopaedics	770	860	901
General surgery	472	721	887
Neurology	222	453	296
ENT	193	186	251
Obstetrics and gynaecology	198	213	243
Plastic	200	240	110
Paediatric	0	28	37
Ophthalmology	16	27	32
Urology	38	25	27
Breast and thyroid	0	1	0
Total	2,109	2,754	2,784

Source: TUTH, Questionnaire

The emergency building of TUTH, which is independently located near the main entrance and has three storeys, was established in 2011. The emergency department has 60 beds, and there are 30 doctors and 64 nurses working 24-7 on three shifts. A total of 70% of the doctors are medical officers fresh from medical college.

On the first floor of the emergency department, there are some beds for emergency patients and three areas categorized by the seriousness level of patients (red: severe/10 beds, yellow: moderate/10 beds, green: minor/7 beds). At least two doctors handle each category. A nurse triages[v] patients at the entrance of the emergency department, and assigns the patients to each category. Oxygen inhalers, aspirators, patient monitoring monitors, and defibrillators are placed by the bedside of seriously ill patients. There are many patients' families bedside, and they may hinder the treatment of the patients. On the second floor, there are 23 beds for follow-up observation. After observation for 24 hours, patients are discharged or moved to inpatient wards in principle. There are only 5 beds for trauma patients.

There are a 16-slice CT, a digital X-ray imaging apparatus, two ultrasound apparatuses, ventilators and electrocardiographs in the emergency department. There is a laboratory department on the third floor, and blood gas and biochemistry examinations are available 24 hours a day. There is no anaesthesia equipment in the operating theatre of the emergency department, so the patients are transported to the operating theatre in the main building except for minor surgery such as suturing. Ultrasonic diagnostic equipment, an advanced patient monitor and an anaesthesia machine will be provided to the emergency department through Japan's grant aid in 2018. TUTH has four ambulances, but they do not have sufficient medical equipment except oxygen aspirators.

In the emergency department, training for new staff members on first aid, BLS, advanced life support (ALS) and trauma management are conducted by doctors in the hospital. However, the number of specialists in emergency medicine is insufficient, although their development has

[v] Triage is the process of determining the priority of patients' treatments based on the severity of their condition. There are four triage categories with corresponding colour codes: red, yellow, green and black. A red case is highest-priority and a black is lowest-priority.

started in Nepal. Doctors of the emergency department mentioned that it was better for them to undergo clinical training on the diagnosis and treatment of emergency cases including multiple trauma.

- Disaster Medical Services

TUTH has a disaster preparedness plan and stockpiles medicine, medical equipment, tents, etc. In addition, disaster training is carried out once a year. Since TUTH is designated as a hub hospital, it is supposed to accept victims at the time of a disaster in collaboration with HEOC.

At the time of the Gorkha earthquake in 2015, TUTH established the disaster headquarters chaired by the director of TUTH and started treatment and surgeries for victims two hours after the earthquake. TUTH confirmed the damage to hospital buildings and classified the buildings where safety could be ensured into red, yellow, green and black areas as places for accepting victims. Triage was carried out in front of the outpatient reception area, and victims were assigned to each building. Health workers were divided into teams and treated victims. During the first eight days after the earthquake, TUTH accepted about 1,300 victims and carried out about 300 operations.

4-2 Bir Hospital

(1) Outline of the Hospital

Bir Hospital, which is located in the central part of Kathmandu, was established in 1889. It is the oldest general hospital in Nepal and is under the control of MoH. It consists of several buildings including the main building, emergency building, ICU building and cancer ward, and has 17 departments such as general surgery, internal medicine, cardiovascular surgery, brain surgery, endocrinology department, kidney transplantation and radiotherapy. Because there are special hospitals for obstetrics and gynaecology, and paediatrics in Kathmandu City, Bir Hospital does not have these two departments. There are 460 beds and about 1,200 employees including 164 doctors and 287 nurses. Bir Hospital is a tertiary hospital and accepts patients transferred from other health facilities all over the country.

It also functions as a teaching hospital of NAMS, which is an educational institution that develops health professionals. NAMS was established in 2002 and offers 17 programs including various specialist courses, nursing bachelor's degrees, and certificate level courses. There is no course for MBBS, and only postgraduate education is provided. More than 150 students for specialist courses and 25 students for doctoral courses are accepted annually.

The hospital has a master plan for the renovation of the facility and plans to construct a surgical complex and an internal complex with 650 beds each. As of August 2017, the Program for Rehabilitation and Recovery form Nepal Earthquake (Reconstruction of Bir Hospital) was

being implemented through Japan's grant aid, which forms part of the master plan, and it will be completed in the first half of 2019.

(2) Situation of Medical Service Delivery

Bir Hospital accepts about 9,000 inpatients annually, an average of 900 to 1,000 outpatients and about 90 emergency patients daily (see Table 4-6). The number of outpatients and emergency patients of Bir Hospital are the second largest following TUTH among the target hospitals.

Table 4-6 Number of patients

	2014/15	2015/16
In-patients	7,155	9,087
Out-patients	204,295	276,490
Emergency patients	29,535	32,342

Source: Annual Report 2014/15, 2015/16

As shown in Table 4-7, the top ten diseases of inpatients in 2016 were all NCDs except for pneumonia, and the number of cases of cholelithiasis and chronic obstructive pulmonary disease was particularly high. The statistical data of the top 10 causes of death for inpatients was not available, but Table 4-7 indicates that there were many cases of death from chronic obstructive pulmonary disease, chronic liver failure and pneumonia.

Table 4-7 Top ten morbidities and number of death of inpatients (2016)

	Diseases	Cases	No. of death
1	Cholelithiasis	794	2
2	Chronic obstructive pulmonary disease	630	43
3	Acute appendicitis	365	0
4	Nephrolithiasis	356	0
5	Diabetes mellitus	347	14
6	Chronic liver disease	317	33
7	Inguinal hernia	316	0
8	Carcinoma lung	250	13
9	Pneumonia	248	33
10	Carcinoma (unspecified)	187	10
	Total	3,810	148

Source: Interview at Bir hospital

The number of operations by specialty is shown in Table 4-8, and general surgeries and urological surgeries accounted for the majority. Since trauma patients are transported to the National Trauma Centre near the hospital, few orthopaedic patients are accepted by the hospital. Cardiac catheter treatment, pacemaker implantation, craniotomy, kidney transplantation, etc., can be performed in Bir Hospital.

Table 4-8 Number of operations by specialty (2016/17)

Specialty	Cases	Specialty	Cases
General surgery	1,536	Cardiovascular surgery	479
Urology	1,328	Gastroenterology	226
ENT	613	Orthopaedics	178
Neurology	582	Dental	57
Emergency	540		
		Total	5,539

Source: Interview at Bir hospital

(3) Medical Equipment

Bir Hospital has a 1.5-tesla MRI, a 16-slice CT, an angiographic imaging device, a mammogram, four general X-ray apparatuses, two C-arm X-ray apparatuses, four ultrasonic apparatuses, 10 endoscopes, an arthroscope and a gamma camera. Using this equipment, the hospital can provide various diagnoses and treatments including nuclear scanning and treatment.

Six technicians maintain medical equipment in the hospital and work 24-7 on three shifts. All the technicians studied electrical engineering at vocational training schools and learned about the management and repair of medical equipment in the hospital. Because of the shortage of human resources for maintenance, the technicians can only provide maintenance for malfunctioning equipment; preventive maintenance cannot be carried out. Bir Hospital concludes CMCs for the MRI, CT, angiography device, mammography and gamma camera with local agents of medical equipment manufacturers, and engineers of the agents maintain and repair this sophisticated equipment. There was a request from the technicians of the hospital to provide support for human resources development for the maintenance of medical equipment.

(4) Emergency and Disaster Medical Services

- Emergency Medical Services

As mentioned earlier, the number of emergency patients in Bir Hospital is approximately 30,000 a year - an average of 90 emergency patients a day. Trauma patients are transported to the National Trauma Centre. Since there are specialty hospitals for obstetrics and gynaecology, paediatrics and heart disease in Kathmandu City, the main reasons for visits by emergency patients in Bir Hospital are breathing difficulties and abdominal symptoms. The number of surgical cases among emergency patients is one or two per day, and most cases are acute appendicitis. In the emergency department, statistical data such as the reason for the visit and number of patients by disease have not been compiled. The data are very important to grasp the trend of emergency patients to improve emergency medical services; therefore, it is necessary to compile medical records of emergency patients and analyse the data.

The emergency department is an open area with 22 beds and is not categorized into red, yellow and green areas. Triage is not carried out and serious patients are placed in 6 beds where patient monitors are installed. Emergency beds are always fully occupied, and the situation

where a bed is used by two patients occurs on a daily basis. In addition, many patient families accompany patients, so it is too crowded in the emergency department to provide urgent treatment to emergency patients.

In the emergency department, there is a minor operating theatre and a treatment room for suturing, etc. There is an old defibrillator that is of less practical use in the treatment room. In addition, the emergency department has a digital general X-ray apparatus, but only one CT in the hospital is shared with the outpatient and inpatient departments. Bir Hospital has four ambulances equipped with oxygen cylinders for transporting patients between hospitals. The shortage of human resources in emergency departments is a challenge for ensuring the quality of emergency medical services.

In Bir Hospital, training for doctors, nurses and paramedics on BLS and ALS are regularly conducted by specialists in anaesthesiology and general practitioners in the hospital as lecturers. Moreover, training on first aid is conducted by MoH and NRCS.

- Disaster Medical Services

Bir Hospital has a disaster manual, and a disaster management team and a relief team are organized at time of a disaster. The doctors in the emergency department examine patients in normal time, but at the time of a disaster, triage of patients is done by paramedics based on the triage plan. There are areas categorized into red, yellow, green, and black at the front entrance of the main building, and victims are assigned to those areas by triage. Additionally, medical equipment, medicines, water, etc. are stocked in the hospital in case of a disaster. Trainings on disaster management, emergency trauma management and emergency preparedness are conducted by MoH and WHO in the hospital.

At the time of Gorhka earthquake in 2015, Bir Hospital accepted many victims as a hub hospital in Kathmandu City in collaboration with HEOC. The hospital treated 2,574 victims, accepted 427 inpatients, and conducted 190 major operations and 563 minor operations at the time of the disaster.

4-3 National Trauma Centre

(1) Outline of the Hospital

The National Trauma Centre was established with support from the Government of India as the first trauma centre in Nepal. Providing health services in the centre started right after the Gorkha earthquake in 2015. It is a public specialty hospital under the control of MoH located next to Bir Hospital, but it is a facility independent from Bir Hospital. The centre has 200 beds (150 beds in the inpatient ward, 32 beds in the emergency department, 11 beds in the ICU, 7 beds in the restoration room), five operating theatres and five departments, namely

orthopaedics/trauma, brain surgery, burn injury, emergency and ICU.

There are 46 doctors, of which 21 are specialists, and the breakdown is shown in Table 4-9. In addition, 154 nurses and 12 paramedics also work in the centre. Moreover, the National Trauma Centre plays a role as a teaching hospital of NAMS and accepts internship students, as does Bir Hospital.

Table 4-9 Number of specialists

Specialty	No.	Specialty	No.
General surgeon	5	Anaesthesiologist	4
Neurosurgeon	2	Pathologist	1
Orthopaedic surgeon	6	Radiologist	2
ENT surgeon	1		

Source: National Trauma Centre, Questionnaire

(2) Situation of Medical Service Delivery

The National Trauma Centre accepts about 2,500 inpatients per year and on average 60 to 70 outpatients per day (see Table 4-10). The number of emergency patients has increased every year, and the average number of emergency patients per day was 25 in 2016, but was 50 to 60 in 2017.

Table 4-10 Number of patients

	2015	2016
In-patients	3,081	2,473
Out-patients	17,998	19,864
Emergency patients	5,441	8,375

Source: National Trauma Centre, Questionnaire

As shown in Table 4-11, leading diseases of inpatients are RTAs followed by fall injuries. As mentioned in “3-2-2 Trend of Emergency Patients,” these leading diseases are the same as the results of the survey conducted by Nepal Health Research Council in 2008/09. It was found that main causes of trauma are RTAs and falls; these causes have not changed for about 10 years. The centre has just introduced a medical information system, so data on the number of patients by disease was not available.

Table 4-11 Leading morbidities of inpatients (2016/17)

	Diseases
1	Road traffic accident
2	Fall injury
3	Back and joint pain
4	Burn
5	Orthopaedic follow-up care (implant removal)
6	Sarcoma/Neoplasm

Source: Interview at the National Trauma Centre

Table 4-12 Top ten operations (2016/17)

	Operations	Cases
1	Fracture of leg	180
2	Fracture of femur	159
3	Fracture of shoulder and upper arm	152
4	Fracture of forearm	119
5	Head injury	98
6	Fracture of spine	49
7	Orthopaedic follow-up care (implant removal)	41
8	Burn	32
9	Open wound / fracture of the whole body	32
10	Spondylolisthesis / Spondylosis	30
	Total	892

Source: Interview at the National Trauma Centre

Most operations performed in 2016/17 were fracture reduction surgeries (see Table 4-12). Surgeries for head trauma and burns were also performed. Data on the number of surgeries per year was not available, but according to interviews, it was said that 20 to 30 operations were performed per day.

(3) Medical Equipment

The National Trauma Centre has a 16-slice CT, two general X-ray imaging apparatuses, an angiography apparatus, seven C-arm X-ray apparatuses, six ultrasound apparatuses, an endoscope and an arthroscope. In addition, there is a plan to install an MRI in the future. Since the National Trauma Centre started providing services in 2015, most of the equipment is still under warranty. A biomedical engineer with a bachelor's qualification maintains and manages the medical equipment in the centre.

(4) Emergency and Disaster Medical Services

- Emergency Medical Services

The National Trauma Centre accepts approximately 50 to 60 emergency patients per day, of which about 20 patients are admitted, and only one operation is performed a day. As well as inpatients, the most common case of emergency patients is traffic injuries, followed by fall injuries. The degree of injury varies from fractures to internal organ and brain injuries.

All five doctors in the emergency department are medical officers who have not yet undergone specialist training, and there are no full-time specialists. The doctors in the emergency department examine patients at first, and the patients are referred to specialists such as orthopaedic surgeons and brain surgeons when necessary. A total of 20 nurses and three paramedics also work in the emergency department. Health workers work 24-7 on three shifts, and at least one doctor and four nurses and/or paramedics are allocated to each shift.

The emergency department is on the first floor, so that emergency patients can be brought in immediately. The emergency department is categorized into three areas (red: severe/6 beds, yellow: moderate/8 beds, green: minor/14 beds). Oxygen inhalers and patient monitoring monitors are placed in the red area for severe patients, but there are no artificial respirators or automated external defibrillators (AEDs). Patients who need intensive care are supposed to be immediately transferred to the ICU. Insufficient medical equipment and human resources are problems facing the emergency department.

There is a digital X-ray imaging apparatus in the emergency department, but only one CT in the hospital is shared with the inpatient and outpatient departments. Most emergency patients have X-ray examinations, but a CT examination is rarely conducted. Because there is an examination department next to the emergency department, blood test equipment, etc., is not installed in the emergency department. In addition, there is an operating theatre with a C-arm

X-ray apparatus in the emergency department where minor operations can be performed. Since emergency patients should be moved to inpatient wards or be discharged after treatment, the patients never stay long in the emergency department. There is an ambulance without equipment for treatment, which is only used for transporting patients between hospitals.

The National Trauma Centre has a physiotherapy department, where five physiotherapists work. Therapeutic instruments such as low-frequency therapy equipment, laser therapy equipment, ultrasound therapy equipment, hot pack unit, an ergometer and parallel bar are installed, but the kind of equipment is very limited and the space between the instruments is narrow. About 60 outpatients come to the physiotherapy department per day. There are many patients who have low back and knee pain and who are post-fracture. Moreover, the physiotherapists visit inpatient wards every morning and provide training for inpatients on how to get up, move and walk by their bedsides and educate their family on how to support the patients. It seemed that only patients who could walk visited the physiotherapy department. Once discharged from the hospital, it is difficult for patients with disabilities to go to hospitals for rehabilitation.

- Disaster Medical Services

At the time of a disaster, the National Trauma Centre is supposed to accept victims from four to five areas in Kathmandu City with Bir Hospital as a hub hospital. A disaster management team and rescue teams are established to respond to a disaster. As preparation for a disaster, the centre stockpiles medicine, and training for health workers on BLS and ALS is conducted four times and twice a year, respectively, by the specialists in the hospital.

At the time of the Gorkha earthquake in 2015, the National Trauma Centre had not opened, and all hospitals in Kathmandu City were crowded with an overflow of victims, so the National Trauma Centre was quickly opened and started providing health services for victims.

4-4 Paropakar Maternity & Women's Hospital

(1) Outline of the Hospital

Paropakar Maternity & Women's Hospital located in the southern part of Kathmandu City was established in 1959. The hospital is the only public maternity specialty hospital in the country and accepts patients from all over the country as a tertiary hospital. The hospital provides medical services of obstetrics and gynaecology such as examinations at the outpatient department, support for labour, operations, response to emergency cases, abortion and infertility treatment. The hospital has 631 employees including 59 doctors, 172 nurses and 40 health assistants, but the number of health workers is insufficient for responding to patients transferred from across the country. The number of beds was 415 before the Gorkha earthquake in 2015

(241 beds in obstetrics, 61 beds in gynaecology, 34 beds for newborns, 79 beds for others), but since the main building was damaged in the earthquake, only about 320 beds are currently available. As of August 2017, the Program for Rehabilitation and Recovery form Nepal Earthquake (Reconstruction of Paropakar Maternity & Women's Hospital) was being implemented through Japan's grant aid, and it will be completed in the first half of 2019.

As there is no obstetrics and gynaecology department in Bir Hospital, which is a teaching hospital of NAMS, the hospital has also been designated as a teaching hospital of NAMS that provides education and accredits a master's degree in obstetrics and gynaecology. In addition, training for skilled birth attendants working in rural areas is also conducted in the hospital.

(2) Situation of Medical Service Delivery

Paropakar Maternity & Women's Hospital accepts approximately 23,000 inpatients annually, an average of 400 to 500 outpatients and about 70 emergency patients per day (see Table 4-13). The number of inpatients is equal to TUTH, which is the largest hospital in the country, and many inpatients are admitted short-term for childbirth. Most outpatients have prenatal and postnatal care, but have long waits for ultrasound examinations. In principle, perinatal services are provided free of charge based on the Ama Programme.

Table 4-13 Number of patients

	2014/15	2015/16	2016/17
In-patients	23,759	23,120	23,547
Out-patients	122,429	113,634	136,646
Emergency patients	24,557	23,893	24,074

Source: Paropakar Maternity & Women's Hospital, Questionnaire

Leading morbidities including childbirth of inpatients in 2014 to 2016 are shown in Table 4-14; the largest number of cases was childbirth, which accounted for 80% of the total, followed by abortion. There are seven beds in the delivery room and nine beds in the labour room, and the number of births is 50 to 60 per day, about 25% of which are deliveries by caesarean section.

Table 4-14 Leading morbidities of inpatients (including deliveries)

	Diseases	2014	2015	2016
1	Deliveries (normal/caesarean section)	18,928	18,618	18,097
2	Abortion	1,533	1,334	1,437
3	Menstrual disorder	300	286	322
4	Hydatid mole	128	173	244
5	Fibroid uterus	148	138	215
6	Uterine prolapse	146	162	165
7	Pregnancy hyperemesis	129	142	138
	Total	21,312	20,853	20,618

Source: Interview at Paropakar maternity & Women's Hospital

In the newborn care unit, there are about 40 beds. It is difficult to save the life of low-birth-weight babies less than 1,000g without consequences because of the shortage of human resources including specialists and medical equipment for neonatal care, although there was a case of a 600g low-birth-weight baby surviving.

There are four operating theatres and about 7,500 operations are performed annually (see Table 4-15). Most major obstetrics operations are caesarean sections and 15 to 20 caesarean sections are performed per day. About three to four other operations such as abortion and gynaecological surgery are performed per day. The hospital has the largest number of childbirths and obstetrics and gynaecology operations in Nepal and accepts pregnant women with serious complications transported from across the country. Therefore, the shortage of human resources is an urgent issue for the hospital.

Table 4-15 Number of operations

	2014	2015	2016
Obstetrics major operation	4,665	4,807	4,548
Obstetrics minor operation	645	561	605
Gynaecology major operation	447	424	597
Gynaecology minor operation	1,728	1,706	1,755
Total	7,485	7,498	7,505

Source: Paropakar Maternity & Women's Hospital, Questionnaire

(3) Medical Equipment

The hospital has a general X-ray apparatus, a mammography X-ray apparatus, four ultrasound apparatuses, an endoscope and a 16-slice CT, which was just installed in June 2017. An annual maintenance contract is concluded only for the CT. There is no biomedical engineer with a bachelor's qualification, and human resources for maintenance and management are not sufficient.

(4) Emergency and Disaster Medical Service

- Emergency Medical Services

The hospital accepts approximately 70 emergency patients per day and most of them are patients with preterm labour, bleeding, abdominal pain and gynaecologic diseases. In addition, as shown in Table 4-16, one or two patients are referred from other hospitals per day. Usually an ambulance is used for transporting patients between hospitals, but helicopters are also used in rare cases. In cases outside the field of obstetrics and gynaecology, such as complications with cerebral haemorrhage and heart disease, patients may be referred to other specialty hospitals. The hospital owns four ambulances without equipment for treatment and only two drivers are employed.

Table 4-16 Number of referral patients between hospitals

	2014	2015	2016
Referral-in patients	623	554	578
Referral-out patients	25	19	30

Source: Paropakar Maternity & Women's Hospital, Questionnaire

The emergency department has eight beds and does not have much room for emergency treatment. In addition, there is no special equipment, and emergency patients can be received only supplemental oxygen and intravenous drips. As of August 2017, Japan's grant aid project was being implemented. A new emergency department will be constructed, and an ultrasound apparatus, a defibrillator, a foetal monitor, vacuum extractors, etc., will be provided under the project.

Doctors in the hospital form six groups (10 doctors for each group) and the groups are rotated in the wards, outpatient department, operating theatre, emergency department, etc. Thus, there is no doctor attached to the emergency department, but there are 12 nurses and nursing assistants. Health workers work 24-7 on three shifts in the emergency department, and at least two doctors and two nurses and/or nursing assistants are allocated to each shift. The number of health workers is insufficient throughout the hospital, but it is particularly noticeable in the emergency department.

- Disaster Medical Services

Paropakar Maternity & Women's Hospital is a specialty hospital in the field of obstetrics and gynaecology, and at the time of the Gorkha earthquake in 2015, the hospital actively supported female victims by utilizing the characteristics of the hospital. The hospital accepted pregnant women and female patients instead of trauma patients. On the other hand, neonatal care was provided in vans and temporary tents due to the lack of space. The hospital received supplies such as tents, drugs and delivery kits from donors, and provided medical services to victims using the supplies. The hospital stockpiles tents, drugs, medical equipment, etc., in preparation for disasters.

4-5 Dhulikhel Hospital

(1) Outline of the Hospital

Dhulikhel Hospital, which is a non-profit and community-based hospital, was established in 1996. The hospital is located at the entrance of Sindhuli highway in the Kavrepalanchok district, about 30 km east from Kathmandu, and mainly covers six districts (population approximately 1.6 million people) on the east side of the central region and the west side of the eastern region. The hospital provides health services to community residents as a tertiary hospital, and basic health services are provided free of charge as commissioned by MoH. In

addition, the hospital has 21 outreach centres all over the country, and provides primary health care at the community level.

The hospital consists of several buildings including the main building, outpatient building, radiation department, childbirth centre, etc. It has 17 departments including surgery, internal medicine, paediatrics, obstetrics and gynaecology. The hospital has 425 beds and 1,084 employees including 198 doctors, 278 nurses and 54 paramedics. Out of the 198 doctors, 95 doctors are specialists, and the breakdown of specialists is shown in Table 4-17.

Dhulikhel Hospital has also played a role as a teaching hospital of KUSMS since 1999. KUSMS provides bachelor's courses for the development of health workers including doctors, dentists, nurses and physiotherapists, and postgraduate courses for various kinds of specialists.

Table 4-17 Number of specialists

Specialty	No.	Specialty	No.
Surgeon	11	ENT	4
General practitioner	10	Ophthalmologist	4
Obstetrics and gynaecology	8	Dermatologist	3
Paediatrician	8	Psychiatrist	2
Orthopaedic surgeon	9	Anaesthesiologist	8
Cardiologist	2	Radiologist	6
Dentist	18	Forensic medicine	2
		Total	95

Source: Interview at Dhulikhel Hospital

(2) Situation of Medical Service Delivery

The hospital accepts approximately 15,000 inpatients annually, an average of 600 to 700 outpatients and an average of 40 emergency patients per day (see Table 4-18). The hospital provides medical services with minimum medical fees equivalent to other public hospitals.

Table 4-18 Number of patients

	2014/15	2015/16	2016/17
In-patients	15,482	15,134	15,491
Out-patients	213,921	213,133	195,628
Emergency patients	16,241	17,914	16,292

Source: Dhulikhel Hospital, Questionnaire

Table 4-19 Top ten morbidities of adult inpatients* (2015/16)

	Diseases	Cases
1	Laparo-cholecystectomy	466
2	Chronic obstructive pulmonary disease	374
3	Hepatic-biliary problem	365
4	Appendicitis	271
5	Tonsillitis and tonsil related cases	234
6	Fever	228
7	Gastro intestinal problem	224
8	Pneumonia	200
9	Liver problem	188
10	Diabetes mellitus	186
	Total	2,736

*Except normal and caesarean deliveries

Source: Interview at Dhulikhel Hospital

As show in Table 4-19, most of the top 10 diseases of adult inpatients in 2015/16 were digestive and respiratory NCDs. On the other hand, the number of cases of infectious diseases

such as pneumonia, sepsis and acute gastroenteritis was still high among neonatal and paediatric inpatients (see Table 4-20).

Table 4-20 Top ten morbidities of neonatal/Paediatric inpatients (2015/16)

	Diseases	Cases
1	Respiratory problem	294
2	Pneumonia	239
3	Neonatal Jaundice	235
4	Sepsis	204
5	Fever	131
6	Acute gastroenteritis	126
7	Seizure disorder/febrile convulsion	100
8	Preterm baby	85
9	Asphyxia	54
10	Urinary tract infection	45
	Total	1,513

Source: Interview at Dhulikhel Hospital

The number of deaths among inpatients during the first half of the year 2015 was 54. As shown in Table 4-21, the most frequent cause of death was respiratory failure, and hepatobiliary disorders, cardiovascular disease and carcinoma were also among the leading causes of death. The main causative disease of respiratory failure was chronic obstructive pulmonary diseases, and consequently NCDs accounted for more than 70% of the causes of death in the hospital.

Table 4-21 Leading causes of death among inpatients (January-June, 2015)

Diseases	Cases
Respiratory shut-off	19
Hepatobiliary	10
Cardiovascular disease	6
Preterm baby	6
Carcinoma (lung and gall bladder)	4
Pneumonia	3
Sepsis (Neonatal and post-partum)	2
Others	4
Total	54

Source: Interview at Dhulikhel Hospital

The number of operations has increased year by year, and about 5,700 operations were performed in 2016. As shown in Table 4-22, the most common operation was orthopaedic surgery (25%), followed by obstetrics and gynaecologic surgery (24%) and general surgery (23%). As the hospital accepted many trauma patients during the Gorkha earthquake in 2015, the number of orthopaedic surgeries in 2015 was higher than in other years. Most cases of orthopaedic surgery were fracture reduction, open wound suturing and implant removal, and caesarean section accounted for 60% of obstetrics and gynaecologic surgeries. In general surgery, the most common case was gallbladder removal, followed by hernia repair and appendectomy (see Table 4-23).

Table 4-22 Number of operations by specialty

	2014	2015	2016
Orthopaedics	1,323	1,888	1,429
Obstetrics and gynaecology	1,122	1,198	1,383
General surgery	1,116	1,040	1,336
Urology	406	569	861
ENT	244	233	378
Others	259	340	355
Total	4,470	5,268	5,742

Source: Interview at Dhulikhel Hospital

Table 4-23 Top ten operations (2016)

	Operations	Cases
1	Caesarean section	829
2	Fracture management	663
3	Urinary tract stone management	450
4	Cholecystectomy	425
5	Hernia repair	287
6	Appendectomy	235
7	Open wound management	194
8	Implant removal	185
9	Hysterectomy	130
10	Tonsillectomy	84
	Total	3,482

Source: Interview at Dhulikhel Hospital

(3) Medical Equipment

There is an independent building of the radiation department across from the entrance of the emergency department of the main building, where there are two X-ray apparatuses, a fluoroscopic diagnostic apparatus and three ultrasound apparatuses. In the outpatient building, there are a 128-slice CT introduced in 2014 and a 1.5-Tesla MRI introduced in 2016. Before introducing the CT and the MRI, patients were referred to hospitals in Kathmandu City for CT and MRI examination. As shown in Table 4-24, the number of CT and MRI examinations have increased every year; therefore, patients have to wait one or two days to have the examination. In addition, there are two microscopes, one for orthopaedic surgery and one for otolaryngologic surgery, and two C-arm X-ray apparatuses in the operating theatre, and two portable X-ray apparatuses in the wards, and an ultrasound apparatus in the childbirth centre. Moreover, there is a used angiography apparatus donated by a donor in the catheter room on the first floor of the main building.

There is a maintenance and management department in the hospital, and a biomedical engineer and three technicians maintain and repair the medical equipment. The hospital concludes CMCs for CT and MRI with local agents of medical equipment manufacturers and orders maintenance and repair services.

Table 4-24 Number of CT and MRI examinations

	2014	2015	2016	2017 (till June)
CT examination	1,561	2,929	3,287	2,170
MRI examination	-	-	564	883

Source: Interview at Dhulikhel Hospital

(4) Emergency and Disaster Medical Services

- Emergency Medical Services

As mentioned earlier, Dhulikhel Hospital accepts approximately 16,000 emergency patients per year, namely an average of 40 per day. As shown in Table 4-25, the major reasons for visits to the emergency department in 2016 were trauma (22.1%), abdominal pain (11.8%) and respiratory difficulty (8.5%). While the proportion of trauma cases among the patients

transported by ambulances of NAS, which provides emergency transportation services in Kathmandu, was about 10%, the proportion of trauma cases among emergency patients in Dhulikhel Hospital was as high as 22%. This is probably because many trauma patients of traffic accidents on the Sindhuli highway, which is an accident black spot, are transported to the hospital. In addition, NCD patients such as those with chronic obstructive pulmonary disease and stroke were included among emergency patients in the hospital.

Table 4-25 Main reasons for visit to the emergency department (2016)

	Reasons	Cases	(%)
1	Trauma	3,607	22.1
2	Abdominal pain	1,920	11.8
3	Respiratory difficulty (including COPD)	1,391	8.5
4	Fever	800	4.9
5	Neurological problem（including stroke and loss of consciousness）	567	3.5
6	Obstetrics and gynaecology problem	540	3.3
7	Musculoskeletal pain	456	2.8
8	Gastritis	296	1.8
9	Vomiting	274	1.7
10	Gastro-intestinal diseases (including bowel obstruction and bleeding)	227	1.4
	Total	10,078	61.9

*Total number of emergency patients in 2016 was 16,292. Source: Interview at Dhulikhel Hospital

In the emergency department, there are 17 doctors including five specialists in general practice, 12 nurses and eight paramedics working 24-7 on three shifts. At least four doctors including a specialist, three nurses and two paramedics are allocated to each shift. The emergency department has 21 beds and is categorized into three areas (red: severe/2 beds, yellow: moderate/12 beds, green: minor/7 beds). A nurse or paramedic triages emergency patients using a triage form at reception and assigns the patients to each area. In addition, a board indicating triage categories is posted on the wall at reception. The triage form and board were uniquely created by the hospital with the cooperation of a donor. Patient monitors, aspirators and oxygen inhalators are installed for all beds, and moreover an ultrasound apparatus and a defibrillation unit are placed in the red area. About 200 severe patients who cannot be treated in Dhulikhel Hospital are referred to specialty hospitals, central general hospitals and private hospitals in Kathmandu per year. The hospital has two ambulances equipped with an oxygen inhaler, a blood pressure monitor, a saturation monitor, basic drugs and a first aid kit. One of the ambulances also has a ventilator. Patients pay Rs.500 for transportation to Kathmandu.

The ambulances of the hospital transport patients not only between hospitals, but also from accident sites or homes to the hospital. Moreover, an EMT rides in the ambulance. The hospital uniquely fostered three EMTs who have paramedic qualifications. They underwent BLS training and one or two weeks of emergency lifesaving training conducted by teams from the United Kingdom and Israel. One of them also attended a three-month training programme on

emergency lifesaving at Stanford University in the United States.

Training on trauma management for doctors, nurses and paramedics is regularly conducted in the hospital in cooperation with the NRCS. In addition, training on fracture management is conducted in the hospital in collaboration with an INGO organized by trauma surgeons.

There is a physiotherapy department in the hospital where 16 physiotherapists work. About 50 outpatients come to the department every day, and there are many patients who have low back and knee pain. The patients with complications from infectious diseases such as filariasis also come for physiotherapy. There are exercise training machines, parallel bars, walking exercise stairs, traction devices, electrotherapy equipment, hot pack equipment, daily activity kits, etc., in the physiotherapy department. In addition to outpatient services, the physiotherapists visit inpatient wards every morning and provide training for inpatients on how to get up, move and walk at their bedsides. As of August 2017, a bachelor's degree course for physiotherapists was provided only by KUSMS. KUSMS accepts 30 students every year in this course and provides them with clinical training in the physiotherapy department of Dhulikhel Hospital and educational facilities in KUSMS.

- Disaster Medical Services

At the time of the Gorkha earthquake in 2015, Dhulikhel Hospital established an emergency response team and started accepting victims one or two hours after the earthquake occurred. A triage point was set up outside, and victims who needed surgery and in-hospital treatment were carried into the hospital. The total number of victims treated in the hospital in the month and a half after the earthquake was 3,679. Since most of the victims were trauma patients, more than 2,700 X-ray examinations and more than 3,000 minor operations such as wound management and suturing, and more than 500 major operations such as fracture reduction, were conducted. Some patients were transported by military helicopter from Kathmandu City and its suburbs because hospitals in Kathmandu were crowded with victims. In addition, the hospital distributed meals and essential goods to victims in cooperation with international aid agencies and community organizations.

As the experiences of the Gorkha earthquake in 2015 showed, Dhulikhel Hospital plays a role as a hub hospital in the surrounding area at the time of a disaster, and alleviates crowding in central hospitals.

4-6 Hetauda Regional Hospital

(1) Outline of the Hospital

Hetauda Regional Hospital is a public secondary hospital established in 1961, and is located about 75 km south of Kathmandu. The hospital has 10 departments, such as surgery, internal medicine, obstetrics and gynaecology, paediatrics and psychiatry, and about 20 doctors, 19 nurses and 12 paramedics. As of August 2017, there were 85 beds in the hospital; however, the expansion of the hospital will start in 2017, and the number of beds will increase to 200. In addition, the hospital accepts medical and nursing students for their internships from the Patan Academy of Health Sciences and two nearby nursing colleges.

(2) Situation of Medical Service Delivery

The hospital accepts approximately 7,000 inpatients annually, an average of 200 outpatients and about 50 emergency patients per day (see Table 4-26). Although the hospital is not so large, it has a large number of patients. Most inpatient cases, however, are not so serious and the average length of stay is about two or three days. The bed occupancy rate is about 60%. The hospital has two operating theatres and an ICU; 357 caesarean sections, 67 major operations and 223 minor operations were performed in 2015/16 (Table 4-27).

Table 4-26 Number of patients

	2014/15	2015/16
In-patients	5,773	6,903
Out-patients	51,074	58,458
Emergency patients	17,549	18,139

Source: Interview at Hetauda Regional hospital

Table 4-27 Number of deliveries and operations

	2014/15	2015/16
Normal delivery	1,802	2,324
Caesarean section	285	357
Major operation	90	67
Minor operation	206	223

Source: Interview at Hetauda Regional Hospital

(3) Medical Equipment

The hospital has two general X-ray apparatuses, an ultrasound apparatus, an electrocardiograph and a dental X-ray apparatus. About 40 to 50 X-ray examinations are conducted each day. There is equipment to conduct blood gas and biochemical tests in the laboratory department. Most medical equipment in the hospital was provided by the Korea International Cooperation Agency. Two technicians maintain and manage medical equipment in the hospital, but repairs of X-Ray apparatuses are ordered to a medical equipment agent.

(4) Emergency and Disaster Medical Services

- Emergency Medical Services

As mentioned earlier, the number of emergency patients is approximately 18,000 per year, an average of 50 per day. There are only five beds in the emergency department, and there is no special equipment, even oxygen piping. The number of emergency patients is large with an average of 50 patients per day; however, it is presumed that there are many patients who visit

outside of working hours and who are mild cases such as for injections, infusions and drugs. Compared with the other target hospitals, the seriousness of emergency patients is obviously different. Severe patients who cannot be treated in the hospital are referred to hospitals in Chitwan (25 km, about 2 hours) or in Kathmandu (about 5 hours). The hospital has an ambulance without equipment for treatment.

There are large differences in the level of medical services between the central/specialty hospitals and the regional hospital. Medical services in the regional hospital are very limited, and consequently central/specialty hospitals, which are supposed to provide tertiary and specialized medical services, are forced to accept all patients from mild to severe cases. This is the reason that central/specialty hospitals are always overcrowded. It is necessary to improve medical services at the regional level by strengthening facilities, medical equipment and human resource development so that the more severe patients can be managed within each region.

- Disaster Medical Services

At the time of a disaster, the hospital is supposed to accept victims and provide rescue activities according to the instructions of the regional health directorate and HEOC in MoH. In addition, there is a regional warehouse, where a large amount of medicine, medical supplies, etc., is stored in Hetauda. This medicine and medical supplies are distributed to each district at the time of a disaster.

Chapter 5 Japanese Cooperation in the Health Sector

Chapter 5 Japanese Cooperation in the Health Sector

5-1 Outline of Japanese Cooperation in Nepal

Japan has implemented a variety of assistance programmes in the health sector in Nepal as a main donor since 1969. Recently, Japan pledged 32 billion yen to Nepal for recovery and reconstruction from the Gorkha earthquake in April 2015 at the international conference on Nepal's reconstruction in Kathmandu in June 2015.

Japan's assistance to Nepal contributes to not only the development of better relations through support for peace building and poverty reduction, but also to the stability of the whole of South Asia. Japan provides assistance with a focus on the following three priority areas: “Poverty alleviation in rural areas”, “Peace building and steady transition to democracy” and “Building social infrastructure and institutions for balanced and sustainable economic growth.”

5-2 Japan's Assistance in the Health Sector

As shown in Table 5-1, Japan's assistance for tuberculosis control and medical education as the two main pillars was implemented from 1980 to 2005 through the programme approach, which combines technical cooperation and grant aid. The grass-roots technical cooperation and the human security projects have mainly been implemented since 2000; the former focused on the field of maternal and child health and the latter focused on the improvement of health facilities and medical equipment.

Table 5-1 Japan's assistance in the Health Sector

Scheme	Project	Period
Technical Cooperation	Tribhuvan University Medical Education Project	1980～1989
	National Tuberculosis Control Project	1987～1994 1994～2000
	Medical Education Project	1989～1994
	Community Tuberculosis and Lung Health Project	2000～2005
	School Health and Nutrition Project	2008～2012
Grant Aid	Establishment of Tribhuvan University Teaching Hospital	1981～1982
	Project for the Construction of Nursing School	1984
	Project for Improvement of Medical Equipment in Kanti Children's Hospital	1984
	Project for the Construction of National TB Centre	1987
	Project for the Expansion of Tribhuvan University, Institute of Medicine and the Teaching hospital	1990～1992
	Expansion of Kanti Children's Hospital	1993～1994
	Emergency Grant Aid to Nepal for the Earthquake Damage	2015
	The Project for Improvement of Medical Equipment in Tribhuvan University Teaching Hospital	2016～
	The Program for Rehabilitation and Recovery form Nepal Earthquake- The subproject of Reconstruction of Paropakar Maternity & Women's Hospital and Reconstruction of Bir Hospital	2016～

Scheme	Project	Period
Grassroots Technical Cooperation	Project for improvement of nutrition for women and children through capacity building of health governance system	2006～2010
	Strengthening Eye Care System in Nepal	2007～2010
	Project for Promotion of Maternal and Child Health at 4 VDCs in Nawalparasi District	2010～2013
	Life improvement in Dhital Village Development Committee of Kaski District, Nepal -Supply promotion of safe water-	2012～2015
	Maternal and Child Health Project for Safe and Secure Delivery	2015～
	Early Rehabilitation Support Project for Patients with Respiratory Disease in the Kathmandu Valley -Wide-area Development of Respiratory Rehabilitation Services-	2015～
	Strengthening retina eye care services in Nepal	2016～
	Sustainable Maternal and Child Health Project	2017～
Grass-roots Human Security Projects	Establishment of Safe Motherhood Center in Roopnagar (Recipient: Asian Mama Nepal)	2008～2009
	Construction of Dobra Community Health Center in Bajhang District (Recipient: Chhabis Rural Sensitive Centre)	2009～2010
	Project for Improvement of Siddhi Memorial Hospital (Recipient: Siddhi Memorial Hospital)	2011～2012
	(Recipient: Pokhara Sub-Metropolitan City Office)	2011～2013
	Construction of Sub-Health Post in Sindhuli (Recipient: Khurkot Sub Health Post)	2012～2013
	Project for Improvement of medical equipment for ophthalmic and ENT in Rural Nepal (Recipient: B.P. Eye Foundation)	2012～2013
	Project for the Improvement of Diabetic Medical Service Provision for the Urban Poor (Recipient: Nepal Diabetes Society)	2012～2013
	Project for Improvement of Medical Equipment in Damauli Hospital (Recipient: Damauli Hospital)	2015
	Project for Extension of the Community Health Center and Improvement of Medical Equipment (Recipient: Council of Community Health Service)	2015～2016
	The Project for Provision of Ambulances in Provincial Cities (Recipient: Nepal Red Cross)	2015～
	The Project for Construction of ICU and Provision of Medical Equipment for Amda Damak Hospital (Recipient: Amda Damak Hospital)	2015～
	Project for the Construction of Eye Hospital in Bhojpur District (Recipient: Nepal Netra Jyoti Sangh)	2016～
	Project for the Construction of Hostel for Training Children with Vision and Hearing Impairment (Recipient: B.P. Eye Foundation)	2016～
	Project for the Installation of Water Purification System at Dhulikhel Hospital and Ravi Opi Village (Recipient: Kathmandu University)	2017～

Source: JICA Knowledge Site and Information provided by Embassy of Japan in Nepal

5-3 Achievement and Challenges of Japan's Assistance in the Health Sector

The technical cooperation projects for tuberculosis control were implemented from 1987 to 2005, and national tuberculosis control was strengthened including through the introduction of DOTS and instruction on sputum examination. A grant aid project was also implemented at the same time through the programme approach, and consequently National Tuberculosis Centres were established in Kathmandu and Pokhara. According to the annual report of WHO, the mortality caused by tuberculosis per 100,000 population per year decreased from 50 in 1990 to 20 in 2000 thanks to the implementation of DOTS. Since 2000, the mortality caused by tuberculosis has remained flat at about 20, and about 30,000 new cases are registered every year. The treatment success rate has hovered around 90% for several years. The increase in MDR-TB has become an issue (see “2-1-4 Infectious Diseases, (7) Tuberculosis” for the current situation of tuberculosis).

Technical cooperation for medical education provided to IOM under Tribhuvan University, which was another pillar of Japan's assistance, was implemented for about 15 years from 1980, led by Hyogo College of Medicine in collaboration with Tokyo Women's Medical University. In addition to assistance for tuberculosis control, grant aid projects were implemented in parallel with technical cooperation. Accordingly, TUTH was constructed in 1982 and the expansion of IOM and TUTH was conducted in 1992. Japan's assistance efforts have supported the establishment of a foundation for medical education in Nepal and have contributed greatly to the subsequent development of doctors. IOM had produced many doctors as the sole educational institute for doctors for 15 years from 1978 and sustained medical services in Nepal. Since 1994, medical universities have been established one after another, and there were 20 medical universities providing MBBS courses in the country as of August 2017. IOM still plays a central role in the development of doctors as a representative medical university (see “2-4-2 Medical Education and Human Resources for Health, (1) Medical Education” for the details of medical education).

TUTH provides tertiary medical services as a top referral hospital and accepts the largest number of patients in the country. At the time of the Gorkha earthquake in 2015, more than 30 years had already passed since TUTH was constructed, but the amount of damage to the buildings was small. Therefore, TUTH could accept victims immediately after the earthquake occurred. The experience of the earthquake shows that TUTH provides services with stability in both normal times and during emergencies.

On the other hand, 25 to 35 years have passed since medical equipment was procured in 1982 and 1992. While some Japanese equipment has been replaced with non-Japanese equipment because of aging, some of the equipment is still in use after being repaired. Although the Project for Improvement of Medical Equipment in TUTH was being implemented through

Japan's grant aid as of August 2017, this was the first time in about 25 years that a follow-up project in TUTH has been implemented. The maintenance and renewal of medical equipment are supposed to be conducted by GoN through its own efforts after the project; however, there are not a few examples of procured equipment being left unused because of insufficient management capacity. It was necessary to perform a proper assessment of the implementation of the project and to consider a follow-up project.

Japan's past assistance for tuberculosis control and medical education since the beginning, which combines hardware and software, were thought to be quite effective and received a high evaluation by MoH and health workers at clinical sites. However, follow-up projects had not been implemented for medical education and tuberculosis control since 1994 and 2005, respectively, and assistance in the health sector was only implemented at the grass-roots level until 2015. Continuous assistance in the health sector, which is not restricted to a particular field, is required by GoN.

From the achievement and lessons of Japan's past assistance, it is thought to be appropriate to consider future assistance through the programme approach such as grant aid projects including soft components, and projects combining technical cooperation and grant aid. In addition, it is important to implement continuous assistance in various fields to contribute to solving problems in the health sector. Moreover, the assessment of the implementation of a project should be properly performed, and based on the results, follow-up projects and future assistance should be considered.

Chapter 6　Development Cooperation in the Health Sector

Chapter 6 Development Cooperation in the Health Sector

6-1 Outline of Development Cooperation in the Health Sector

Development cooperation from other countries has contributed to Nepal's socio-economic growth since the First Five-Year Plan began in 1956. The health sector, as with other sectors, has depended on assistance of development partners. During the period of 2005/06-2011/12[1], the ratio of their assistance to the total health budget accounted for 40-50% (8-10 billion Nepal Rupee) annually. However, this accounted for 20% in the fiscal year 2015 since GoN has increased the budget for the health sector[2].

In addition to bilateral cooperation, the pool fund is there to support Nepal's health sector development. The fund was initially established to support Health Sector Programme 1 (2004-2009) by DFID and the World Bank, and it still plays a significant role to support the health sector. Currently, other partners, namely GAVI and KfW contribute to the fund[1].

After the Paris Declaration[vi] in 2005, a sector-wide approach (SWAps)[vii] was adopted to realize more effective cooperation and comprehensive support for the health sector. Based on the principle of SWAps, the Health Sector External Development Partners (EDPs) were formulated. The EDPs consist of 12 development partners including the organizations in Table 6-1. Currently, EDPs are heavily involved in supporting the implementation of the Health Sector Strategies 2015-2020.

The table below shows the amount of support provided by the major development partners to the health sector.

Table 6-1 Financial support from main donners in 2015/16

UNICEF	$20.8 million (Health: $11.7 million, Nutrition: $9.1 million)
World Bank	$5.5 million
UNFPA	$4.89 million
WHO	$4.8million
DFID	£12.25 million (Financial aid: £6.65 million, technical assistance: £5.6 million)
GIZ & KfW	€9.6 million (GIZ: €5.54 million, KfW: €4.06 million)

Source: MoH, *Annual report 2015/2016*

[vi] The Paris Declaration mentions a practical, action-oriented roadmap to improve the quality of aid and its impact on development.

[vii] The sector-wide approaches are the way of a formulation and implementation of Programme Based Approach applied at the sector level between the development partners and the recipient country.

6-2 Current Cooperation by Development Partners

The following are the outlines of health sector cooperation by development partners (Multilateral/Bilateral organizations).

(1) United Nations International Children's Emergency Fund (UNICEF) [3]

[Overview]

UNICEF started field activities over 40 years ago in Nepal. In the beginning, UNICEF provided immunization programmes and basic health services to children. During the civil war between the late 1990s and early 2000s, UNICEF also provided humanitarian aid. UNICEF emphasizes not only the rights of children to education and protection, but also the self-reliance of women.

[Main assistance]

Country Programme Action Plan 2013 - 2017

To ensure the right of survival, development, protection and participation for all children, adolescents and women, the purpose of this programme is to improve the three components of policies, systems and social aspects in the whole country. UNICEF implements a programme on child health, maternal and newborn health, HIV/AIDS response, nutrition improvement, and emergency medical care support in 15 priority districts.

Scheme: Technical cooperation
Budget Scale: About $14.4 million for five years.
Implementation Period: January 2013 – December 2017
Target area and group: Children and women who live in 15 districts in the far west region, mid-western region and southeast of the Terai area.

Multi-sector nutrition plan

The plan aims to improve malnutrition in mothers and children. It is implemented by the National Planning Commission, MoH and other concerned ministries and development partners.

Scheme: Technical cooperation
Budget Scale: $12.7million for five years
Implementation period: 2013 - 2017
Target area: 16 districts selected across Nepal. The areas will be expanded to 28 by the middle of 2017.

Humanitarian assistance for earthquake in 2015

Target area: 14 districts in the western and central regions that were heavily damaged due to the earthquake in 2015.

(2) World Bank [4]

[Overview]

As the one of the world's largest sources of funding and knowledge for developing countries, the World Bank has provided support on reducing poverty, increasing shared prosperity, and promoting sustainable development. In Nepal, the World Bank conducts several programmes based on a sector-wide approach.

[Main assistance]
Health Sector Management Reform Program-for-Results (PforR) Project

The objective of the programme is to improve efficiency in the public resource management systems of the health sector in Nepal. The programme to be supported by PforR financing is a subset of the larger Nepal Health Sector Strategy programme and focuses on specific NHSS outcomes in critical areas of public management reforms. The government's reform programme recognizes that improved health outcomes hinge on the ability of the MoH to direct public resources to areas of need and to react to and make evidence-based decisions. While it is important to continue to invest in expanding service delivery and improving equity, better developed government systems for financial management, procurement, and evidence-based decision-making will enhance the sustainability of these investments. PforR financing supports five of the nine outcomes of the NHSS, focusing on three themes: public procurement, financial management, and evidence-based decision-making for greater accountability and transparency.

Scheme: Loan
Budget Scale: Total $150 million
Implementation Period: 2017 - 2012
Target area: All of Nepal

(3) United Nations Population Fund (UNFPA) [5]

[Overview]

UNFPA support for Nepal began in 1971 and has evolved in response to the changing national context. The current seventh Country Programme is part of the UN Development Assistance Framework (UNDAF), which is the strategic programme framework that describes the UN System's collective response to national development priorities.

[Main assistance]
Country Programme Action Plan 2013-2017

The country programme contributes to three outcome areas of the UNDAF 2013-2017, namely that (1) vulnerable and disadvantaged groups get improved access to basic essential social services and programmes; (3) vulnerable groups experience greater self-confidence, respect and dignity; and (5) institutions, systems and processes of democratic governance are more accountable, effective, efficient and inclusive.

The programme supports national efforts to improve the sexual and reproductive health of the most marginalized adolescent girls and women. To achieve this goal, the programme has provided support on building national capacity and strengthening policy dialogue for evidence-based planning and resource allocation at the national level and in 18 districts.

Scheme: Technical cooperation
Budget Scale: About $30.55 million
Implementation Period: 2013 - 2017
Target area: Selected 18 districts by UNFPA

Emergency support after the 2015 earthquake

Immediately after the Gorkha earthquake occurred, UNFPA worked with MoH and other ministries to distribute essential birth kits and to provide humanitarian aid in 14 disaster-stricken districts.

Scheme: Emergency grants
Target area: 14 districts from the western and central regions, that were severely damaged

(4) World Health Organization (WHO) [6]

[Overview]

WHO started its projects in Nepal in 1953. Since then, WHO has supported the strengthening of the health system through the formulation of health policies and plans, solving health problems by age and controlling infectious diseases and NCDs with the MoH and other ministries.

[Main assistance]

Country Cooperation Strategies

Country Cooperation Strategies (2013 - 2017), which is currently deployed, consists of the following six priority strategies: (1) Achieving communicable disease control targets, (2) Controlling and reversing the growing burden of NCDs, (3) Promoting health throughout a life-cycle focusing on interventions for the underprivileged and vulnerable, (4) Strengthening health systems within revitalized primary health care, approaches and support policy dialogue on health policies, strategies and plans for universal health coverage, (5) Reducing the health-related problems occurring because of disasters, (6) Addressing environmental determinants to health.

Although WHO covers all of Nepal, its support focused on districts damaged after the earthquake in 2015.

Scheme: Grants and Technical cooperation
Implementation Period: 2013 - 2017
Target area and group: All of Nepal

(5) United Nations World Food Programme (WFP) [7]

[Overview]

WFP has given assistance for strengthening food security at the vulnerable community level and resilience against disasters since 1963. It provided emergency food assistance after the earthquake in 2015.

[Main assistance]

Country Programme Nepal (2013-2017)

For improving malnutrition and health of mothers and children, WFP provides education on nutrition and distributes school lunches. It also supports the installation of furniture and toilets at schools.

Scheme: Technical cooperation
Budget Scale: About $216 million
Implementation Period: 2013 - 2017
Target area and group: 88 village development committees in the Mugu district, Jumla district and Solukhumbu district.

(6) United States Agency for International Development (USAID) [8]

[Overview]

On January 23, 1951, the United States and Nepal signed an agreement making the United States the first bilateral donor to Nepal and beginning a 60-year relationship. USAID initially supported the development of the data communication business, and after that, it expanded its support to areas such as infrastructure maintenance, infectious diseases, maternal and child health, food aid, agriculture and education.

[Main assistance]
Support for International Health and Family Planning Organizations (SIFPO)

The SIFPO project was implemented in USAID priority countries to provide technical assistance on strengthening the organizational capacity and sustainability of country-level programmes. SIFPO contributes to reductions in maternal and child mortality.

In Nepal, SIFPO provides capacity development support for health workers to obtain skills in family planning and the management of health and logistics information in 11 districts.

Scheme: Technical cooperation
Implementation Period: 2015 - 2019
Target area and group: 11 districts

Health Communication Capacity Collaborative (HC3) Project

In Nepal, the HC3 project aims to strengthen the institutional and technical capacity of the National Health Education Information Communication Centre (NHEICC) within MoH to design, implement and evaluate social and behavioural change and communication (SBCC) programs for family planning.

Scheme: Technical cooperation
Budget Scale: About $500 million
Implementation Period: 2014 - 2017
Target area: All of Nepal

(7) Department for International Development (DFID) [9]

[Overview]

DFID set up its office in Nepal in 1999. Since then, DFID has provided support to Nepal on poverty reduction and protecting socially vulnerable people to create a sustainable foundation for peace.

[Main assistance]
Nepal Health Sector Programme III

DFID contributes funds to SWAps for improving the health sector. It especially focuses on improving the health status of mothers, children and socially vulnerable people. After the Gorkha earthquake, DFID has provided reconstruction support in greatly damaged areas.

Scheme: Financial support and technical support
Budget Scale: Total 85 million pounds (60.2% for health policy and administrative management, 27.8% for providing basic health care.)
Implementation Period: July 2016 – December 2020
Target area and group: All of Nepal

(8) Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) [10]

[Overview]

GIZ currently implements 10 projects in Nepal and particularly focuses on three fields: (1) Sustainable economic development and trade, (2) Renewable energy and energy efficiency, and (3) Health. ODA projects of Germany are usually implemented by two organizations: GIZ (technical cooperation) and KfW (Grant aid).

[Main assistance]
Support to the Health Sector Programme (S2HSP)

The project is closely aligned with the Nepal Health Sector Strategy (2015–2020). It advises the national authorities responsible for steering the sector on designing reforms and supports implementation in selected districts and municipalities in the far western,

mid-western and central development regions. The project concentrates on five fields of activity: (1) Implementing a social health insurance system including strengthening hospital management, (2) Raising the quality of health care services in sexual and reproductive health, (3) Strengthening governance in health (including urban health), (4) Upgrading and networking existing health information systems to prepare for a future national health information platform, and (5) Improving the delivery of medical and psycho-social services for drug users.

Scheme: Technical cooperation
Budget Scale: About €1.6 million
Implementation Period: January 2016 – June 2018
Target area: 10 districts from the far-western, mid-western and central regions

Transition Project

The project was implemented to support 14 districts severely damaged by the earthquake in 2015. In the three prioritised districts (Dhading, Nuwakot, Rasuwa), the project provided basic health care services including technical assessment and the improvement of essential medical care.

Scheme: Emergency grants
Budget Scale: About €0.48 million
Implementation Period:
Target area: 14 districts from the western and central regions that were severely damaged

Recovery Project

GIZ reconstructed 34 medical facilities (prefab structure) that had been damaged by the earthquake, and constructed and maintain three health facilities. They also contributed pool funds, supported the maintenance programme for medical equipment, the restoration project after the earthquake in 2015 and implemented consulting/measures.

Scheme: Emergency grants
Budget Scale: About €2.5 million
Target area: Nuwakot district and Dhading district

6-3 Cooperation of Local and International NGOs

In Nepal, NGOs began to expand their activities in the 1950s. As of 2017, 39,718 NGOs are registered with the social welfare council, including 234 INGOs from 26 countries[11].

Table 6-2 The number of registered I/NGO in Social Welfare Council Nepal, 2017

Sector	Number
AIDS and Abuse Control	98
Child Welfare	1,145
Community and Rural Development	25,375
Education Development	516
Environmental Protection	1,451
Handicapped and Disabled Services	756
Health Services	874
Moral Development	1,145
Women Services	2,967
Youth Services	5,390
Total	39,718

Source: Information on the website of Social Welfare Council Nepal

(1) Nepal Red Cross Society (NRCS) [12]

[Overview]

The NRCS came into being in 1963. It has grown to be the largest humanitarian organization in Nepal, with its network of District Chapters (DCs) extending to each of the 75 districts of the country. Its mission is to relieve human suffering and to reduce vulnerability through community participation and the mobilization of an increased number of volunteers, by expanding and strengthening the organizational structure of society and by building links with governmental and non-governmental organizations.

[Main Contents of Assistance]

Disaster management

Since NRCS began its activities in 1963, it has been carrying out disaster relief and disaster management at both the central level and community levels. After the earthquake in 2015, it carried out reconstruction assistance in 6 districts where the damage was severe.

Scheme: Technical cooperation and Emergency grants

Target area and group: Mainly six districts with severe damage

Blood Transfusion Service

Blood Transfusion Service of NRCS was established in 1966 and NRCS was delegated the blood transfusion service by the Nepalese government in 1991. They organize comprehensive blood collection, storage and supply related services. The service was initially available only for the people of Kathmandu but over the years blood transfusion service centres (BTSCs) have been established in 68 places of 48 districts of the country as follows below.

Central BTSC	1 (Kathmandu)
Regional BTSCs	4 (Biratnagar, Pokhara, Nepalgunj and Chitwan)
District BTSCs	21
Emergency BTCs	17
Hospital units	25 (in different hospitals and medical colleges)

Health care service

NRCS provides health services to people through the promotion of cleanliness and sanitation, immunization, nutrition improvement, family planning, infectious disease control, first aid, etc. It also provides support for the ambulance service and emergency management.

Scheme: Technical cooperation

Target area and group: All of Nepal

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11 Social Welfare Council Nepal http://www.swc.org.np/
12 Nepal Red Cross Society http://www.nrcs.org/about-nrcs

Chapter 7 Recommendations for Future Assistance

Chapter 7 Recommendations for Future Assistance

7-1 Priority Challenges

In Nepal, the number of traffic accidents and deaths due to traffic accidents have increased about 3.5 times and 1.5 times, respectively, for 12 years since 2000. The improvement of emergency medical services for trauma patients is greatly needed. In addition, most victims of the Gorkha earthquake in 2015 were trauma patients, and the importance of trauma care was once again recognized. In addition to trauma care, medical services for NCD emergency patients such as heart attack and stroke should be strengthened.

Considering such circumstances, the survey team analysed the challenges of emergency and disaster medical services and prioritised them from three aspects: pre-hospital care, in-hospital care and post-hospital care.

(1) Pre-Hospital Care

- Undeveloped emergency transportation system

In Nepal, there is no official emergency transportation system, and currently it depends on services provided by local communities, NGOs and the private sector. Health facilities have ambulances for transporting patients between hospitals, but basically not for picking up patients at home or accident sites and delivering them to health facilities.

In addition, there is no unified emergency call number in Nepal, so patients or their attendants have to find out the numbers of ambulance drivers from websites, newspapers and noticeboards of police stations and health facilities when requesting an ambulance. Moreover, patients need to bear the cost when they use the services provided by NGOs or private companies. These situations hinder requesting ambulances and lead to delays in transportation.

It is necessary to immediately establish an official emergency transportation system to improve access to emergency medical services for all citizens.

- Shortage of ambulances that meet the national standards

Ambulances in Nepal are classified into grades A, B and C. Grade C is the lowest level, and such ambulances have basic equipment such as oxygen masks and sphygmomanometers, but no health workers on-board. There are 1,419 ambulances in the country and the ratio of the number of ambulances to the total population is 1/20,000, which is comparable to the Japanese standard. However, most ambulances in Nepal, both privately-owned and hospital-owned, are graded as C or lower and do not have sufficient medical equipment. In addition, because of heavy traffic, it takes time to transport patients to health facilities that can provide appropriate emergency medical services, so there are many deaths during transportation.

For saving the lives of emergency patients, it is important to provide adequate treatment before reaching hospitals. Therefore, it is necessary to provide ambulances with medical equipment so that proper pre-hospital care can be provided during transport.

- Lack of EMTs providing pre-hospital care

The Ambulance Service Operational Guidelines were revised in 2016, and it was stated that EMTs should ride in grade A and B ambulances. However, the development of such human resources has just started, and the number of educational institutes providing EMT courses is very limited. In addition, currently there is no national qualification system for EMTs in Nepal and the curriculum and guidelines for developing EMTs have yet to be standardised. Therefore, the quality of emergency medical services varies among EMTs.

It is necessary to develop EMTs in addition to the establishment of an emergency transportation system and equipping ambulances for the improvement of pre-hospital care.

In pre-hospital care, proper first aid and rapid transportation are significantly related not only to lifesaving, but also to the prevention of sequelae. It is necessary to improve the quality of pre-hospital care, which is linked to in-hospital care in health facilities, by solving the challenges mentioned above.

(2) In-Hospital Care

- Disparity in emergency medical services between the central and regional levels

As is known from the comparison between the central/specialty hospitals in Kathmandu and Hetauda Regional Hospital, there is a considerable disparity in medical services between them. Therefore, few emergency cases can be managed at the regional level, and most emergency patients are transported to tertiary hospitals in Kathmandu.

Because more severe cases require more immediate treatment, it is necessary to raise the level of medical treatment in hub hospitals at the regional level by improving facilities, medical equipment and capacity of health workers so that the more severe patients can be managed within each region.

- Insufficient medical equipment necessary for emergency medical services

The target hospitals in the survey were tertiary hospitals except Hetauda Regional Hospital; however, there were no artificial respiratory apparatuses or defibrillators, which are needed for lifesaving, in the emergency departments of most of the hospitals. In addition, there were no hospitals that could perform operations in the emergency department due to lack of surgical medical equipment such as anaesthesia machines.

Regarding diagnostic equipment, while there were X-ray apparatuses in the emergency departments of target hospitals except the regional hospital, a CT was installed only in the emergency department of TUTH. According to the interviews at the target hospitals, it is rare to conduct CT examinations for emergency patients, and it seems that CT image diagnosis for emergency patients is lagging.

It is essential to install medical equipment necessary for emergency medical services to provide proper diagnosis and treatment of emergency patients. Moreover, there was a shortage of human resources for the maintenance and management of medical equipment at all hospitals, so preventive maintenance was not carried out. Therefore, support for training for the maintenance of medical equipment is also needed when advanced equipment is newly installed.

- Lack of health professionals in emergency medicine in health facilities

While the development of specialists in emergency medicine has recently started in three medical institutions, there are no colleges providing an education in emergency medicine for nurses in Nepal so far. Because of the shortage of human resources, emergency medical services are provided by young doctors fresh from medical college, paramedics without training in emergency medicine and nursing students in most hospitals. The quality of emergency medical services needs to be improved.

Although the emergency trauma management guidelines were developed in 2016, decisions on procedures of the diagnosis and treatment of emergency patients are left to doctors due to the lack of clinical guidelines. In addition, guidelines for training on first aid, BLS and ALS for health workers have yet to be standardized.

To secure high-quality health professionals in emergency medicine, it is important to standardize curriculums so that more professionals in emergency medicine can be developed in more universities. In addition, it is necessary to develop guidelines regarding emergency medical services, and to enhance training in emergency medical diagnosis and treatment for health workers working in emergency departments.

- Lack of capacity of management and bed control in emergency departments

In Nepal, patients' families take care of inpatients as an important source of manpower in health facilities, however, they may hinder the treatment of patients, especially in emergency departments. Most of the emergency departments in the target hospitals were crowded with patients' families. In addition, medicine and equipment were not organized in the emergency departments of most of the target hospitals, because the number of health workers was insufficient and they were always busy.

In most of the target hospitals, beds for emergency patients were always fully occupied, and in Bir Hospital, the situation where two patients were using one bed occurred on a daily basis. Inappropriate bed control is a challenge. Moreover, triage of emergency patients under normal conditions was performed only in TUTH and Dhulikhel Hospital. Triage is very useful to treat emergency patients effectively and efficiently.

To provide emergency medical services efficiently and effectively in emergency departments with insufficient beds and health workers, improvement of the working environment and capacity building on bed control are required.

In-hospital care in health facilities is the most important part of emergency medical services related to lifesaving of patients. By solving the challenges mentioned above, the improvement of the quality of in-hospital care is required to save the lives of patients, which are preserved during transport.

(3) Post-Hospital Care

- Lack of human resources and equipment related to rehabilitation

There are many educational institutions that can foster physiotherapists at the certification level in Nepal, but only Kathmandu University offers a bachelor's course for physiotherapists. Many students get a bachelor degree in physiotherapy overseas, mainly in India. According to interviews with the physiotherapists in the target hospitals, there are few hospitals that have physiotherapy departments in rural areas, and most physiotherapists work in private hospitals in the capital and major urban areas.

In physiotherapy departments, rehabilitation services are provided to improve physical functions and the activities of daily living; however, the space and equipment for rehabilitation in the target hospitals were insufficient.

Although physiotherapists visit inpatient wards and provide training for inpatients on daily living activities, rehabilitation services in physiotherapy departments are basically provided for outpatients. It seemed that only patients who could walk visited the physiotherapy departments. As per the interviews with doctors in the target hospitals, it is difficult for patients with disabilities to go to hospitals continuously for rehabilitation once they are discharged from the hospital, and there are many cases where patients with disabilities are ignored by their families. Therefore, further improvement of rehabilitation services is necessary, not only for outpatients but also inpatients.

From the perspectives of patients and their families, it is necessary to provide support not only for lifesaving, but also for rehabilitation, especially for patients with orthopaedic injuries, brain injuries and stroke. For improving post-hospital care, strengthening the development of

physiotherapists with bachelor's degrees, establishing physiotherapy departments in hospitals in rural areas, and the improvement of rehabilitation equipment are required.

7-2 Direction of Future Assistance

From the achievements and lessons of Japan's past assistance, it is expected to be more effective to implement relevant projects including both technical cooperation and grant aid through the programme approach. Some assistance plans, which can be combined with each other, are proposed in the next section.

In addition, assistance from other donors in the health sector consists mainly of financial support through a pool fund and technical cooperation. There are few donors that implement grant aid projects except for emergency grant aid after the Gorkha earthquake. Nepal is currently in the reconstruction period after the Gorkha earthquake, and most of the donors implementing grant aid have reconstructed health facilities damaged by the earthquake. However, these support efforts focus on relatively small-scale facilities such as health posts, primary health care centres and district hospitals. Therefore, it is thought that Japanese assistance can increase its presence by implementing grant aid targeted at secondary and tertiary hospitals. Accordingly, the duplication of assistance by other donors can be avoided.

In the survey, it was revealed that WHO and NRCS have mainly provided support in the field of emergency and disaster medical services. Therefore, it is necessary to discuss matters with these two organizations when considering a detailed plan of assistance in the field.

WHO has supported MoH in the implementation of a project for strengthening the emergency response capacity of hub hospitals, and the support is mainly technical cooperation such as the development of systems, guidelines and human resources. Therefore, implementing Japan’s grant aid projects such as the expansion of hub hospitals and the improvement of medical equipment is expected to have synergistic effects.

NRCS has been delegated the blood transfusion service by GoN. It can be considered that technical cooperation regarding blood transfusion services are requested to NRCS, if the improvement of facilities and medical equipment related to blood transfusions are implemented by Japan's grant aid. In addition, NRCS has more than 200 ambulances throughout the country and provides emergency transportation services. Therefore, it is necessary to discuss matters with NRCS to avoid the duplication of assistance, and to collaborate with each other when considering detailed assistance plans such as the provision of ambulances and the improvement of emergency transportation services.

7-3 Proposed Assistance Plans

Based on the aforementioned issues in the field of emergency and disaster medical services in Nepal, the proposed assistance plans were drafted as follows:

- Pre-Hospital Care

(1) Project for strengthening the emergency transportation system

Goal	Emergency transportation system to medical facilities will be strengthened
Outputs	1) A unified emergency call number will be introduced and made known to the public 2) The number of emergency transportations by ambulance will be increased 3) Time for transporting emergency patients will be reduced
Scheme	Development Assistance Loans, Grant aid and Technical Cooperation
Activities	-Introduce a nationwide unified emergency call number and to educate people in Nepal about it -Set up call centres for controlling the dispatch of ambulances in each region -Utilize GPS for the effective/efficient dispatch of ambulances
Remarks	-MoH and NAS are already working together to introduce unified emergency call numbers and to establish an ambulance network system. -It is necessary to closely cooperate with private companies that provide emergency transportation services and tele-communication services. -Securing resources such as funds and labour is essential for sustainability. -Firstly, select pilot sites to conduct a trial of introducing and operating the new system. The pilot sites should be selected from the NAS operating areas (Kathmandu, Chitwan, Pokhara, Kabure, Dardin and Bouwaru). -MoH has already begun to establish an ambulance network system and it is requested that immediate assistance will be implemented.
C/P and Target areas	-PPICD, MoH -NAS operating areas (Kathmandu, Chitwan, Pokhara, Kabure, Dardin and Bouwaru)

(2) Project for the provision of ambulances

Goal	Emergency transportation system to health facilities will be strengthened
Outputs	Ambulances that meet the national standards will be provided
Scheme	Grant aid
Activities	Provide ambulances that meet national standards
Remarks	-A procurement plan should comply with the management guidelines for ambulance services. -The recruitment of EMTs and the specification of standard equipment in ambulances need to be confirmed. -A distribution list of ambulances and by number and grade has yet to be confirmed. -An ambulance costs about 10 million yen. -Maintenance vehicles and equipment, and the cost of medicine and consumables, need to be considered. -For more effective/efficient use of ambulances, this project should be conducted after the ambulance network is established.
C/P and Target areas	-It is necessary to discuss the allocation for supplying ambulances with PPICD, MoH

(3) Project for the development of EMTs

Goal	The system for emergency transportation to medical facilities will be strengthened.
Outputs	Qualified EMTs will be developed
Scheme	Grant aid and Technical Cooperation
Activities	-Develop a standardised training curriculum for EMTs -Establishing a national qualification for EMTs is also required -Necessary facilities and equipment for the training of EMTs at educational institutions would be supported.
Remarks	-The educational institutions and health facilities that provide training to the EMTs should be involved in the project. -MoH, MoE and health professional councils are the focal point for the institutionalization of the training of paramedics and establishing national qualifications. -For the provision of appropriate pre-hospital care in ambulances, this project should be immediately conducted because it takes time to train human resources.
C/P and Target areas	-MoH, MoE, health professional councils -Pattan Health Sciences Academy, which provides short-term courses for EMTs (as of August 2017), and Kathmandu University Medical School of Sciences, which conducts training for EMTs in Dhulikhel Hospital are recommended as the targets of support for institutionalization.

- In-Hospital Care

(4) Project for the improvement of medical equipment and expansion of trauma/emergency departments in hub hospitals

Goal	Improve emergency medical services including trauma care at regional hospitals.
Outputs	1) Facilities that provide emergency medical services including trauma care will be established (newly construct or expand the existing facilities) 2) Necessary medical equipment for emergency medical services will be procured 3) Emergency patients will be received and treated by the health facilities within the region
Scheme	Development Assistance Loans and Grant aid
Activities	-Construct new trauma/emergency centres, or expand emergency departments of existing facilities in areas with many trauma/emergency patients -Procure medical equipment necessary for the diagnosis and treatment of emergency patients
Remarks	-Securing the human and financial resources for running the project should be borne by the government of Nepal and this is a precondition to implement the project. Therefore, it is essential to confirm the current medical services and technical level of target facilities. -MoH plans to conduct a basic survey for establishing a trauma centre at Dhaulaghi zonal hospital and Bharatpur district hospital in FY 2017. -MoE submitted a request to JICA for supporting the establishment of the trauma centre in Dhulikhel hospital, and MoH acknowledges that the hospital would be one of the target facilities in the trauma centre network. -Improvement of medical services for trauma and emergency patients is an urgent issue and the implementation of immediate assistance is needed.
C/P and Target areas	-MoH and MoE - Dhaulaghi zonal hospital, Bharatpur district hospital and Dhulikhel hospital

(5) Project for strengthening the management of trauma/emergency departments

Goal	Emergency medical services including trauma care will be improved
Outputs	1) The capacity of managing trauma/emergency departments will be strengthened 2) Working environment of trauma/emergency departments will be improved
Scheme	Technical Cooperation

Activities	Introduce the concept of 5S-KAIZEN(CQI)-TQM[viii] to improve the work environment in trauma/emergency departments for enhancing the management of medical equipment, medicine and consumables in the departments
Remarks	-There are few health workers in Nepal who know the concept of 5S-KAIZEN(CQI)-TQM. -It is expected to start from the emergency/trauma department, and activities would be expanded to other departments. -It would be more effective if the aforementioned project (4) is implemented accordingly.
C/P and Target areas	TUTH and Bir Hospital, which accept transferred patients from all over the country and have many patients in the emergency departments, are listed as the targets of the project.

(6) Project for capacity building of doctors and nurses in the emergency departments

Goal	Emergency medical services including trauma care will be improved
Outputs	The capacity of doctors and nurses in emergency medical care will be strengthened
Scheme	Technical Cooperation
Activities	-Conduct training for doctors and nurses working in emergency departments to strengthen the capacity of emergency medical care -Training would be conducted at each medical facility and/or national health training centre. In addition, the Knowledge Co-Creation Programme could be utilized.
Remarks	-It is necessary to discuss the detailed contents of training with MoH, educational institutions providing specialist courses in emergency medicine and hospitals that accept many emergency patients. -Improvement of medical services for trauma/emergency patients is an urgent issue and it takes time to train human resources, so the project should be implemented immediately. -In the survey, it was requested to conduct clinical training on the diagnosis and treatment of emergency diseases including multiple trauma in TUTH and Dhulikhel Hospital.
C/P and Target areas	-Tertiary general hospitals that accept many emergency patients referred from all over the country such as TUTH, Bir Hospital, Pattan Hospital and Dhulikhel Hospital. -Hub hospitals in each area (regional/sub regional hospitals, etc.)

(7) Project for capacity building on diagnostic imaging of trauma/emergency patients

Goal	Emergency medical services including trauma care will be improved
Outputs	The capacity of doctors and radiology technicians on diagnostic imaging of emergency patients with trauma and NCDs will be improved
Scheme	Technical Cooperation
Activities	-Conduct training for doctors and radiology technicians on CT examination using contrast medium and reading of CT images -Training would be conducted in health facilities with imaging diagnostic equipment. In addition, the Knowledge Co-Creation Programme could be utilized.
Remarks	-Providing diagnosis equipment should be considered within the component of technical cooperation. Otherwise, utilizing grant aid is also an option. -In the survey, it was requested to conduct clinical training on the diagnosis and treatment of emergency diseases including multiple trauma in TUTH and Dhulikhel Hospital. -Improvement of medical services for trauma/emergency patients is an urgent issue and it takes time to train human resources, so immediate assistance should be implemented.
C/P and Target areas	-Doctors and radiology technicians in tertiary and secondary hospitals with imaging diagnostic equipment such as CT

[viii] An approach combined 5S (Sort, Set, Shine, Standardize, Sustain), CQI (Continuous Quality Improvement) which can be called "KAIZEN" and TQM (Total Quality Management) for improving of working environment and quality control of services

(8) Project for capacity building on bed control in the trauma/emergency departments

Goal	Emergency medical services including trauma care will be improved
Outputs	1) Bed control in trauma/emergency departments will be improved 2) Emergency medical services will be provided efficiently and effectively in the trauma/emergency departments
Scheme	Technical Cooperation
Activities	Strengthen bed control to operate the trauma/emergency centre efficiently and to accept emergency patients smoothly
Remarks	-Collaboration among hospital departments is necessary for better bed control -The introduction of a triage system into bed control in the trauma/emergency department can be considered -Bed control is important not only in normal times, but also in the time of a disaster
C/P and Target areas	-All health facilities can be targets, but TUTH and Bir Hospital have priority since they accept more emergency patients from all over the country

- Post-Hospital Care

(9) Project for the improvement of medical equipment and the expansion of rehabilitation departments

Goal	Rehabilitation services for trauma/emergency patients will be strengthened
Outputs	1) Facilities that provide rehabilitation services will be established (newly construct or expand the existing facilities) 2) Necessary equipment for rehabilitation will be established
Scheme	Development Assistance Loans and Grant aid
Activities	-Support the construction of a rehabilitation department in health facilities with many trauma/emergency patients, or support the expansion of the existing rehabilitation department -Procure necessary equipment for evaluation measurement, exercise therapy and physiotherapy.
Remarks	-Installation of equipment for rehabilitation is usually cost-effective -Physiotherapy departments are mainly used by outpatients, but it is necessary to have various types of equipment and adequate space so that inpatients can also use them
C/P and Target areas	-The National Trauma Centre and the trauma centres to be constructed in the future

(10) Project for the development of physiotherapists

Goal	Rehabilitation services for trauma/emergency patients will be strengthened
Outputs	1) More physiotherapists with bachelor's degrees will be developed 2) The capacity of physiotherapists will be improved
Scheme	Grant aid and Technical Cooperation
Activities	-Institutionalize bachelor's course for physiotherapists through establishing facilities and procuring necessary equipment -Conduct training for physiotherapists on rehabilitation for trauma/emergency patients
Remarks	-As of August 2017, only Kathmandu University provides a bachelor's degree course for physiotherapists, but there are many schools providing courses for certification level -Collaboration with MoH, MoE and health professional councils is required for the institutionalization of a bachelor's degree course for physiotherapists
C/P and Target areas	-Educational institutions that plan to provide a bachelor's degree course for physiotherapists are proposed targets for support for institutionalization - Physiotherapists working in hospitals are the proposed targets for the training

7-4 Priority of Proposed Plans of Assistance

The proposed plans mentioned in the previous section were prioritized with the following perspectives.

Necessity: Whether it is consistent with the needs of beneficiaries, highly beneficial and necessary support for solving problems

○: It is consistent with the needs of beneficiaries, highly beneficial and essential support for problem solving.

△: It is consistent with the needs of beneficiaries and contributes to solving problems, but benefits are limited.

×: It does not meet the needs of beneficiaries and benefits are limited, and contribution to solving problems is low.

Validity: Whether it is consistent with the policies/plans of GoN and Japan's aid schemes and Japan has experience for implementing similar assistance

○: It is consistent with the policies/plans of GoN and Japan's aid schemes and the experience of Japan's past assistance is utilized.

△: It is consistent with the policies/plans of GoN and Japan's aid schemes, but Japan does not have experience in implementing similar assistance.

×: It does not meet the policies/plans of GoN and Japan's aid schemes.

Urgency: Whether it is an urgent issue to solve

○: If it is not solved promptly, it will have a significant effect on emergency and disaster medical services.

△: If it is not solved, it has a possibility of affecting emergency and disaster medical services.

×: It is necessary to solve, but is not an urgent issue.

Request by GoN: Whether there is a request by GoN

○: There is a request by GoN.

－: A request by GoN could not be confirmed in the survey.

Feasibility: Whether it is feasible

○: Ownership of GoN can be expected and resources for the implementation of a project borne by GoN are secured.

△: Ownership of GoN can be expected, but it is difficult for GoN to secure resources for the implementation of a project.
Resources for the implementation of a project borne by GoN are secured, but ownership of GoN cannot be expected.

×: Ownership of GoN cannot be expected and it is difficult for GoN to secure resources for the implementation of a project.

Table 7-1　Priority of proposed plans of assistance

Priority	Proposed plans of assistance	Necessity	Validity	Urgency	Request	Feasibility
High	(1) Project for strengthening the emergency transportation system	○	○	○	○	△
Medium	(2) Project for the provision of ambulances	○	○	○	－	△
Medium	(3) Project for the development of EMTs	○	○	○	－	△
High	(4) Project for the improvement of medical equipment and the expansion of trauma/emergency departments in hub hospitals	○	○	○	○	△
Medium	(5) Project for strengthening the management of trauma/emergency departments	△	○	△	－	△
Medium	(6) Project for capacity building of doctors and nurses in the emergency departments	○	○	○	－	○
Medium	(7) Project for capacity building on diagnostic imaging of trauma/emergency patients	○	○	△	－	○
Low	(8) Project for capacity building on bed control in the trauma/emergency departments	△	○	×	－	△
Medium	(9) Project for the improvement of medical equipment and the expansion of rehabilitation departments	△	○	×	－	○
Low	(10) Project for the development of physiotherapists	△	○	×	－	△

As a result of consideration from the five perspectives, namely necessity, validity, urgency, request by GoN and feasibility, proposed plans (1) and (4) took high priority. MoH has also developed plans that are the same as these two proposed plans based on national health policies and considered the details of the plans, so it is thought assistance for proposed plans (1) and (4) are a high priority for MoH.

It is thought that to implement proposed plans (2) and (3) separately would not be effective, so these two proposed plans shall be implemented in parallel after the implementation of proposed plan (1). Consequently, it is expected that emergency transportation services will be improved more effectively. In addition, proposed plans (1), (2) and (3) can be implemented through a programme approach with a long-term vision.

Meanwhile, the improvement of health facilities that accept emergency patients is an urgent issue in Nepal, and it is thought that the implementation of proposed plan (4) is the highest-priority for Japan's assistance. In addition, proposed plans (5), (7), and (8) can be included in proposed plan (4) as soft components of grant aid. Moreover, proposed plan (9) can also be combined with proposed plan (4).

Appendixes

1. **Member List of the Survey**
2. **Schedule of the Survey**
3. **List of Members Concerned**
4. **List of Collected Reference Materials**

Appendix 1. Member List of the Survey

(1) First Mission (17th of June, 2017～1st of July, 2017)

Kazuhiro Abe	Team Leader/ Health&Medical Planning	International Techno Center Co., Ltd.
Yuko Suzuki	Emergency Medical Planning	International Techno Center Co., Ltd.
Koji Aoki	Medical Equipment Planning	International Techno Center Co., Ltd.

(2) Second Mission（3rd of August, 2017～11th of August, 2017）

Kazuhiro Abe	Team Leader/ Health&Medical Planning	International Techno Center Co., Ltd.
Yuko Suzuki	Emergency Medical Planning	International Techno Center Co., Ltd.

Appendix 2. Schedule of the Survey

(1) First Mission (17th of June, 2017～1st of July, 2017)

Date			Team Leader/ Health & Medical Planning Kazuhiro Abe	Emergency Medical Planning Yuko Suzuki	Medical Equipment Planning Koji Aoki
1	June-17	Sat	Tokyo→Bangkok		
2	June-18	Sun	Bangkok→Kathmandu		
3	June-19	Mon	11:00-JICA, 13:00-Ministry of Health, 15:30-Bir Hospital		
4	June-20	Tue	10:15- Nepal Red Cross Society, 12:30-Ministry of Education, 15:30- UNFPA		
5	June-21	Wed	10:00- Paropakar Maternity & Women's Hospital, 12:30- Bir Hospital 13:00-National Trauma Centre, 15:00-World Bank		
6	June-22	Thu	11:00- Ministry of Home Affairs, 13:00- TUTH		
7	June-23	Fri	11:00-WHO, 13:00-Nepal Ambulance Service, 15:00-GIZ		
8	June-24	Sat	Team Meeting		
9	June-25	Sun	10:00- Dhulikhel Hospital, 15:00- Kathmandu University		
10	June-26	Mon	10:30-NorvicInternational Hospital, 12:00- Bir Hospital		
11	June-27	Tue	12:00- Central Regional Health Directorate 13:00- Hetauda Regional Hospital	12:30-Medical Council, 13:30- Health Professional Council 14:45-MoH Curative Service Div.	
12	June-28	Wed	11:15-Local Medical Equipment Agency, 12:30-MoH Policy, Planning and International Cooperation Div.		
13	June-29	Thu	10:00-MoH Curative Service Div. 11:30-MoH Epidemiology and Disease Control Div. 13:00- Ministry of Physical Infrastructure and Transport		11:00-MoHHEOC 11:30-Nursing Council
			14:30-Embassy of Japan, 16:00-JICA		
14	June-30	Fri	10:15- Ministry of Education, Kathmandu→Bangkok→		
15	July-1	Sat	→Tokyo		

(2) Second Mission (3rd of August, 2017～11th of August, 2017)

Date			Team Leader/ Health & Medical Planning Kazuhiro Abe	Emergency Medical Planning Yuko Suzuki
1	Aug-3	Thu	Tokyo→Bangkok	
2	Aug-4	Fri	Bangkok→Kathmandu 17:00- JICA	
3	Aug-5	Sat	14:00- Dhulikhel Hospital	
4	Aug-6	Sun	9:30- Kathmandu University, 13:00- Dhulikhel Hospital	
5	Aug-7	Mon	10:30- Ministry of Health, 12:00- National Trauma Centre	
6	Aug-8	Tue	Team meeting	
7	Aug-9	Wed	12:00- National Trauma Centre、 14:00- Ministry of Health, 16:00- JICA	
8	Aug-10	Thu	Kathmandu→Bangkok→	
9	Aug-11	Fri	→Tokyo	

Appendix 3. List of Members Concerned

Ministry of Health

Dr. Rajeev Pokhrel	Joint Secretary,
Mr. Ramesh Prasad Adhikari	Chief, Public Health Planning Policy, Planning and International Cooperation Div.
Mr. Pradeep Adhikari	Senior Technical Assistant Policy, Planning and International Cooperation Div.
Mr. Hira Baral	Program Officer Policy, Planning and International Cooperation Div.
Mr. Gyanendra Shakya	Senior Architect (Nepal Health Sector Support Programme)
Dr. Bhim Achrya	Director, Epidemiology and Disease Control Div.
Dr. Bibek Kumar Lal	Senior Health Administrator, Epidemiology and Disease Control Div.
Dr. Bhola Ram Shrestha	Div. Chief, Curative Service Div.
Mr. Uttam Shrestha	Administrator, Curative Service Div.
Mr. Sanjib Gautam	Secretary, Health Emergency Operation Centre

Central Regional Health Directorate, Hetauda

Dr. Basu Dev Pandey	Regional Director

Ministry of Education

Mr. Laxmi Kumar Khadka	Under Secretary
Mr. Mukund Mani Khanal	Under Secretary
Mr. Dhruv Raj Regmi	Foreign Coordinator / Under Secretary

Ministry of Home Affairs

Mr. Krishna Bahadur Raut	Joint Secretary

Ministry of Physical Infrastructure and Transport

Mr. Rajendra Raj Sharma	Joint Secretary

Nepal Medical Council

Dr. Dilip Sharma	President

Nepal Health Professional Council

Mr. Kashi Nath Rimal	President

Nepal Nursing Council

Ms. Tara Pokhrel	President
Ms. Laxmi Rai	Registrar

Tribhuvan University Teaching Hospital

Prof. Dr. Deepak Prakash Mahara	Executive Director
Mr. Amit K Chaudhary	Biomedical Engineer
Mr. Kumar KC	Senior Medical Recorder, Chief, IT Section
Mr. P. N. Prasad	Head of Department of Practice & Emergency Medicine
Mr. Chanchal Joshi	Chief, Maintenance Department

Bir Hospital

Prof. Dr. Bhupendra Kumarr. Basnet	Director
Mr. Sunil Shrestha	Chief, Maintenance Department
Mr. Krishna Prasad Khanal	Chief, Administration Officer
Ms. Roshini tuiti	Senior Nursing Administrator
Mr. Laxmi Prasad	Chief, Finance Department
Mr. Sudip Pradhan	Civil Department

National Trauma Center

Prof. Dr. Pramod Kumar Upadhyay	Chief Medical Superintendent
Dr. Prem Shahi	Medical Officer, Emergency Department
Mr. Prawin Kumar Yedaw	Physiotherapist

Paropakar Maternity and Women's Hospital

Prof. Dr. Amir babu Shrestha	Hospital Director
Dr. Gehanath Baral	Professor and Senior Consultant Gynaecologist/Obstetrician
Ms. Maiya Manandhar	Chief Matron

Dhulikhel Hospital

Dr. Ram Kr Shrestha	Vice Chancellor
Prof. Dr. Rajendra Koju	Director Administration
Mr. Bhim Prasad Shrestha	Professor at Department of Mechanical Engineering
Dr. Deepak	Professor, Department of Orthopaedics & Traumatology

Mr. Roshan Mahato	Administrative Officer
Mr. Krishna	Personal Secretary, Director
Dr. Sano Krishna	Emergency Department
Ms. Subarna Thapa Chhetri	Physiotherapist

Hetauda Regional Hospital

Mr. Ananta Baskets	Head of Administration

World Bank

Mr. Manav Bhattrai	Health Specialist

World Health Organization

Dr. Reuben Samuel	Head of National Emergency Program
Dr. Damodar Adhakari	National Professional Officer, Emergency Preparedness and Response

United Nations Population Fund

Ms. Latika MaskeyPradhan	Assistant Representative
Mr. Hari Bahadur Karki	National Human Response Officer

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

Ms. Sewa Shrestha	Senior Monitoring and Evaluation Officer
Mr. Jeevan Shretha	Engineer

Nepal Red Cross Society

Mr. Bipul Neupane	Director, Health Department

Nepal Ambulance Service

Mr. Amit Joshi	Chief Operations Officer
Mr. Ranjit Acharya	Chief Executive Officer
Dr. Pradeep Vaidya	Board Member
Dr. Kuldeep	General Secretary

Norvic International Hospital

Mr. Ravi Sharma	Senior Marketing Officer

Capital Enterprises

Mr. Jay K. Shrestha	Chief Executive Officer

Appendix 4. List of Collected Reference Materials

S.N.	Name	Type	Publisher	Year
1	Hyogo Framework for Action 2005-2015	PDF	UN	2005
2	Sendai Framework for Disaster Risk Reduction 2015-2030	PDF	UN	2015
3	Human Development Report 2013	PDF	UNDP	2013
4	WHO-AIMS Report on Mental Health System in Nepal	PDF	WHO	2006
5	WHO Country Cooperation Strategy Nepal, 2013-2017	PDF	WHO	2013
6	Multisectoral Action Plan for the Prevention and Control of Non-Communicable Diseases 2014-2020	PDF	WHO	2014
7	Non-Communicable Diseases Country profiles 2014	PDF	WHO	2014
8	Global Status Report on Road Safety 2015	PDF	WHO	2015
9	Post-Crush Response, supporting those affected by road traffic crashes	PDF	WHO	2015
10	Update: WHO Health Emergencies Programme-Progress and priorities	PDF	WHO	2016
11	2016 Health SDGs Profile: Nepal	PDF	WHO	2016
12	World health statistics 2016 Monitoring Health for the SDGs	PDF	WHO	2016
13	Global Tuberculosis Report 2016	PDF	WHO	2016
14	Global strategy on human resources for health: Workforce 2030	PDF	WHO	2016
15	WHO Consortium Project Presentation	PDF	WHO	2017
16	Hub Hospitals, HEOCs and Medical Stores in Nepal	PDF	WHO	2017
17	Presentation of Strengthening Emergency Response capacity of hub hospitals	PDF	WHO	2017
18	Nepal Road Safety Action Plan 2013-2020	Original	MoPIT	2013
19	Road Safety Status of Nepal 2013	PDF	MoPIT	2013
20	National Population and Housing Census 2011	Original	National Planning Commission	2012
21	Sustainable Development Goals 2016-2030 National (Preliminary) Report	PDF	National Planning Commission	2015
22	An Approach Paper to The Fourteenth Plan FY2016/17-2019/20	PDF	National Planning Commission	2016
23	Nepal and the Millennium Development Goals Final Status Report 2000-2015	Original	National Planning Commission	2016
24	A Report on Census of Private Hospitals in Nepal 2013	PDF	Central Bureau of Statistics	2013
25	Post Disaster Recovery Framework 2016-2020	PDF	National Reconstruction Authority	2016
26	Budget Speech of Fiscal Year 2016-2017	PDF	MoF	2016
27	Economic Survey Fiscal Year 2016/2017	PDF	MoF	2017
28	Nepal Education Figures in 2015	PDF	MoE	2015
29	Nepal Education Figures in 2016	PDF	MoE	2016
30	National Strategy for Disaster Risk Management 2009	PDF	MoHA	2009
31	Disaster Risk Management: Policies and Practices in Nepal	PDF	MoHA	2011
32	National Disaster Response Framework	PDF	MoHA	2013
33	Disaster Risk Reduction in Nepal: Achievements, Challenges and Ways Forward	PDF	MoHA	2016
34	Nepal Earthquake 2015, Lesson Learnt and Future Guidance	PDF	MoHA	2016
35	Nepal Disaster Report 2015	PDF	MoHA	2016
36	Experiences and Lessons from Nepal Global Platform on Disaster Risk Reduction	PDF	MoHA	2017
37	Second Long Term Health Plan 1997-2017	PDF	MoH	2007
38	Public Procurement Guidelines	PDF	MoH	2009
39	Nepal Health Sector Programme-II 2010-15	PDF	MoH	2010
40	Assessment of Health System Performance in Nepal	PDF	MoH	2010
41	Human Resources for Health Strategic Plan 2011-2015 Draft	PDF	MoH	2011
42	Current Status of MoHP's Annual Work Plan and Budget 2013/14	PDF	MoH	2013
43	Annual Performance Report (2069/70)	PDF	MoH	2013

S.N.	Name	Type	Publisher	Year
44	Non Communicable Diseases Risk Factors STEPS Survey Nepal 2013	PDF	MoH	2013
45	Procurement Improvement Plan (PIP) FY2013/14 to FY 2015/16	PDF	MoH	2014
46	National Health Policy 2014	PDF	MoH	2014
47	Nepal Health Sector Strategy Implementation Plan 2016-2021	PDF	MoH	2015
48	Annual Report 2071/2072 (2014/2015)	PDF	MoH	2015
49	Nepal Health Facility Survey 2015	PDF	MoH	2015
50	Additional Statistic & Information od Dept. of Health Service Annual report	PDF	MoH	2015
51	Standard Operating Procedures (Nepali)	PDF	MoH	2015
52	Programme Wise Budget Allocation	PDF	MoH	2016
53	Nepal Demographic and Health Survey 2016	PDF	MoH, USAID	2017
54	Bhaktapur Hospital Disaster Preparedness Plan	PDF	MoH	2017
55	The List of Hub Hospital and Satellite Hospital for Emergency Response	PDF	MoH	2017
56	National Building Code	PDF	MoH	2017
57	Standard Design of Health Facilities	ZIP	MoH	2017
58	Annual Progress Report of Health Sector Fiscal Year 2015/16	PDF	MoH	2017
59	Annual Report 2072/2073 (2015/2016)	PDF	MoH	2017
60	Emergency Trauma Management Guidelines 2015	Original	MoH	2015
61	Ambulance Service Operation Guidelines 2073	PDF	MoH	2017
62	Integrated Health Infrastructure Development Project Concept Presentation	PDF	MoH	2017
63	Epidemiological Study on Injury and Violence in Nepal	PDF	Nepal Health Research Council	2009
64	Current Macroeconomic Situation	PDF	Nepal Rastra Bank	2017
65	Pre-Hospital Emergency Medical Services	Original	Nepal Ambulance Services	2017
66	Need of Improvement in Emergency Medical Service in Urban Cities	PDF	Journal of Nepal Medical Association	2009
67	Emergency medicine in Nepal: present practice and direction for future	PDF	International Journal of Emergency Medicine	2016