The Survey on the Current Situation of Disaster/Emergency Medicine System in the ASEAN Region

Final Report

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Japan International Cooperation Agency (JICA)

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Abbreviations and Acronyms

Abbreviations	Description	Countries*
A MERT	Advanced Medical Emergency Response Team	Malaysia
AADMER	ASEAN Agreement on Disaster Management and Emergency Response	
ABC	Association of Barangay Captains	Philippines
ACDM	ASEAN Committee on Disaster Management	
ACEM	Australasian College for Emergency Medicine	
ACLS	Advanced Cardiac/Cardiovascular Life Support	
ADAT	Army Disaster Assistance Team	Thailand
ADB	Asian Development Bank	
ADMM	ASEAN Defense Ministers' Meeting	
ADPC	Asian Disaster Preparedness Center	
AELB	Atomic Energy Licensing Board	Malaysia
AFP	Armed Forces of the Philippines	Philippines
AHA Centre	ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management	
AJDRP	ASEAN Joint Disaster Response Plan	
ALS	Advanced Life Support	
AMDAT	Army Medical Disaster Assistance Team	Thailand
AMFA	Association Médicale Franco-Asiatique (Franco-Asian Medical Association)	
AMO	Assistant Medical Officer	Malaysia
AMR	antimicrobial resistance	
AMS	ASEAN Member States	
ANLS	Advanced Neonatal Life Support	
AO	administrative order	Philippines
APC	Annual Practicing Certificate	
APLS	Advanced Pediatric Life Support	Brunei
APRC	Advanced Pediatric Resuscitation Courses	
APSED	Asia Pacific Strategy for Emerging Diseases	
ARDEX	ASEAN regional disaster emergency response simulation exercise	
ARF	ASEAN Regional Forum	
ASEAN	Association of South-East Asian Nations	
ASEC	ASEAN Secretariat	
ATLS	Advanced Trauma Life Support	
B MERT	Basic Medical Emergency Response Team	Malaysia
BDC	Barangay Development Council	Philippines
BEAP	Basic Emergency Ambulance Protocol	Indonesia
BEmOC	Basic Emergency Obstetric Care	
BFP	Bureau of Fire Protection	Philippines
BIHC	Bureau of International Health Cooperation	Philippines
BLS	Basic Life Support	
BLS-CPR	Basic Life Support-Cardiopulmonary Resuscitation	Philippines
BMKG	Indonesian Agency for Meteorology, Climatology and Geophysics	Indonesia
BNPB	National Disaster Management Agency	Indonesia
BPBD	Regional Disaster Management Agency	Indonesia
BPHER	Bureau of Public Health in Emergency Response	Thailand
BPPSDMK	National Board for the Development of Health Human Resources	Indonesia
BSB	Disaster Preparedness Brigade	Indonesia
BSN	Bachelor of Science in Nursing	Philippines
BTLS	Basic Trauma Life Support	
Bru-HIMS	Brunei Health Information Management System	Brunei
CBDRM	community based disaster risk management	
CBDRR	Community-Based Disaster Risk Reduction	
CBO	Community Based Organization	
CBRE	Chemical, Biological, Radiological and/or Explosives	

Abbreviations	Description	Countries*
CBRNE	Chemical, Biological, Radiological, Nuclear, and Explosives	
CCDM	Commune Committee for Disaster Management	Cambodia
CCM	Camp Coordination and Management	Philippines
CCFSC	Central Committee for Flood and Storm Control	Viet Nam
CDM	Committee for Disaster Management	Cambodia
CDPC	Committee for Disaster Prevention and Control	Lao PDR
CDV	Civil Defense Volunteer	Thailand
CEPP	Community Emergency Preparedness Programme	Singapore
CERT	Community Emergency Response Team	Singapore
CEU	Central Epidemiology Unit	Myanmar
CGH	Changi General Hospital	Singapore
CMG	Crisis Management Group	Singapore
CPA	Complementary Package of Activities	Cambodia
CPD	Continuous Professional Development	
CPR	Cardio-Pulmonary Resuscitation	
CPRC	Crisis Preparedness and Response Centre	Malaysia
CRC	Cambodian Red Cross	Cambodia
CRED	Center for Research on the Epidemiology of Disasters	
CVGHM	Center for Volcanology and Geological Hazard Mitigation	Indonesia
DaLA	Damage, Loss and Needs Assessment	
DARD	Department of Agriculture and Rural Development	Viet Nam
DART	Disaster Assistance and Rescue Team	Singapore
DCDM	District Committee for Disaster Management	Cambodia
DDMC	District Disaster Management Committee	Brunei
DDMCC	Department of Disaster Management and Climate Change	Lao PDR
DDMFSC	Department of Dike Management, Flood and Storm Control	Viet Nam
DDPM	Department of Disaster Prevention and Mitigation	Thailand
DEOC	District Emergency Operation Center	Brunei
DF/R	Draft Final Report	
DILG	Department of the Interior and Local Government	Philippines
DIPECHO	Disaster Preparedness Programme of the European Commission's Humanitarian Aid Department	
DMAT	Disaster Medical Assistance Team	
DMC	Disaster Management Center	
DMC	Disaster Management Committee	Lao PDR
DMERT	Disaster Medical Emergency Response Team	Thailand
DMO	Disaster Management Order	Brunei
DMRC	Disaster Management and Relief Committee	Malaysia
DMU	Disaster Management Unit	Viet Nam
DND	Department of National Defense	Philippines
DO	Department Order	Philippines
DOCC	Disaster Operation and Control Center	Malaysia
DOCE	disasters, outbreaks, crises and emergencies	Malaysia
DOH	Department of Health	
DOH-HEM Task Force	Department of Health Task Force on Health Emergency Management	Philippines
DOST	Department of Science and Technology	Philippines
DRM	Disaster Risk Management	
DRM-H	Disaster Risk Management in Health	
DRR	Disaster Risk Reduction	
DRRMC	Disaster Risk Reduction and Management Council	Philippines
DRRMO	Disaster Risk Reduction and Management Offices	Philippines
DSMC	Disaster Site Medical Command	Singapore
DSWD	Department of Social Welfare and Development	Philippines
EAS	East Asia Summit	
EAS	Emergency Ambulatory Service	Singapore

Abbreviations	Description	Countries*
EAS Tool Kit	the East Asia Summit Rapid Disaster Response Tool Kit	
ECC	emergency command center	Thailand
ED	Emergency Department	
EM-DAT	Emergency Events Database	
EMIS	Emergency Medical Information System	
EMO	Emergency Medical Officer	Malaysia
EMS	emergency medical services	
EMT	Emergency Medical Team	Thailand
EMT	Emergency Medical Technician	
EMT-A	EMT-Advanced Life Support	Thailand
EMT-B	EMT-Basic Life Support	Thailand
EMT-I	Emergency Medical Technician-Intermediate	Brunei
EMT-I	EMT-Intermediate Life Support	Thailand
EMT-P	EMT-Paramedics	Thailand
EMTS	emergency medical and trauma care service	Malaysia
EMTSP	Emergency Medicine and Trauma Services Policy	Malaysia
EN	Emergency Nurse	
ENP	Emergency Nursing Practitioner	
EOC	Emergency Operation Center	
EP	emergency physician	
ERAT	Emergency Rapid Assessment Team	
ERPWG	Emergency Response Preparedness Working Group	Philippines
ERR	Early Recovery and Rehabilitation	Philippines
ERT	Emergency Response Team	Thailand
ESI	Emergency Severity Index	Malaysia
ESR	Event-based Surveillance and Response reporting systems	Philippines
ETS	Emergo Train System	
ETSC	Emergency Telecommunications Support Coordination	Philippines
F/R	Final Report	
FAO	Food and Agriculture Organization	
FMT	Foreign Medical Team	
FMT	Field Medical Team	Singapore
FNI	Food and Non-Food Items	Philippines
FR	First Responder	
FRDM	Fire and Rescue Department Malaysia	Malaysia
FRM	Fast Response Medic	Singapore
FSD	Fire Service Department	Myanmar
FSMM	Foreign Surgical and Medical Missions	Philippines
GELS	General Emergency Life Support	Indonesia
GH	General Hospital	
GHC	Global Health Cluster	
HADR	Humanitarian Assistance and Disaster Relief	
HAZMAT	Hazardous materials and items	
HC	Humanitarian Coordinator	
HCMC	HomeFront Crisis Ministerial Committee	Singapore
HCT	Humanitarian Country Team	
HEARS	Health Emergency Alert Reporting System	Philippines
HEMB	Health Emergency Management Bureau	Philippines
HEMS	Health Emergency Management Staff	Philippines
HEPRRP	Hospital Emergency Preparedness, Response and Rehabilitation Plan	Philippines
HEARS	Health Emergency Alert Reporting System	Philippines
HFA	The Hyogo Framework of Action	
HITs	Hazardous materials and items (HAZMAT) Incident Teams	Singapore
HOPE	Hospital Preparedness for Emergencies	
HRF	Humanitarian Response Forum	Cambodia

Abbreviations	Description	Countries*
HSDP	Health Sector Development Plan	Lao PDR
HSPH	Hanoi School of Public Health	Viet Nam
IC/R	Inception Report	
ICC	Inter-Cluster Coordination	Philippines
ICP	Incident Command Post	
ICRC	International Committee of the Red Cross	
ICS	Incident Command System (a systematic tool used for the command, control, and coordination of emergency response)	
ICU	Intensive Care Unit	
IFEM	International Federation for Emergency Medicine	
IFRC	International Federation of Red Cross and Red Crescent Societies	
IHR	International Health Regulations	
IKBI	Indonesia Surgeons Association	Indonesia
ILS	Intermediate Life Support	Thailand
INSARAG	International Search and Rescue Advisory Group	
IOM	International Organization for Migration	
IPP	In-Place Protection	Singapore
ISBI	International Society of Burn Injuries	
IT/R	Interim Report	
ITEMS	Information Technology for Emergency Medical Service System	Thailand
JATEC	Japan Advanced Trauma Evaluation and Care	
JDR	Japan Disaster Relief	
JICA	Japan International Cooperation Agency	
JMTDR	Japan Medical Team for Disaster Relief	
KKH	KK Women's and Children's Hospital	Singapore
KLCC	Kuala Lumpur City Center	Malaysia
KTPH	Khoo Teck Puat Hospital	Singapore
LAK	Laotian Kip	Lao PDR
LGU	Local Governmental Unit	Philippines
LSC	Logistics Support Coordination	Philippines
LUDMP	Lao PDR Urban Disaster Mitigation Project	Lao PDR
MAF	Malaysian Armed Forces	Malaysia
MAF	Ministry of Agriculture and Forestry	Lao PDR
MAPDRR	Myanmar Action Plan on Disaster Risk Reduction	Myanmar
MARD	Ministry of Agriculture and Rural Development	Viet Nam
MASTEM	Malaysian Society of Traumatology & Emergency Medicine	Malaysia
MAT	Medical Action Team	Indonesia
MCDF	Malaysian Civil Defense Force	Malaysia
MCI	Mass Casualty Incident	
MCT	Medical Consultation Team	Thailand
MDGs	Millennium Development Goals	
MDM	Management of the Dead and the Missing	Philippines
MECCS	Medical Emergency Coordinating Centre Services	Malaysia
MERT	Medical Emergency Response Team	Thailand
MHPSS	mental health and psychosocial support	Philippines
MHLW	Ministry of Health, Labour and Welfare	Japan
MIMMS	Major Incident Medical Management and Support (Sieve and Sort are triage methods of Major Incident Medical Management and Support Course established by the Advanced Life Support Group in England.)	
MIREX	Major Incidence Response Exercise	Malaysia
MLSW	Ministry of Labor and Social Welfare	Lao PDR
MMA	Myanmar Medical Association	Myanmar
MME	Major Medical Emergency (Plan)	Brunei
MMERT	Malaysian Medical Emergency Response Team	Malaysia

Abbreviations	Description	Countries*
MMERT	Military Medical Emergency Response Team	Thailand
MOF	Ministry of Finance	Lao PDR
MOH	Ministry of Health/ Ministry of Public Health	
MONRE	Ministry of Natural Resources and Environment	Lao PDR
MOPH	Ministry of Public Health	
MOU	memorandum of understanding	
MPWT	Ministry of Public Works and Transportation	Lao PDR
MRC	Myanmar Red Cross	Myanmar
MRCS	Malaysian Red Crescent Society	Malaysia
MRT	Mass Rapid Transit	
MRT	Medical Response Team	
MTF	Medical Task Force	Thailand
MTLS	Malaysia Trauma Life Support	Malaysia
MYR	Malaysia Ringgit	Malaysia
NAD	Nangguro Aceh Darussalam	Indonesia
NC	National Commander	Thailand
NCD	Non-communicable disease	
NCDM	National Committee for Disaster Management	Cambodia
NCDPC	National Committee for Disaster Prevention and Control	Lao PDR
NCSR	National Committee for Search and Rescue	Viet Nam
NDC	National Disaster Council	Brunei
NDCC	National Disaster Coordinating Council	Philippines
NDMC	National Disaster Management Centre	Brunei
NDMC	National Disaster Management Committee	Lao PDR
NDMO	National Disaster Management Office	Lao PDR
NDMO	National Disaster Management Organization	
NDPCC	National Disaster Preparedness Central Committee	Myanmar
NDPMC	National Disaster Prevention and Mitigation Committee	Thailand
NDRF	National Disaster Relief Fund	Malaysia
NDRRM	National Disaster Risk Reduction and Management	Philippines
NDRRMC	National Disaster Risk Reduction and Management Council	Philippines
NEDA	National Economic and Development Authority	Philippines
NEHR	National Electronic Health Record	Singapore
NGO	Non-Governmental Organization	
NHA	National Housing Authority	Philippines
NHSO	National Health Security Office	Thailand
NIEM	National Institute for Emergency Medicine	Thailand
NDPCC	National Disaster Preparedness Central Committee	Myanmar
NPO	non-profit organizations	
NSC	National Security Council	Malaysia
NSCT	National Safety Council of Thailand	Thailand
NSD	National Security Division	Malaysia
NUH	National University Hospital	Singapore
OCD	Office of Civil Defense	Philippines
OCEP	Operations Civil Emergency Plan	Singapore
OCHA	Office for the Coordination of Humanitarian Affairs	
OEMSS	Office for Emergency Medical Service System	Thailand
OPCEN	Operation Center	Philippines
OPS CE Plan	Operations Civil Emergency Plan	Singapore
OSCP	On-Scene Command Post	Malaysia
OTOS	One Tambon One Search and Rescue Teams	Thailand
PALS	Pediatric Advanced Life Support	
RC	Resident Coordinator	
PCDM	Provincial Committee for Disaster Management	Cambodia
PCEM	Philippine College of Emergency Medicine	Philippines

Abbreviations	Description	Countries*
PCEMAC	Philippine College of Emergency Medicine and Acute Care	Philippines
PCFSC	Provincial Committee for Flood and Storm Control	Viet Nam
PDCA	Plan-Do-Check-Action	
PDGI	Emergency Doctor Association in Indonesia	Indonesia
PDRRM	Philippine Disaster Risk Reduction and Management	Philippines
Perdamsi	Emergency Specialist Doctors' Association in Indonesia	Indonesia
PERKI	Indonesia Cardiologist Association	Indonesia
PHCTLS	Prehospital Critical and Trauma Life Support	Malaysia
PHE	Public Health Emergency	Brunei
PHEMAP	Public Health and Emergency Management in Asia and the Pacific	
PHEN	prehospital emergency nurse	Thailand
PKK	Crisis Management Center	Indonesia
PMI	Indonesia Red Cross	Indonesia
PNP	Philippine National Police	Philippines
PNRC	Philippine National Red Cross	Philippines
POSKO	command post	Indonesia
PPGD	Management of Emergency Patient	Indonesia
PPKK	Center for Health Crisis Management	Indonesia
PPMK	Center for Health Problem Management	Indonesia
PPNI	Nursing Council of Indonesia	Indonesia
PRC	Philippine Red Cross	Philippines
PSECP	Philippine Society of Emergency Care Physicians	Philippines
PTC	Primary Trauma Care	
PUSDALOPS	Center for Operation and Monitoring	Indonesia
PrepSOM	Preparatory Senior Officials Meeting	
RA	Republic Act	Philippines
RACS	Royal Australasian College of Surgeons	
RHA	Rapid Health Assessment	
RCMD	Research Center for Disaster Mitigation	Indonesia
RDAMAT	Rapid Damage Assessment and Needs Assessment Team	Philippines
RELA	Malaysian People's Volunteer Corps	Malaysia
RHMCH	Reproductive Health and Maternal and Child Health	Philippines
RIPAS	Raja Isteri Pengiran Anak Saleha (Hospital)	Brunei
RMP	Royal Malaysian Police	Malaysia
RR	Rapid Response	
RRD	Relief and Resettlement Department, Ministry of Social Welfare, Relief and Resettlement	Myanmar
RTA	Road Traffic Accident	Malaysia
RTA	Royal Thai Army	Thailand
RTAF	Royal Thai Armed Forces	Thailand
SAMU	*Service d'Aide Médicale Urgente* (Emergency Medical Assistance Service in French)	
SAR	Search and Rescue	
SARS	Sever Acute Respiratory Syndrome	
SASOP	Standard Operating Procedure for Regional Standby Arrangements and Coordination of Joint Disaster Relief and Emergency Response Operations	
SCDF	Singapore Civil Defence Force	Singapore
SDGs	Sustainable Development Goals	
SEA Games	South East Asian Games	
SEARO	WHO South-East Asia Regional Office	
SEMS	Society for Emergency Medicine in Singapore	Singapore
SFDRR	Sendai Framework for Disaster Risk Reduction	
SGH	Singapore General Hospital	Singapore
SGH A&E	Accident and Emergency Department of Singapore General Hospital	Singapore
SH	Specialized hospital	Indonesia

Abbreviations	Description	Countries*
SMART	Special Malaysia Disaster Assistance and Rescue Team	Malaysia
SMART	Surgico-Medical Ambulance and Rescue Team	Thailand
SMOT	Special Medical Operation Team	Thailand
SNAP	Strategic National Action Plan for Disaster Risk Reduction	Brunei
SNAP-DRR	Strategic National Action Plan for Disaster Risk Reduction	Cambodia
SNS	social networking service	
SOD	Sudden Onset Disaster	
SOMHD	ASEAN Senior Officials Meeting on Health Development	
SOMHD+3	ASEAN Senior Officials Meeting on Health Development plus Japan, Korea, and China	
SOP	Standard Operating Procedure	
SPEED	Surveillance in Post Extreme Emergencies and Disasters	Philippines
SRC-PB	Rapid Response Disaster Relief Team	Indonesia
SRR	Search, Rescue and Retrieval	Philippines
SRT	Search and Rescue Team	
START	Simple Triage and Rapid Treatment	Singapore
T MERT	Training of Trainer Medical Emergency Response Team	Malaysia
TAEM	Thai Association of Emergency Medicine	Thailand
TALS	Thai Advanced Life Support	Thailand
THB	Thai Baht	Thailand
TLS	Trauma Life Support	
TOT	Training of Trainer	
TTSH	Tan Tock Seng Hospital	Singapore
The Survey	the Survey on the Current Situation of Disaster/Emergency Medicine System in the ASEAN Region	
The Survey Team	A consultant team formed by KRI International Corp. and Nippon Koei Co., Lid.	
UBD	Universiti Brunei Darussalam	Brunei
UHC	Universal Health Coverage	
UK	United Kingdom	
UKM	University Kebangsaan Malaysia	Malaysia
UN	(the) United Nations	
UNDAC	United Nations Disaster Assessment and Coordination	
UNDP	United Nations Development Programme	
UNEP	United Nations Environmental Programme	
UNFPA	United Nations Population Fund	
UN-HABITAT	United Nations Human Settlements Programme	
UNHCR	Office of the United Nations High Commissioner for Refugees	
UNICEF	United Nations Children's Fund	
UNISDR	United Nations International Strategy for Disaster Reduction	
UP-CPH	College of Public Health of the University of the Philippines	Philippines
USA	United States of America	
USAID	United States Agency for International Development	
USAR	Urban Search and Rescue	
USD	US Dollar	
VDMT	Village Disaster Management Team	Cambodia
VND	Vietnamese Dong	Viet Nam
WASH	Water, Sanitation and Hygiene	
WCDRR	Consultation to the Third World Conference for Disaster Risk Reduction	
WFP	World Food Programme	
WHO	World Health Organization	
WHO CC	WHO Collaboration Center	
WOG-IRM	Whole-of-Government Integrated Risk Management	Singapore
WPRO	WHO Regional Office for the Western Pacific	

Note: *Abbreviations with country names are exclusively used in the particular country. The others are used internationally or in more than two countries.

Executive Summary

The Survey on the Current Situation of Disaster/Emergency Medicine System in the ASEAN Region (hereinafter referred to as "the Survey") was conducted from November 2014 to August 2015. It aimed to collect necessary data and information on the current status, potential needs, and challenges of disaster/emergency medicine in each ASEAN Member State (AMS) in order to examine a possible plan and way forward of establishing a collaboration mechanism on disaster medicine in the ASEAN region.

The Survey was started in November 2014. Available data and information in Japan were collected and analyzed prior to an in-country survey. Also, the questionnaire for the stakeholders and the in-country survey plan were prepared. Then, the in-country survey was conducted to collect necessary data and information.

The survey findings on the ten AMS and a proposal on future vision were suggested and discussed with the stakeholders through a series of workshops and seminars. And along with the future vision, cooperation programs were also suggested. These were compiled in the Final Report in August 2015.

Interview with the Viet Nam Burn Association
(Viet Nam)

Crisis Preparedness and Response Centre
(Malaysia)

During the Survey, the Survey Team also assisted JICA in conducting four invitation programs. On 12 December 2014, the first regional meeting was held with the participation of nine AMS and the ASEAN Secretariat. Thereafter, the participants from the AMS, the ASEAN Secretariat, and the AHA Centre were involved in the site visit to the affected area of the Great East Japan Earthquake and in the second regional meeting on 18 March 2015.

Workshop, Third Regional Meeting in Bangkok

Third Regional Meeting in Bangkok

1. Outline of the Survey Results

Regarding the in-country survey, itinerary and major interviewees in each country are presented in Appendix 1. The questionnaire template is shown in Appendix 2, summary of the results are attached in Appendix 3, and records of invitation programs including the regional meetings are presented in Appendix 4.

(1) Relevant Regional Trends

Coordination in disaster management has been discussed in various regional bodies and forums such as the ASEAN Regional Forum (ARF), East Asia Summit (EAS), as well as ASEAN taking into account international discussions to strengthen multi-sectoral collaboration and mainstreaming of disaster risk reduction, as well as prioritizing preparedness. Also, common tools on disaster response such as the Standard Operating Procedure for Regional Standby Arrangements and Coordination of Joint Disaster Relief and Emergency Response Operations (SASOP) and the East Asia Summit Rapid Disaster Response Tool Kit (EAS Tool Kit) have been developed to make regional collaboration more efficient and effective. In response to the "One ASEAN, One Response 2020 and beyond: ASEAN Responding to Disasters as One" to be launched in 2015, ASEAN is preparing the ASEAN Joint Disaster Response Plan (AJDRP) which will be a multi-sectoral plan that includes the health sector and promotes inter-sectoral collaboration. Under such regional trends, regional coordination and inter-sectoral collaboration will be enhanced. As disaster health management is one of the 20 priority areas of the ASEAN Post-2015 Health Development Agenda, regional collaboration will be enhanced through close coordination in ASEAN.

(2) Disasters in ASEAN

Flood and storm are the most frequent disasters in the region. In many cases, areas to be affected and approximate period could be predictable, and it could be responded by the local authority. However, such disasters usually require long-term response to take care of internally displaced people and therefore, public health aspects are more important. Although it does not frequently occur, earthquake and eruption, as well as tsunami should also be considered to strengthen preparedness and capacity of response especially in Indonesia and the Philippines because these might cause huge damages and require

immediate, large scale and well-organized response. Regarding the man-made disasters, although the type, scale and damage cannot be predicted or forecasted based on the existing data, it could be effective to develop or strengthen the capacity for mass casualty incident (MCI) response especially in major hospitals.

(3) Current Situation of Disaster Medicine

The capacity of disaster medicine have been developed and improved based on lessons learned from the actual response to remarkable disasters and international events.

Each AMS has developed some policies and/or legal framework on disaster medicine; however, the latest international and regional trends should be reflected to the relevant development strategy/plan. Particularly, close collaboration and coordination with other relevant sectors should be carefully considered to increase the effectiveness of preparedness and response.

As for the institutional settings, each AMS has national machineries on disaster management involving the health sector. To increase efficiency and effectiveness of preparedness and response, the central unit should strengthen its collaboration with other relevant sectors, especially with disaster management authorities and local government. In addition, collaboration with the military could contribute to increase efficiency of deployment and field operation of medical teams.

The level of preparedness for emergency response varies among countries. Disaster-prone countries such as Indonesia and the Philippines, as well as countries of more than upper-middle-income economies such as Brunei, Malaysia and Singapore and Thailand are well equipped and maintained necessary equipment and facility, but Cambodia, Lao PDR, Myanmar and Viet Nam could not obtain sufficient resources because of low priority. As the Sendai Framework for Disaster Risk Reduction (SFDRR) and some international organizations such as the World Health Organization (WHO) are promoting the Safe Hospital Initiative and “build back better” concept, resilience of the health facilities could be more considered in the future.

International emergency response in ASEAN region is provided complying with the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) and its operating procedure, SASOP. The ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre) facilitates the mobilization of the Emergency Rapid Assessment Team (ERAT) and provides information to the stakeholders. Regarding the health sector, as SASOP and ERAT assessment tools (draft) do not sufficiently include the health aspects, it was identified through the discussions in the Survey that common and minimum tools to coordinate medical response and rapidly assess the health needs in the affected areas should be necessary.

(4) Current Situation of Emergency Medical Services

Some components of the emergency medical services (EMS) are the basis of disaster medicine such as emergency call and patient transportation system, as well as human resources for prehospital and in-hospital cares. In Cambodia, Lao PDR, Myanmar and Viet Nam, the need for an EMS has been sharply

growing because of recent increase in traffic accidents. In Indonesia and the Philippines, EMS system is generally functioning although there are some issues on the integration or standardization of relevant systems. While for the others (Brunei, Malaysia, Singapore and Thailand), their EMS system has been established and well operated.

In Brunei, Malaysia, Singapore and Thailand, there is a national emergency call system. Indonesia has been under the process of having one. While for the others, various organizations, both public and private, provide patient transportation services with/without charge to respond to the expanding needs. However, the quality and safety of the patient are not always ensured. In Thailand, NIEM has been trying to assure quality of services through training and accreditation system for first responders although there are some charity organizations that provide rescue and transportation services.

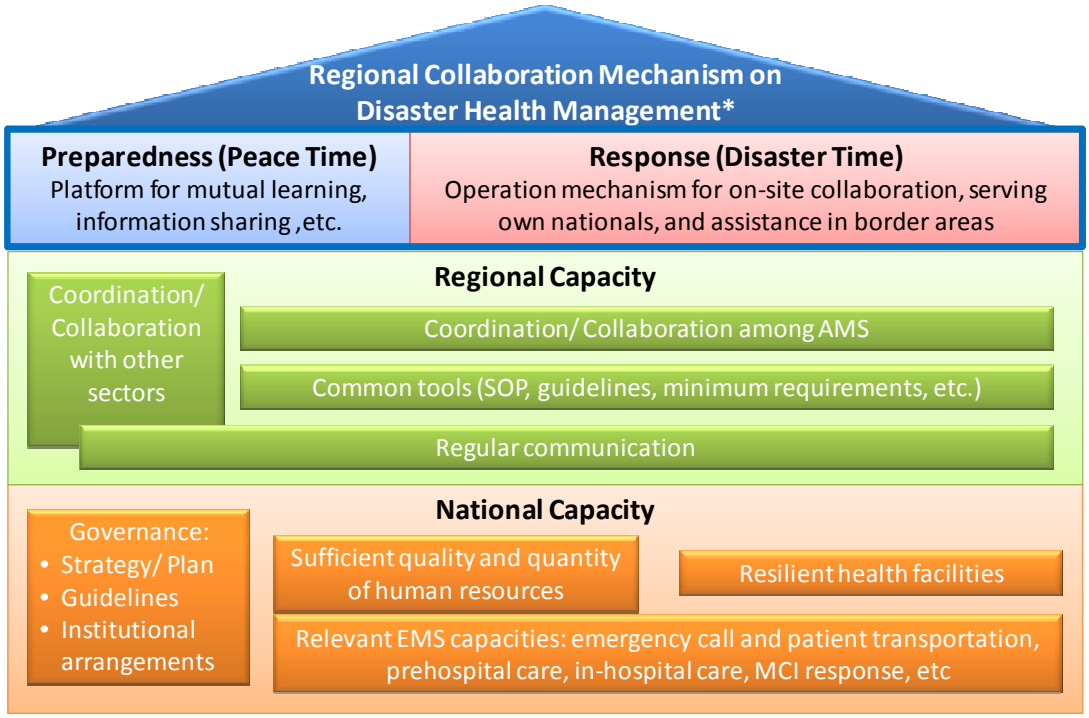
Regarding capacity for mass casualty incident (MCI) response, major hospitals have developed plans and conducted drills in Brunei, Malaysia, the Philippines and Singapore. Since disasters could cause many injuries at once, health facilities, especially major hospitals, need to prepare to appropriately deal with a certain number of patients at the same time.

2. Future Vision of Collaboration Mechanism on Disaster Health Management

Based on the survey results and the series of discussions among the stakeholders through the Survey, it was proposed that collaboration mechanism on disaster health management including disaster medicine could be developed in the next ten years, to cope with the above challenges and issues within and beyond the region.

The proposed mechanism, as shown in the following figure, could function as a platform for mutual learning, information sharing and maintaining communication among the stakeholders in peacetime. It could be expected to inspire or motivate each AMS to set clear development target by knowing more advanced cases, best practices, lessons learned, and innovative approaches in other countries.

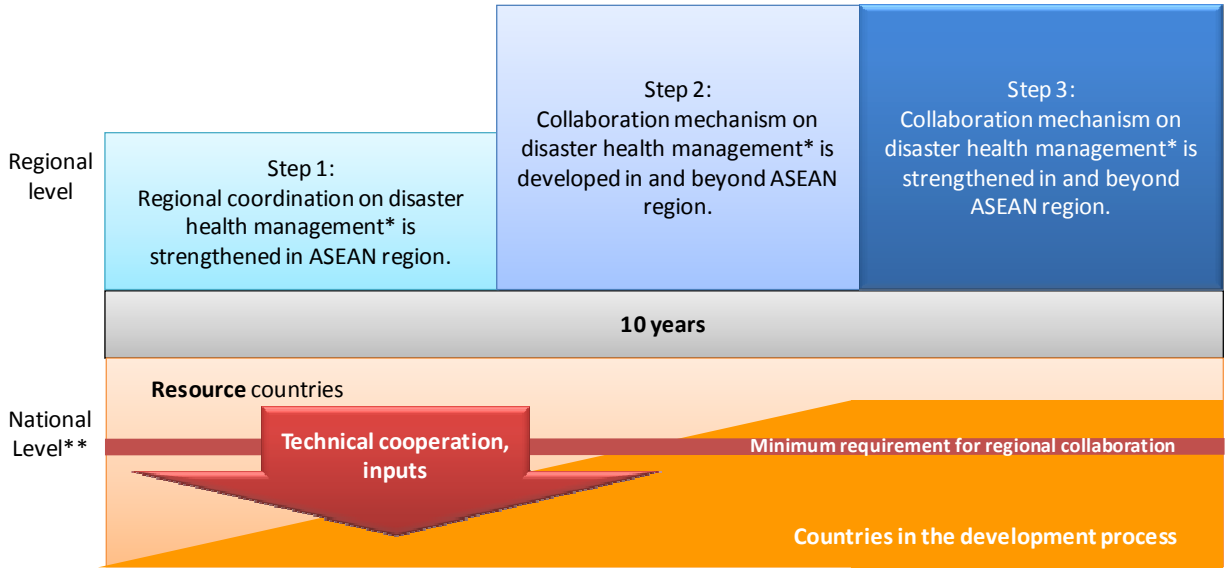
Once a disaster occurs, it could function as an operation mechanism for on-site collaboration and cross-border deployment of medical teams. Some examples: a medical team could collaborate with other teams from AMS on the site in disaster response; a country could dispatch a medical team to assist their own nationals affected by the disaster in a neighboring country; and a medical team could be dispatched from the nearest health facility regardless of the country's border to assist people in the border area. The latter two examples could be regarded as far more important because people can move around after the ASEAN economic integration in 2015. In addition, the core organization which might be necessary for the mechanism should be carefully considered in view of the relevant discussions and activities in the region.



*Note: It is understood that disaster health management includes disaster medicine (refer to Section 13.3.2(1)).

Future Vision of Regional Collaboration Mechanism

The following figure shows steps for the future vision for the next ten years which was proposed based on the survey results and the series of discussions among the stakeholders through the Survey.



Note: *It is understood that disaster health management includes disaster medicine (refer to Section 13.3.2(1)).
**The height of the square shows national capacity regardless the continuous improvement.

Steps for the Future Vision of Regional Collaboration Mechanism

At the regional level, through regular communication, common tools could be developed to use "common language" in the operation. In addition, mutual relationship of trust could be enhanced to promote efficient coordination and collaboration in disaster response. When collaboration is strengthened and the

necessary tools are developed, a certain form of collaboration mechanism could be developed within the region and it could be expanded to other neighboring countries. Then, it could be strengthened through regular operation of the platform and collaboration in the actual disaster response.

To have and use common tools, every country might need to fulfill a certain level of minimum standard both administratively and technically. Relevant activities could be taken according to the level of capacity and needs; while some countries might need most of the actions, some might not need at all and could be resources to assist other countries.

3. Recommendations for Future Cooperation Programs

AMS and Japan have resources for technical cooperation to achieve the above future vision. For example, human resource development, capacity of MCI response, and development of patient transportation system could be learned from some advanced countries among AMS. Japan also could provide experiences and lessons learned accumulated through numerous number of actual disaster responses both domestic and international, and discussions aftermath.

(1) Regional Level

The regional coordination capacity could be strengthened through the cooperation program involving all AMS. Therefore, the program could be expected to provide opportunity to promote awareness on issues and development target in each AMS. The following table summarizes the outline of the proposed project for the first stage towards the future vision which was proposed based on the survey results and a series of discussions among stakeholders. It will aim to strengthen regional coordination on disaster health management with focusing on disaster medicine as one of the components of disaster health management which is one of the priorities of ASEAN Post-2015 Health Agenda.

Draft Outline of the Proposed Technical Cooperation Project

Overall Goal	ASEAN and Japan collaboration mechanism on disaster health management is established.
Project Purpose	Regional coordination on disaster health management is strengthened in the ASEAN region.
Project Period	3 years
Outputs	
1. Coordination platform on disaster health management is set up.	
2. Framework of regional collaboration practices is developed.	
3. Tools for effective regional collaboration on disaster health management are developed.	
4. Progress and outcomes of the Project are widely shared and disseminated.	
5. Capacity on disaster health management strengthened in each AMS	

Note: It is understood that disaster health management includes disaster medicine (refer to Section 13.3.2(1)).

(2) National Level

At the same time, national capacity should be developed mainly through the national level program to fulfill the minimum requirements to be involved in the regional collaboration mechanism. Cambodia, Lao PDR, Myanmar and Viet Nam seemed to have more needs to develop the capacity of EMS as a basis of disaster medicine. Because the country context, needs, and progress of the relevant development activities vary among countries, cooperation programs should be tailor-made although some common and

minimum component could be applied. In addition, each country should seek assistance based on appropriate situation analysis, needs assessment and prioritization, as well as setting of clear development target by their own effort. In undergoing such process, the ownership and commitment of the recipient agencies could be established.

Chapter 1 Outline of the Survey

1.1 Background and Objectives of the Survey

Asia is the most disaster-prone region in the world because of the various forms of disasters that strike the region. Strengthening the resilience against disasters is one of the priorities in the region and the Association of South-East Asian Nations (ASEAN) has continued to make efforts to mitigate the loss and damages related to disasters as stated in the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) in December 2009 and in the ASEAN Declaration on Enhancing Cooperation in Disaster Management in October 2013.

Disaster Medicine (Health Implication in Disaster Management) has been identified as one of the new collaboration activities for 2014-2015 under the 4th ASEAN Senior Officials' Meeting on Health Development (SOMHD) Plus Three on 12 June 2014 in Chiang Rai, Thailand. Thailand and Viet Nam are designated as lead countries. In addition, the post-2015 Health Development Agenda included Disaster Health Management as one of the priority areas that was agreed at the Preparatory Senior Officials Meeting (PrepSOM) in the 6th ASEAN plus three Health Ministers Meeting on 15 September 2014 in Hanoi, Viet Nam

Japan is also a disaster-prone country and has a plenty of experiences and knowledge in all aspects of disaster management. Through their experiences and lessons learned, Japan has developed a Disaster Medical Assistance Team (DMAT) for domestic incidents as well as the Japan Disaster Relief (JDR) Team for international response. With knowledge and skills gained from these developments, the Japan International Cooperation Agency (JICA) had conducted a training course on Emergency and Disaster Medicine for those who were from the disaster-prone countries for the past 20 years.

In December 2013, the Government of Japan has committed to enhance cooperation in disaster management with the ASEAN as stated in the Vision Statement of the ASEAN-Japan Commemorative Summit. In April 2014, the ASEAN Disaster Medicine Workshop was held in Thailand with the participation of concerned personnel from the ASEAN member states (AMS), international/regional organizations, and Japan. In the workshop, the effectiveness of regional cooperation was recognized and future cooperation strategy was discussed. During the ASEAN Senior Officials Meeting on Health Development plus Japan, Korea, and China (SOMHD+3) in June 2014, the Japanese representative proposed the technical cooperation to strengthen the capacity of disaster medicine in the ASEAN region. It was identified as one of the collaboration activities in health development for 2014/2015.

With the above context, JICA is conducting the Survey on the Current Situation of Disaster/Emergency Medicine System in the ASEAN Region (hereinafter referred to as "the Survey") to collect necessary data and information on current status, potential needs, and challenges of disaster/emergency medicine at each AMS in order to examine a possible plan and way forward of establishing disaster medicine collaboration mechanism in the ASEAN region.

1.2 Scope of the Survey

1.2.1 Types of Disasters

The Survey covers natural and man-made disasters as shown in Table 1-1. It basically corresponds to the classification of EM-DAT[1], the International Disaster Database provided by the Center for Research on the Epidemiology of Disasters (CRED). However, because of the different response systems, biological disasters (epidemic, insect infestation and animal accident) are not included in the scope of the Survey.

Table 1-1 Types of Disasters Covered by the Survey

Disaster Group	Disaster Subgroup	Disaster Main Type	Disaster Group	Disaster Subgroup	Disaster Main Type
Natural	Geophysical	- Earthquake	Man-made	Industrial accident	- Chemical spill
		- Mass movement			- Collapse
		- Volcanic activity			- Explosion
	Meteorological	- Extreme Temperature			- Fire
		- Fog			- Gas leak
		- Storm			- Poisoning
	Hydrological	- Flood			- Radiation
		- Landslide			- Other
		- Wave action		Transport accident	- Air
	Climatological	- Drought			- Road
		- Glacial Lake outburst			- Rail
		- Wildfire			- Water
	Extraterrestrial	- Impact		Miscellaneous accident	- Collapse
		- Space weather			- Explosion
					- Fire
					- Other

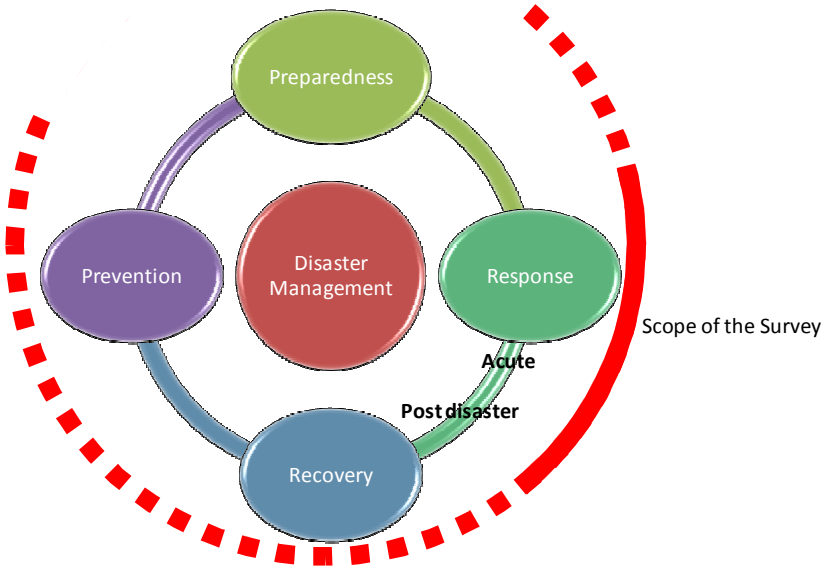
Source: [CRED]

1.2.2 Phases

Among the disaster management phases, the Survey mainly focuses on response at the acute phase of the disaster; however, taking into account the international and regional framework described in Chapter 2; it also looks at the preparedness and post-disaster phases (Figure 1-1).

Therefore, the main focus of the Survey is overview and capacity of disaster medicine to be mobilized in the acute phase. Also emergency medical services (EMS), especially prehospital care and ambulance services are covered by the Survey because those are quite relevant to and could be a basis of disaster medicine.

[1] The international disaster database provided by the Center for Research and Epidemiology of Disasters (CRED)
For a disaster to be entered into the database at least one of the following criteria must be fulfilled: (1) Ten (10) or more people reported killed; (2) Hundred (100) or more people reported affected; (3) Declaration of a state of emergency; or (4) Call for international assistance.



Source: the Survey Team

Figure 1-1 Scope of the Survey in the Disaster Management Cycle

1.2.3 Stakeholders

The Survey targets ten ASEAN member states (AMS). As it focuses on disaster medicine and relevant EMS, the main stakeholders of each country are mainly concerned department/ bureau or agency in the ministry of health. Also, concerned regional bodies are involved in the Survey (Table 1-2).

Table 1-2 Major Stakeholders of the Survey

Brunei Darussalam	- Ministry of Health ・ Department of Medical Services ・ Department of Health Services	**Cambodia**	- Ministry of Health ・ Disaster Management and Environmental Health Bureau, Preventive Medicine Department
Indonesia	- Ministry of Health ・ Center for Health Crisis Management (PPKK)	**Lao PDR**	- Ministry of Health ・ Department of Health Care
Malaysia	- Ministry of Health ・ Crisis Preparedness and Response Centre (CPRC) ・ Medical Development Division ・ Disease Control Division	**Myanmar**	- Ministry of Health ・ Department of Health
Philippines	- Department of Health ・ Health Emergency Management Bureau (HEMB)	**Singapore**	- Ministry of Health ・ Emergency Preparedness and Response Division, Public Health Group - Singapore Civil Defense Force ・ Medical Department
Thailand	- National Institute for Emergency Medicine (NIEM) - Ministry of Public Health ・ Bureau of Public Health Emergency Response	**Viet Nam**	- Ministry of Health ・ Disaster Management Unit ・ Planning and Finance Department
Regional Body	- ASEAN Secretariat ・ Health and Communicable Diseases Division ・ Disaster Management and Humanitarian Assistance Division		
	- ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre)		

Source: the Survey Team

1.3 Work Flow

Figure 1-2 presents the workflow of the Survey. The Survey was started in November 2014. Available data and information in Japan were collected and analyzed prior to an in-country survey. Also, the questionnaire for the stakeholders and the in-country survey plan were prepared. Then, the in-country survey was conducted to collect necessary data and information through interviews with concerned agencies, institutions, and organizations, as well as obtaining relevant materials such as published reports, statistics, legislations, etc.

The survey findings on the ten AMS were compiled to the interim report (IT/R). Then, a future vision was suggested and discussed with the stakeholders through a series of workshops and seminars. And along with the future vision, cooperation programs were also suggested. Those were compiled in this draft final report (DF/R). It was finalized and referred to the stakeholders for further discussion and inputs. The final report (F/R) was submitted in August 2015.

During the Survey, the Survey Team also assisted JICA in conducting four invitation programs. On 12 December 2014, the first regional meeting was held with the participation of nine AMS and the ASEAN Secretariat. Thereafter, the participants from the AMS, the ASEAN Secretariat, and the AHA Centre were involved in the site visit to the affected area of the Great East Japan Earthquake and the second regional meeting on 18 March 2015. The third regional meeting was held on 9 July 2015 in Bangkok.

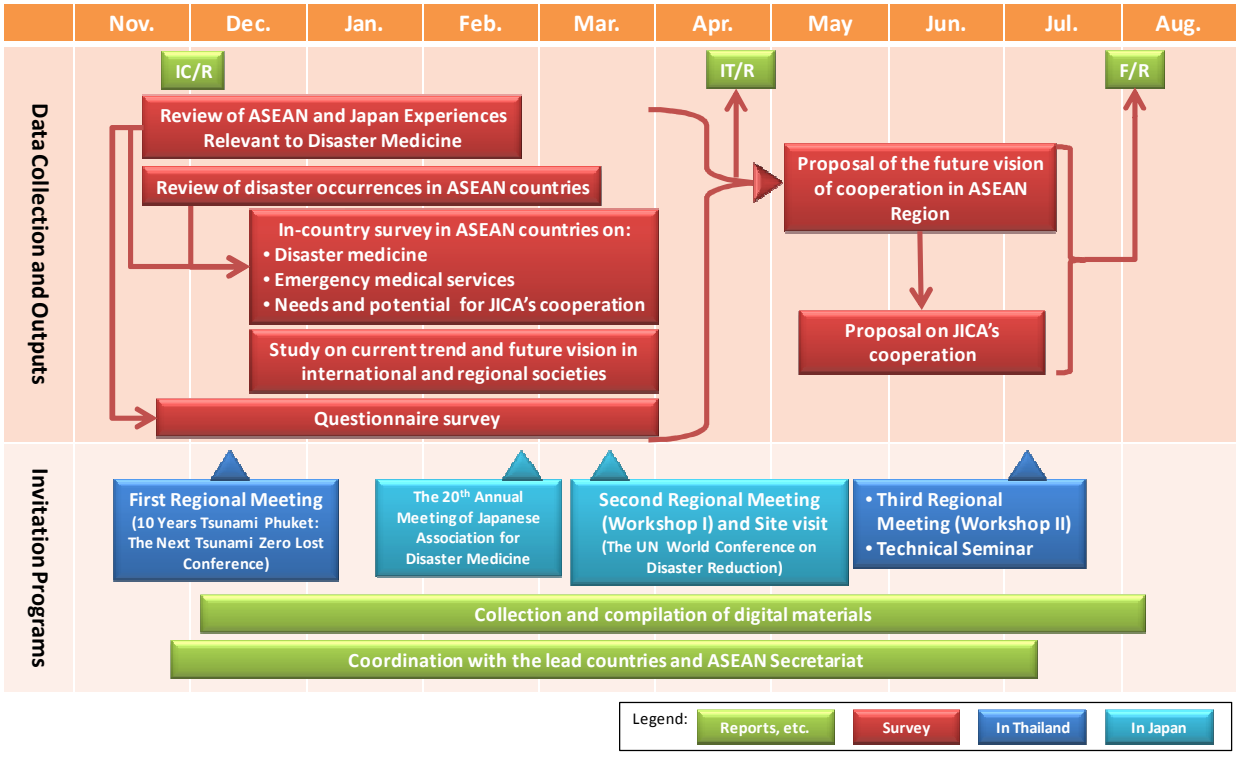


Figure 1-2 Work Flow of the Survey

The work schedule is presented in Figure 1-3.

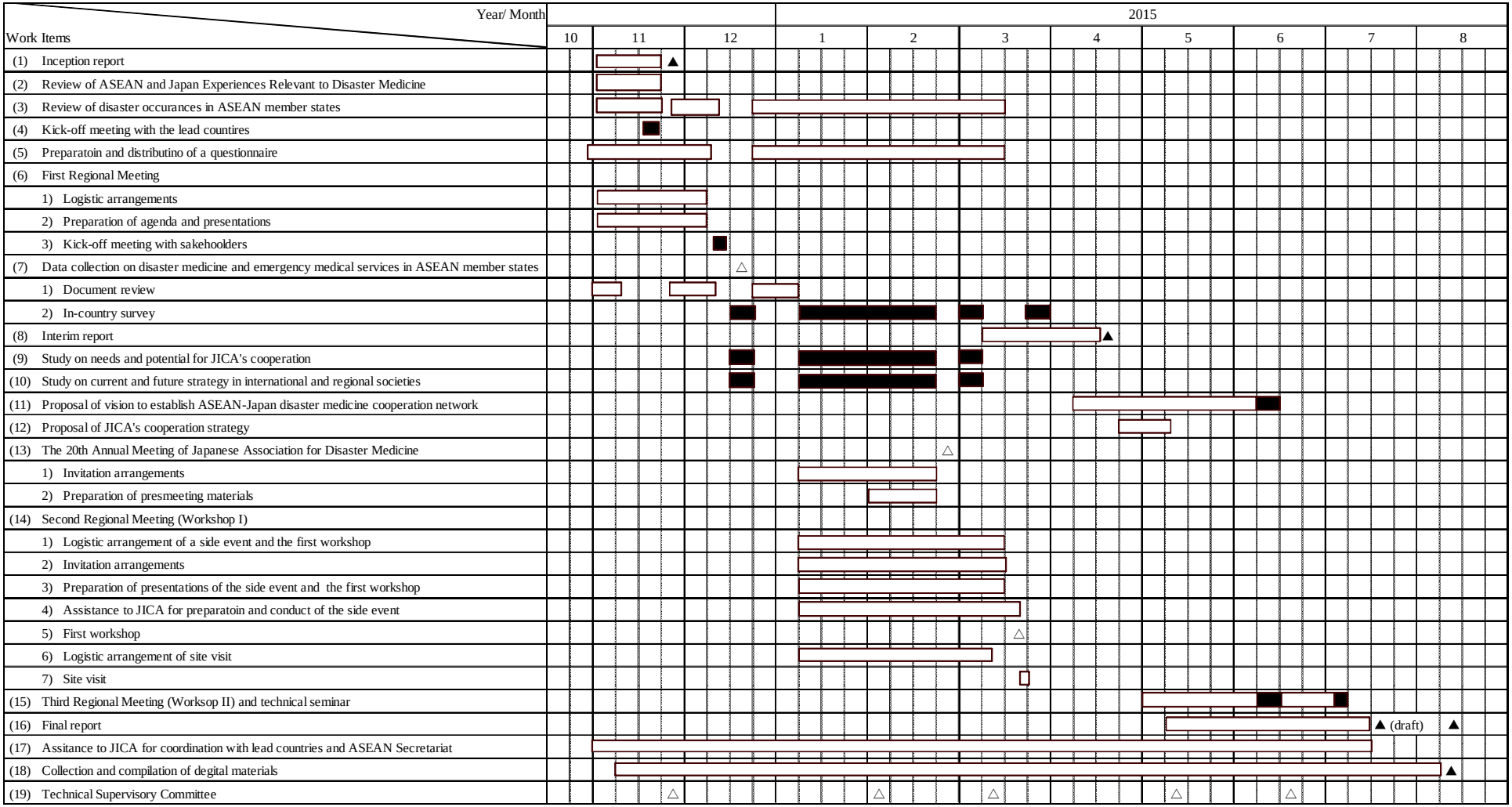


Figure 1-3 Work Schedule of the Survey

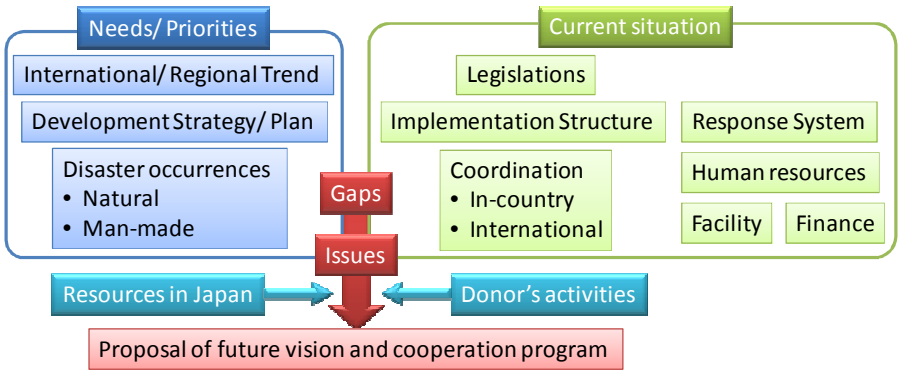
1.4 Methodology

1.4.1 Data Collection

The necessary data and information were collected through: (1) document search and review; (2) questionnaire survey; and (3) interview survey. Itinerary, members, interviewees and photos of each in-country survey is presented in Appendix 1. Prior to and during the in-country survey, relevant documents and reference materials were collected. Those include policy, strategy, development plans, regulations, and guidelines issued by the government, academic papers, reports issued by development partners, etc. List of reference materials are attached at the end of the main text.

The questionnaire was distributed prior to the in-country survey and collected by the end of the Survey or soon after it was accomplished. The questionnaire template, shown in Appendix 2, was modified in accordance with the results of preparatory works to suit the situation and context of each AMS. Interviews were conducted during the in-country survey by using open-ended questions in some of the main topics.

In the analysis, firstly, the collected information was organized as shown in Figure 1-4 to find the gaps between needs/priorities and the current situation of disaster medicine/ EMS. Then, measures to fill in the gaps or cope with the challenges were suggested for each country. Finally, the future vision of collaboration mechanism on disaster medicine and possible cooperation were proposed after careful consideration of relevant donor's activities and available resources and discussions among stakeholders during the Survey.



Source: The Survey Team

Figure 1-4 Survey Items and Analysis

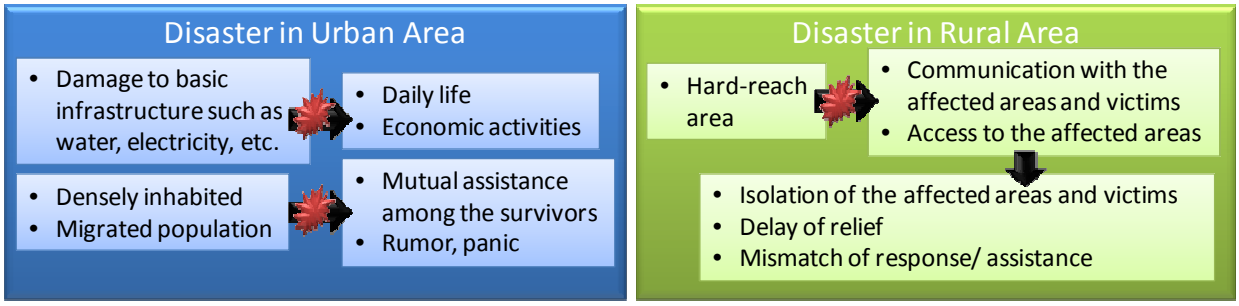
1.4.2 Disaster Analysis

EM-DAT is the primary information source of disaster occurrences. Disaster analysis was preformed taking consideration of the following viewpoints to consider needs of disaster medicine.

(1) Place
(2) Speed and length of disaster stages (prediction, expansion, continuation and restoration)
(3) Secondary disasters

(1) Place of Disaster

Figure 1-5 shows characteristics of disasters by place of occurrences. When the disaster occurs in the urban areas, it could cause certain damages to daily life and economic activities and it might be difficult to control residents due to high population density and dilute human relations. While in the rural areas, because of insufficient access in terms of information and transportation, situation and needs of the affected areas and people might not be properly assessed.

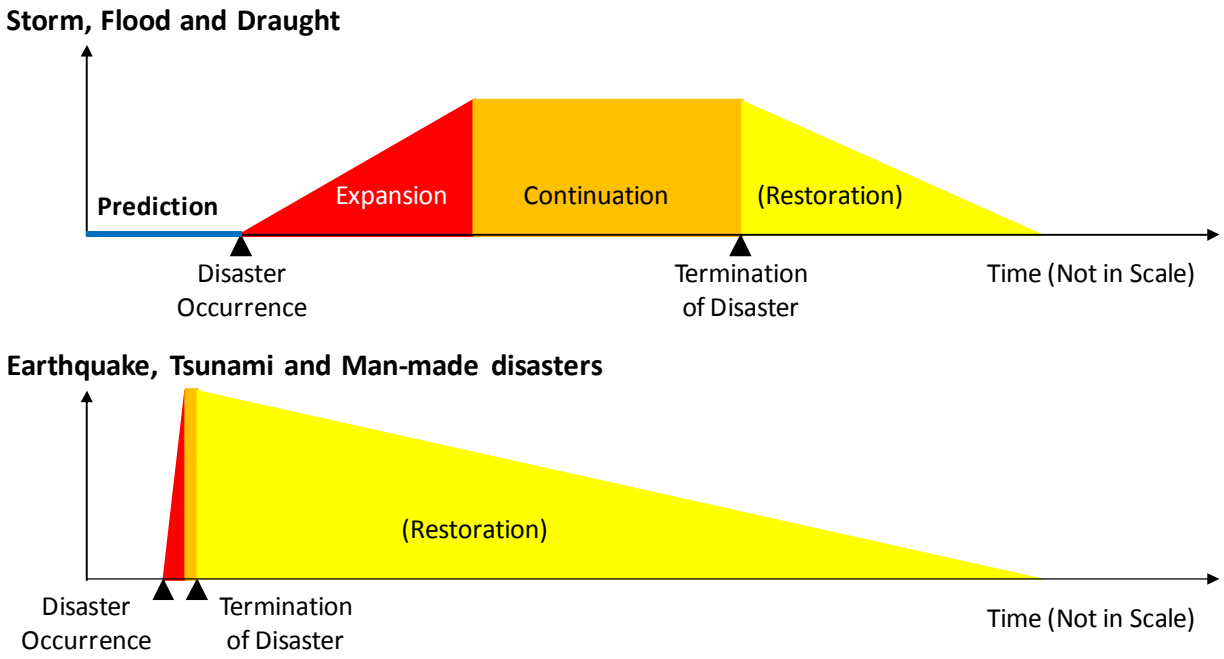


Source: the Survey Team

Figure 1-5 Place of Disasters

(2) Disaster Stages

As shown in Figure 1-6, storm, floods and draught are usually predictable and the damages require relatively long time to be expanded and continued as compared with earthquake and tsunami. Therefore, it is possible to prepare for storm, floods and draught well in advance, but it might require several months for the response. In contrast, an immediate response is required for earthquake, tsunami and man-made disasters. Its response might require a massive deployment of resources at once.



Source: the Survey Team

Figure 1-6 Speed of Disaster Stages

(3) **Secondary Disaster**

Secondary disasters could be triggered after some types of disasters. For example, storm, floods and earthquake could be a trigger for landslides, flash floods and high tides. Earthquake could trigger tsunami. Secondary disasters could require more complicated responses for a longer period.

1.4.3 Invitation Programs

During the Survey, three invitation programs (two in Thailand and one in Japan) were implemented as shown in Table 1-3. Representatives of AMS, ASEAN Secretariat and AHA Centre were involved in all the programs. The details are presented in Appendix 3.

Table 1-3 Outline of the Invitation Programs

Period	Place	Participants	Outputs
(1) First Regional Meeting (Occasion: "10 Years Tsunami Phuket : The Next Tsunami Zero Lost" Conference, 10 to 11 December 2014)			
From 9 to 13 December 2014	Phuket, Thailand	A total of 54 participants from AMS, ASEAN Secretariat, AHA Centre and Japan	- Shared concept and methodology of the Survey. - Confirmed communication line and cooperation for the Survey.
(2) Second Regional Meeting (Occasion: The UN World Conference on Disaster Reduction, 14 to 20 March 2015)			
From 15 to 19 March 2015	Sendai and Tokyo, Japan	A total 55 participants from all AMS, ASEAN Secretariat, AHA Centre and Japan	- Confirmed challenges and strategies to develop a regional collaboration mechanism of disaster medicine. - Recognized further challenges related to the enhancement of disaster medicine both at the national and regional levels.
(3) Third Regional Meeting and Technical Seminar			
From 6 to 10 July 2015	Bangkok, Thailand	A total of 64 participants from all AMS, ASEAN Secretariat, AHA Centre and Japan	- To share a common understanding on needs/ importance of regional collaboration on disaster health management in AMS. - To have a common understanding on the future technical cooperation project. - To confirm further steps to present the survey outcomes to SOMHD to be held in September 2015.

1.5 Structure of the Report

DF/R consists of 14 chapters. Chapter 1 outlines the Survey and Chapter 2 summarizes discussions and trend on disaster medicine in the ASEAN Region. From Chapter 3 to 12 compiles the results of each in-country survey. These chapters include overview of disaster occurrences, national disaster management framework, current situation of disaster medicine and relevant EMS, relevant donors' activities, challenges, and issues. Chapter 13 summarizes the points of discussions made among the stakeholders through the First to the Third Regional Meetings. The last chapter summarizes all the results of the in-country survey, proposes the future vision of collaboration mechanism in disaster medicine, summarizes the relevant cooperation resources both in Japan and AMS, and describes the proposed future cooperation programs.

In addition, outline of the in-country survey, template of questionnaire, summary of the survey results and records of the regional meetings are presented in Appendix 1 to 4, accordingly.

Chapter 2 Overview of International Humanitarian Assistance Relevant to Disaster Medicine and Trend on Disaster Health Management

2.1 Outline of International Humanitarian Assistance Relevant to Disaster Medicine

International humanitarian assistance should be provided with the consent of the affected country and in principle on the basis of an appeal by the affected country complying relevant biding/non-binding regulations such as the United Nations General Assembly resolution 46/182 and the ASEAN Agreement on Disaster Management and Emergency Response (AADMER) for the ASEAN Member States (AMS). Through its Standard Operating Procedure for Regional Standby Arrangements and Coordination of Joint Disaster Relief and Emergency Response Operations (SASOP)[2], the AADMER enables AMS to mobilize and deploy resources and for emergency response [OCHA-ROAP, 2013].

2.1.1 Tools for Coordination of Humanitarian Response Referred in ASEAN Region

In ASEAN, humanitarian assistance is coordinated along with the SASOP. The East Asia Summit Rapid Disaster Response Toolkit (EAS Tool Kit) which was finalized in June 2015 guides decision makers in the affected/ assisting/ transit countries in emergency response.

(1) **SASOP**

The SASOP provides (i) the guides and templates to initiate the establishment of the ASEAN Standby Arrangements for Disaster Relief and Emergency Response, (ii) the procedures for joint disaster relief and emergency response operations, (iii) the procedures for the facilitation and utilization of military and civilian assets and capacities, and (iv) the methodology for the periodic conduct of the ASEAN regional disaster emergency response simulation exercises (ARDEX) which shall test the effectiveness of these procedures [ASEAN, 2010].

As shown in Table 2-1, the SASOP consists of guides for preparedness, assessment, and monitoring of disaster occurrences, emergency response, and facilitation and utilization of military assets and capacities, as well as relevant templates and formats. Sections I to V were adopted at the 11th ASEAN Committee Disaster Management Meeting in March 2008 and the first edition were printed in November 2009. Section VI could be revisited under the Joint Task Force on Humanitarian Assistance and Disaster Relief (HADR, refer to Section 2.3.4). Also, after every ARDEX, improvement of SASOP has been discussed to be referred to future modification.

Medical response is not covered in the SASOP because it focuses on initial response, particularly needs assessment, and search and rescue activities.

[2] SASOP was signed in 2005 and entered into force in 2009.

Table 2-1 Contents of SASOP

I. INTRODUCTION	VI. FACILITATION AND UTILISATION OF MILITARY ASSETS AND CAPACITIES (being developed)
II. INSTITUTIONS A. Parties B. AHA Centre	VII. ANNEXES Annex A - Template 1: Designation of National Focal Points and Competent Authorities Annex B - Template 2: Emergency Response/Search and Rescue Directory Annex C - Template 3: Military and Civilian Assets and Capacities Annex D - Template 4: Emergency Stockpiles of Disaster Relief Items Annex E - Template 5: Disaster Management Expertise and Technologies Annex F - Template 6: Network of Pre-Designated Areas Annex G - Form 1: Initial Report/Situation Update to AHA Centre Annex H - Form 2: Initial Report/Update of AHA Centre to the National Focal Points Annex I - Form 3: Request for Assistance Annex J - Form 4: Offer of Assistance Annex K - Form 5: Contractual Arrangements for Assistance Annex L - Form 6: Report of Status of Provision of Assistance Annex M - Form 7: Final Report from Assisting Entity to AHA Centre Annex N - ARDEX
III. DISASTER PREPAREDNESS A. Designation of National Focal Points and Competent Authorities B. Inventory of Earmarked Assets and Capacities (i) Emergency Response/Search and Rescue Directory (ii) Military and Civilian Assets and Capacities (iii) Emergency Stockpiles of Disaster Relief Items (iv) Disaster Management Expertise and Technologies C. Network of Pre-Designated Areas	
IV. ASSESSMENT AND MONITORING A. Notification of Disaster B. Situation Updates	
V. EMERGENCY RESPONSE A. Request for Assistance/Offer of Assistance B. Joint Assessment of Required Assistance C. Mobilisation of Assets and Capacities (i) Response Time (ii) Customs, Immigration and Quarantine (iii) Briefing and Coordination D. On-Site Deployment of Assets and Capacities E. Direction and Control of Assistance F. Disaster Situation Update G. Demobilisation of Assistance H. Reporting I. Review of Operations, Experiences and Lessons Learnt	

Source: [ASEAN, 2010]

(2) **EAS Tool Kit**

Also, the East Asia Summit (EAS) Rapid Disaster Response Toolkit has been finalized in June 2015 (Table 2-2). It provides reference guide for decision makers of the EAS countries[3] in rapidly responding to disasters and to share relevant information on the key considerations for managing offers and requests for international disaster response in EAS countries including the SASOP [Emergency Management Australia, 2014]. Parts of the text and templates contained in this publication are quoted or reprinted from the AADMER and the SASOP [The Commonwealth of Australia and the Republic of Indonesia, 2015]. And also refers other relevant international agreements, trends, and discussions such as the foreign medical team (FMT, refer to Section 2.1.3(2)) in Tool 2.

The toolkit covers the comprehensive aspects of disaster response including regulations on medicine and accreditation of professional personnel in each country in Tool 3. However, concrete guides on medical assistance are not descried.

[3] AMS, Australia, China, India, Japan, New Zealand, Korea, Russia and United States of America (18 countries)

Table 2-2 Outline of EAS Tool Kit[4]

Preliminaries		Overview of the Tool Kit
TOOL 1: NATIONAL FOCAL POINT TABLE		- Key contact information for officials from each EAS participating country that have responsibility for managing offers and requests for international disaster assistance.
TOOL 2: GUIDANCE FOR RAPID DISASTER RESPONSE		- A reference guide for disaster management decision makers of the affected/ assisting/ transit countries. - Key issues for decision makers to consider when readying for and rapidly responding to a disaster in the region.
Contents	Part 1: Introduction	
	Part 2: Guidance for decision makers in Affected Countries	
	Phase 1: Get ready	- Monitor, communicate and warn - Commence early planning and action - Activate simplified customs, immigration and quarantine procedures - Notify and prepare personnel
	Phase 2: Assess/ request	- Provide notification of the disaster to international society - Undertake rapid impact/needs assessment - Communicate the nature and extent of the disaster to other EAS - Formally request disaster response - Activate simplified customs, immigration and quarantine procedures - Provide situation reports/ temporary recognition for practice for disaster response personnel - Requests for urban search and rescue teams/ foreign medical teams
	Phase 3: Respond	- Respond to offers of disaster response
	Phase 4: Receive	- Provision of further assessments and notifications - Entry points for disaster response - Briefs for arriving disaster response personnel - Provision of facilities and security - Temporary recognition of professional qualifications, accreditations and registrations - Temporary provisions for transport - Direction, control and coordination of disaster response - Costs - Termination of international disaster response
	Part 3: Guidance for decision makers in Assisting Countries	
	Phase 1: Get Ready	- Monitor, communicate and warn - Commence early planning and action - Activate simplified customs, immigration and quarantine procedures - Notify and prepare personnel
	Phase 2: Initiate	- Consider all communications from the Affected Country (and/or the AHA Centre) - Consult existing Standard Operating Procedures and Guidelines of the affected countries - Make a formal offer of disaster response/ respond to a request for disaster response - Commence processes to obtain necessary permits or clearances in the Affected Country - Activate simplified customs, immigration and quarantine arrangements - Provide list(s) of disaster response goods to be brought into the Affected Country - Provide list(s) of incoming personnel and details of their qualifications or registrations

[4] http://www.ag.gov.au/eastoolkit

Table 2-2 Cont.

	Phase 3: Send and manage	- Response time - Types of disaster response available and required (goods, personnel, foreign field hospitals, specialty teams: surgical, etc., military, funding assistance) - Country entry requirements – customs, immigration and quarantine/ accreditation requirements for disaster response personnel - Minimum standards of quality (imported foods and medicines) - Health and safety, immunity and indemnity - Self-sufficiency - Monitoring and reporting - Withdrawal of disaster response - Gifting, disposal or re-export of goods or equipment
	Part 4: Guidance for decision makers in Transit Countries - Consider all communications from the Affected Country - Activate simplified customs, immigration and quarantine procedures	
	Part 5: Appendices - Health Protection Group of Western Australia Example List for Disaster Management Assistance Teams - UN OCHA Oslo Guidelines - INSARAG Methodology and Guidelines Annex F: USAR Team Fact Sheet, Annex E: USAR Team Post Mission Report, Annex G: Mission Summary Report	
TOOL 3: EAS COUNTRY DISASTER RESPONSE ARRANGEMENTS	- Outlines of the rapid disaster response arrangements for each EAS participating country. - Key information for decision makers on the arrangements of each participating country are in place for the reception and provision of rapid disaster response. These cover information on immigration, custom, cluster, and regulations on food/ medicines/ equipment,/ accreditation of professionals/ specialists, etc.	

Source: [The Commonwealth of Australia and the Republic of Indonesia, 2015]

2.1.2 Needs Assessment and Request for International Assistances

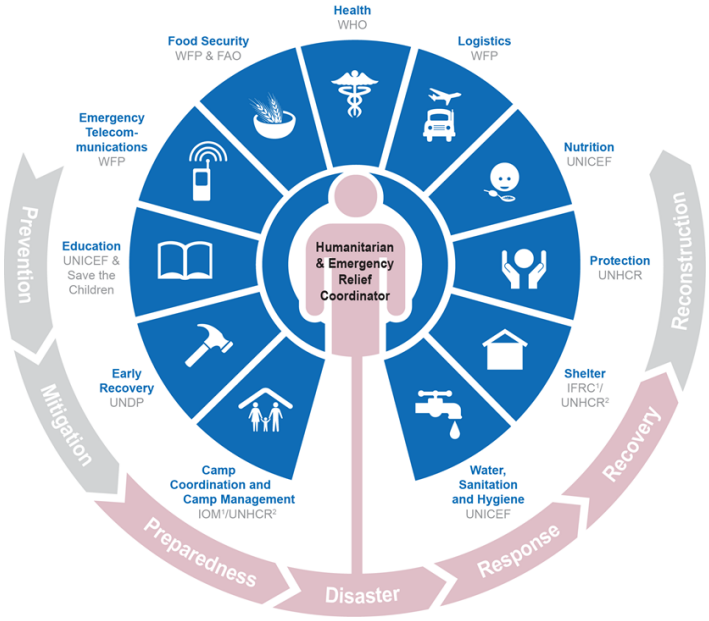
When the government of the affected country requests international humanitarian response, the needs assessment teams such as the United Nations Disaster Assessment and Coordination (UNDAC) team and/or the ASEAN Emergency Rapid Assessment Team (ERAT) are deployed. The ASEAN ERAT consisting of trained national disaster management organizations (NDMOs) and related ministries staff from AMS assists the NDMO of the affected country in coordination with ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre). The draft rapid assessment tool covers demography, shelter, water and sanitation, health, nutrition, food security, livelihood, education, and protection. Although it includes the health sector, it mainly covers infectious diseases and maternal and child health [AHA Centre]. According to AHA Centre, health personnel are quite limited in ERAT members[5].

Then, the government, usually the NDMO, requests international assistances such as urban search and rescue (USAR) teams and foreign medical teams (FMTs) based on the results of the needs assessment. Also, the government, or the NDMO decides whether to accept or refuse offers from other countries or organizations, and coordinates the assistances usually in cooperation with the UN mechanism and along with the cluster approach.

[5] According to AHA Centre, there are only a few health personnel registered as ERAT members.

2.1.3 Cluster Approach

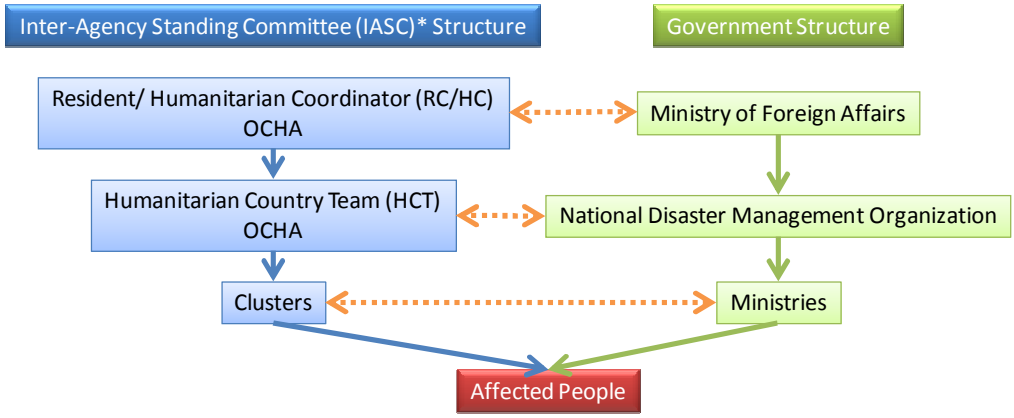
International humanitarian response for emergency has been undertaken by cluster as shown in Figure 2-1. Its basis was set by the UN General Assembly in 1991. In the Humanitarian Reform in 2005, the Cluster Approach was introduced to improve capacity, predictability, accountability, leadership and partnership.



Source [OCHA]

Figure 2-1 Cluster Approach

In-country clusters support the response needs of the Governments through hand-in-hand support to line ministries (Figure 2-2).



*Note: IASC is an inter-agency forum for coordination, policy development and decision-making involving key UN and non-UN humanitarian partners (Food and Agriculture Organization(FAO), OCHA, United Nations Development Programme (UNDP), United Nations Population Fund (UNFPA), United Nations Human Settlements Programme (UN-HABITAT), Office of the United Nations High Commissioner for Refugees (UNHCR), United Nations Children's Fund (UNICEF), World Food Programme (WFP) and WHO) and standing invitees such as ICRC, IFRC, International Organization for Migration (IOM), and the World Bank.

Source [OCHA]

Figure 2-2 International Cluster and Interface of the Government

In-country clusters are accessed through the Resident/ Humanitarian Coordinator (RC/HC), the Humanitarian Country Team (HCT) or cluster lead organizations. In the ASEAN Region, clusters and

cluster-like structures are currently active in Indonesia, Lao PDR, Myanmar, and the Philippines[6] [OCHA]. In some countries, in-country clusters are utilized for information sharing in peacetime.

(1) The Global Health Cluster

Health management and medical response are included in the health cluster. The Global Health Cluster (GHC) is led by WHO and involves 40 partners including UN organizations, non-governmental organizations (NGOs), international organizations, bilateral donors and academic agencies. Its goal during humanitarian crises is to prevent and reduce excess mortality, morbidity and disability. To achieve the goal, GHC partners have been collaborating to strengthen international capacity for humanitarian response through:

- Providing guidance, standards, tools and policies;
- Establishing systems and procedures for rapid deployment of field staff,
- Technical experts and medicines and supplies; and
- Building global partnerships to implement and promote this work [WHO].

(2) Foreign Medical Team

In order to improve the coordination of foreign medical teams (FMTs), which are mobilized for the sudden onset disaster (SOD), the GHC's FMT Working Group works on the guidance and procedures to have more predictability in FMT response capacity and to have minimal quality assurance systems. The first edition of the classification system and minimum standards for FMTs that provide trauma and surgical care in the first month following an SOD has been issued (Table 2-3). Then, a first outline was proposed for the procedures in registering and monitoring of FMTs [Foreign Medical Team Working Group, 2013].

For the registration, the FMTs are expected to confirm that they are able and willing to meet the guiding principles and adhere to the minimum standards. On the other hand, the recipient country could consider what type of assistance is required in the affected areas and facilitate on-site coordination. The approach to registration will seek to be inclusive rather than exclusive, with self-declared information on capacities and commitment to adhere to the FMT principles and core standards [Foreign Medical Team Working Group, 2013].

[6] In-country clusters in those countries are describes in Chapter 5, 6, 8 and 9, accordingly.

Table 2-3 Classification of FMT

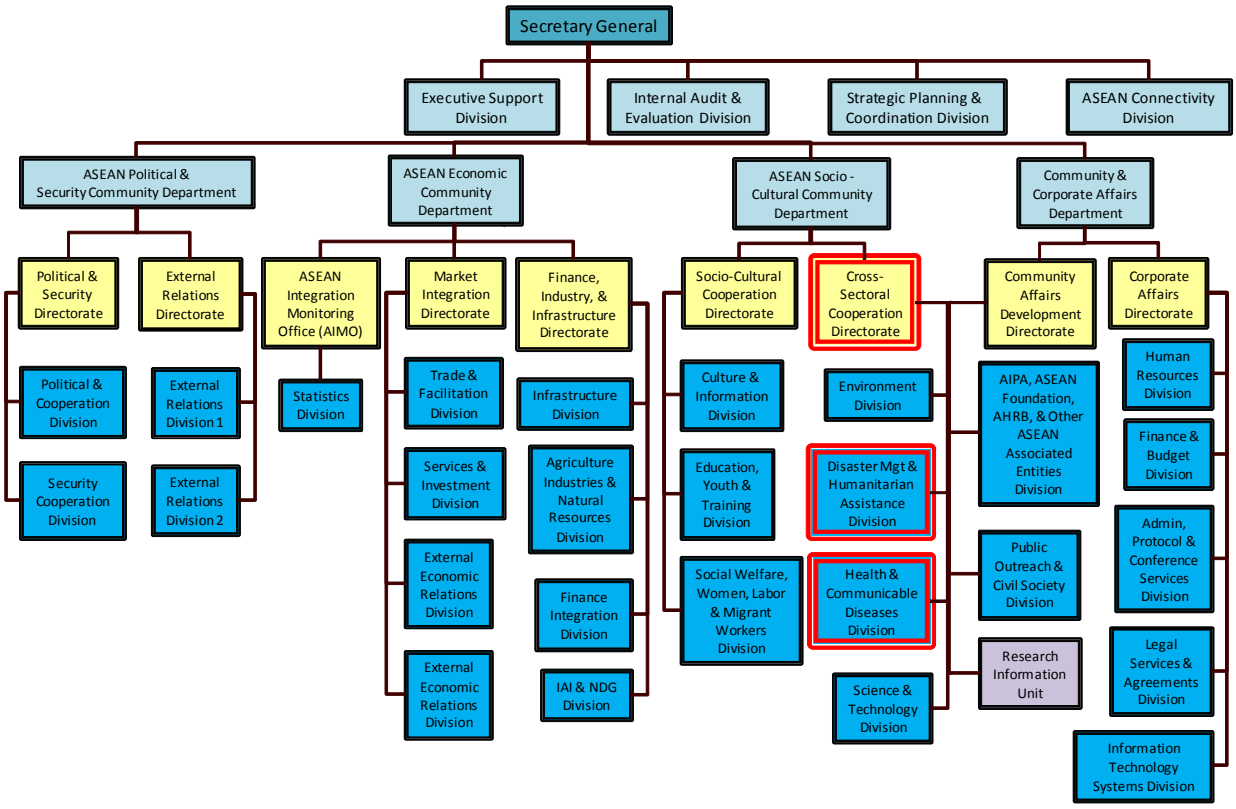
Classification	Key Services	Capacity
Type 1: Outpatient Emergency Care	- Triage, Assessment and First Aid - Stabilization and referral of severe trauma and non-trauma emergencies - Definitive care for minor trauma and non-trauma emergencies	- Temporary shelter care for outpatient capacity or mobile - 100 outpatients/day for 2 weeks - Day time services
Type 2: Inpatient Surgical Emergency Care	- Intake/Screening of new and referred patients, counter-referral - Surgical triage and assessment - Advanced life support - Definitive wound and basic fracture management - Damage control surgery - Emergency general and obstetric surgery - Inpatient care for non-trauma emergencies - Basic anesthesia, X-ray, sterilization, laboratory and blood transfusion - Rehabilitation services and patient follow up	- 1 operating theatre with 1 operating room - 20 inpatient beds - 7 major or 15 minor operations/day - Day and night services
Type 3: Inpatient Referral Care	- Intake/Screening of referred and new patients, surgical triage and assessment, plus counter-referral - Capacity to provide type 2 services when needed - Complex reconstructive wound and orthopedic care, when required - Enhanced, X-ray, sterilization, laboratory and blood transfusion - Rehabilitation services and patient follow up - High level pediatric and adult anesthesia - Intensive care beds with 24/7 monitoring and ability to ventilate	- 1 operating theatre with at least 2 operating rooms - 40 inpatient beds - 4 to 6 intensive care beds If facility provided - 15 major or 30 minor operations/day - Day and night services

Source: [Foreign Medical Team Working Group, 2013]

2.1.4 Relevant Regional Organizations

(1) ASEAN Secretariat

When disaster occurs in the ASEAN Region, the ASEAN Secretary-General serves as a humanitarian assistance coordinator and concerned divisions coordinate relevant activities in each sector. Particularly, the Disaster Management and Humanitarian Assistance Division and the Health and Communicable diseases Division under the Cross Sectoral Cooperation Directorate are concerned divisions to disaster medicine (Figure 2-3). These divisions also coordinate to develop relevant policy, strategy, plan and guidelines in collaboration with the AMS and other concerned organizations.



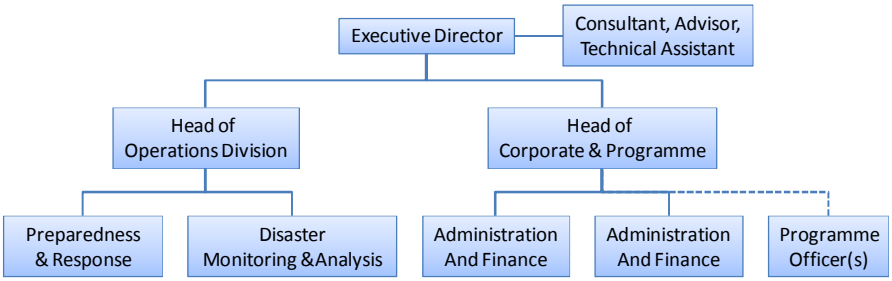
Source: [ASEAN]

Figure 2-3 Organization Structure of ASEAN Secretariat

(2) ASEAN Coordinating Centre for Humanitarian Assistance on Disaster Management (AHA Centre)

The ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre) is an inter-governmental organization to implement the AADMER. AHA Centre is governed by the members of the ASEAN Committee on Disaster Management (ACDM), which consists of the heads of NDMO of AMS and representatives of ASEAN Secretariat.

Since its establishment in 2011, AHA Centre has been strengthening the capacity through four phases until 2020: (1) start operation by 2014; (2) availability of disaster response in cooperation with relevant organizations; (3) expand cooperation on disaster response to development partners; and (4) achieve "One ASEAN, One Response 2020 and beyond: ASEAN Responding to Disasters as One" (refer to Section 2.3.4). AHA Centre consists of four sections along with the AADMER working group as shown in Figure 2-4. Although the initial plan required 32 personnel, there are 19 personnel and no health professional at the time of the Survey.

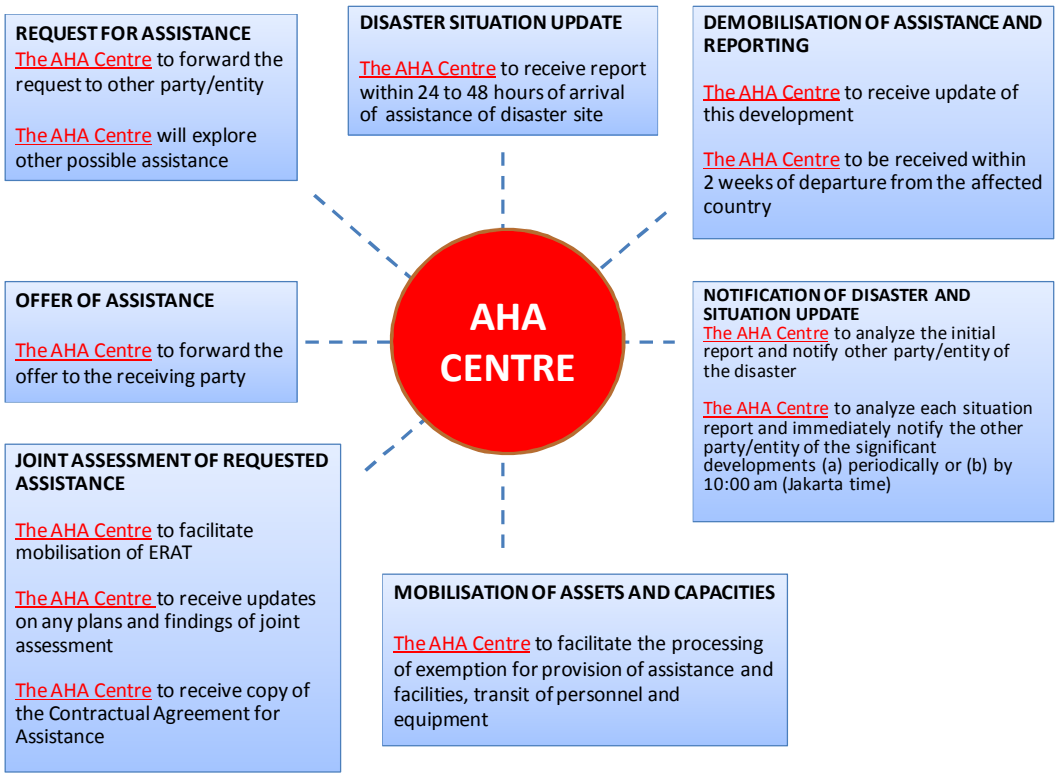


Source: JICA Indonesia

Figure 2-4 Organization Structure of AHA Centre

AHA Centre has the following four mandates: (1) Facilitating coordination and cooperation of emergency humanitarian assistances in the ASEAN Region among government and international organization compiling to SASOP (Figure 2-5); (2) Coordinating disaster response beyond the countries; (3) Developing relevant agreements and guidelines; and (4) Promoting "One-ASEAN, One-Response".

In peacetime, AHA Centre monitors disaster occurrence in the region and once the disaster occurs, the centre analyses the initial and situation reports sent by the affected country and shares information to other stakeholders in a timely manner. Also, AHA Centre facilitates in the mobilization of the ERAT. The team is managed by the AHA Centre to be deployed in a very short notice anywhere in the ASEAN region to provide a fast, reliable and collective response. Also, AHA Centre has been providing induction training annually since 2010. As of 2014, 93 have been trained and of which 91 have been registered as an ERAT member.



Source: AHA Centre

Figure 2-5 Roles and Functions of AHA Centre in Emergency Response

In response to the Nepal Earthquake[7], AHA Centre provided situation update to all National Focal Point of ASEAN Member States and shared updates on the latest situation and assistances provided by AMS through video conference with ACDM. Through the operation, the AHA Centre exchanged information on the ground for smooth coordination among Urban Search and Rescue Team from Malaysia (SMART), Singapore (Lion Heart) and Thailand Team. It was the first case for AHA Centre to respond outside of ASEAN region. Based on the lessons learned, operation mechanism outside of the region could be developed and regional capacity and operational coordination among AMS could be strengthened.

2.2 International Trend Relevant to Disaster Health Management

The Hyogo Framework of Action (HFA) 2005-2015[8] led a paradigm shift from simple response to disaster risk management. Regarding the health sector, it was recommended to integrate disaster risk reduction planning to ensure all new hospitals are built with a level of resilience to continue health services in disaster situation, particularly primary health care [UNISDR, 2005]. In the Sendai Framework for Disaster Risk Reduction (SFDRR) 2015-2030[9], it was clearly mentioned that disaster preparedness should be emphasized for the continuity of health services during emergencies and disasters.

(1) Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR)

In the SFDRR, disaster risk reduction (DRR) is mainstreamed into all phases of disaster management cycle to minimize the number of people affected by any kinds of disasters. It states the following four priority areas:

1) Understanding disaster risk;
2) Strengthening disaster risk governance to manage disaster risk;
3) Investing in disaster risk reduction for resilience; and
4) Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation, and reconstruction.

Regarding the third priority area (investing in disaster risk reduction for resilience), cross-sectoral coordination and collaboration are encouraged for maximum use of investments. Regarding the health sector, it is recommended for global and regional partners to enhance cooperation between health authorities and other relevant stakeholders to strengthen country capacity for disaster risk management for health, the implementation of the International Health Regulations (2005, IHR), and the building of resilient health systems.

Regarding the resilience of national health systems, it could be developed by integrating disaster risk management into primary, secondary, and tertiary health care, especially in the local level, developing the capacity of health workers in understanding disaster risk and applying and implementing disaster risk

[7] It was a 7.8 magnitude earthquake struck Nepal on 25 April 2015 followed by several powerful aftershocks. As of 12 July 2015, it was reported that there were 8,856 deaths and 604,930 houses fully damaged [OCHA].
[8] HFA was adopted at the Second World Conference on Disaster Reduction in 2005, held in Kobe, Hyogo, Japan.
[9] SFDRR was adopted at the Third World Conference on Disaster Reduction in 2015, held in Sendai, Miyagi, Japan.

reduction approaches in health work, promoting and enhancing the training capacities in the field of disaster medicine, and supporting and training community health groups in disaster risk reduction approaches in health programs in collaboration with other sectors[UNISDR, 2015].

(2) The United Nations (UN) Contribution for the Consultation to the Third World Conference for Disaster Risk Reduction (WCDRR)

The UN made a contribution on health and disaster risk to emphasize the incorporation of health aspects into the existing DRR program and preparedness of health systems to continue services during emergencies and disasters. The key recommendations for the Post-2015 Framework for DRR are as follows [UN, 2015].

1) Make people's health and well-being an explicit outcome of the next global framework on DRR.
2) Include health targets and indicators for monitoring and reporting on DRR.
3) Strengthen action and resources to support health and other sectors that are vital for implementing DRR.
4) Establish the Safe Hospitals Initiative as a global priority for action to ensure that new and existing health facilities remain operational during emergencies and disasters.

(3) Safe Hospital Framework

In the HFA 2005-2015, the DRR planning aimed to be integrated to health sector to achieve the goal of "hospitals safe from disaster". In 2011, the 64th World Health Assembly and the World Health Organization (WHO) Regional Committees have passed the resolutions to make hospitals safer[10] [WHO, 2015].

At the third WCDRR, WHO released the Comprehensive Safe Hospital Framework that guides the development and implementation of Safe Hospital programmes at national, subnational and facility levels. Also it aims to guide global and national actions for implementing safe hospitals as a major priority in the post-2015 framework on DRR and in country and community strategies for DRR. WHO has launched the Hospital Safety Index (second edition) which is an assessment tool for giving a snapshot of the safety and preparedness of hospitals to remain operational in emergencies and disasters [WHO].

(4) Global Health Emergency Workforce

In the 68th World Health Assembly held in May 2015, the Director-General reported a conceptual plan for the Global Health Emergency Workforce, which was established in order to respond to acute or protracted risks and emergencies with health consequences. Although it was mainly based on lessons learned from the response to the Ebola outbreak, the workforce will cope with the issues to strengthen the global and national capacity of emergency health response which includes public health, clinical care, coordination, social mobilization, communication, logistics, information management and systemic support [WHO, 2015].

[10] WHA64.10 Strengthening national health emergency and disaster management capacities and resilience of health systems

2.3 Regional Trend on Disaster Health Management

Along with the above international trend, multi-sector approach and mainstreaming of disaster risk reduction have been emphasized in Asia. The East Asia Summit Statement on Rapid Disaster Response was adopted in the ninth EAS held in November 2013. It recommended to all participating countries to establish a whole-of-nation approach, prioritize preparedness, strengthen communication and coordination through national focal points, information sharing, and establish a pre-agreement on custom clearance and immigration to improve rapid disaster response in the region. Also, it was mentioned that relevant measurements should be implemented through the existing regional mechanisms and frameworks such as AADEMR. Also, regional coordination on disaster relief has been discussed in the Disaster Relief Inter-sessional Meeting of the ASEAN Regional Forum (ARF)[11]

2.3.1 Asia Pacific Strategy for Emerging Diseases (APSED) (2005)

Disaster management in health has been developed to respond to epidemics in accordance with the IHR and expanded to cover any types of disasters. The Asia Pacific Strategy for Emerging Diseases (APSED) was updated to include public health emergency preparedness, regional preparedness, alert and response, and monitoring and evaluation in 2010.

2.3.2 Western Pacific Region Framework for Action for Disaster Risk Management for Health (2014)

Aiming to strengthen regional, national, and sub-national capacities to address the health aspects of the disaster risk management (DRM), thus enhancing health and human security, the Western Pacific Region Framework for Action for Disaster Risk Management for Health was endorsed in the 65th World Health Assembly. It urges all member states to take action to enhance capacity of disaster risk management in health (DRM-H) with the following four priority areas as presented in Table 2-4.

[11] EAS participating countries plus Bangladesh, Canada, Democratic Republic of Korea, Mongolia, Pakistan, Papua New Guinea, Sri Lanka, Timor Leste (26 countries), and European Union

Table 2-4 Priority Actions in the Western Pacific Region Framework for Action for Disaster Risk Management for Health

Framework's components	Priority Actions
1. Governance, policy, planning and coordination	Priority 1: Ensure the health sector's contribution in the shift from disaster management to disaster risk management and its representation on the relevant governing bodies. Priority 2: Develop and revise relevant national health policies across the four phases of the DRM-H cycle. Priority 3: Strengthening of the Ministry of Health unit(s) responsible for planning and coordinating DRM-H activities across the four phases of DRM.
2. Information and knowledge management	Priority 4: Disseminate health information and health perspectives to multi-sectoral risk assessments at the national, sub-national, and local levels. Priority 5: Establish procedures for the management and utilization of information and knowledge from risk assessments among partners in health and other sectors. Priority 6: Develop policies, mechanisms, and procedures for risk communication for public, media and responders.
3. Health and related services	Priority 7: Match health programs and services with the profiles of hazards and risk that was assessed and monitored at the national and sub-national levels. Priority 8: Define or revise existing health services packages for routine activities and disaster response. Priority 9: Develop strategies for the continuity of health service delivery and mechanisms for response and recovery operations as part of the National Health Preparedness Plans. Priority 10: Develop or enhance the Safe Hospital Initiative.
4. Resources (human, financial, drugs and supplies)	Priority 11: Review and develop skills and experiences in disaster risk management for health that are available at national, subnational and local levels. Priority 12: Develop the national and sub-national plans and mechanisms to meet staffing needs for surge requirements. Priority 13: Identify critical medical supplies and equipment through risk assessment and analysis to ensure a minimum stocking level in appropriate locations. Priority 14: Develop procedures for emergency contracting of health supplies and services. Priority 15: Ensure policies for funding mechanism(s) to cover all components of the disaster risk management for health cycle. Priority 16: Establish or enhance contingency funding for disasters.

Source: [WPRO, 2014]

2.3.3 ASEAN Post-2015 Health Development Agenda

The ASEAN Post-2015 Health Development Agenda was presented in the 12th ASEAN Health Ministers Meeting in September 2014. It aims to promote a healthy and caring ASEAN community, where people achieves maximal health potential through healthy lifestyle, have universal access to quality health care and financial risk protection, have safe food and healthy diet, live in a healthy environment with sustainable inclusive development, where health is incorporated in all policies[ASEAN, 2014]. As shown in Table 2-5, disaster health management is the twelfth priority under the second cluster.

Table 2-5 ASEAN Post-2015 Health Development Agenda

Cluster	Goal 2020	Health Priorities
1. Promoting health lifestyle	To achieve maximal health potential of ASEAN community through promoting health lifestyle To ensure health lives and promote well being for at all ages	1) Prevention and control of non-communicable diseases (NCDs)
		2) Reduction of tobacco consumption and harmful use of alcohol
		3) Prevention of injuries
		4) Promotion of occupational health
		5) Promotion of mental health
		6) Promotion of healthy and active aging
		7) Promotion of good nutrition and healthy diet
2. Responding to all hazards and emerging threats	To promote resilient health system in response to communicable diseases, emerging infectious diseases, and neglected tropical diseases To respond environmental health threats, hazards and disaster, and to ensure effective preparedness for disaster health management in the region	8) Prevention and control of communicable diseases, emerging infectious diseases and neglected tropical diseases
		9) Strengthening laboratory capacity
		10) Combating antimicrobial resistance (AMR)
		11) Environmental health and health impact assessment (HIA)
		12) Disaster Health Management
3. Strengthening health system and access to care	The ASEAN community has universal access to [essential] health care, safe and good quality medical products including traditional and complementary medicines To achieve the unfinished health related millennium development goals (MDGs), in light with sustainable development goal (SDG)	13) Traditional medicine
		14) Health related MDGs (4,5,6)
		15) Universal Health Coverage (UHC)
		16) Migrants' health
		17) Pharmaceutical development
		18) Healthcare financing
		19) Human resources development
4. Ensuring food safety	To promote access to safe food, safe drinking water and sanitation	20) Food safety
		21) Water and sanitation

Source: [ASEAN, 2014]

Regarding the disaster health management, the following strategies were recommended in the Post 2015 Working Group Meeting of ASEAN SOMHD on 7th and 8th April 2015 to be endorsed by SOMDH:

- Advocate on ASEAN collaboration network on disaster health management with a strong national focal point in each AMS such as ASEAN-Japan collaboration network on disaster medicine.
- Developing a regional standard and operation procedure among related disaster health management system including human resource and operation system.
- Strengthening the regional response through capacity building as well as enhancing the operation system on disaster/health emergency medicine at the national level and disaster medicine at the regional level.

2.3.4 One ASEAN, One Response

In the 23rd ASEAN Summit held in October 2013 in Bandar Seri Begawan, Brunei, formation of a joint task force was proposed to promote synergy and coordination on HADR. The Joint Task Force (HADR Joint Task Force) is composed of chairs and vice chairs of ASEAN bodies in charge of disaster management, defence, political cooperation, health, and social welfare, as well as ASEAN Secretariat and AHA Centre. As one of the outputs of the HADR Joint Task Force, "One ASEAN, One Response 2020 and beyond: ASEAN Responding to

Disasters as One" strategy was adopted in the Second ASEAN Ministerial Meeting on Disaster Management (AMMDM) convened in Bandar Seri Begawan in October 2014. It is to be launched in 2015 to ensure an effective and efficient response to regional disasters.

(1) **ASEAN Joint Disaster Response Plan**

In support of the "One ASEAN, One Response" strategy, the ASEAN Joint Disaster Response Plan (AJDRP) has been under preparation. The plan will be multi-sectoral and multi-level and therefore will include the health sector. AJDRP will coordinate and facilitate the assistance of AMS, its Partners and others of relief assets and capacities to a disaster affected Member State [AHA Centre, 2015].

2.3.5 Public Health in Emergencies

In 2001, the Asian Disaster Preparedness Center (ADPC)[12] in collaboration with the two Regional Offices of WHO, for South East Asia (SEARO) and the Western Pacific (WPRO) developed and implemented a course on public health and emergency management, the Public Health and Emergency Management in Asia and the Pacific (PHEMAP) Program. The PHEMAP Steering Committee[13] provides leadership and direction for the PHEMAP Program which aims to strengthen national capacities for managing health risks of emergencies in the Asia and Pacific regions. The PHEMAP Program has established a technical and organizational framework for the development and implementation of international and national courses.

In the ASEAN Region, the national PHEMAP courses have been implemented in Cambodia, Lao PDR, the Philippines, and Viet Nam by Ministries of Health with support from WHO and other agencies. Other activities, such as the Management of the Dead and the Missing in Disasters, have also been organized by ADPC, SEARO, and WPRO [ADPC, 2011].

2.3.6 Preparedness in Hospitals

(1) **ASEAN Agreement on Disaster Management and Emergency Response (AADMER) Work Program**

The ASEAN Agreement on Disaster Management and Emergency Response (AADMER) Work Program for 2010 – 2015 includes the mainstreaming of disaster risk reduction in health sectors as a part of the second strategic component (Prevention and Mitigation). According to the program, structural and non-structural mitigation measures should be done to make health facilities safe to ensure continuity of health care services during and aftermath of a disaster.

In the AADMER Work Program Phase 2 for 2013 – 2015, the Hospital Networking for Resilience Initiative Project has been implemented as one of 21 flagship and priority projects (Table 2-6) [AHA Centre, 2013].

[12] An independent NGO established in 1986. With headquarters located in Bangkok, Thailand, it has country offices in Bangladesh, Lao PDR and Myanmar and has been providing trainings to enhance disaster risk reduction capacities in cooperation with international organizations and governments.

[13] It composed of representatives of WPRO, SEARO, and ADPC, and the principal development cooperation partner (most recently the Royal Government of Norway).

Table 2-6 Outline of the Hospital Networking for Resilience Initiative Project

Period	from 2014 to 2015
Specific Objectives	a) Promote the institutionalization of disaster-resilient hospitals in the health sector agenda b) Enable AMS to undertake vulnerability and risk assessment of existing hospitals c) Facilitate the exchange of knowledge and good practices in reducing the disaster vulnerability of hospitals through collaborative networking and project d) Implement and showcase retrofitting measures in select pilot hospitals through multilateral cooperation and public-private partnership e) Support AMS in the development of a national action plan for safe hospitals

Source: [AHA Centre, 2013]

(2) Hospital Preparedness for Emergencies (HOPE)

In 2009, ADPC launched Hospital Preparedness for Emergencies (HOPE). It is a capacity building and technical assistance program for medical facility staff and healthcare personnel, both medical and non medical, to prepare healthcare facilities to respond effectively to community emergencies involving large numbers of casualties. It aims to develop model hospitals through the trainings and pilot activities. In the ASEAN Region, Cambodia, Indonesia, Lao PRD, the Philippines, and Thailand, and Viet Nam have been involved in the program [ADPC].

Chapter 3 Country Report: Brunei Darussalam

3.1 Overview of Disaster Occurrences (Natural and Man-made)

Generally, Brunei Darussalam (hereinafter referred to as Brunei) is one of the least disaster-prone countries in the ASEAN region (Figure 3-1). The major natural disaster is flood, in both urban and rural areas, and man-made disaster is fire, especially in Water Village because of its high population density. Because of the scale of the country, even a small scale disaster can be destructive.

Source: [UNEP/ UNISDR, 2013]

Figure 3-1 Map of Brunei

3.1.1 Occurrence of Natural Disasters

The major natural disasters in Brunei are flood (river and flash flood) and landslide. It occurs during the rainy season from November to January. Although the major disasters are not recorded in EM-DAT, the country has been affected by haze from other countries such as Malaysia, Indonesia and the Philippines (1991, 1998 and 2009), floods in Temburong District, the eastern enclave (2008) and Tutong District (2009 and 2011). Also, flash floods occurred in Brunei-Muara, Tutong and Belait Districts in 2009 [Brunei Delegate, 2014].

3.1.2 Occurrence of Man-Made Disasters

The major and frequent man-made disaster is fire in Water Village because the houses are built on top of the water and are made of timber. Also the building code is not applied to these houses. Chemical disaster is also remarkable such as Rasau gas blow-out in Belait District (1987) [Brunei Delegate, 2014].

3.2 Emergency Response System

3.2.1 Laws and Regulations for Emergency Response

The Disaster Management Order 2006 (S26) is the basic constitution for disaster management and emergency response in Brunei. The contents are shown in Table 3-1.

Table 3-1 Contents of Disaster Management Order 2006

PART I Preliminary	- Duration
- Citation, commencement, and long title	- Extending disaster situation
- Interpretation	- Ending disaster situation
- Non-application of Order	- Authorization for disaster situation
PART II Further Definitions	PART VII Powers
- Meaning of “disaster”	- Directions about powers under other written law
- Meaning of “disaster management”	- Exercise of powers by the Director
- Meaning of “disaster operations”	- General powers of the Director
- Meaning of “event”	- Power to give direction about a property
PART III National Disaster Council	- Requirements for direction about a property
- Establishment of Council	- General powers of a Rescue Officer
- Functions	- Provision about power of entry
- Membership	PART VIII Offences
- Time, places, and quorum of meetings	- Personation of Director or Rescue Officer
- Presiding a meeting	- Obstruction of Director or Rescue Officer
- Conduct of business	- Failure to comply with direction
- Conduct of meetings	- Failure to help the Director or Rescue Officer
- Annual report	PART IX Compensation
PART IV National Disaster Management Centre	- Entitlement to compensation
- National Disaster Management Centre	- When compensation is not payable
- Functions of the Director	- Applying for compensation
PART V National Disaster Management Plan	- Lapsing an application
- National Disaster Management Plan	- Deciding an application
- Review and renew the plan	- Notice about the decision
- Disaster management guidelines	- Appeal
- Public Response Plan	PART X General
PART VI Disaster Situation	- Limitation of liability
- Declaration	- Regulations
- Form and notice of declaration	

Source: [Government of Brunei Darussalam, 2006]

3.2.2 Organization for Emergency Response

(1) National Disaster Council (NDC)

The National Disaster Council (NDC) is the highest authority for disaster management in Brunei. It is convened when disasters occur. The chairman is the Senior Minister and the Vice Chairman is designated in accordance with the type of disaster. The main role of the NDC is to develop and implement a strategic policy framework for disaster management, to ensure regional and international, public and individual arrangements for effective disaster management, and to prepare the Strategic National Action Plan for Disaster Risk Reduction (SNAP).

(2) National Disaster Management Centre (NDMC)

The National Disaster Management Centre (NDMC) was established based on the Disaster Management Order. The NDMC is under the Ministry of Home Affairs and has 32 staff consisting of the Ministry of Home Affairs officers and secondment staff from the Fire and Rescue Department.

The main function of the NDMC is as the coordinating agency for disaster management in Brunei. This includes the preparation of the SNAP, manuals, and guidelines for management, restoration and mitigation of disasters, the procurement of materials, and the enhancement of emergency response capacity of stakeholders.

(3) **District Disaster Management Committee (DDMC)**

The District Disaster Management Committee (DDMC) is convened by the District Officers when disasters occur. The members of the DDMC are generally composed of the district representatives from the police, fire and rescue, health, welfare, public works departments, and army.

3.2.3 Classification of Disaster and Emergency Response

Table 3-2 shows the type of the disasters and level of emergency response in Brunei.

Table 3-2 Disaster and Emergency Level in Brunei

Level	Definition	Organization for Response	Responsibility	Member/ Responder
1	Disaster occurred at the district level	DDMC is formed and responded	District Officer	District Representative of: - Royal Brunei Police Forces - Fire and Rescue Department - Ministry of Health - Community Development Department - Public Works Department - Royal Brunei Armed Forces - Others
2	Disaster occurred at the national level	NDMC	Senior Minister/ Prime Minister	Representative of: - Ministry of Health - Ministry of Home Affairs - Ministry of Defence - Other ministries/agencies
3	Disaster occurred at the national level and requires regional and international assistance	NDMC		

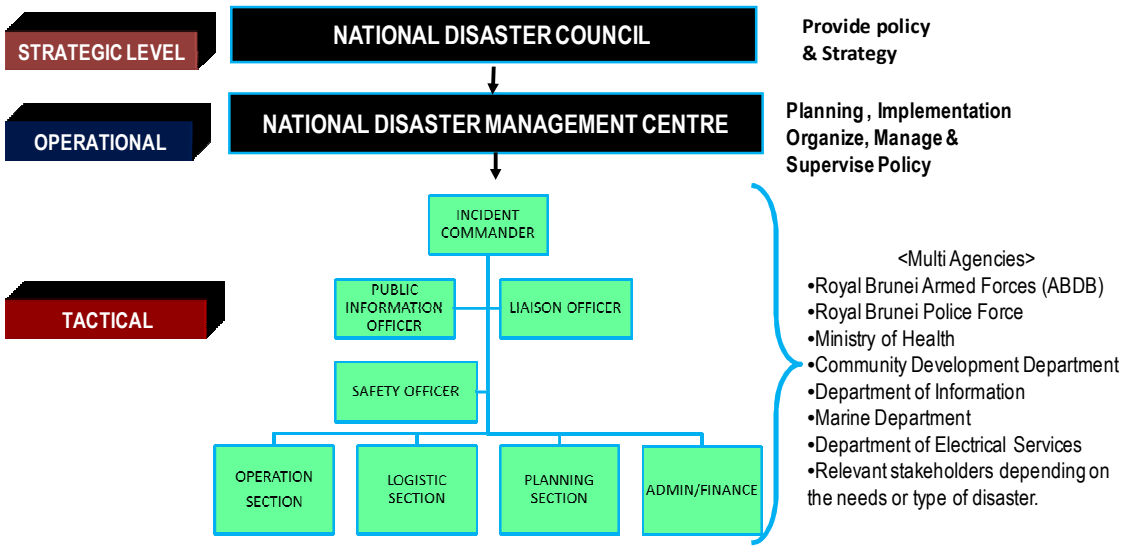
Source: NDMC

The main responsibility depends on the types of disasters. For example, the Marine Department of the Ministry of Communication is responsible for oil spill, the Department of Civil Aviation for aviation emergencies, and the Ministry of Health (MOH) for epidemic. In the previous response to the spread of influenza virus H1N1 strain in 2009, the NDMC provided non-health logistic support to the MOH.

When the scale of disaster exceeds the capacity of the district level, the neighboring districts and/or the NDMC could be requested for support. Collaboration with other agencies is smoothly done through the focal points of agencies in the NDMC and/or the representative of other agencies in the DDMC

Figure 3-2 presents the disaster management system. Brunei is one of the pilot countries for the Incident Command System (ICS) in ASEAN[14] and strengthens the ICS system with the support from Singapore, Japan, and the United States of America (USA). When disasters occur, Incident Command Post (ICP) and District Emergency Operation Center (DEOC) are organized by DDMC based on ICS to respond at the disaster sites.

[14] Under the ASEAN-US Cooperation on Disaster Management [USAID, 2010]



Source: NDMC modified by the Survey Team

Figure 3-2 Disaster Management Arrangement in Brunei

3.2.4 Emergency Response at the Site

(1) Disaster Relief

Table 3-3 shows the primary responder in emergencies.

Table 3-3 Primary Responder for Emergency Response in Brunei

Activity	Organization
Search and rescue	Royal Brunei Police Force, Fire and Rescue Department
Medical activity and transportation of injuries	Ministry of Health
Shelter and support of refugees	Community Development Department, Ministry of Culture, Youth and Sports
Assessment of disaster occurrence and damage, investigation and mechanism analysis of landslide	Fire and Rescue Department, Public Works Department

Source: NDMC

The non-government organizations (NGOs) and community service organizations (CSOs) such as the Brunei Darussalam Red Crescent Society also provide assistance only in the recovery phase such as communication tools, vehicles for transportation, food distribution and cleaning campaign.

(2) Emergency Drills

There are national level emergency drills conducted for several types of disasters to strengthen coordination capacity. Although there is no plan for emergency drill at the community level, there is a community-based disaster risk management programme (CBDRM) that promotes awareness as well as enhances preparation and readiness in facing any untoward incidents.

3.3 Overview of Disaster/Emergency Medicine

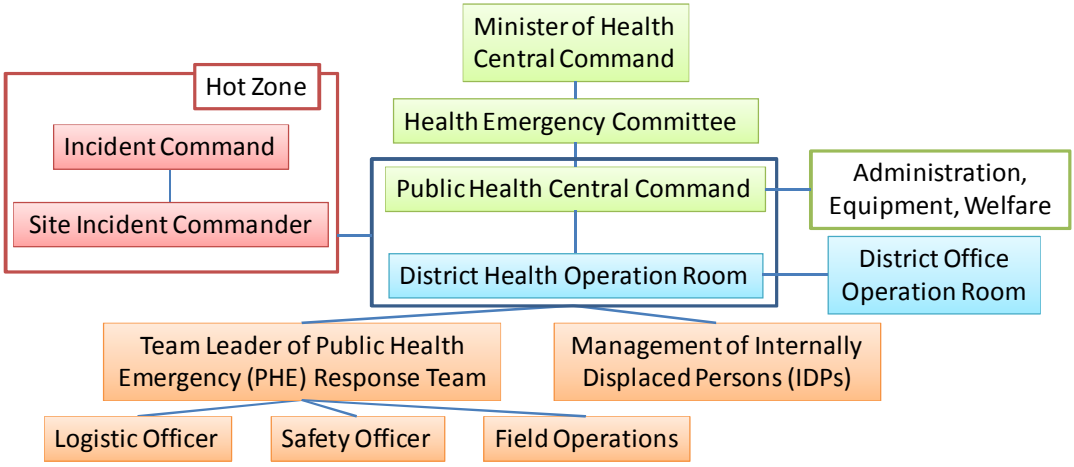
The Emergency Medical Services (EMS) was initiated in 1989 and has been rapidly developing since 2008.

3.3.1 Relevant Legislations and Plans

The Disaster Management Order (DMO) in 2006 did not incorporate disaster medicine. The Public Health Emergency Operation Plan (2008) provides guideline for public health response during disasters, including infectious disease outbreak.

3.3.2 Institutional Setting

In the management of public health emergencies involving infectious diseases, the Department of Health Services, MOH is the lead agency supported by other relevant government agencies including the NDMC and the Royal Brunei Armed Forces. For all other disasters, NDMC is the coordinating agency for disaster management in Brunei. Figure 3-3 presents the communication line of public health emergency/disaster response.



Source: [MOH Brunei, 2008] modified by the Survey Team

Figure 3-3 Communication Line for Public Health Emergency/ Disaster Reponses

3.3.3 Financial Arrangements

The cost of disaster response is basically bared by the primary responsible ministry and supplemented by the NDMC according to the DMO 2006 whenever there is a shortage. The budget for epidemic includes preparedness of health facilities, and academic budget covers disaster prevention education and community preparedness.

3.4 Current Situation of Disaster Medicine

According to the MOH, disaster medicine is currently being set-up as part of disaster management.

3.4.1 Facility and Equipment

There are no specialized healthcare facilities for disaster response. Generally, the existing resources for emergency medical services (EMS) are being used in disaster response. The MOH has one national hospital and three district hospitals. The Raja Isteri Pengiran Anak Saleha (RIPAS) Hospital is the only tertiary level hospital in the whole country. It has a Major Medical Emergency (MME) Plan, which is activated by an emergency declaration by the Chief Executive Officer of the Hospital or the Director

General of Medical Services of MOH. Then, to expand the maximum capacity of patient intake during emergency situations, patients in the Emergency Department (ED) are to be evacuated to the wards and extra equipment are to be installed in the ED.

3.4.2 Response System

The medical response teams and patient transportation system are organized after the emergency declaration. Preparing for disaster response is very systematic by doing routine maintenance of equipment and vehicles and also the standby system for mass gathering events.

(1) Medical Response Teams

The Medical Response Teams are deployed for disaster/crisis medical response at the hospital level and triggered by the activation of the MME. There are three medical response teams composing of one doctor, one nurse, one paramedic, and two logisticians per team.

(2) Transportation of Patients

The MOH is responsible for evacuating victims using EMS. However, when the scale of disaster is beyond the capacity of the existing EMS, the other agencies are requested to provide the necessary assistance by coordinating with the NDMC.

3.4.3 Human Resource Development

The NDMC coordinates training programs on disaster management with MOH, the Fire and Rescue Department, and other relevant agencies. The trainees are being trained to develop their capacity on disaster management through international trainings provided by the regional and international training organizations, Singapore, USA, etc. In addition, the National Hazardous Materials (HAZMAT) Course was provided for the first responders such as the hospital staff, Royal Brunei Armed Forces and Fire and Rescue officers by the National Resuscitation Center in 2014. There is no disaster nursing training course as of 2014.

3.4.4 Receiving/ Dispatching Medical Team to Other Countries in Emergencies

Although the general form of registration for visiting practitioners and the registration system are provided, these were not specifically for disaster responders.

The country has experiences in dispatching medical teams several times such as the Yogyakarta Earthquake (2004) with the military. Recently, medical teams were dispatched to the bus accident in Kota Kinabalu (2012) to evacuate the Bruneians involved in the accident.

3.4.5 Experiences in the Past Disaster

Since Brunei is not a disaster-prone country, it does not have experiences in responding to significant disasters both in domestic and international.

3.5 Current Situation of Relevant Emergency Medical Service

In Brunei, hospital-based EMS had started in 1989 [M. M. Sheikha, S. H. Angb, & Lin Nainga]. Prehospital EMS has been provided since 1999 in the Brunei-Muara District where Bandar Seri Begawan, its capital is located, when the Ambulance Dispatch Centre was set-up in the RIPAS Hospital. After 2009, the EMS system has been improved based on the statistical evidence by MOH in cooperation with the RIPAS Hospital. The EMS statistical reports include the monthly response number, purpose, condition, time of responses, and causes of morbidity.

3.5.1 Facility and Equipment

In Brunei, there is one national hospital, three district hospitals, and two private hospitals. Table 3-4 summarizes the category of hospitals.

Table 3-4 Emergency Departments in the Hospitals

Category	Number of Emergency Department
National Hospital	1 (main tertiary level hospital for whole country)
District Hospital	3
Private Hospital	2

Source: MOH Brunei

The Brunei Health Information Management System (Bru-HIMS) integrates the hospital information system and public health information system. It is being used throughout the MOH since 2013. In Bru-HIMS, one patient has one unique medical record and the patient history could be shared among all Government health facilities.

(1) **Emergency Department**

The ED has three triage priorities, which is composed of Urgent Case- P1 (Priority 1), Semi-Urgent Case- P2, and Non-Urgent Case- P3. In 2014, among the 126,000 patients attended in the ED, 70% were Non-Urgent Cases in RIPAS Hospital[15]. To maintain its capacity as a tertiary hospital, in 2014, some clinics were opened near the hospital to receive P3 patients.

In RIPAS Hospital, the ED has two entrances assigned for ambulance and walk-in clients.

The different areas in the ED are as follows:

- Triage Area
- P1 Area (6 rooms)
- P2 Area (16 beds and 2 isolation beds)
- P3 Area
- Minor Injury Area
- Observation Area

The triage area has two triage nurses for the first triage, and if necessary, an emergency specialist consultation service is available. The triage protocol was developed by the RIPAS Hospital based on the Singapore and the United Kingdom (UK) model and is expanded to all hospitals. Medical examination and

[15] ED of RIPAS Hospital started ED operation in 2009.

treatments in an emergency specialist are provided by the doctors under direct supervision of EPs. The beds in critical care units and coronary care units are shared with all other clinical departments.

(2) **Dispatch Center and Station**

Currently, there are four hospital-based dispatch centers for ambulance services in the whole country, which are not functionally connected between each other, as of 2014. For example, in the Brunei-Muara District, five ambulance dispatch stations are located based on geographical conditions; these are located in the RIPAS Hospital and four other health centers in the community.

The Department of Estate Management under the MOH is responsible for the logistics of the EMS's transportation and its maintenance such as ambulances and boat ambulances.

3.5.2 Response and Transportation System

(1) **Emergency Call**

For the ambulance service, call number 991 for the whole country. The other emergency call numbers are 995 for fire and rescue, 993 for police, and 998 for search and rescue. Currently, the 991 calls are autorelayed to the nearest ED in each hospital, and the ambulance will be dispatched from the nearest station.

(2) **Medical Response Teams**

In general, most of the patient transportation is provided by the EMS following a 991 call. The EMS covers three functions, i.e., (1) emergency dispatch, (2) inter-facilities transfer, and (3) non-urgent case requiring support for transfer. The EMS has different vehicles and selects the most suitable for a given situation. Each ambulance service is operated by two paramedics and one driver trained as first responder and undergone training on defensive driving. Basically, each pair of paramedics is composed of a senior and junior level under the control of the Head of Emergency Medical Ambulance Service to assure the quality of services.

3.5.3 Human Resources

There are three categories of emergency medical personnel, namely; emergency specialists, emergency nurses, and paramedics. During major medical emergencies, doctors and nurses from other departments, e.g., general surgery and **anesthesiology** will be deployed as well. Emergency medical practitioners in Brunei are bound with their boards as shown in Table 3-5.

Table 3-5 Minimum Qualification Requirement and Licensing System for Emergency Medical Personnel

Category	Number	Minimum Qualification Requirement	Licensing System
Emergency Specialists	47	Medical Degree	Brunei Medical Board
Emergency Nurses	132	Staff Nurse (Nursing Diploma)	Nursing Board of Brunei
Paramedics	60	Paramedic/ Emergency Nurse	Nursing Board of Brunei

Source: MOH Brunei

(1) **Pre-service Education**

In Brunei, the MOH established the National Resuscitation Center. It provides the Advanced Cardiac Life Support (ACLS) course for medical personnel, while the Advanced Trauma Life Support (ATLS) and Advanced Pediatric Life Support (APLS) courses will start in 2015. In addition, the Basic Life Support (BLS) for medical personnel and Cardiopulmonary Resuscitation (CPR) training courses for non-medical personnel are also provided.

1) Medical Doctors

All medical doctors are recognized by the Brunei Medical Board that were certified after a three-year structured preclinical course in Universiti Brunei Darussalam[16] (UBD) followed by evaluation tests and three years overseas clinical course in countries such as Singapore, UK, USA, and Australia. After the completion of the six-year course, all graduates have to be involved in a two-year post-graduate foundation training, which is composed of rotations in several departments (four months in each department), especially the internal medicine and general physicians whom are required to rotate in the ED.

Currently, four emergency physicians are recognized as specialist by the Brunei Medical Board. Basic emergency medical training is provided in Brunei; however, the advanced emergency medical training has to be provided in Singapore and UK. Specialist Certification for doctors who trained in these countries is officially recognized in Brunei.

2) Paramedics

Previously up to 2010, paramedic certification is given after the three-year structured nursing diploma course, six months of in-house EMS provider course, and six months of on-the-job training in the EMS Department of a medical facility followed by a competence evaluation. Since 2010, there is a three-year diploma course in paramedic in the Institute of Health Sciences in the UBD, which consists of a 1.5 year nursing course and 1.5 year paramedic course.

3) Nurses

All nurses who practice in Brunei must be licensed in good standing with the Nursing Board of Brunei. As for the undergraduate education for emergency nursing, Advanced Diploma in Emergency Nursing is provided by the Institute of Health Sciences, UBD to be certified as an Advanced Emergency Nurse. The curriculum includes a six-month on-the-job training in the tertiary ED followed by a competence evaluation. Under the MOH initiative to develop the specialization in nursing (from 2010), many nurses have been sent to Singapore, Australia, and UK to take degree courses, e.g., emergency nursing and paramedic.

(2) **Continuous Professional Development (CPD)**

In-service training courses for paramedics are conducted locally by the respective hospitals from time to time, among them are as follows:

[16] Officially in Malay

- ACLS
- ATLS
- Rescue Skills
- Defensive Driving Techniques

The MOH have established an Annual Practicing Certificate (APC) for doctors and recently introduced it for nurses in 2015. As one of the requirements to renew the certificate, they are required to have a minimum of 30 CPD points for doctors and nurses in a year. CPD courses are mainly provided by the hospitals and health centers.

3.6 International Cooperation

Close cooperation between Brunei and Singapore has been maintained especially for human resource development as mentioned in Section 3.5.3.

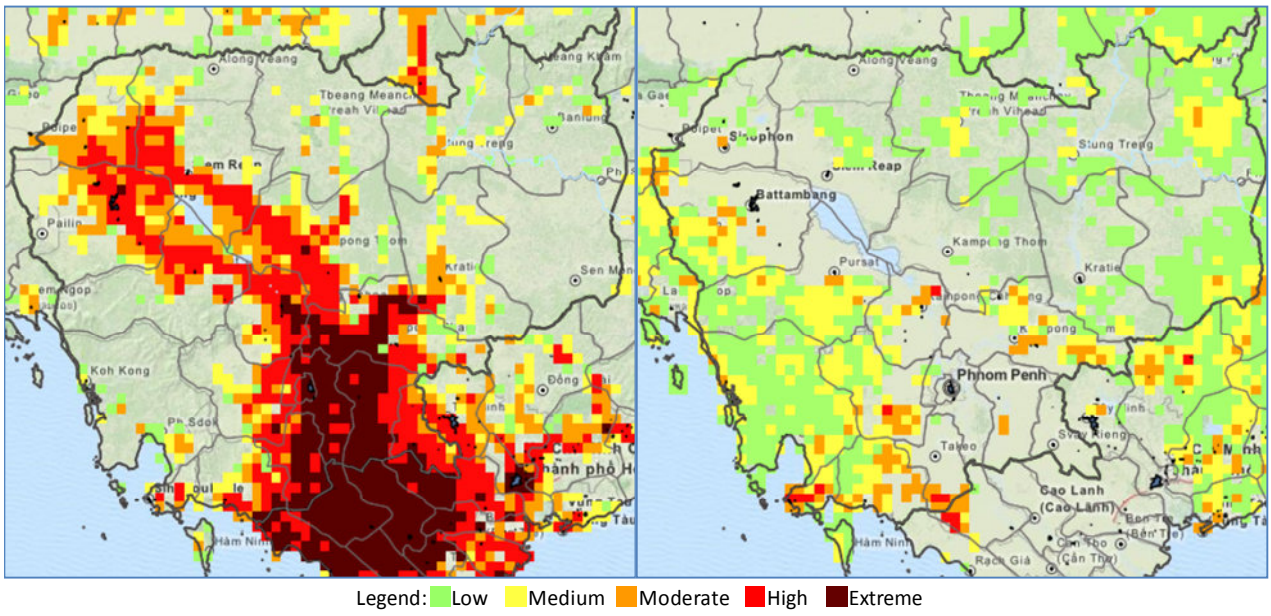
3.7 Conclusion

Although it is not disaster-prone country, Brunei is well prepared for emergencies and disasters. According to observation of the Survey Team, the investment for development of disaster medicine and EMS has been well considered. It might not be only because the size of the country is small and developed country but the relevant personnel has been accumulated their effort to raise awareness on importance of such preparedness. Especially, experiences in human resource development of paramedics and logistic system of EMS and disaster preparedness could be shared with other AMS. Also, with the qualified human resources and equipment, the country could contribute to medical assistance for other countries in emergencies.

Chapter 4 Country Report: Cambodia

4.1 Overview of Disaster Occurrences (Natural and Man-made)

The most frequent disaster in Cambodia is the river flood that affects the areas surrounding the Mekong River and Tonle Sap Lake (Figure 4-1). The river flood in Cambodia is characterized based on the affected period; sometimes, flooding lasts for months until the rainy season ends, and sometimes this makes it difficult for disaster relief activities. Recently, the impact of flood disasters has been increased due to climate change. In some coastal areas, there is a risk of landslide.



Source: [UNEP/ UNISDR, 2013]

Figure 4-1 Mortality Risk: Flood (Left) and Landslide (Right)

Regarding man-made disasters, the Phnom Penh Stampede in 2010 was the most remarkable and worst incident during the period of 1980 to 2014.

4.1.1 Occurrence of Natural Disasters

Table 4-1 summarizes the occurrence of natural disasters from 1980 to 2014. Among the natural disasters from 1980 to 2014, 69% were floods.

Table 4-1 Natural Disaster Occurrence in Cambodia (1980-2014)

Type of Disaster	No. of Occurrence	Death (person)	Totally Affected (person)
Flood	18	1,641	12,803,087
Drought	5	0	6,550,000
Storm	3	44	178,091
Total	26	1,685	19,531,178

Source: [CRED]

Table 4-6 shows remarkable natural disasters from 2000 to 2014 that brought more than 100 deaths in Cambodia.

Table 4-2 Remarkable Natural Disasters in Cambodia (2000-2014)

Disaster	Month, Year	Number of Death[1)]	Mainly Affected Areas[2)]
Flood	Jul-Aug 2000	347	Kampong Speu, Takeo, Oddar Meanchey, Prey Veng, Kampong Chhnang and Kampot Province
Flood	Aug-Nov 2011	247	18 provinces where the Mekong River, Tonle Sap River and Tonle Sap Lake are located.
Flood	Sep-Oct 2013	200	20 provinces throughout the north-west and along the Mekong River in central and southern Cambodia

Source: 1) [CRED], 2) [OCHA]

4.1.2 Occurrence of Man-Made Disasters

Table 4-3 shows the occurrence of man-made disasters from 1980 to 2014.

Table 4-3 Man-Made Disaster Occurrence in Cambodia (1980-2014)

Type of Disaster	No. of Occurrence (A)	Death (person) (B)	Totally Affected (person)	Death per Occurrence (B/A)
Air Accident	3	110	0	36.7
Other	2	358	388	179.0
Ship Accident	2	58	13	29.0
Explosion	1	13	0	13.0
Fire	1	0	20,000	0.0
Total	9	539	20,401	59.9

Source: [CRED]

Table 4-4 shows all the remarkable man-made disasters from 2000 to 2014 in Cambodia.

Table 4-4 Remarkable Man-Made Disasters in Cambodia (2000-2014)

Disaster	Month Year	Number of Death[1)]	Outline[2)]
Bassac Slums Fires	Nov 2001	0	A 2-hour violent fire gutted the Chamkar Mon slum behind the Bassac theatre and the Russian Embassy in Phnom Penh, destroying over 2000 homes.
Mine Explosion	Nov 2005	13	13 villagers were killed when their truck drove over an anti-tank mine in Oddar Meanchey Province.
Air Accident	Jun 2007	22	The plane - a Russian-made AN-24 - flying from Siem Reap to the coastal city of Sihanoukville, Him Sarun, crashed.
Ship Accident	Oct 2009	27	An overloaded ferry capsized on the Mekong river. The ferry was on its way to the Buddhist temple in Kratie province when it was caught in strong currents.
Phnom Penh Stampede	Nov 2010	346	The crowd panicked while crossing a bridge and were crushed underneath on the final day of the Water Festival

Source: 1) [CRED], 2) [John Vink], [Khmer Casanova, 2006], [The Guardian], and [BBC]

4.2 Emergency Response System

4.2.1 Laws and Regulations on Emergency Response

Laws and regulations on emergency response are listed in Table 4-5.

At the time of the Survey, the Law on Disaster Management has not been enforced. Once the law is enforced, the National Committee for Disaster Management (NCDM) will issue new Sub-Decrees on visa exemption arrangements for international humanitarian relief teams and special measures for the receipt of international humanitarian relief goods to reinforce disaster management and emergency response.

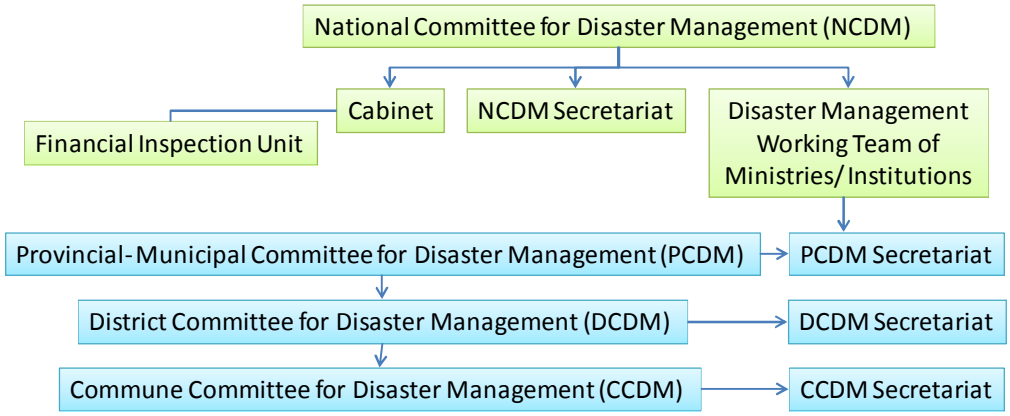
Table 4-5 Laws and Regulations for Emergency Response in Cambodia

Name	Year	Outline
Organization and Functioning of the National and Sub-National Committees for Disaster Management (Sub-decree No. 30 ANKR.BK)	2002	The Sub-Decrees and Direction define the establishment of disaster management committees/team at the national, sub-national, commune and village levels and the roles and their roles.
Establishment of the Commune Committee for Disaster Management (CCDM) (Sub-decree No. 61 ANKR.BK)	2006	
Establishment of the Village Disaster Management Team (VDMT) for the implementation of Community-Based Disaster Risk Management (CBDRM) (Direction No. 315 NCDM)	2010	
Strategic National Action Plan for Disaster Risk Reduction (SNAP-DRR: 2008-2013)	2009	The action plan specifies the priority and implementation of disaster risk reduction. The next SNAP-DRR (2014-2018) was already prepared and in press (as of March 2015).
Law on Disaster Management	2014	The law specifies the overall tasks for natural disaster management at the pre-disaster, emergency response, and post-disaster period. The law was adopted by the President's office on 9th January 2015, and the technical committee of the parliament is reviewing the contents (as of March 2015).

Source: NCDM

4.2.2 Organization for Emergency Response

Figure 4-2 shows the disaster management arrangement in Cambodia.



Source: [Government of Cambodia, 2008]

Figure 4-2 Disaster Management Arrangement in Cambodia

(1) National Committee for Disaster Management (NCDM)

The NCDM was established in 1995 to serve as the coordinating body for all disaster management-related activities of the government. It is also recognized as the primary agency for managing emergency responses and building the resilience of communities to natural disasters. The secretariat of NCDM is a permanent organization for disaster management under the Office of the Council of Ministers. The NCDM has been implementing the Community-Based Disaster Risk Reduction (CBDRR) strategies in 13 provinces with the support from local and international NGOs. The structure and members of the NCDM are shown in Table 4-6.

Table 4-6 Structure of National Committee for Disaster Management (NCDM)

Position	Governmental/ Non-Governmental Organizations	
President	- Prime Minister	
Vice President	- Two Senior Officials - Ministry of National Defense	- Ministry of Interior
Member	- Ministry of Economy and Finance - Ministry of Foreign Affaires - Ministry of Environment - Ministry of Water Resources and Meteorology - Ministry of Agriculture, Forestry and Fisheries - Ministry of Commerce - Ministry of Health - Ministry of Rural Development	- Ministry of Industry, Mines and Energy - Ministry of Social Affairs, Veteran and Youth Rehabilitations - Ministry of Public Works and Transport - Ministry of Education, Youth and Sport - Ministry of Women Affairs - Royal Cambodian Armed Force Headquarter - State Secretary of Civil Aviation - Cambodian Red Cross

Source: Cambodian Royal Gendarmerie

(2) **Sub-National Committee for Disaster Management (CDM)**

The details of task forces of the sub-national Committee for Disaster Management (CDM) from provincial to commune levels are listed in Table 4-7.

Table 4-7 Structure of Task Force of Committee for Disaster Management at the Sub-National Levels in Cambodia

Committee for Disaster Management	Task Force	Members
Provincial Committee for Disaster Management (PCDM)	Search and Rescue	- Police Department - Army - Military Police (Gendarmerie) Department
	Health and Sanitation	- Health Department
	Information and Response	- Water Resource Information Dept. - Social Affairs Department - Cambodian Red Cross (CRC)
District Committee for Disaster Management (DCDM)	Search and Rescue	- District Police - Army, Military - Police (Gendarmerie)
	Health and Sanitation	- Bureau of Health
	Information and Response	- Water Resource Information Office. - Social Affairs Office - Cambodian Red Cross (CRC)
Commune Committee for Disaster Management (CCDM)	Search and Rescue	- Commune Police and Volunteers
	Health and Sanitation	- Health Center
	Information and Response	- Volunteers of CRC - Focal point of Woman and Children

Source: NCDM

The CDM is established from commune to provincial levels when disaster occurs. Each CDM is composed of three task forces: Search and Rescue, Health and Sanitation, and Information and Response. The NCDM is planning to reorganize those task forces similar to the United Nations clusters after the Law on Disaster Management is enforced.

4.2.3 Levels of Emergency and Responsible Organizations

The main body responsible for emergency response in Cambodia is the NCDM and sub-national CDMs as described above. Table 4-8 shows the levels of disaster and emergency response and commanders at each level in Cambodia.

Table 4-8 Commanders and Responsible Organizations for Disaster and Emergency Response in Cambodia

Level	Commander	Responsible Organization
National Level	Prime Minister	NCDM Coordination Task force composed of Ministries concerned and high-command of Armed Forces
Provincial Level	Provincial Governor	PCDM
District Level	District Chief	DCDM
Commune Level	Commune Chief	CCDM
Village Level	Village Chief	Self-help groups and voluntary groups

Source: NCDM

4.2.4 Emergency Response at the Site

(1) Emergency Response

Each province prepared its own Disaster Preparedness and Emergency Plan; and emergency response activities are conducted based on the plan when disaster occurs. The primary responder is the police and volunteers at the commune level. In case of a man-made and large-scaled disaster, the Cambodian Royal Gendarmerie[17] will conduct activities necessary to respond to the disasters.

The assessment team is formed at each administrative level based on the written request from the commune. The teams are composed of NCDM staff and other members from relevant sectors based on the request. The United Nations Development Programme (UNDP) also dispatches the Damage, Loss and Needs Assessment (DaLA) Team.

(2) Emergency Drills

The National Police and Armed Forces conduct emergency drills for natural disaster once a year. Disaster simulation exercises at the community level are planned to be implemented through the CBDRR project from 2015 to 2017 supported by the Asian Development Bank (ADB) and the Government of Japan (the Japan Fund for Poverty Reduction). The project will support 54 vulnerable communes in 18 districts in the six target provinces (Battambang, Banteay Meanchey, Siem Reap, Kampong Thom, Kampong Cham, and Prey Veng) [ADB, 2014].

4.3 Overview of Disaster/Emergency Medicine

4.3.1 Legislations, Policies and Plans

In 2008, the "National Policy on Emergency Medical Services System in Cambodia" and the "National Policy for Pre-Hospital and Hospital Trauma Care", as well as the "National Policy on Management of

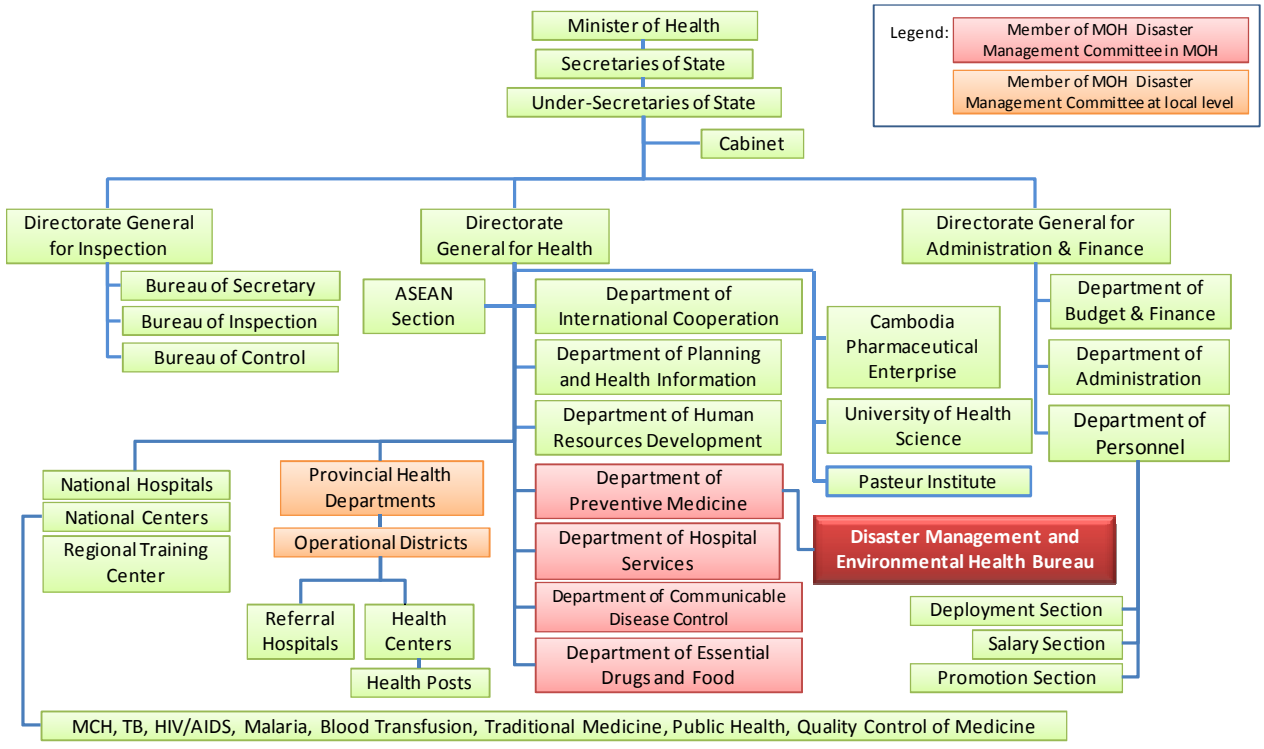
[17] The Royal Gendarmerie is part of the Royal Cambodian Armed Forces which has the autonomy to carry out and implement its internal rules and regulations. The Royal Gendarmerie must carry out their duties and responsibilities throughout the country in both civilian police and military police tasks.

Health Risk in Mass Casualty Incidents and Mass Casualty Management" were issued to promote the development of the emergency medical services (EMS) system and mass casualty management system.

The first national strategy on disaster management in health, namely, the "National Strategic Plan on Disaster Risk Management for Health, 2015-2019" was prepared in cooperation with the NCDM and with technical assistance from the World Health Organization (WHO). It complies with the "Western Pacific Regional Framework for Action: Health Emergency Risk Management of Natural Hazards (WPRO, 2012)". Since it is a technical document and with no bilateral donors involved in the development process, the cost estimate was not included. In addition, since disaster management in health has not been highly prioritized in the health sector, the Ministry of Health (MOH) needs to continue its effort to obtain the necessary budget to implement it.

4.3.2 Institutional Setting

The MOH Disaster Management Committee involves relevant departments as shown in Figure 4-3, and relevant health programs to the disaster.



Source: [JICA, 2012]

Figure 4-3 Concerned Departments in Disaster Management in the Ministry of Health of Cambodia

The Disaster Management and Environmental Health Bureau under the Department of Preventive Medicine, MOH consists of five staff and is responsible for the establishment of policy and development plans, training and reporting facts or events relevant to disaster management in health in cooperation with the provincial health offices. The bureau has been operating through the financial support from donor agencies such as WHO and UNDP.

4.4 Current Situation of Disaster Medicine

4.4.1 Facility and Equipment

There is no designated health facility for disaster response in Cambodia. During disaster situations, the existing health facilities and equipment are utilized to respond to disaster victims. It is unknown, however, up to what extend those health facilities are able to respond to and manage disaster victims.

The Calmette Hospital, one of the eight national hospitals, has developed and regularly updated disaster response plan/guidelines. The hospital had tried to respond to any kind of disaster especially after the stampede in the Water Festival in 2010. Before hosting international events, the Calmette Hospital, together with the MOH, develops a disaster response plan. Disaster drills are conducted two to three times per year. The Ambulance Unit of the hospital is able to deploy four ambulances in the event of a disaster.

Regarding the safety and preparedness of hospitals, the Department of Preventive Medicine of MOH conducted an assessment of six national hospitals and three provincial hospitals with the support from the World Health Organization Regional Office for the Western Pacific (WPRO) and the Disaster Preparedness Programme of the European Commission's Humanitarian Aid Department (DIPECHO) in 2011. However, activities related to "Safe Hospitals" did not follow. Therefore, the reactivation of "Safe Hospitals" program is included in the National Strategic Plan on Disaster Risk Management for Health 2015-2019.

4.4.2 Response System

The fire, police and ambulances services are available in the urban and tourist areas, but most of the country is not served by emergency personnel. Cambodia does not have an established Urban Search and Rescue (USAR) agency and would require external assistance in case a disaster hit an urban area [CEDMHA, 2014]. The Gendarmerie is expected to be the primary responders in a disaster. The Gendarmerie is responsible for the search, rescue and transportation of victims from a Hot Zone to a Cold Zone. After the victims arrive in the Cold Zone, they will be transported to a hospital or field hospital by medical experts such as the Provincial Medical Teams [Chantha Tat, 2015].

4.4.3 Major Providers in Disaster Response

The MOH is responsible for disaster response in the health sector. The Disaster Management and Environment Health Bureau, the Department of Preventive Medicine of MOH is tasked with running the Secretariat of the Coordinating Group for Emergency Response and Recovery in MOH. The MOH's responsibilities in disaster response are as follows [CEDMHA, 2014]:

- Establishes national mass casualty management plans and epidemic control plan;
- Organizes facilities for, and provides for the health care of people living in evacuation centers by collaborating with the Cambodian Red Cross, international organizations and NGOs that are involved;
- Organizes Emergency Response Teams in all hospitals, clinics, and health institutions;

- Provides guidelines for the provincial, municipal and rural health services to support all respective committees for disaster management during emergencies;
- Undertakes necessary measures to detect the occurrence of communicable diseases and other health hazards that may affect the population after an emergency;
- Issues an appropriate warning to the public on the occurrence of epidemics or other health hazards; and,
- Provides direct service and/or technical assistance on sanitation.

The Cambodian Red Cross (CRC) has been officially adopted by the NCDM as the primary partner to conduct relief operations. The CRC's responsibilities are as follows [CEDMHA, 2014]:

- Collaborates with NCDM with respect to;
  - the development and implementation of training programs,
  - damage and needs assessments,
  - providing emergency relief assistance to victims,
  - providing facilities for people living in evacuation centers,
  - post emergency welfare activities;
- Makes whole blood and its derivatives available in times of emergencies;
- Interfaces its other emergency welfare services (warning, rescue, evacuation, first aid, medical and nursing care, transfusion, ambulance, and social services) with the activities of member agencies at all levels; and,
- Provides a missing persons tracing service (local and foreign) during emergencies.

4.4.4 Human Resources Development

Disaster-related training for health workers does not appear to be a widespread practice. If there is any, the disaster training for health professionals is generally led by the United Nations (UN) agencies such as WHO, bilateral donors and major international NGOs. Unfortunately, the training does not appear to be mandated by the government and relatively few health workers appear to receive this specialized training [CEDMHA, 2014].

Some specialized health trainings for disasters have been held by development partners and NGOs. For example, the Asian Disaster Preparedness Center (ADPC) provided disaster related courses such as Hospital Preparedness for Emergencies (HOPE) course for health personnel.

There is no postgraduate education on disaster medicine and/or disaster management except the lecture (two credits) on disaster management in the Master of Hospital Administration course at the National Institute of Public Health. The National Institute of Public Health is now planning to establish a Master's degree course specializing in disaster in partnership with Karolinska Institute of Sweden.

4.4.5 Receiving/ Dispatching Medical Team to Other Countries in Emergencies

The major disaster in Cambodia is flooding in the Mekong River basin and usually it could be responded by the provincial governments because the damage spreads slowly and predictably. Therefore, Cambodia has not received any medical assistance team from other countries.

Although there is legislation on registration of foreign medical personnel, not all of them register because there is no penalty defined by law. A foreign medical doctor has to submit necessary documents such as curricula vitae, existing license, and certificate of clearance to the Cambodia Medical Council for a one-year temporary registration (renewable). In addition, it is necessary for foreign medical personnel to be approved by the MOH for medical practice in Cambodia. Usually, it is applied through the embassy of a particular country or donor agency such as JICA and may take five to ten days or it might be shorter (a few days) in emergencies.

4.5 Current Situation of Relevant Emergency Medical Services

4.5.1 Facility and Equipment

According to the MOH, all hospitals and health facilities, except health centers, have an Emergency Department (ED). The number of ED per category is shown in Table 4-9.

The Complementary Package of Activities (CPA) are graded from one to three on the basis of the number and composition of staff, number of beds, standard drug kit, standard medical equipment, and clinical activities. The CPA-1 hospitals are the lowest hospital level, with 40–60 beds, and provide basic obstetric care, but with no major surgery (no general anesthesia) and no blood bank or blood deposit. The CPA-2 hospitals are hospitals with 60–100 beds and provide CPA-1 services plus emergency care, major surgery and other specialized services such as blood transfusion. The CPA-3 hospitals are hospitals with 100–250 beds and are the highest hospital level. It provides major surgery and more activities than CPA-2. All eight national hospitals located in Phnom Penh and 21 of 24 provincial hospitals are CPA- 3 hospitals[18].

Table 4-9 Number of Emergency Department per Hospital Category

Category	Number of ED
Referral Hospital (CPA 1)	50
Referral Hospital (CPA 2)	29
Referral Hospital (CPA 3)	18
Health Centre	-
Private Hospital	51

Source: MOH Cambodia

4.5.2 Response and Transportation System

In Cambodia, the emergency medical service (EMS) system is still being developed. Cambodia has 119 emergency system and ambulance services available; however, the coverage of the 119 services is limited to the Phnom Penh area and patients are transported to public hospitals. The 119 dispatch center was established in the Calmette Hospital. The ambulances of Calmette Hospital are dispatched with one

[18] WHO, The Kingdom of Cambodia Health System Review, Health Systems in Transition, Vol. 5 No. 2 2015.

medical doctor and one nurse. Although ambulance service fee is free of charge in case of road accident, in other cases, it costs USD 15 in the Phnom Penh area and USD 1 per kilometer outside of Phnom Penh.

At the provincial level, there are ambulances attached to hospitals. Every hospital has its own ambulance and telephone number (normally the driver's number). In general, ambulances are dispatched with one nurse who learned emergency care onboard. The ambulance service fee is decided by the Director of Provincial Health Office (e.g. USD 0.5 per kilometer). There is no regulation about the fee.

4.5.3 Human Resources

An emergency physician (EP) is not recognized as a specialist in Cambodia. The EPs are required to be trained in anesthesia and critical care in addition to emergency care. According to the MOH and Calmette Hospital, there exist 30 to 40 EPs with 100 hours of practical experience.

In Cambodia, the minimum qualification requirement for human resources engaging in EMS is shown in Table 4-10.

Table 4-10 Minimum Qualification Requirement for EMS personnel

Category	Number	Minimum Qualification Requirement	Licensing System
EP	30	Medical doctor + 100hours training	no
Nurse		Nurse + first aid	no
Paramedic		Nurse + first responder	no

Source: MOH Cambodia

(1) **Pre-service Education**

Emergency medicine (30 hours on the sixth year) is incorporated into the undergraduate curriculum of medical doctors at the National University of Health Science. Also, Emergency Care and Disaster Nursing (30 hours on the third year) are taught at the Technical School for Medical Care. However, there is no emergency medicine course at the postgraduate level.

(2) **Continuous Professional Development (CPD)**

Trainings in emergency medicine and emergency medical services for health professionals are mainly offered by hospitals and/or international partners and NGOs. In the Calmette Hospital, for example, the staff received the training on trauma care in Singapore.

4.5.4 Relevant Academic Society/ Professional Organization

The Cambodia Society of Anaesthetists has 150 members. Its annual meeting is held in November.

4.6 International Cooperation

The Humanitarian Response Forum (HRF) was established in 2011 aiming to strengthen the coordinating capacity of government in disaster response. It is chaired by the World Food Programme (WFP) and involves international organizations and NGOs in close collaboration with NCDM. The HRF is activated

from July to October during the rainy season where flooding usually occurs and organizes simulation exercise every year[19].

WHO provides technical and financial support for development of strategies, policies, and capacity. It also leads the health group of HRF. ADPC provides training and technical and financial support for the development of hospital preparedness plan in emergencies. In addition, many NGOs provide assistance for ambulance services.

4.7 Conclusion

With various external assistances, Cambodia has been developing necessary administrative documents such as strategy and development plan on disaster medicine and EMS. However, at operational level of EMS, there seem to be more rooms for further improvement. For example, ambulance services still cover limited areas and do not seem to be well coordinated among various providers. Regarding disaster health management, since Cambodia is frequently suffered from flood especially in the Mekong River basin, public health in emergencies should be prioritized especially at local government and community levels.

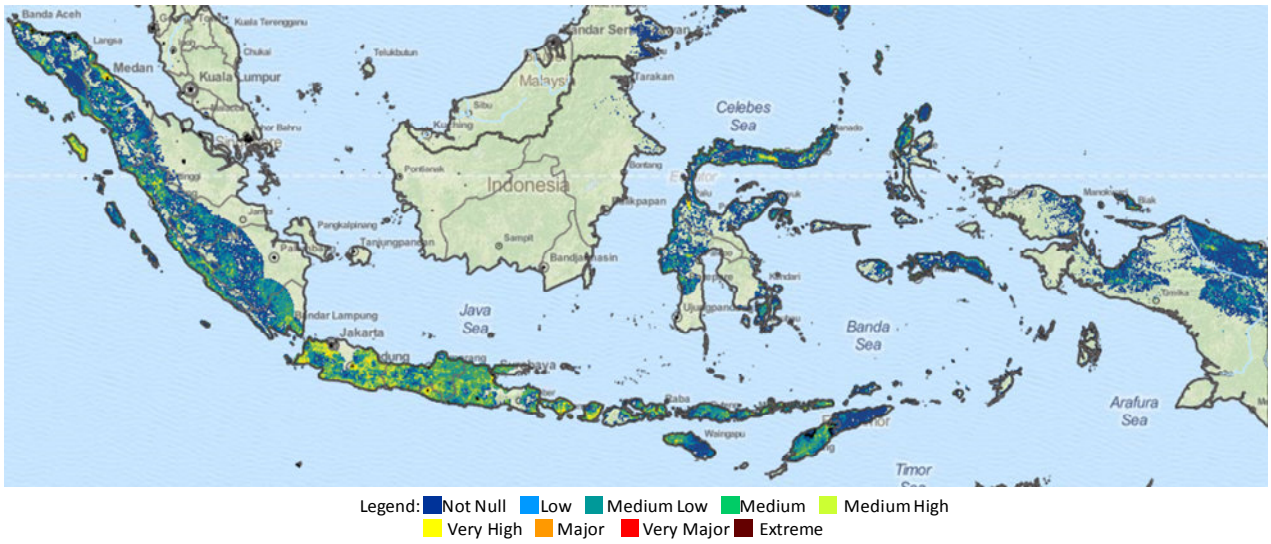
[19] It was August in 2014 and will be May in 2015.

Chapter 5 Country Report: Indonesia

5.1 Overview of Disaster Occurrences (Natural and Man-made)

Indonesia is one of the most disaster-prone countries in the ASEAN Region and the most terrible disasters are earthquake and tsunami. From the view point of mortality risk, Sumatra, Java and Sulawesi islands where 86% of population [BPS] lives need disaster response more than the other areas. In addition, transportation accidents, especially marine accident, are one of the most prioritized man-made disasters.

The risk of huge earthquake (more than Magnitude 6.0) is in Southwestern Sumatra, South of Java, some parts of Maluku and Papua (Figure 5-1).

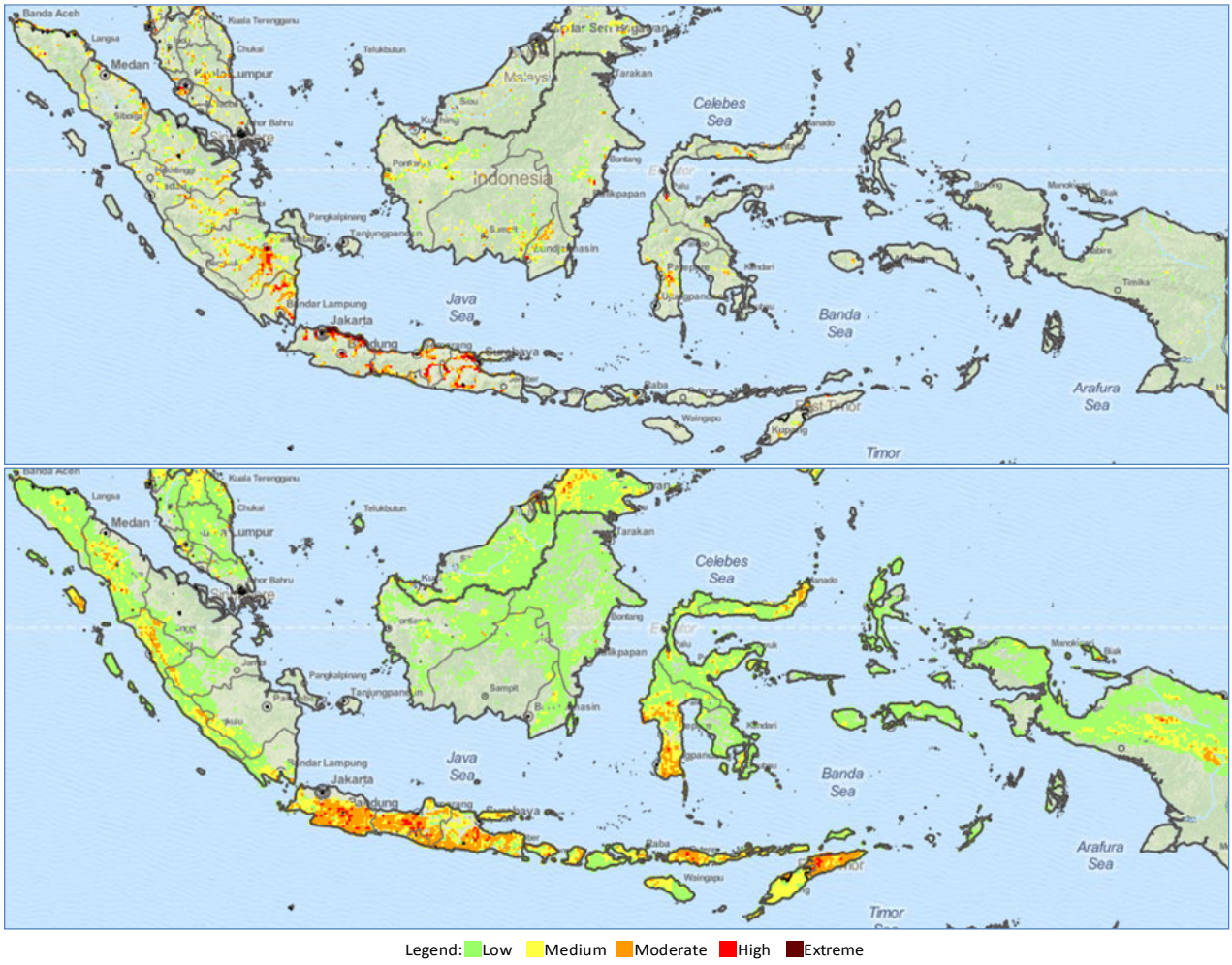


Source: [UNEP/ UNISDR, 2013]

Figure 5-1 Mortality Risk: Earthquake

The most of coastal area is at the risk of Tsunami, thus the Government is carrying out measures against Tsunami disaster such as reinforcing Tsunami warning system, conducting Tsunami drills, and strengthening disaster education and community based disaster risk management (CBDRM) after the Indian Ocean Earthquake and Tsunami in 2004.

As shown in Figure 5-2, mortality risk of flood and landslide is also distributed most of whole countries. Java Island and South Sulawesi have higher risk of landslide than other areas. The mortality risk of landslides in Sumatra and Java Islands might be related to earthquake.



Source: [UNEP/ UNISDR, 2013]

Figure 5-2 Mortality Risk: Flood (Above) and Landslide (Below)

5.1.1 Occurrence of Natural Disasters

Table 5-1 summarizes the occurrence of natural disasters from 1980 to 2014. More than 40% of disasters were floods. Earthquake and tsunami were the second, around 25% of occurrence over the period. Other natural disasters such as landslide and volcanic activity also occurred frequently.

Table 5-1 Natural Disaster Occurrence in Indonesia (1980-2014)

Type of Disaster	No. of Occurrence	Death (person)	Totally Affected (person)
Flood	148	5,579	8,327,541
Earthquake and Tsunami	85	179,441	8,505,943
Landslide	48	1,973	393,883
Volcanic Activity	42	362	930,153
Wildfire	9	300	3,034,478
Storm	7	27	25,188
Drought	6	1,266	1,083,000
Total	345	188,948	22,300,186

Source: [CRED]

Table 5-2 shows remarkable huge and famous natural disasters in Indonesia from 2000 to 2014.

Table 5-2 Remarkable Natural Disasters in Indonesia (2000-2014)

Disaster	Month, Year	Number of Death	Mainly Affected Areas
Indian Ocean Earthquake and Tsunami	Dec 2004	165,708	Nangroe Aceh Darussalam and North Sumatra provinces
Sumatra Earthquake	Mar 2005	915	Islands on West Coast of Sumatra including Simeule and Nias,
Mt. Talang Eruption	Apr 2005	0	West Sumatra Province
Java Earthquake	May 2006	5,778	Yogyakarta and Central Java provinces
Flash Flood	Dec 2006	236	South Sulawesi Province
Aceh Flood	Dec 2006	236	North Sumatra Province
Padang Earthquake	Mar 2007	67	West Sumatra Province
Mt. Kelud Eruption	Oct 2007	0	Kedili, Blitar District, East Java Province
River Flood	Dec 2007	127	Central Java, East Java provinces and Pesisir Seratan District in West Sumatra Province
River Flood	Mar 2009	64	Cirendeu and Yangerang areas in Jakarta
September 2009 Sumatra Earthquake	Sep 2009	1,195	Bukittinggi, Pariaman, Payakumbuh, Solok and Padang, West Sumatra Province
October 2010 Sumatra Earthquake and Tsunami	Oct 2010	530	Mentawai Island, West Sumatra Province
River Flood	Oct 2010	291	Teluk Wondama District, West Papua Province
Mt. Merapi Eruption	Oct 2010	322	Yogyakarta and Central Java provinces
River Flood	Jan 2013	34	Jakarta City
Mt. Sinabung Eruption	Sep-Dec 2013	0	Karo District and Medan, North Sumatra
Mt. Kelud Eruption	Feb. 2014	7	Central and West Java provinces, Malang

Source: [CRED] [OCHA]

5.1.2 Occurrence of Man-made Disasters

Table 5-3 shows the occurrence of man-made disasters from 1980 to 2014.

Table 5-3 Man-made Disaster Occurrence in Indonesia (1980-2014)

Type of Disaster	No. of Occurrence (A)	Death (person) (B)	Totally Affected (person)	Death per Occurrence (B/A)
Ship Accident	83	10,475	2,537	126.2
Air Accident	34	1,405	225	41.3
Road Accident	30	696	308	23.2
Rail Accident	22	603	1,739	27.4
Fire	15	380	65,244	25.3
Collapse	10	228	77	22.8
Explosion	7	132	7,722	18.9
Poisoning	1	0	100	0.0
Total	202	13,919	77,952	-

Source: [CRED]

Transport accidents (ship, air, road, and rail) shared 84% of total occurrence and 95% of deaths. Table 5-4 shows the remarkable man-made disasters from 1980 to 2014 that brought more than 100 deaths in Indonesia.

Table 5-4 Remarkable Man-made Disasters in Indonesia (2000-2014)

Disaster	Month, Year	Number of Death[1)]	Outline[1), 2)]
Ship Accident	Jun 2000	481	Hundreds of refugees were drowned after their overloaded ship sank without a trace in stormy waters off eastern Indonesia.
Ship Accident	Oct 2001	350	About 350 people who set sail from Indonesia in search of a new life drowned after their boat sank off the island of Java minutes after it started taking on water.
Ship Accident	Mar 2004	223	Ship accident occurred in Damau.
Ship Accident	Jul 2005	200	Ship accident occurred in Arafula Sea.
Mandala Airlines Flight 091	Sep 2005	150	An Indonesian Domestic jet crashed into a residential area in Medan City shortly after takeoff.
Ferry Senopati Nusantara	Dec 2006	400	The ferry sank during a stormy night-time voyage as it travelled between Borneo and Java islands.
MV Teratai Prima	Jan 2009	247	The ferry sunk in the Makassar Strait after encountering stormy weather.
Ship Accident	Dec 2011	203	The refugee boat, packed with 250 people by Afghanistan, Iraq, Iran and Turkey sunk when it ran into a powerful storm 32km off Java's southern coast.
Missing of Air Asia Flight QZ8501	Dec 2014	162	The airplane lost contact with air traffic control during bad weather on a flight from Surabaya to Singapore.

Source 1) [CRED], 2) [LA Times], [LA Times, 2001], [The Guardian, 2005], [BBC], [New York Times, 2014], and [RE UTERS, 2014]

5.2 Emergency Response System

5.2.1 Laws and Regulations for Emergency Response

Regulations and guidelines on emergency response are listed in Table 5-5.

Table 5-5 Laws and Regulations for Emergency Response in Indonesia

Name	Year	Outline
Disaster Management Law No. 24/2007	2007	The law specifies the principles of disaster management in Indonesia, such as promptness and precision, priority, coordination and integrity, efficiency and effectiveness, transparency and accountability, partnership, etc.
Government Regulation No.21/2008 Operation of Disaster Management	2008	The regulation specifies the overall tasks for disaster management at the pre-disaster, emergency response, and post-disaster period, and monitoring and evaluation.
Government Regulation No. 22/2008 Funding and Managing in Disaster Assistance	2008	The regulation specifies the resources and use of disaster management fund as well as disaster aid management with supervision and accountability.
Government Regulation No. 23/2008 Role of International Agencies and Foreign non-governmental Agencies in Disaster Management	2008	The regulation specifies the procedures of participation and implementation of international institutions and foreign non-government organizations, and their supervisions and reports.
Presidential Regulation No. 8/2008 Establishment of National Agency for Disaster Management	2008	The regulation specifies the position, tasks and functions, organizations, work procedures, appointment, dismissal, and financing of the National Disaster Management Agency (BNPB).
BNPB Strategy and Policy Direction for 2010-2014	2010	The policy and strategy of BNPB's disaster management activities within 2010-2014 are described.

Source: BNPB

5.2.2 Organization for Emergency Response

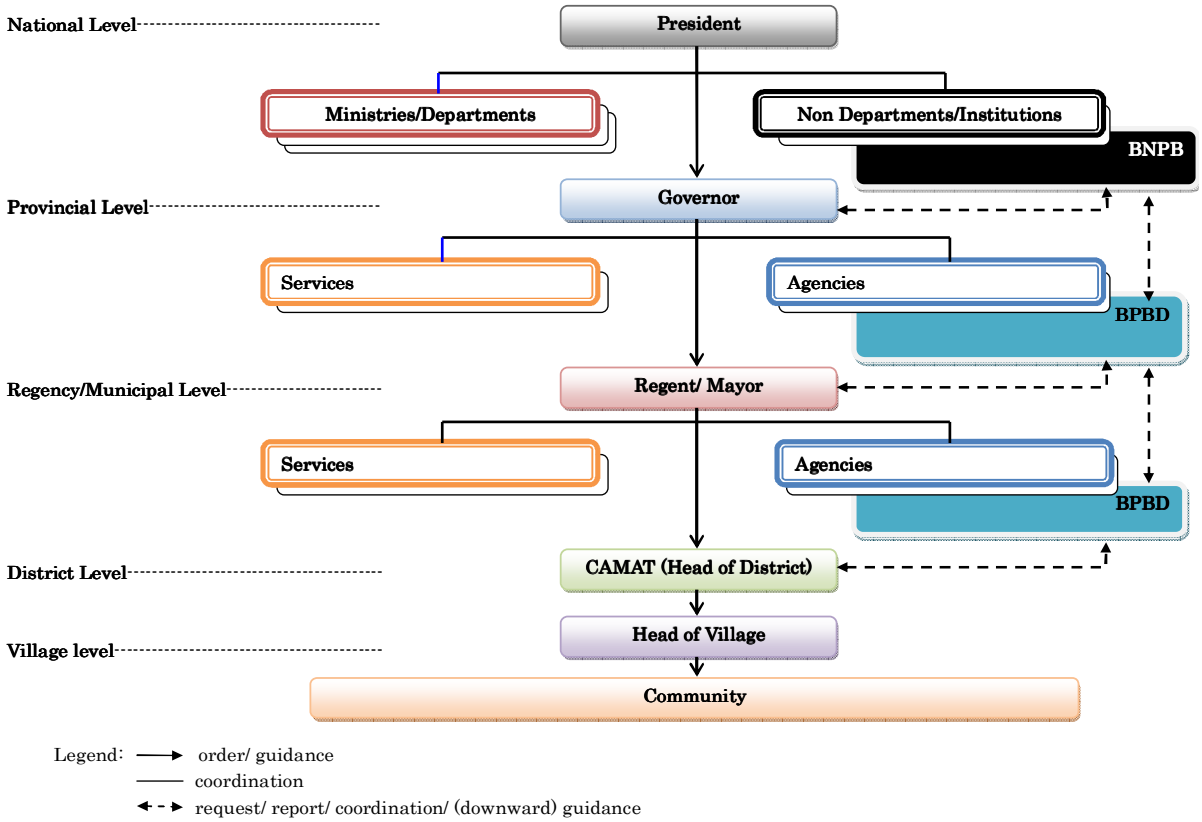
(1) National Disaster Management Agency (BNPB)

The National Disaster Management Agency (BNPB) is the highest authority which is directly under the President for disaster management in Indonesia established in January 2008. The level of Director General of the organization is equivalent to that of the Minister.

(2) Regional Disaster Management Agency (BPBD)

The Regional Disaster Management Agency (BPBD) is a permanent agency for disaster management at the local level, i.e.: provinces, regencies/cities, and districts. BPBD is responsible to carry out disaster management activities including emergency response. BPBD is established at each local government and BNPB subsidizes 20% of its budget. BPBD is established at all provincial level, but only 30% of the districts have established BPBD due to lack of budgetary and human resources

Figure 5-3 shows the disaster management arrangement in Indonesia which includes BNPB and BPBD.



Source: [JICA, 2012]

Figure 5-3 Disaster Management Arrangement in Indonesia

5.2.3 Classification of Disaster and Emergency Response

The main body responsible for emergency response in Indonesia is the Emergency Operation Center (EOC), which is established in the provinces, regencies/cites, and districts when disaster occurs. Only tsunami is specified as a national level disaster, which may bring massive damages in many areas of the country. Table 5-6 shows the types of disaster and levels of emergency response in Indonesia.

Table 5-6 Disaster and Emergency Levels in Indonesia

Levels	Major Types of Disaster	Responsible Organizations	Responsibility
National Level	Large Tsunami	EOC - Warning Center: BNPB - Command and Coordination Center: Representatives of the ministries	President
Provincial Level	Earthquake, Tsunami, Volcano Eruption, Flood	EOC (Provincial Level) - Warning Center: BPBD - Command and Coordination Center: Dept. of Health, Dept. of Social Affairs, Military, Police, Dept. of Search and Rescue - Commander: Army or Police (Governor)	Provincial Governor
Regency/ City/ District Level	Earthquake, Tsunami, Volcanic Eruption, Flood, Sediment Disaster	EOC (Regency/ Municipal/ District Level) - Warning Center: BPBD - Command and Coordination Center: Dept. of Health, Dept of Social Affairs, Military, Police, Dept. of Search and Rescue - Commander: Army or Police (Mayor)	Mayor, Head of Regency/ Head of District

Source: BNPB

When disaster occurs, EOC is established at each level. EOC consists of a warning center and a command and coordination center. The warning center is mainly composed of the staff from BNPB/BPBD. BNPB has a Center for Operation and Monitoring (PUSDALOPS) and collects information and warning level provided by Indonesian Agency for Meteorology, Climatology and Geophysics (BMKG) and/or Center for Volcanology and Geological Hazard Mitigation (CVGHM) and then provides information to respective BPBD. The command and coordination center is mainly composed of representatives from health, social affairs, military, security, and search and rescue organizations.

In case the disaster is beyond the capacity of the local BPBD, it requests support from the surrounding local governments and/or higher levels, e.g., provincial BPBD or BNPB.

5.2.4 Emergency Response at the Site

(1) Disaster Relief

The primary responder in emergency response is EOC and BPBD at the regency/city/ district level. Table 5-7 shows the activity of primary response to be taken by EOC.

Table 5-7 Detailed Activity for Disaster Relief at the Site

Activity	Responsible	Cooperation Agencies/ Organizations
Search and Rescue	Dept. of Search and Rescue	Military, Red Cross
Security	Police Department	-
Relief	Dept. of Social Affairs	Red Cross
Medical care	Dept. of Health	Military, Red Cross

Source: Research Center for Disaster Mitigation (RCMD), Bandung Institute of Technology

BNPB procures equipment for emergency response for BPBD provincial and district levels. Table 5-8 shows the equipment for emergency response.

Table 5-8 Equipment in BPBD for Emergency Response

Name of Equipment	Details
General Equipment	Rescue vehicles, motorcycles, generators, communication tools, torches, etc.
Special Equipment	Amphibian vehicles, speed boats, water lorries, gun boots, etc.
Supporting Equipment	Tracks, mobile phones, mobile kitchens, water filters, ambulances, etc.

Source: BNPB

BNPB also dispatches the Rapid Assessment Team to the site soon after the disaster occurred, in order to collect information and determine the scale of disaster, with the local government and military, and gives support if necessary. The BNPB has two teams for small-scale disasters and four teams for medium to large-scale disasters. The teams for medium to large-scale disasters have been dispatched in Haiti, Pakistan, and Myanmar as part of their international cooperation.

(2) **Emergency Drills**

Emergency drills are conducted at several administrative levels for several types of disaster. The National Tsunami Drill was conducted from 2005 to 2008 with lessons learned from the 2004 Indian Ocean Tsunami, where the President was seriously involved. Since the National Tsunami Warning Center was established in 2008, tsunami drills have been conducted at the provincial level.

The government also conducted emergency drills for man-made disaster. In 2008, emergency drills were conducted at the national level with the participation of special team coming from the army, aimed for radioactive disaster.

5.3 Overview of Disaster/Emergency Medicine

Emergency medical services (EMS) are known to have originated from prehospital care that was initiated in the 1970s in order to reduce trauma death caused by traffic accidents. In 1972, a pilot ambulance project was established but encountered difficulty due to financial problems and other priorities such as infectious diseases. During the late 1980s to early 1990s, the realization of the importance of prehospital care was heightened and the Emergency Ambulance Service was developed by the Indonesian Surgeons Association. This was introduced in major urban areas such as Jakarta, Palembang, Yogyakarta, Surabaya, Makassar, Malang, and Denpasar [E Pitt and A Pusponegoro, 2005].

Meanwhile, disaster preparedness and management in the health field started to be introduced in 1991. Table 5-9 summarizes the history of disaster management in the health sector in Indonesia.

Table 5-9 History of Disaster Preparedness and Management in Health Sector in Indonesia

Year	Events
1991	Working Group for Preparation and Management of Health Crisis was formed to develop the strategy and inter-sector coordination mechanism.
1995	Functional Unit for Crisis Center was formed to respond from the early warning to emergency response stages.
1998	Health Crisis Information Center was formed to monitor and analyze the impact or economic crisis towards public health.
2000	The above three units were integrated into the Center for Health Problem Management (*Pusat Penanggulangan Masalah Kesehatan*: PPMK) under the supervision of a Secretary-General. The tasks include the following: a) to formulate relevant policies and programs, b) to coordinate health management in disaster, and c) to assess health problems in disaster.
	As a result of the collaboration between the Ministry of Health (MOH) and the Minister's Office of Social Affairs and Social Department, the Health Problems Management Monitoring Division and the Resource Mobilization Division were formed to re-organize disaster management and preparedness functions.
2001	The Disaster Preparedness Brigade (*Brigade Siaga Bencana*: BSB) was formed as a functional unit. It initially consisted of a medical team and later developed into four teams, i.e.: medical technical team, surveillance team, social work team, and management team.
2005	PPMK was re-organized into the Crisis Management Center (*Pusat Penanggulangan Krisis*: PKK) based on the lessons learned from the Aceh Earthquake.
2007	Nine regional centers and two sub-regional centers were established.
2010	PKK was re-named to the Center for Health Crisis Management (*Pusat Penanggulangan Krisis Kesehatan*: PPKK)
2012	The World Health Organization (WHO) Collaborating Center was established.

Source: [PPKK] and [PPKK, 2014]

5.3.1 Legal and Political Arrangements

Regulations and guidelines on disaster medicine and EMS are listed in Table 5-10. The regulation on emergency medicine and the guidelines on EMS and emergency call center were under drafting process.

Table 5-10 Regulations and Guidelines on EMS and Disaster Medicine

Disaster Medicine	**Laws and Regulations** - MOH Regulation on Health Crisis Management (Permenkes No. 64, 2013) - MOH Regulation on Health Crisis Information System (Permenkes No. 77, 2014) - MOH Regulation on Post Disaster Needs Assessment (Permenkes No. 36, 2014) - MOH Regulation on Disaster Medical Assistance Team at the Hospital (Kepmenkes No. 448/Menkes/SK/VII/1993) - MOH Regulation on Medical Services in Disaster (Kepmenkes No. 28/Menkes/SK/I/1995)
	Guidelines - Technical Guidelines for Health Crisis Response On Disaster - Human Health Resources on Disaster Management (Kepmenkes No. 66/ Menkes/SK/II/2006)
EMS	**Laws and Regulations** - Act No. 44 of 2009 on Hospital (Undang-Undang No. 44, 2009) - Act No. 36 of 2009 on Health (UU No. 36, 2009) - MOH Regulation on the Standard of Emergency Installation in the Hospital (Kepmenkes No. 856/MENKES/SK/IX/2009) - MOH Regulation on the Development Team of Safe Community and Emergency Medical Services (EMS) at the National Level (Kepmenkes No. 301/Menkes/SK/VIII/2012) - MOH Regulation on the Development Team of EMS and Training of General Emergency Life Support (GELS) at the National Level (Kepmenkes No. 106/Menkes/SK/II/2004)) - MOH Regulation on Safe Community (Kepmenkes No. 426/Menkes/SK/V/2002) - MOH Regulation on the Emergency Medical System (EMS) (draft in progress)
	Guidelines and Plans - Guideline of EMS (The draft new regulation/guideline of EMS is under process.) - Guideline Call Center 119 (draft in process) It will consist of two parts, i.e., EMS on the hospital and telecommunication code access of 119 - Strategic plan for integrated system of EMS 2015–2019

Source: MOH Indonesia

5.3.2 Institutional Setting

MOH leads a health cluster in the national cluster as shown in Table 5-11.

Table 5-11 National Cluster System of Indonesia

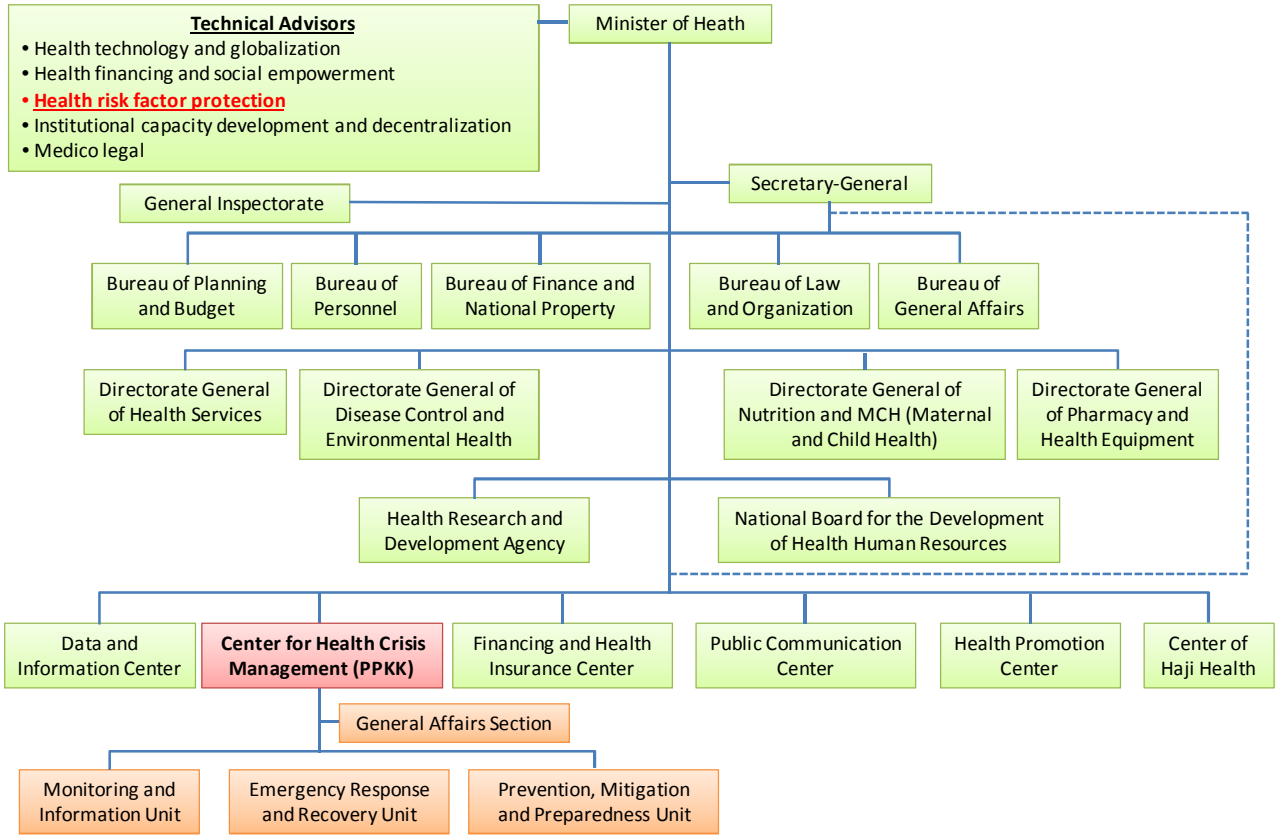
Clusters	Cluster Lead	Cluster (co-)Lead
Education	Ministry of Education & Culture	UNICEF/Save the Children
Displacement & Protection (including Camp management, Protection)	Ministry of Social Affairs	UNHCR/IFRC
Health (including Nutrition)	Ministry of Health / PPKK	WHO
Logistics	Ministry of Social Affairs / Department of Logistics & Equipment, BNPB	WFP
Structure & Infrastructure (including WASH, Telecommunications)	Ministry of Public Works	UNICEF/WFP
Economy (including food security)	Ministry of Agriculture / Ministry of Cooperatives & Enterprises	FAO/WFP
Search & Rescue	National Search and Rescue Agency	n/a
Early Recovery	Ministry of Interior	n/a

Source: [Lucy Styles, 2014] and Ministry of Social Affairs

Figure 5-4 presents the institutional setting for disaster management of MOH. The Center for Health Crisis Management (PPKK) is responsible for the overall coordination of preparedness and disaster response, as well as capacity development. It has 65 staff and is available for 24-hour monitoring.

According to MOH Regulation on Health Crisis Management (*Permenkes No. 64 Tahun 2013 tentang Penanggulangan Krisis Kesehatan*), health crisis management shall be implemented by health authorities at all levels. At the national level, MOH conducts the health crisis management and assisted by a higher

level officer. During operation, the secretary-general conducts coordination in the health sector through PPKK. At the provincial level, health crisis management is conducted by the Province Health Authority. At the district/city level, health crisis management is conducted by the District/City Health Authority. Each health authority office and hospital has a Disaster Medical Assistance Team.



Source: [Nofi Ardan] and [MOH Indonesia]

Figure 5-4 Organization Structure on Disaster Management of MOH Indonesia

There are nine regional and two sub-regional centers as shown in Table 5-12.

Table 5-12 Regional/ Sub-regional PPKK

Centers	Locations	Coverages
North Sumatra	Medan	Nangguroe Aceh Darussalam (NAD), North Sumatra, Riau, Riau Islands
West Sumatra (Sub-regional)	Padang	West Sumatra, Bengkulu
South Sumatra	Palembang	South Sumatra, Jambi, Bangka Belitung
DKI Jakarta	Jakarta	Jakarta Capital, Banten, West Jawa, West Kalimantan, Lampung
Central Jawa	Semarang	Yogyakarta Special City, Central Jawa
East Jawa	Surabaya	East Jawa
South Kalimantan	Banjarmasin	East Kalimantan, Central Kalimantan, South Kalimantan
Bali	Denpasar	Bali, West Nusa Tenggara, East Nusa Tenggara
North Sulawesi	Manado	North Sulawesi, Gorontalo, North Maluku
South Sulawesi	Makassar	South Sulawesi, Central Sulawesi, West Sulawesi, Southeast Sulawesi, Maluku
Papua (Sub-regional)	Jayapura	Papua, West Papua

Source: [PPKK, 2014]

These are distributed in accordance with the following four criteria: (1) Having enough medical capacity such as regional top referral and/or education hospital; (2) Being able to access all covered provinces within two hours; (3) Having communication infrastructure such as telephone/mobile phone network, radio network or internet for reporting system; and (4) Local health department is capable enough to operate the center.

Each center has more or less ten staff who are seconded from the local government in the province, e.g., the staff of North Sumatra Regional Center is employed by the Medan Municipal Government.

Assistance is mobilized based on the results of rapid health assessment and a request by the affected local authorities. The health crisis management is implemented gradually from the district/city to province and to MOH, and also depending on the magnitude of health crisis.

According to MOH Regulation on Health Crisis Information System, initial report/information can be sent directly to PPKK, but progress report on the health crisis management and update of the situation must be sent to a higher level authority (district/city level sends update/progress report to provincial level, whereas provincial level sends update report to the national level).

5.3.3 Financial Arrangements

The budget and expenditure of PPKK are shown in Table 5-13. Since 2010, costs for emergency response have basically been borne by the local government of the affected area, and the budget and expenditure have been decreasing. The budget of MOH is allocated to the affected areas upon the request of the local government.

Regarding regional and sub-regional centers, facility and equipment are purchased by MOH and operation costs including personnel are borne by the provincial government where the center is located.

Table 5-13 Budget and Expenditure of PPKK

(Rupiah)

Year	Budget	Expenditure
2006	178,555,200,000	98,230,800,000
2007	282,521,000,000	230,443,900,000
2008	513,895,800,000	427,123,300,000
2009	102,242,000,000	87,917,900,000
2010	19,888,400,000	18,324,600,000
2011	97,295,500,000	32,978,700,000
2012	9,194,200,000	6,521,400,000
2013	13,709,982,000	4,204,965,120
2014	6,339,633,000	5,457,599,457

Source: MOH Indonesia

5.4 Current Situation of Disaster Medicine

In general, Indonesia has a lot of experience in disaster response due to its geographical situation as described in Section 5.1. Based on the accumulated experiences, Indonesia has established systematic disaster health management and response system from the central to the regional level.

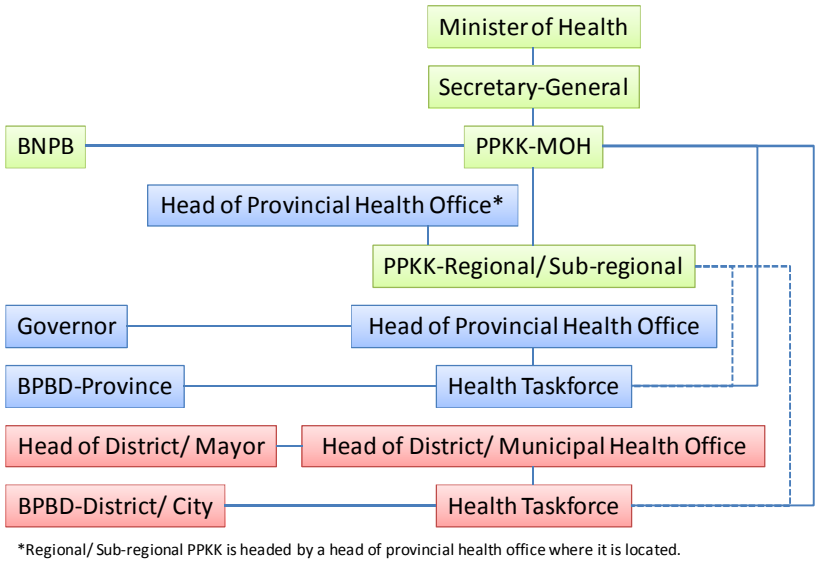
5.4.1 Facility and Equipment

In Indonesia, there are no specialized healthcare facilities for disaster response. Generally, the existing resources for emergency medical services (EMS) are being used in disaster response.

5.4.2 Response System

Figure 5-5 presents the emergency response structure from the national to district/city levels. At the national level, the MOH is responsible for management and response and PPKK-MOH takes necessary actions in coordination with BNPB.

Regional/sub-regional PPKK supports PPKK-MOH and local authorities. At the provincial and district/city level, health task force led by the head of local health office implements the response and management in coordination with BPBD. When a disaster is beyond the capacity of a provincial government or occurs in more than two provinces, PPKK-MOH coordinates among the neighboring local provinces. When the same situation happens at the district/city level, the head provincial health office coordinates the neighboring districts/cities.



Source: [MOH Indonesia, 2013]

Figure 5-5 Emergency Response Structure in Health Sector

According to PPKK-MOH, previously, PPKK-MOH deployed and coordinated a rapid health assessment team and a medical response team for most of the disaster levels. However, as regional PPKK are developing their capacities, most of the regional/sub-regional PPKK can dispatch their own team to the affected area within 48 hours followed by PPKK-MOH deployment a few days later.

Also, the BNPB deploys a disaster response team including medical team on the basis of a report from the rapid assessment team via PPKK-MOH. However, regional PPKK-MOH also has an authority to deploy medical team in case expansion of damage is expected.

5.4.3 Major Providers of Disaster Response

In disaster response, firstly, a local Search and Rescue Team (SRT) is dispatched to the affected area to assess the situation and needs. Secondly, the Rapid Response Disaster Relief Team (SRC-PB) is mobilized to: a) assess the situation and needs and b) conduct relief activities. These teams send reports on the situation and needs to the incident commander and based on the report, the medical response teams (MRTs) are dispatched to the scene.

(1) Search and Rescue Team (SRT)

In disaster response, search and rescue activities are mainly carried out by search and rescue teams at the national and/or local level (*Badan SAR Nasional/ Daerah*). In addition, volunteers can also be recruited if necessary. The search and rescue teams are engaged in the following:

- Minimizing loss of lives,
- Transporting the victims from danger areas to the points of assembly/accommodation,
- Assessing the health status of the victims (triage at the disaster site),
- Give first aid when necessary, and
- Move the victims to the field medical post, if necessary [PPKK, 2011].

(2) Rapid Response Disaster Relief Team (SRC-PB)

BNPB has a special team, SRC-PB, which should be deployed within several hours after a disaster. SRC-PB is divided into two headquarters, one at the Halim Perdana Kusuma Jakarta Airbase covering the western region, and the other at the Abdul Rahman Saleh Malang Airfield in East Java covering the eastern region. The number of personnel is about 1,100, i.e., 550 in the western region and 550 in the east region.

SRC-PB consists of medical team, engineering team, communication team, and rapid response team supported by personnel from the army and national police. It has undertaken overseas missions to the following disasters: Pakistan (2005), Myanmar (2008), and Haiti (2010) [Government of Indonesia, 2013] [BNPB, 2012].

(3) Medical Response Teams (MRT)

Basically, each local health office and hospital has a Medical Response Team (MRT). The composition and scale of MRT depends on the availability of the hospital which dispatches the team as well as the needs in the affected area. In general, 30 personnel including doctors, nurses, logisticians and drivers form the MRT. A team coordinator is the head of the local health office in the respective province /district/ municipality in compliance with the Decree of the Minister of Health Number 066 of 2006. Actually, the head of the hospital decides their deployment.

Quality assurance of the MRTs is undertaken by the regional PPKK based on the relevant guidelines and training programs in collaboration with the national PPKK. The training programs should be accredited by the National Board for the Development of Health Human Resources (BPPSDMK).

Table 5-14 shows outlines of the MRTs.

Table 5-14 Summary of Medical Response Teams in Indonesia

Type	Time for Dispatch	Requested Member	
Rapid Response Team (RR Team)	0-24 hours	- Doctor - Surgeons - Anesthesiologist - Paramedics/skilled nurse - Pharmacist - Ambulance driver	- Surveillance officer - Communications officer - Logistics officer - Disaster Victims Identification staff
Rapid Health Assessment Team (RHA Team)*	0-24 hours or at the same time as the RA Team	- Doctor - Epidemiologist	- Sanitarian
Health Assistance Team **	Recommendation from RHA Team in order to provide health services with more adequate instruments and supplies	- Specialists - Pharmacist and pharmacy staff nurses and skilled nurses	- Midwife - Sanitarian - Nutritionist - Surveillance staff - Entomologist

Note: * PPKK mobilizes RHA team appropriate members referring to a list of volunteers in the particular area.
**It is mobilized in response to the needs of the affected areas reported by RHA Team.
Source: [PPKK, 2011] and MOH Indonesia

According to MOH Regulation on the Guideline of Human Health Resources on Disaster Management (Kepmenkes No. 66/Menkes/SK/II/2006), composition and minimum qualification requirements are indicated as summarized in Table 5-15.

Table 5-15 Minimum Qualification Requirement of Disaster Management Health Personnel

Category	Minimum Qualification Requirement
Doctor	Trained on Advanced Trauma Life Support (ATLS), Advanced Cardiac Life Support (ACLS), or GELS
Pharmacist	Capable of managing drugs and medical equipment
Nurse	Trained on emergency nursing or Basic Trauma Life Support (BTLS)
Paramedic	Trained on emergency nursing
Midwife	Trained on normal delivery care, basic emergency obstetric care (BEmOC) and neonatal care
Nutritionist	Trained on emergency nursing
Surveillance Officer	Capable in surveillance
Entomologist	Capable in vector control

Source: MOH Indonesia

(4) **Indonesia Red Cross**

The Indonesia Red Cross (PMI) plays an important role in disaster response especially at the community level. It sets up a command post (POSKO) at its headquarters and the disaster scene. POSKO in the headquarter is responsible for coordinating with regional PMI and the International Federation of Red Cross and Red Crescent Societies (IFRC), as well as other concerned organizations such as POSKO of the local government, BNPB/BPBD, and AHA centre.

The Medical Action Team (MAT) is also provided upon the request of the central/local government, foreign government or IFRC. MAT is usually mobilized by a district PMI in cooperation with volunteer groups registered from medical education institutions. MAT is composed of doctors, nurses, midwives, pharmacologists, drivers, logisticians, and first aiders. It is also mobilized from hospitals as mentioned above.

In the meantime, PMI conducts first aid training for volunteers, private companies, and community-based organizations (CBOs). However, there are no training courses focusing on disaster response for medical personnel. Also, health promotion and disease preparedness activities are conducted through hospitals (Bogor, Banda Aceh, Cirebon, and Kendari) and some clinics in collaboration with community health care activity such as Posyandu[20].

(5) **Transportation of Patients**

In general, transportation of patients is undertaken by the logistic sector of the BPBD. In case of needs is beyond the capacity of a particular BPBD and the local resources, the BNPB coordinates with the army and/or the National Police Authority.

5.4.4 Human Resource Development

A systematic human resource development system on disaster medicine, especially in formal education, has not been well established yet. However, health personnel generally have been accumulating experiences and acquiring necessary skills through actual disaster response especially in disaster-prone areas.

(1) **Major Training Providers**

1) Disaster Management for Health

PPKK is setting up a human resource development policy/strategy for disaster management. As for formal education, there are postgraduate courses of disaster management in the University of Gajah Mada, University of Hasanudin, and University of Padjadjaran. Defence University also provides training on disaster management.

Aiming to enhance capacity on disaster response, the PPKK also conducts annual meeting on disaster management to share experiences among concerned agencies and organizations, as well as to evaluate the effectiveness and efficiency of responses taken throughout the year. The recommendations are to be referred to review the existing system. In general, the certification system is for the disaster response personnel.

2) Disaster Medicine

Currently, postgraduate course on disaster medicine is only provided by the University of Brawijaya. It is a combined course with emergency medicine. The University of Indonesia will set up the curriculum of disaster medicine to provide the course in the near future.

[20] *Posyandu* means integrated social service post. But it is mainly focus on maternal and child health activities such as antenatal care, nutrition monitoring, and immunization. It is operated by community health volunteers in close cooperation with a health center.

3) Disaster Nursing

The Nursing Council of Indonesia (PPNI) provides the certificate and registers a nurse who completed the Continuous Professional Development (CPD) Program on Disaster Nursing. The registration is utilized by PPKK to mobilize nurses for disaster response.

5.4.5 Receiving/Dispatching Medical Team to Other Countries in Emergencies

All foreign assistance teams are to be received through the BNPB. Then, medical teams are referred to the MOH for further coordination with the provincial/district BPBD. Accreditation for medical practice is regulated for peaceful situation, but not for emergency response.

Four days after the Nepal Earthquake, a medical team was deployed in coordination with BNPB and in collaboration with the military. The team was composed of doctors (general practicionists, specialists), advanced nurses, nurses, pharmacists, assistant pharmacists, sanitarian, technical support and administration staff to operate a field hospital for two to three weeks. However, it took a long time to be recognized in the health cluster because communication had been done through the disaster management authority. Also, to cooperate with other foreign and local teams, the team faced some difficulties in using and understanding some terminologies.

5.4.6 Experiences in the Past Disaster

Table 5-16 summarizes the lessons learned from past major disasters compiled by the PPKK. The most remarkable opportunity to review and improve disaster response system was during the 2004 Indian Ocean Earthquake and Tsunami. Through the experiences of great earthquakes afterwards, the BNPB/BPBD was re-structured to enhance the coordinating function in disaster management in 2008.

Table 5-16 Lessons Learned from Major Disasters

Disasters	Year	Analysis and Lessons Learned
Indian Ocean Earthquake and Tsunami	2004	- As the public service system was totally damaged, coordination with domestic and international stakeholders, information management, and treatment of victims were not carried out well. - MOH dispatched experts to the provincial Department of Health (DOH) to support the management and coordination in the heath sector. It was one of the bases of Crisis Management Act 2007. - Importance of integrated risk management and 24-hour information management in disaster situation was recognized.
Nias Earthquake	2005	- Based on the Aceh Earthquake mentioned above, the capacity of the North Sumatra Provincial Government was improved. However, as it occurred in the island, physical access, communication, and coordination with foreign assistance team were difficult. - Need to enhance the communication network with the islands was recognized.
Yogyakarta Earthquake	2006	- The first case to apply UN cluster system. - MOH firstly installed field hospital in cooperation with the Indonesian and Norwegian Red Cross.
West Jawa Earthquake	2009	- The West Java Provincial Government managed and coordinated well in cooperation with PPKK Jakarta and MOH. - A field hospital was installed by MOH and operated in cooperation with PPKK Jakarta, PMI, and the Military Medical Team.

Disasters	Year	Analysis and Lessons Learned
Padang Earthquake (West Sumatra)	2009	- As evacuation routes were not ensured, there were a certain number of victims. And based on this, risk management should have alternatives. - It was recognized that information management system, inter-sector cooperation, and seismic design of public facilities are critical for integrated risk management system. - It was also confirmed that foreign assistance should effectively match with the needs of affected areas.
Mentawai (West Sumatra) Earthquake and Tsunami	2010	- Physical access and site operation were difficult in a remote island. Based on this experience, health personnel in such remote islands should develop enough capacity to respond to and manage the disaster.
Merapi Explosion	2010	- Communication was difficult as the affected areas were scattered over several provinces, Yogyakarta, Central and East Java. - First time to apply "Damage, Loss, and Needs Assessment".
Bandang Waisor (West Papua) Flood	2010	- Physical access was limited, only for waterway and airway. There were no hospitals and many health personnel were also affected. These resulted in difficult site operation. - However, the West Papua BPBD rapidly established POSKO to coordinate smoothly with provincial DHO and PPKK.
Sukhol Air Clash (West Jawa)	2012	- Physical access was difficult as it is located in the mountainous area. It made search and rescue activities difficult. - Mobilized ambulances were mostly used for dead bodies, and transportation of the injured person was limited.
Jakarta Flood	2007 and 2013	- It caused severe traffic jam that restricted response activities. - As Jakarta PPKK did not function well, MOH PPKK took the responsibility in cooperation with BNPB. - Based on the above, it was recommended that frequent communication with concerned organizations and personnel should be encouraged even during peaceful time. Also, importance of drills and involvement of private sectors were recognized.

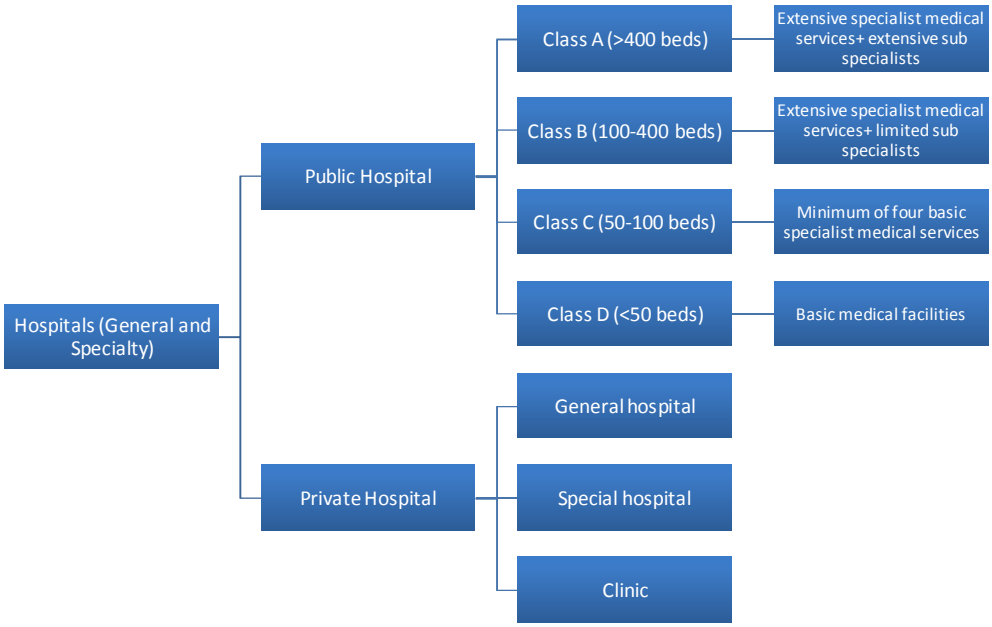
Source: [PPKK, 2014]

5.5 Current Situation of Relevant Emergency Medical Services

In general, emergency medical services in Indonesia are hospital-based response systems. According to the interviews, features of the services widely vary among hospitals and the level and quality of services depend on the commitment and priority of each local government because of decentralization. The 119 emergency calls are handled by a hospital call center, and then the hospital medical personnel are dispatched to the scene. Although relevant data on emergency call services is collected, analysis and evaluation have not been done properly nationwide. Currently, the Special Capital Territory of Jakarta and some provinces or districts/cities, which have been conducting their own EMS, provide relevant data to MOH.

5.5.1 Facility and Equipment

In Indonesia, 35% of healthcare facilities are private hospitals and 65% are public hospitals. The hospitals are classified into four types based on the number of beds as shown in Figure 5-6. Class A hospitals are highly-specialized referral centers. Class B hospitals usually operate 18 specialty and sub-specialty departments. Class C general hospitals are designed to provide four basic specialist services in internal medicine, obstetrics and gynecology, and pediatrics. Class D hospitals are the lowest level hospitals. They provide general services and two basic specialist services.



Source: [MOH Indonesia, 2012]

Figure 5-6 Hospital Classification of Indonesia

Table 5-17 summarizes the ownership of hospitals.

Table 5-17 Ownerships of Hospitals

Category	Owner/Class	A		B		C		D		Undetermined		Total
		GH	SH	GH	SH	GH	SH	GH	SH	GH	SH	
Public Hospital	MOH	10	15	3	4	1	0	0	0	0	0	33
	Province	7	14	26	15	13	5	2	1	4	12	99
	District	0	0	69	1	232	1	100	0	56	0	464
	City	0	2	42	6	31	2	4	0	4	2	93
	NPO	0	0	52	5	185	67	176	14	126	114	739
	Military	1	0	10	1	9	0	16	0	85	5	127
	Police	1	0	2	0	13	0	4	0	22	0	42
	Other Ministry	0	0	1	0	1	0	1	0	2	2	7
Private Hospital	Private/others	1	2	41	8	71	41	75	11	103	60	413
	Enterprises	0	1	11	1	33	33	36	0	84	64	263
	Personal	0	0	0	0	3	15	16	3	19	16	72
	State-owned enterprises	0	2	5	1	21	0	13	0	21	4	67
Total		**20**	**36**	**262**	**42**	**613**	**164**	**443**	**29**	**526**	**284**	**2,419**

Note: GH=General Hospital, SH=Specialized Hospital

Source: MOH Indonesia

(1) Emergency Departments

Standard facility and equipment of emergency departments are defined in MOH Regulation on Standard of Emergency Installation in Hospital (Kepmenkes No. 856/MENKES/SK/IX/2009). Each hospital prepares a strategic development plan of its emergency department referring to the above regulation and based on situation analysis. For example, one of the most progressive hospitals on emergency medicine, Saiful Anwar General Hospital in Malang, has same emergency department system as the United States of America (USA), the United Kingdom (UK), and Australia, including triage space, resuscitation/critical care room (Priority 1), urgent care room (Priority 2), minor care room (Priority 3), and observation room before administration.

(2) **Dispatch Center**

An emergency call center is located in the hospital to receive emergency calls through phone and to deploy the hospital ambulance team. Features of the dispatch centers vary among the local governments, and depend on its capacity and commitment.

MOH recognizes that province/district/city call center must be able to analyze and properly operate the system so that the operator can guide the patients on what should/could be done before the ambulance arrives. To strengthen the capacity of call center, MOH plans to allocate human resources with minimum standard, such as having a bachelor's degree to the national call center, and medic or paramedic to the province/district/city call center.

(3) **Patient Transportation**

Each hospital has its own ambulance with drivers and ambulance nurses to transport patients from the scene and between hospitals. There is no national standard of ambulance team, as of 2014.

5.5.2 Response and Transportation System

Currently, ambulance services have been provided on a hospital basis and national statistics have not yet been compiled. MOH launched the emergency hotline services and has been drafting the national regulation and guidelines of EMS (Table 5-10). Although the number of call seems to be increasing [Jakarta Post, 2012] [Nadya Natahadibrata , 2013], patients are generally transported to the hospital by private vehicle or public transportation due to delay of response or luck of an ambulance or fuel.

(1) **Emergency Call**

Emergency call service was started in the 1970s in Jakarta, with area code number plus 118. Initially, it was a paid service (flat rate of Rp.200,000) and became free since June 2012, but only for Jakarta ID cardholders [Jakarta Post, 2012]. In 2013, MOH launched the emergency hotline services in cooperation with a telecommunications company in each region, modeled after the 911 hotline number in the USA. The number is area code plus 119 and some hospitals have their own code for their call centers [Nadya Natahadibrata , 2013].

(2) **Medical Response Teams**

When the hospital call center directly receives these emergency calls, they dispatch their own ambulance. The ambulance team is composed of an ambulance nurse and a driver.

5.5.3 Human Resources

Currently, as paramedics are not officially recognized by MOH in Indonesia, ambulance nurses dispatched to the scene are trained under their own hospital curriculum. For example, in Saiful Anwar General Hospital, they provide Basic Emergency Ambulance Protocol (BEAP) Course and Triage Course for registered nurses before deployment. After registration of the ambulance nurses, they continue to improve their skills through actual practices.

In Indonesia, an emergency physician (EP) is not a major specialist because the Medical Council of Indonesia does not certify EP as of 2014. Therefore, statistics of relevant human resources are not available. According to Saiful Anwar General Hospital, they have developed 35 EPs with certain professional standard. However, there are no or few medical institutions developing such human resources so far. However, in general, because of such EP status and burden of work, there is much less number of medical students intending to become EP compared with other specialists.

(1) **Pre-service Education**

MOH has a human resource development policy/strategy for EMS. However, each provincial/district governor has primary responsibility for trainings and certifications. The national statistics of EMS human resources were not available.

A compulsory course on emergency care in each medical school might have a curriculum. Now, only Saiful Anwar General Hospital provides the emergency medical training for general physicians, nurses, and first aid responders. It also provides the emergency care residency training for EP for four years.

Currently, EPs are not recognized as specialist doctors. The Brawijaya University has the only postgraduate course on EP. As MOH has already considered the need for EP, the course will be expanded in Dr. Cipto Mangunkusumo Hospital and the University of Indonesia by the end of 2015. Emergency care courses for doctors/physicians are currently set up through pilot activities by some universities and hospitals.

(2) **Continuous Professional Development (CPD)**

Education and training in emergency medicine and disaster medicine are provided by the following institutions:

- Brawijaya University, Malang, East Java (Specialist Emergency)
- Indonesia Surgeons Association (IKBI) training ATLS
- Indonesia Cardiologist Association (PERKI) training ACLS
- Some centers/hospitals/universities have emergency trainings such as Management of Emergency Patient (PPGD), GELS, Advanced Pediatric Resuscitation Courses (APRC), Pediatric Advanced Life Support (PALS), and Advanced Neonatal Life Support (ANLS)

5.5.4 Relevant Academic Society/ Professional Organization

As for emergency medicine, there are two associations, namely, the Emergency Specialist Doctors' Association in Indonesia (Perdamsi) and Emergency Doctor Association in Indonesia (PDGI).

5.6 International Cooperation

The major and relevant development partner on disaster medicine is the World Health Organization (WHO). The ASEAN, the United Nations (UN) organizations, the Australian Agency for International Development (AusAID), and the United States Agency for International Development (USAID) also

provide technical support in the context of disaster management. In addition, some hospitals individually cooperate with medical institutions overseas.

In 2012[21], the WHO Collaboration Center (WHO CC) was established in the PPKK-MOH. It aims to promote research activities and training. Major topics for research are safe hospital, inter-organization coordination, and capacity development of Regional PPKK. Because of the location, close cooperation with the PPKK is possible. According to WHO, approximately 30% of staff are involved in the WHO CC activities.

5.7 Conclusion

Indonesia has been developing health crisis management system from central to regional level based on accumulated experiences of responding various types of disasters, as well as legislations and technical guidelines. Also, major hospitals in disaster prone areas seem to be capable enough to provide necessary medical services during emergencies. Based on such experiences and practical knowledge, evidences could be established for policy making and human resource development program through further research activities in cooperation with WHO CC. Then, the outputs could be shared with among AMS.

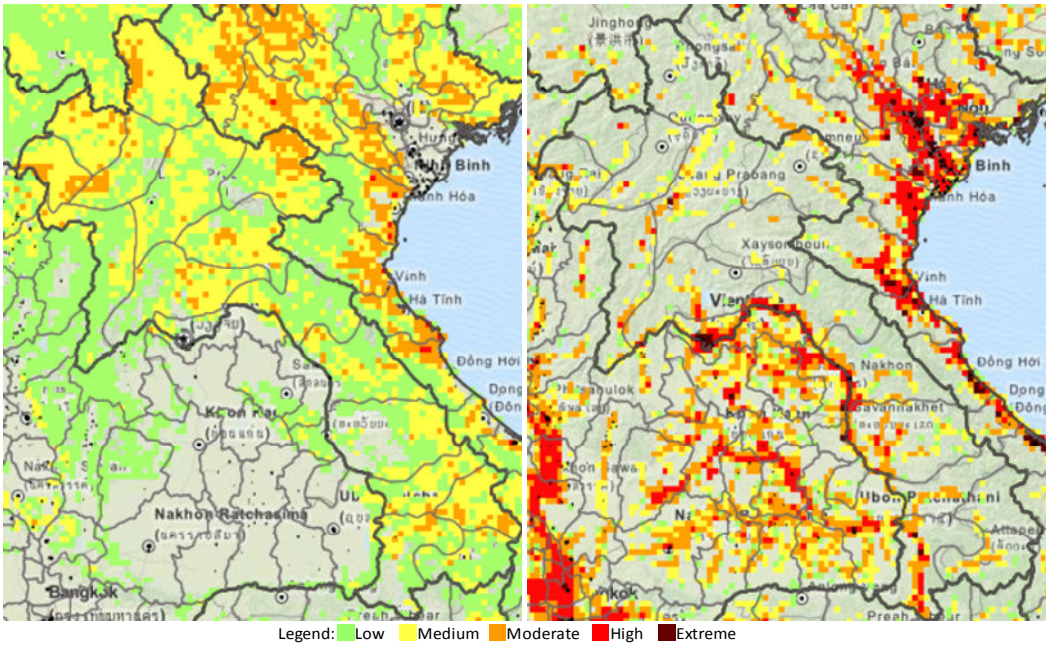
However, EMS, especially ambulance services, seems to be in the stage of standardization. Because of the socio-cultural diversity, geographical condition and decentralization, it might require huge effort to share good practices and maintain a certain quality of the services nationwide.

[21] Official opening was in 2013 due to delay of administrative procedure.

Chapter 6 Country Report: Lao PDR

6.1 Overview of Disaster Occurrences (Natural and Man-made)

River flood is the most frequent disaster in Lao PDR. The Mekong River and its river branch area in the northern and central parts are at risk of river flood due to heavy and continuous rainfall from June to August as well as the influence of tropical storms. Other climatic disasters such as droughts and storms are not frequent but the seriousness of flood disasters has been increased due to climate change. There is a risk of landslide in the northern areas (Figure 6-1).



Source: [UNEP/ UNISDR, 2013]

Figure 6-1 Mortality Risk: Landslide (Left) and Flood (Right)

After Typhoon Katsana in 2009, the Government of Lao PDR recognized the importance of early warning and preparedness in flood disasters. The National Disaster Management Office (NDMO) was transferred to the Ministry of Natural Resources and Environment (MONRE) in 2011.

Regarding man-made disasters, no remarkable incidents have occurred except some air accidents. According to the interviews, the air accident in 2014 was one of triggers to review the disaster response system. In addition, the South East Asian (SEA) Games held in Vientiane in 2009 was also the opportunity to improve the response system for mass casualty incidents.

6.1.1 Occurrence of Natural Disasters

Table 6-1 summarizes the occurrence of natural disasters from 1980 to 2014. More than 60% of disasters were floods.

Table 6-1 Natural Disaster Occurrence in Lao PDR (1980-2014)

Type of Disaster	No. of Occurrence	Death (person)	Totally Affected (person)
Flood	18	158	3,834,743
Storm	5	72	1,436,199
Drought	4	0	750,000
Total	27	230	6,020,942

Source: [CRED]

Table 6-2 shows remarkable natural disasters in Lao PDR from 2000 to 2014.

Table 6-2 Remarkable Natural Disasters in Lao PDR (2000-2014)

Disaster	Month, Year	Number of Death[1)]	Number of Affected People [1) 2)]	Affected Provinces[1) 2)]
Flood	Sep 2000	15	450,000	Louang Namtha, Bolikhamxay, Kham Muane, Savannakhet, Champassak, Saravan and Vientiane
River Flood	Aug 2009	10	-	Khammoune
Typhoon Katsana	Sep 2009	16	128,887	Attapeu, Sekong, Savannakhet, and Saravan.
Tropical Storm Haima	Jun 2011	14	37,000	Xiengkhuang, Vientiane, Borikhamxay, Khammuane, Boolikhamxay and Xayaboury.
Tropical Storm Nock-ten	Aug - Oct 2011	34	430,000	Savannakhet, Kammouane and Champasak
River Flood	Jun - Aug 2013	20	350,077	Oudomxay Xayabouly, Bolikhamxay, Khammuan, XiengKhuang and Vientiane. More than 60 % of the territory was flooded.

Source: 1) [CRED], 2) [OCHA]

6.1.2 Occurrence of Man-made Disasters

Table 6-3 shows the occurrence of man-made disasters from 1980 to 2014.

Table 6-3 Man-made Disaster Occurrence in Lao PDR (1980-2014)

Type of Disaster	No. of Occurrence (A)	Death (person) (B)	Totally Affected (person)	Death per Occurrence (B/A)
Air Accident	5	161	5	32.2
Other	1	0	0	0.0
Total	6	161	5	26.8

Source: [CRED]

Table 6-4 shows the remarkable man-made disasters from 2000 to 2014 in Lao PDR.

Table 6-4 Remarkable Man-made Disasters in Lao PDR (2000-2014)

Disaster	Month Year	Number of Death[1)]	Outline[2)]
Helicopter Crash	Jun 2000	18	A helicopter ran into a bad weather and hit the Phasay Mountain 27 kilometers to its destination.
Air Accident of Lao Aviation Flight 703	Oct 2000	8	The Sam Neua Airport Control Tower lost contact with the plane. It appeared that the plane had crashed in the mountainous area near Vientiane during bad weather.
Air Accident of Lao Airlines Flight 301	Oct 2013	49	A Lao Airlines ATR-72 was damaged beyond repair in an accident near Pakse, Lao PDR.
Air Accident	May 2014	16	A plane Antonov AN-74TK300 carrying senior Laotian government officials crashed in Xiangkhouang province.

Source 1) [CRED], 2)[BBC], [ASN], and [New York Times, 2014]

6.2 Emergency Response System

6.2.1 Laws and Regulations on Emergency Response

Laws and regulations on emergency response are listed in Table 6-5.

Table 6-5 Laws and Regulations for Emergency response in Lao PDR

Laws/ Regulations	Year	Outline
Prime Minister's Decree No. 158	1999	The decree specifies the task of the National Disaster Management Committee (NDMC). The NDMO was assigned as the secretariat to the NDMC, and later on the focal point structure was established consisting of the NDMC members and units within each key ministry. Since then, the committees and offices with formal lines of reporting have been established in the provinces, district and village levels.
Prime Minister's Decree No. 373	2011	The decree specifies the institutional reform of the NDMC to establish the National Committee for Disaster Prevention and Control (NCDPC).
Prime Minister's Decree No. 220	2013	The decree specifies the task and institutional change of the NCDPC and the NDMO.

Source: NDMO

According to the Prime Minister's Decree No. 220 in 2013, the latest decree, the NDMO, the secretariat of the National Committee for Disaster Prevention and Control (NCDPC), was transferred from the Ministry of Labor and Social Welfare (MLSW) to the Department of Disaster Management and Climate Change (DDMCC) of MONRE. There were two reasons for the transfer: 1) the task of the NCDPC is specified mainly for natural disasters and 2) the necessity of preparedness and early warning is increasing for disaster management. This decree will be modified and enforced again in May 2015 based on the air accident that happened in May 2014. The Strategic Plan on Disaster Risk Management in Lao PDR (2016-2020) and the Disaster Risk Management Law are under preparation as of March 2015.

6.2.2 Organization for Emergency Response

(1) National Committee for Disaster Prevention and Control (NCDPC)

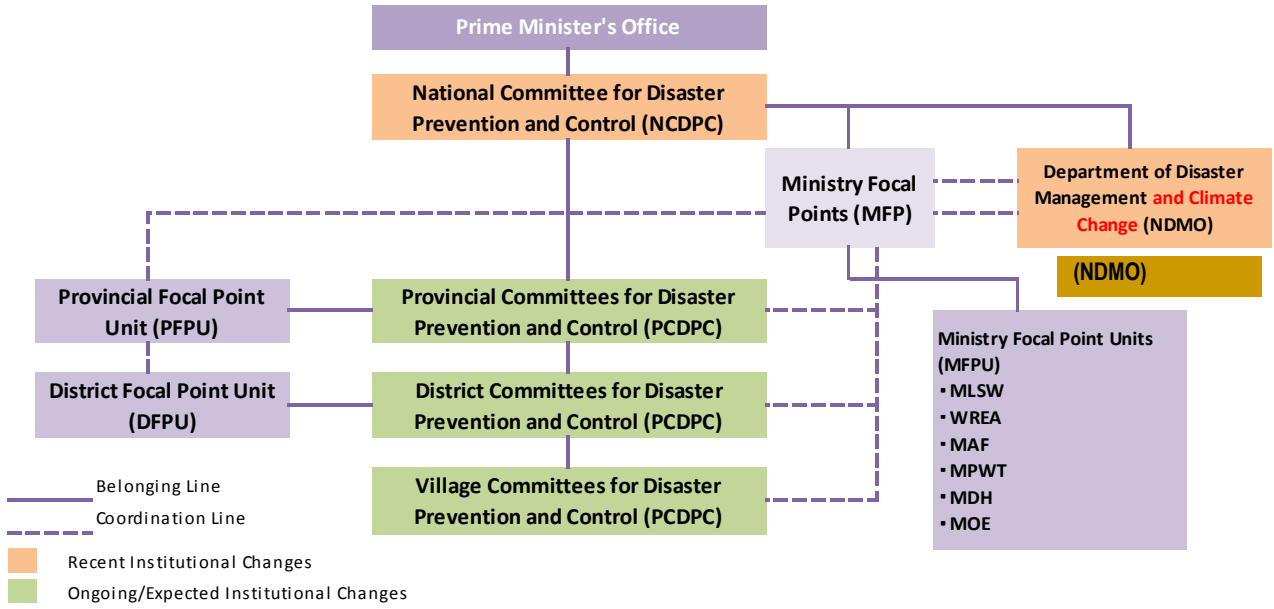
The NCDPC is the highest committee for disaster management in Lao PDR. The new NDPCC structure includes an expanded leadership team and the appointment of more senior members (i.e. Minister Level). This includes the Deputy Prime Minister/Minister of Defense as Chair, and Ministers from the Ministry of Natural Resources and Environment (MONRE), Ministry of Agriculture and Forestry (MAF), Ministry of Public Works and Transportation (MPWT) and Ministry of Labor and Social Welfare (MLSW) as Vice Chairs [GFDRR, 2014].

The four vice-chairs (line agency ministers) are expected to take clear roles: 1) MONRE: preparedness, and early warning; 2) MLSW: response; and 3) MAF and MPWT: implementation of priority post-disaster recovery initiatives (i.e. road and irrigation rehabilitation). The Ministry of Planning and Investment (MPI) and the Ministry of Finance (MOF) continue to strengthen their role as lead agencies in recovery planning and allocation of financing [GFDRR, 2014].

(2) **National Disaster Management Office (NDMO)**

The NDMO is an office located in the DDMCC. The office was established in 2012 and is composed of 40 staff. The office covers six types of disasters: flood (major disaster), drought, fire (forest and man-made), earthquake, epidemic and mine explosion. The office has main four tasks, namely 1) strengthening early warning, 2) integration with land use and natural resource planning, 3) connection to social and environmental safeguard measures, and 4) integration between disaster risk reduction and climate change adaptation.

Figure 4-2 shows the institutional arrangement for disaster management in Lao PDR which includes the NCDCP and the NDMO.



Source: [GFDRR, 2014]

Figure 6-2 Institutional Arrangement for Disaster Management in Lao PDR

Before 2011, the Disaster Management Committee (DMC) was established at all sub-national levels, i.e. province, district and community/village levels. The DMCs were also responsible for emergency response. Currently the institutional reform is in the process, and DMC is expected to be Committee for Disaster Prevention and Control (CDPC). However, the decree has not been prepared yet (as of March 2015).

6.2.3 Emergency Response at the Site

(1) **Disaster Relief**

The primary responder in emergency response is not officially or legally decided yet; however the following organizations shown in Table 5-7 carry out emergency disaster relief activities.

Table 6-6 Responsible Organizations for Disaster Relief at the Site

Activity	Responsible Organizations
Search and Rescue	Local police, local military, local youth
Security	Local police, local military, local youth
Disaster Medicine	(some) District hospitals for primary and secondary care
Relief	All sectors (task force will be organized) and donors NGOs (IFRC, Oxfam, Save the Children, Plan, etc.)

Source: CCMD

(2) **Emergency Drills**

Fire drills were conducted in schools and hospitals in urban areas according to the Lao PDR Urban Disaster Mitigation Project (LUDMP) by ADPC [ADPC, 2004]. The ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre) conducted a storm disaster drill after Typhoon Nock-ten in 2011, using the Standard Operating Procedure for Regional Standby Arrangements and Coordination of Joint Disaster Relief and Emergency Response Operations (SASOP) with the support from the United Nations Development Programme (UNDP). In 2014, the Ministry of National Defence conducted a disaster drill.

6.3 Overview of Disaster/Emergency Medicine

The development of emergency medicine has been recognized and the government had sent trainees to Thailand to learn prehospital care from 2005 to 2007. However, it has not been continued because of lack of resources. Since the disaster/emergency medicine is included in the latest development plan as one of the priority areas in the Health Sector Development Plan (HSDP) 2016–2020, it could be expected to revitalize such efforts.

6.3.1 Legal and Political Arrangements and Plans

According to MOH, the HSDP 2016–2020 is expected to include the following eight priority areas:

(1) Hygiene Promotion
(2) Communicable Diseases Control
(3) Health Care
(4) Drug and Food Safety
(5) Health Finance
(6) Health Education and Research
(7) Human Resources for Health
(8) Planning and International Cooperation

The disaster/emergency medicine is included in the number (3) Health Care and among its four sub-areas are the following: 1) health service network reform, 2) strengthening of major health services, 3) prevention and control of non-communicable diseases (NCD), and 4) standard and quality regulation. The third sub-area includes disaster/ emergency medicine in addition to NCD, trauma and accident, elderly care and rehabilitation, and mental health.

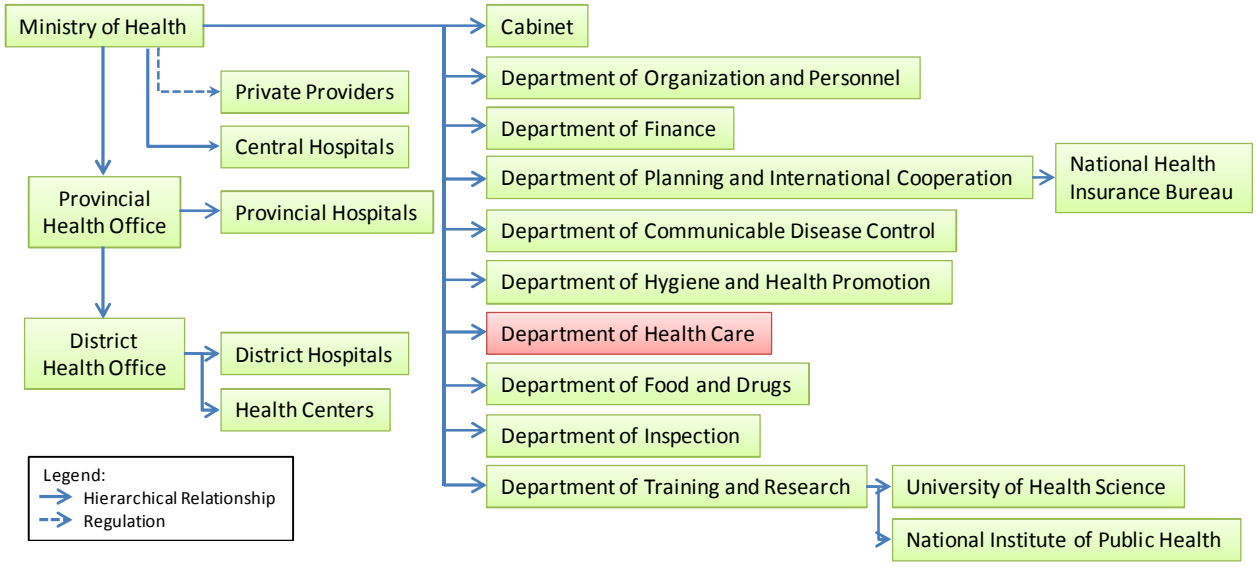
In 2010, the National Health Emergency Response Plan was prepared with technical assistance from the World Health Organization (WHO). However, since it covers areas that were too wide to be feasible, the

Health Emergency Risk Management Plan was developed and its contents were narrowed down in 2013 are still waiting for official approval of the Ministry of Health (MOH).

According to WHO, although the MOH tries to develop practical guidelines or standard operating procedure (SOP) in accordance with the above strategic plan, there is no technical person for developing the SOP.

6.3.2 Institutional Setting

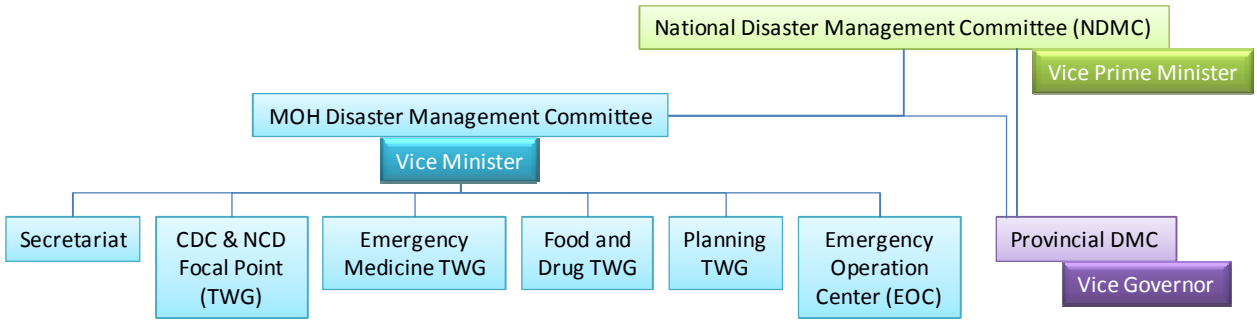
As shown in Figure 4-3, the focal point of disaster health management is the Department of Health Care.



Source: [WHO, 2014]

Figure 6-3 Concerned Departments in Disaster Management in the Ministry of Health in Lao PDR

The Disaster Management Committee under MOH[22] chaired by the Vice Minister is responsible for health-related activities in emergency response with close collaboration of the National Committee for the Prevention and Control on Natural Disaster, chaired by the Vice-Prime Minister and the Provincial Committee for the Prevention and Control on Natural Disaster, chaired by the Vice-Governor. (Figure 6-4)



Source: MOH Lao PDR

Figure 6-4 Organizational Structure of the Ministry of Health in Disaster Management

[22] It was reformed and endorsed in August 2013.

In September 2014, the Emergency Operation Center (EOC) was established under a cabinet office with technical and financial assistance from WHO. It aims to monitor and respond to communicable disease outbreak: therefore, the agency responsible for this is the Department of Communicable Disease Control. It has two part-time staff working in shifts and officers from concerned departments are deployed. According to MOH, similar centers will be established in some pilot provinces. So far, EOC does not respond to other disasters other than epidemic.

6.4 Current Situation of Disaster Medicine

6.4.1 Facility and Equipment

According to MOH, the number of designated hospitals for disaster response is shown in Table 6-7. The Mittaphab Hospital, one of the four central hospitals, is designated for disaster response and has three ambulances reserved for disaster response.

Table 6-7 Number of Designated Hospitals for Disaster Response per Hospital Category

Category	Number of Designated Hospitals for Disaster Response
Central Hospital	01
Regional Hospital	03
Provincial Hospital	14
District Hospital	27

Source: MOH Lao PDR

A number of activities related to emergency risk management have taken place in Lao PDR in recent years. The latest hospital preparedness for emergency and disaster assessment was conducted in one central hospital, four provincial hospitals and seven district hospitals in 2011. The assessment found that most of the hospitals have somewhat met the structural indicators, but all of provincial hospitals have problems with the following: emergency management, logistic system management, safety and security systems, communication and information systems, planning for emergency and disasters, human resource development (exercise and simulation), and monitoring and evaluation [WHO, 2011].

6.4.2 Response System

In Lao PDR, the disaster response in the health sector is under the responsibility of the Department of Health Care, MOH. The MOH is directly involved with the medical teams in an emergency situation that covers first aid, health care and the issuing of death certificates for victims. The MOH is responsible for hygiene activity and control over disaster-borne diseases. The ministry organizes specialized training for medical teams who work in emergencies and post-disaster environments [CEDMHA, 2014]. According to MOH, special teams for disaster are organized and dispatched on a case-to-case basis based on the situation and needs.

6.4.3 Major Providers in Disaster Response

The MOH's tasks during a disaster are defined in Decision No. 097 of the Ministry of Labor and Social Welfare on 30 June 2000 are as follows [IFRC/ADB, 2009]:

- The direct involvement of medical teams in emergency operation: first aid, health care, and issuance of 'Death Certificates' for victims.
- Stockpiling of some medical equipment and medicines for emergency.
- Hygiene activity and control of disaster born diseases and organization of specialized training for medical teams working in emergency and in post-disaster operations.

The students of the University of Health Sciences are one of the major actors in health emergency and disaster response. The students are deployed to the affected areas in case of a health emergency or disaster. For instance, at the time of a dengue outbreak in 2013, the fifth and sixth-year medical students were dispatched to the affected areas to assist local doctors, perform clinical management, and conduct community vector control activities and household surveys, etc. [Minh Pham, 2013].

6.4.4 Human Resource Development

Some specialized trainings for disaster medicine and/or disaster management have been held by international partners and non-governmental organizations (NGOs). The Hospital Preparedness for Emergencies (HOPE)[23] training has been conducted with assistance from the Asian Disaster Preparedness Center (ADPC), in which, doctors and medical administration personnel learned new skills to save lives when disasters hit. The MOH has endorsed HOPE program in Lao PDR [CEDMHA, 2014]. There are also health professionals who have received the Public Health and Emergency Management in Asia and Pacific (PHEMAP) training.

There is no postgraduate education on disaster medicine and/or disaster management for health professionals except the lecture (two to four hours) which is entitled "Public Health Perspective in Disaster Management" in the Master of Public Health at the University of Health Sciences.

6.4.5 Receiving/ Dispatching Medical Team to Other Countries in Emergencies

Lao PDR never received medical assistance teams from other countries. It deployed a medical team to Myanmar for Cyclone Nargis. In general, international organizations provide emergency response only upon the official request of the government when it declares a state of emergency. However, since the government sometimes does not declare emergencies, donors could not provide any immediate assistance[24].

[23] The Mittaphab Hospital is appointed as model hospital.

[24] For example, during the dengue outbreak in 2013, although the emergency declaration was not stated, WHO provided support in response to the Prime Minister's appeal.

6.5 Current Situation of Relevant Emergency Medical Services

6.5.1 Facility and Equipment

The emergency medical services (EMS) system in Lao PDR has just started to develop. The Mittaphab Hospital is designated by MOH as a model hospital for EMS. The Emergency Department (ED) of Mittaphab Hospital operates 24 hours a day, seven days a week. The staff in the ED is composed of four medical doctors (three critical care physicians and one orthopedist), 17 nurses, and residents. The hospital has seven ambulances of which three for disaster response and four for EMS.

According to MOH, the number of EDs per hospital category is shown in Table 6-8.

Table 6-8 Number of Emergency Department per Category

Category	Number of Emergency Departments
Central Hospital	3 (Mahosot, Mittaphab, Setthathirat)
Regional Hospital	3 (Luangprabang, Savanakhet, Champasak)
Provincial Hospital	14
District Hospital	130

Source: MOH Lao PDR

6.5.2 Response and Transportation System

There was no systematic/organized pre-hospital emergency service in the 1990s and it was not until the 2010s that emergency transportation improved due to better road networks and infrastructure. One ambulance center emerged in 2011 for the whole country, under the responsibility of the Vientiane Health Department [WHO, 2014]. The responsibility is now transferred to the Mittaphab Hospital. There are currently three organizations providing ambulance service in Vientiane as shown in Table 6-9. However, there is no coordination among the organizations.

Table 6-9 Organizations Providing Ambulance Services

Organization	Telephone Number
Mittaphab Hospital	1195
Lao Red Cross Society	020 59966111 or 020 22005563
Foundation for assisting poor people of Lao PDR rescue	020 56668825

Source: MOH Lao PDR

The Mittaphab Hospital has four ambulances for EMS and four drivers. The 1195 dispatch center is established within the hospital. The ambulance service fee is LAK 10,000 per kilometer. The service is differentiated by three levels. Level 1 service is provided by a volunteer who provides first aid and a driver. Level 2 service is provided by a nurse and a driver. Level 3 service is provided by a medical doctor, a nurse and a driver. Only one ambulance can provide Level 3 service and is used during special occasions such as the Asia-Europe Meeting.

The Lao Red Cross Society has started ambulance service as a pilot project in 2012 targeting four districts in Vientiane. The Lao Red Cross Society has two ambulances and services are offered free of charge, operating entirely on donations from private companies. The Lao Red Cross ambulance team attends to any road traffic accident, provides first aid where required, and transports any injured parties to the closest hospital. The

ambulance team is composed of four volunteers and a driver. There are 65 volunteers involved in ambulance service.

Ambulance services are also available at several provincial hospitals at most, in type A and some type B district hospitals[25], although at this level, the ambulance services are very limited [WHO, 2014].

6.5.3 Human Resources

There are medical doctors who specialized in emergency care, critical care and anesthesiology: however, emergency physicians are not recognized as a specialist and there is no certification system.

(1) Pre-service Education

The University of Health Sciences is the only university that offers medical education in Lao PDR. Emergency medicine is not part of the curriculum at the university. At the undergraduate level, the fifth year students receive the first responder training (one week) during one month training at the ED/ Intensive Care Unit (ICU). The first responder training includes theory, cardio-pulmonary resuscitation (CPR), bone fracture immobilization, transportation of patients and others.

At the postgraduate level, training in anesthesia, intensive care and emergency has been offered as one training program. Currently, the University of Health Sciences is planning to separate the training into three independent training courses. Regarding emergency medicine, the curriculum is being developed and the emergency medicine course will commence in September 2016.

(2) Continuous Professional Development (CPD)

Continuous Professional Development (CPD) trainings in emergency medicine and EMS for health personnel are mainly offered by hospitals and/or by international partners.

For instance, the Mittaphab Hospital has organized training on first aid and CPR for nurses. The hospital has concluded a memorandum of understanding with international partners for technical assistance to improve the capacity of staff and quality of services. In relation to emergency medicine, MUSE [MUSE AHP], a French organization created in the American Hospital of Paris, has supported training of hospital staff.

6.5.4 Relevant Academic Society/ Professional Organization

There are no academic associations specializing in emergency or disaster medicine.

6.6 International Cooperation

The Inter-Agency Contingency Plan has been revised annually. It involves the stakeholders for emergency response in all sectors. For the health sector, the Health Cluster Response Plan is attached as an annex of

[25] District hospitals have been divided into two categories: type A, with capacity to provide surgery requiring anesthesia (though lack of staff limits the capacity to provide surgical services at this level); and type B, with more limited capacity to provide minor surgery. By the end of 2010, there were 18 type A district hospitals and 109 type B district hospitals (MOH Decree No. 2312, 30 December 2009).

the plan. WHO leads the health cluster in cooperation with MOH. The cluster involves the Lao Red Cross, the French Red Cross, the United Nations World Food Programme (WFP), UNDP, and Care International, etc.

WHO provides technical and financial support. Although disaster management is not prioritized, it assists the EOC as mentioned in Section 6.3.2 in line with the core capacity of the International Health Regulation (IHR).

The ADPC and the United States Agency for International Development (USAID) are jointly providing training courses on Hospital Preparedness for Emergencies (HOPE).

6.7 Conclusion

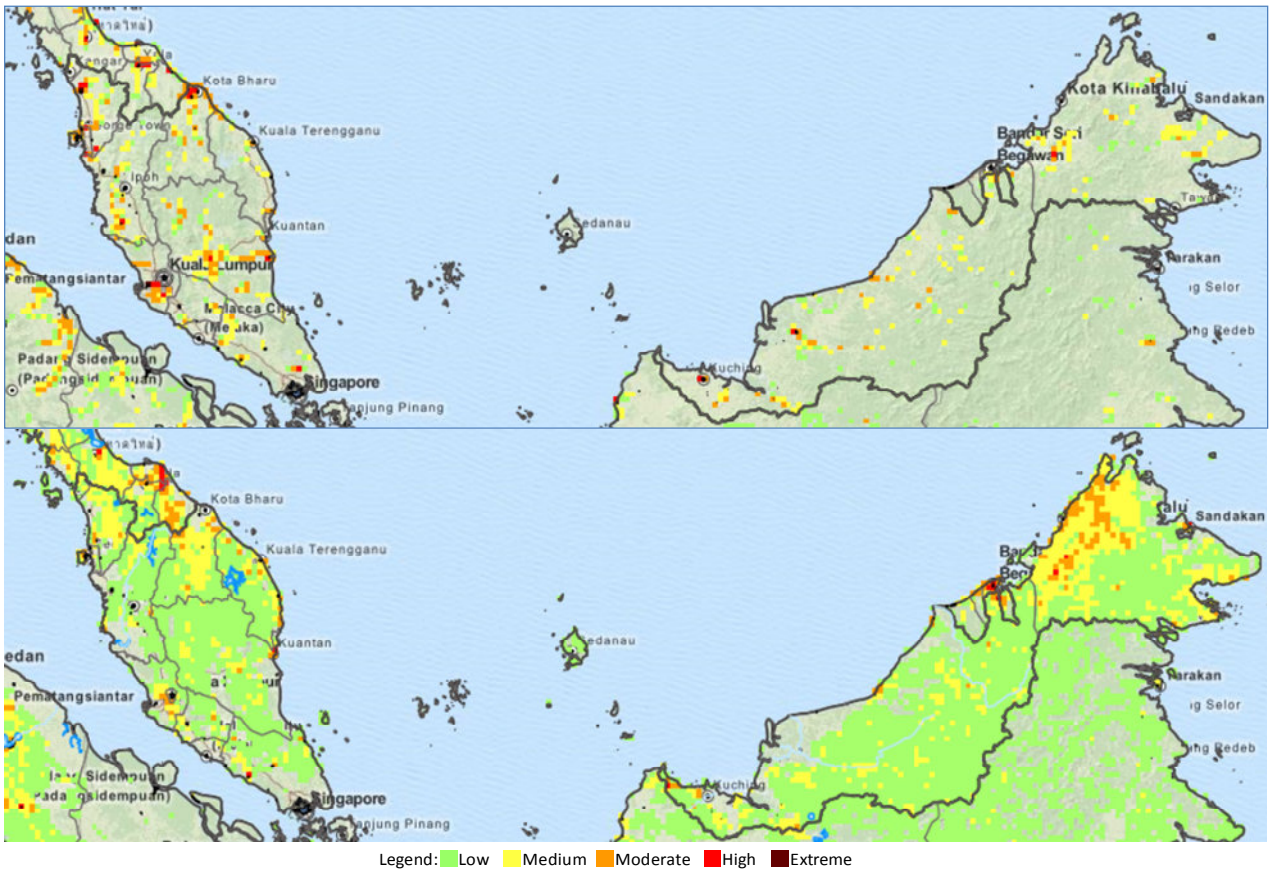
Since the institutional setting for national disaster management was reformed recently, the health sector needs to coordinate with the new national structure. According to the observation of the Survey Team, the development of EMS system is in the initial stage from policy and legislation to operational level.

Although various organizations started providing patient transportation services to respond to the increasing traffic accidents, quality of services varies and some might be inappropriate in terms of the patients' safety. It might be one of the priority issues to develop medical and co-medical personnel for EMS and establish a certain standard and appropriate supervising system for such ambulance services.

Chapter 7 Country Report: Malaysia

7.1 Overview of Disaster Occurrences (Natural and Man-made)

Malaysia is a less disaster-prone country in the ASEAN Region. The major and most frequent disaster is river flood during the rainy season which is sometimes associated with landslides. The river flood occurs mainly in the eastern part of the country including Kelantan, Terengganu and Pahang States. As shown in Figure 4-1, the northern part of Sabah State is a high risk area for landslide; and Kota Bharu, Kelantan State seems to be a high risk area for flood.



Source: [UNEP/ UNISDR, 2013]

Figure 7-1 Mortality Risk: Flood (Above) and Landslide (Below)

The emergency response system was officially enforced by law; however, practical implementation of the emergency response is still in progress. In 2014, when a large flood occurred in Kelantan, the Federal Government responded instead of the local government because the local government officials did not have any experiences in dealing with such disaster before and not familiar with emergency response.

7.1.1 Occurrence of Natural Disasters

Table 4-1 shows the occurrence of natural disasters from 1980 to 2014. Flood is the most frequent disaster (66%) which is caused by storms and rainfall; while storm (12%) and landslide followed.

Table 7-1 Natural Disaster Occurrence in Malaysia (1980-2014)

Type of Disaster	No. of Occurrence	Death (person)	Totally Affected (person)
Flood	33	200	641,058
Storm	6	275	47,946
Landslide	4	96	291
Wildfire	4	0	3,000
Drought	2	0	2,205,000
Earthquake and Tsunami	1	80	5,063
Total	50	651	2,902,358

Source: [CRED]

Table 7-2 shows the remarkable natural disasters in Malaysia from 2000 to 2014. Also included in the table, are two remarkable natural disasters in the 1990s.

Table 7-2 Remarkable Natural Disasters in Malaysia

Disaster	Month, Year	Number of Death[1)]	Mainly Affected Areas[1),2)]
Collapse of Highland Towers Condominium caused by Landslide	Dec. 1993	72	Ulu Klang in Kuala Lumpur
Genting Highland Bus Crash caused by Landslide	Jun. 1995	30	Genting Highland near Kuala Lumpur
Indian Ocean Tsunami	Dec. 2004	80	Penang and Langkawi Island
River Flood	Jan. - Feb. 2007	17	Johor, Kelantan, Pahang and Terengganu states
River Flood	Dec. 2007	29	Johor, Pahang Batu Paht and Kota Tinggi states
Kelantan Flood	Dec. 2014	21	Kelantan, Pahang, Terengganu, Perak, Johor, Selangor, and Perlsi states, Sabah (Borneo island)

Source: 1) [CRED], 2) [OCHA]

7.1.2 Occurrence of Man-made Disaster

Table 7-3 shows the occurrence of man-made disasters from 1980 to 2014. Forty-six percent of man-made disasters are ship accidents.

Table 7-3 Man-made Disaster Occurrence in Malaysia (1980-2014)

Type of Disaster	No. of Occurrence	Death (person)	Totally Affected (person)	Death per Occurrence
Ship Accident	14	660	197	47.1
Fire	5	49	1,000	9.8
Air Accident	4	302	19	75.5
Road Accident	3	78	27	26.0
Explosion	2	59	3,261	29.5
Collapse	1	30	300	30.0
Others	1	0	5,000	0.0
Total	30	1,178	9,804	

Source: [CRED]

The most remarkable man-made disaster since 2000 was the ship accident at Port Dickson which caused 53 deaths in August 2000.

7.2 Emergency Response System

7.2.1 Laws and Regulations for Emergency Response

The National Security Council Directive No. 20 (NSC No. 20), Policy and Mechanism for National Disaster and Relief Management, is the main guidelines for emergency response in Malaysia. The first edition of the guidelines was promulgated in 1997, which mainly focused on disaster response. The revised guidelines issued in 2012 (Table 7-4) includes the concept of disaster cycle, response to complex disasters, role of communities, private sector, and non-governmental organizations, and correspondence with the ASEAN Agreement on Disaster Management and Emergency Response (AADMER).

Table 7-4 Contents of NSC No.20 (2012)

1. General	19. The Role and Duty of Major Rescue Agencies and Secondary Agencies in Disaster Management on Scene
2. Objective	
3. Definition of Disaster	
4. Disastrous Incidents	20. The Role and Duty of Relief and Recovery Agencies and Voluntary Bodies In Disaster Management on Scene
5. Air Disaster	
6. Flood Disaster	
7. Nuclear and Radiology Disaster	21. Exercises
8. Sea Disaster	22. Training and Courses
9. Non-Disastrous Incidents	23. Collaboration from Government Agencies, Statutory Bodies and Private Sectors
10. Disaster Management Level	
11. Disaster Management and Relief Committee	24. Media Control Centre
12. Disaster Management Mechanism	25. Declaration of Disastrous Situation
13. The Responsibility of State Disaster Management and Relief Committee Chairman to the State Operation Director	26. Management of Disaster Relief Fund
	27. Statements and Other Messages
	28. Enforcement
14. Assistance from the Superior Level	
15. Order and Control	Appendixes (details of membership, roles and responsibilities of the relevant committees and agencies)
16. Management At the Scene of Disaster Based on Zone	
17. Guidelines in Disaster Management	
18. Standing Order for Agencies Operation	

Source: NSC

7.2.2 Organization for Emergency Response

(1) National Security Council and National Security Division

The Disaster Management Division of the National Security Council (NSC) under the Prime Minister's Department is responsible for coordination of all activities related to disasters, including establishing regulations and strategies, standard operation procedures (SOP), preparedness, emergency response, and mitigation and restoration. In the period of emergency response, the NSC is the secretariat for the National Disaster Management and Relief Committee (National DMRC) for coordination of all the activities. At the state and district levels, the National Security Division (NSD) is responsible for coordination of all activities related to disasters and is the secretariat of the DMRC.

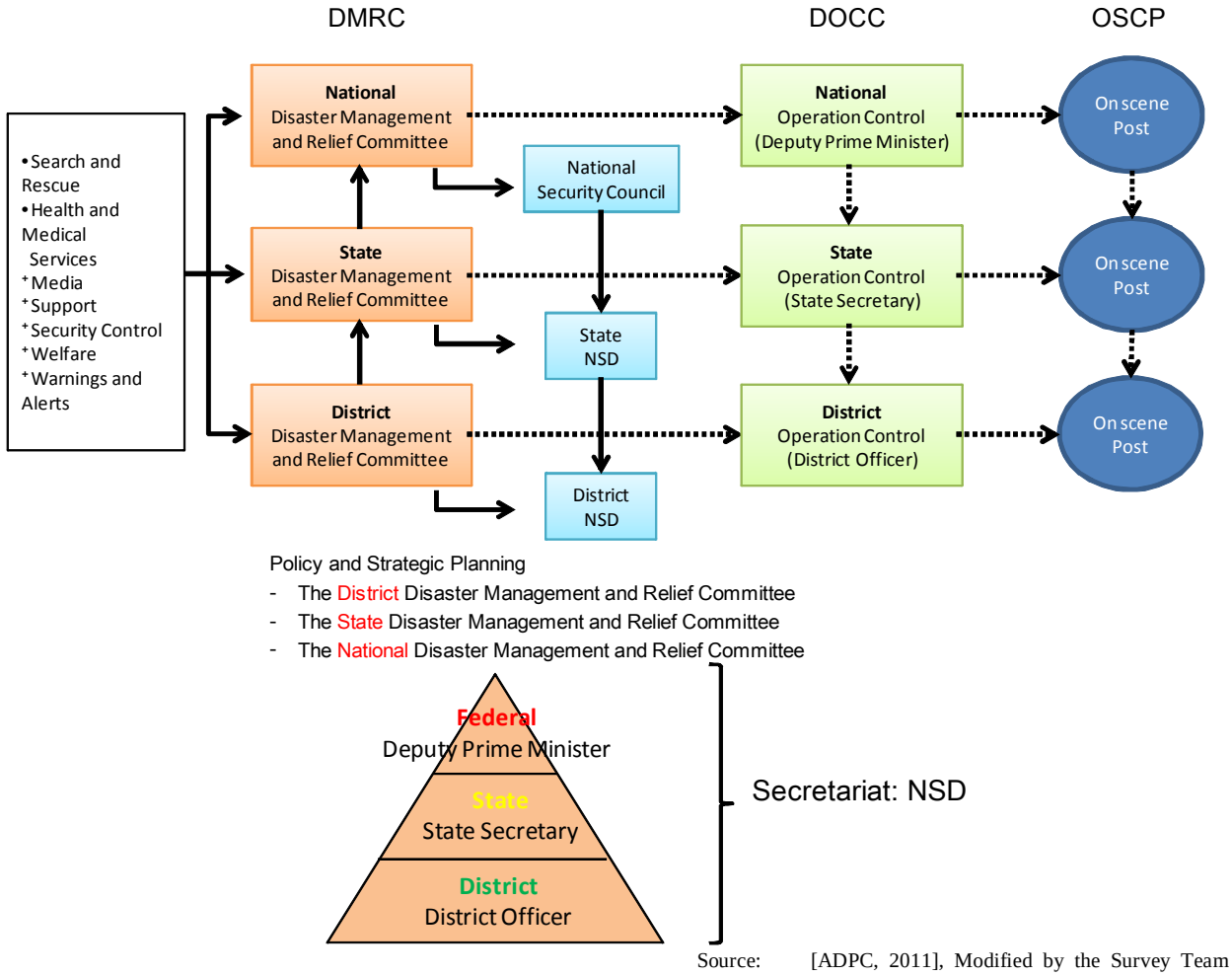
The NSC collects information on disaster and emergency response in two different ways: (1) the DMRC at each level (where the NSC staff is a member), and (2) the local health office at each level through the Crisis Preparedness and Response Centre (CPRC) of the Ministry of Health (MOH).

(2) **Disaster Management and Relief Committee (DMRC)**

The DMRC is responsible for all the activities related to disaster management at all levels of disaster response.

The DMRC is composed of two organizations, namely, the On-Scene Command Post (OSCP), and the Disaster Operation and Control Center (DOCC). The OSCP is organized by the officer-in-charge of the police district, while the DOCC is headed by the district officer at the district level, the state secretary at the state level, and the National DMRC Chairman at the national level.

The organizational framework of the NSC, NSD, and DMRC is shown in Figure 7-2.



Source: [ADPC, 2011], Modified by the Survey Team

Figure 7-2 Disaster Management Arrangement in Malaysia

The main functions of the DMRC are as follows:

- Formulate policies and strategies at the federal level and ensure implementation at the state and district levels;
- Ensure coordination among the agencies involved;
- Determine the principal emergency agencies;
- Activate the DOCC at the federal, state, or district level;
- Coordinate and mobilize resources and logistics available both from the government agencies and the private sector;
- Coordinate assistance and rehabilitation to the disaster victims;
- Carry out postmortem analysis of the disaster;

- Formulate and implement disaster awareness and education; and
- Coordinate disaster drills and exercises.

7.2.3 Classification of Disaster and Emergency Response

Table 7-5 shows the types of disasters and the levels of emergency response in Malaysia.

Table 7-5 Disaster and Emergency Level in Malaysia

Level	Description	Organization for Response	Responsibility
Level 1 District Level	- An under-control local disaster that has no potential for further outbreak. - Expected to be less complex and may result in minimal loss of lives and properties. - Will not be detrimental to the daily routine of the people at large.	District DMRC - District DOCC - District OSCP	District Officer
Level 2 State Level	- A more serious disaster happening in a larger area or exceeding two districts and has a potential for a bigger outbreak. - Potential heavy loss of life and properties. - Potential for impeding the daily activities of the local people. - More complex than Level 1 disaster and poses more difficulty in terms of search and rescue and relief activities.	State DMRC - State DOCC - State OSCP	State Secretary
Level 3 National (Federal) Level	- Characterized by extreme complexity or the disaster has taken place through a wide area or exceeding two districts. - Will be handled by the authorities at the federal level with or without assistance from foreign countries.	National DMRC with outside help - National DOCC - National OSCP	Deputy Prime Minister

Source: NSC and JICA Malaysia

In the event of disaster, the DMRC at each level manages all the response activities through the OSCP and DOCC. The OSCP at each level coordinates and implements all activities related to disaster operation such as search, rescue, and relief at the scene, and the DOCC at each level conducts meetings of the DMRC, monitors the situation and damages of the disaster, and coordinates relevant activities such as search and rescue, emergency, and relief in order to ensure that these efforts are effectively and smoothly implemented.

7.2.4 Emergency Response at the Site

(1) Disaster Relief

The fire and rescue department, police, and civil defense force at the district level are the primary responders when a disaster occurs. The District DMRC coordinates the concerned organization. For the victims, the National Disaster Relief Fund (NDRF) provides relief aid of 500 MYR per person.

(2) Emergency Drills

Emergency drills are conducted by the districts and states twice a year. The national level emergency drill is also being conducted by the NSC annually. For instance, in 2014, it was conducted at the Kuala Lumpur City Center (KLCC).

According to the MOH, the following drills are relevant to the health sector and should regularly be conducted:

- Crisis and Disaster Management Course;
- Disaster Drill and Tabletop Exercise; and
- Major Incident Response Exercise (MIREX) Competition.

7.3 Overview of Disaster/Emergency Medicine

Before 1990's, although some hospitals had emergency departments, it was like a temporary space to wait for admission and there was no medical doctor. In 1993, the first emergency medical and trauma care service (EMTS) was started in Kuala Lumpur Hospital [MOH Malaysia, 2005]. Then, triage was introduced and necessary training was initiated such as Malaysia Trauma Life Support (MTLS) and Advanced Life Support (ALS). In 1998, postgraduate education for emergency physician (EP) was started and an EP is recognized as a specialist doctor. Ambulance services were piloted in 2004 and after the tsunami disaster, it was expanded nationwide. Disaster management is recognized as one of the core businesses of emergency medical technician (EMT) [MOH Malaysia, 2005]. To enhance disaster response, the CPRC was established under the 9th Malaysia Plan 2006-2010 to enhance disease surveillance system and emergency preparedness and response.

7.3.1 Legal and Political Arrangements

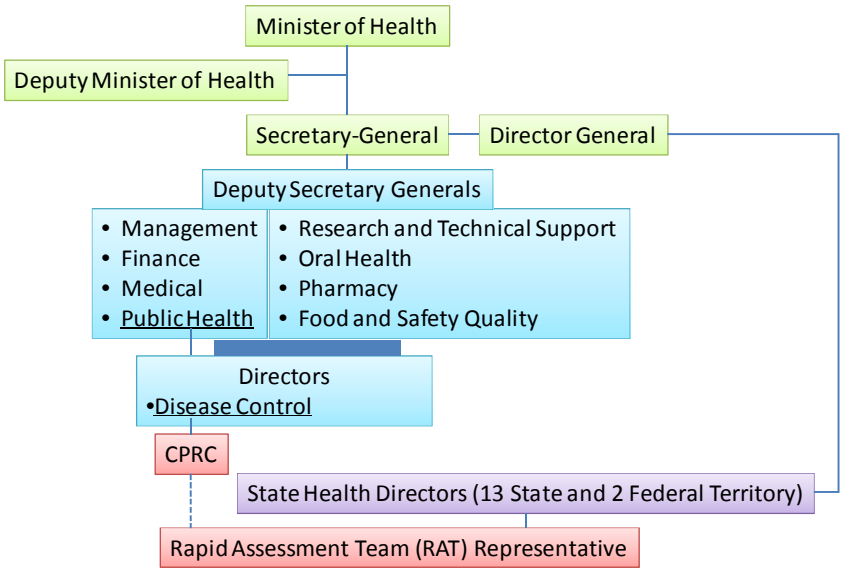
There is no law or regulation on Emergency Medical Services (EMS) in Malaysia. However, there is a guideline that is being used by all Emergency and Trauma Departments in MOH hospitals.

7.3.2 Relevant National Development Strategy/ Plan

The Emergency Medicine and Trauma Services Policy (EMTSP) 2012 provides standards in emergency medical and trauma services including policy, scope and service system, facilities, equipment, and human resource development. It will be reviewed every five years. According to the policy, an emergency and trauma service department is expected to provide the following emergency medical services: major trauma care, pediatrics care, mental health, care for survivors of gender-based violence, infectious diseases, care for victims of chemical/ biological/ radiological incidents, observational care, prehospital care, as well as transport and retrieval services. Also it is expected to prepare for mass casualty or disaster victims [MOH Malaysia, 2012].

7.3.3 Institutional Setting

The CPRC of the MOH takes the main responsibility of emergency response in the health sector. It was established as part of the overall strategies in preparation and effective management of disasters, outbreaks, crises and emergencies (DOCE) related to health. The CPRC is placed under the Surveillance Section of the Disease Control Division. (Figure 7-3)



Source: [MOH Malaysia, 2013] modified by the Survey Team

Figure 7-3 Institutional Setting of Emergency Response in the Health Sector

The CPRC is equipped with an online information management system to monitor the abovementioned notifiable diseases and emergency patients as well as staff deployment to affected areas nationwide.

There are five permanent staff consisting of medical doctors, public health inspectors, and administrative staff. It operates in passive surveillance mode for DOCE and emergency patients. A daily report specific to DOCE should be sent to all relevant stakeholders within the MOH. In the event of DOCE of significance, upon the advice of the Director of Disease Control, Deputy Director General of Health (Public Health), or Director-General of Health, an operation room will be set up in the CPRC and will be switched to active surveillance mode [Noor Hisham Abdullah, 2014].

7.4 Current Situation of Disaster Medicine

In general, Malaysia is not disaster-prone country as described in Section 7.1. Therefore, disaster medicine is currently being set up as part of disaster management authorized by NSC No. 20. The MOH requires all medical facilities to be prepared for disaster management. EMTSP requires that a medical facility should be responsible in providing immediate response to the needs of the affected people. On the other hand, the MOH has also set up a support system for small facilities such as clinics, which are to deploy members to the Medical Emergency Response Teams and to transport patients to referral hospitals.

7.4.1 Facility and Equipment

There is no designated hospital for disaster response; however, respective state hospitals are prepared in managing disaster and mass casualties.

7.4.2 Response System

In general, disaster response is started by a local Search and Rescue Team (SRT) followed by Medical Response Team. The local SRT mainly consists of Fire and Rescue Department Malaysia. When the

situation is beyond these capacities, Special Malaysia Disaster Assistance and Rescue Team (SMART) is deployed under the control of NSC. EMTS are usually the first responder in mass casualty situations and responsible for the acute management of the patients as same in disaster situations. In addition, EMTS are involved in training and preparedness of mass casualty and disaster management including CBRNE (Chemical, Biological, Radiological, Nuclear, and Explosives).

Each hospital has a disaster response plan according to EMTSP. In general, this plan is based on Incident Command System (ICS), the hierarchy start at the top with the hospital director, and Major Incident Medical Management and Support (MIMMS) [MOH Malaysia, 2012].

7.4.3 Major Providers of Disaster Response

(1) SMART

SMART was set up for domestic and overseas disaster response. The composition is almost the same as the Japan Disaster Relief (JDR) rescue team[26]. The numbers of members is usually over 50 personnel and are deployed depending on the needs of the affected areas. The composition of SMART is as follows:

- Fire and Rescue Department Malaysia (FRDM);
- Royal Malaysian Police (RMP);
- Malaysian Armed Forces (MAF);
- Ministry of Health Malaysian (MOH);
- Atomic Energy Licensing Board (AELB);
- Malaysian Civil Defense Force (MCDF); and
- Other authorized agencies.

(2) Medical Response Teams

The MOH is currently developing a dedicated and trained team for disaster management such as the Japanese Disaster Medical Assistance Team (DMAT). The Malaysian Medical Emergency Response Teams (MMERT) are categorized into three levels based on official certifications: Basic (B MERT), Advanced (A MERT), and Training of Trainer (T MERT). In general, the team comes from the emergency department of public hospitals. The team consists of the following:

1. EP or Medical Officer (Leader)
2. Staff Nurse
3. Assistant Medical Officer (AMO)
4. Health Attendant
5. Driver

(3) Transportation of Patients

In general, the responsibility of evacuating victims is taken by the MOH, Malaysian Civil Defense Force (MCDF), Malaysian Red Crescent Society (MRCS), Malaysian People's Volunteer Corps (RELA), Ministry of Tourism, and other agencies under the control of the NSC.

[26] JDR are composed of National Police, Fire and Rescue and Coast Guard with medical team and structure engineers supported by the JICA logistics.

7.4.4 Human Resource Development

There are no special institutions providing education and training on disaster medicine; however, a lecture on disaster management is included in the medical school curriculum. Medical students can participate in disaster management training and be provided ad-hoc basis to raise awareness of disaster response. Regarding nursing education, there is no disaster nursing course in Malaysia.

Disaster management courses are provided regularly as part of in-service training in hospitals. In 2012, under the EMTS, the Crisis and Disaster Training for Emergency Medical Personnel was started in collaboration with the Malaysian College of Emergency Physicians. Minimum qualification requirements for medical personnel to be involved in a medical response team can be licensed by the MOH upon completion of the MTLS/ Prehospital Critical and Trauma Life Support (PHCTLS) training course.

(1) Major Training on Disaster Medicine

Table 7-6 summarizes the major training courses for disaster medicine.

Table 7-6 Summary of Training Program for Disaster Medicine

Type of Medical Emergency Response Team	Duration	Lectures	Exercises
Basic: B MERT	2 1/2 Days	- Disaster management and NSC - Role of medical response in crisis and disaster - On site medical management - Casualty management system - Skills station	- Basic scenarios (e.g. Road Traffic Accident (RTA), Mass Casualty Incident (MCI)) - Tabletop exercises (4 scenarios) each last for 1 hour - Field exercises (4 scenarios) each last for 1 hour
Advanced: A MERT	5 Days		- Advanced Scenarios (e.g. RTA, MCI, CBRNE Management) - Table top exercises (6 scenarios) each last for 1 hour - Field exercises (6 scenarios) each last for 1 hour
Training of Trainer (TOT): T MERT	5 Days (Focusing on emergency physicians from all states)		

Source: [MOH Malaysia, 2014]

7.4.5 Receiving/ Dispatching Medical Team to Other Countries in Emergencies

There is no policy or regulation for receiving foreign medical personnel or team. As domestic resources are currently affordable to respond to emergency situations, there are no or few experiences in receiving and deploying foreign medical teams.

7.4.6 Experiences in the Past Disaster

The Highland Towers Collapse in 1993 and the Genting Highland Bus Crash in 1995 were significant events to review the disaster response system in Malaysia. Based on these experiences, the NSC established the basis of multi-agency cooperation. In addition, the Indian Ocean Tsunami in 2004 saw the need for international cooperation with the deployment of overseas disaster response teams.

The flood in Kelantan in 2014 was the biggest challenge to the Malaysian disaster management system. Most of the health facilities, including 934 clinics, were damaged and/or isolated except for a university hospital in Kotabaru. The NSC provided transportation of patients and emergency supplies and generators

for the isolated health facilities. To provide necessary health and medical services, the MOH operates a field relief center. The ICS and support system were functional; however, communication breakdown caused by damage of infrastructure was sometimes critical. According to the NSC, based on the lessons learned from this disaster, it is recommended that the capacity of hospitals should be enhanced such as in identifying location for rebuilding, additional functions for shelters, and helipad.

7.5 Current Situation of Relevant Emergency Medical Services

In Malaysia, more than 80% of medical services are provided by the public sector. The EMS in Malaysia was developed after the United States of America (USA)/ United Kingdom (UK)/ Australian model, and the EMT was developed referring to the UK education system. In addition, the classification of healthcare facilities is based on variation of specialists and daily number of outpatients. Emergency and trauma departments of public hospitals are operated by the guidelines shown in the EMTSP as mentioned in the previous section.

7.5.1 Facility and Equipment

In Malaysia, hospitals are categorized into four according to coverage of specialty and capacity to intake outpatients. Class IV hospitals are highly-specialized referral centers and have a minimum of 300 patients/day. Class III hospitals can take a minimum of 200 patients/day, while Class II hospitals can take a minimum of 150 patients/day. Class I hospitals are the lowest level hospitals. Regarding emergency departments (ED), deployment of specialist doctors are designated as shown in Table 7-7.

Table 7-7 Coverage of Specialists in Emergency Departments by Category of the Hospitals

Category	Numbers	Specialist coverage
National Hospital	1	"Active coverage" and specialist "on the floor (ED)"
State Hospital	14	
Major Specialists Hospitals	26	24 hours coverage, either as active or passive
Minor Specialists Hospitals	27	Headed by EP, with minimum number of 3 EP's
Non-Specialist Hospitals	66	
Special Institution	10	
Total	**144**	

Source: MOH Malaysia

(1) **Emergency Department**

There are ED or emergency unit in 132 public hospitals. The minimum payment is 1 MYR (for Malaysian nationals) per ED visit including consultation, investigation, and medication. Total attendance number was 7.5 million in 2012, which includes triage red (priority 1) at 3%, triage yellow (priority 2 and 3) at 20%, and triage green (priority 4 and 5) at 77%. The standards of basic medication and equipment in ED are defined in the EMTSP. The components of Emergency Clinical Care are as follows [MOH Malaysia, 2012];

- Triage,
- Emergency care,
- Emergency critical care,
- Observational medicine,

- One stop crises centre services[27], and
- Minor emergency medicine and trauma limited follow-up.

(2) **Dispatch Center**

Medical Emergency Coordinating Centre Services (MECCS) provides medical dispatch, including primary and secondary ambulance services, inter-facility transfers, major incident and disaster management, as well as mass gathering and major event management. There are 21 MECCs in the country. Basically there is one center per state, which is located at the state or district hospital. Some states with urban areas have more than two, i.e., the Federal Territory of Kuala Lumpur has two MECCs and Selangor State has five MECCs. These centers are located in areas with heavy traffic and in industrial areas where the need for emergency medical services could be concentrated.

7.5.2 Response and Transportation System

(1) **Emergency Call**

In Malaysia, the emergency phone number is 999, which started in 2007. Initially, the numbers were different for each service such as police, fire and rescue, and EMS. The number for all services was integrated into one number in 2012. Primarily, Telecom Malaysia receives emergency calls from three call centers in the country, and then distributes the emergency-calls to the National Police, Fire and Rescue, EMS, Civil Defense and Maritime depending on the situation or event. When the EMS receives MCI from the telecom call center, other agencies can also receive the same information.

Basically, the MECC dispatches the nearest ambulance team to the location of the patient; however, in case of critical situation, the nearest Basic Life Support (BLS) level ambulance team is dispatched as the Primary Response Team, followed by the ALS team based on a hospital near the patient as the Secondary Response Team.

The MECC deploys an ambulance according to the original protocol based on the Emergency Severity Index (ESI). For example, the MECC in Serdang District Hospital has three workstations for call takers, radio communication system, and ten ambulances. Although there are ten staff and three supervisors, it seems not sufficient because they have to undertake three-shift call taking and ambulance deployment. Quality assurance is undertaken by analyzing gaps between decisions of call takers and the diagnosis of the patient in the hospital. According to the MECC in Serdang, about 2% of all dispatches are non-proper cases.

(2) **Medical Response Teams**

In general, each ambulance service is operated by one AMO and one driver trained as a first responder. It will request online medical direction during an extreme and unique emergency situation or encounter from the MECC. In addition, the EP will attend an emergency in case of MCI, if necessary.

[27] One-stop crisis center services: An integrated and comprehensive service center for the management of survivors of violence and sexual abuse against women, children and elderly.

Ambulance service provides have multiple functions that are not limited to hospitals but also covers primary health facilities. The types of ambulance services are as follows:

(a) Primary Response Service covers management of incidences which require emergency medical treatment in an out-of-hospital environment.
(b) Secondary Response Team supports the Primary Response Team. The Secondary Response Team can be dispatched when the Primary Response Team requires assistance.
(c) Inter-facility Transfer provides transportation service of patients to be referred for advance medical care.
(d) Medical Standby provides medical coverage at public events attended by VIPs, or sports events that involve risk.
(e) In the event of a disaster, the ambulance service is needed for the purpose of transport, transfer, and management of both semi-critical and critical patients.

(3) **Patient Transportation**

Most of the patients access the ED with their own transportation. However, when patients need prehospital care, public hospitals could provide ambulance services offered by the MECCS. Also, inter-facility transportation is coordinated by the MECC according to the standard protocol and guidelines of the hospitals on a case-to-case basis. The MOH is the main ambulance service provider all over the country. They also receive support from agencies including the Red Crescent Society, St. John's Ambulance, and the Civil Defense. As of the moment, there is no specific regulation or law that governs private or other ambulance services, so the nature of ambulance ownership cannot be determined.

7.5.3 Human Resources

In Malaysia, there is no EMT like in the US/UK system. The Assistant Medical Officer (AMO) functions as an ambulance dispatcher in the EMS, an assistant to a medical doctor in an ED, and emergency care provider in health clinics. The AMO is supervised by the Emergency Medical Officer (EMO). Currently, only three EMOs are accredited as supervisors and master trainers by the MOH. Only one has both licenses as call taking trainer and EMO trainer. Others only have a license as call taking trainer.

Currently, around 180 EPs have been produced, and more than 90% of them are working in 63 public general/ specialist hospitals. In addition, others are in universities or the army hospital, and only one EP is working in a private hospital but not as an EP. Advance emergency care is provided at the MOH hospitals by the EP. In contrast, there is no EP in private hospitals although there is an emergency unit/department.

(1) **Pre-service Education**

All medical practitioners that are practicing in Malaysia are bound with the Malaysian Medical Council regulations.

Emergency physician (EP) is recognized as a specialization in 2002. The number of intakes for EP specialization per year is around 15-20 from each of the three universities [MOH Malaysia, 2014]. Table 7-8 summarizes the recommended basic training requirement for medical personnel.

Table 7-8 Recommended Basic Training Requirement for Medical Personnel

Category	Recommended Basic Training Requirement
Specialist	- Advanced Airway Management - Area of interest: Clinical Toxicology, Prehospital Care, Sport Medicine, Disaster Medicine, Hyperbaric and Underwater Medicine, Emergency Critical Ultrasonography - Research Methodology and Biostatistics - Quality Assurance - Professional Conferences - Middle-level Management
Medical officer*	- Basic Life Support (BLS) - Trauma Life Support (TLS) - Pediatric Advanced Life Support (PALS) - Advanced Life Support (ALS) - Triage Skills and Competency - Corporate Culture and Communication - First Responder Life Support; Trauma, Medical Emergencies, Disaster, CBRNE - Pain Management Course
Assistant Medical Officer / Staff Nurse	- BLS - ALS (Trauma, Cardiac) - PALS - Holistic Pain Management - Triage Skills and Competency - Corporate Culture and Communication - First Responder Life Support; Trauma, Medical Emergencies, Disaster, CBRNE - Prehospital Care Course - Post Basic Trauma Care Intensive/Coronary Care - Pain Management Course
Other Medical Professionals	- Life Support Courses (BLS, Malaysia Trauma Life Support (MTLS), ATLS, Cardiac Mega Code) - First Responder Life Support for EMTs - Prehospital Care Course - Triage Course - OSCC Course - High Quality Continuous CPR

Note: *Medical education is five years after eleven years primary and secondary education [M. Beppu and N. Nara, 2009].
Source: MOH Malaysia and [MOH Malaysia, 2014]

AMO certification is given after a three-year diploma course and six months on-the-job training in a medical facility. Currently, more nurses are becoming AMOs. The University Kebangsaan Malaysia (UKM) provides a bachelor course for AMO (four years) to enhance its capability as a paramedic.

AMOs who completed two weeks of training of call taking and dispatching as well as on-the-job training for six months will be certified as EMO by the MOH. The certification needs to be annually renewed through examination.

As for undergraduate education of emergency medicine, a bachelor of science in emergency medicine degree is provided by the Medical Faculties at UKM. Although it is not yet officially approved, the graduates are involved in the EMS as paramedics.

The first post-basic emergency course was started in May 1989 at the Medical Assistants Training College in Seremban. It was a six-month course and opened for both physicians and nurses [MOH Malaysia, 2005]. Emergency physician is recognized as a specialization in 2002. Postgraduate training (master's degree) in EM was established in 1998 by University Sains Malaysia, followed by University Malaya and UKM in 2005. It is structured as a four-year course including dissertation. The number of intakes for EP is 15-20 per year from each of the three universities [MOH Malaysia, 2014]. Table 7-9 shows the steps on how to be certified as a specialist in EP

Table 7-9 Steps to be Certified as a Specialist in EP

1. Training in university/ public hospitals	Internship in ED: 30 to 36 months* (two to three trainees per supervisor) Rotation to other disciplines: 24 months
2. Examinations	Part 1: end of the first year Part 2: end of the fourth year subject to passing the dissertation before taking the examination
3. Certification as a specialist	On-the-job training: 6 months (supervised by a senior specialist or a consultant)

Note: *Initially, internship in ED was 24 months. As more supervisors (specialist EP) increased, the period has been increased accordingly.
Source: MOH Malaysia

Currently, the MOH recognizes six subspecialties of EP as follows: (1) Emergency Critical Care, (2) Clinical Toxicology, (3) Emergency Trauma Care, (4) Pediatric Emergency, (5) Disaster Management, and (6) Prehospital Care.

(2) **Continuous Professional Development (CPD)**

Short in-service training courses are conducted locally by the respective hospitals or nationwide from time to time. Among them are as follows:

- BLS;
- ALS;
- Major incident management;
- Patient triaging;
- Managing patients in crisis (domestic violence, sexual assault, child abuse, and others); and
- Wound management.

7.5.4 Relevant Academic Society/ Professional Organization

There are two academic societies relevant to emergency medicine, namely, the Malaysian College of Emergency Physician, and the Malaysian Society of Traumatology & Emergency Medicine (MASTEM). The Malaysian College of Emergency Physician also takes care of disaster medicine.

7.6 International Cooperation

According to the MOH, there is no specific international cooperation in the field of disaster medicine and emergency medicine as of the moment.

7.7 Conclusion

Malaysia has established EMS with well-trained co-medical staff such as call taker and emergency nurses/ medical officers. Regarding disaster medicine, several medical response teams have been deployed and The MOH is trying to strengthen medical response teams referring the Japanese model, DMAT.

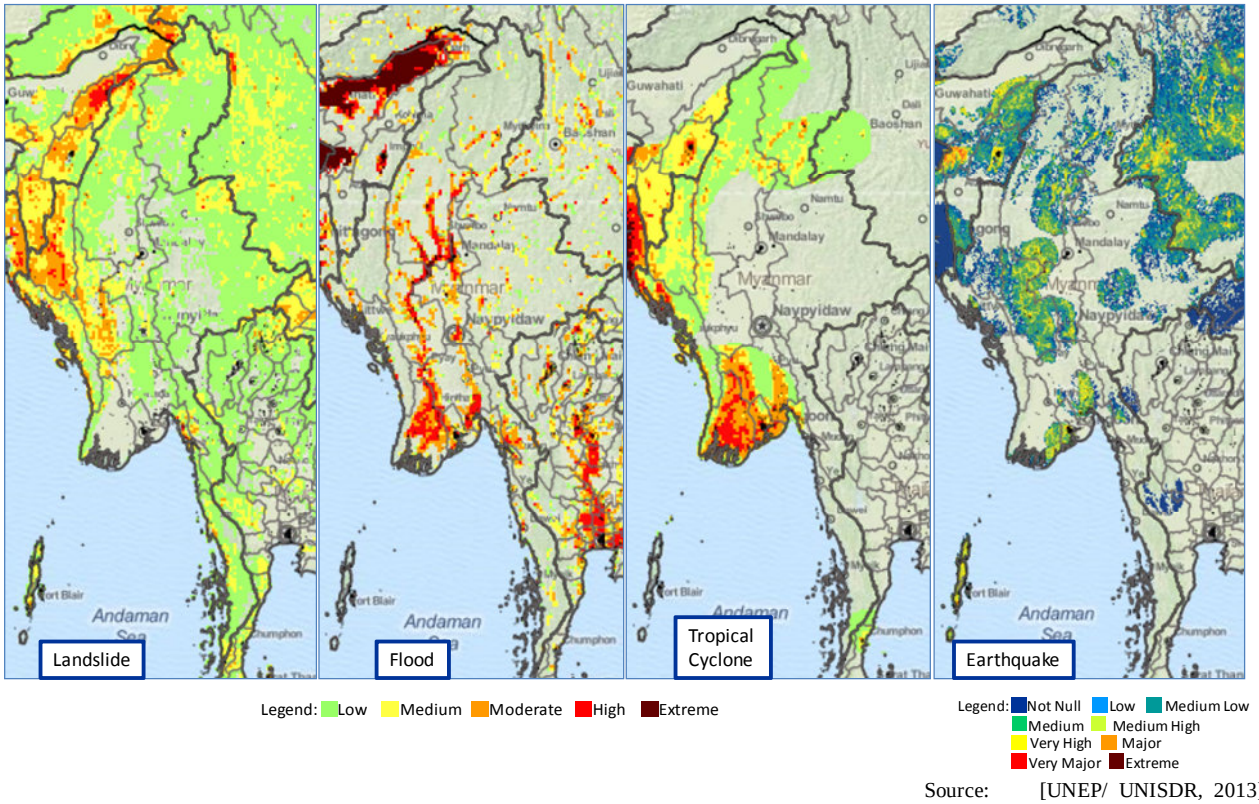
During the in-country survey, Malaysia was being in the big challenge in disaster response and health management for the Kelantan Flood. The Survey Team observed that CPRC seemed to be well functioning to monitor deployment of MOH staff of the affected areas. According to the interview, the MOH will review the existing disaster health management and response system based on the experiences. Although Malaysia still has some challenges in disaster medicine and EMS for further development, their experiences especially in development of EMS system.

Chapter 8 Country Report: Myanmar

8.1 Overview of Disaster Occurrences (Natural and Man-made)

Myanmar is one of the most disaster prone countries in the ASEAN Region. Flooding of rivers occurs frequently in the central area such as Sagaing and Magway states and in the southern coastal areas such as Rakhine, Ayeyarwady, Yangon, Bago, Kayin, Mon and Tanintharyi, and especially in the Irrawaddy Delta area. Earthquake is also a common disaster in Myanmar which usually occurs mainly in the eastern and northeastern part near the border of Thailand. The coastal areas of Myanmar are also the usual paths of cyclones which bring heavy rain in the country and tidal surge in coastal areas (Figure 8-1). In May 2008, 130,000 people perished or went missing due to Cyclone Nargis.

Transportation accidents are major man-made disaster. The SEA Games (South East Asian Games) held in Nay Pyi Taw in 2013 provided an opportunity to enhance response system for mass casualty incidents.



Source: [UNEP/ UNISDR, 2013]

Figure 8-1 Mortality Risk: Flood, Landslide, Tropical Cyclone and Earthquake

8.1.1 Occurrence of Natural Disasters

Table 8-1 summarizes the occurrence of natural disasters from 1980 to 2014. More than the half of the disasters in Myanmar are due to floods.

Table 8-1 Natural Disaster Occurrence in Myanmar (1980-2014)

Type of Disaster	No. of Occurrence	Death (person)	Totally Affected (person)
Flood	17	431	1,048,412
Storm	6	138,709	2,866,125
Earthquake and Tsunami	5	183	38,623
Landslide	4	125	146,367
Wildfire	1	8	48,588
Total	33	139,456	4,148,115

Source: [CRED]

Table 8-2 shows remarkable natural disasters in Myanmar from 2000 to 2014.

Table 8-2 Remarkable Natural Disasters in Myanmar (2000-2014)

Disaster	Month, Year	Number of Death	Mainly Affected Areas
Cyclone Rakhine	May 2004	236	Rakhine State (townships of Sittwe, Myae Bon, Pauk Taw, Myauk Oo, Ponnar Kyun, Min Byar, Kyauk Phyu, Ann of and numerous islands off the coast)
Earthquake and Indian Ocean Tsunami	Dec. 2004	71	Coastal areas including Rakhin State, Ayeyarwaddy Division, Yangon Division, Mon State, Tanintharyi Division
Cyclone Nargis	May 2008	138,366	Southern part of Yangon and the Irrawaddy Delta
Cyclone Giri	Oct. 2010	45	Rakhine State
Tarlay Earthquake	Mar. 2011	74	Tarlay sub-township (Shan State) and Tachilek, near the border of northern Thailand
Flash Flood	Oct. 2011	151	Magway, Mandalay and Sagaing regions.

Source: [CRED], [OCHA]

8.1.2 Occurrence of Man-made Disasters

Table 8-3 shows the occurrence of man-made disasters from 1980 to 2014.

Table 8-3 Man-made Disaster Occurrence in Myanmar (1980-2014)

Type of Disaster	No. of Occurrence (A)	Death (person) (B)	Totally Affected (person)	Death per Occurrence (B/A)
Fire	21	226	214,909	10.8
Ship Accident	17	1,303	44	76.6
Air Accident	6	264	33	44.0
Rail Accident	3	152	91	50.7
Road Accident	2	25	49	12.5
Poisoning	1	28	123	28.0
Explosion	1	15	65	15.0
Total	51	2,013	215,314	-

Source: [CRED]

Fire contributed 41% to the total number of occurrence followed by ship accident, which makes up 65% of total deaths. Table 8-4 shows the remarkable man-made disasters that resulted in more than 50 deaths in Myanmar from 2000 to 2014.

Table 8-4 Remarkable Man-made Disasters in Myanmar (2000-2014)

Disaster	Month, Year	Number of Death[1)]	Outline[2)]
Ship Accident of Ferry NAY WIN TUN	Nov. 2009	50	Ferry NAY WIN TUN carrying more than 170 passengers sunk after hitting an oil barge on the Ngawun River.
Ship Accident	May 2013	150	Boats carrying hundreds of Rohingya Muslims who were evacuating ahead of a storm capsized off the Pauktaw township in Rakhine State, western Myanmar.

Source 1) [CRED], 2) [INTC, 2009], and [Al Jazeera, 2013]

8.2 Emergency Response System

8.2.1 Laws and Regulations on Emergency Response

Laws and regulations on emergency response are listed in Table 8-5.

Table 8-5 Laws and Regulations on Emergency Response in Myanmar

Name	Year	Outline
Myanmar Action Plan on Disaster Risk Reduction (MAPDRR) 2009-2015	2009	The action plan specifies the committees for disaster risk reduction: National Disaster Preparedness Central Committee (NDPCC), National Disaster Preparedness Management Working Committee and Sub-committees.
Natural Disaster Management Law	2013	The law specifies the overall tasks for natural disaster management at the pre-disaster, emergency response, and post-disaster period, monitoring and evaluation, and the criteria and process of assistance from outside of the country.

Source: RRD

Additional laws and regulations for disaster management were also prepared for approval of the Office of the President (as of February 2015). The MAPDRR after 2016 will be prepared based on the Sendai Framework for Disaster Risk Reduction 2015-2030.

8.2.2 Organization for Emergency Response

(1) **National Disaster Preparedness Central Committee (NDPCC)**

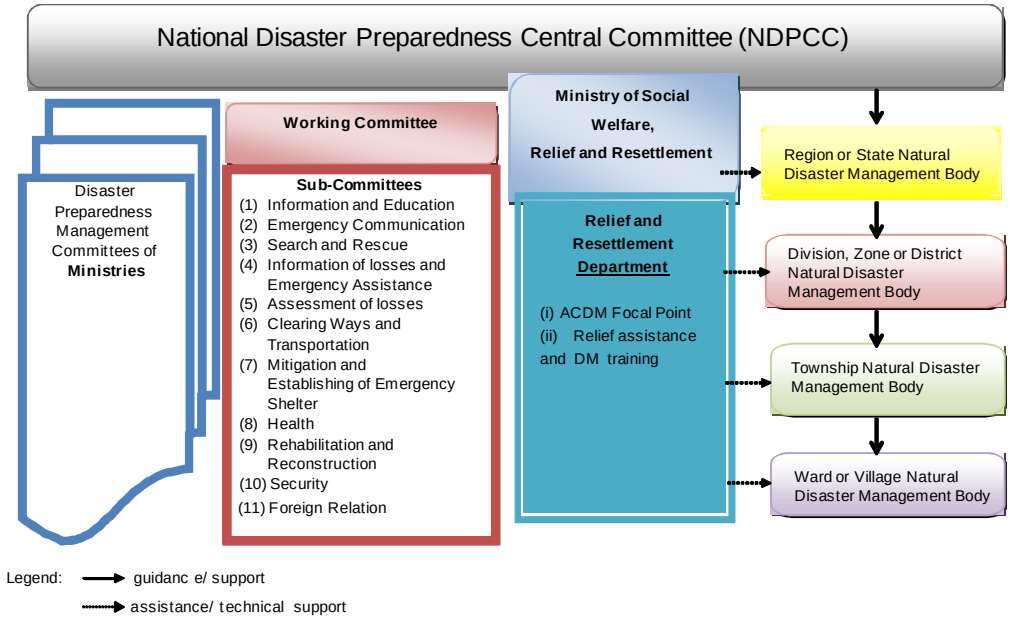
The NDPCC is the highest committee for disaster management in Myanmar. The NDPCC was reformed in May 2013 under the chairmanship of the Vice President while the Ministry of Social Welfare, Relief and Resettlement is the secretariat of the NDPCC.

(2) **National Disaster Preparedness Management Working Committee and Sub-committees**

The National Disaster Preparedness Management Working Committee was formed to supervise the implementation of disaster management activities in support of the NDPCC and to coordinate the NDPCC activities. The working committee consists of the following eleven sub-committees.

- Information and Education
- Emergency Communication
- Search and Rescue
- Information of Losses and Emergency Assistance
- Assessment of Losses
- Clearing Ways and Transportation
- Mitigation and Establishing of Emergency Shelter
- Health
- Rehabilitation and Reconstruction
- Security
- Foreign Relation

Figure 8-2 shows the disaster management arrangement in Myanmar.



Source: [JICA, 2012], Modified by the Survey Team

Figure 8-2 Disaster Management Arrangement in Myanmar

8.2.3 Classification of Disaster and Emergency Response

The main body that is responsible for emergency response in Myanmar is the Natural Disaster Management Body which is established in every administrative level (regions, states, divisions, zones, districts, townships, wards and villages) when disaster occurs. The Natural Disaster Management Body in each level is composed of the same clusters as of the sub-committees at the national level. Table 8-6 shows the levels of emergency response in Myanmar.

Table 8-6 Disaster and Emergency Levels in Myanmar

Level of Disaster	Responsible Organizations	Chairman
Level 1 National Level	NDPCC, National Disaster Preparedness Management Working Committee and ten Sub-committees	Vice Prime Minister or suitable person
Level 2 Region and State Level	Region or State Natural Disaster Management Body	Mayor/Governor or suitable person
Level 3 Division, Zone and District Level	Division, Zone or District Natural Disaster Management Body	Head of Division, Zone, District, or suitable person
Level 4 Township Level	Township Natural Disaster Management Body	Township Chairman or suitable person
Level 5 Ward and Village Tract Level	Ward or Village Natural Disaster Management Body	Ward/Village Head or suitable person

Source: Relief and Resettlement Department, Ministry of Social Welfare, Relief and Resettlement (RRD)

8.2.4 Emergency Response at the Site

(1) Disaster Relief

The primary responder in emergency response is the ward/ village Level is the Natural Disaster Management Body (Level 5). If the event that the disaster level is more than what the township level

(Level 4) can accommodate, the Search and Rescue Sub-committee dispatches its response teams. The team is composed of approximately 40 members from the Fire Service Department (FSD) and ten members from the Myanmar Red Cross (MRC). The team often involves police and/or army personnel depending on the type and scale of disaster. The dispatching of medical teams is controlled by the Health Sub-committee chaired by the Ministry of Health (MOH).

The government has installed stockpiles to all regions/states and disaster-prone districts while emergency stocks are distributed to the townships.

(2) **Emergency Drills**

Tsunami drills are usually conducted in the coastal areas once a year, while other disaster drills are being conducted by the FSD in disaster-prone townships. Fire drills are being conducted by the FSD twice a year. The Disaster Awareness Program has been conducted to government officers and staff in disaster-prone areas by international non-governmental organizations (NGOs) and the Office of the United Nations High Commissioner for Refugees (UNHCR) for the purpose of strengthening their capacity in responding to disasters.

8.3 Overview of Disaster/Emergency Medicine

The development of national disaster management system was initiated prior to the Indian Ocean Tsunami and after the Tsunami. In 2004, the National Disaster Management Committee was established after the tsunami. A sub-committee was also developed based on the experiences from Cyclone Nargis (2008). Since then, the MOH capacity in disaster management has been developing. In 2013 The Disaster Management Law was established and the working groups were assigned. The Emergency Operation Center (EOC) was installed in the Relief and Resettlement Department (RRD), the Ministry of Social Welfare, Relief and Resettlement in 2014.

Regarding the medical aspects, the AMFA (*Association Médicale Franco-Asiatique*, France) provided training on emergency medicine including paramedic in early 2000. Then, the Primary Trauma Care (PTC) was introduced by the Myanmar Medical Association (MMA) in response to Cyclone Nargis. This triggered a critical thinking on the environs of trauma care provision as well as it enabled an expansion of local vision for emergency care and emergency medicine training. Afterwards, a consensus for emergency medicine development was established in 2012. The SEA Games in December 2013 and the ASEAN Meeting in 2014 were the opportunities to accelerate its progress [Georgina Ann PHILLIPS, Zaw Wai SOE, et al., 2014].

8.3.1 Relevant Legislations, Policies and Plans

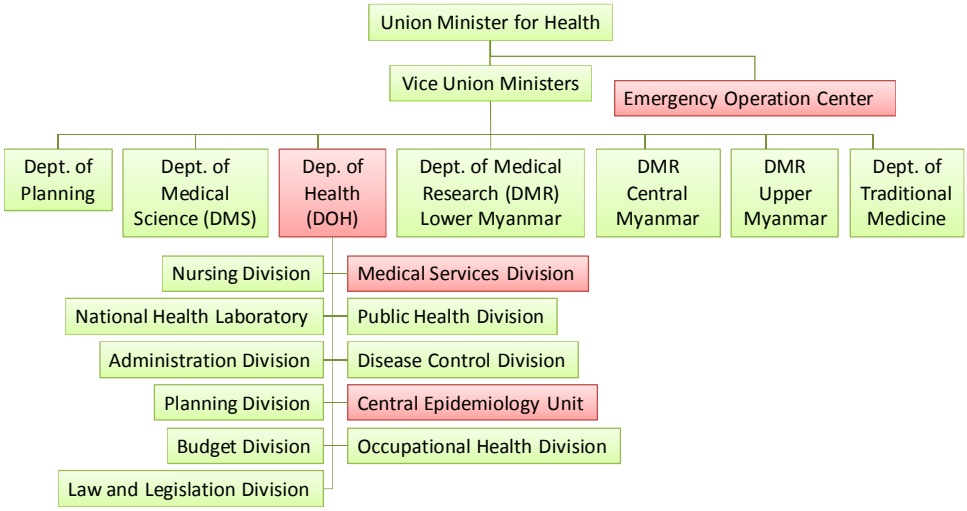
The rules relating to Disaster Management of 2014 was prepared according to the Disaster Management Law of 2013. It requires healthcare services to people in the affected area and preventing subsequent epidemics in post disaster period. Therefore, all public hospitals should establish disaster management and mitigation plan; however, more advocacy efforts are needed since disaster management and mitigation is not usually a high priority issue at the practical level.

Although the MOH drafted a plan for early recovery and rehabilitation in 2012, it has not been finalized because the situation has been changing so fast to reflect to the draft. The Central Epidemiology Unit (CEU) is preparing the National Health Preparedness and Management Plan in anticipation of cyclones that could struck the Rakhine State and the flooding in the Ayeyarwady Region.

Regarding emergency medicine, the Emergency Patient Care and Treatment of Injuries Act (Union Law No. 53.) was established in 2014. It designates responsibilities to all stakeholders concerned to care for an injured emergency patient.

8.3.2 Institutional Setting

The CEU is responsible for disaster response and management and the Medical Care Division takes care of mass casualty incidence (Figure 8-3). According to the MOH, the Department of Health (DOH) will be restructured into two departments, the Department of Medical Services and the Department of Public Health. And a division/unit will be established under the Department of Medical Services to take care of emergency medicine[28].



Source: [JICA, 2012] and [JICA, 2014]

Figure 8-3 Institutional Setting for Disaster Management in Health in Myanmar

In 2014, the EOC was established under the Health Minister with technical and financial support from WHO. It is actually operated by CEU because its main focus is communicable diseases.

The stockpiles are installed in the national and regional/ state level. Emergency stocks are to be distributed up to the grass-roots level according to the instructions.

Regarding the cluster approach in the health sector, water, sanitation and hygiene (WASH), protection and health clusters have been activated those activities since Rakhine State Riots in 2012. However, it has not been officially recognized.

[28] Accordin to MOH website (http://www.moh.gov.mm) as of July 2015, the departments in MOH are the followings; Department of Public Health, Department of Medical Care, Department of Health Professional Development and Management, Department of Medical Research, Department of Traditional Medicine, and Department of Food and Drug Administration

8.4 Current Situation of Disaster Medicine

8.4.1 Facility and Equipment

In disaster situations, the existing health facilities and equipment are utilized to respond to disaster victims. According to the Yangon General Hospital which is the largest national hospital in the country, the hospital can accommodate maximum of 200 victims at the same time. However, it is not clear up to what extent the health facilities in Myanmar are able to respond to natural and/or man-made disasters.

In December 2013, the emergency department of Nay Pyi Taw 1000 Bedded Hospital was opened to prepare for a potential mass casualty incident during the SEA Games. Also in preparation for the SEA Games, 85 ambulances were procured by the government and ten ambulances were donated by WHO. According to MOH, after the SEA Games, 75 ambulances were distributed to district hospitals.

Regarding hospital preparedness for emergency response, according to the assessment of emergency preparedness and response capacities in 2011, risks from existing hazards to health facilities and other infrastructure have been assessed and prioritized in large hospitals. Also a hospital emergency plan is in place for hospitals with more than 200 beds [WHO, 2012].

8.4.2 Response System

The National Disaster Preparedness Management Working Committee was formed to supervise the implemented disaster management activities in support of the NDPCC and to coordinate the NDPCC activities. The Working Committee consisted of eleven sub-committees including the Health Sub-committee which is chaired by the Minister of Health. The major roles and responsibilities of Health Sub-committee are as follows [RRD-MOSW Myanmar, 2009]:

- To formulate and take action for emergency health care;
- To prepare emergency hospitals/ clinics/ mobile clinics for the affected regions;
- To impart necessary trainings on emergency health care;
- To stock necessary drugs and to have plan for storage and distribution; and
- To prepare for epidemic prevention.

In emergency situations, the Ministry of Defense and the Armed Forces (Army, Navy, and Air Force) have performed an integral role in disaster management and are constitutionally designated specific responsibilities based on the capabilities of the components. For instance, at the time of Cyclone Nargis, the Defense Services Medical Corps provided doctors and nurses for emergency medical care to the impacted areas [CEDMHA, 2014].

8.4.3 Major Providers of Disaster Response

The MOH is responsible for disaster response in the health sector. MOH's tasks during a disaster are as follows:

- Coordination with other sub-committees for search, rescue and relief;

- Provision of health care through emergency clinics and mobile medical squads;
- Prioritization of patients in surgical and general cases;
- Provision of health care in emergency shelter;
- To collect, monitor and keep data on the injured, dead, missing and diseases;
- Immunization, if required;
- Chlorination of safe drinking water and sanitations;
- Management of sanitary waste disposal; and
- Cooperation with the police surgeon for the identification of the dead [RRD-MOSW Myanmar, 2009].

Apart from the government, as one of the first responders during Cyclone Nargis in 2008, Cyclone Giri in 2010, and the Tarlay Earthquake in 2011, the MRC always strives to provide the fastest care to the hardest-hit communities. MRC is the largest humanitarian organization in Myanmar and one of the members of the Health Sub-committee. MRC responds to disasters in partnership with the MOH, the Relief and Resettlement Department of the Ministry of Social Welfare, UN agencies, and NGOs.

The MMA is the only professional organization of qualified medical doctors in Myanmar. MMA provides emergency medical relief and was the first one who sent volunteer medical doctors to the affected areas at the time of Cyclone Nargis. The MMA also provided support in response to Cyclone Giri. Small-scale disasters are being responded by the local offices of MMA.

8.4.4 Human Resource Development

In pre-service education, training for disaster medicine is not offered separately. The trainings related disaster medicine such as the Major Incident Medical Management and Support (MIMMS) course was taught as part of the Diploma in Emergency Medicine course [Georgina Ann PHILLIPS, Zaw Wai SOE, et al., 2014].

As part of continuous professional development (CPD), trainings related to disaster medicine are provided depending on the support from the donors. An example of this is the MIMMS course in February 2013, which was supported by the Australian government. A total of 42 participants, including medical officers, fire fighters, Red Cross (ambulance) volunteers and police attended the three-day advanced course. An additional 30 doctors and nurses from the Yangon General Hospital attended a one day team member course. To evaluate and consolidate the teaching and training, an Emergo Train System (ETS) exercise was conducted with 62 participants at the Yangon General Hospital [Ambulance Services of New South Wales, 2013].

Also, in preparation for the SEA Games assistance was given in the training of over 1500 volunteers who provided basic prehospital care during the period of the SEA Games. Volunteers were primarily junior doctors, nurses and Red Cross volunteers. Training was conducted in multiple sites around the country focusing on basic life support, management of trauma, disaster preparedness, triage, use of basic ambulance equipment and scene management [Nigel Klein, 2014].

Another example is the five-day introductory course of the Public Health and Emergency Management Program in Asia and the Pacific (PHEMAP) in December 2014. The course was conducted under the guidance of the Asian Disaster Preparedness Center (ADPC) and WHO in partnership with the MOH and the Ministry of Social Welfare, Relief and Resettlement with funding support from the Royal Norwegian Ministry of Foreign Affairs. There were 27 participants in the PHEMAP introductory course representing 15 regions or states [ADPC, 2014].

JICA also provided trainings on disaster medicine in 2012 and 2013 in Japan with total twelve participants. The duration of training was six weeks.

8.4.5 Receiving/ Dispatching Medical Team to Other Countries in Emergencies

It was the first time that Myanmar received foreign medical teams when Cyclone Nargis struck the country with assistance from UN and ASEAN frameworks. The lessons learned from the disaster were reflected in the Disaster Management Law of 2013.

In peace time, foreign medical practitioners could practice in Myanmar by obtaining temporary registration from the Myanmar Medical Council. In general, it could take a few weeks in obtaining temporary registration, but during emergency situations, the RRD is the gateway in receiving foreign medical teams and providing permission to medical practitioners. The MOH emphasized that if the information of the medical response teams of the neighboring countries could be shared regularly, making such arrangements in receiving foreign medical teams could be simpler and can be done smoothly.

8.4.6 Experiences in the Past Disaster

Myanmar is trying to learn from experience from Cyclone Nargis. The workshop entitled “Evaluation of Health Sector Performance in Cyclone Nargis” organized by the MOH on December 22, 2008 is one of the examples. Also, learning from the past disaster, the material of triage band has changed from paper to plastic or film-coated paper [RRD-MOSW Myanmar, 2009].

In response to Cyclone Nargis, the medical doctors from public hospitals were mobilized to the affected areas but they were not able to provide medical services because most of the health facilities were damaged or destroyed (based on interview). According to the Post Nargis Joint Assessment Report, approximately 75% of health facilities in the affected townships were damaged and most of the damages occurred in the lower delta. Almost all the destroyed facilities were primary health facilities, including station hospitals, rural health centers and sub-centers [MOSWR & MOH, Myanmar]. On the other hand, patients were transported to hospitals in urban areas. However, most of the medical doctors in those hospitals in the urban areas went to the disaster affected areas. This situation was caused by the non-coordinated multiple command systems. Based on this experience, field hospitals were introduced.

8.5 Current Situation of Relevant Emergency Medical Services

The EMS in Myanmar is still being developed. The main organization leading EMS to public is the DOH through the emergency department of government hospitals. The centers providing EMS exist only in

major cities. In other cities and rural hospitals, there is no separate emergency department due to lack of facilities and skilled staff; thus, the outpatient department has to provide both outpatient and emergency care [WHO, 2014].

8.5.1 Facility and Equipment

The modern emergency department is in the Yangon General Hospital, having been developed since the early 1990s [WHO, 2014]. In 2009, only the Yangon General Hospital has the Accident and Emergency Department, out of 924 government hospitals in Myanmar [Pa Pa, 2013]. The current emergency department of Yangon General Hospital was opened in March 2014 with the support from the Australasian College for Emergency Medicine (ACEM).

In Nay Pyi Taw 1000 Bedded Hospital, there was no emergency department before December 2013. At that time, the out-patient department received all types of patients and admitted them to specific wards where patients received the first treatment. The emergency department was opened in December 2013 just before the SEA Games with the support of the ACEM and the Royal Australasian College of Surgeons (RACS). The emergency department is equipped with modern medical facilities such as ultrasound, CT scan, MRI, and patient monitors [1000 Bedded General Hospital-Nay Pyi Taw, 2014].

8.5.2 Response and Transportation System

There is no EMS system established yet for transporting patients from a district to a major hospital, only primitive ambulance and other transport modalities are available. The transport of patients in cities relies solely on taxis, private cars and other vehicles. Even in Yangon City, no more than three percent of patients come to hospital by poorly equipped ambulances [WHO, 2014]

Currently, there is no coordinated ambulance system in Myanmar. Ambulance services are provided by various organizations; 1) public hospitals, 2) NGOs (MMA etc.), 3) Fire Service Department, 4) MRC, and 5) private hospitals (Table 8-7). Each organization has its own number. Ambulance services are provided free of charge except in private hospitals. Skill levels vary from provider to provider since there is no national training program for prehospital care.

Table 8-7 Organizations Providing Ambulance Services

Organization	Telephone number
Traffic Police Ambulance	500005
Emergency Ambulance Service (MMA)	09-412060999, 09-42063999, 09-421072999, 1830 (trial)
Yangon General Hospital	95-1-283022
Myanmar Red Cross Society	383684
Fire Service Department	191
Nay Pyi Taw 1000 Bedded Hospital	192

Source: Survey Team

The hotline number 192, for ambulance call in the Nay Pyi Taw region was introduced during the SEA Games in 2013. The dispatch center is located in Nay Pyi Taw 1000 Bedded Hospital under the management of the emergency department consultant. It can receive five calls at a time and is connected to

ambulances through radio communication. The trained dispatcher, the nurses in the emergency department, can respond to calls, but the service is active only during special events and mass gathering activities and it is offline in other times [1000 Bedded General Hospital‐Nay Pyi Taw, 2014].

8.5.3 Human Resources

An emergency physician is recognized as a specialist in Myanmar, but the development of EP has just started. There are currently 26 emergency physicians that were trained by the Postgraduate Diploma in Emergency Medicine. Of which 18 were trained in the first diploma course and eight were trained in the second diploma course. After the SEA Games, ten of the 18 graduates from the first course committed to stay fulltime in emergency medicine and were located in Mandalay, Nay Pyi Taw and Yangon hospitals [Roseanne Skalicky, 2014].

As for emergency nursing, it just started to develop with the commencement of the Diploma Course in Emergency Nursing in the academic year 2015. Emergency Medical Technicians (EMT) do not exist since there is no training institution for EMT in Myanmar.

(1) Pre-service Education

The MOH through the Department of Health and Department of Medical Science has implemented degree courses in emergency medicine as a new specialization to produce emergency medicine specialists to lead the future development of standard emergency departments in major hospitals in Myanmar [WHO, 2014]. After the Emergency Medicine Development Consensus Conference in January 2012, the MOH, MMA and the local academic and clinical leaders have committed to a three-phase program to enhance the quality of emergency care provision with international partners [Maung Maung Htwe, 2012]. The Australasian College for Emergency Medicine (ACEM), the Royal Australasian College of Surgeons (RACS) and the International Federation for Emergency Medicine (IFEM) became formal partners with MOH [Georgina Ann PHILLIPS, Zaw Wai SOE, et al., 2014].

The program consists of three phases. Phase I was the rapid training (through a Postgraduate Diploma in Emergency Medicine) of junior specialists to become first emergency physicians, to provide emergency care during the SEA Games and to lead subsequent development of emergency medicine. Phase II is the establishment of Master of Emergency Medicine course and Phase III is the development of mature emergency medicine, emergency department and emergency care systems through formal academic and government pathways [Georgina Ann PHILLIPS, Zaw Wai SOE, et al., 2014].

The Diploma in Emergency Medicine course (18 months) was implemented through the University of Medicine 1, Yangon in 2012 and 2014. There are total of 26 graduates; 18 from the first course and eight from the second course.

Master of Emergency Medicine course (three years) was started in 2015 at the University of Medicine 1, Yangon. 25 students were accepted to the course. The first Department of Emergency Medicine was established in the University Medicine 1, Yangon in 2014.

As for nursing, a postgraduate Diploma in Emergency Nursing commenced in 2015 at the University of Nursing, Yangon. Five students were accepted to the course.

A Diploma in Primary Emergency Care course (one year) will commence in July 2015 for medical officers in townships. The number of trainees will be 48 per year.

(2) **Continuous Professional Development (CPD)**

Trainings in emergency medicine and EMS for health professionals are mainly offered by hospitals and/or by international partners and the MMA.

For example, at Nay Pyi Taw 1000 Bedded Hospital, the emergency department has involved in CPD activities in the hospital twice and discussed the topics about initial stabilization and nursing experiences. In addition, the consultants are involved in regular teaching program of Township and Station Medical Officer regarding emergency care [1000 Bedded General Hospital‐Nay Pyi Taw, 2014].

The MMA promotes continuous medical education among the medical professionals. The MMA introduced Primary Trauma Care (PTC) course in response to Cyclone Nargis [Georgina Ann PHILLIPS, Zaw Wai SOE, et al., 2014]. The PTC course has been conducted with the assistance from RACS and Hong Kong.

8.5.4 Relevant Academic Society/ Professional Organization

Around 30 members who have been involved in trainings related to emergency medicine are listed in the Emergency Medicine Society under the MMA.

8.6 International Cooperation

In preparation for the SEA Games, WHO provided ambulances and trainings on mass casualty incident (MCI). Also, it provides technical and financial support for the preparation of relevant policies and plans, as well as the establishment of EOC. WHO in cooperation with ADPC conducted the PHEMAP international training course.

Australia has consolidated health spending through the Three Millennium Development Goals Fund and is also supporting improvements in emergency medicine from the technical and equipment aspects, and medical training with the assistance of the Australian Volunteers and Australia Award Fellowships [Australian Government].

JICA provided training program on emergency/disaster medicine in Japan in 2012 and 2013.

8.7 Conclusion

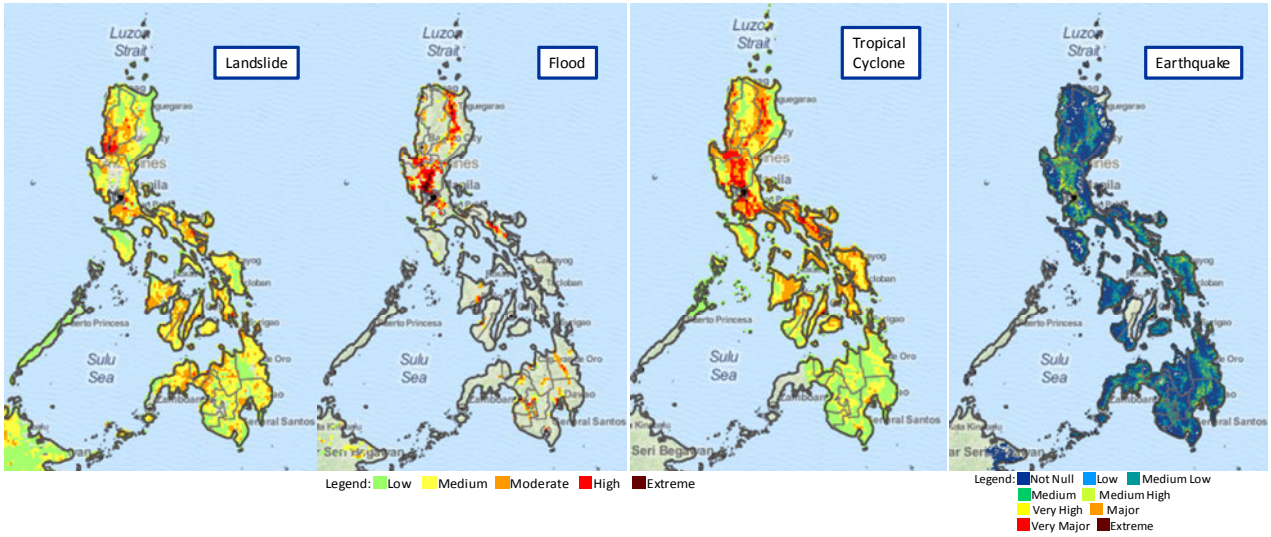
In Myanmar, the development of emergency medicine seems to be in the initial stage. Resources obtained for the SEA Game in 2013 such as ambulances and EMT trainings could contribute to the development effectively. Also, it should be noted that MOH is trying to integrate or strengthen collaboration among various ambulance services. When it succeeds, its experiences could be shared with the other counties

having similar challenges in ambulance services. Emergency Physicians have been produced and the number is increasing, but they are still limited in the major cities. It is expected to expand emergency medicine to rural areas through the primary diploma course to be started in 2015.

Chapter 9 Country Report: The Philippines

9.1 Overview of Disaster Occurrences (Natural and Man-made)

The Philippines is the one of the disaster-prone countries in the ASEAN region. There are more or less than 20 typhoons that hit the country every year that cause serious floods and landslides. Also, earthquakes might occur although the mortality risk is estimated low (Figure 9-1). In addition, the damages of these disasters increased due to climate change. The government has been strengthening its early warning and emergency response systems to mitigate the damages and reduce the risks based on the lessons learned in past disaster responses.



Source: [UNEP/ UNISDR, 2013]

Figure 9-1 Mortality Risk: Flood, Landslide, Tropical Cyclone and Earthquake

For example, when Typhoon Ruby hit the country in December 2014, the government carried out effective measures and reduced the damages based on the lessons learned from the disaster response during the Typhoon Haiyan. Based on the early warning information, the government carried out coordination meeting and risk assessment seven days before the typhoon hit the country to define the task of each stakeholder, and the line of communication, and to strengthen the civil-military coordination process.

9.1.1 Occurrence of Natural Disasters

Table 9-1 summarizes the occurrence of natural disasters from 1980 to 2014. Among the disasters occurred from 1980 to 2014, 55% were storms.

Table 9-1 Natural Disaster Occurrence in the Philippines (1980-2014)

Type of Disaster	No. of Occurrence	Death (person)	Totally Affected (person)
Storm	235	35,813	139,049,020
Flood	124	2,662	24,632,206
Landslide	28	2,379	317,539
Earthquake	17	2,884	5,554,674
Volcanic Activity	17	719	1,646,258
Drought	7	8	6,549,542
Wildfire	1	2	300
Total	429	44,467	177,749,539

Source: [CRED]

Table 9-2 shows the remarkable natural disasters in the Philippines.

Table 9-2 Remarkable Natural Disasters in the Philippines (2000-2014)

Disaster	Month, Year	Number of Death[1)]	Mainly Affected Areas[1) 2)]
Typhoon Muifa (Kabayan)	Nov. 2004	1,619	Quezon province and the east coast of Luzon Island
Southern Leyte Landslide	Feb. 2006	1,126	St. Bernard, Southern Leyte
Typhoon Durian (Reming)	Nov. - Dec. 2006	1,399	Albay, Catanduanes, Camarines, Sorgoson (Bicol) Mindoro, Marinduque (Minaropa) Batangas Laguna (CALABARZON)
Typhoon Fengshen (Frank)	Jun. 2008	644	Aklan, Iloilo, Antique, Capiz, Negros Occidental (Western Visayas) Leyte, Ormoc, Eastern And Western Samar Island (Eastern Visayas) Cebu (Central Visayas), Masbate (Bicol) Cotabato, General Santos (Central Mindanao) Marinduque, Mindoro Oriental, Romblon (Minaropa)
Typhoon Ketsana (Ondoy)	Sep. 2009	501	Pangasinan (Ilocos), Quirino (Cagayan Valley), NCR Bataan, Bulakan, Pampanga, Nueva Ecija (Central Luzon) Masbate, Albay, Sorgoson (Bicol), Zamboanga Del Sur Sultan Kudarat (Central Mindanao), Apayo- Benguet (CAR)
Typhoon Perma (Pepeng)	Sep. - Oct. 2009	512	Ilocos, Cagayan Valley,·Central Luzon,·CALABARZON, Bicol, CAR
Tropical Storm Washi (Sendong)	Dec. 2011	1,439	Northern Mindanao, Central Visayas, Zamboanga, Davao, Caraga, ARMM
Typhoon Bopha (Pablo)	Dec. 2012	1,901	Oriental, Compostela Valley (Davao)
Typhoon Haiyan (Yolanda)	Nov. 2013	7,354	Samar, Layte (Eastern Visayas), Cebu (Central Visayas) Iloilo (Minaropa, Palawan), Capiz, Aklan (Western Visayas)
Typhoon Hagupit (Ruby)	Dec. 2014	18	Central Luzon, Calabarzon, Minaropa, Bico, Wesern Visayas, Central Visayas, Eastern Visayas, Caraga

Source: 1) [CRED], 2) [OCHA]

9.1.2 Occurrence of Man-made Disasters

Table 9-3 shows the occurrence of man-made disasters from 1980 to 2014.

Table 9-3 Man-made Disaster Occurrence in the Philippines (1980-2014)

Type of Disaster	No. of Occurrence (A)	Death (person) (B)	Totally Affected (person)	Death per Occurrence (B/A)
Ship Accident	54	8,817	4,128	163.3
Fire	51	527	147,277	10.3
Road Accident	26	588	365	22.6
Explosion	15	309	5,936	20.6
Air Accident	9	384	153	42.7
Other	8	242	2,901	30.3
Collapse	3	67	0	22.3
Rail Accident	2	13	345	6.5
Total	168	10,947	161,105	-

Source: [CRED]

Table 9-4 shows the remarkable man-made disasters from 2000 to 2014 in the Philippines.

Table 9-4 Remarkable Man-made Disasters in the Philippines (2000-2014)

Disaster	Month Year	Number of Death[1)]	Outline[2)]
Ship Accident	Apr. 2000	143	An overloaded wooden Philippine ferryboat headed to Malaysia capsized near Jolo, Sulu.
Air Accident Davao	Apr. 2000	131	A Philippine airliner packed with holiday vacationers crashed and burst into flames on Samal Island, a resort island in the south.
Super Ferry 14	Feb. 2004	134	Abu Sayyaf, a Muslim extremist group, claimed responsibility for an explosion that led to a fire aboard a ferry in Manila Bay
MV Princess of The Stars	Jun. 2008	815	A ferry that capsized during the Typhoon Fengshen (Frank) that battered the southern Philippines.
MV St. Thomas Aquinas	Aug. 2013	137	The collision happened near the central city of Cebu - around 2km from the shore. The coastguard and military vessels helped in the rescue but the operation had been hampered due to rough seas.

Source: 1) [CRED], 2) [BBC], [ASN], and [New York Times, 2014]

9.2 Emergency Response System

9.2.1 Laws and Regulations for Emergency Response

Laws and regulations on emergency response are listed in Table 9-5.

Table 9-5 Laws and Regulations for Emergency Response in the Philippines

Name	Year	Outline
Republic Act No. 10121 Philippine Disaster Risk Reduction and Management (PDRRM) Act	2010	The Act provides development of policies and plans, as well as implementation of actions and measures pertaining to all aspects of disaster risk reduction and management, including good governance, risk assessment and early warning, knowledge building and awareness raising, reducing underlying risk factors, and preparedness for effective response and early recovery.
National Disaster Risk Reduction and Management (NDRRM) Framework	2011	The framework shows that mitigating the potential impacts of disaster and climate changes, preventing hazards and small emergencies to mitigate damages, and preparedness, to reduce loss of life and damage to social, economic and environmental assets.

Source: Office of Civil Defense (OCD)

9.2.2 Organization for Emergency Response

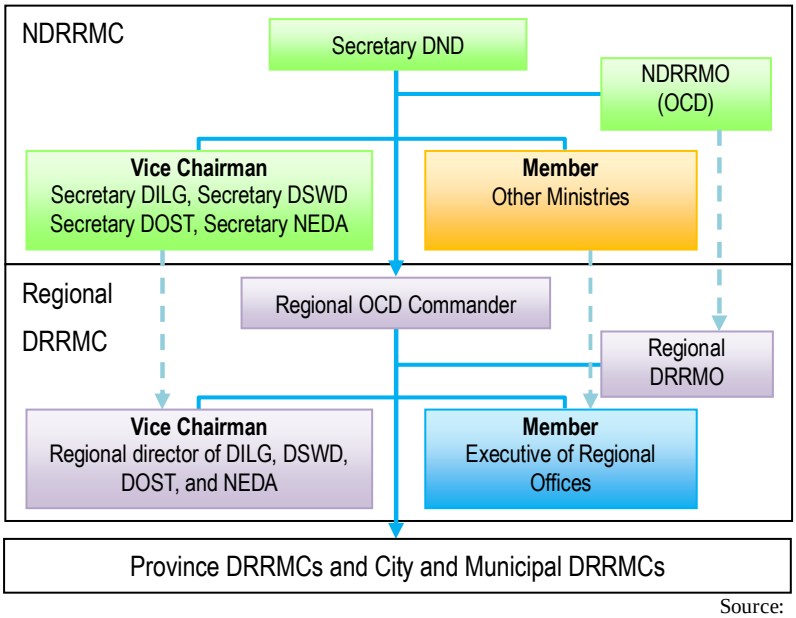
(1) National Disaster Risk Reduction and Management Council (NDRRMC) and Disaster Risk Reduction and Management Council (DRRMC)

The National Disaster Risk Reduction and Management Council (NDRRMC), formerly known as the National Disaster Coordinating Council (NDCC), consists of various government, non-government, civil sector, and private sector organizations and was established by the Republic Act No. 10121 of 2009. The activities of the council include policy-making, coordination, integration, supervision, monitoring and evaluation. The Act also specified the establishment of the Disaster Risk Reduction and Management Council (DRRMC) at the local governmental units (LGUs) in the regional, provincial, and city/municipal levels. The Disaster Risk Reduction and Management Offices (DRRMO) are established in LGU offices. Based on the Act, the DRRMO is a permanent office and secretariat of DRRMC.

(2) Office of Civil Defense (OCD)

The Office of Civil Defense (OCD) was established in 1972 as civil defense force, an implementing agency of the NDRRMC. The OCD has the primary mission of administering comprehensive national civil defense and disaster risk reduction and management program by providing leadership in the continuous development of strategic and systematic approaches, as well as measures to reduce the vulnerabilities and risks to hazards, and manage the consequences of disasters. Around 300 personnel works in the OCD; however, the current number of staff is not sufficient because the coverage of the OCD has increased such as disaster response and global warming.

Figure 9-2 shows the disaster management arrangement in the Philippines.



Source: OCD

Figure 9-2 Disaster Management Arrangement in the Philippines

9.2.3 Classification of Disaster and Emergency Response

The main bodies responsible for emergency response in the Philippines are NDRRMC and DRRMC in LGUs as described in Section 9.2.2. Table 9-6 shows the level of emergency response in the Philippines.

Table 9-6 Disaster and Emergency Levels in the Philippines

Levels	Responsible Organizations
National Level	National DRRMC
	Chairman: Secretary of the Department of National Defense (DND)
	Vice Chairman: Secretary of the Department of the Interior and Local Government (DILG) for Disaster Preparedness Secretary of the Department of Social Welfare and Development (DSWD) for Disaster Response Secretary of the Department of Science and Technology (DOST) for Disaster Prevention and Mitigation Director General of the National Economic and Development Authority (NEDA) for Disaster Rehabilitation and Recovery.
	Member: Secretary of the departments and non-governmental organizations (NGOs)
	Secretariat: NDRRMO
Regional Level	Regional DRRMC
	Chairman: OCD Regional Commander
	Vice Chairman: Regional Director of DILG for Disaster Preparedness Regional Director of DSWD for Disaster Response Regional Director of DOST for Disaster Prevention and Mitigation Regional Director of NEDA for Disaster Rehabilitation and Recovery.
	Member: Executives of the regional offices and field stations at the regional level of the government agencies
	Secretariat: Regional DRRMO
Provincial Level	Provincial DRRMC
	Chairman: Local Chief Executives
	Member: Local Planning and Development Officer Head of local DRRMO Head of the Local Social Welfare and Development Office Head of the Local Health Office Head of the Local Agriculture Office Head of the Gender and Development Office Head of the Local Engineering Office Head of the Local Veterinary Office Head of the Local Budget Office Division Head/ Superintendent of Schools of the Department of Education Highest-ranking Officer of the Armed Forces of the Philippines (AFP) assigned in the area Provincial Director/City/Municipal Chief of the Philippine National Police (PNP) Provincial Director/City/ Municipal Fire Marshall of the Bureau of Fire Protection (BFP) President of the Association of Barangay Captains (ABC) The Philippine National Red Cross (PNRC) Four (4) accredited CSOs One (1) private sector representative
	Secretariat: Provincial DRRMO
City/Municipal Level	City/Municipal DRRMC
	Chairman: Mayor
	Member: Administrations and organizations of provincial DRRMC at the city/municipal level
	Secretariat: City/municipal DRRMO
Barangay Level	Barangay Development Council (BDC)
	Chairman: Barangay Chief

Source: Republic Act 10121

9.2.4 Emergency Response at the Site

(1) **Disaster Relief**

The LGU is responsible for the initial response and assessment of damage and needs when natural disasters occur. The LGU dispatches the Rapid Damage Assessment and Needs Assessment Team (RDAMAT), which is composed of representatives from the DSWD, OCD, DOH, DILG, PNP, and AFP. The activities of the RDAMAT are classified into two phases, i.e., in Phase I, the RDAMAT should dispatch personnel to the affected site within 72 hours to respond and obtain initial information about the disaster. In Phase II, the RDAMAT is dispatched to collect detailed information of damages when the disaster is coming to an end.

(2) **Emergency Drills**

The Republic Act No. 10121 states that the national government and the LGUs are obliged to conduct natural disaster drills as part of disaster preparedness program. Based on the Act, the national government and the LGUs should conduct natural disaster drills four times a year. In 2015, the first National Drill Tsunami was conducted on March 27.

9.3 Overview of Disaster/Emergency Medicine

As mentioned in the previous section, the Philippines has been accumulating considerable experiences in disaster response and has improved their response system and capacities based on the lessons learned from previous disasters. In 1994, the Stop Death Program was initiated to strengthen the capacity of emergency response in hospitals. The program was expanded into Health Emergency Preparedness and Response Program in 2000 and then the Stop Death Coordinators of Department of Health (DOH) and the DOH hospitals were designated as Health Emergency Management Staff (HEMS). In 2004, the National Policy on Health Emergencies and Disasters was published and the Department of Health Task Force on Health Emergency Management (DOH-HEM Task Force) which later became the Health Emergency Management Bureau (HEMB) was established.

In terms of preparedness, the Hospitals Safe from Disasters Campaign (the United Nations (UN) International Disaster Risk Reduction 2008 – 2009) was launched in the Philippines in collaboration with the World Health Organization (WHO). Since then, all DOH hospitals are required to develop the Hospital Emergency Preparedness, Response and Rehabilitation Plan (HEPRRP).

Based on the experiences from Typhoon Haiyan (2013), the DOH has been reviewing the existing emergency response system, e.g., registration system of medical assistances from foreign countries.

9.3.1 Policy and Legislations

Based on the lessons learned from the past emergencies and disasters, a large number of legislations have been developed as listed in Table 9-7. These cover emergencies and disaster management in health, institutional setting, coordination of foreign medical assistance, and preparedness.

Table 9-7 Relevant Policies and Legislations in Disaster/ Emergency Medicine

Year	Title
Emergencies and Disaster Management in Health	
2004	Administrative Order (AO) 168 s. "National Policy on Health Emergencies and Disasters"
2004	AO 155 s. "Implementing Guidelines for Managing Mass Casualty Incidents during Emergencies and Disasters"
2005	Department Order (DO) "Creation of a Management Committee on Prevention and Control of Emerging and Re-emerging Infectious Diseases (DOHMC-PCREID)"
2007	AO 0018, "National Policy on the Management of the Dead and Missing Persons during Emergencies and Disasters"
2011	AO 0006, "Framework on Health Sector Response to Terrorism"
Institutional Arrangements of the Department of Health for Emergencies and Disasters	
1999	AO "Institutionalization of a Health Emergency Preparedness and Response Program within the Department of Health"
2001	DO "Designation and Responsibilities of the Health Emergency Management Staff (HEMS) - Stop Death Coordinators of the Centers for Health Development and DOH Hospitals"
2003	DO "Amendment to the Department Order No. 136-1 s., 2001 dated 28 May 2001. Designation and Responsibilities of the Health Emergency Management Staff (HEMS) Coordinators of the Centers for Health Development and DOH Retained Hospitals"
2003	Reiteration of the Stop Death Budget Allocated to All Regions and some Hospitals since CY 2000 (Department Memorandum)
2003	Reporting Mechanism of Health Emergency Management Staff (HEMS) at the Central and its Units at the Centers for Health Development and DOH Hospitals (Department Order)
2004	DO "Creation of the Department of Health Task Force on Health Emergency Management (DOH-HEM Task Force)"
2004	DO "Creation of the Steering Committee and Technical Working Groups in the Health Sector Responding to Emergencies and Disasters"
2005	DO "Amendment to Department Order No. 193-D s. 2003 dated October 08, 2003. Designation and Responsibilities of the Health Emergency Management Staff (HEMS) Coordinators of the Centers for Health Development and DOH Hospitals"
2009	AO 29, Policies and Guidelines on the Establishment of Operation Center for Emergencies and Disasters
2012	AO 0013, Policy and Guidelines on Logistics Management in Emergencies and Disasters
2012	AO 0014, Policy and Implementing Guidelines on Reporting and Documentation in Emergencies and Disasters
Preparedness in Hospitals	
1998	AO 16-A s, Guidelines on the Conduct of Medical Mission in DOH Hospitals or by DOH Hospitals
2001	AO 182 .s, Adoption and Implementation of Code Alert System for DOH Hospitals During Emergencies and Disasters
2008	AO 0024, "Adoption and Institutionalization of an Integrated Alert System" (2008)
2013	AO 0014, Policies and Guidelines on Hospitals Safe from Disasters
Foreign Medical Missions	
2001	Policies and Guidelines in the Conduct of Local and Foreign Medical and Surgical Missions
2007	AO 0017, "Guidelines on the acceptance and Processing of Foreign and Local Donations During Emergency and Disaster Situations"
2009	AO 030, Revised Policies and Guidelines in the Conduct of Foreign Surgical and Medical Missions (FSMM) in the Country
2012	AO 30, Guidelines on Foreign Surgical and Medical Mission Program in Support of Universal Health Care/ *Kalusugan Pangkalahatan*
EMS	
1997	Republic Act (RA) 8344, Penalizing Hospitals and Medical Clinics for Refusing to Administer Appropriate Initial Medical Treatment and Support in Emergency or Serious Cases
1998	FAE-007, Policies and Guidelines on the Transfer and Referral of Patients Between DOH Metro Manila Hospitals
2003	Personnel and Ambulance Services for Emergencies and Disasters (Department Memorandum)
2010	AO 0003, National Policy on Ambulance Use and Services

Year	Title
	General
2005	Executive Order 366: Directing a Strategic Review of the Operations and Organizations of the Executive Branch and Providing Options and Incentives for Government Employees Who May be Affected by the Rationalization of the Functions and Agencies of the Executive Branch
2010	Republic Act 10121: An Act Strengthening the Philippine Disaster Risk Reduction and Management System, Providing for the National Disaster Risk Reduction and Management Plan, Appropriating Funds There for and for Other Purposes

Source: DOH Philippines

9.3.2 Institutional Setting

The DOH is responsible for the provision of emergency medical support during disasters and emergencies. The DOH leads the four clusters in health, i.e.: medical and public health, water, sanitation and hygiene (WASH), nutrition in emergencies, and mental health and psychosocial support (MHPSS) in the national cluster as shown in Table 9-8.

Table 9-8 National Cluster of the Philippines

	CLUSTER	GOVERNMENT LEAD
1	Search, Rescue and Retrieval (SRR)	Armed Forces of the Philippines (AFP)
2	Logistics Support Coordination (LSC)	OCD
3	Emergency Telecommunications Support Coordination (ETSC)	DOST
4	Food and Non-Food Items (FNI)	DSWD
5	Camp Coordination and Management (CCM)	DSWD
6	IDP Protection	DSWD
7	WASH, Health, Nutrition & Psychosocial Services	DOH
8	Education	Department of Education (DepEd)
9	Livelihood	Department of Trade and Industry (DTI)
10	Management of the Dead and the Missing (MDM)	DILG
11	Agriculture	Department of Agriculture (DA)
12	Permanent Shelter	National Housing Authority (NHA)
13	Early Recovery and Rehabilitation (ERR)	NEDA
14	*International Humanitarian Relations	Department of Foreign Affairs (DFA)
15	*Law and Order	PNP

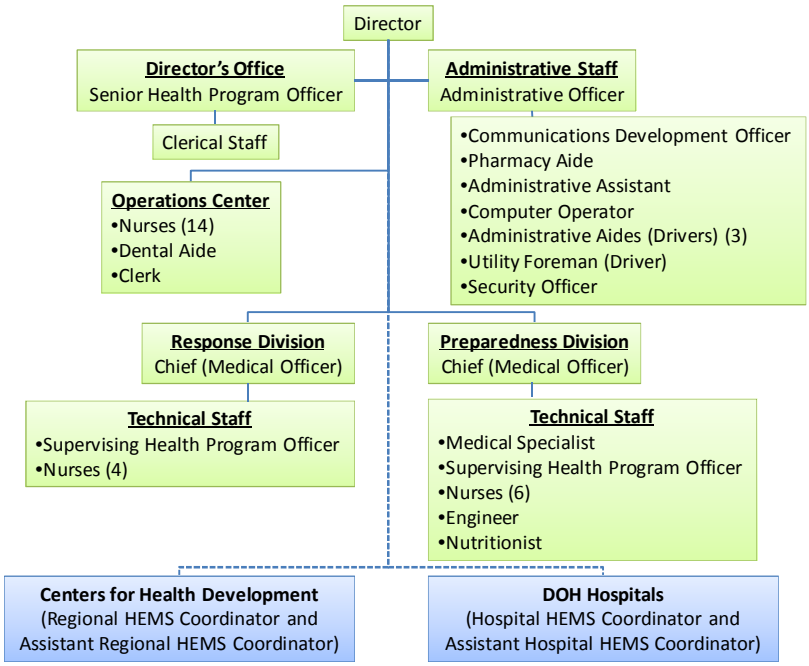
Note: * = to be approved

Source: Disaster Risk Reduction and Response Operations Office, Department of Social Welfare and Development (DRRROO-DSWD)

Within the DOH agencies, the HEMB plays an important role in the health emergency management system in the country. As shown in Figure 9-3, the organizational structure of the council is replicated to all levels of government. At the regional level, a HEMS coordinator is deployed to DOH hospitals.

At the provincial level and below, a regional HEMS Coordinator works with focal points of each level to coordinate concerned organizations and agencies and to deploy medical response teams. However, due to decentralization of command and the buddy-to-buddy system[29], the chain of communication from the central command to the site is sometimes not implemented well. The continuity of health emergency management is also a concern especially after the election because the HEMS Coordinator has to educate new heads of LGUs and train new officers.

[29] When the scale of the disaster is beyond the capacity of a particular local government, it has to request assistance to a neighboring local government, before asking help to the central agency.



Source: DOH-HEMB

Figure 9-3 Structure of Health Emergency Management from the Department of Health to the Regions

9.3.3 Financial Arrangements

Emergencies and disaster response costs could be covered by the Emergency Response Budget of HEMB, and some other sources such as the budget from the Office of the Secretary of Health, the Quick Release Funds, and the Calamity Funds. However, sometimes it is not enough to cover all the necessary expenses. Although some LGUs prepare their contingency budget, it depends on the commitment and understanding of the head.

Also, due to the regulation on expenses of the central government, the Emergency Response Budget cannot be distributed directly to the regional level and be allocated to procure fixed assets including some vital equipment such as vehicles and radio equipment. This might cause difficulty for the HEMB to assist in capacity development of regional and hospital HEMS.

9.4 Current Situation of Disaster Medicine

9.4.1 Facility and Equipment

In disaster and emergency situations, the existing health facilities and equipment are utilized to respond to disaster victims. In an administrative order (AO) issued in 2004 declaring the national policy on health emergencies and disaster (AO168s), all health facilities should have an emergency preparedness and response plan and a health emergency management office/unit; and should also establish a crisis and consequence management committee to handle major emergencies and disasters [WHO, 2011].

However, many health facilities have been victims of the devastation and destruction of typhoons and subsequent floods, flash floods, and landslides and have hampered their operations in providing medical care, during extreme situations rendering equipment and supplies non-functional and personnel helpless

and desolate [DOH Philippines, 2010]. In response to this situation, the HEMS has strengthened the capacity of hospitals to prepare and respond to disasters through various activities such as the Hospitals Safe from Disasters Initiative.

9.4.2 Response System

Under RA 10121 (known as the Philippine Disaster Risk Reduction and Management Act of 2010), the DOH is the lead for the provision of emergency medical support during disasters and emergencies. Within the DOH, the HEMS is the hub for the preparedness and response to health emergencies.

The HEMS has a 24-hour Operation Center (OPCEN) responsible for the coordination and mobilization of the health sector and its partners in times of emergencies and disasters. There are two emergency officers on duty and part of their functions is to have a direct radio communication to the hospital network through a similar OPCEN as well as to check their status daily. If a disaster response requires hospital involvement, the OPCEN alerts the specific hospital(s), mobilizes hospital response teams, and coordinates the flow of traffic of hospital movements, ambulances, and patient referrals [DOH Philippines, 2010].

There are 72 hospitals (20 in Metro Manila and 52 in other areas) that have an Emergency Response Team. The cost of the team operation will be coming from the Emergency Response Operation Budget of the HEMS. For instance, at the Tondo Medical Center in Manila, the Hospital Incident Commander, the Director, receives request from the HEMS and decides hospital responses such as the dispatch of hospital response team. When the hospital sends a response team, the team is coordinated by the HEMS Coordinator depending on the severity of the disaster, needs of the affected areas, and profile of victims. For example, at the time of the Bohol earthquake, the hospital sent male staff.

The HEMS responds to mass casualty incidents where the number of victims exceeds ten. According to the DOH, when mass casualty incident occurs in Metro Manila, the hospitals surrounding the affected area are supposed to dispatch more than one ambulance. This system is based on the Hospital Zoning System in Metro Manila. The area is divided into eight zones, and each zone has one lead hospital while the others function as support hospitals [DOH Philippines, 2010].

The Philippines has established Incident Command System (ICS). However, according to the DOH, there are some cases where ICS does not function properly in the affected area due to the lack of common understanding among stakeholders.

9.4.3 Major Providers of Disaster Response

The DOH has the mandate to lead in providing medical services. With the passage of the Local Government Code in 1991, the primary responsibility of providing direct response to disasters was transferred to the LGUs – provinces, cities, and municipalities. LGUs can call on the DOH when the situation goes beyond their capacity to respond [DOH Philippines, 2005]. According to the interviews, generally in evacuation centers, the medical services are provided by hospital staff and public health services are offered by the DOH/LGUs health staff.

The Philippines National Red Cross (PNRC), a member of the NDRRMC, responds to disasters by deploying emergency response team and conducting search and rescue activities in collaboration with the LGUs and local organizations. The PNRC provides assistance to the bangaray level when the government cannot reach out to them to provide assistance. The response team is composed of community-based volunteers, medical doctors, nurses, and other personnel and brings necessary equipments for fist aid, search and rescue, and other activities. In the affected areas, the PNRC team in collaboration with Red Cross societies from other countries operates a field hospital and provides community outreach services.

The Department of National Defense (DND), the Department of the Interior and Local Government (DILG), and the DOH are the lead agencies for search, rescue, and retrieval activities [Government of Philippines, 2011].

9.4.4 Human Resources Development

The major organizations that provide relevant trainings in human resources development in disaster medicine and/or disaster management include the HEMB, Bicol University, the College of Public Health of the University of the Philippines (UP-CPH), and the Philippines Red Cross Society.

The post graduate course Master in Public Administration major in Health Emergency and Disaster Management is conducted by HEMS in collaboration with Health Human Resource Development Bureau and in partnership with the Bicol University Graduate School [HEMS-DOH].

The HEMS has been organizing for more than ten years the conduct of National Public Health Emergency Management of Asia and the Pacific (PHEMAP) Training Course in order to enhance the capacities of health emergency providers and managers at the different levels of governance in the country. For 2014, HEMS in collaboration with the UP-CPH held its 16th National PHEMAP Training Course in May 2014 [HEMS-DOH].

The PNRC offers Disaster Nursing course as a two-week intensive course at universities. The curriculum is accredited by the Department of Education. In the Philippines, Disaster and Emergency Nursing is taught in the Bachelor of Science in Nursing (BSN) program [CHE, 2009].

9.4.5 Information Management System

HEMS in collaboration with WHO has developed and implemented the Surveillance in Post Extreme Emergencies and Disasters (SPEED). In addition to SPEED, the Event-based Surveillance and Response reporting systems (ESR) and Health Emergency Alert Reporting System (HEARS) are in place. Reports such as Flash report (daily “Health Emergency Alert Report”) and early warning report are provided to national and international partners.

9.4.6 Receiving/ Dispatching Medical Team to Other Countries in Emergencies

Basically, medical assistance teams are received according to the Guidelines on the Acceptance and Processing of Foreign and Local Donations during Emergency and Disaster Situations (AO No. 2007-0017). Since Typhoon Haiyan, the Bureau of International Health Cooperation (BIHC) is responsible

for registration and coordination of the foreign medical teams (FMTs). Overall 151 FMTs were deployed in response to Typhoon Haiyan out of which 108 arrived to the country during the first month of the typhoon. Of 108 FMTs, 8 FMTs were deployed from 5 AMS[30] [Kim Brolin et al., 2015]. According to MOH, every FMT should be screened based on its capacity and composition. At the time of Haiyan response, however, most teams were accepted based on irrelevant reasons such as political consideration. As a result, in some areas, logistic support for such teams caused a heavy burden for local health authorities and the quality of services was not well monitored.

Based on this experience, DOH has been assessing actual performance of FMTs and developing pre-registration platform and minimum qualification. According to Department of Social Welfare and Development (DSWD), coordination to receive medical assistance could be improved by promoting coordination with the Philippines Embassies in the particular countries and strengthening of temporal licensing system of medical personnel.

DOH and some donor organizations emphasized that if there are any database and/or opportunity to have regular face-to-face communication among health emergency response personnel, it could contribute to promote mutual understanding of capacity and characteristics of medical response personnel or teams and therefore, make necessary arrangements in disaster response more smoothly.

Also, the national cluster has been revised (Table 9-8). It is based on the lessons learned from Haiyan response that any assistance has to appropriately respond to the needs of affected areas with careful consideration for their socio-cultural background. According to DSWD, external assistances were screened and selected in accordance with the above principle at the time of Typhoon Ruby (2014).

The Philippines also has several experiences to dispatch medical teams to other countries such as Myanmar (Cyclone Nargis), and Haiti (earthquake), etc.

9.4.7 Experiences in the Past Disaster

The Philippines has extensive experience in all phases of disaster: preparedness, response and recovery. The country faces the situation so-called “disaster upon disaster” in a short period of time and has to handle different phases at a time. For instance, in 2013, the Philippines experienced flood in Manila (August), Zamboanga and Basilan emergency (September) and earthquake in Bohol province (October) within 60 days and one million people which is equivalent to one percent of the total population was without shelter and the DOH had stretched its resources before Typhoon Haiyan hit in November 2013.

Given its expansive experience with disasters, the country has developed the knowledge base for contributing to the global expertise on emergency humanitarian action, including participating in regional training activities and providing technical experts to regional emergency preparedness activities. It has also spearheaded regional efforts to support the United Nations global campaign on safer hospitals/health facilities in emergencies and disasters [WHO, 2011].

[30] Those were one team from Indonesia (Muhammadiyah Disaster M.C.), three teams from Malaysia (Military/Government, Malaysian Relief Agency, Mercy Malaysia), one team from Myanmar (Myanmar Medical Team), two teams from Singapore (REACT Philippines, RC), and one team from Thailand (Thailand Medical Team).

9.5 Current Situation of Relevant Emergency Medical Services

9.5.1 Facility and Equipment

Emergency care is governed by RA 8344 which was passed in 1997, penalizing hospitals and medical clinics for refusing to administer appropriate initial medical treatment and support in emergency or serious care.

There are approximately 1800 hospitals in total in the Philippines, of which 721 (40%) are public hospitals and 70 are DOH hospitals [WHO, 2012]. According to the DOH, all the national and regional hospitals have emergency department as show in Table 9-9. All the DOH hospitals (general tertiary hospitals) provide trauma care. However, only two national hospitals can provide neurosurgery services.

Table 9-9 Number of Emergency Department

Category	Total number of hospitals	Number of Emergency Departments
National Hospital	72	72
Regional Hospital	52	52

Source: DOH Philippines

The private sector mostly provides emergency care in the country, as they have the appropriate equipment for dealing with emergency medical situations. Many public health facilities, particularly in the provinces, lack ambulances and basic emergency devices such as defibrillators and respiratory equipment [Maria Elena B. Herrera, et al., 2010].

9.5.2 Response and Transportation System

In the Philippines, there is no coordinated national ambulance service. The country has ambulance services offered by multiple providers - public, private and charity. Each organization has its own number. Table 9-10 shows some organizations providing emergency medical services (EMS) including ambulance services. Availability of services, skill levels of attendant personnel, equipment levels and response time vary from provider to provider since those are neither standardized nor regulated.

Table 9-10 Organizations Providing Ambulance Services/EMS

Organization	Telephone number
DILG	117 (police, fire and ambulance)
DOH-HEMB Operation Center	711-1001 to 02
Marikina	161
Davao	991
Philippines Red Cross	143

Source: DOH Philippines

The Bureau of Fire Protection (BFP) of the DILG provides prehospital care and has 90 ambulances at the central and regional levels. However, there are some ambulances which are out of order or too old to be repaired since they were procured before 2000. There is also a problem in communication because the communication equipment such as radio transmitters has not been renewed since 1998.

The PNRC has 130 ambulances and provides service at minimum fee for operational cost (gasoline and maintenance). In disaster situation, service is free of charge. In an ambulance, EMT and a driver are onboard.

9.5.3 Human Resources

Emergency physicians are recognized as specialists and certified by the Philippine Board of Emergency Medicine. There were 23 certified emergency physicians in the country in 1995 [Peralta PG, Sinon JB, 1995]. However, the current number of emergency physicians is not known. The minimum requirement for emergency physicians is to undergo residency training program.

As for nurses, the DOH has initiated the nurse certificate program including Trauma and Emergency Nursing since 2012 targeting on registered and licensed nurses with the Level II competencies[31] or above [DOH Philippines, 2012]. The progress of the program and the number of nurses who obtained Trauma and Emergency Nursing certificate are not known.

There are health professionals trained as emergency medical technicians (EMTs). Although there has been an effort to establish EMTs as formally recognized specialists, EMT is not recognized as specialists yet.

(1) Pre-service Education

Emergency medicine is taught in the medical schools. For instance, at St. Luke's College of Medicine, in the third year emergency medicine is taught as an independent subject [SLCM].

There are medical institutions that offer residency training program in emergency medicine accredited by the Philippines Board of Emergency Medicine. The training program is a three-year program with an additional (fourth) year in emergency medicine administration as a chief resident [UPCM]. Emergency medicine residency training institutions include the Makati Medical Center, the Philippine General Hospital, the St. Luke's College of Medicine, and the East Avenue Medical Center.

As for nursing, as stated before, emergency nursing is taught in the BSN program in the Philippines.

(2) Continuous Professional Development (CPD)

Trainings for Continuous Professional Development (CPD) are being conducted by hospitals, the HEMS, national and/or international partners. The HEMS has been conducting and coordinating various trainings in the field of emergency medicine and EMS in collaboration with national/international partners. The HEMS also develops training modules and distributes them to hospitals. The Basic Life Support (BLS) training (16 hours) is mandatory [DOH Philippines, 2004] to all health staff and the HEMS allocates the necessary budget to each hospital. The Advanced Cardiovascular Life Support (ACLS) and Pediatric Advanced Life Support (PALS) trainings are conducted by the hospitals.

[31] Level II competencies are competencies of an Advanced Beginner nurse; with Level I competencies or with at least one year of clinical experience.

The PRC (Phillipine Red Cross) offers EMS-related training courses such as First Aid, Basic Life Support-Cardiopulmonary Resuscitation (BLS-CPR), and EMT training courses. The BLS training for health personnel is financed by the HEMS.

As stated in the previous section, the DOH has initiated the nurse certificate program since 2012 to implement the competency-based learning intervention and development for nurses, which adopts a career level progression directed towards certification in a specialized area. The Trauma and Emergency Nursing is included in the specialized programs under the nurse certificate program. The Trauma and Emergency Nursing specialty program is headed by the East Avenue Medical Center [DOH Philippines].

9.5.4 Relevant Academic Society/ Professional Organization

It was in early 2009 that the Philippine College of Emergency Medicine and Acute Care (PCEMAC) and the Philippine Society of Emergency Care Physicians (PSECP) began the process of merging into a single national specialized society for emergency medicine, with the encouragement and guidance of the Philippine Medical Association. A steering committee was organized to work towards the merger of the PCEMAC and after several meetings, the Philippine College of Emergency Medicine (PCEM) was born.

9.6 International Cooperation

The cluster approach was initiated in 2007. Initially there were eight clusters. The number of clusters increased to twelve in 2008, then to 15 in 2014 as shown in Table 9-8. The cluster scales up during disaster situations and goes down in peace time in the Philippines. In peace time, relevant donors share information under the Inter-Cluster Coordination (ICC). During emergencies, the Emergency Response Preparedness Working Group (ERPWG)[32] is activated.

WHO takes co-lead of health cluster with the DOH. WHO provides technical and financial support such as the development of SPEED, and mapping system of health facilities and medical response teams in the affected areas [WHO Philippines]. WHO Country Cooperation Strategy 2012-2016 includes “Improving the resiliency of national and local institutions against health security risks and threats” as one of the three strategic priorities aiming to increase the capacity of key government agencies and LGUs to manage health security risks following natural and human-induced disasters.

Based on the experiences of support in the reproductive health field in response to Typhoon Haiyan[33], the United Nations Population Fund (UNFPA) is developing the Reproductive Health and Maternal and Child Health (RHMCH) guidelines in emergency situation. It will be published by the end of 2015 and will be incorporated into the national protocol.

[32] ERPWG was just approved by UN Humanitarian Country Team. The composition will be almost same as ICC.

[33] UNFPA provided “Hospitainer” services. It is a sort of temporary RH and MCH clinic for pregnant and lactating women and also functioned as service point for gender-based violence victims.

9.7 Conclusion

Because the Philippines seems like to respond disaster all through the year, they understand importance of preparedness in peacetime and efficiency of disaster management and response. The Philippines has been developing useful and practical tools for preparedness and emergency/ disaster management such as SPEED, pre-registration platform of foreign medical teams and the Hospital Emergency Preparedness, Response and Rehabilitation Plan. In addition, the focal points are deployed in the regional health offices and DOH hospitals for prompt response and coordination with the central government. Despite of some difficulty caused by decentralization and political aspects, preparedness and response to the disaster seem to have been improving. Such experiences of continuous improvement and tools could be useful with the other countries.

Chapter 10 Country Report: Singapore

10.1 Overview of Disaster Occurrences (Natural and Man-made)

Singapore does not lie in a natural disaster-prone area (Figure 10-1). However, the risk of man-made disasters is high because the country functions as a major communications center and has one of the busiest seaports and airports in the world. Therefore, there is a need for preparation in responding to disasters [Lim SH and Anantharaman V, 1999].

Source: [UNEP/ UNISDR, 2013]

Figure 10-1 Map of Singapore

10.1.1 Occurrence of Natural Disasters

There are no natural disaster records in the EM-DAT database from 1980 to 2014.

10.1.2 Occurrence of Man-made Disasters

Table 10-1 shows the man-made disasters from 1980 to 2014 in Singapore.

Table 10-1 Man-made Disasters in Singapore (1980-2014)

Disaster	Month Year	Number of Death[1)]	Outline[2)]
Collapse of Hotel New World	Mar 1986	33	The rescue operations encountered difficulties as the rescue personnel were neither trained nor equipped to deal with such situation.
Ginza Plaza Explosion	Aug 1992	3	People were injured after an explosion at a large shopping mall.
Clementi Mass Rapid Transit (MRT) Accident	Aug 1993	0	An east-bound train hit a stationary train at Clementi Station during peak hours in the morning. Many passengers flung aside or collide against the metal poles inside the train, resulting to 156 injuries.
Collapse of Nicoll Highway	Apr 2004	4	Part of Nicoll Highway incidentally caved-in in the MRT Circle Line tunnel construction underneath.
Pulau Bukom Fire	Sep 2011	0	At the height of the incident, the Singapore Civil Defence Force (SCDF) activated the Operations Civil Emergency Plan (OCEP), a national-level emergency response framework for major incidents in Singapore.
Jurong Oil Rig Accident	Dec 2012	0	After failure of a jacking mechanism on one of the jack-up rig's legs the newbuilt rig, 89 workers have been injured. It was "the worst industrial accident" in recent time.

Source: 1) [CRED], 2) [Singapore Government], [SCDF, 2015], [RemSG, 2011], and [WMN, 2012]

10.2 Emergency Response System

10.2.1 Laws and Regulations for Emergency Response

Laws and regulations on emergency response are listed in Table 10-2.

Table 10-2 Laws and Regulations for Emergency Response in Singapore

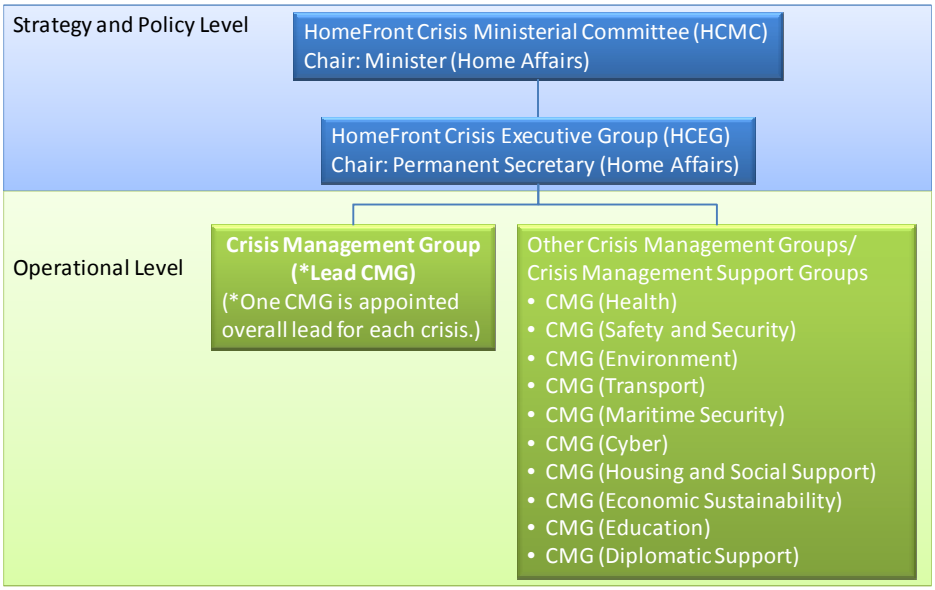
Name	Year	Outline
Fire Safety Act	1986	It provides the framework for response and preparedness of commercial and industrial facilities when fire occurs.
Civil Defense Act	1986	It provides the legal framework for the declaration of a state of emergency and the mobilization and deployment of operationally ready national service rescuers.
Civil Defense Shelter Act	1997	It provides the legal framework for provision of buildings with civil defense shelters during the state of emergency.

Source: [JICA, 2012]

10.2.2 Organization for Emergency Response

(1) Whole-of-Government Integrated Risk Management (WOG-IRM)

The Singapore government adopts a cross-ministerial policy framework entitled the Whole-of-Government Integrated Risk Management (WOG-IRM) for disaster risk mitigation and disaster management (Figure 10-2).



Source: MOH Singapore

Figure 10-2 Whole-of-Government Integrated Risk Management (WOG-IRM) Framework

This is a framework that aims to improve the risk awareness of all government agencies and the public; and helps to identify the full range of risks systematically. In addition, the framework identifies cross-agency risks that may have fallen through gaps in the system. [Allen Yu-Hung Lai and Seck L. Tan, 2012] The Homefront Crisis Ministerial Committee (HCMC) is responsible for strategy and policy on risk management and emergency response. Each Crisis Management Group (CMG) takes care of relevant activities of emergency response for each sector at operational level. A lead CMG is to be designated according to the type of disaster/emergency.

The activities for disaster preparation include predicator planning, equipping, and training of potential disaster response forces such as rescue services provided by the Singapore Civil Defence Force (SCDF), police forces, the military, the telecommunication agency, social agencies, environmental board, public

utility agencies, the information bureau, and the foreign affairs group. [Lim SH and Anantharaman V, 1999].

(2) **Singapore Civil Defence Force (SCDF)**

The SCDF is a national organization for emergency response in charge of fire fighting and rescue. It commands and coordinates response of organizations concerned with advice by the joint planning staff. The SCDF has 5,600 staff members (1,700 regular staff, 200 civil staff, and 3,700 national service personnel[34]). In an emergency, more than 8,300 stand-by national service personnel can be mobilized[35]. There are 16 fire fighting offices all over the nation divided into four divisions where fire fighters and search and rescue staff are deployed. The command center in the SCDF head office makes decision on necessary response activities and sends out an order to the nearest team to go into operation.

The SCDF has the Disaster Assistance and Rescue Team (DART)[36], a specially trained unit that can undertake high-risk fire fighting and rescue operations.

(3) **Community Emergency Response Team (CERT)**

The Community Emergency Response Team (CERT) is an emergency response unit consisting of residents living within a particular neighborhood's vicinity. During emergencies, the CERT will work hand-in-hand with the police and SCDF to mitigate the impact of the emergencies in the community.

10.2.3 Classification of Disaster and Emergency Response

The main bodies responsible for emergency response in Singapore are the SCDF headquarters and fire fighting offices. Table 10-3 shows the level of emergency response in Singapore.

Table 10-3 Level of Emergency Response in Singapore

Levels	Responsible Organizations	Responsibility
Phase III (Declaration of Civil Emergency)	SCDF headquarters and activation of the Joint Planning Staff (JPS)	Commissioner SCDF as Incident Manager
Phase II (Enhanced Response)	SCDF Division Office: Deployment of additional support appliances and division forward command vehicle	Division Commander as Ground Commander
Phase I (Initial Response)	SCDF Fire Station: Deployment of predetermined appliances	Fire Station Commander as Ground Commander

Source: [SCDF, 2012]

[34] Full-time National Servicemen are Singaporean males who are 18 years old or older and are called to enlist and serve for 2 years of national service, either in the military, police, or civil defence.

[35] Another 10,000 Operationally Ready National Servicemen (ORNSmen) from the reserve service are available for activation during emergencies.

[36] DART is a specially trained unit that can undertake high-risk fire fighting and rescue operations.

10.2.4 Emergency Response at the Site

(1) Disaster Relief

The Operations Civil Emergency Plan (OPS CE Plan) was formulated by SCDF for the management of large-scale disasters. It coordinates the operations of SCDF and all 22 relevant agencies. The OPS CE Plan is prepared for the following disasters [SCDF, 2012]:

- Structural collapse
- Air crash
- Hazardous materials and items (HAZMAT) incidents
- Acts of terrorism involving chemical, biological, radiological and/or explosive (CBRE) agents
- Accidents related to radioactive materials
- Major fires
- Maritime fire (involving cruise ship)

(2) Emergency Drills

The national-level multi-agency exercise (Exercise Northstar) has been conducted to validate the various OPS CE Plans as well as to develop the government's level of preparedness from new threat scenarios. The exercise was started in the late 1990s as a platform for testing peacetime civil contingency preparedness. The latest exercise (Exercise Northstar VIII) was conducted in November 2011 for two weeks. The content of the exercise is to launch the National Maritime Security System, a framework for early detection and coordinated response to maritime threats.

10.3 Overview of Disaster/Emergency Medicine

The "Casualty and Outpatient Service", which started in 1948 at the Singapore General Hospital, started as grew into the first 24-hour emergency unit in 1964 and has since expanded to the emergency departments of the six public hospitals providing acute 24-hour accident and emergency services with an annual patient load of up to 540,000. In 1984, emergency medicine was recognized as a distinct medical specialty by the Ministry of Health [Lim SH and Anantharaman V, 1999].

10.3.1 Legal and Political Arrangements

As mentioned in Section 10.2, the Singapore government adopts WOG-IRM for disaster risk mitigation and disaster management. This framework includes medical response systems during emergencies, mass casualty management, risk reduction legislation for fire safety and hazardous materials, police operations, information and media management during crises and public-private partnerships in emergency preparedness. [Allen Yu-Hung Lai and Seck L. Tan, 2012].

10.3.2 Institutional Setting

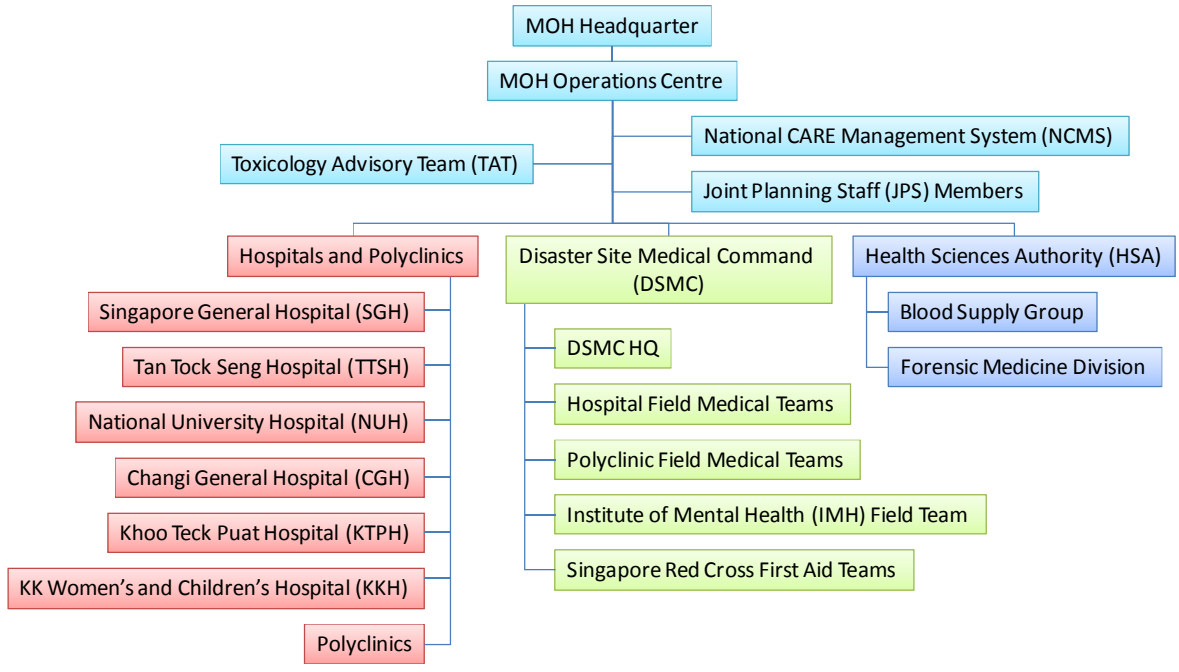
The Ministry of Health (MOH) chairs CMG-Health under HCMC (Table 10-4). CMG-Health manages all health issues including medical services during emergencies, formulates plan to deal with health emergencies, and provides policy guidance and advices to responding agencies. CMG-Health involves relevant agencies such as SCDF, Singapore Police Force (SPF), and Singapore Armed Forces (SAF).

Table 10-4 CMG-Health

Agencies	Responsibilities
Ministry of Health (MOH)	- Chair the group - Providing pre- and in- hospital services
Singapore Civil Defence Force (SCDF)	- Incident Manager and overall coordinator for most disaster response: Rescue operations, firefighting, HAZMAT mitigation, monitoring and plume modeling, evacuation, personal decontamination
Singapore Police Force (SPF)	- Providing safety and security: Cordoning and crowd control, security, traffic control, causalities identification, family assistance centre (management of next-of-kins)
Singapore Armed Forces (SAF)	- Providing support to responding agency through deployment of assets such as ambulances, stretcher bearers, logistics, helicopters and naval crafts.
Other members	- Ministry of Home Affairs, Ministry of Foreign Affairs, Ministry of Transport, Ministry of Education, Ministry of Communication and Information, Ministry of National Development, Ministry of Trade and Industry, Ministry of Manpower, Civil Aviation Authority, Maritime Port Authority, etc.

Source: MOH Singapore

Operations structure in MOH is shown in Figure 10-3. Emergency Preparedness and Response Division, Public Health Group is a focal point of those activities. The SCDF coordinates most civil disaster rescue efforts, and the Accident and Emergency Department of Singapore General Hospital (SGH A&E) works closely with them in the medical planning for disasters. Medical support at disaster sites is the responsibility of MOH during disaster or mass casualty events [Lim SH and Anantharaman V, 1999].



Source: MOH Singapore

Figure 10-3 MOH Operations Structure

10.3.3 Financial Arrangements

The Government of Singapore makes no annual budgetary allocations for disaster response because the risks of a disaster are low. However, the Singapore government can swiftly activate the budgetary

mechanisms or funding lines in the event of a disaster and ensure these lines are sufficiently resourced with adequate financial capacity [Allen Yu-Hung Lai and Seck L. Tan, 2012].

10.4 Current Situation of Disaster Medicine

As described in Section 0, Singapore is not natural disaster-prone country. Therefore, it strongly focuses on mass casualty incident (MCI) with/without chemical and radiological substances. Disasters are managed at a national level by involving multiple ministries. The activates of disaster preparation include pre-disaster planning, equipping and training of potential disaster response forces such as rescue services (SCDF), police forces, the military, the telecommunication agency, social agencies, environmental board, public utility agencies, the information bureau, and the foreign affairs group [ADRC, 2005].

10.4.1 Facility and Equipment

The SCDF has headquarters of the call center and manages 20 fire stations nationwide. In addition, the Civil Defense Academy was established in 1999 to train not only the domestic officers but also the foreign emergency officers. The training facilities in the Academy include the use of state-of-the-art simulators and modern communication technology to make the training more practical, interesting, and realistic [ADRC, 2005].

The MOH designates six public restructured hospitals and six polyclinics to respond to MCI situations. The public restructured hospitals have emergency department (ED), intensive care units (ICUs), operation theaters and management bureau. In addition, the hospitals have decontamination system like as showers, personal protective equipment, detectors and treatment drugs for chemical and radiological substances.

10.4.2 Response System

The SGH A&E works closely with SCDF in the medical planning for disasters. Medical support at disaster sites is the responsibility of the MOH.

During disaster or mass casualty events, EDs of the acute care hospitals send field teams to the site. The field teams provide triage and initial medical care to the casualties. The teams are coordinated by a medical command post. The field commander is usually a senior emergency physician. The commander is in charge of coordinating all the field medical teams deployed by the hospitals, the Red Cross, the military, and the SCDF. The MOH also coordinates logistics and manpower support to these field teams.

EDs and hospitals also participate in civil disaster exercises regularly at least six times annually. The exercises are carried out assuming airport/ aircraft accidents, marine accidents, MRT incidents, nuclear disasters, and hazardous material disasters. The hospital disaster plans also involve not only EDs but also other hospital departments such as operating suites, ICUs, wards, and hospital management. The MOH coordinates the medical support services such as the blood bank, medical supplies, and medical information flow system [Lim SH and Anantharaman V, 1999].

10.4.3 Major Providers of Disaster Response

(1) **SCDF**

As described in Section 10.2.2(2), the SCDF can mobilize a maximum of more than eight thousand workforces for emergencies. Also, the SCDF has established special rescue capabilities including the DART and the hazardous materials and items (HAZMAT) Incident Teams (HITs)[37] [ADRC, 2005].

(2) **Field Medical Team**

The MOH organizes two MCI response plans on pre-hospital and in-hospital levels. According to the pre-hospital level response plan, each public healthcare facility dispatches field medical teams (FMTs) after the activation of the plan followed by the SCDF's response. FMT is standby at the hospital to be mobilized anytime.

The team is composed of two doctors, four nurses and one driver and takes care of 50 victims. All the doctors in the first FMT must be emergency physicians. In the second and third FMTs, the other specialists such as pediatrician and psychiatrist will be deployed according to the needs. The teams are deployed by its ambulance with necessary medical equipment and supply within the designated response time as shown in Table 10-5.

Table 10-5 Dispatch Plan of Field Medical Team

Hospital/NGO	Response Time of each Team		
	1st <15min	2nd <45min	3rd <2hr
Singapore General Hospital (SGH)	1	1	2
Changi General Hospital (CGH)	1	1	1
National University Hospital (NUH)	1	1	1
Tan Tock Seng Hospital (TTSH)	1	1	1
Khoo Teck Puat Hospital (KTPH)	1	1	-
Pediatric team	1(KKH*)	1(NUH)	-
Institution of Mental Health (IMH)	1	1	1
Polyclinic	-	-	6
Total	**7**	**7**	**12**
Singapore Red Cross			1 (for Priority 3;minor injury)

Note: * KKH= KK Women's and Children's Hospital

Source: MOH Singapore

When incidents occur on several sites, the FMTs are to be dispatched separately up to two sites. The FMT is responsible for the triage and stabilization of the victims within the clean area under a tight SCDF control. In order to control the site, the medical commander from the first FMT must join the command post center. This system has modified the concept of Major Incident Medical Management and Support (MIMMS) course in the United Kingdom (UK).

(3) **Red Cross**

The Singapore Red Cross is responsible for the blood supply and the FMT for minor injuries (Priority 3 patients).

[37] HITs are specialized teams trained and equipped to handle HAZMAT incidents.

(4) **Transportation of Patients**

The patients are divided into four triage categories i.e.: priority 0 (P0), P1, P2, and P3. These priorities are based on the Simple Triage and Rapid Treatment (START) method. In general, the SCDF transports victims directly to the nearest public hospital and it is known as the "Scoop and Run[38]" principle. However, in case of MCI, the Disaster Site Medical Command (DSMC) reports the list of victims to the MOH headquarters according to the results of triage. The MOH manages the referral of victims to the adequate hospitals, and to transfer them to six public hospitals separately.

(5) **Public Reconstructed Hospital**

When an MCI occurs, there are two ways to activating the hospital MCI response plan. Usually, it is based on a notice from the MOH followed by the SCDF's on-site information; while the other one is made by the ED of the hospital after recognizing the victims' arrival. In the latter case, the hospital management has to report on such MCI situation to the MOH.

In the in-hospital level, the hospital's MCI response plan is classified into four levels. For example, in the NUH, Level 1 means the activation of the ED, and level 4 means the activation of all healthcare personnel.

10.4.4 Human Resource Development

(1) **Public Education**

SCDF has been conducting awareness rising and education activities for general population to increase the capacity of disaster risk reduction at the community level. It focuses on preparedness and In-Place Protection (IPP), a series of protective measures to be taken at home during a chemical release. Such education takes place via the distribution of the Civil Defense Emergency Handbook, a handbook on emergency procedures and skills required for various types of emergencies. Other methods include the conduct of annual community exercises, as well as the Home Fire Safety Visit Programme. The former familiarizes the community volunteers and residents on how to deal with large-scale emergencies within their neighborhood, while the latter provides personal fire safety advice from Civil Defence volunteer personnel to registered residents. To sensitize and get the community more prepared for terrorist acts [ADRC, 2005].

(2) **Civil Academy**

The Civil Defense Academy, with purpose-built features, meets the training needs of regulars, national service personnel, emergency response personnel of the industries, fire fighters and rescuers as well as participants from other parts of the world [ADRC, 2005].

[38] A stance is taken when a trauma victim's condition is of such severity that there is (1) insufficient time for the usual format of medical stabilization and/or (2) the equipment and/or experts needed to save the victim's life are not present in the ambulatory field unit—e.g., ambulance or helicopter (Segen's Medical Dictionary, 2011).

(3) **Public Reconstructed Hospital**

All public hospitals have capabilities of blast injuries, pediatric cases, HAZMAT and radiation contamination, and burns. Especially, the MOH instructs each public hospital to train its staff for response to MCI on HAZMAT and radiation contamination twice a year.

10.4.5 Receiving/ Dispatching Medical Team to Other Countries in Emergencies

Singapore has deployed an emergency assistant team in Sumatra Earthquake in 2004. It was an integrated team consisting of rescue (SCDF), medical (MOH) and logistics (military), etc.

10.4.6 Experiences in the Past Disaster

As mentioned in Section 10.1.2, Singapore has experienced several serious disasters and has been improving the preparedness and response system based on lessons learned from not only their own experiences but also the other countries. In the health sector, the outbreak of Sever Acute Respiratory Syndrome (SARS) in 2003 was one of the triggers to improve the disaster response system [Allen Yu-Hung Lai and Seck L. Tan, 2012].

10.5 Current Situation of Relevant Emergency Medical Services

In Singapore, there are two ambulance-call numbers; 995 for life-threatening cases, and 1777 for non-emergency cases. Call 995 is operated by SCDF, and call 1777 is conveyed to the private non-emergency ambulance operators. Emergency ambulance provided by SCDF transfers the patient to the nearest hospital. On the other hand, the patient may choose the hospital to be transferred by non-emergency ambulance. In 2013, 98% of the ambulance calls to the SCDF were life-threatening cases [SCDF].

10.5.1 Facility and Equipment

In Singapore, the eight public hospitals is composed of six acute general hospitals (SGH, NUH, CGH, TTSH, KTPH and Alexandra Hospital), and two specialized hospitals (KKH and psychiatric hospital (IMH)). The general hospitals provide multi-disciplinary acute inpatient and specialist outpatient services and a 24-hour emergency medical care. In addition, there are six healthcare groups operating public restructured hospitals and specialist centers as of 2015. The MOH has established a National Electronic Health Record (NEHR) system that provides a common access point for medical information of all citizens among the six healthcare groups [Accenture, 2012].

10.5.2 Response and Transportation System

The SCDF was established in 1989 to operate an Emergency Ambulatory Service (EAS) with a universal emergency number (995). All calls in the Central Dispatch Controls Room are categorized into either medical or fire emergencies. The SCDF will then deploy an ambulance from the nearest fire station to the patient in accordance with the dispatch protocol. In case of trauma victims, a motorcycle-based Fast Response Medic (FRM) provides initial care following an ambulance. Each ambulance is staffed by an ambulance driver, a paramedic, and an ambulance attendant (a former fireman who are also trained in

standard first aid and CPR) [Lim SH and Anantharaman V, 1999] [F. Lateef and V. Anantharaman, 2000] [SCDF, 2014].

The SCDF ambulance will transport all patients needing emergency care to the nearest hospital according to the patient's needs. This is to facilitate early treatment by the hospital's doctor and enable the ambulance to be ready and available for the next emergency call. The SCDF does not charge fees for transportation of any emergency case; however, S$198 will be charged for each non-emergency case that the SCDF brings to the hospital. The final decision on whether the status of a patient is an emergency or non-emergency case is determined on the assessment of the doctor at the ED of the receiving hospital. On the other hand, 1777 private ambulance services for non-emergency cases can transfer the patients to any health facility upon his/her request [SCDF, 2015].

10.5.3 Human Resources

An emergency physician is recognized as a specialist under the auspices of the MOH in 1990. A three-year structured basic postgraduate training program in emergency medicine (residency) is needed primarily. In addition to conducting regular review of the postgraduate training syllabus, MOH also accredited training centers and conducted 6-month reviews of progress of postgraduate residents [Lim SH and Anantharaman V, 1999].

All of the paramedics belong to the SCDF. To become a qualified paramedic, the completion of the Section Commander (Paramedic) Course provided by the SCDF is required [SCDF].

Regarding the first aid personnel, the SCDF conducts modular-based instructional training for the public under the Community Emergency Preparedness Programme (CEPP). Through both theoretical and practical trainings, the program covers First Aid, Cardio-Pulmonary Resuscitation (CPR), Fire Safety and Casualty Evacuation, Emergency Preparedness for War and dealing with unconventional threats [ADRC, 2005].

(1) Pre-service Education

Paramedic training has started in 1995 as a collaborative effort among SCDF, the School of Military Medicine, and the Paramedic Academy of the Justice Institute of British Columbia. As of 2015, all trainings for paramedic are certificated by the SCDF. The Section Commander (Paramedic) Course (about 14 months) is required to be qualified as paramedics. The contents of the program are as follows:

- SAF Medical Training Institute (Level One and Level Two)
- Fire Station Attachment (OJT as Paramedic Trainees)
- SAF Counseling Centre (SCC) (Paramedic) General Term
- SCC (Paramedic) Specialist Term
- Outward Bound Training (Brunei/Sabah)
- Home Team Basic Course (Home Team Academy)
- Fire Station Attachment (OJT as Paramedic Trainees)
- Obstetrics and Pediatrics Course (Nanyang Polytechnic)
- Fire Station Attachment (OJT as Paramedic Trainees)
- SAF Medical Training Institute (Level Three)
- SCC (Paramedic) Operations Term

Source: [SCDF, 2014]

The medical doctor in Singapore is accredited by the Singapore Medical Council after a five-year undergraduate curriculum. In the undergraduate curriculum of the National University of Singapore (NUS), fourth-year medical students are assigned to one of the EDs for three weeks to learn emergency medicine [NUS, 2015].

Emergency medicine specialists are required to be mature into independent, senior attending-equivalent physicians who are not only proficient in emergency medicine, but also developed further expert knowledge and skills in specially identified areas of emergency medicine. To accomplish this goal, a three- to six-year program was developed with logbooks to document their progress during the phase of advanced training. This program is a postgraduate training in internal medicine, general surgery, pediatrics, and family medicine [Lim SH and Anantharaman V, 1999].

Nursing training program is offered by nursing schools in polytechnics. After completing the three-year program and passing the national examination, the Singapore Nursing Board accredits the nursing license. In 2006, a three-year course for Bachelor of Science (Nursing) and a four-year course for Bachelor of Science (Nursing) (Honors) were established in the Department of Nursing at NUS [NUS, 2015].

(2) **Continuous Professional Development (CPD)**

The Continuing Medical Education (CME) certified by the Singapore Medial Council under the MOH has been a duty for medical doctors from 2003 [Singapore Medical Council, 2014]. Seven areas of sub-specialization have been identified for development of EPs i.e.: emergency cardiac care, emergency trauma care, emergency toxicology, pre-hospital emergency care, pediatric emergency medicine, disaster medicine, and observation medicine [Lim SH and Anantharaman V, 1999].

Regarding nurses, a one-year full-time Advanced Diploma Program in Emergency Nursing was introduced as one of the various in-house nurse-training programs in 1995 [Lim SH and Anantharaman V, 1999].

10.5.4 Relevant Academic Society/ Professional Organization

The Society for Emergency Medicine in Singapore (SEMS) was formed in 1993 and involves emergency physicians.

10.6 International Cooperation

Singapore provides technical cooperation on a bi-lateral basis in the institutional level such as universities, hospitals, etc. According to the interviews, under the framework of the ASEAN Defense Ministers' Meeting (ADMM), a standard operating procedure (SOP) has been developed for military medical cooperation. The practice could be shared if civilians would develop an SOP for disaster medical cooperation.

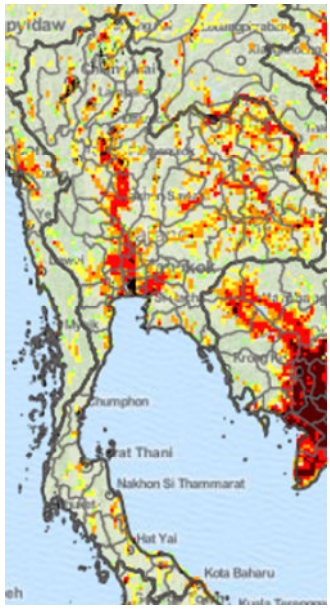
10.7 Conclusion

Singapore has established a well organized system to respond to MCI and HAZMAT. The WOG-IRM is quite effective to respond the disaster quickly and efficiently. Such system might be possible because of the size of the country and strong leadership. However, some factors or components such as hospital preparedness and human resource development curriculum could be learned by other countries.

Chapter 11 Country Report: Thailand

11.1 Overview of Disaster Occurrences (Natural and Man-made)

The major disaster in Thailand is floods and storms. The flood prone-area is at Chao Playa River Basin in the south and the central part, and Mekong River Basin in the north-eastern border of the country (Figure 11-1). The flood is caused by seasonal heavy rain and storms in the country and upwards the rivers. It is predictable because the flood warning is developed in Thailand; however delay of flood information expanded the damage at Bangkok Flood in 2011.



Source: [UNEP/ UNISDR, 2013]

Figure 11-1 Mortality Risk: Flood

11.1.1 Occurrence of Natural Disasters

Table 11-1 shows the occurrence of natural disasters from 1980 to 2014.

Approximately 85% of disaster occurrence is floods and storms. On the other hand, occurrence of earthquake and tsunami were slight but huge number was killed.

Table 11-1 Natural Disaster Occurrence in Thailand (1980-2014)

Type of Disaster	No. of Occurrence	Death (person)	Totally Affected (person)
Flood	65	3,587	50,250,750
Storm	30	895	4,235,503
Drought	9	0	29,982,602
Earthquake & Tsunami	4	8,347	84,546
Landslide	3	47	43,110
Extreme temperature	1	63	1,000,000
Wildfire	1	0	0
Total	113	11,239	85,592,020

Source: [CRED]

Table 11-2 shows remarkable disasters that gave more than 100 deaths in Thailand from 2000 to 2014.

Table 11-2 Remarkable Natural Disasters in Thailand (2000-2014)

Disaster	Month, Year	Number of Death	Mainly Affected Areas
Mekong River Flood	Aug-Sep 2001	104	Petchabun and Udorn Thani provinces
Flash Flood	Oct 2002	154	Northern part of Thailand
Indian Ocean Earthquake and Tsunami	Dec 2004	8,345	Krabi, Phang Nga, Phuket, Ranong, Satun and Trang
River Flood	May-Jun 2006	116	Nan, Phrae, Lamphang, Uttaradit and Sukhothai provinces
Flash Flood	Aug-Dec 2006	164	Chiang rai and Chang mai provinces.
River Flood	Oct-Dec 2010	258	Lampang Province and central part of Thailand
Bangkok Flood	Aug 2011-Jan 2012	813	Bangkok Metropolitan Area and Chao Playa River Basin, central and northern part of Thailand

Source: [CRED], [OCHA], [The World Bank]

11.1.2 Occurrence of Man-Made Disasters

Table 11-3 shows the occurrence of man-made disasters from 1980 to 2014.

Table 11-3 Man-made Disaster Occurrence in Thailand (1980-2014)

Type of Disaster	No. of Occurrence (A)	Death (person) (B)	Totally Affected (person)	Death per Occurrence (B/A)
Road Accident	27	671	0	24.9
Fire	16	508	33	31.8
Air Accident	11	770	0	70.0
Ship Accident	11	570	0	51.8
Explosion	11	451	20,000	41.0
Rail Accident	5	67	0	41.0
Collapse (building and mine shaft)	4	195	0	48.8
Gas Leakage	1	1	200	1.0
Total	86	3,233	20,233	-

Source: [CRED]

The highest number of the disaster is road accidents followed by fire accidents. Table 11-4 shows remarkable man-made disasters that gave more than 50 deaths in Thailand from 2000 to 2014.

Table 11-4 Remarkable Man-made Disasters in Thailand (2000-2014)

Disaster	Month, Year	Number of Death	Outline
One-Two-GO Airlines Flight 269 Plane Crash	Sep 2007	90	A plane crashed in Phuket, Thailand
The Santika Club fire	Jan 2009	66	The blaze broke out in the Santika Club, Bangkok in the early hours when up to 1,000 people were inside.

Source: [BBC, 2007], [BBC]

11.2 Emergency Response System

11.2.1 Laws and Regulations for Emergency Response

Emergency response is included to the following regulations in Thailand (Table 11-5).

Table 11-5 Laws and Regulations for Emergency response in Thailand

Name	Year	Outline
Disaster Management under the National Civil Defence Plan	2005	The Office of Civil Defense Secretariat was obliged to formulate the National Civil Defense Plan every three years. The plan had designed the direction and policies for the country's disaster management.
Disaster Prevention and Mitigation Act	2007	The act stipulates the following: - Scope of disaster management activity has been extended to encompass all types of disasters along with clear definitions of disasters and security threats. - Designating National Disaster Prevention and Mitigation Committee to lay down policy for formulating National Disaster Prevention and Mitigation Plan. The committee is comprised of 23 members and chaired by the Prime Minister or the Deputy Prime Minister entrusted by the Prime Minister. - Designating the Department of Disaster Prevention and Mitigation as national focal point to carry out disaster management activities in the country. - Formulation of three disaster prevention and mitigation plans through; National Disaster Prevention and Mitigation Plan, Provincial Disaster Prevention and Mitigation Plan, and Bangkok Metropolitan Disaster Prevention and Mitigation Plan. - Clearly identifying the authorized persons and their disaster management tasks at all levels.
National Disaster Prevention Plan 2010-2014	2010	It designates management principal, response procedure, and safety and risk management. Also, the Incident Command System (ICS) is applied to integrated lines of communication in disaster response.

Source: [DDPM, 2010]

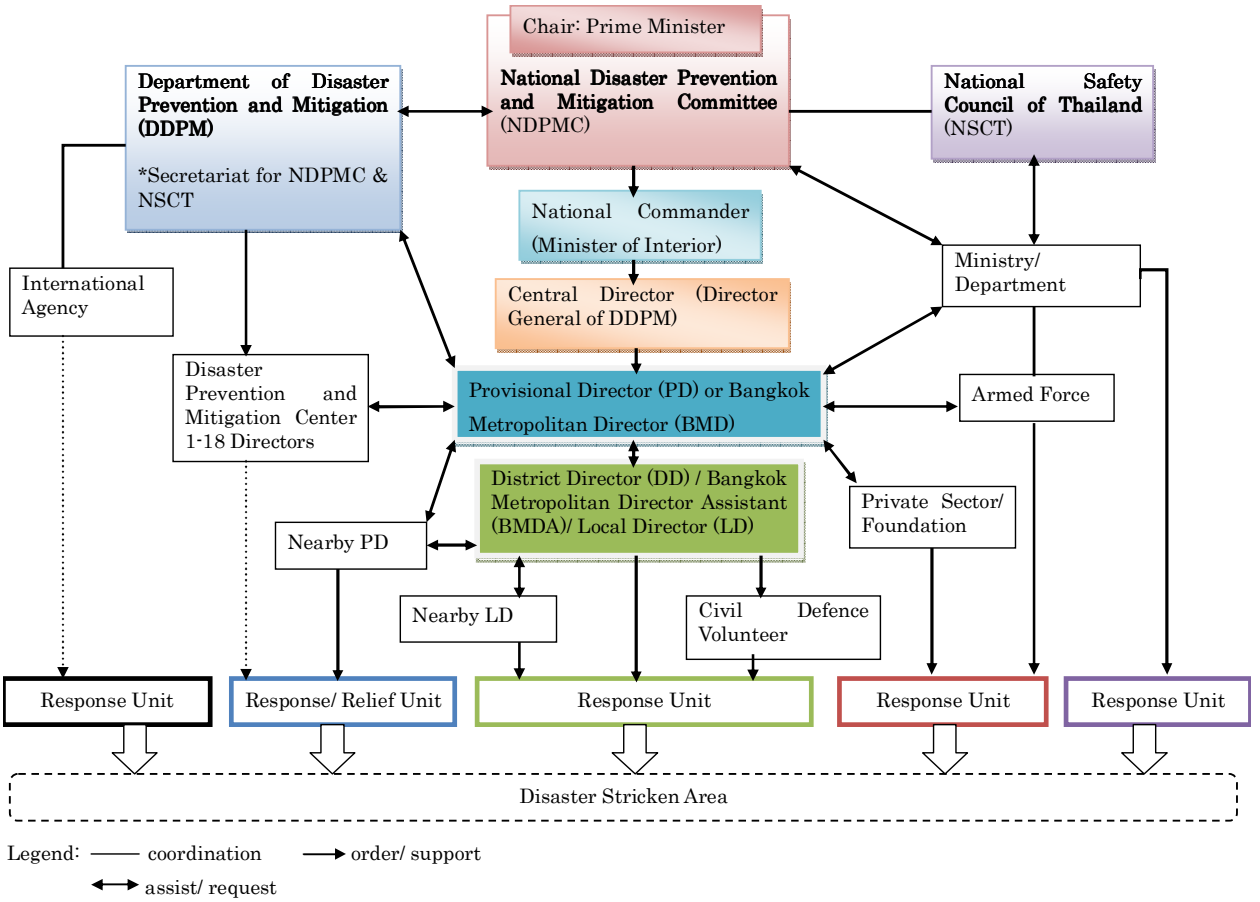
11.2.2 Organization for Emergency Response

All disaster operations-related command, order, and management at the national, provincial/Bangkok Metropolis and local levels must proceed according to the Act. Figure 11-2 shows the disaster management arrangement which was set based on the Disaster Prevention and Mitigation Act (2007), which includes emergency response.

In case of extreme large-scale disasters, the Prime Minister has been empowered to command the National Commander (NC), Director, state agency, and local administration organization to handle disaster situations.

The National Disaster Prevention and Mitigation Committee (NDPMC) is to define a policy for the formulation of National Disaster Prevention Mitigation Plan and integrate the development of disaster management system. The Department of Disaster Prevention and Mitigation (DDPM), as the Secretariat of NDPMC, is tasked to formulate the plan in conjunction with relevant government agencies including representatives from local administration organizations.

The National Safety Council of Thailand (NSCT) is the main body responsible for formulating the accident–related policy and increasing of safety awareness in people's mind.



Source: [JICA, 2012]

Figure 11-2 Disaster Management Arrangement in Thailand

11.2.3 Classification of Disaster and Emergency Response

The government classified all the disaster into four levels, the definition and responsibility with medical operators and operations are shown in Table 11-6.

Table 11-6 Disaster Level, Scale, Responsibility and Medical Operation in Thailand

Level	Scale of Disaster	Responsibility (Person in charge of management)		Medical Operators and Operations
		Civil	Military	
1	Small	Local Director, District Director, and/or Bangkok Metropolitan Director Assistant are capable of containing the situation and suppressing the incident.	Local Military Commander	- Medical personnel in the Area (Military) - Area/ Local Hospital
2	Medium	In case where disaster situation is beyond the capacity of the above mentioned Directors, the Provincial Director and/or Bangkok Metropolitan Director are obliged to intervene.	Military in Province	- Area Medical Sergeant (Military) - Provincial Hospital
3	Large and severe and widespread impact or required specialist or specific equipment	In case where situation is beyond the capacity of the second level Directors, the Central Director and/or National Commander are obliged to intervene.	Minister for Defense	- Disaster Relief Center (in Army, Navy and Air Force, the Army has 37 centers over the country) - National Hospitals
4	Large and catastrophic impact	The Prime Minister or entrusted Deputy Prime Minister will be in charge as the commander.	National Council	- Emergency Operation Committee (EOC) (Military) - National Hospitals

Source: [DDPM, 2010] and Interviews

11.2.4 Emergency Response at the Site

(1) DDPM in Emergency Response

In the event of a disaster, DDPM is obliged to dispatch the Emergency Response Team (ERT), taking charge of coordination among stakeholders. There are 20 ERTs set up, two teams are embedded in DDPM headquarter, and the other 18 teams are in each regional office of DDPM. Each ERT consists of ten members, including one team leader, three for planning, and six for operation. The team leader of ERT will be the chief officer who is tasked to coordinate with the Provincial Director and officers of the Ad-Hoc Control Center to be organized at the disaster event.

(2) Civil Defense Volunteers (CDV)

DDPM also nominates the Civil Defense Volunteer (CDV) from the community, and CDV is trained for disaster response including first aid. CDV has roles of first responder, search and rescue (SAR), and emergency medical services (EMS). In particular, more than 8,000 One Tambon[39] One Search and Rescue Teams (OTOS) have been setup to act as efficient and skillful Search and Rescue (SAR) team. CDV reports the situation to DDPM local office. DDPM local office receives the report from CDVs, reports to the head office and military in charge, and gives orders to CDVs.

(3) Emergency Drills

An emergency drill is carried out once a year at the national level, and DDPM will be the secretariat of the drill from 2015. Emergency drills were also carried out in some provinces[40].

[39] "Tambon" is Thailand's administrative unit in between district and village.

[40] Chiang Mai preparing for possible earthquakes by holding emergency drills: (http://reliefweb.int/report/thailand/chiang-mai-preparing-possible-earthquakes-holding-emergency-drills)

11.3 Overview of Disaster/Emergency Medicine

Through experiences in many natural disasters and man-made incidents, the need for better education in management of mass causalities and knowhow of cooperation with other concerned organizations when the resources are insufficient has been emphasized [Chayanin Angthong et al., 2012].

The emergency medical service (EMS) in Thailand was started as voluntary foundations[41]. Since then, emergency medical system in Thailand has been developed together with the development of tools and life-saving appliances in the emergency rooms of each hospital, both public and private sector [NIEM]. As shown in Table 11-7, emergency medical system has been upgraded and improved in response to the experiences and lessons learned from the major disasters such as the Great Sumatra-Andaman Earthquake of 2004 and the Thailand Flood of 2011.

Table 11-7 History of Emergency Medical Service (EMS) in Thailand

Year	
1993	- Accident Center (Trauma Center)[42] at Khon Kaen Hospital was established. ("Khon Kaen initiatives" to cover both prehospital and hospital services)
1994	- Based on the Accident Prevention Plan of Metropolitan Bangkok, Wachira Hospital has provided the Surgico-Medical Ambulance and Rescue Team (SMART).
1995	- The Ministry of Public Health (MOPH) set up the Office for Emergency Medical Service System (OEMSS) in charge of the national EMS policy formulation/implementation, and local service provision in Bangkok. - Prehospital medical treatment was launched at Rajavithi Hospital (The Rescue Narenthorn Center) networking with Nopparat Rajathanee and Lerdsin hospitals.
2003	- OEMSS established a national emergency call number ("1669").
2004	- National Health Security Office (NHSO) launched a pilot project in seven provinces to assess the feasibility of applying the Khon Kaen initiatives.
2006	- NHSO decided to scale up prehospital care nationwide.
2008	- National Institute for Emergency Medicine (NIEM) was established in accordance with Emergency Medical Act of B.E. 2551 (2008) - Disaster Medical Assistance Team (DMAT) was established.
2009	- Medical Emergency Response Team (MERT) was established in Bangkok Metropolitan Area.
2011	- Bureau of Public Health in Emergency Response (BPHER) was established in MOPH.

Source: [NIEM] and [Suriyawongpaisal Paibul et al., 2012]

11.3.1 Legal and Political Arrangements

There are varying policy and management practices that reflect the use of legal measures for emergencies and disasters such as training and practice. Under the disaster situation, relevant national law and acts of the health sector, such as the Communicable Disease Act, B.E. 2525 (1982), the Law on Disease Control, B.E. 2550 (2007), the Prevention and Mitigation Act, B.E. 2550 (2007), and the Mental Health Act, B.E. 2551 (2008) are applied for health management in the affected areas [Faculty of Public Health, Thammasat University, 2012].

Emergency Medical Act of B.E. 2551 (2008) led to the establishment of National Institute for Emergency Medicine (NIEM) to: 1) issue operational standards and regulations; 2) provide policy recommendations to the Cabinet; 3) provide recommendations on operational solutions to the Cabinet; 4) issue regulations for

[41] Initially, it was initiated as transportation of bodies without relatives. Hua Khew Poh Teck Tung Foundation (Poh Teck Tung Foundation at present) has started its activity in 1937 and Ruam Katanyu Foundation was established in 1970.

[42] Technical assistance from JICA

approval of institutes and curriculum for health personnel training; 5) establish communication and information systems; 6) coordinate EMS operation across agencies; and 7) monitor and evaluate the operation [Suriyawongpaisal Paibul et al., 2012].

NIEM has been developing several guidelines to improve EMS as follows:

- Standards and Criteria of Training Programme, Certification and Accreditation for Organization and Personnel, NIEM (BE. 2557/2014)
- Guideline on Criteria, Standard Categorization of Triage in Emergency Medicine, NIEM
- Medical Preparedness Standards for Disaster, NIEM (BE 2552/ 2009)
- Plan of Public Health Preparedness for Disaster, NIEM (BE 2552/ 2009)
- Action Plan of Medical Management and Medical Preparedness for Disaster, NIEM (BE 2551/ 2009)

11.3.2 Relevant National Development Strategy/ Plan

The National Health Development Plan (2012–2016), comprised five strategies as shown in Table 11-8. The second strategy is specific to develop surveillance system and disaster management and health hazard by the Bureau of Epidemiology [Faculty of Public Health, Thammasat University, 2012].

Table 11-8 National Health Development Plan (2012–2016)

Strategy 1	Strengthen partners for health promotion and self-reliance in health with Thai wisdom.
Strategy 2	**Further develop systems for monitoring, warning and management of disasters and health threats** - To establish an effective medical and health monitoring and warning system. - To further develop medical and health preparedness systems to efficiently respond to disasters, accidents and health threats. - To further develop medical and health management systems during and after the occurrence of disasters, accidents and health threats.
Strategy 3	Focus on health promotion, disease prevention, and consumer protection in health for Thais to be physically, mentally, socially and spiritually healthy.
Strategy 4	Strengthen health-care systems with quality and standards at all levels in response to health needs of all age groups and improve seamless referral systems.
Strategy 5	Create national mechanisms for enhancing the efficiency of health-care system governance and resource management systems.

Source: [Steering Committee on Formulation of 11th National Health Development Plan, 2012-2016]

According to NIEM, national development plan or strategy of disaster medicine will be formulated in 2016.

Regarding emergency medicine, the Second Master Plan of Emergency Medicine 2013-2016 aims to provide emergency medical services for all people equally, to prepare for disaster in all provinces and to promote international and regional cooperation. It consists of seven strategies as presented in Table 11-9.

Table 11-9 Master Plan of Emergency Medicine (2012–2016)

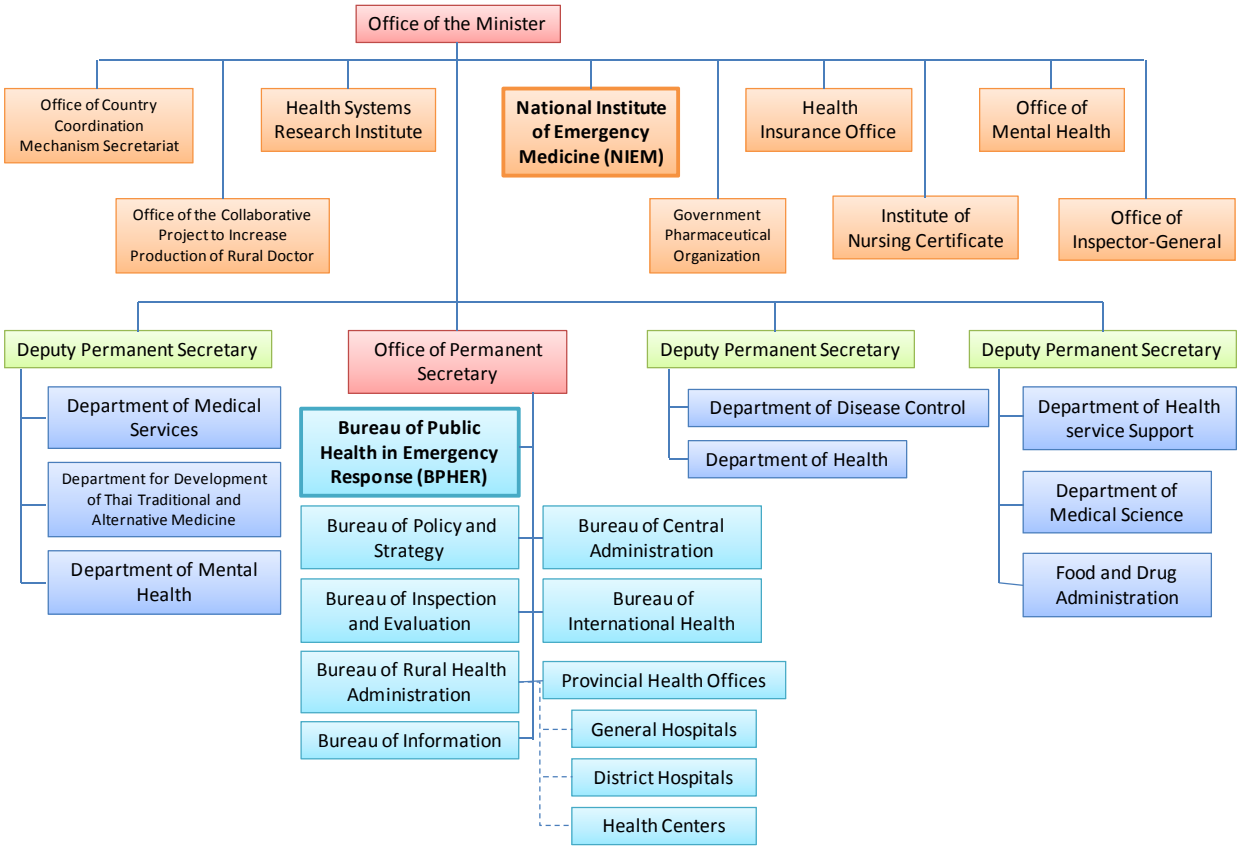
Strategy 1	Development of standards on emergency medicine for sufficient, wide-range and equal EMS.
Strategy 2	Development of standardized mechanism and management of EMS.
Strategy 3	Preparedness of emergency medicines for disasters.
Strategy 4	Development of an efficient accounting system.
Strategy 5	Cooperation with domestic and international organization as well as the ASEAN community.
Strategy 6	Development of information and communication system for management, monitoring and evaluation.
Strategy 7	Promotion of responsibility, cooperation, knowledge and management.

Source: [NIEM, 2013]

11.3.3 Institutional Setting

MOPH (Figure 11-3) is responsible for policy planning and implementation, as well as provision of emergency response services including disaster medicine.

The Bureau of Public Health in Emergency Response (BPHER) of the Ministry of Public Health (MOPH) is responsible for policy planning and implementation of emergency response of the health sector. NIEM is involved in coordinating emergency medical services in peace-time as well as under emergency response.



Source: the Survey Team based on [MOPH, Thailand] and interviews

Figure 11-3 Organization Chart of MOPH, Thailand

(1) **Bureau of Public Health in Emergency Response (BPHER)**

In emergency response, personnel in charge of emergency response in each concerned department of MOPH were used to be involved in each areas of responsibility. Based on lessons learned from Bangkok Flood of 2011, the BPHER was established under the Office of Permanent Secretary to centralize emergency response in the health sector in level three and four disaster. BPHER is equipped with a war

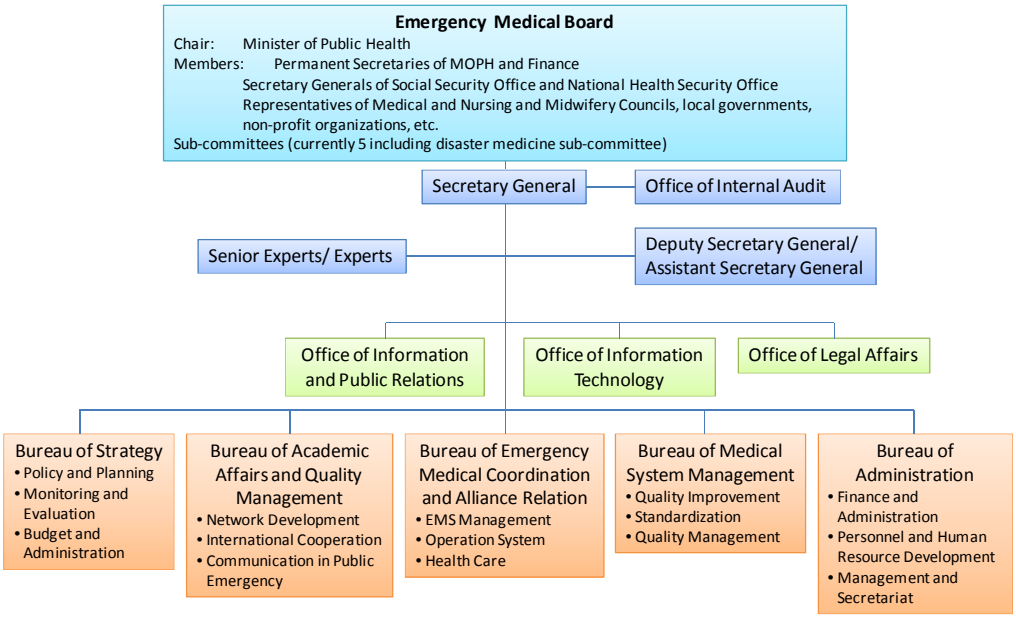
room for emergency operations. It has approximately 20 staff and most of them seemed young. Senior staff concurrently served as senior medical officer in hospitals to compensate for the lack of medical doctors.

(2) National Institute for Emergency Medicine (NIEM)

Coordinating function of EMS was expanded from the Office for Emergency Medical Service System (OEMSS) to the NIEM. It is an autonomous government agency under the supervision of the minister. The organizational chart is presented in Figure 11-4 and its roles and functions are as follows:

Roles and Functions of NIEM
(1) To draw up a master plan in emergency medical respect for presentation to the Board;
(2) To set standards and guidelines in emergency medical respect for presentation to the Board as well as to set the criteria and emergency operations according to standards and guidelines prescribed by the Board;
(3) To draw up emergency medical operation systems including management and communication and information technology systems development for the benefit of emergency operations;
(4) To study, research, analyze, develop, and disseminate emergency medical knowledge;
(5) To arrange for education and training for emergency medical operators;
(6) To coordinate, monitor, and evaluate the result of emergency operations;
(7) To act as the coordination centre for public and private agencies locally and abroad operating the emergency medical respects;
(8) To charge emergency medical fees and the operation of the Institute; and
(9) To be responsible for the administrative work of the Board or to perform other acts and things prescribed in the Emergency Medical Act or other laws or as assigned by the Board.

Source: [NIEM, 2008]



Source: [NIEM], [NIEM, 2008], [NIEM, 2014] and interviews

Figure 11-4 Organization Chart of NIEM, Thailand

11.3.4 Financial Arrangements

National budget dedicated for EMS for the last five years is shown in Table 11-10. Annual operation cost of NIEM in 2013 was about THB 194 million. It includes personnel, administrative, and operational costs. The financial source consists of government budget and other incomes. In 2013, 96% of the total income was covered by the government. The operation cost of EMS, which is at THB 500 million annually is covered by the Emergency Medical Foundation.

Table 11-10 National Budget for EMS

Year	Budget (Million Baht)	Expenditure
2010	628	669
2011	531	526
2012	702	782
2013	946	791
2014	884	774

Source: NIEM

11.4 Current Situation of Disaster Medicine

11.4.1 Facility and Equipment

In Thailand, there are no specialized healthcare facilities and equipment for disaster response. In general, existing resources for EMS are used in disaster response. Basically, when the scale of disaster is beyond the capacity of existing EMS, the military is requested to provide necessary assistance.

The Royal Thai Armed Forces (RTAF) is made up of the Army, Navy, and Air Force. The Royal Thai Army (RTA) has the largest capacity of healthcare facilities with 37 military hospitals in the country and a well-organized emergency response system and resources including field hospitals. These are set up as a referral system, which Phra Mongkut Klao Hospital (200 beds) in Bangkok is on top of the system, and 70 to 90 beds hospitals at the secondary level. The Navy and Air Force also have 5 or 6 hospitals.

11.4.2 Response System

In general, disaster response starts from search and rescue phase, and then, medical response and evacuation phase follows. As mentioned in Section 11.2.2, these responses proceed independently by both DDPM and RTAF. The Disaster Response Team of DDPM consists mainly of CDVs.

To improve the coordination capacity among concerned agencies in the affected area, DDPM has been implementing the Emergency Response Team Development Project to organize an inter-agency team at the local level and strengthen cooperation among the stakeholders. The team is obliged to support EOC of the affected area. The existing EMS system is being utilized to dispatch medical response team even under disaster situations. The Dispatch Center (Section 11.5.1(2)) identifies the number and level of Emergency Medical Team (EMT) according to reports from 1669 calls, radio network, social network services, and/or media. The dispatched EMTs apply triage protocol such as the Sieve and Sort triage of Major Incident Medical Management and Support (MIMMS) at the scene.

11.4.3 Major Providers of Disaster Response

(1) **Medical Response Teams**

Various kinds of medical response teams have been established such as the Medical Emergency Response Team (MERT), Disaster Medical Emergency Response Team (DMERT), Mini-MERT, Disaster Medical Assistance Team (DMAT), and Thai Red Cross Team. Basically, MERT is to be established in each provincial hospital under the initiative of MOPH. DMAT is established in public and private hospitals and medical universities in the southern part.

1) MERT/DMERT/Mini-MERT

MERT and DMERT were developed by MOPH in response to large-scale disasters. Outline of MERT is summarized as follows:

- It was initiated by the Department of Medical Services of MOPH and Thai Association of Emergency Medicine in 2008.
- It is self-sustainable and with an advanced medical team in the tertiary level of care to patients during natural disaster.
- There are 35 teams in Bangkok and 67 teams in each provincial hospital.
- The team consists of 16-35 members like US DMAT, while mini-MERT in each district hospital consists of 5-6 members.

2) DMAT

DMAT was organized in 2008 after the Indian Ocean Tsunami (2004). Its establishment consists of public and private hospitals, medical schools, and some military sections. Each team includes 17 standard members with medical doctors (12-18 members on average), but some teams have no medical doctors. Most of DMAT are in the southern part of Thailand, and therefore, flood is their main target of response. However, as they have no concrete basis for deployment yet, MOPH deploys on a case-to-case basis.

3) Thai Red Cross

Thai Red Cross provides disaster response under the control of MOPH. They have only one disaster response team. Because they have no special doctors in disaster response, they usually organize a temporal disaster relief team in cooperation with local hospitals.

(2) **RTAF**

RTAF have Medical Task Force (MTF) system for disaster response. MTF consists of six taskforces (TF) as summarized in Table 11-11. ADAT/AMDAT and SMOT, which were originally special taskforces in RTA, are deployed four in the Navy and Air Force. MMERT, EMS, and Field Hospital are to be set up for Level 4 (refer to Table 11-6) disaster/incident.

Table 11-11 Taskforces of MTF

Taskforce	Functions
Medical Consultation Team (MCT)	To consult a deployment of medical teams.
Army Disaster Assistance Team/Army Medical Disaster Assistance Team (ADAT/AMDAT)	To assess an affected area.
Special Medical Operation Team (SMOT)	To rescue and transport victims in the Hot Zone. Each team will consist of 13 members, including one team leader, two squads by six for operation. In addition, each SMOT will be self-sustainable during seven days.
Military Medical Emergency Response Team (MMERT)	To handover victims from SMOT to EMS in the Cold Zone. Each team will consist of 17 members, who have been trained for Medial Emergency Response Team and then have extra-training course for man-made disaster. In addition, each MMERT will be self-sustainable for three days.
Emergency Medical Service (EMS)	To transport victims to the field hospital.
Field Hospital	It consists of treatment units (Emergency Room, Outpatient, Ward): 20 members, Operation Unit: 8 members, Command Post: 5-8 members, Logistics Units: 5 members, Prevention Units: 5 members.

Source: RTAF

(3) **Transportation of Patients**

Transportation of patients in disaster situation is covered by the existing emergency response system. In addition, a sky doctor system of air-emergency evacuations and speedboat ambulances for water emergencies (Section 11.5.1(3)) are provided for patient transportation under the coordination of an Emergency Operation Center (EOC). Responsibilities of EOC are to function as focal point to mobilize disaster resources from all agencies and direct the coordination with various civil agencies, and military agency as well as local administration organization and charitable organizations to jointly handle disaster situation on rapid, efficient and thorough manner [NDPMC, 2011]. The EOC and/or NIEM coordinates with existing EMS and RTAF based upon necessity.

11.4.4 Human Resource Development

Human resources for disaster medicine have been developed through in-service training. Most of them have basis and experiences in emergency medicine. In general, the training program/curriculum is according to MIMMS.

(1) **Major Training Providers on Disaster Medicine**

Human resources for disaster medicine are trained by MERT program, which is supervised by the Department of Medical Services, MOPH. The curriculum is seven-day training, including three-day lecture and one-day desktop simulation in a classroom, following a three-day field exercises. About ten trainers selected from MOPH, the Royal Thai Army, and Navy join the annual MERT training program in each province to provide annual compulsory training or refresher training for each team.

The NIEM has the responsibility for standardization and certification of EMS. At the local level, NIEM is also in charge of dispatch and coordination of EMS. In addition, NIEM provides training courses on disaster response for personnel from DMAT, MERT, and private hospitals free of charge. The training program is mostly similar to the one of MERT.

The DDPM established the Disaster Prevention and Mitigation Academy in 2004. There are six regional campuses upland with other foreign partners such as the Asian Disaster Preparedness Center (ADPC) and JICA. Training and simulated exercises are organized for each typical regional disaster such as flood/landslide disaster in the north, chemical disaster in the east and flood/tsunami disaster in the south. A number of trainings and simulated exercises are organized each year to strengthen the civil-military coordination [ASEAN].

(2) **Disaster Nursing**

The Thai Red Cross provides nursing education in cooperation with Chulalongkorn University. Disaster Nursing is included in the nursing curriculum similar with the Japan Red Cross. Also, they have a First Aid Training course for civilians in the Red Cross Training Center in Bangkok.

(3) **Training for OTOS**

The OTOS are certificated after a ten-day training course. CDVs are certificated by DDPM after a five-day training course, which consists of a two-day emergency medical course in cooperation with local hospital personnel following a three-day search and rescue training. Prior to it, CDVs have to complete a five-day FR course certificated by NIEM.

11.4.5 Receiving/ Dispatching Medical Team to Other Countries in Emergencies

Based on the experiences in the Indian Ocean Earthquake and Tsunami in 2004, a national disaster management plan was established and according to it, the request for medical assistance in emergency situations depends on the decision of the incident commander at the national level.

In peacetime, the Medical Council of Thailand issues temporary license for medical doctors from other countries to practice, usually this will take two weeks after application.

The Thai government has deployed seven batches of medical teams since the fourth day after the Nepal Earthquake until the middle of July 2015. Before the deployment, information gathering and pre-arrangements had been done through the Nepalese community in Thailand and an advance team was dispatched to Kathmandu. For example, the third team consisted of eight doctors, eight nurses, two EMTs and two health officers. According to NIEM, the common understanding among countries on emergency medical response and minimum standard of personnel and medical teams might contribute to a more effective and efficient response in the future.

11.4.6 Experiences in the Past Disaster

At the time of the 2004 Tsunami Disaster, although there was no plan or legal framework for disaster management, the responses were relatively well coordinated. The Thai government maintained the structural arrangements relatively clear, discouraged unsolicited external assistance, and did not rely on ad hoc response. It declined international financial assistance and welcomed technical assistance in specific areas, such as donor coordination, alternative livelihoods, disaster preparedness and forensic identification. Primary responders were limited to the organizations which were present in Thailand long before the

tsunami disaster. Therefore, although more than 80 organizations provided aid to the victims at the initial stage, it was still manageable to avoid overlapping and confusion among responders [WHO/SEARO, 2013].

Another one is the setup of BPHER after the Bangkok Flood in 2011 to improve coordination capacity of MOPH's response. The DMAT and MERT changed the strategy of deployment for affected area. Also, the government accepted minimum external assistances and engagement of civil societies [Arpaporn Winijkulchai].

11.5 Current Situation of Relevant Emergency Medical Services

In general, EMS in Thailand is based on the *Service d'Aide Médicale Urgente* (SAMU) model in France, and EMT was developed referring to the Australian educational system. In addition, a classification of healthcare facilities is based on the American College of Surgeons' models.

11.5.1 Facility and Equipment

(1) **Emergency Rooms**

In Thailand, 20% of healthcare facilities are private hospitals and 80% are public hospitals. Table 11-12 summarizes the level of hospitals under MOPH. After the 2004 Tsunami Disaster, many of the hospitals started 24-hour emergency medical service. Trauma care excellent centers were established in 33 tertiary hospitals, applying the American College of Surgeons' models, three levels of trauma centers were set up [ATS].

Table 11-12 Levels of Health Services of MOPH, Thailand

Levels		Category	Number	Total
Tertiary	Super-tertiary Hospital (> 500 beds)	A	33	116
	Tertiary Hospital (300-500 beds)	S	48	
	Provincial Hospital (150-300 beds)	M1	35	
Secondary	Major District Hospital (>120 beds)	M2	91	774
	District Hospital (90-120 beds)	F1	73	
	District Hospital (30-90 beds)	F2	518	
	District Hospital (10-30 beds)	F3	35	
	New District Hospital (No beds)		57	
Primary	Local Health Service Station Primary Care Unit			10,174

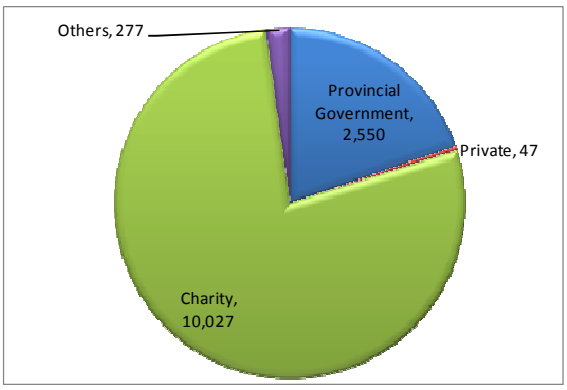
Source: [Somchai Kanchanasut and Pairoj Khruekarnchana, 2014]

(2) **Dispatch Center**

NIEM supports 94 dispatch centers in 77 provinces, 13 regions of MOPH, and Bangkok Metropolitan area. Most of the provincial dispatch centers are located in the provincial hospitals. These centers are also operated for 24 hours such as the emergency command center (ECC) or emergency operation center (EOC). In general, their equipment are telecommunications system, radio networks, monitoring of TV show/social networking service (SNS), and emergency vehicles' tracking system based on Google mapping with GPS on board.

(3) Patient Transportation

According to NIEM, there are nearly 13,000 ambulances as of 2015 and 77% belong to charity organizations (Figure 11-5). In general, the ambulances of the public sector have necessary medicines and equipment to provide prehospital care and transport the patient.

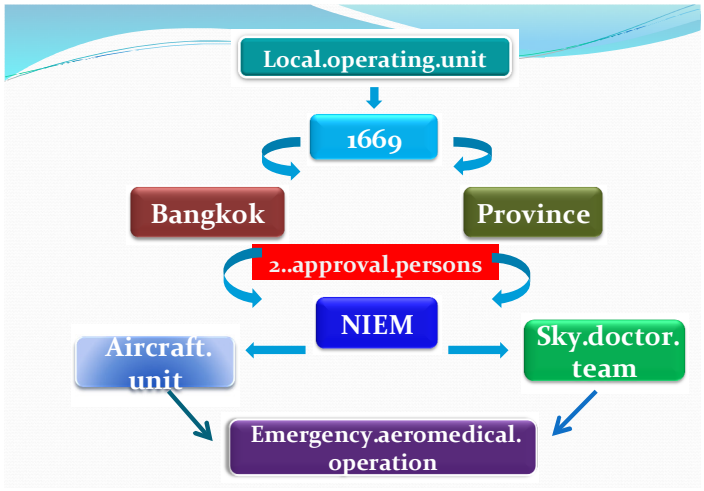


Source: NIEM

Figure 11-5 Number of Ambulance per Ownership

The Sky Doctor System (Figure 11-6) provides an air-transport of patients by helicopter mainly in the northern part of Thailand. These helicopters belong to the Royal Air Force, Royal Thai Army, Royal Thai Police, Ministry of Natural Resources and Environment, and Kan Air (Chang Mai). The NIEM and these agencies signed a memorandum of understanding (MOU) for the system [Naridsa Phachart, 2014].

In the southern part of Thailand, the Royal Thai Navy is responsible for critical maritime emergency. Emergency medical services with private speedboat are also available. More than 1,100 boats are assigned in the MOU with NIEM [NIEM, 2014].



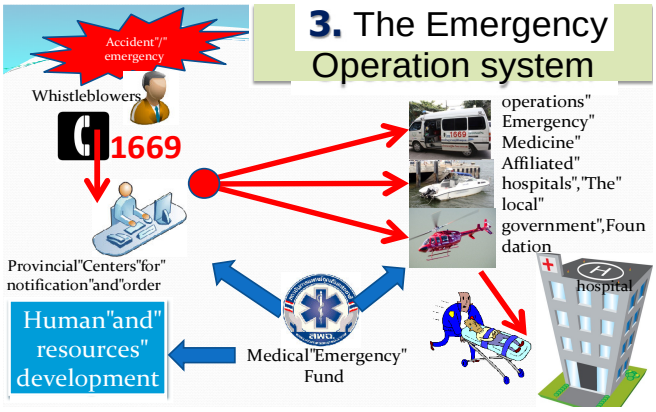
Source: [NIEM, 2014]

Figure 11-6 Outline of Sky Doctor System

11.5.2 Response and Transportation System

(1) Emergency Call

EMS in Thailand has 1669 call system coordinated by NIEM (Figure 11-7). The dispatch centers have five levels of functions: (1) Call taker using telephone and radio network, (2) EMS dispatcher deciding EMS team level by criteria based on triage protocol, (3) coordinator arranging transportation, (4) medical director approving each dispatch and advising if necessary, and (5) supervisor emergency medical direction authorizing all dispatches. NIEM have also record reporting system called Information Technology for Emergency Medical Service System (ITEMS) that is the basis for payment for EMS teams and/or hospitals. The system is also available for annual analysis and evaluation of current EMS' situation.



Source: [NIEM, 2014]

Figure 11-7 Emergency Operation System

(2) Medical Response Teams

The Medical Emergency Response Team is set up to assist different levels of critical situations, tend and assist the injured on scene until arrival at the hospital. The team consists of the team leader, a medical assistant, and an ambulance driver. The teams are categorized into four levels (Table 11-13). The dispatch center identifies the team to be dispatched according to the condition of the patient.

Table 11-13 Standards and Regulations for Medical Team

Teams	Number of Teams	Standards Team Composition
Advanced Life Support Team (ALS)	1,133	Total 3-5 personnel - 1 leader; EMT-P or EMT-A or prehospital emergency nurse (PHEN) or emergency physician (EP) or physician - 1-3 members; EMT-I or EMT-B or FR personnel or nurse - 1 driver; FR or EMT-B
Intermediate Life Support Team (ILS)	27	Total 3 personnel - 1 leader; EMT-I personnel - Member; EMT-B or EMT-I personnel - 1 Driver; FR or EMT-B personnel
Basic Life Support Team (BLS)	1,345	Total 3 personnel - 1 leader; EMT-B personnel; - Member; EMT-B or FR personnel - 1 driver; FR or EMT-B personnel
First Responder Team (FR)	5,987	Total 2 personnel - 1 Leader; FR personnel; - Member or driver; FR personnel
Total	**8,492**	

Source: [NIEM, 2014], [NIEM] and interviews

(3) **Patient Transportation**

According to the ITEMS, the public EMS has transferred 60% of emergency patients. While a private emergency medical team belonging to private hospitals have transported 40% of them, the proportion of EMS have been rising recently. NIEM covers the expenses as shown in Table 11-14.

Table 11-14 Payment Rate of EMS' Dispatch, Thailand

Type of Team	Level of Emergency (THB)		
	Red Emergency; Crisis	Yellow Emergency	Green Emergency; Mild
ALS	1000	750	350
ILS	750	500	350
BLS	500	500	350
FR	350	350	350
In no event or died before delivery must pay 20% of patients, emergency crisis			

Source: [NIEM, 2014]

In the mountainous area, helicopters are used to transfer patients. In an emergency, NIEM coordinates with a concerned agency to transport the patient to a better-equipped hospital by air [Naridsa Phachart, 2014] and covers the cost at a rate of THB 40,000 per flight hour per engine.

In maritime area, only private EMS is the first responder to transport a few patients. In case of a large accident, the Royal Thai Navy is deployed in coordination with NIEM. The cost covered by NIEM is shown in Table 11-15.

Table 11-15 Payment Rate of Waterway and Maritime's Dispatch, Thailand

Operations	Distance (km)/ compensation rate (THB /trip)			
	0 – 15 km.	16 -50 km.	51 – 100 km.	> 100 km.
Long-tailed boat	1,200	3,000	4,000	-
Speed boat 1	2,000	5,000	10,000	50,000
Speed boat 2	5,000	35,000	35,000	50,000

Source: [NIEM, 2014]

11.5.3 Human Resources

There are two personnel groups of EMS in Thailand. One is a volunteer non-medical group trained for 40 hours as FR. The other is a medical group trained as EMT, emergency physician, and emergency nurse.

The level of EMT is classified into three levels, namely EMT-Paramedics (EMT-P)/EMT-Advanced Life Support (EMT-A), EMT-Intermediate Life Support (EMT-I), and EMT-Basic Life Support (EMT-B). According to MIEN, EMT-A will be integrated into EMT-P in the near future. FR and EMT are certificated by NIEM. (Table 11-16)

Table 11-16 Summary of EMT Personnel, Thailand

Categories	Number
FR	83,584
EMT-B	4,516
EMT-I	1,161
EMT-P/EMT-A	*

Note: *the number was not available

Source: [NIEM, 2014]

There are three types of physicians and two types of nurses in emergency medicine. The Medical Council of Thailand authorizes the Emergency Physician. The Nursing and Midwifery Council of Thailand authorizes the Emergency Nurse and Emergency Nursing Practitioner. (Table 11-17)

Table 11-17 Summary of Personnel in Emergency Medicine, Thailand

Type of personnel	Number
Emergency Physicians (EP)	204
Medical Specialties	505
Physicians with partial training	1,072
Emergency Nurse including Emergency Nurse Practitioner	18,899

Source: [NIEM, 2014]

In addition, NIEM developed the Sky Doctor System as mentioned in 11.5.1. The Bureau of Emergency Medical System Management of NIEM established a mechanism of aero-medical transportation and the guideline for patient transportation. So far, 20 doctors, nurses, and medical personnel in both Chiang Mai and Mae Hong Son have been trained as specialists in difficult patient care on aircraft [Naridsa Phachart, 2014].

(1) Pre-service Education

Pre-service education is summarized in Table 11-18. To strengthen the capacity of communities, NIEM provides a 3- to 8-hour First Aid Training Course for volunteers. Also, NIEM provides certification of the FR who are trained for 40 hours.

Table 11-18 Summary of Education and Training for Emergency Medical Personnel

License	Training Period	Training Facility	Authority	Revised Period
FR	40 hours	-	NIEM	2 years
EMT-Basic	110 hours	College of Primary Healthcare/ Hospital	MOPH	2 years
EMT-Immediate/ Advance	2 years	College of Primary Healthcare	MOPH	3 years
EMT-Paramedic	4 years	University	MOPH	Unknown
EN/ENP	4ysars	College of Nursing	The Nursing Council of Thailand	5 years
EP	6 years for MD + 3 years for EP	University	Thai Association of Emergency Medicine	5 years

Source: [NIEM], [Somchai Kanchanasut and Pairoj Khruekarnchana, 2014], and interviews

EMT education in Thailand is based on the Australian EMT educational system. There are six EMT-A nursing colleges, and 43 EMT and 77 FR hospital-based schools/training centers as of 2013. In particular, EMT-Paramedic course was started by one university in 2011.

EP education is undertaken by the medical councils. As of 2010, there are 18 hospitals serving as training centers recognized by the Thai Association of Emergency Medicine.

The Emergency Nurse (EN) or Nursing Practitioner (ENP) education is taken care of by the Nursing and Midwifery Council. There are three institutions as of 2009.

(2) **Continuous Professional Development (CPD)**

Continuous professional development (CPD) for EMT and EMS teams is provided by NIEM. NIEM is responsible for developing and improving provincial and district EMS mechanism. For example, NIEM has been establishing a curriculum of water-rescue in collaboration with the Division of Marine and Aviation Medicine, Naval Medical Department, and MOPH.

In addition, Rajavithi Hospital has systematized the Thai Advanced Life Support (TALS), with various program options by personnel: five-day course for an emergency physician, four days for a general physician, three to four days for nurse, and three days for EMT.

11.5.4 Relevant Academic Society/ Professional Organization

The Thai Association of Emergency Medicine (TAEM) was established in 1999 by physicians, nurses, and emergency medical personnel to promote the establishment, development, and sustainability of emergency medicine to reduce losses from preventable death, disability, and suffering of emergency, sick, and injured patients in Thailand. TAEM has been involved in the following:

- Promoting development of emergency care system in Thailand in both academic and operative aspects. These include curriculum, training, certification, drills, guidelines, and texts;
- Establishing and supporting trainings on emergency medicine as a specialty for physicians, nurses, and paramedics;
- Coordinating relationship among personnel and organizations in both local and international for every sector;

- Facilitating and participating in operations in emergency situations; and
- Representation for non-government activities in emergency medicine of Thailand.

Since its establishment, TAEM has contributed to the development of emergency medicine as follows:

- Proposing the curriculum and training program for emergency medicine as a specialty to be approved by the Thai Medical Council.
- Supporting and participating in the sub-committee for training and examination of emergency medicine under the Royal College of Physicians of Thailand.
- Initiating and cooperating in emergency nursing training with Bangkok Nursing College.
- Establishing the TALS curricula for physicians and nurses.
- In cooperation with the Department of Medical Services of MOPH, establishing the curriculum of medical emergency response team (MERT and mini-MERT) and publishing the guideline for hospital-based emergency care system as well as providing technical cooperation to Viet Nam[43].

11.6 International Cooperation

The World Health Organization (WHO) Country Cooperation Strategy 2012-2016 includes disaster preparedness and response in five priority programs. It aims to 1) establish coordination and collaboration mechanisms in the disaster health emergency management system among various national and international agencies; 2) further support the development of the disaster health emergency management system to be effectively and efficiently integrated and linked with relevant agencies at all levels in institutional, legislative frameworks, policies, SOPs, contingency plans and capacity building; and 3) engage various sectors systematically to establish mechanisms for disaster prevention, preparedness, response, recovery, and rehabilitation.

Currently, NIEM cooperates with foreign organizations mainly to send trainees for short course training to Italy, Germany, and France. In 2015, NIEM is establishing an international cooperation center to strengthen cooperation with neighboring countries especially in technical aspects. Initially, it will be started in cooperation with Myanmar and Lao PDR. According to NIEM, Malaysia, and the Philippines are also interested in it. Because more Thai people might move around the region after the ASEAN economic integration, it could be more important for the Thai government to protect them in case of emergency even in other countries. Therefore, in addition to the above technical cooperation to upgrade the capacity of neighboring countries, medical teams for emergency response have to be strengthened in order to be dispatched to other countries. According to NIEM, practical network of emergency medical response needs to be strengthened.

[43] From 2013 to 2016, TAEM is cooperating with Hue Medical University to receive trainees to Rajaviti Hospital and dispatch lecturers to Viet Nam for short course trainings.

11.7 Conclusion

In Thailand, NIEM was established to coordinate EMS and disaster medicine as an independent agency. However, some functions seem to be duplicated with some departments or bureaus of MOPH.

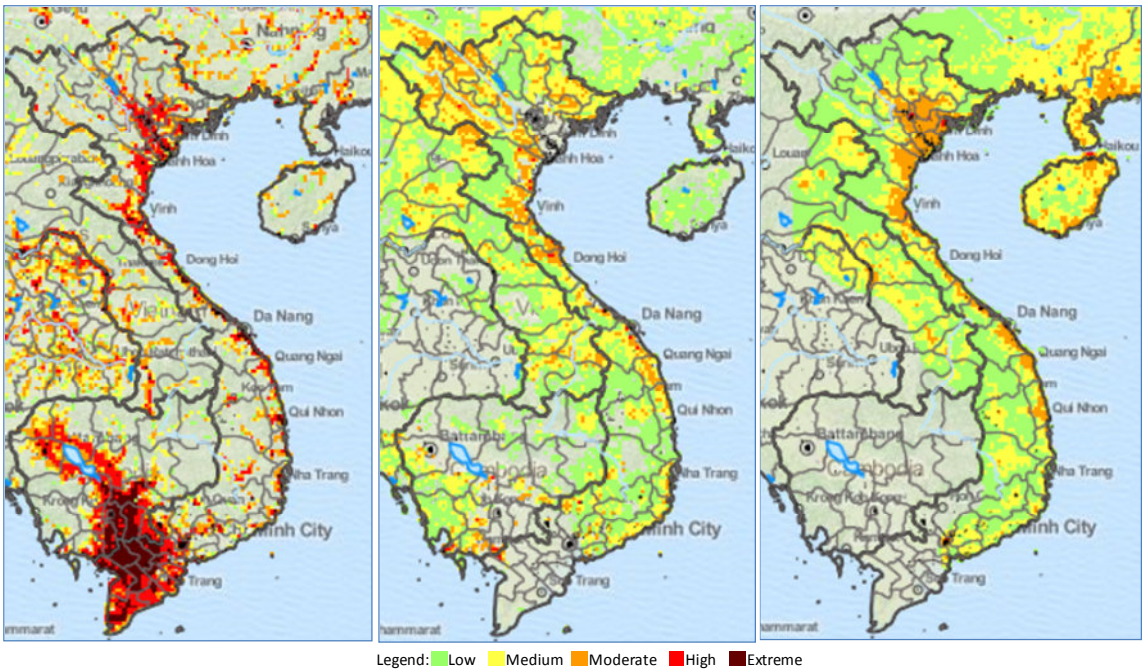
Medical response teams have been established in provincial hospitals and some institutions. Training programs, guidelines and manuals have been developed and provided to relevant personnel. NIEM has been trying to improve quality of EMS from first responder to prehospital care through such trainings and guidelines. Also, NIEM hopes to enhance coordination among various medical response teams and training providers.

Such experiences in human resource development could be shared with the other countries, especially the neighboring courtiers such as Lao PDR, Cambodia and Myanmar that have similar socio-cultural context

Chapter 12 Country Report: Viet Nam

12.1 Overview of Disaster Occurrences (Natural and Man-made)

Viet Nam is one of the terminal areas of storms in the ASEAN Region. Some of the typhoons originating in the Pacific Ocean move westward after crossing the Philippines and reach the coastal areas of Viet Nam, bringing strong winds and heavy rain. Heavy rain causes serious flooding in the country. Flash flood occurs in the mountainous areas in Tay Bac, Dong Bac, Tay Nguen and Dong Nam Bo while river flood occurs mainly along the Red River and the Mekong River (Figure 12-1).



Source: [UNEP/ UNISDR, 2013]

Figure 12-1 Mortality Risk: Flood (Left), Landslide (Middle) and Tropical Cyclone (Right)

Since the capacity of monitoring station for weather and flood is not sufficient, the government of Viet Nam is developing early warning system as well as weather forecasting and hazard mapping.

12.1.1 Occurrence of Natural Disasters

Table 12-1 shows the occurrence of natural disasters from 1980 to 2014. Ninety three percent (93%) of disaster occurrence is storms (52%) and floods (41%).

Table 12-1 Natural Disaster Occurrence in Viet Nam (1980-2014)

Type of Disaster	No. of Occurrence	Death (person)	Totally Affected (person)
Storm	89	10,785	46,414,907
Flood	70	4,882	26,895,560
Landslide	6	330	39,074
Drought	5	0	6,110,000
Wildfire	1	0	0
Total	171	15,997	79,459,541

Source: [CRED]

Table 12-2 shows remarkable natural disasters that resulted in more than 100 deaths in Viet Nam.

Table 12-2 Remarkable Natural Disasters in Viet Nam (2000-2014)

Disaster	Month, Year	Number of Death[1)]	Mainly Affected Areas[1),2)]
Mekong River Flood	Nov. 2000	460	Mekong Delta (Lon An, Dong Thap, An Giang, Kien Giang, Can Tho, Vinh Long, Thien Giang)
Mekong River Flood	Nov. 2001	310	Mekong Delta (Lon An, Dong Thap, An Giang, Kien Giang, Kien Tho, Can Tho, Vinh Long, Thien Giang, Soc Trang, Tra Vinh, Ben Tre)
Typhoon Chanchu	May 2006	204	Quang Ngai Province and other provinces in coastal area.
Tropical Storm Kammuri	Aug. 2008	162	East North (Lao Cai, Yen Bai, Phu To, Quang Ninh, Ha Giang, Tuyen Quang, Lai Chau), West North (Son La)
Typhoon Ketsana	Sep. 2009	182	South Central (Binh Dinh, Da Nang, Phu Yen, Quang Nam) Central Highland (Dak Lak, Gia Lai, Kon Tum, Lam Dong) North Central (Ha Tinh, Thua Thien=Hue, Quang Binh, Quang Tri)
Typhoon Mirinae	Nov. 2009	124	South Central (Binh Dinh, Phu Yen, Khabh Hoa, Ninh Thuan, Quang Nam, Qunag Ngai) Central Highland (Dac Lac, Kon Tum, Gia Lai)

Source: 1) [CRED], 2) [OCHA]

12.1.2 Occurrence of Man-Made Disasters from 1980 to 2014

(1) Occurrence of Man-made Disasters

Table 12-3 shows the occurrence of man-made disasters from 1980 to 2014.

Table 12-3 Man-made Disaster Occurrence in Viet Nam (1980-2014)

Type of Disaster	No. of Occurrence (A)	Death (person) (B)	Totally Affected (person)	Death per Occurrence (B/A)
Road Accident	19	455	225	23.9
Ship Accident	17	574	75	33.8
Explosion	8	161	5,159	20.1
Collapse (building and mine shaft)	7	482	80	68.9
Air Accident	5	97	5	19.4
Fire	3	78	3,621	26.0
Poisoning	2	177	964	88.5
Rail Accident	2	25	76	12.5
Other	1	24	0	24.0
Total	45	1,618	9,980	36.0

Source: [CRED]

More than 80% of the man-made disasters occurred in the transportation sector such as road and ship accident. Although the number of incidents was small, the impact of collapse and poisoning was serious. Table 12-4 shows remarkable man-made disasters that resulted in more than 50 deaths from 2000 to 2014.

Table 12-4 Remarkable Man-made Disasters in Viet Nam (2000-2014)

Disaster	Month, Year	Number of Death[1)]	Outline[2)]
Bus Accident	Feb. 2000	57	The bus collided with another bus, and plunged into a river in the north of the country.
Saigon International Business Centre Fire	Oct. 2002	60	The fire engulfed the six-storey building in Ho Chi Minh City.
Ship Diem Tinh Accident	Apr. 2004	50	The tourist ship sank near Hon Khoai Island in Ca Mau Province.
Can Tho Bridge Collapse	Sep. 2007	64	Part of the bridge's approach ramp collapsed during the construction of the 2.75km-long bridge in Southern Viet Nam
Ship Accident	Dec. 2010	53	No information

Source: 1) [CRED], 2) [ADRC], [Vu Kim Chung, 2002], [BBC, 2000], and [thanhniennews , 2004]

12.2 Emergency Response System

12.2.1 Laws and Regulations for Emergency Response

Viet Nam has not experienced frequent large-scale natural disasters, but the local governments in the areas where disasters would frequently hit have been developing and enhancing preparedness and early warning systems. Table 12-5 summarizes the legislations that are relevant to emergency response in Viet Nam. Currently, the government is preparing the necessary guidelines and manuals in accordance with the Law on Disaster Preparedness and Response (2013).

Table 12-5 Laws and Regulations for Emergency Response in Viet Nam

Name	Year	Outline
Decree No. 168 - HDBT	1990	It stipulates the roles and responsibilities of the Central Committee for Flood and Storm Control (CCFSC) and other relevant organizations and committees in all levels (state, district, and village).
National Strategy for Natural Disaster Prevention, Response and Mitigation to 2020	2007	It states the development of legislation system (laws related to prevention of disasters, mitigation of damages, emergency response, rehabilitation and reconstruction, disaster prone areas, fund for disaster measures, disaster compensation, etc.).
Law on Disaster Preparedness and Response (Order No. 07/2013/L-CTN)	2013	It states the natural disaster prevention and control activities, the rights and obligations of agencies, organizations, households and individuals engaged in natural disaster prevention and control activities, and the state management of and assurance of resources for natural disaster prevention and control.
Detailing and Guiding a Number of Articles of the Law on Natural Disaster Prevention and Control (Decree No. 66/2014/ND-PC)	2014	It states the prevention of natural disasters including responsibilities of each governmental organization, communication system, level and response, and recovery and restoration in the country.

Source: MOH Viet Nam and [JICA, 2012]

12.2.2 Organization for Emergency Response

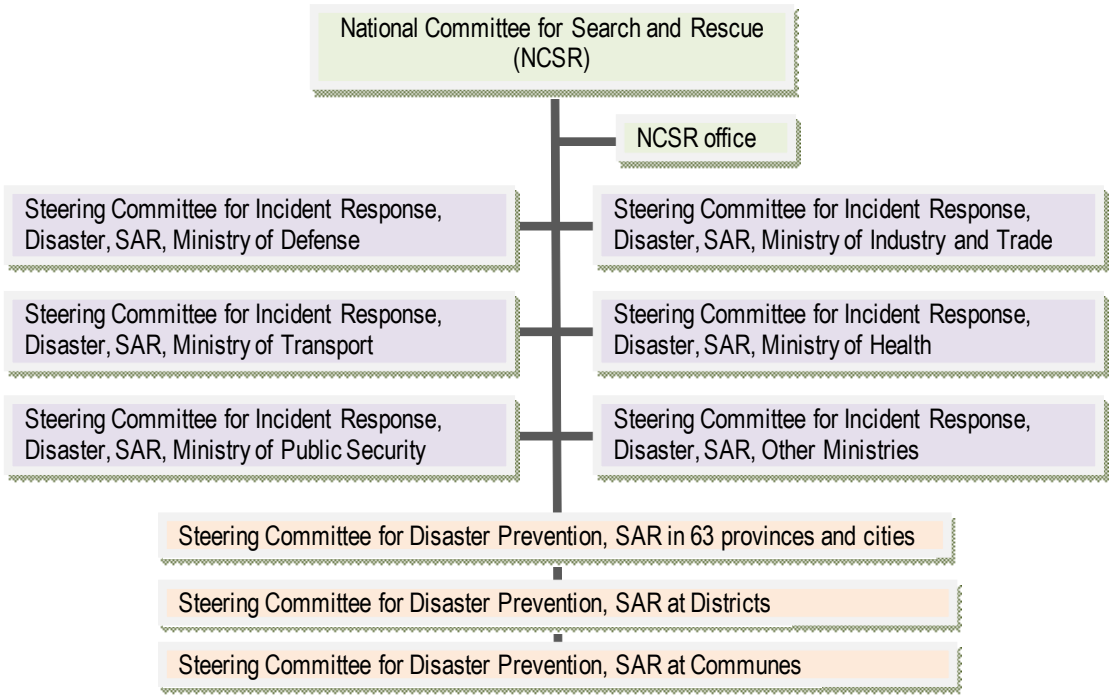
(1) The Central Steering Committee for Natural Disaster Prevention and Control

The Central Steering Committee for Natural Disaster Prevention and Control is the committee in charge of disaster prevention and control and search and rescue. The Central Steering Committee is chaired by the National Committee for Search and Rescue (NCSR) and its members are representatives of related ministries and agencies. The Central Steering Committee works on a part-time basis and is called up within

a few hours after the disaster alert is issued. During emergencies, the Central Steering Committee issues documents to direct and command the implementation of natural disaster response measures to the relevant ministries and agencies. Local committees are also set at the province, district, and commune levels.

(2) **National Committee for Search and Rescue (NCSR)**

NCSR is the organization responsible for search and rescue activities when disasters occur and chaired by the deputy prime minister. The entire ministry has steering committees for incidents, response, disasters, search and rescue, and NCSR will direct and command them for search and rescue activities as shown in Figure 12-2. NCSR works on a part-time basis. Local steering committees are also set at the province, district, and commune levels.



Source: JICA Viet Nam

Figure 12-2 Organization Chart of National Committee for Search and Rescue (NCSR) and Steering Committees

(3) **Ministry of Agriculture and Rural Development (MARD)**

MARD is the ministry responsible for issuing warnings for natural disasters, and conducting several measures against natural disasters at the central level together with the Disaster Management Center (DMC). MARD includes the Department of Dike Management, Flood and Storm Control (DDMFSC) and the Department of Agriculture and Rural Development (DARD) at the local level.

(4) **Central Committee for Flood and Storm Control (CCFSC)**

CCFSC is the organization responsible for natural disaster management, especially for storms and floods. The committee provides both structural and non-structural measures against disasters for preparedness. During periods of disasters, CCFSC distributes early warning in three warning levels to the Provincial

Committee for Flood and Storm Control (PCFSC) and to the media, taking into account disaster preparation operations. PCFSC distributes disaster management information to the district and commune level. The secretariat of the committee is DDMFSC.

12.2.3 Classification of Disaster and Emergency Response

The Guidelines on the Law on Natural Disaster Prevention and Control (Decree No. 66/2014/ND-PC) categorized disasters into five levels based on the degree of risk. Those risk levels correspond to warning level of CCFSC. The scale and responsibility is shown in Table 12-6.

Table 12-6 Disaster Level, Scale and Responsibility in Viet Nam

Level	Scale	Responsibility (Person in Charge of Management)
1	Commune-Level Disaster	- Commune-level people's committee chairman - Commune-level chief commander of prevention of natural disasters - Search and rescue in commune
	District-Level Disaster*	- District level people's committee chairman - District level chief commander of prevention of natural disasters - Search and rescue in district
2	Provincial-Level Disaster	- Provincial-level people's committee chairman - Provincial-level chief commander of prevention of natural disasters - Search and rescue in province
3	Ministerial-Level Disaster	<Command> - Central Steering Committee for Natural Disaster Prevention and Control - Ministries and ministry-level government organizations <Coordination> - NCSR
4	Prime Minister-Level Disaster	<Command> - Prime Minister with advice from the Central Steering Committee for Natural Disaster Prevention and Control <Coordination> - NCSR
5	State of Emergency	(To follow the tasks and responsibilities specified in the Law on State of Emergency)

Note: * When the disaster exceeds more than two communes, district level committee is deployed.

Source: [The Government of Viet Nam, 2014]

12.2.4 Emergency Response at the Site

(1) Disaster Relief

In the event of a disaster, the Coordination Committee, led by the head of local government, is organized across the sector. When the disaster is identified as Level 3 or higher, NCSR takes primary responsibility for search and rescue activities. For Levels 1 and 2, local governments and concerned agencies conduct a search and rescue activity directed by the above Coordination Committee. In general, the army in the affected area is involved in relief activities in rural areas and the fire department is involved in urban areas.

(2) Emergency Drills

Regular disaster drills are not conducted in all the local governments. So far, only some local governments have conducted disaster drills in cooperation with non-government organizations (NGOs) and/or donor agencies, but ad-hoc basis. The Project for Community-based Disaster Management (The Programme

1002: from 2009) includes awareness raising and annual disaster drills; however, it may not have been conducted due to lack of financial resources.

12.3 Overview of Disaster/Emergency Medicine

Legislation on emergency medicine has been established since 2008 and the service provision system including emergency rooms and mobile medical teams are to be set up from central to provincial level. Regarding disaster medicine, relevant guidelines and strategies are under development. As for institutional arrangement, a disaster management unit was directly established under the Health Minister in 2008. However, in general, it seems the priority is to establish emergency medicine and relevant system in Viet Nam.

12.3.1 Legal and Political Arrangements

Table 12-7 summarizes regulations and guidelines on emergency medicine. Some could be applied to emergency response. A national guideline for disaster medicine is being prepared[44] in accordance with the Law on Disaster Preparedness and Response 2013. According to the law, it is expected that roles and functions of local governments in emergency response could be enhanced. At the same time, preparation will also be more focused.

Table 12-7 Relevant Regulations and Guidelines on Emergency Medicine

Title	Outline
Decision No. 01/2008/QD/BYT of Health Minister dated 21 January 2008	Regulations on emergency medical services, intensive care, and clinical toxicology.
Decision No. 3385/QD-BYT of Health Minister dated 18 September 2012	List of drugs, medical supplies, and essential vehicle-equipped ambulances for emergency medical services
Decision No. 1904/QD-BYT of Health Minister dated 05 March 2014	Guidelines on technical procedures for medical examination and treatment of emergency intensive care clinical toxicology
Circular No. 41 dated 14 November 2011	Promulgating the licensing of practitioners and clinics
Circular No. 17/2014/TT-BYT dated 2 June 2014	Licensing for first aid points of the Red Cross and training regulation for first aid points of the Red Cross
Guidance to Handle Emergency Situations (2013)	Handbook for health workers and grassroots outreach workers prepared in collaboration with the World Health Organization (WHO)
Decision No. 4695/Qd-BYT of Health Minister dated 21 November 2013	Promulgating the assessment tools on hospital safety in emergencies and disaster.

Source: MOH Viet Nam

12.3.2 Relevant National Development Strategy/ Plan

The Minister of Health approved the Action Plan of Health Sector on Disaster Prevention and Response 2015-2020 by the Decision No. 646/QD-BYT dated 13 February 2015.

The plan aims to develop capacity to ensure timely and effective health services before, during, and after a disaster to reduce mortality and morbidity caused by/related to the disaster. To achieve this overall objective, five specific objectives are set to: (1) strengthen institutional capacity from the central to local levels; (2) develop and improve relevant policy; (3) strengthen capacity and preparedness of health facilities; (4) establish information system to assess and monitor impact of a disaster to health sector; and (5) improve the quality of human resources through trainings and research activities.

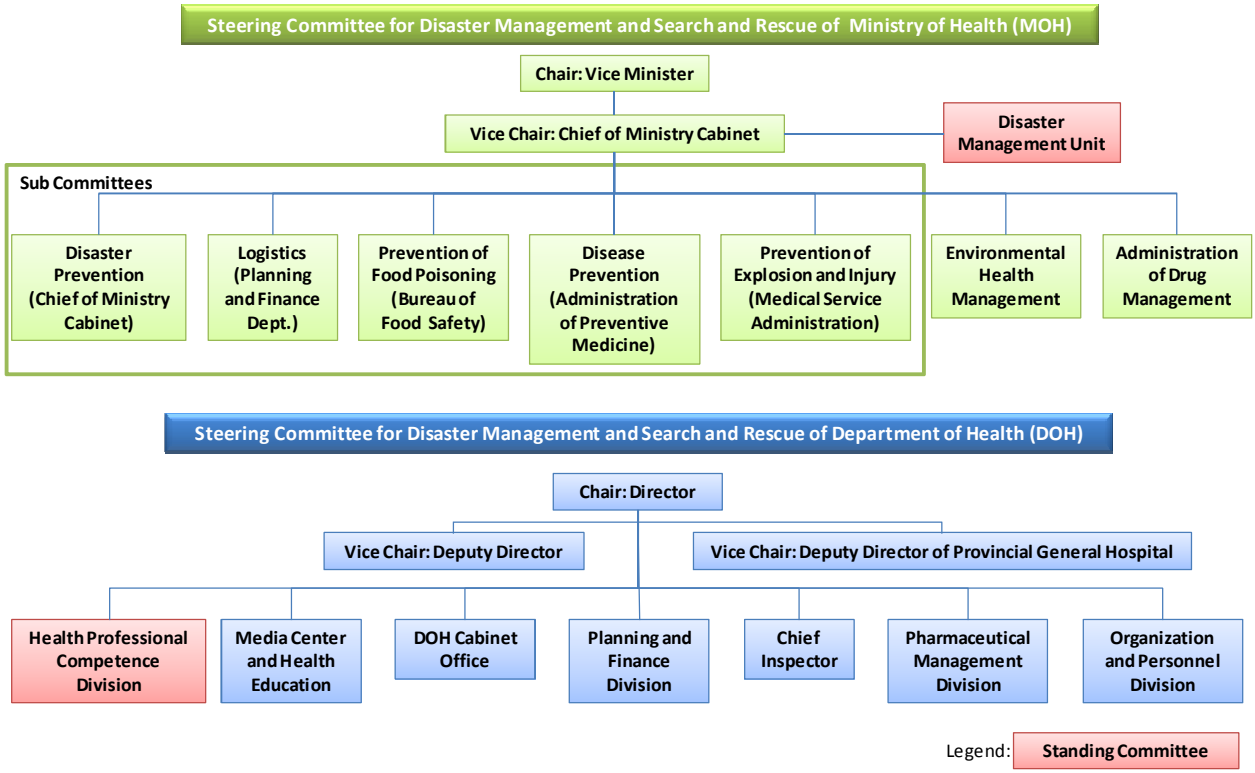
[44] According to the interviews, the National Institute of Burns is responsible for drafting the guidelines.

12.3.3 Institutional Setting

(1) Steering Committee of Disaster Management and Search and Rescue of the Ministry of Health (MOH) and Department of Health (DOH)

The Steering Committee of Disaster Management and Search and Rescue of the MOH and Department of Health (DOH) at the provincial level are presented in Figure 12-3. At the MOH level, the Disaster Management Unit (DMU) is the secretariat of the committee.

The DMU was established in 2008 to collect and analyze relevant information, coordinate among relevant agencies both inter and intra ministry, as well as plan and monitor the annual work plan on disaster management of health sector. It is under the direct supervision of the vice minister. Seven permanent staff are working under the chairman; the vice minister and head of administration and departments are the vice chairs. At the provincial level, DMUs are set in the provincial hospitals.



Source: MOH Viet Nam

Figure 12-3 Organization Structure of the Steering Committee of Disaster Management and Search and Rescue of Ministry of Health (MOH) and Department of Health (DOH)

DMU is also involved as the secretariat for the Steering Committee for Disaster Management and Search and Rescue, which is called a few hours after the warning of natural disaster. The relevant regulations and guidelines are drafted by DMU in cooperation with concerned department/administration for approval of the committee.

As shown in Table 12-8, VND 5-6 billion has been allocated to DMU every year to procure necessary equipment, supplies, and conduct other activities for the last four years.

Table 12-8 National Budget for DMU, 2011 - 2014

Year	National Budget	Expenditure
2011	VND 5,000,000,000	Procurement of equipment, medicine and other activities (DMU)
2012	VND 5,000,000,000	
2013	VND 6,000,000,000	
2014	VND 6,000,000,000	

Source: MOH Viet Nam

12.4 Current Situation of Disaster Medicine

12.4.1 Facility and Equipment

According to the MOH, the following five national hospitals[45] have a disaster response capability:

- Bach Mai Hospital
- Viet Duc Hospital
- Hue Central Hospital
- Cho Ray Hospital
- National Institute of Burns

The National Institute of Burns in Hanoi is the highest level hospital for burn treatment. The institute has 360 beds, of which 50 beds are reserved for disaster and emergency events. The institute can accept up to 100 patients at a time. The lobby on the ground level can accommodate a maximum of 1,000 patients. There are ten operating rooms; five of them are used daily and others are used in case of disaster. The institute has a skin and tissue bank (wound healing and tissue engineering research laboratory).

In addition to the four central hospitals, 63 provincial general hospitals provide emergency response services in the event of disasters.

12.4.2 Emergency Response System

In Viet Nam, the disaster response in the health sector is under the responsibility of the Steering Committee for Disaster Management and Search and Rescue (Section 12.2.2). The Steering Committee of MOH is coordinated by the Central Steering Committee which is chaired by the NCSR.

12.4.3 Major Providers for Disaster Response

(1) **Search and Rescue**

The NCSR is responsible for directing and organizing the search and rescue of people and means (aircraft, ships, boats, oil-gas facilities) meeting with accidents in the air and on the sea and adjacent areas of responsibility between Viet Nam and other countries (Decision No.780).

Decree No. 95/2010/NĐ-CP dated 16 September 2010 governs the licensing of, and coordination with, foreign search and rescue forces in Viet Nam.

[45] Some other hospitals under other ministries such as Ministry of Defense also have a disaster response capacity.

(2) **Medical Response Teams**

There are no medical response teams specially designated for disasters. In disaster situations, the existing facilities, equipment and human resources for emergencies are mobilized and utilized to respond to the disaster victims. Recently, the medical response team formed by personnel from Bach Mai Hospital and Cho Ray Hospital was dispatched and responded to a mining accident. The MOH, the Ministry of Defense and local governments can form a "Joint Military and Civil Search, Rescue and Medical Team" based on the necessity.

At the national level, it is possible to deploy one or two special teams for disaster response which is composed of two medical doctors, six nurses, two logisticians, and one driver.

The National Institute of Burns organizes a response team in case of disaster and emergency. The institute has a hotline (mobile) number which anyone can call in an emergency. Within 30 minutes after receiving a call or request, a response team will be organized and dispatched to the affected site. The standard response team is composed of four medical doctors, eight nurses, one pharmacist, and one driver. The team as a first responder assesses the situation and reports to the institute. The team performs triage and decides transportation means and place of treatment of victims.

(3) **Transportation of Patients**

According to the National Institute of Burns, the Steering Committee of MOH arranges the transportation of disaster victims. Ships are used for transporting patients based on their condition. In the event of a disaster, ambulance services are offered free of charge.

12.4.4 Major Training Providers on Disaster Medicine

In medical universities except the Viet Nam Military Medical University and the National Institute of Burns, training on disaster medicine is not offered separately. It is offered as one of the components of training on traffic and occupational accidents in the training institutions for healthcare staff.

Trainings on disaster medicine are mainly provided by the Viet Nam Military Medical University and the National Institute of Burns.

The Faculty of Burns and Disaster Medicine of the National Institute of Burns offers trainings for masteral level (three years), doctoral level (four to five years), and specialist levels 1 and 2 (six to twelve months). The faculty focuses on practical issues such as treatment of the injured by fire, explosion, industrial accidents, and airplane crash. The curriculums in the area of disaster medicine are developed based on the models of the United States of America (USA), Australia, and France.

In addition, the Hanoi School of Public Health (HSPH)[46] has a Disaster Prevention and Management Department and offers disaster-related trainings. The department does not focus on disaster medicine per se but focuses mainly on disaster management issues. In the Bachelor of Public Health Course, "Public Health and Disaster Management (4 credits, 60 hours)" is one of the compulsory subjects. HSPH also offers

[46] HSPS provides education at bachelor, master, and doctorate levels, offers training, conducts research, and provides technical support to MOH in the area of public health.

disaster management-related short courses[47] such as "Safe Hospital", "Public Health and Emergency Management in Asia and Pacific (PHEMAP)", "Rapid Health Assessment", and "Mass Casualty Management" for health staff working in hospitals, personnel of provincial health departments and others.

12.4.5 Receiving/ Dispatching Medical Team to Other Countries in Emergencies

So far, any foreign medical team has not been received. A medical team has been dispatched to Myanmar and Lao PDR. It consists of selected members from major national hospitals.

12.5 Current Situation of Relevant Emergency Medical Services

12.5.1 Facility and Equipment

(1) **Hospitals**

In Viet Nam, according to the MOH, all national hospitals, provincial hospitals, and district hospitals have an emergency department. The number of hospitals in each level is indicated in the table below.

Table 12-9 Number of Hospitals in Viet Nam (2012)

Level of Service	Number of Hospitals
National	44
Provincial	376
District	615

Source: [WHO and MOH Viet Nam, 2012]

According to the MOH, the following five national hospitals[48] provide emergency medical services as the highest-level hospitals in Viet Nam:

- Bach Mai Hospital
- Viet Duc Hospital
- Hue Central Hospital
- Cho Ray Hospital
- National Institute of Burns

The Decision on Basic Trauma Care (2008) of MOH defines roles of each level of hospital (primary to tertiary) in prehospital care and instructed all the provincial hospitals to prepare an investment plan to improve prehospital care services. However, due to lack of resources and low priority within the health sector, the progress has been delayed in most provinces.

In the northern part of Viet Nam, the emergency medical service (EMS) system is based on the French system and the emergency department is divided into two parts: surgical and internal emergency. On the other hand, in the southern part of the country, the American system is adopted and the emergency department is not separated.

[47] Short courses are offered depending on available budget.
[48] Except for the hospitals under other ministries

(2) **Dispatch Center**

The 115 emergency center was established in each provincial hospital. However, due to the small number of users, difficulties in securing operational cost and other reasons, many centers were closed. At present, there are only six to eight centers operating in big cities such as Hanoi, Ho Chi Min, Hue, and Haiphong.

12.5.2 Response and Transportation System

There is the Committee of Injury Prevention chaired by the Vice-Minister of Health. The Department of Environmental Health is the secretariat of the committee and responsible for injury prevention and prehospital care, including 115 emergency call service.

Some pilot activities of 115 services were implemented in Hanoi and Hue from 2006 to 2008 (assisted by Atlantic Pharmaceuticals), and in Hanoi, Hue, Hung Yen, Ho Chi Minh and Dong Nai from 2010 to 2012 (assisted by WHO). The pilot activities conducted from 2010 to 2012 included the development of geographical database and a patient information format, the collection of information on hospital capacity, and the training of first responders in the community.

(1) **First Responder**

In Viet Nam, as socio-cultural beliefs, people tend to believe that a person who is at the accident site should transport the victim to a hospital. However, if victims are not transported appropriately, it might be dangerous for them. The Decision on Basic Trauma Care (2008) defines a prehospital trauma care model and facilitated the development of first responders such as community volunteers, employees, drivers of public transportation and transportation polices. The first responders are expected to have communication skills with medical facilities and to call 115.

(2) **Ambulance Services**

Viet Nam has a 115 emergency system and ambulance services are available. In general, ambulances are dispatched with one medical doctor and two nurses onboard. However, it is difficult to meet this standard because of the shortage of medical personnel especially in rural areas.

Ambulance service fees are paid by users but the users can refuse to pay. In cases where the users refuse to pay, the hospital that accepted the patient has to pay. In case of traffic accidents, the service fees could be covered by traffic insurance. And in case of occupational accidents, the service fees could be either paid by employers or covered by health insurance.

Although ambulance services are available, the coverage of 115 emergency service is low. One of the reasons for low uptake is that it takes time for 115 ambulances to reach the site and people tend to either call hospital ambulance or take a taxi to bring them to the hospital.

There are also private ambulance services available. However, private ambulance service is expensive and does not provide first aid but only provides transportation services.

12.5.3 Human Resources

Every medical doctor receives training in emergency medicine. However, an emergency physician is not recognized as a specialist by the Viet Nam Medical Association.

In Viet Nam, an emergency medical technician (EMT) is not recognized as an established health professional. According to interview, thus, their status and income is not secure even though the demand for EMT is high.

Taking into consideration the number of nurses will surpass the need, it is expected that nurses will be trained to serve as an EMT or a paramedic in order to improve prehospital care especially in remote areas.

(1) Pre-service Education

All medical universities have a department of emergency medicine, critical care medicine, and toxicology in which emergency medicine is taught as a subspecialty.

In 2012, the course for the Master of Emergency Medicine was established in Hue University of Medicine. Emergency physicians used to learn surgery and toxicology, but with the changes of disease burden, they are trained in internal medicine as well.

Major institutions providing education and training in emergency medicine are as follows:

- Hanoi Medical University;
- University of Medicine and Pharmacy, Ho Chi Minh City;
- Can Tho University of Medicine and Pharmacy;
- Hue University of Medicine and Pharmacy;
- Thai Nguyen University of Medicine and Pharmacy;
- Hai Phong University of Medicine and Pharmacy; and
- Thai Binh University of Medicine and Pharmacy.

(2) Continuous Professional Development (CPD)

Trainings in emergency medicine and emergency medical services for health personnel are mainly offered by hospitals and/or project bases supported by international partners.

Trainings in Advanced Trauma Life Support (ATLS)/ Japan Advanced Trauma Evaluation and Care (JATEC) are offered to emergency physicians in Bach Mai Hospital.

JICA's "Project for Improvement of the Quality of Human Resources in Medical Services System" supports trainings in emergency medical services mainly in the form of training of trainers (TOT).

12.5.4 Relevant Academic Society/ Professional Organization

The Viet Nam Society of Emergency, Intensive Care and Clinical Toxicology, and the Viet Nam Burn Association are accumulating academic and professional knowledge on emergency and disaster medicine. The Viet Nam Society of Emergency, Intensive Care and Clinical Toxicology has 200 medical doctors working in emergency departments and would like to expand their membership to nurses and other co-medicals in the future. The Viet Nam Burn Association has 600 members nationwide. As a member of

the International Society of Burn Injuries (ISBI), it is actively involved in international cooperation activities.

12.6 International Cooperation

Regarding disaster medicine, WHO, the Asian Disaster Preparedness Center (ADPC), the International Federation of Red Cross and Red Crescent Societies (IFRC), and some bilateral donors such as the United States Agency for International Development (USAID) provide technical and/or financial support.

WHO provides technical and financial cooperation to strengthen the capacity of emergency response of MOH. The major areas of cooperation are: (1) preparation of guidelines and training package, (2) domestic and international trainings, and (3) research activities. Technical assistance is provided in collaboration with Hanoi Institute of Public Health, Ho Chi Minh Institute of Public Health, ADPC, etc. The guidelines have been drafted on disaster management, information management in emergency response and rapid assessment. For the trainings, disaster-prone provinces are prioritized. In 2015, WHO will provide the following assistance in addition to existing support for trainings:

(1) **Risk and Hazard Mapping**

A model and database will be established in some provinces and it will be expanded to the others. It will be utilized for relevant action plan for disaster preparedness and management.

(2) **National Action Plan**

In cooperation with DMU, a national workshop will be held to prepare the national action plan for disaster preparedness and management.

(3) **Standard Operating Procedure (SOP) of First Aid**

Standard operating procedure of first aid will be prepared in cooperation with concerned departments/ administrations of MOH.

12.7 Conclusion

Although relevant legislations have been developed and some major hospitals have prepared for emergencies, implementation at local level and further capacity development DMU might be the next challenges. Because there are more prioritized health issues at operational level, preparedness and disaster management might be left behind. Regarding EMS, further development might be required to respond increasing needs caused by increasing of traffic accidents.

Chapter 13 Discussions in the Regional Meetings

The Survey involved the ASEAN member states (AMS), ASEAN Secretariat, and AHA Centre to discuss future vision of cooperation on disaster health management through a series of discussions in the three regional meetings as mentioned in Section 1.4.3. Through these meetings, the participants could share their understanding on common issues in disaster health management in the region and way forward, and then, the future vision for the next ten years was proposed as shown in Chapter 14. The points of discussions are summarized in this chapter. Details of the meetings, including program, participants, meeting summary, and minutes of the meeting, are presented in Appendix 4.

Through the meetings, key persons in disaster health management in both administration and operation of each AMS were invited. Thailand, as a lead country, co-hosted the first and third meetings with JICA. From the ASEAN Secretariat, representatives from the Disaster Management and Humanitarian Assistance Division and the Health and Communicable Diseases Division as well as the Cross Sectoral Cooperation Directorate were involved. Representatives from AHA Centre also participated in all the meetings.

13.1 First Regional Meeting

The first regional meeting was held on 12 December 2014 in Phuket, Thailand. A total of 54 representatives from nine ASEAN Member States (AMS), ASEAN Secretariat, and Japan attended the meeting. They also participated in "The 10 Years Tsunami Phuket: the Next Tsunami Zero Lost" Conference hosted by Thailand on 10 and 11 December 2014.

In the first regional meeting, the National Institute for Emergency Medicine (NIEM) of Thailand and JICA presented the background of the Survey. Furthermore, and JICA presented the accumulated experiences and lessons learned on disaster medicine in Japan, the background of initiatives in regional cooperation on disaster medicine, as well as the concept and methodology of the Survey. Then, NIEM presented the way forward including the communication line and expectations and responsibilities of AMS. In response to the presentations, the following discussions were made among the participants.

(1) Difficulty in International Deployment of Medical Teams

Because different countries have different systems of government related to foreign relations, the medical teams deployed from other countries faced difficulties at the operational level such as in the custom and immigration, therefore impede quick response. To enhance regional coordination, sharing of information on such government system and qualified personnel relevant to disaster medicine should be given importance in order to provide immediate assistance to the affected countries with ensured quality of care.

(2) National Capacity and Regional Cooperation

In order to strengthen the regional capacity of disaster management, especially focusing on the capacity of disaster medicine to mitigate preventive loss and damages, it was recognized that enhancement of the national capacity of emergency/disaster medicine would be first prioritized. Eventually it was followed by the establishment/enhancement of regional capacity of disaster medicine including regional collaboration

mechanism and systems (i.e., ASEAN Standard Operation Procedures) for enabling more proactive cooperation, technical assistance and resource mobilization in all health related aspects in disaster risk reduction, preparedness and response which are highly required.

At the same time, through the enhancement of the national capacity of emergency/disaster medicine, strengthening of the regional capacity and any type of collaboration mechanism could be realized. Also, to establish a reliable system of disaster medicine, relevant capacity of EMS should be ensured in each AMS.

(3) **Sharing of the Survey Progress**

It has been requested that the progress of this Survey including schedule, outputs of regional meetings/workshops will be shared with all concerned organizations and personnel in the field of emergency medicine, disaster medicine and beyond, if necessary. In response to the request, the outputs of the meetings and the survey outline were shared with AMS through ASEAN Secretariat.

13.2 Second Regional Meeting

The second regional meeting was held on 18 March 2015 in Tokyo, Japan. A total of 55 participants from ten AMS, ASEAN Secretariat, AHA Center and Japan attended the meeting. Prior to the meeting, they participated in public forum events in the 3rd World Conference on Disaster Risk Reduction (Sendai) and visited the affected areas of the Great East Japan Earthquake (Ishinomaki and Onagawa), in order to share Japan's experience and lessons learned from the Great East Japan Earthquake.

In the second regional meeting, JICA recapped the background of the survey and the preliminary results of the in-country survey were presented by the Survey Team. Following the presentations, the floor discussions were made along with eight sub-categories, namely; a) Governance, b) Institutional Setting, c) Preparedness, d) Response, e) Emergency Medicine System (EMS), f) Surveillance System, g) Human Resources, and h) International Cooperation in Response. The points of discussions are summarized as follows:

(1) **Priority Challenges in Disaster Medicine in the Region**

Among the eight sub-categories, human resources, international cooperation, and EMS were identified as priority areas to focus on in the region.

Regarding human resources, it was pointed out that curriculum development for disaster medicine/health management could be important for all cadres of health personnel. Also, retention and recruitment of trained personnel were raised. In this regard, the participants could mutually exchange their experiences and resources to develop human resources in the region efficiently.

As for the international cooperation, it was mentioned that mutual trust through regular face-to-face communication might enable the deployment or receiving of medical assistance teams from other countries in disaster/emergencies be more efficient. Also, adopting the minimum common guidelines or standard operating procedure (SOP) could be effective in deploying or receiving the medical teams from other countries. For example, through the regular joint exercises, it could be possible to have some opportunities

for regular face-to-face communication and discussion on common SOP. In addition, a strong national focal point would be important to have consistent discussion on regional coordination.

Regarding EMS, the definition in line with the Survey context was discussed; whether it should include the day-to-day EMS system or focus on the one in disaster/emergencies. It was also pointed out that EMS is an issue at the national level.

(2) **Strategy for the Next Five Years**

To establish the regional collaborative operational mechanism in the field as well as at the administration together with the enhancement of relevant national capacity both in the human resources as well as national systems/mechanism on disaster medicine, the following strategies up to 2020 were confirmed:

- Developing human resources and operation systems on disaster/emergency medicine at the national level and disaster medicine at the regional level.
- Initiating and providing continuous support of ASEAN-Japan collaboration network on disaster medicine with a strong national focal point in each AMS.
- Drafting the regional SOP with related systems and forms on disaster medicine in the ASEAN region.

The above strategies together with the survey progress were reported to the Post 2015 Working Group Meeting of ASEAN SOMHD on 7 and 8 April 2015, and the strategy for disaster health management, one of the priority areas of the ASEAN Post 2015 Health Development Agenda, mentioned in Section 2.3.3 was endorsed.

(3) **Sharing within the Region**

As for the future action, the discussions or any strategies on disaster medicine need to be shared and discussed among relevant ASEAN sectoral bodies at such occasions as the Joint Task Force Meeting of ASEAN Committee for Disaster Management, where sectoral bodies of defense, disaster management, foreign affairs, health, social welfare & development etc., would work together. In response to the suggestion, the outputs of the meeting and outline of the Survey were reported to the Joint Task Force Meeting on Humanitarian Assistance and Disaster Relief (HADR) on April 2015.

13.3 Third Regional Meeting

The third regional meeting was held on 9 July 2015 in Bangkok, Thailand. A total of 70 representatives from ten AMS, ASEAN Secretariat, AHA Centre, and Japan attended the meeting. Prior to the third regional meeting, JICA recapped the background, methodology and progress of the Survey. The participants were also involved in the site visit to the hospital affected by the 2011 Bangkok Flood and in the work shop on regional cooperation and coordination among medical teams.

13.3.1 Discussions in the Workshop

The purposes of the workshop are: a) to identify the challenges/issues on regional cooperation and coordination among medical teams in the affected area, and b) to share the experiences and lessons learned

in response to the Nepal Earthquake. In the workshop, experiences of response to the Nepal Earthquake (April 2015) were shared by Indonesia, Thailand and AHA Centre, as well as Japan. And then, simulation exercise was conducted with referring the above presentations.

(1) **Experiences of Nepal Earthquake Response**

AHA Centre provided situation update to AMS and exchanged information with teams from Malaysia, Singapore and Thailand (refer to Section 2.1.4(2)). Indonesia deployed a medical team in coordination with the National Disaster Management Agency (BNPB) (refer to Section 5.4.5). Thailand deployed seven batches of medical teams until middle of July (refer to Section 11.4.5). Japan deployed two batches until late May. Although Thailand and Japan tried to collaborate with each other, their designated sites were far and therefore, they only could share information through the phone. However, because the communication infrastructure was not well, it was also quite difficult.

(2) **Simulation Exercise**

The participating countries were divided into two groups. Discussions were made on 1) capacities and resources (human resources and other resources such as medical equipment) of each country, 2) cooperation and coordination in each group, and 3) cooperation and coordination as a whole, between the two groups.

Through the workshop, challenges and issues identified through the discussion are as follows:

- The command center including information ad hoc center could be necessary to enhance coordination among the medical teams from AMS as well as with the local health authorities.
- A commander and a liaison coordinator should be assigned in the local government of the affected area.
- Adequate equipment and suitable common checklists for ASEAN should be developed for efficient information sharing.
- Collaboration with local volunteers could contribute to expand the capacities of the teams.
- Arrangements of transportation and logistics might be critical for efficient and effective coordination.

13.3.2 Discussions in the Third Regional Meeting

In the third regional meeting, the ASEAN Secretariat presented the details of various components that help in the functioning of ASEAN cooperation on disaster management such as AADMER and AHA Centre, as well as the scope of disaster medicine and explained about the current understanding of “Disaster Health Management”. Then, the Survey Team presented the draft recommendations from the Survey along with the needs and priorities, and challenges identified based on the survey findings. JICA presented a draft proposal for the next step based on the results of the survey and discussion in the regional meetings, and explained the draft outline of the proposed technical cooperation project.

The points of discussions are summarized as follows:

(1) **Terminology**

Considering the ASEAN Post 2015 Heath Agenda, the terminology "Disaster Health Management" is understood to include "Disaster Medicine" which has been used in the Survey. Basically, it was usually understood to include all the relevant aspects of disaster management in health. The stakeholders will continue to pay attention to the discussion on the exact or concrete definition of "Disaster Health Management" in ASEAN. Therefore, in the context of the Survey and the relevant activities in the future, it was understood that "Disaster Medicine" is one of the components of "Disaster Health Management" and a cooperation focusing on "Disaster Medicine" could contribute further development of "Disaster Health Management" in the ASEAN region.

(2) **Future Vision**

In response to the draft future vision of collaboration mechanism on disaster health management proposed by JICA, the participants reached a common understanding about the coordination and collaboration that will be expected at the national and regional level in ASEAN. To achieve the future vision, AMS participants shall aim to strengthen regional coordination for a rapid and effective response to disaster in the ASEAN region by utilizing the regional resources along with the three strategies endorsed in the Post 2015 Working Group Meeting of ASEAN SOMHD (refer to Section 2.3.3). Thus, strengthening of both the (a) regional collaboration capacity and (b) capacity of each AMS on disaster health management and emergency medical services (as the base of disaster health management) will be considered. The future vision and the roadmap for the next ten years are mentioned in Section 14.2.

(3) **Draft Outline of the Proposed Technical Cooperation Project**

In order to contribute to achieve the future vision, the participants reach a common understanding on the proposed draft outline of the up-coming technical cooperation project for the first step of the roadmap. In line with the discussion on terminology (Section (1) above), the project will focus on coordination on disaster medicine and be expected to contribute to further development of disaster health management in the region. The participants also agreed that all AMS shall be involved in the project and the official focal points on disaster health management shall be appointed to contribute to the project implementation through various activities such as, but not limited to, being a member of the thematic project working group, or as trainees, or as resource/information providers, etc. The draft outline of the proposed technical cooperation project is mentioned in Section 14.4.1.

Chapter 14 Conclusion and Recommendations

In this chapter, challenges and issues drawn from the in-country survey and discussions in the regional meetings are concluded adding some information and discussions at the regional and global level. Then, future vision of collaboration mechanism on disaster health management is suggested, and the relevant resources in ASEAN member states (AMS) and Japan are described. Finally, some possibilities of future cooperation are recommended both at the regional and national levels.

14.1 Overview of Current Situation of Disaster Medicine and Emergency Medical Services in ASEAN Region

14.1.1 Regional Trend

As mentioned in Chapter 2, coordination in disaster management has been discussed in various regional bodies and forums such as the ASEAN Regional Forum (ARF) and East Asia Summit (EAS) taking into account the international discussions to strengthen multi-sectoral collaboration and mainstreaming of disaster risk reduction, as well as prioritize preparedness. Also, common tools on disaster response such as SASOP and EAS Tool Kit have been developed to make regional collaboration more efficient and effective. ASEAN is preparing the ASEAN Joint Disaster Response Plan (AJDRP), which will be a multi-sectoral plan, which includes the health sector and promotes inter-sectoral collaboration. Under such regional trends, regional coordination and inter-sectoral collaboration will be enhanced.

14.1.2 Disaster Medicine

(1) Types of Disasters to be Considered

Flood and storm are the most frequent disasters in the region. In many cases, areas to be affected and approximate period could be predictable, and it could be responded by the local authority. Therefore, if the early warning system functions well, the local authority and relevant stakeholders could have some time to prepare for response. However, as mentioned in Section 1.4.2, such disasters usually require a long-term response to take care of internally displaced people and therefore, public health aspects are more important.

Although it does not frequently occur, earthquake and eruption (Indonesia and the Philippines), as well as tsunami should also be considered to strengthen preparedness and capacity of response in some countries because those disasters might cause huge damages and require immediate, large scale and well organized response. Regarding the man-made disasters, although the type, scale and damage cannot be predicted or forecasted based on the existing data, it could be effective to develop or strengthen the capacity for mass casualty incident (MCI) response especially in the major hospitals.

(2) Governance

Most of AMS have developed some policies and/or legal framework on disaster medicine. However, the latest international and regional trends (refer to Section 2.2 and 2.3) should be reflected in the relevant

development strategy/plan. Particularly, close collaboration and coordination with other relevant sectors should be carefully considered to increase the effectiveness of preparedness and response.

For the guidelines and the standard operating procedure (SOP) to be useful, the minimum standard is to "speak the same language" for common understanding to enhance cooperation in the region, and help the countries that are undergoing development process in drafting relevant guidelines and SOPs. Also, some forms of mutual agreement at the regional level might be necessary to develop regional collaboration mechanism in the future, particularly, after the ASEAN economic integration in 2015.

As for the institutional settings, most of AMS have national machineries on disaster management involving the health sector. In the ministries of health, some countries have established a unit/bureau/center to be responsible for emergency response (Cambodia, Indonesia, the Philippines, Thailand, and Viet Nam). However, most of those are still "young" and need further capacity development both in human resources and administrative function. Also, capacity at the local authority, which could be the first responder and main player in most of the disasters, seemed to be insufficient. Most of AMS excluding Singapore and Brunei, capacity of the local governments varies and depends on commitment and prioritization of the head because of decentralization.

To increase efficiency and effectiveness of preparedness and response, the central unit should strengthen its collaboration with other relevant sectors, especially the disaster management authorities and local government. In addition, collaboration with the military could contribute to increase efficiency of deployment and field operation of the medical teams. For instance, Singapore and Indonesia have good civil-military collaboration under the "Whole-of-Government Integrated Risk Management (WOG-IRM)" (Singapore) and strong leadership of the National Disaster Management Agency (BNPB) (Indonesia).

(3) **Response**

The response system and capacity have been developed and improved based on lessons learned from the actual response especially to remarkable disasters, as well as international events.

Basically, the medical response teams are to be mobilized from the nearest secondary or tertiary hospitals according to the needs of the affected areas. Most of AMS, except Singapore and Thailand, do not have a registration system of the medical response teams, although Indonesia and Malaysia have the standards of composition of their medical response teams. Indonesia has minimum qualification requirements for the members of the emergency medical response team. Malaysia is developing a system of the registered medical response team similar to the Japanese Disaster Medical Assistance Team (DMAT) system. Equipment for disaster response is stocked and maintained in the major hospitals in Brunei, Malaysia, the Philippines, and Singapore. It is managed by BNPB in Indonesia.

Once the teams are deployed to the site, it is operated under the incident command system (ICS). When the country receives international assistance, the medical response teams are coordinated under health cluster led by the Ministry of Health and World Health Organization (WHO). However, in the actual operation both domestic and international, there were some difficulties in coordination and communication among

the teams, with the local health authorities/facilities, and the relevant sectors, as well as with the foreign medical teams. In the Philippines, MOH is developing a pre-registration system and database of foreign medical teams including their capacity and actual performance in the past disaster response. The Survey Team observed that if there are regular personal contact and trusting relationship among the stakeholders, it could be more smooth and efficient. It might be difficult to develop a perfect system because one cannot predict what will happen in the actual operation in disaster response, but considering such reality, regular communication to be familiar with each other could contribute to improve efficiency of response. Common terminology and minimum standard operating procedure could also help to enhance such coordination in operation. In line with this, relevant activities such as FMT Working Group, EAS Tool Kit, and SASOP should be carefully considered.

Regarding coordination in emergency response, SASOP covers rapid needs assessment as well as search and rescue in initial response, but does not include medical assistance. Although the East Asia Summit Rapid Disaster Response Tool Kit (EAS Tool Kit) can be used as the basis of foreign medical team (FMT) classifications, it does not provide the concrete procedure, probably because the FMT is still under discussion and in a sort of trial stage. As for rapid health needs assessment at the initial phase, because there are few health personnel in ASEAN ERAT, health needs assessment is not sufficiently covered, although the assessment tools include simple health aspects which can be improved to be more specific. Through the discussions in the regional meetings, the participants shared their opinion that common and minimum standard operating procedure of medical response is necessary to enhance regional coordination. Also, to utilize such regional tools, each personnel to be involved in the medical response teams should fulfill the minimum qualifications or obtain the minimum capability to understand and implement such tools.

In addition, some issues which had not been well considered should be counted, such as socially vulnerable groups, gender, and psychological support both for the affected people and response team members. According to the interviews, the psychological aspects of the affected people have been considered in the health sector although it is generally taken care of by a social welfare agency. But consideration of socially vulnerable groups and gender seemed to be left behind.

(4) **Human Resources**

In most of AMS (except Singapore and Thailand), there is no standby or registration system of personnel for emergency medical response. When disaster occurs, the response organization deploys the necessary personnel from the list or the major medical facilities. For example, in Indonesia, the Center for Health Crisis Management of MOH shares the list of health workers such as trained emergency nurses, in cooperation with professional associations like the nursing association, and uses the list to deploy medical teams. Trainings on emergency response and/or disaster management seemed not to be sufficiently provided regularly and widely.

(5) **Health Facility**

The level of preparedness for emergency response varies among the countries. Disaster-prone countries such as Indonesia and the Philippines, as well as the countries of more than upper-middle economies[49] such as Brunei, Malaysia, Singapore and Thailand are well equipped and maintained the necessary equipment and facility, but some could not obtain sufficient resources because of low priority. As the Sendai Framework for Disaster Risk Reduction (SFDRR) and some international organizations such as WHO are promoting the Safe Hospital Initiative and "build back better" concept, resilience of the health facilities could be more considered in the future.

(6) **Information Management/ Surveillance**

The Philippines has developed the Surveillance in Post Extreme Emergencies and Disasters (SPEED), the Evident-based Surveillance and Response (ESR) and Health Emergency Alert Reporting System (HEARS). These have been implemented in disaster situations for both domestic and foreign medical teams and other stakeholders in the health sector. Other countries apply routine disease surveillance systems even in disaster situations. Malaysia has integrated information management system to monitor notifiable diseases and staff deployment in the affected areas. The disease surveillance system is switched from passive to active in disaster situation.

14.1.3 Emergency Medical Services

Some components of the emergency medical services (EMS) are the basis of disaster medicine such as emergency call and patient transportation system, as well as human resources for prehospital and in-hospital care. In Cambodia, Lao PDR, Myanmar and Viet Nam, the needs for EMS have been sharply expanding because of recent increase in traffic accidents. In Indonesia and the Philippines, EMS system is generally functioning although there are some issues on integration or standardization of relevant systems. As for Brunei, Malaysia and Singapore, EMS system has been established and well operated.

(1) **Emergency Call and Patient Transportation System**

In Brunei, Malaysia, Singapore and Thailand, there is a national emergency call system. Indonesia has been under the process in developing their own system. As for the others, various organizations, both public and private, provide patient transportation services with/without charge to respond to the expanding needs. However, the quality and safety of the patient are not always ensured because official standard or guidelines have not been established and the government, usually the Ministry of Health, has not developed the capacity to monitor and supervise such various providers. In Thailand, NIEM has been trying to assure the quality of services through training and accreditation system for first responders although there are some charity organizations which have been providing rescue and transportation services.

[49] According to the World Bank's classification of country economies, Cambodia is in the group of low-income; Indonesia, Lao PDR, Myanmar, the Philippines and Viet Nam are in lower-middle-income; Thailand and Malaysia are in upper-middle, and Brunei and Singapore are in high-income. [The World Bank]

(2) **Human Resources**

Human resources both for prehospital and in-hospital cares need further development in quality and quantity.

Although emergency physicians are involved in the work regardless of the time and required wide range of medical knowledge and responsibility, they are not well respected compared with other specialized doctors in some countries. Therefore, in such countries, it is difficult to ensure qualified and well motivated emergency physicians especially in the rural areas. Some efforts to improve recognition on their expertise should be done in cooperation with the medical professional societies and academic institutions.

Regarding the nurses, generally they play important roles in both prehospital and in-hospital cares. And in the countries which have emergency medical technicians (EMT) or paramedics, the education system is usually quite relevant to the nursing education. To improve the prehospital care including patient transportation and triage system, relevant curriculum could be incorporated into the nursing education. Also, in-service training or career development system for emergency nurses and EMT/paramedics could contribute to ensure well qualified human resources. In addition, a competency standard might be effective to develop such human resource development programs.

(3) **Preparedness for Mass Casualty Incident (MCI)**

In Brunei, Malaysia, the Philippines and Singapore, the major hospitals have developed mass casualty incident (MCI) response plan and conducted drills because disasters could cause many injuries at once, health facilities, especially major hospitals, needs to prepare to appropriately deal with certain number of patients at the same time.

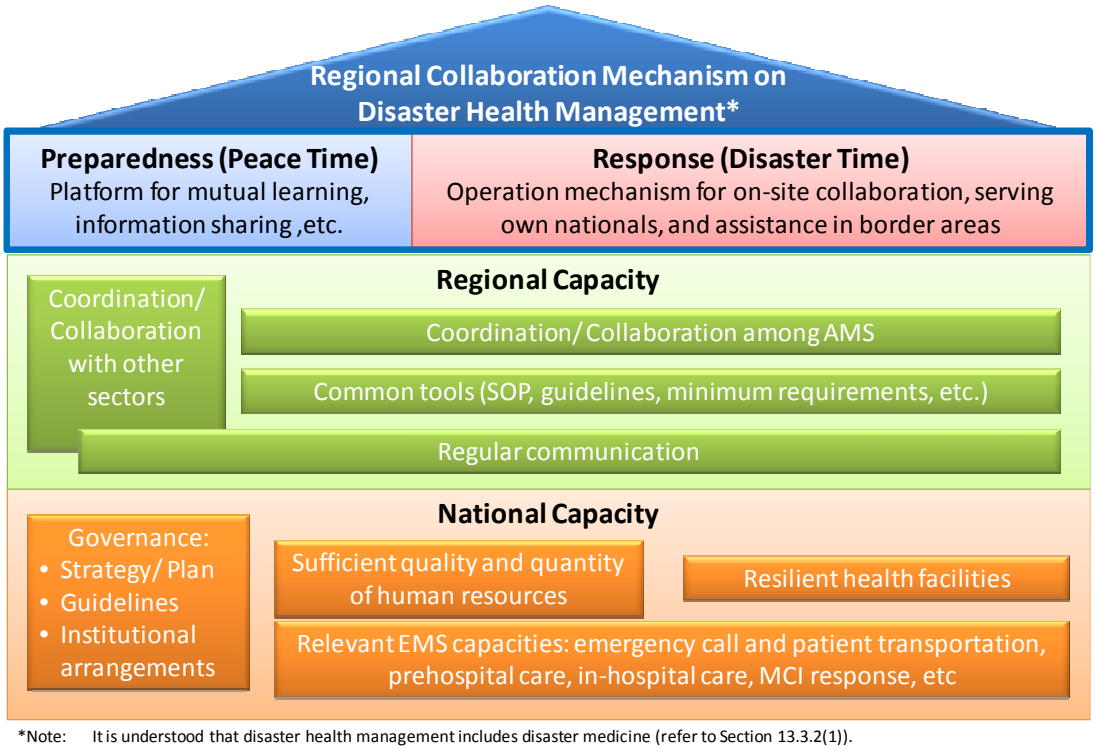
14.2 Future Vision of Collaboration Mechanism on Disaster Health Management

Figure 14-1 presents the future vision of regional collaboration mechanism on disaster health management in the ASEAN region which was proposed based on the survey results and a series of discussions among the stakeholders.

The mechanism could function as a platform for mutual learning, information sharing and maintaining communication among the stakeholders in peacetime. The platform could be expected to inspire or motivate each AMS to set clear development target through knowing more advanced cases, best practice, lessons learned, and innovative approached in other countries.

Once a disaster occurs, it could function as an operation mechanism for on-site collaboration and cross-border deployment of the medical teams. Some examples: a medical team could collaborate with other teams from AMS on the site in disaster response; a country could dispatch a medical team to assist their own nationals affected by the disaster in the neighboring country; and a medical team could be dispatched from the nearest health facilities regardless of the country's border to assist people in the border area. The latter two examples could be regarded as far more important because people can move around after the ASEAN economic integration in 2015. In addition, the core organization, which might be

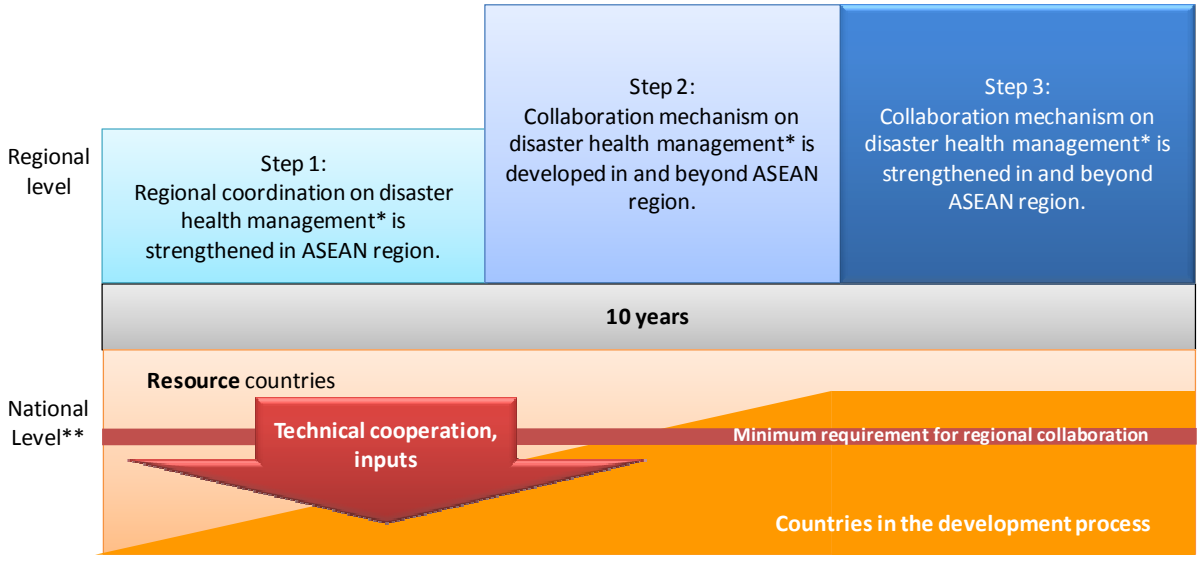
necessary for the mechanism, should be carefully considered in view of the relevant discussions and activities in the region.



*Note: It is understood that disaster health management includes disaster medicine (refer to Section 13.3.2(1)).

Figure 14-1 Future Vision of Regional Collaboration Mechanism

To achieve this vision, the regional capacity should be developed and strengthened. Also, the relevant capacities at the national level need to be enhanced. Figure 14-2 shows the steps for the future vision for the next ten years which was proposed based on the survey results and a series of discussions among the stakeholders.



Note: *It is understood that disaster health management includes disaster medicine (refer to Section 13.3.2(1)).
**The height of the square shows national capacity regardless the continuous improvement.

Figure 14-2 Steps for the Future Vision of Regional Collaboration Mechanism

At the regional level, the collaboration mechanism might be developed through close communication and careful discussion in the region and it might be expanded to the neighbors. Also, the minimum requirements might be set to operate the mechanism in Step 1. On the other hand, the national capacity could be effectively developed through mutual cooperation among AMS and other resource countries, if necessary. The resource countries could provide relevant experiences, knowledge and knowhow to the other AMS which are still developing their relevant capacities. Then, all AMS might fulfill the minimum requirement to operate the mechanism during Step 2 and the mechanism will effectively function and be strengthened with sustainability in Step 3.

14.2.1 Strengthening the Regional Capacity

Through regular communication, common tools could be developed to use "common language" in the operation. In addition, mutual relationship of trust could be enhanced to promote efficient coordination and collaboration in disaster response and regular communication in peacetime. Taking into account the ASEAN economic integration in 2015, the following actions could be taken to strengthen the regional collaboration as shown in Step 1.

- To promote collaboration with other relevant sectors in disaster management such as disaster management, social welfare and military.
- To provide opportunities for regular communication among the stakeholders of disaster medicine in AMS.
- To develop necessary tools such as:
  - Standard operating procedure for disaster medicine;
  - Common health needs assessment tools;
  - Minimum requirement for personnel of medical team; and
  - Database of medical teams.

Regarding the tools, as mentioned in Section 14.1.2(3), the existing tools such as SASOP, EAS Tool Kit and ERAT assessment tools (draft) do not sufficiently cover the health aspects, and therefore, the necessity to develop common tools with minimum standard or items were raised in the regional meetings (Chapter 13). Although such tools could be modified in accordance with the context and situation of each affected country or area and available resources in each AMS, it is quite important to establish a common understanding on the necessary terminology and minimum protocol of emergency medical response among AMS. To share the above common understanding, each personnel should fulfill the minimum requirement and obtain the minimum knowledge and skills. Therefore, the minimum requirement for the personnel will be developed along with the above tools. As for the database, it will include composition and capacity of foreign medical teams as well as key persons of each AMS to be utilized for rapid information sharing in requesting or receiving the teams.

When the collaboration is strengthened and necessary tools are developed, a certain form of collaboration mechanism could be developed within the region and it could be expanded to other neighboring countries.

Then, it could be strengthened through regular operation of the platform and collaboration in actual disaster response. In the mechanism, a core organization might be necessary to maintain the platform in peacetime and ensure coordination among stakeholders during disaster time. It could be continuously discussed among AMS taking into account relevant activities regarding disaster management and disaster health management.

14.2.2 Development of the National Capacity

To have and use the common tools, every country might need to fulfill a certain level of minimum standard both administratively and technically. Therefore, at the national level, the following activities could be taken accordingly to the level of capacity and needs; while some countries might need most of the actions, some might not need at all and could be resources to assist other countries.

- Institutional arrangement
  - To update the development strategy/plan along with the latest global priority.
  - To strengthen the coordination between central and local levels.
  - To strengthen the capacity of local health authorities.
  - To strengthen the collaboration with other relevant sectors.
- Resilient health system
  - To build/ improve health facilities to have the resilience.
  - To train health workers on disaster management and risk reduction.
- Capacity of disaster medicine
  - To develop the human resource development system for disaster medicine and EMS.
  - To develop the model/standard of a medical team suitable for the most concerned disaster in each country/ area.
  - To develop the quality control system of patient transportation services.
  - To strengthen MCI response in health facilities.

14.3 Resources for Cooperation in AMS and Relevant Experiences in Japan

14.3.1 Relevant Resources in AMS

Some countries could be cooperation resources that will provide technical assistance, which is more feasible in context and needs in each AMS. Table 14-1 presents examples of possible resources in AMS identified through the Survey.

Disaster-prone countries such as Indonesia and the Philippines have accumulated lessons learned from actual disaster response and continuously improved the system, guidelines and capacity. Also, they have been developing the capacity at the sub-national level (i.e., regions) to strengthen the coordination with the local government (i.e., prefectures). Regarding civilian-military cooperation, the Whole-of-Government approach in Singapore could provide some ideas and Indonesia has some good practices.

Generally, the countries with more than upper-middle-income economies could provide resources relevant to EMS system as they have experiences to establish and continuously improve it. Malaysia and Thailand could show how they have integrated and are operating the call and patient transportation system. Brunei and Singapore could provide good practices on MCI response plan and preparedness in major hospitals. Regarding emergency physicians, Malaysia, the Philippines, Thailand and Singapore have well established human resource development system, while a rapid education course for primary emergency physicians in Myanmar could be useful to produce emergency physicians working in the rural areas. As for EMTs/paramedics, Brunei, Malaysia, Singapore, and Thailand could provide the relevant curriculum in pre-service education, career development system, and in-service training programs.

Table 14-1 Examples of Cooperation Resources in AMS

Topics	Possible Resource Countries
Relevant policy, development strategy, plan, guidelines, SOPs	Indonesia, Philippines
Capacity at the sub-national level	Indonesia, Philippines
Civilian-military cooperation	Indonesia, Singapore
Deployment/receiving of medical teams to/from other countries	Indonesia, Philippines
Emergency calling system and ambulance services	Malaysia, Thailand
MCI response in hospitals	Brunei, Singapore
Human resource development	
- Emergency physicians	Malaysia, Myanmar, Philippines, Singapore, Thailand
- EMT/Paramedics	Brunei, Malaysia, Singapore, Thailand

Source: the Survey Team

14.3.2 Relevant Experiences in Japan

Through various experiences in international and domestic disaster reliefs, the relevant systems, guidelines, and standard operating procedures (SOPs) have been developed and/or modified based on discussions and suggestions made at the operational level. Such bottom-up approaches have been enabled because core experts with experiences in actual operations have been involved in preparedness and response phases at the management and administrative levels. They understand the reality of the ground and convey the issues effectively to the decision makers.

(1) International Deployment

Emergency disaster relief conducted by the Japanese government started back to the late 1970s when medical teams were dispatched to assist in the relief of Cambodian refugees flocked along the Thai-Cambodian border. In 1982, the Japan Medical Team for Disaster Relief (JMTDR) was established based on these experiences. It consists of registered volunteers of medical personnel to be dispatched to immediately respond to disasters in other countries. In 1992, Act Concerning Dispatch of Japan Disaster Relief Team (the JDR Law) was promulgated under which disaster relief activities by the Japanese government were systematized properly [Naruo Uehara, 1999]. Since then, 57 JDR medical teams [JICA, 2015] have been dispatched to more than 30 countries [A. Nakamura and H. Kameyama, 2013].

Through the experiences of international disaster relief for around 40 years, its operation has been continuously improved based on the accumulated lessons learned on international deployment. For example:

- Speedy and flexible responses are important for refugee aid/relief.
- As preparedness is vital for efficient responses, the following systems were developed and/or enhanced such as;
  - Registration of human resources,
  - Training for the team members and preparing stocks of necessary equipments,
  - Establishment of a department in JICA headquarter (the Secretariat of Japan Disaster Relief Team) to exclusively coordinate and support effective and flexible response,
  - Development of integrated logistic support system both inside and outside of the country to support the team activities, and
  - Development of communication mechanism among the cluster system, international organizations and local government agencies.
- To continuously improve the operation along with the international trends, cooperation and coordination among international academic experts/organizations on the emergency/disaster medicine have been promoted.

In addition, other discussions have been in process on upgrading the medical teams, enhancing public health aspects and contribution for smooth transition from emergency response to rehabilitation and reconstruction.

(2) **Domestic Disaster Relief**

On the other hand, Japan has been accumulating experiences in disaster relief in the country. Especially, the two catastrophic disasters, i.e., Hanshin-Awaji Earthquake in 1995 and the Great East Japan Earthquake in 2011 were remarkable.

1) Nationwide Medical Evacuation System and Disaster Medical Assistance Teams (DMATs)

The Hannshin-Awaji Earthquake has a magnitude of 6.8 on the Richter scale and 6,434 people lost their lives[50]. Through the response, the prompt medical evacuation was required in many cases to provide adequate medical treatment for severe trauma/crush syndrome patients out of the affected areas. However, it is estimated that there were around 500 preventable deaths caused by insufficient medical evacuation system. Based on such experience, the action plan of nationwide medical evacuation system was established to refer the patients beyond administrative borders in 1998. To operate the system, the Disaster Medical Assistance Teams (DMATs) were established [WHO] after a decade of discussion and preparation.

In 2005, the Central Disaster Prevention Council of Japan revised its Basic Disaster Management Plan to include full deployment of DMATs in disaster areas. In 2006, the Ministry of Health, Labour and Welfare (MHLW) sent the Japan DMAT operation guidelines to all prefectural health departments, along with basic guidelines on the management of prefecture-based DMATs. The MHLW directed prefectural health

[50] It is a final estimate as of December 22, 2005 [Kobe City, 2008].

departments to include the promotion of training of DMAT personnel in their local disaster management plans[51] [A. Fuse and H. Yokota, 2010].

According to the Japan DMAT operation guidelines, DMATs were defined as trained, mobile, and self-contained medical teams that can act in the acute phase of disasters (48 to 72 hours after their occurrence) such as major earthquakes, plane crashes, and railway accidents to provide medical treatment in affected areas, which consist of registered one or two doctors, two nurses and one logistician [Cabinet Office, 2012]. Such efforts of new settings on DMATs contributed to strengthening capacities of immediate responses to mass casualty incidents (MCI) in Japan.

2) Building a Resilient Health System

Since the ordinance of MLHW on strengthening of emergency medical services in acute phase of the disaster was issued in 1996, major hospitals have been encouraged to be designated as disaster base hospitals[52] to continue medical services after the disaster occurs. The hospitals have to be capable for 24-hour stand-by for emergency response in disaster, aeromedical evacuation of severe patients, and deployment of medical teams in collaboration with relevant emergency relief agencies [NDMC]. In response to lessons learned from the East Japan Earthquake, the following aspects were considered in reviewing the criteria of the disaster base hospital to continue providing medical services despite of critical damage of infrastructure [MHLW, 2012].

- Applying earthquake-resilient construction to disaster base hospitals;
- Ensuring communication system in disaster situation such as satellite phone;
- Ensuring vital infrastructure such as water and electricity;
- Ensuring stockpile of medicine, medical supply and equipment, and food; and
- Installing a helipad in the hospital compound.

In addition, the Emergency Medical Information System (EMIS) has been operating since 2006 after a decade of development period. During the disaster, DMAT and other relevant stakeholders utilize the EMIS to gather and share information on damages, needs and resources in the hospitals [MHLW, 2007].

3) Development and Improvement of Coordination System

The Great East Japan Earthquake has a magnitude of 9.0 on the Richter scale and consequently, 15,891 deaths were confirmed [National Police Agency of Japan, 2015]. The team concepts of DMATs, which was suitable for trauma and crush syndrome, showed vulnerability in responses. The existing DMATs could not sufficiently deal with public health, as well as the psychological aspects of affected people because the team had minimum experience in immediate response. Also, mutual coordination system among DMATs and other medical teams was not sufficient. Based on lessons learned in the Great East Japan Earthquake, medical incident command system has been reviewed and discussed nationwide to coordinate various stakeholders in the health field, i.e., not only DMATs but also the other volunteer groups, under the same

[51] As of 2012, 1002 teams have been developed [MHLW, 2012].
[52] As of 2012, 610 hospitals are designated.

response plan. Also, team management system has been reviewed based on the experiences of Area-based/Line-linking Support System[53] in Ishinomaki City, Miyagi Prefecture [Satoshi Yamanouchi et al., 2014].

4) Utilization of the Lessons Learned for Human Resource Development

Currently, the Japan DMAT secretariat is one of the main players in disaster medicine that draws from the lessons learned from actual responses and tries to incorporate and/or reflect those experiences to the human resource development of both pre-service education and in-service training.

14.4 Recommendations for Future Cooperation Programs

In this section, the cooperation programs that would help achieve the future vision described in Section 14.2 are proposed both at the regional and national levels with consideration of resources mentioned in Section 14.3. The regional coordination capacity could be strengthened through the cooperation program involving all AMS. Therefore, the program could be expected to provide opportunity to promote awareness on issues and development target in each AMS. At the same time, national capacity should be developed mainly through the national level program and the effort of each AMS to fulfill the minimum requirements to be involved in the regional collaboration mechanism.

14.4.1 Regional Level

Table 14-2 presents the draft outline of the proposed technical cooperation project for the Step 1 for the future vision which was proposed based on the survey results and a series of discussions among stakeholders. Along with the discussions in the third regional meeting (refer to Section 13.3.2(3)), the project will aim to further development of disaster health management in the region with focusing on coordination on disaster medicine at the regional level.

The project will be coordinated among all stakeholders through coordination meetings and it could be the basis for the regional coordination platform (Output 1). The regional collaboration drills will focus on coordination aspects among the medical teams and with other relevant stakeholders. Through the drills, all stakeholders will share challenges and issues for further development of the regional collaboration mechanism and also, each country could be made aware of their own challenges at the national level (Output 2).

[53] The Ishinomaki Medical Zone was segmented into 14 areas based on administrative boundaries, and number of shelters and evacuee patients. Each area has three or four lines, i.e., medical teams consisted of five to eight doctors, nurses, pharmacists, and coordinators which could stay more than one month. In each area, one of the lines was designated as a ‘‘management line’’, a leader. The management lines were to exchange information on the latest situation and issues within and beyond the area. Short-term relief teams, “spots”, were allocated to the more congested areas, the hospitals with necessary assistance provided by the disaster-base hospital, i.e., the Ishinomaki Red Cross Hospital.

Table 14-2 Dart Outline of the Proposed Technical Cooperation Project

Overall Goal	ASEAN and Japan collaboration mechanism on disaster health management* is established.
Project Purpose	Regional coordination on disaster health management* is strengthened in the ASEAN region.
Project Period	3 years

Outputs	Activities
1. Coordination platform on disaster health management* is set up.	1-1 Regional coordination meetings and workshops are organized every year to share the progress and discuss the direction of the Project.
2. Framework of regional collaboration practices is developed.	2-1 Develop and prepare the programme of regional collaboration drill with the project working group.
	2-2 Conduct a regional collaboration drill every year in AMS.
	2-3 Compile recommendations on regional collaboration on disaster health management* based on the discussion and knowledge sharing through project activities.
	2-4 On-site practice is conducted when disaster occurs in ASEAN (if possible)
3. Tools for effective regional collaboration on disaster health management* are developed.	3-1 Formulate project working groups for regional collaboration tools.
	3-2 Develop a draft regional SOP and minimum requirements for disaster medical assistance teams with project working group.
	3-3 Prepare databases of medical assistance teams of AMS.
	3-4 Draft a framework of health needs assessment in emergencies with project working group.
4. Progress and outcomes of the Project are widely shared and disseminated.	4-1 Outcomes of the Project activities are shared in academic societies.
	4-2 Progress and outcomes of the Project are shared in the meetings of ASEAN SOMHD and related opportunities.
5. Capacity on disaster health management* strengthened in each AMS.	5-1 Prepare training plan, curriculum and materials on disaster health management* and emergency medical services (EMS) based on the needs survey.
	5-2 Conduct trainings on disaster health management*/EMS for AMS.
	5-3 Conduct monitoring survey and evaluation on capacity development in disaster health management* in each AMS.
	5-4 Conduct visit program in Japan for AMS.

Note: It is understood that disaster health management includes disaster medicine (refer to Section 13.3.2(1)).

Based on lessons learned and recommendations drawn from the above activities, necessary common tools could be developed. Those could include a regional SOP consisting of minimum standards on operation of medical assistance teams, minimum requirements of health personnel for the medical response team, and rapid health needs assessment tools. Also, the database of medical teams could be developed if the medical teams participating in the drills provide necessary information and the project team compiles it (Output 3). Those tools could be handed over to a regional coordination body on disaster health management in the future.

From the above activities, training needs could be identified to cope with the challenges and fill in the gaps with a minimum standard. The prioritized training topics could be covered in the project. The training should be implemented through Plan-Do-Check-Action (PDCA) cycle for continuous improvement (Output 5). The fruits of the project could be shared with other relevant stakeholders and can be brought to the academic society to promote further international discussions on the area of disaster health management (Output 4).

14.4.2 National Level

Table 14-1 presents examples of possible cooperation topics at the national level identified through the Survey. Cambodia, Lao PDR, Myanmar and Viet Nam seemed to have more needs to develop the capacity

of EMS as a basis of disaster medicine. Also, the quality assurance of emergency call and patient transportation services could be effective. However, some countries should integrate or coordinate various service providers before developing the national standard and supervision system.

Since country context, needs, and progress of the relevant development activities vary among the countries, cooperation programs should be tailor-made, although some common and minimum component could be applied. In addition, each country should seek assistance based on appropriate situation analysis, needs assessment and prioritization, as well as setting of clear development target by their own effort. Through such processes, the ownership and commitment of the recipient agencies could be established.

Table 14-3 Examples of Possible Cooperation Topics

Topics	Possible Target Countries	Target Agencies
Development of post-graduate education curriculum/ in-service training program on disaster medicine and disaster nursing	Cambodia, Indonesia, Lao PDR, Myanmar, Viet Nam	MOH, education institutions
Development of national disaster medical assistance team (DMAT) and relevant response system	Cambodia, Lao PDR, Malaysia, Myanmar, Viet Nam	MOH
Development of EMS guidelines	Cambodia, Lao PDR, Myanmar, Viet Nam	MOH
Strengthening of supervising capacity of patient transportation services	Cambodia, Indonesia, Lao PDR, Myanmar, Philippines, Viet Nam	MOH
Capacity development for MCI preparedness and response	Cambodia, Lao PDR, Myanmar, Viet Nam	MOH, major hospitals
Development of career ladder of emergency physicians/nurses	Cambodia, Lao PDR, Myanmar, Viet Nam	Educational institutions, major hospitals, professional associations
Development of EMT curriculum in nursing education institutions	Cambodia, Lao PDR, Myanmar, Viet Nam	MOH, educational institutions

Source: The Survey Team

References

1000 Bedded General Hospital-Nay Pyi Taw. 2014. The Profile of Emergency Department. 2014.

A. Fuse and H. Yokota. 2010. An Analysis of Japan Disaster Medical Assistance Team (J-DMAT) Deployments in Comparison with Those of J-DMAT's Counterpart in the United States (US-DMAT). : J Nippon Med Sch 2010; 77 (6), 2010.

A. Nakamura and H. Kameyama. 2013. The Formulation of Platform for the International Emergency Relief Japan - Team Building of Diverse Human Resources for Emergent Mission. : Journal of the International Association of P2M, Vol.8 No.1, pp.99-113, 2013.

Accenture. 2012. Singapore's Journey to Build a National Electronic Health Record System. 2012.

ADB. 2014. ADB, Japan Assist Grassroots Push to Reduce Disaster Impacts in Cambodia. Asian Development Bank (ADB). (online) Oct.2014. http://www.adb.org/news/adb-japan-assist-grassroots-push-reduce-disaster-impacts-cambodia.

ADPC. 2011. Country Report Malaysia. : ADPC, 2011.

−. Hospital Preparedness for Emergencies (HOPE). PEER. (online) http://www.rccdm.net/blog/?page_id=143.

−. 2011. PHEMAP-11. ADPC. (online) 2011 . http://www.adpc.net/v2007/Programs/PHE/PROGRAMS/PHEMAP/COURSES/Inter-Regional/PHEMAP11/ .

−. 2014. Program on public health and emergency management launched in Myanmar. ADPC. (online) Dec. 2014, http://www.adpc.net/igo/contents/Media/media-news.asp?pid=773#sthash.GwqiNyS8.dpbs.

−. 2004. Safer Cities 9: Reducing Fire Threats to Homes. : ADPC, 2004.

ADRC. Asian Disaster Reduction Center (ADRC). (online) http://www.adrc.asia/.

−. 2005. Information on Disaster Risk Reduction of the Member Countries ADRC. (online) 2005 . (quoted: Apr. 2015) http://www.adrc.asia/countryreport/SGP/2005/english.pdf.

AHA Centre. 2015. AHA Centre’s Experience in Nepal Earthquake (PPT presentation). 2015.

−. ASEAN-ERAT Guidelines. (online) http://www.ahacentre.org//contents/default-file_erat-Kfsz2zpKX8pNEJo0.pdf.

−. 2013. Strategy and Priorities for AADMER Work Programme Phase 2 (2013-2015) . : AHA Centre, 2013.

Al Jazeera. 2013. Rescue operation after Myanmar boats sink. Al Jazeera. (online). May 2013. http://www.aljazeera.com/news/asia-pacific/2013/05/201351445742416350.html.

Allen Yu-Hung Lai and Seck L. Tan. 2012. Chapter 13: Impact of Disasters and Disasters Risk Management in Singapore: A Case Study of Singapore's Experience in Fighting the SARS Epidemic. Economic Research Institute for ASEAN and East Asia. (online) Dec. 2012 http://www.eria.org/Chapter_13.pdf.

Ambulance Services of New South Wales. 2013. Australians deliver emergency management training in Myanmar, Sirens. Ambulance Services of New South Wales. (online) Apr. 2013, http://www.ambulance.nsw.gov.au/Media/docs/MYANMAR-43383668-4bf4-418d-ba25-f622663fd694-0.pdf .

Arpaporn Winijkulchai. Thailand's 2011 Flood Crisis Reveals Potential of Technology and Social Media in

Disaster Response. Weekly insight and analysis in Asia. (online) http://asiafoundation.org/in-asia/2012/06/27/thailands-2011-flood-crisis-reveals-potential-of-technology-and-social-media-in-disaster-response/.

ASEAN. 2014. ASEAN Post-2015 Health Development Agenda. Hanoi, Viet Nam : The 12th ASEAN Health Ministers Meeting, 2014 .

–. Organizational Structure. ASEAN. (online) http://www.asean.org/asean/asean-secretariat/organisational-structure.

–. 2010. Standard Operating Procedure for Regional Standby Arrangements and Coordination of Joint Disaster Relief and Emergency Response Operations (SASOP). ASEAN Secretariat. (online) Jan. 2010 http://www.ahacentre.org/contents/default-file_sasop-Y4Pe3g3gC1DDjz3m.pdf.

–. Thailand's Disaster Relief Resources and Capacities. (online) http://www.asean.org/archive/arf/14ARF/6th.

ASN. Aviation Safety Database. Aviation Safety Network (ASN). (online) Flight Safety Foundation. http://aviation-safety.net/database/.

ATS. Trauma Center Levels Explained. American Trauma Society (ATS). (online) http://www.amtrauma.org/?page=TraumaLevels.

Australian Government. Health assistance in Burma. Department of Foreign Affairs and Trade. (online) http://dfat.gov.au/geo/burma/development-assistance/Pages/health-assistance-burma.aspx.

BBC. 2007. Airline 'disregarded safety' prior to Phuket crash. BBC Online Network. (online) 2007 . http://www.bbc.com/news/uk-wales-12839516.

–. News Asia-Pacific. BBC. (online) http://www.bbc.com/news/world/asia_pacific.

–. 2000. Seventeen killed in Vietnam bus crash . BBC News. (online) Feb. 2000 http://news.bbc.co.uk/2/hi/asia-pacific/643227.stm.

–. Two jailed over deadly Bangkok night club fire. BBC New Asia-Pacific. (online) http://www.bbc.co.uk/news/world-asia-pacific-14988134.

BNPB. 2012. PETUNJUK PELAKSANAAN PENGEMBANGAN KAPASITAS SRC PB. : BADAN NASIONAL PENANGGULANGAN BENCANA (BNPB), 2012.

BPS. Sensus Penduduk 2010. Badan Pusat Statistiks. (online) http://sp2010.bps.go.id/.

Brunei Delegate. 2014. Country Presentation in ASEAN Disaster Medicine Workshop. 2014.

Cabinet Office. 2012. Revision of Japan DMAT Operation Guidelines (in Japanese). : Cabinet Office, 2012.

–.*Medical evacuation system responding to lessons learned from Hanshin-Awaji Earthquake* (in Japanese). Disaster Management. (online) http://www.bousai.go.jp/oukyu/pdf/kouiki_hanshin.pdf.

CEDMHA. 2014. Burma (Myanmar) Disaster Management Reference Handbook. : Center for Excellence in Disaster Management & Humanitarian Assistance, 2014.

–. 2014. Cambodia Disaster Management Reference Handbook. : Center for Excellence in Disaster Management & Humanitarian Assistance, 2014.

–. 2014. Lao PDR Disaster Management Reference Handbook. : Center for Excellence in Disaster Management & Humanitarian Assistance, 2014.

Chantha Tat. 2015. Roles and Responsibilities of Royal Cambodian Gendarmerie in HA/DR. : Gendarmerie

Cambodia, 2015 .

Chayanin Angthong et al. 2012. Disaster Medicine in Thailand: A Current Update. Are We Prepared? : Journal of Medical Association of Thailand, 95 (Suppl. 1) : S42-S50, 2012.

CHE. 2009. CHED MEMORANDUM ORDER (CMO) 14, 2009: Policies and Standards for Bachelor of Science in Nursing (BSN) Program. : Commission on Higher Education, Office of the President, Republic of the Philippines, 2009.

CRED. The International Disaster Database. EM-DAT. (online) Centre for Research on the Epidemiology of Disasters (CRED). http://www.emdat.be/.

DDPM. 2010. National Disaster Prevention and Mitigation Plan (2010-2014). Bangkok : Department of Disaster Prevention and Mitigation (DDPM), 2010.

DOH Philippines. 2004. Administrative Order No. 155, 2004, Implementing Guidelines for Managing Mass Causality Incidents during Emergencies and Disasters. : Office of the Secretary, Department of Health, 2004.

–. 2010. Beyond Data: Best Safe Hospital Practices. : Department of Health, Republic of the Philippines, 2010.

–. 2012. Department Order No. 2012-0181, Guidelines on the Department of Health Nurse Certification Program. Manila : Office of the Secretary, Department of Health, 2012.

–. Nurse Certification Program. (online) http://hhrdb.doh.gov.ph/ncp/index.php#general.

–. 2005. Responding to Health Emergencies and Disasters: The Philippines Experience. Manila : Department of Health, Republic of the Philippines, 2005.

E Pitt and A Pusponegoro. 2005. Prehospital care in Indonesia. : Emerg Med J 2005;22:144‑147. doi: 10.1136/emj.2003.007757, 2005.

Emergency Management Australia. 2014. Draft Version 2, East Asia Summit (EAS) Rapid Disaster Response Toolkit. : EAS, 2014.

F. Lateef and V. Anantharaman. 2000. Emergency medical services in Singapore. 2000. cjem-online.ca/files/pg272.pdf, http://www.cjem-online.ca/sites/cjem-online.ca/files/pg272.pdf.

Faculty of Public Health, Thammasat University. 2012. Assessment of Capacities using SEA Region, Benchmarks for Emergency Preparedness and Response, Thailand. : Regional Office for South-East Asia, WHO (SEARO) and Korean Federation of International Health Care (KOFIH), 2012.

Foreign Medical Team Working Group. 2013. Classification and Minimum Standard for Foreign Medical Team. : WHO, the Global Health Cluster, 2013.

Georgina Ann PHILLIPS, Zaw Wai SOE, et.al. 2014. Capacity building for emergency care: Training the first emergency specialists in Myanmar. : Emergency Medicine Australia, 2014.

GFDRR. 2014. Strengthening Insitutional Capacities for Resilient Recovery, Country Case Study. Lao PDR. : The World Bank Global Facility for Disaster Reduction and Recovery (GFDRR), 2014.

Government of Brunei Darussalam. 2006. Disaster Management Order 2006 (S26). 2006.

Government of Cambodia. 2008. Strategic National Action Plan for Disaster Risk Reduction (SNAP-DRR: 2008-2013). 2008.

Government of Indonesia. 2013. National Assessment Report on Disaster risk reduction 2013. : Government of the Republic of Indonesia, 2013.

Government of Philippines. 2011. National Disaster Risk Reduction and Management Plan 2011-2028. 2011.

HEMS-DOH. Health Emergency Management Bureau. Department of Health. (online) http://hems.doh.gov.ph.

IFRC/ADB. 2009. Legal Preparedness for Responding to Disasters and Communicable Disease Emergencies in Lao PDR. : IFRC/ADB, 2009.

INTC. 2009. 47/2009. Internship Navigation Training Centre (INTC). (online) Nov. 2009 http://www.isntc.org/?q=node/393.

Jakarta Post. 2012. Free ambulance service to expand coverage . Jakarta Post. (online) Aug. 2012 http://www.thejakartapost.com/news/2012/08/21/free-ambulance-service-expand-coverage.html.

JICA. 2012. Data Collection Survey on ASEAN Regional Collaboration in Disaster Management. Tokyo : JICA, 2012.

―. 2012. Data Collection Survey on Health Sector, Country Report of Myanmar. Tokyo : JICA, 2012.

―. 2012. Data Collection Survey on Health Sector, Country Report: Kingdom of Cambodia. Tokyo : JICA, 2012.

―. 2014. Data Collection Survey on Health System in Myanmar. Tokyo : JICA, 2014.

―. 2015. Deployment of JDR. JICA. (online) 2015 7 月. http://www.jica.go.jp/jdr/activities/index.html.

John Vink. Distro - Cambodia: Slum fires.2001. Magnum Photos. (online) https://www.magnumphotos.com/C.aspx?VP3=SearchResult&ALID=2TYRYD1X9IB9.

Khmer Casanova. 2006. Odar Mean Chey People. KhmerConnection. (online) May 2006. http://khmerconnection.com/topic/odar-mean-chey-people-38413/.

Kim Brolin et al. 2015. Foreign Medical Teams in the Philippines after Typhoon Haiyan 2013 – Who Were They, When Did They Arrive and What Did They Do? : PLOS Currents Disasters, 2015.

Kobe City. 2008. Final report on damages of Hanshin-Awaji Earthquake (in Japanese). (online) Jan. 2008 (quoted: 2015 Jul.) http://web.pref.hyogo.jp/pa20/pa20_000000015.html.

LA Times. 2001. 350 Drown as Ship Sinks Off Indonesia. LA Times. (online) 2001 . http://articles.latimes.com/2001/oct/23/news/mn-60504.

―. Ship Accidents Indonesia. LA Times. (online) http://articles.latimes.com/keyword/ship-accidents-indonesia.

Lim SH and Anantharaman V. 1999. Emergency Medicine in Singapore: Past, Present, and Future. : ANNALS OF EMERGENCY MEDICINE, Vol. 33, No. 3, 1999.

M. Beppu and N. Nara. 2009. Medical education program in Malaysia. : Igakukyouiku Vol.40, No.5, 2009.

M. M. Sheikha, S. H. Angb, & Lin Nainga. Medical Emergency Responses in the Brunei-Muara District.

Maria Elena B. Herrera, et al. 2010. Overview of Health Sector Reform in the Philippines and Possible Opportunities for Public-Private Partnerships. 2010.

Maung Maung Htwe. 2012. Emergency Medicine Development in Myanmar: An Update, IEMSIG, Newsletter of the International Emergency Medicine Special Interest Group of ACEM. : the International Emergency Medicine Special Interest Group of ACEM Vo.8, No.2, pp16-17, 2012.

MHLW. 2012. *On emergency medicine etc. at the time of large scale disaster (in Japanese)*. (online) 2012 . http://www.bousai.go.jp/jishin/syuto/taisaku_wg/7/pdf/5.pdf.

Minh Pham. 2013. Resident/Humanitarian Coordinator Report on the Use of the CERF Funds Lao People's Democratic Republic Rapid Response Dengue. : UN Central Emergency Response Fund, 2013.

MLHW. 2007. Emergency Medical Information System (EMIS). Ministry of Labour, Health and Welfare. (online) 2007 Apr. https://www.wds.emis.go.jp/topcontents/guidelines.pdf.

MOH Brunei. 2008. Public Health Emergency Operation Plan. : Department of Health Services, MOH Brunei Darussalam, 2008.

MOH Indonesia. 2013. Peraturan Menteri Kesehatan Republic Indonesia Nomor 64 Tahun 2013 tentatng Penangulangan Krisis Kesehatan. 2013.

–. 2012. Profil Kesehatan Indonesia. : Deratement Kesehatan Republik Indonesia, 2012.

–. Struktur Organisasi Kementerian Kesehatan Republik Indonesia. Kementerian Kesehatan Republik Indonesia. (online) http://www.depkes.go.id/article/view/13010100002/kemkes-struktur-organisasi-2014.html.

MOH Malaysia. 2013. Annual Report 2012. : MOH Malaysia, 2013.

–. 2012. Emergency Medicine and Trauma Services Policy. Kuala Lumpur : MOH Malaysia, 2012.

–. 2014. Emergency Medicine in Malaysia. (ppt) 2014 .

–. 2005. Malaysia's Health 2005. Kuala Lumpur : MOH Malaysia, 2005.

MOPH, Thailand. Agencies in the moph. Ministry of Public Health (MOPH). (online) http://eng.moph.go.th/index.php/about-us/agencies-in-the-moph.

MOSWR & MOH, Myanmar. Guidance on Mainstreaming Disaster Risk Reduction in the Health Sector, Myanmar – Rural Settings. : Ministry of Social Welfare and Resettlement and Ministry of Health.

MUSE AHP. Notre travail au Laos. MUSE AHP. (online) https://museahp.wordpress.com/missions-laos/.

Nadya Natahadibrata . 2013. Health Ministry launches emergency hotline. Jakarta Post. (online) Jun. 2013 http://www.thejakartapost.com/news/2013/06/04/health-ministry-launches-emergency-hotline.html.

Naridsa Phachart. 2014. High flying and high pressured 'Sky Doctors', new lifesavers of the North. The Nation. (online) Nov. 2014 http://www.nationmultimedia.com/national/High-flying-and-high-pressured-Sky-Doctors-new-lif-30247327.html.

Naruo Uehara. 1999. An Overview of Current Approaches to Quality in Health Services. Prehospital and Disaster Medicine / Volume 14 / Supplement S1. (online) Mar. 1999 http://journals.cambridge.org/action/displayAbstract?fromPage=online&aid=8418100.

National Police Agency of Japan. 2015. Disaster Situation and Police Countermeasures associated with 2011 Tohoku direst - off the Pacific Ocean Earthquake. (online) Jul. 2015 (quoted: 2015 Jul.) http://www.npa.go.jp/archive/keibi/biki/higaijokyo_e.pdf.

NDMC. Disaster Base Hospital. National Disaster Medical Center (NDMC). (online) http://www.nho-dmc.jp/disaster/saigaikyoten.html.

NDPMC. 2011. National Disaster Prevention and Mitigation Plan B.E. 2553 - 2557. Department of Disaster Prevention and Mitigationof InteriorMinistry. Bangkok : National Disaster Prevention and Mitigation Committee (NDPMC), 2011.

New York Times. 2014. Asia Pacific. the New York Times. (online) May 2014. http://www.nytimes.com/2014/05/18/world/asia/crash-in-laos-kills-top-government-officials.html?_r=0.

NIEM. 2014. Annual Report 2013 (Thai Language). : National Institute for Emergency Medicine (NIEM),

2014.

–. 2008. Emergency Medical Act BE2551 (2008), English Translation. Bangkok : NIEM, 2008.

–. History. National Institute for Emergency Medicine (NIEM). (online) http://www.niems.go.th/en/View/Page.aspx?PageId=25551114035939822.

–. Organization Chart. National Institute for Emergency Medicine (NIEM). (online) http://www.niems.go.th/en/View/Page.aspx?PageId=25551114055217793.

–. 2014. Past - Present - Future Thailand Emergency medical system. (ppt) 2014 .

–. 2013. Second Master Plan of Emergency Medicine 2013-2016 (Thai Language). : National Institute for Emergency Medicine (NIEM), 2013.

–. Standards and Regulations for Medical Team in Thailand. (pdf)

–. Thailand country report in EM and DM. (PDF)

Nigel Klein. 2014. Myanmar – Pre hospital care in Myanmar, IEMSIG, Newsletter of the International Emergency Medicine Special Interest Group of ACEM. : the International Emergency Medicine Special Interest Group of ACEM, Vol 10, 2014.

Nofi Ardan. Struktur Organisasi. PPKK. (online) http://www.penanggulangankrisis.depkes.go.id/menu/ik/struktur-organisasi.

Noor Hisham Abdullah. 2014. What is Crisis Preparedness and Response Centre (CPRC)? Director General of Health Malaysia. (online) Aug. 2014. http://kpkesihatan.com/.

NUS. 2015. National University of Singapore. NUS medicine . (online) Mar. 2015 (quoted: Apr. 2015) http://medicine.nus.edu.sg/corporate/index.html.

OCHA. Disasters. ReliefWeb. (online) http://reliefweb.int/disasters.

–. Myanmar: Storm - May 2004. ReliefWeb. (online) http://reliefweb.int/disaster/ss-2004-000029-mmr.

–. Nepal Earthquake 2015. OCHA. (online) http://www.unocha.org/nepal.

–. Thailand Typhoon Gay Nov 1989 UNDRO Information Report 1-4. ReliefWeb. (online) http://reliefweb.int/report/thailand/thailand-typhoon-gay-nov-1989-undro-information-report-1-4.

–. What is the Cluster Approach? Humanitarian Response. (online) http://www.humanitarianresponse.info/coordination/clusters/what-cluster-approach.

OCHA-ROAP. 2013. Disaster Response in Asia and the Pacific, A Guide to International Tools and Services. : OCHA-Regional Office for Asia and the Pacific, 2013.

Pa Pa. 2013. EM development at Yangon General Hospital – Preparing for the South East Asian Games, IEMSIG, Newsletter. : The International Emergency Medicine Special Interest Group of ACEM Vol 9, No 2, 2013.

Peralta PG, Sinon JB. 1995. Emergency Medicine in the Philippines, Annals of Emergency Medicine, Volume 26, Issue 6, Pages 743–745,. : Annals of Emergency Medicine, 1995.

PPKK. 2014. Sewidndu – Pemaunatuan dan informasi PPKK 2005-2013 (Monitoring and Information of the Center for Health Crisis 2005-2013). : PPKK/ WHO, 2014.

–. 2011. Technical Guidelines for Health Crisis Responses on Disaster. Revised edition. : PPKK, 2011.

–. The History of Crisis Center. Pusat Penanggulangan Krisis Kesehantan (PPKK). (online)

http://www.penanggulangankrisis.depkes.go.id/the-history-of-crisis-center.

RemSG. 2011. Headlines that shook Singapore (since 1955). Remember Singapore. (online) Jan. 2011 http://remembersingapore.org/2011/01/24/headlines-that-shook-singapore/.

REUTERS. 2014. Bodies, debris from missing AirAsia plane pulled from sea off Indonesia. REUTERS. (online) 2014 . http://www.reuters.com/article/2014/12/30/us-indonesia-airplane-idUSKBN0K601C20141230.

Roseanne Skalicky. 2014. Myanmar – Myanmar Emergency Medicine – Moving Forward, IEMSIG, Newsletter of the International Emergency Medicine Special Interest Group of ACEM. : the International Emergency Medicine Special Interest Group of ACEM Vol 10 No 1, 2014.

RRD-MOSW Myanmar. 2009. Institutional Arrangements for Disaster Management in Myanmar. : The Relief and Resettlement Department of the Ministry of Social Welfare, 2009.

Satoshi Yamanouchi et al. 2014. Streamlining of Medical Relief to Areas Affected by the Great East Japan Earthquake with the "Area-based/Line-linking Support System". : Prehospital and Disaster Medicine, 2014.

SCDF. Emergency Ambulance Services Statistics (January–December 2013). Statistics. (online) http://www.scdf.gov.sg/content/scdf_internet/en/general/news/statistics/_jcr_content/par/download_25/file.res/SCDF%20Amb%20Stats%202013.pdf.

–. 2012. Emergency Response in Singapore. : Singapore Civil Defence Force, 2012 .

–. 2015. Local Major Incidents. Singapore Civil Defence Force. (online) Singapore Government, 2015 Jan. http://www.scdf.gov.sg/general/information/local-major-incidents.

–. 2014. SCDF Outline. SCDF, Paramedic. (online) Oct. 2014. (quoted: Apr. 2015) http://www.scdf.gov.sg/content/scdf_internet/en/scdf_247/paramedic/training_and_initial_Development.html .

Singapore Government. Collapse of Hotel New Grand. HistorySG. (online) Singapore Government. http://eresources.nlb.gov.sg/history/events/c283d7e4-5a3b-418f-812f-720b1ecc53e6.

Singapore Medical Council. 2014. Singapore Medical Council. Singapore Medical Council. (online) Jun .2014 (quoted: Apr. 2015) http://www.healthprofessionals.gov.sg/content/hprof/smc/en/leftnav/information_for_registereddoctors/continuing_medical_education.html.

SLCM. Curriculum. St. Luke's College of Medicine-WHQM. (online) http://stlukesmedcollege.edu.ph/academics/curriculum.

Somchai Kanchanasut and Pairoj Khruekarnchana. 2014. Introduction to The Thai Association for Emergency Medicine (TAEM). (PDF) 2014 .

Steering Committee on Formulation of 11th National Health Development Plan, 2012-2016. The 11th National Health Development Plan under the National Economic and Social Development Plan BE 2555-2559 (2012-2016).

Suriyawongpaisal Paibul et al. 2012. Scaling up Emergency Medical Services under the Universal Health Insurance in Thailand. : Indian Journal of Public Health Research & Development, 2012.: Vol.3, No. 4, 210-216.

thanhniennews . 2004. Ca Mau ship accident: Total passenger number confirmed at 147. Vietnam Breaking News. (online) 2004 May. http://www.vietnambreakingnews.com/2004/05/ca-mau-ship-accident-total-passenger-number-confirmed-at-147/.

The Commonwealth of Australia and the Republic of Indonesia. 2015. East Asia Summit Rapid Disaster Response Toolkit. Attorney-General's Department of the Australian Government. (online) Jun. 2015 http://www.ag.gov.au/eastoolkit.

The Government of Viet Nam. 2014. Detailing and Guiding a Number of Articles of the Natural Disaster Prevention and Control (Decree No. 66/2014/ND-CP). Hanoi : The Government of Viet Nam, 2014.

The Guardian. 2005. At least 147 dead in Indonesian plane crash. The Guardian. (online) 2005 . http://www.theguardian.com/world/2005/sep/05/indonesia.

−. World News. The Guardian. (online) http://www.theguardian.com/world.

The World Bank. Country and Lending Groups . The World Bank. (online) http://data.worldbank.org/about/country-and-lending-groups.

−. The World Bank Supports Thailand's Post-Floods Recovery Effort. The World Bank. (online) http://www.worldbank.org/en/news/feature/2011/12/13/world-bank-supports-thailands-post-floods-recovery-effort.

UN. 2015. Health and Disaster Risk, A contribution by the United Nations to the consultation leading to the Third World Conference on Disaster Risk Reduction (WCDRR). : the United Nations, 2015.

UNEP/ UNISDR. 2013. Map. Global Risk Data Platform. (online) United Nations Environmental Programme (UNEP) and United Nations' Office for Disaster Risk Reduction , 2013 . http://preview.grid.unep.ch/index.php?preview=map&lang=eng.

UNISDR. 2005. Hyogo Framework for Action 2005-2015: Building the Resilience of Nations and Communities to Disasters. : United Nations International Strategy for Disaster Reduction (UNISDR), 2005.

−. 2015. Sendai Framework for Disaster Risk Reduction 2015-2030. WCDRR Sendai, Japan. (online) Mar. 2015 (quoted: Mar. 2015) http://www.wcdrr.org/uploads/Sendai_Framework_for_Disaster_Risk_Reduction_2015-2030.pdf.

UPCM. Training. The University of Philippines, College of Medicine. (online) http://dems.upcm.ph/?q=training.

USAID. 2010. Report of the 15th Meeting of the ASEAN Committee on Disaster Management. : USAID, 2010.

Vu Kim Chung. 2002. Vietnam's Worst-Ever Fire Disaster Started by Bad Welding. OoCities.org. (online) Jan. 2002. http://www.oocities.org/hoan_kiem/12-2002/VN-bluefire.html.

WHO and MOH Viet Nam. 2012. Health Service Delivery Profile. 2012.

WHO. 2012. Assessment of Capacities using SEA Region Benchmarks for Emergency Preparedness and Response. : WHO, 2012.

−. 2015. Comprehensive Safe Hospital Framework. : WHO, 2015.

−. 2011. Country Cooperation Strategy for the Lao People's Democratic Republic 2012-2015. : WHO, 2011.

−. Foreign Medical Team Working Group. World Health Organization (WHO). (online)

http://www.who.int/hac/global_health_cluster/fmt/en/.

−. 2015. Global health emergency workforce, Report by the Director-General. : WHO, 2015.

−. 2014. Lao People's Democratic Republic Health System Review, Health System in Transition. : Asia Pacific Observatory on Health System and Policies Vol. 4, No.1, 2014.

−. 2012. Philippines Health Service Delivery Profile. World Health Organization : 2012.

WHO Philippines. Maps and Graphs. WHO Philippines. (online) http://www.wpro.who.int/philippines/typhoon_haiyan/maps/en/.

WHO. Safe Hospitals and Health Facilities. The World Health Organization (WHO). (online) http://www.who.int/hac/techguidance/safehospitals/en/.

−. The Global Health Cluster Partners Capacity Survey Report 2012. : World Health Organization (WHO).

−. 2011. The Philippines health system review, Health Systems in Transition, Vol. 1, No. 2. : WHO, 2011.

−. 2014. The Republic of the Union of Myanmar Health System Review,. : Health Systems in Transition, Vol 4, No 3, 2014.

−. 2011. WHO Country Cooperation Strategy for the Philippines 2011-2016. : World Health Organization, 2011.

WHO/SEARO. 2013. Tsunami 2004: a comprehensive analysis. 2 vol. set. : WHO, 2013.

WMN. 2012. Singapore: Jurong Shipyard Accident Update. World Maritime News. (online) World Maritime News, Dec. 2012, http://worldmaritimenews.com/archives/70521/singapore-jurong-shipyard-accident-update/.

WPRO. 2014. the Western Pacific Region Framework for Action for Disaster Risk Management for Health. : WHO, 2014.