

# Chapter 35

## Improvement of Disaster Medicine

Field of expertise: International Cooperation for Disaster Medicine

Shinichi Egawa

### Summary

The disaster medical system in Japan began with the 1995 Great Hanshin Awaji Earthquake and evolved after the 2011 Great East Japan Earthquake. We must prepare for and know that every disaster affects people's health differently. The Sendai Framework for Disaster Risk Reduction described, for the first time, the concept of protecting physical and mental health and the preparedness of disaster medicine. Health promotion in the ordinary time is actually the effort we put toward sound disaster risk reduction!

**Keywords:** disaster medical system, change of medical needs, information sharing, coordination, business continuity plan (BCP), Sendai Framework for Disaster Risk Reduction, life expectancy-disaster risk correlation

### Introduction

The national disaster medical system established after the 1995 Great Hanshin Awaji Earthquake functioned well at the 2011 Great East Japan Earthquake and saved many lives. But, unexpectedly, there were fewer injuries than expected. Chronic diseases, mental health care, and the recovery and reconstruction of local healthcare became the most significant problems, and the disaster medical system needed revision.

### 1: Problems Revealed by the Great East Japan Earthquake

#### What happened?

The 1995 Great Hanshin Awaji Earthquake killed 6,000 people and injured more than 40,000 people, mainly by the collapsed houses and buildings. At that moment, medical doctors estimated many preventable disaster deaths and established a national disaster medical system to reduce such deaths. The Japanese government certified more than 700 disaster base hospitals and more than 1,000 disaster medical assistance teams (DMATs) to arrive at the affected area within 24-48 hours after the onset. Because of the difficulty in providing satisfactory medical services in the affected areas, the national disaster medical system had the staging care unit for wide-area transportation and the emergency medical information system for coordination (Figure 35-1).

## The reality of the damage

The tsunami resulted in 20,000 deaths and losses. Still, the number of direct injuries was around 6,000 because of the improved anti-seismic structures based on the experience in the Great Hanshin Awaji Earthquake and in anticipation of Miyagi Earthquakes every 30-40 years. On the other hand, there were more than 400,000 displaced people, many of whom suffered from health problems. The most frequent medical need in the evacuation centers and the residential area was non-communicable disease (68%), such as chronic disease or pollinosis, followed by infectious diseases (22%) because of the worsened sanitation and hygiene, mental health problems (6%), including sleep disturbance and anxiety, minor injuries (4%) caused by clearing rubble. There were medical needs with pregnant mothers and infants (0.3%) (Figure 2) (Suda et al., 2019).

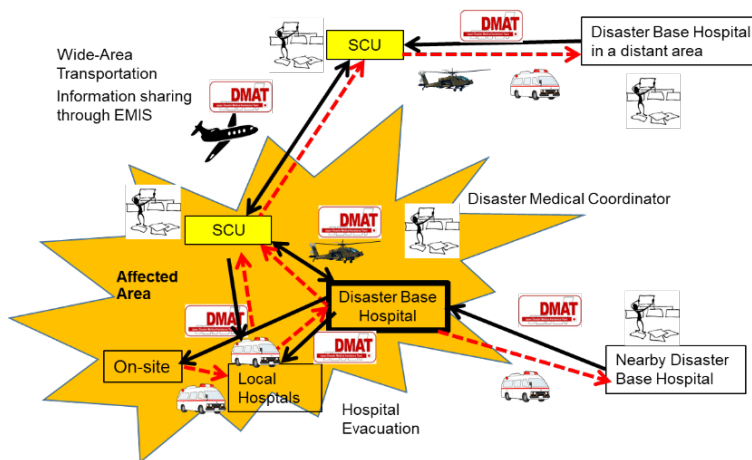


Figure 35-1. The national disaster medical system in Japan

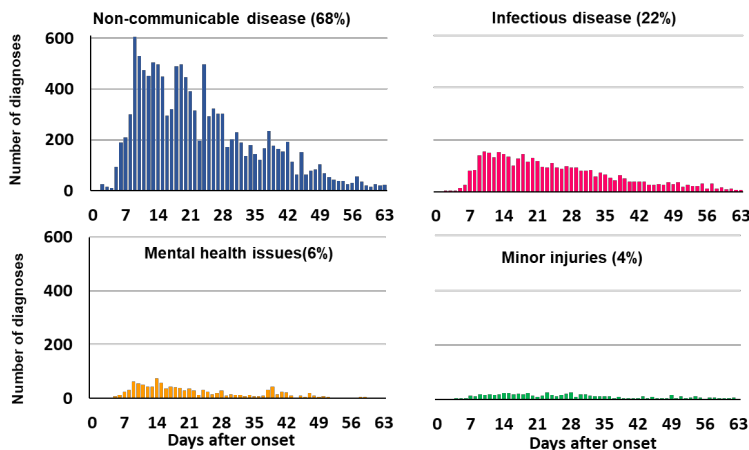


Figure 35-2. The trend of medical needs in Minamisanriku Town, Miyagi Prefecture, after the Great East Japan Earthquake (Suda et al., 2019)

Because of the aging society, the inactive lifestyle in the evacuation centers had a significant impact. Due to the physical and mental expiration, the official disaster-related deaths, including suicides, reached more than 3,000. The hospitals and the healthcare workers were affected. Especially in the coastal areas, the tsunami killed many patients and medical staff and forced hospital evacuations. Even though the healthcare workers themselves were affected, they had to care for other affected people without rest.

## **2: Paradigms Destroyed by the Earthquake**

### **Conventional wisdom and necessary responses**

The national disaster medical system after the Great Hanshin Awaji Earthquake assumed the multi-casualties after an earthquake and focused on the transportation of the severely injured patients to the resource-rich area. The Disaster Base Hospitals had anti-seismic structures and emergency power supplies but did not expect and prepare for the loss of its functions. The nuclear power plant accident created an unprecedented situation for the relief medical teams to protect the safety and security of patients and healthcare workers in the affected area.

In the Great East Japan Earthquake, the primary purpose of the medical relief teams was to fill the gaps between the medical needs and supplies in the affected area. For example, the hemodialysis resource in the Kesenuma area became too short. The network of relief teams conducted a mission to transport many patients to the Tohoku University Hospital to provide transient hemodialysis and finally transported them to Hokkaido Island or the Tokyo Metropolitan area. No patient died because of the unavailability of hemodialysis. Hospital evacuation with skilled coordination by Japan DMAT considering the radioactivity and adjusting the upper limit of relief aid workers, the relief mission from the radioactive area became successful. Substitution from Tohoku University Hospital helped the affected local healthcare workers rest. Based on the long-term mental health damage after the Great Hanshin Awaji Earthquake, many psychosocial assistance teams came in immediately and provided long-term mental health support. To avoid an inactive lifestyle that will lead to the disuse syndrome of older people, rehabilitation support teams provided early intervention. The shortage of public health nurses meant that public health assistance from the supporting local governments was needed. With keeping the radiology safe, medical relief teams offered support to protect affected people's health.

### **3: A New Approach**

After the Great East Japan Earthquake, the change of health affects and medical needs became apparent, and the national government revised the disaster medical system. Every prefecture had appointed disaster medical coordinators to respond simultaneously to various medical needs and to coordinate various stakeholders using the disaster medical system. The role of DMAT became more focused on the support of affected hospitals. The emergency medical information system was updated by integrating the geographical information system to indicate the location and situation of target hospitals, evacuation centers, and the DMATs for effective information sharing. It became mandatory for disaster base hospitals to implement the business continuity plan (BCP) for certification. Various expert teams now exist, including the disaster psychiatry assistance team (DPAT), Japan Rehabilitation Assistance Team (JRAT), Disaster Health Emergency Assistance Team (DHEAT) for public health assistance, liaison teams for pediatrics, and hemodialysis. There is a new system, called J-SPEED, for surveilling the health situation of evacuation centers. These teams join the operation of medical and public health headquarters in disaster drills assuming the South Trough Earthquake, or the Tokyo Metropolitan Earthquake.

### **4: Achievements and the Future**

## A new approach to disaster science

The Sendai Framework for Disaster Risk Reduction 2015-2030, for the first time, clearly described that disaster affects the health of people. There is significantly increased usage of the word “health” (Egawa et al., 2018). Disaster risk is a function of hazard and exposure, vulnerability, and lack of coping capacity. I clarified the negative correlation between life expectancy and overall disaster risk as shown in Figure 35-3. Japan has high hazard and exposure risks including earthquakes, tsunamis, and typhoons. But Japan has very low vulnerability risks such as poverty, under-five-malnutrition, under-five-mortality, and very low lack-of-coping capacity risks such as medical doctors per capita, and the lack of access to healthcare. Consequently, the overall INFORM risk index is very low and the life expectancy is very high in Japan. A healthy society is resilient against disasters.

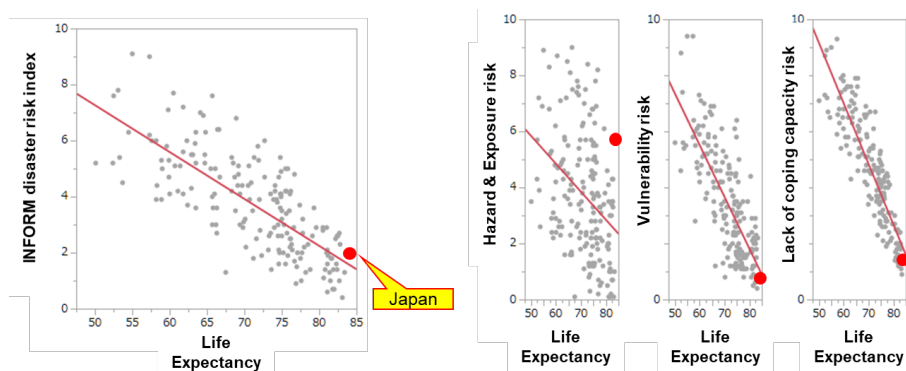


Figure 35-3. Countries with high life expectancy have low disaster risk  
The INFORM disaster risk index is squaring of hazard & exposure risk, vulnerability risk, and lack of coping capacity risk (Egawa et al., 2018)

## Conclusion - from the author

Disaster comes back in a cycle longer than a human’s life. Disaster creates a panic but its memory does not last generations. Forgetting is a necessary function for human beings to keep living. The health needs in future disasters will be different from the health needs we experienced in the Great East Japan Earthquake. Please take a moment to think about the bigger picture regarding how we can build a healthy society that is resilient against disasters.

## References

- Egawa, S., Jibiki, Y., Sasaki, D., et al. (2018). The correlation between life expectancy and disaster risk. *Journal of Disaster Research*, 13(6), 1049-1061. <http://doi.org/10.20965/jdr.2018.p1049>
- Ministry of Health, Labor, and Welfare. (2011). *Report on the National Disaster Medical System*. <https://www.mhlw.go.jp/shingi/0106/s0629-3.html> (In Japanese)
- Suda, T., Murakami, A., Nakamura, Y., et al. (2019). Medical Needs in Minamisanriku Town after the Great East Japan Earthquake. *The Tohoku Journal of Experimental Medicine*, 248(2), 73-86. <https://doi.org/10.1620/tjem.248.73>.