SPECIAL REPORT

Establishing Disaster Medical Assistance Teams in Japan

Hisayoshi Kondo, MD, PhD;[1] Yuichi Koido;[1] Kazuma Morino;[2] Masato Homma;[1] Yasuhiro Otomo;[3] Yasuhiro Yamamoto;[4] Hiroshi Henmi[1]

1. National Hospital Organization Disaster Medical Center, Tokyo, Japan
2. Yamagata Prefectural Medical Center for Emergency, Yamagata, Japan
3. Tokyo Medical and Dental University, Tokyo, Japan
4. Tokyo Rinkai Hospital, Tokyo, Japan

Correspondence:
Hisayoshi Kondo, MD, PhD
National Hospital Organization Disaster Medical Center
3256 Midori, Tachikawa
Tokyo, Japan
E-mail: kondo@kch.biglobe.ne.jp

Keywords: acute phase; critical care medicine; disaster; disaster base hospital; Disaster Medical Assistance Team; disaster medical system; information system; transportation

Abbreviations:
DMAT = Disaster Medical Assistance Teams
HLSRG = Health and Labour Sciences Research Grant
JDR = Japan Disaster Relief
MEXT = Ministry of Education, Culture, Sports, Science and Technology
MHLW = Ministry of Health, Labor and Welfare
NBC = nuclear, biological, or chemical
SCU = staging care unit

Received: 29 December 2008
Accepted: 30 January 2009
Revised: 11 February 2009

Web publication: 09 January 2010

Abstract

Introduction: The large number casualties caused by the 1995 Great Hanshin and Awaji Earthquake created a massive demand for medical care. However, as area hospitals also were damaged by the earthquake, they were unable to perform their usual functions. Therefore, the care capacity was reduced greatly. Thus, the needs to: (1) transport a large number of injured and ill people out of the disaster-affected area; and (2) dispatch medical teams to perform such wide-area transfers were clear. The need for trained medical teams to provide medical assistance also was made clear after the Niigata-ken Chuetsu Earthquake in 2004. Therefore, the Japanese government decided to establish Disaster Medical Assistance Teams (DMATs), as "mobile, trained medical teams that rapidly can be deployed during the acute phase of a sudden-onset disaster". Disaster Medical Assistance Teams have been established in much of Japan. The provision of emergency relief and medical care and the enhancement and promotion of DMATs for wide-area deployments during disasters were incorporated formally in the Basic Plan for Disaster Prevention in its July 2005 amendment.

Results: The essential points pertaining to DMATs were summarized as a set of guidelines for DMAT deployment. These were based on the results of research funded by a Health and Labour Sciences research grant from the, Labour and Welfare (MHLW) of the Ministry of Health. The guidelines define the basic procedures for DMAT activities—for example: (1) the activities are to be based on agreements concluded between prefectures and medical institutions during non-emergency times; and (2) deployment is based on requests from disaster-affected prefectures and the basic roles of prefectures and the MHLW. The guidelines also detail DMAT activities at the disaster scene of the, support from medical institutions, and transportation assistance including "wide-area" medical transport activities, such as medical treatment in staging care units and the implementation of medical treatment onboard aircraft.

Conclusions: Japan's DMATs are small-scale units that are designed to be suitable for responding to the demands of acute emergencies. Further issues to be examined in relation to DMATs include expanding their application to all prefectures, and systems to facilitate continuous education and training.

Kondo H, Koido Y, Morino K, Homma M, Otomo Y, Yamamoto Y, Henmi H: Establishing Disaster Medical Assistance Teams in Japan. *Prehosp Disaster Med* 2009;24(6):556–564.

Introduction

During the aftermath of the Great Hanshin and Awaji Earthquake in 1995, hospitals experienced a sudden surge in demand for medical treatment for the massive number of earthquake casualties. However, the area hospitals also had been devastated or damaged by the earthquake. Lifeline services were disrupted, and securing an adequate numbers of medical personnel was difficult. As a result, hospitals could not function as they normally would, and therefore, only were able to provided reduced levels of medical services. Within the first 24 hours, an estimated 380 people needed to be airlifted outside of the

earthquake-affected areas for emergency medical treatment; a further 120 casualties needed transport by air during the following 48 hours. However, on the day of the earthquake, only one person was transported by helicopter, and just 17 people were transported within the first 72 hours.[1–5] This experience prompted recognition of the need for the ability to wide-area transport of a large number of injured and sick persons in disaster-affected areas, the apparent need for deployment of medical treatment teams required to conduct the transfer, and that hospitals needed to be capable of serving as bases for emergency transportation.

Consequently, the Japanese government established a disaster medicine system that is centered on "emergency base hospitals". A certain number of core emergency base hospitals have been established in each prefecture, and other emergency base hospitals have been designated to serve a group of cities. In the event of a disaster, disaster medicine activities, such as emergency response measures, wide-area transport of casualties, and the deployment of medical support teams that are entered on these emergency base hospitals—have ben implemented.[6]

After the Niigata-ken Chuetsu Earthquake in 2004, medical support teams were dispatched from a large number of emergency base hospitals. However, only a small number of teams were able to arrive at the scene in time to provide the critical care needed during the acute phase. This prompted a clear recognition of the need for trained medical teams that can provide medical assistance during disasters, and led to the establishment of Disaster Medical Assistance Teams (DMATs) by the national government.

This report describes the current state of the DMAT initiative, related laws and regulations, and how the DMAT system is operated.

Methods

This report summarizes data on the current implementation of the DMAT system. Information on the legal base and operational methods of the system are taken from summaries of the disclosures of the Ministry of Health, Labour and Welfare (MHLW), that was based on the results of a study, "The Research about Medical Response System for Health Security and Disaster,"[7] funded by a MHLW Health and Labour Sciences Research Grant (HLSRG).

Results

Current State of DMATs

In 2004, equipment was provided to 172 medical facilities in Japan. Seminars for Japanese DMAT members were conducted at the National Disaster Medical Center and the Hyogo Emergency Medical Center. As of March 2008, 305 medical facilities, 442 teams, and 2,609 individuals had been trained.

Legal Basis

During a meeting of the Central Disaster Management Council in July 2005, the DMAT initiative was incorporated into the Basic Plan for Disaster Prevention. It was based on the Disaster Measures Basic Law outlined below.

The national government is to promote the education and training of medical personnel to participate in DMATs to be deployed rapidly in the event of the occurrence of a disaster. The national government (MHLW and Ministry of Education, Culture, Sports, Science, and Technology (MEXT)), the Japanese Red Cross Society, and local governmental agencies outside of the disaster-affected areas must secure medical doctors to form emergency relief teams and DMATs. In addition, they must request the dispatch of emergency relief teams and DMATs from public and private medical institutions, as needed.

In accordance with an amendment to the Basic Plan for Disaster Prevention, in April 2006, the Guidance of Medical Service Division of the Health Policy Bureau of the MHLW released a set of guidelines for the conduct of DMAT activities. These guidelines serve as a set of principles for the designated governmental agencies and prefectures for their respective disaster preparedness and regional disaster prevention plans (including bilateral local disaster plans) in relation to requests for and the implementation of DMATs. These guidelines also serve to clarify procedures regarding the publication of information on emergency medical treatment in the event of a disaster. This information regarding the provision and implementation of DMATs must be included in the medical treatment plans created by prefectures. Details of these guidelines are outlined below.

Definition of DMATs

In these guidelines, DMATs are defined as "mobile, trained medical teams that can be rapidly deployed during the acute phase of a disaster (within 48 hours)." Currently, these teams comprise persons who have completed the "DMAT Team Member Training Course" provided at the National Hospital Organization's Disaster Medical Center (an independent administrative agency). The roles of DMATs include provision of medical treatment and relief activities during the acute phase of disasters. These DMATs assist in the transfer casualties from disaster-affected areas to appropriate medical facilities in unaffected areas and provide medical assistance within the affected areas.

Basic Principles of DMAT Operation

The DMAT action guidelines set-out basic principles for the operation of DMATs. The activities of DMATs are based on agreements concluded between prefectures and medical institutions during non-emergency periods and on disaster prevention/preparedness plans formulated by the MHLW and the prefectures. Deployment of DMATs is based on a request from a disaster-affected prefecture. The MHLW is required to provide necessary support to the prefecture by actively collecting information from the time a disaster occurs. An extreme emergency is a devastating disaster that paralyzes the functions of the affected prefectural government. In the case of an extreme emergency, the MHLW may request action from medical institutions without a request from a prefecture.

It is assumed that, in some cases, the MHLW may learn about the disaster more quickly than will the Public Health Bureau of the affected prefecture. Hence, the role of the MHLW is to provide the prefectures with information and to support prefectural decision-making.

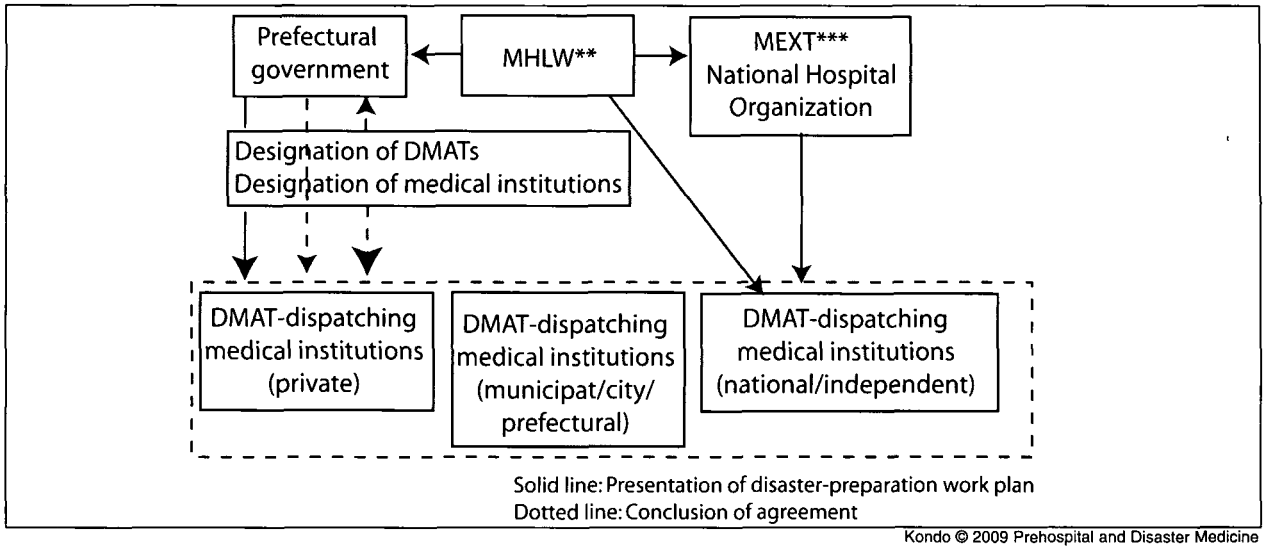

Figure 1—Preparatory plans and agreements
*"Prefecture" refers to any of the 47 prefecture (ken)-level governments in Japan, including Tokyo-to, Hokkaido, Osaka-fu, and Kyoto-fu.
**MHLW, Ministry of Health, Labour and Welfare
***MEXT, Ministry of Education, Culture, Sports, Science and Technology

The role of each institution affected by these guidelines is:

1. Prefectures
   a. *Non-emergency times*—formulate operational plans, conclude agreements with medical institutions, and provide training; and
   b. *Emergency times*—Deploy DMATs and provide necessary support for relief activities.

The prefectures must assume the central role.

2. MHLW
   a. *Non-emergency times*—produce operational guidelines, certify personnel, promote education and training; and
   b. *Emergency times*—collect information; overall coordination.
3. DMAT-designated medical institution
   a. *Non-emergency times*—prepare for deployment, train personnel; and
   b. *Emergency times*—Dispatch DMATs on request.
4. *Emergency base hospitals, Japanese Red Cross Society, and the National Hospital Organization*—provide necessary support (collect information, provide contacts, coordination, personnel, and materials)

Preparation during Non-Emergency Periods

In preparation for disasters, prefectures must formulate DMAT operational plans, register DMAT-designated medical institutions, formulate and make agreements on work plans, perform DMAT registration, secure a contact system, and implement training and drills.

Prefectures and the MHLW formulate plans concerning DMAT implementation for medical institutions under their jurisdiction. The MHLW also formulates strategies concerning the overall planning for DMAT implementation.

Prefectures are to specify hospitals within their jurisdiction as DMAT-designated medical institutions, and to conclude agreements with these hospitals. Such agreements are to specify details regarding request methods, chain of command, work allocation, logistical support, activity expenses, and the status of DMAT personnel, as well as to specify insurance compensation for accidents/incidents in the course of DMAT activities (Figure 1).

The DMAT registration process defines the status of *DMAT registrants* and *DMAT supervisors*. These are:

1. *DMAT Registrant*—Anyone who has completed a "DMAT Team Member Training Course," provided by the Disaster Medical Center of the National Hospital Organization (an independent administrative agency; hereinafter "National Disaster Medical Center"), and is registered with the MHLW. All DMAT registrants become DMAT team members. The DMAT registrants are qualified as DMAT team members to be dispatched to the scene of disasters during the acute phase; and
2. *DMAT Supervisors*—DMAT supervisors have specialized knowledge of DMAT operations and are accredited by the MHLW. They also play a guiding role in DMAT Team Member Training Courses. During a disaster, DMAT supervisors play a guiding role in DMAT operations and serve as a person-in-charge.

Registrations are updated periodically. Registration procedures include certification by the MHLW, assistance with registration by the Disaster Medical Center, and monitoring DMAT registrants in the jurisdiction of the prefecture.

A DMAT information contact system function is provided for the wide-area disaster and emergency medical information system. The DMAT-designated medical institutions provide equipment to ensure contact between themselves and the DMAT teams.

The MHLW is to promote DMAT education and training. It can certify training conducted by prefectures through their "DMAT Team Member Training Courses." The Japanese Red Cross Society also trains all Red Cross Relief Team members

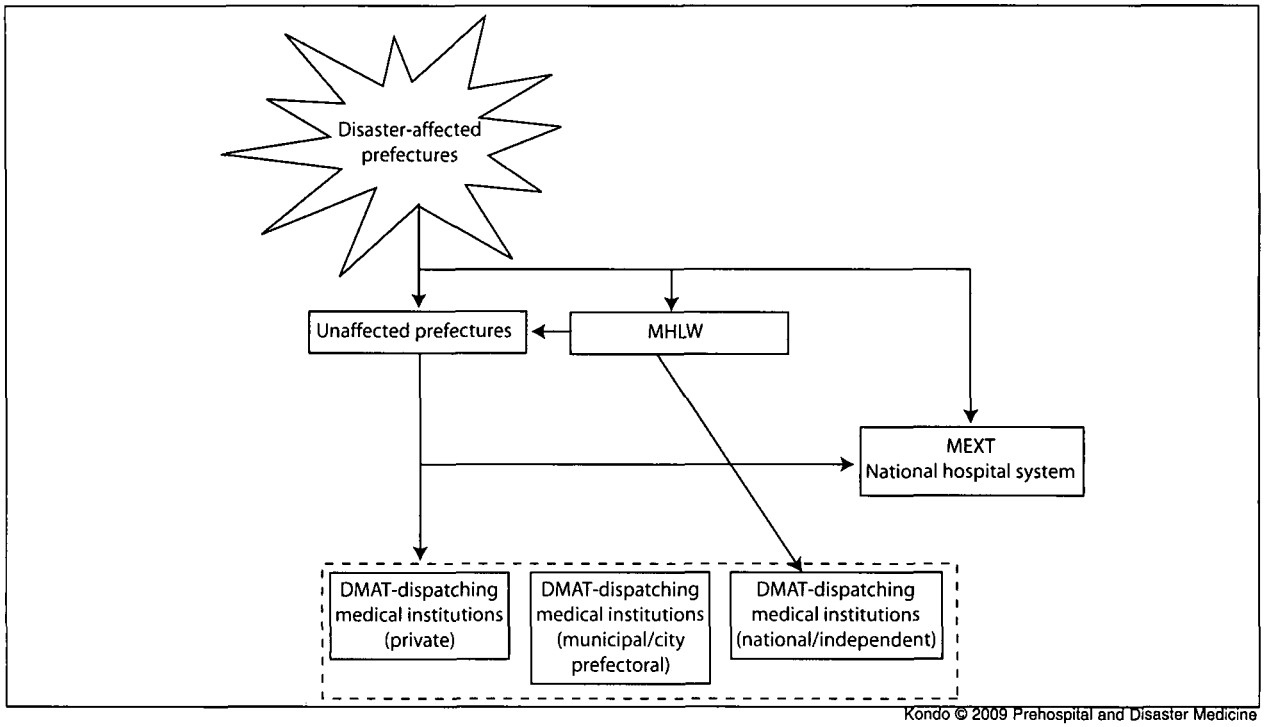

Figure 2—Request process (DMAT = Disaster Medical Assistance Team; MEXT = Ministry of Education, Culture, Sports, Science, and Welfare; MHLW = Ministry of Health, Labor, and Welfare)

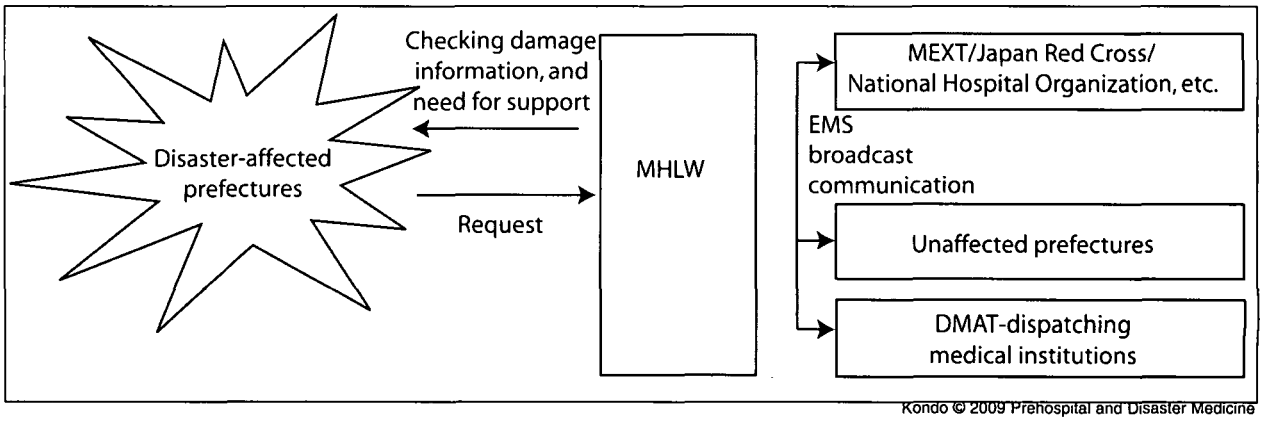

Figure 3—Communications in the initial response phase

to the same standard as designated by the MHLW. During non-emergency times, DMAT-designated medical institutions and registrants are to participate in training and drills.

Initial Response

For an initial response, the guidelines for DMAT activities describe the procedures required for DMAT dispatch requests, DMAT standby requests, and requests for dispatch of DMAT auxiliary members.

Disaster Medical Assistance Teams dispatch requests are based on requests from disaster-affected prefectures. The request process is based on a staged flow:

Disaster-affected prefecture⟶ Unaffected prefectures⟶ DMAT-designated medical institutions

The MHLW is expected to link requests between prefectures (Figure 2). However, in the case of contact during the initial response, information is expected to flow:

Disaster-affected prefecture⟶MHLW ⟶ Unaffected prefectures, DMAT-designated medical institutions and DMAT members

Contacts originating from the MHLW will be broadcast over the Internet using a wide-area disaster and emergency medical information system (Figure 3). If a prior agreement exists between a prefecture and DMAT-designated medical institutions, DMATs can be dispatched quickly because the request process, as outlined in Figure 2, can be implemented after the beginning of an event. If necessary, prefectures, the MHLW, and MEXT can make a standby request to the DMAT-designated medical institutions. The procedure for standby requests is the same as that for dispatch requests.

In the following cases, all DMAT-designated medical institutions are standby dispatch DMATs regardless of the disaster-affected situation and without waiting for a request from the MHLW:

https://doi.org/10.1017/S1049023X00007512 Published online by Cambridge University Press

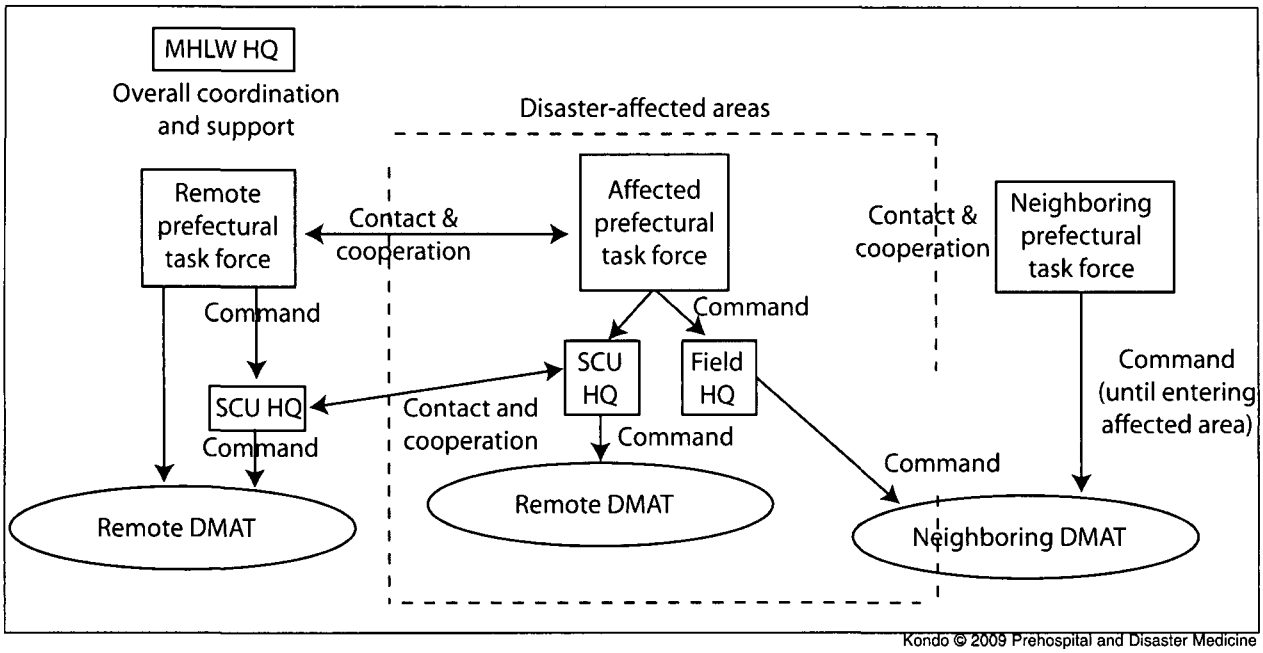

Figure 4—DMAT chain of command (DMAT = Disaster Medical Assistance Team; HQ = headquarters; MHLW = Ministry of Education, Culture, Sports, Science and Technology; SCU = staging care unit)

1. An earthquake of Japanese seismic intensity ≥5 occurring within any of the 23 wards of Tokyo;
2. An earthquake of Japanese seismic intensity of nearly 6 or greater occurring in any other area (outside of the 23 wards of Tokyo);
3. A tsunami alert is issued;
4. An earthquake alert is issued for the Tokai region; or
5. A large-scale aircraft crash occurs.

The Japanese Red Cross Society or National Hospital Organization is to dispatch DMAT auxiliary members to assist with DMAT activities, based on a request from the MHLW or a prefecture.

Roles of Headquarters

In principle, DMATs are expected to perform their activities under the command of the disaster-affected prefecture. However, prior to the DMAT coming under the command of the disaster-affected prefecture, the team is to work under the command of its supervising prefecture (Figure 4).

Two kinds of headquarters are established by the disaster-affected prefecture: (1) a field headquarters; and (2) a staging-care unit (SCU) headquarters. These have pivotal roles in DMAT activities. The Disaster Medicine Response Office of the Health Policy Bureau at the MHLW and DMAT-designated medical institutions provide support to these headquarters and coordinate communications between them.

The DMAT Field Headquarters is established under the Taskforce Headquarters of the disaster-affected prefecture in order to control DMATs involved in activities on-site. A Headquarters will be established at an appropriate place by the Taskforce Headquarters of the affected prefecture or at an emergency base hospital.

The DMAT that arrives at the Field Headquarters first is to collaborate with the Task Force Headquarters of the affected prefecture and the MHLW in establishing the Field Headquarters, and is to serve provisionally as the team-in-charge. If the person-in-charge of the DMAT that arrives first at the Field Headquarters is not registered as a DMAT supervisor, then, as soon as a registered DMAT supervisor arrives at the Headquarters, authority for the Headquarters is to be transferred to that person.

The responsibilities of a DMAT Field Headquarters include:

1. Collecting information about the effects of the event;
2. Coordinating DMATs engaged in relief work;
3. Coordinating the procurement of necessary equipment;
4. Communicating and coordinating with the prefecture Task Force Headquarters; and
5. Providing information to the Disaster Medicine Response Office of the Health Policy Bureau of the MHLW as needed.

Conversely, the Staging Core Unit (SCU) Headquarters is established within the SCU to control DMAT activities related to wide-area emergency medical transportation. An SCU Headquarters in the disaster-affected prefecture is to follow the commands of the Task Force Headquarters for the affected prefecture. If the set-up is in an unaffected prefecture, the SCU Headquarters is to follow the command of that prefecture. The person in charge of the SCU Headquarters is assigned following the same general principles as for the Field Headquarters.

Responsibilities of the SCU headquarters include:

1. Collecting information on the condition of medical facilities and each SCU in the affected area, as well as wide-area emergency medical transportation;
2. Coordinating the activities of each DMAT;
3. Coordinating transportation and procurement of equipment;
4. Communicating and coordinating with prefecture Task Force Headquarters;

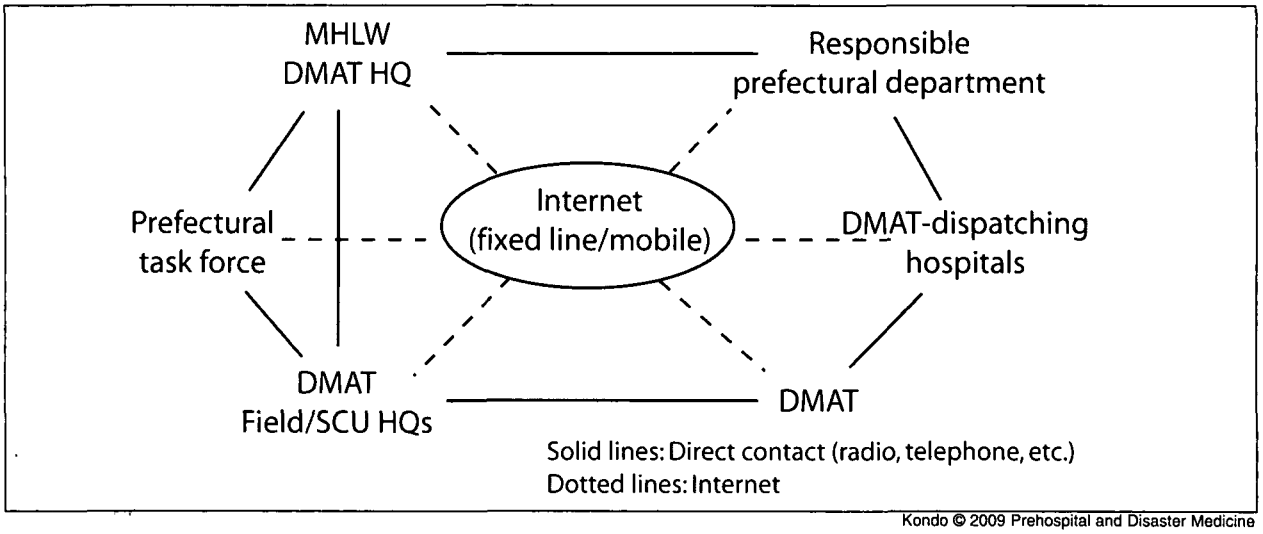

Figure 5—Contact system

5. Communicating and Coordinating with other SCU Headquarters; and
6. Providing information to the Disaster Medicine Response Office of the Health Policy Bureau of the MHLW as needed.

When DMATs are dispatched, DMAT-designated medical institutions are to establish a headquarters function within their organization, in collaboration with the Field and SCU Headquarters. An important role of this Headquarters is to facilitate the sharing of information by entering data obtained from DMATs to the DMAT Operations Section of the wide-area disaster and emergency medical information system. The DMAT communications are conducted directly or over the Internet. The DMAT-designated medical institutions play an important role in this system (Figure 5).

DMAT Activities

Disaster Medical Assistance Team activities can be divided into those in disaster-affected areas, wide-area medical transportation, and logistical support.

As a rule, DMATs involved in activities in disaster-affected areas are to make their own way to the Field Headquarters. They perform their activities in coordination with the Headquarters. Disaster Medical Assistance Teams from areas near the disaster-affected area are deployed.

A DMAT requested to engage in wide-area medical transportation is to arrive at a wide-area Medical Transportation Base designated by each regional block. The MHLW collaborates and coordinates with the relevant ministries and agencies (Cabinet Office, Defense Agency, etc.) to secure the means for DMATs to arrive at the SCUs within the affected areas from the wide-area Medical Transportation Base. Presumably, this work will be done mainly by DMATs in the remote areas. Their main task is to engage in SCU activities and provide the necessary medical care onboard the aircraft. These issues are outlined in Figure 6.

On-scene, the DMATs perform triage, provide emergency care, and deliver medical treatment to people trapped under debris in collaboration with emergency services personnel. For hospital support, the DMATs are to perform triage at the hospitals receiving large numbers of ill or injured people. They help to provide medical treatment at hospitals and perform triage for transport. While working in these hospitals, DMATs follow the command of the Hospital Director. In addition to the work of the DMATs, the MHLW, disaster-affected prefectures, and their Task Force Headquarters are to collect and distribute information on the situation at relevant hospitals and on the need for hospital support.

For transport within the affected area, the DMATs provide medical treatment during patient transport. Disaster-affected prefectures are to conduct such transport and provide the necessary coordination.

Staging Care Units are temporary medical facilities set up at wide-area Medical Transportation Bases to stabilize patients and perform triage for patient transfers. They are established at the wide-area Medical Transportation Bases within disaster-affected areas, or, as necessary, at bases outside a disaster-affected area. The *aim* of the SCUs in disaster-affected areas is to stabilize patients arriving from hospitals in the disaster-affected area; and perform triage for wide-area emergency medical air transport by the Self-Defense Forces of Japan. The work of the SCUs outside disaster-affected areas is to arrange medical facilities for patients airlifted out of affected areas, and perform triage for such patients. As necessary, the SCUs treat and stabilize patients. Staging care units are set up at wide-area Medical Transportation Bases that have been designated in advance, in collaboration between the MHLW, prefectures, and relevant government ministries and agencies. It is stipulated that the MHLW, the Japanese Red Cross Society, and the National Hospital Organization are to provide necessary support for the SCU activities. The DMATs onboard aircraft monitor and treat patients. They are under the command of the SCU Headquarters.

Logistical support involves securing communications and facilitating transportation, and providing medical supplies and subsistence necessities for the work of the DMATs on-scene. It also includes providing communica-

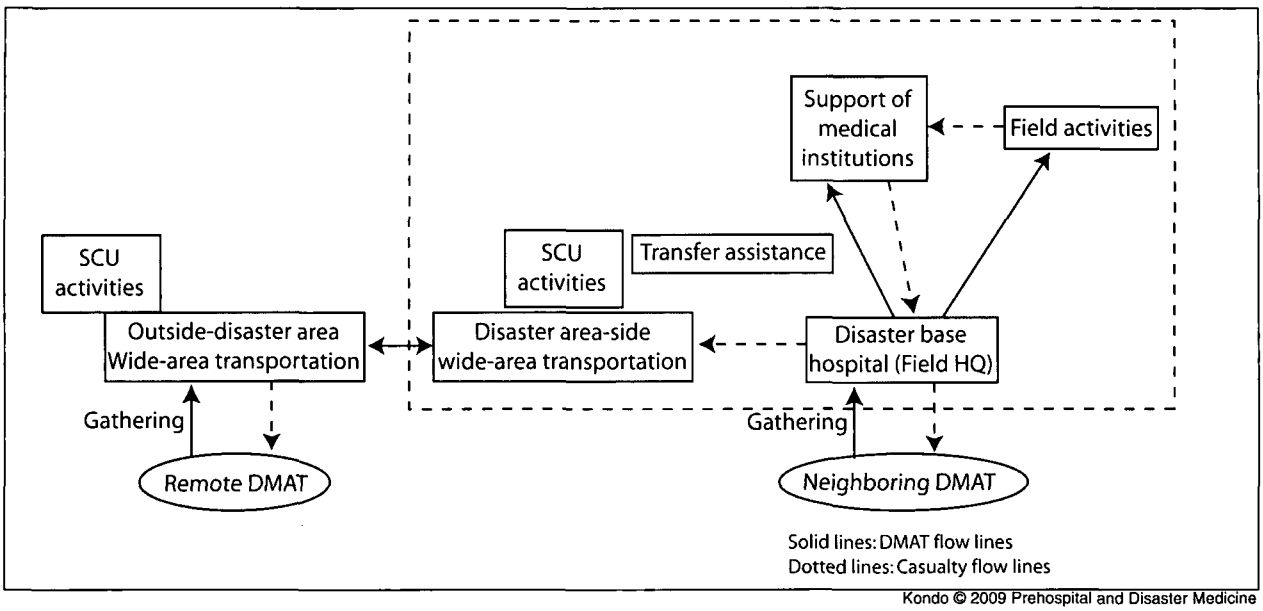

Figure 6—DMAT activities

tion and coordination support and collecting information to facilitate this work. Essentially, the DMATs organize transportation, procure of medical supplies, equipment, and subsistence necessities in order to enable them to work as continuously as possible. However, the MHLW and prefectures provide as much support and coordination as possible to ensure that the DMATs are adequately equipped at all times. The MHLW also coordinates with relevant ministries and agencies, prefectures, and private organizations—as needed—in relation to the deployment of the DMATs, transportation of patients and DMAT members, medical supplies, and the subsistence needs of DMAT members. As required, the MHLW is to request needed items from relevant industrial suppliers. On the request of the MHLW and prefectures, the Japanese Red Cross Society and National Hospital Organization as far as is possible, are to, provide transportation means and medical supplies, and ensure reasonable living conditions for the DMAT members. The DMATs and their auxiliary members are to undertake work related to logistical support. There also is provision for the use of medical helicopters with an onboard doctor to assist with these logistical operations.

Payment of Expenses

As a rule, expenses are covered based on prior agreements between prefectures and medical institutions. In the case of public medical institutions, work is administered based on emergency work plans. However, if the Disaster Relief Law is applied and certain conditions are fulfilled, the prefecture is able to pay the costs of the DMAT-designated medical institutions that dispatch DMATs in accordance with the Disaster Relief Law. These certain conditions are: "A prefectural governor assigns emergency disaster relief work to a DMAT, forms a DMAT by employing paid staff, and implements emergency medical treatment based on the Disaster Relief Law, as necessary, based on the assumption that the relief activities are conducted within areas where the law is applicable."

If expenses are paid based on the Disaster Relief Law, the MHLW and prefectures are to bear these costs of items relating to the deployment of DMATs:

1. The actual cost of all medical supplies used, and the repair of damaged medical equipment; and
2. Transportation expenses for rescue and relief workers, and employment expenses for paid staff.

DMAT Activity

Since the establishment of the DMATS in Japan, they have been dispatched to various disasters in Japan (Figure 7). The Niigata Chuetsuoki Earthquake was a remarkable operation. The Niigata Chuetsuoki Earthquake (magnitude = 6.8) occurred at 10:13 hours (h) on 16 July 2007. Eleven people died during the acute phase. This earthquake was the first full-scale DMAT operation. More than 200 people from 40 facilities in 15 prefectures arrived within 12 h. The DMATs mainly assisted the disaster base hospital, transported the severely injured victims, and participated in field activities.

Discussion

Characteristics of Japanese DMATs

Japan participated in relief work to assist Cambodian refugees in 1979, and subsequently formed the Japan Disaster Relief (JDR) Team. To date, the JDR Team has performed a variety of activities in response to disasters such as floods and earthquakes.[8–11] The human resources and methodologies cultivated in the course of the JDR Team's activities have served as the foundation for the rapid improvement of the DMATs. A comparison of DMAT and JDR mechanisms have many similarities, such as registration by means of training seminars, deployment based on the request of public entities, and a voluntary sense of mission by the medical staff dispatched as a part of relief teams. At the same time, differences do exist. Since the JDR dispatches teams overseas, in most cases, they do not work during the acute phase of emergencies. For this reason, medical supplies and equipment needed for JDR

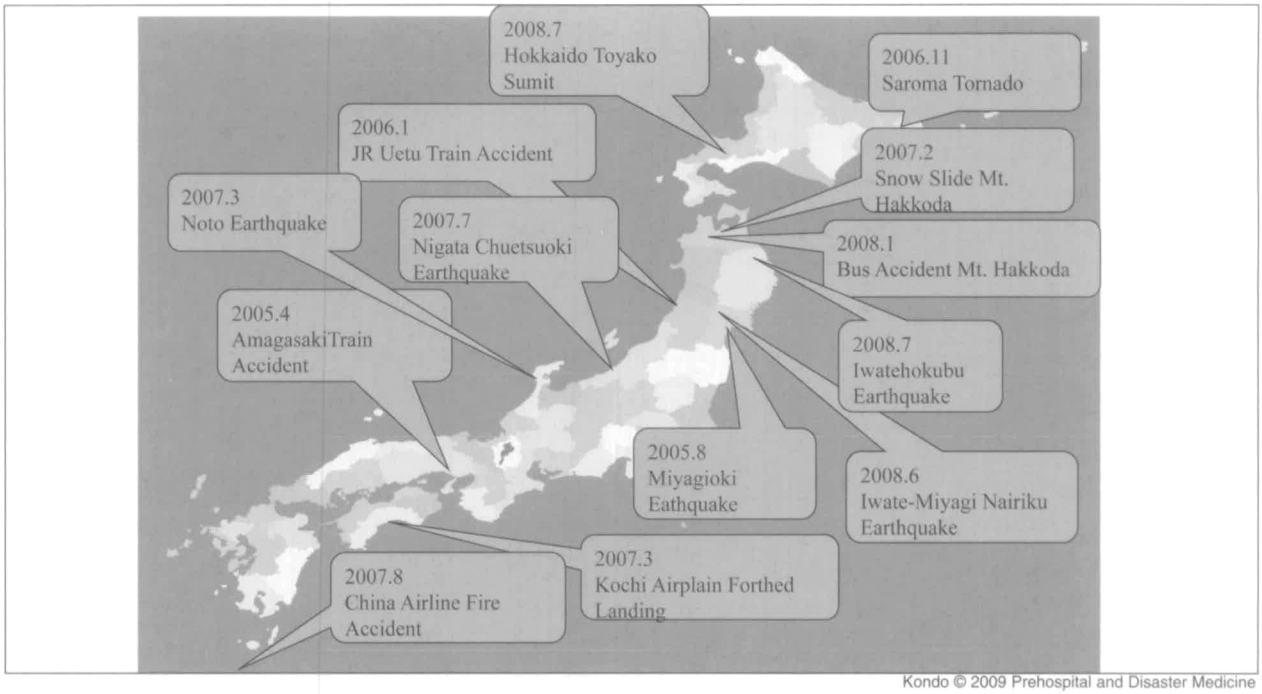

Figure 7—Record of DMAT activity

activities differ from those needed by DMATs, which are intended to work during the acute phase.

A DMAT-type system was established in 1985 in the United States. The system was organized by the national government based on the National Disaster Medical System (NDMS). This is similar to Japan, where DMATs were instituted by the national government under the Basic Plan for Disaster Prevention. However, the DMATs in the US consist of 29 personnel, as opposed to 4–5 in Japan. Thus, significant differences exist between US and Japanese DMATs in terms of mobility and operational methods.[12] In the US, the DMATs are deployed to a variety of events, including many cases of slow-onset disasters such as floods.[13] In contrast, Japanese DMATs are small-scale and mobile. These small-scale teams are best suited for coping with the intense demands during the acute phase of disasters.

Future Challenges

In the US, the DMATs also have been deployed for human-made disasters including fires,[13] as well as terrorist attacks.[14] Japenese DMATs currently are expected to be deployed mainly for natural events such as earthquakes. In the case of localized damage, the DMATs are dispatched from within the locality. However, this pattern of application has yet to be established in any systematic way. Whether the DMATs will be deployed to a site of a terrorist event, such as a possible nuclear, biological, or chemical (NBC) attack, has not yet been decided. These are future challenges.

The DMAT activities are implemented by prefectures, based on agreements between them and medical institutions. Thus, each prefecture must conclude individual agreements and develop its own operational guidelines. Therefore, expanding the operation of the DMAT system to all Japanese prefectures is an important goal.

Currently, DMAT training is conducted at the National Disaster Medical Center and the Hyogo Emergency Medical Center. However, disasters are rare. Attendance at a single seminar cannot ensure that DMAT members will be able to work effectively and continuously.[15] Therefore, a system for implementing continuous education and training must be examined.

Other challenges include training DMAT supervisors in managing DMAT activities, clarifying the chain of command within DMATs, and establishing logistical systems.

Conclusions

The Niigata-ken Chuetsu Earthquake prompted the recognition of the need for medical teams trained to provide medical assistance during disasters, leading to the establishment of DMATs by the national government.

The guidelines developed by the MHLW in April 2006 describe the basic procedures relating to DMAT activities. The DMAT deployments are based on requests from disaster-affected prefectures.

The DMATs in Japan are small-scale units, suitable for responding to the demands of acute emergencies. Further issues to be examined include the use of DMATs in human-made disasters and terrorist incidents. expanding their application to all prefectures, and the implementation of continuous education and training.

Acknowledgements

This paper was written as part of a research project, "The Research about Medical Response System for Health Security and Disaster," funded by an HLSRG.

References
1. Tanaka H: Morbidity and mortality of hospitalized patients after the 1995 Hanshin-Awaji earthquake. *Am J Emerg Med* 1999;5:17(2):186–191.
2. Tanaka H: Overview of evacuation and transport of patients following the 1995 Hanshin-Awaji earthquake. *J Emerg Med* 1998;16(3):439–444.
3. Ukai T: The Great Hanshin-Awaji Earthquake and the problems with emergency medical care. *Ren Fail* 1997;19(5):633–645.
4. Kuwagata Y: Analysis of 2,702 traumatized patients in the 1995 Hanshin-Awaji earthquake. *J Trauma* 1997;43(3):427–432.
5. Ishii N: Emergency medical care following the great Hanshin-Awaji earthquake: practices and proposals (a report from a university hospital located in the damaged region). *Kobe J Med Sci* 1996;42(3):173–186.
6. Yamamoto Y: Disaster Medicine and its clinical practice. *JJAAM* 1995;6:295–308.
7. Henmi H, *et al*: Report of the research about medical response system for health security and disaster. Tokyo: MHLW Health and Labour Sciences Research Grant, 2007.
8. Asari Y: Analysis of medical needs on day 7 after the tsunami disaster in Papua New Guinea. *Prehosp Disaster Med* 2000;15(2):9–13.
9. Kondo H: Post-flood—Infectious diseases in Mozambique. *Prehosp Disaster Med* 2002:17(3):126–133.
10. Takagi F: The mission of Japan Medical Team for Disaster Relief (JMTDR) for the hurricane disaster in republic of Nicaragua: Transition from emergency phase to rehabilitation phase in November 1998. *JJDM* 2000;5(1):34–44.
11. Kondo H: JDR Medical Teams following the earthquake in Taiwan. *JJDM* 2001;5(1):143–152.
12. Brandt EN Jr: Designing a national disaster medical system. *Public Health Rep* 1985;100(5):455–461.
13. Mace SE, Jones JT, Bern AI: An analysis of Disaster Medical Assistance Team (DMAT) deployments in the United States. *Prehosp Emerg Care* 2007;11(1):30–35.
14. Berríos-Torres SI, Greenko JA, Phillips M, Miller JR, Treadwell T, Ikeda RM: World Trade Center rescue worker injury and illness surveillance, New York, 2001. *Am J Prev Med* 2003 8;25(2):79–87.
15. Kondo H: Training Course of Japan Disaster Relief Medical Team. *JJDM* 2004;9(1):6–12.