Preparedness and resilience: the hallmarks of response and recovery

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The Great East Japan Earthquake struck the north-eastern coast of Honshu on 11 March 2011. With a magnitude of 9.0, it was the largest earthquake ever recorded in Japan. It triggered the largest recorded tsunami in Japan which devastated the lifelines, transportation and communication systems in the Tohoku region. The tsunami caused nuclear accidents and meltdowns of three reactors in Fukushima.

The impact on human life and health was massive. The death toll was 15 839 – second only to the Great Kanto Earthquake of 1923. As of 29 November, the missing individuals numbered 3632, while the injured totaled 5950.[1] Power, gas and water supplies were disrupted in many areas for several days and weeks. Roads, railways, airports and infrastructures were severely damaged. More than 930 000 buildings in the Tohoku region were either fully destroyed or partially damaged. Based on information from relevant prefectures and ministries, the economic damage was estimated around US$ 219 billion.[2]

A total of 67 387 persons needed evacuation.[1] Due to the massive efforts on rehabilitation and construction of temporary housing by the nation, all evacuation centres were closed by the end of August. Safe drinking water and food were initial concerns due to the nuclear accident. During the early response stage, the major health concerns were hypothermia among the elderly, tsunami-associated pneumonia[3] and other respiratory ailments. During the recovery phase, a gradual increase in noncommunicable diseases was noted due to risk factors such as continued lack of exercise, poor diet and high stress levels. Mental health challenges are likely to emerge as a priority in the long term, requiring significant psychosocial support in the future.

A series of articles in this publication and elsewhere describe the health and public health concerns following the Great East Japan Earthquake and tsunami, the response and management efforts undertaken, and the lessons learnt from this unprecedented experience. Several articles were written by authors who resided in affected areas and were directly involved in the response.[4-6] The need for a post-disaster surveillance system for developed country settings is proposed by Arima *et al*.[7] Beginning with an event-based surveillance approach in the acute response phase, the system needs to evolve to a syndromic approach during the recovery phase and eventually to enhanced sentinel surveillance during the reconstruction and development phases.[7]

Following the total destruction of the sole medical facility in Taro District, health care personnel responded to suffering citizens in the evacuation centres from a temporary clinic. Due to the active and regular visits by the health workers, all health care activities in the district were restored within six months.[4] The experiences of the Iwate Prefecture in providing public sanitation as well as medical and mental health care are valuable in ensuring better preparedness in future disasters.[5] Rapid responses following a quick needs assessment were critical for successful operations by the Ishinomaki Red Cross Hospital.[6] Providing adequate food, water and sanitation along with medical care ensured that there were no outbreaks of communicable diseases in this region.

The entire nation of Japan and the world rallied to help and support the victims affected by the devastating earthquake and tsunami. Among several heroic efforts, I highlight the support provided by Tono City as an outstanding example of solidarity and resilience. Tono City, located midway between the inland and coastal areas of the Iwate Prefecture, experienced widespread power outages, collapse of the main government building and lack of water supplies. Fortunately, none of the citizens were severely injured or displaced due to

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the earthquake. The mayor of the city, with the support of the community, started providing assistance to the worst–hit coastal areas. Responding to a desperate call from Otsuchi by a man who walked to Tono crossing two hills since all means of communications and transportation were disrupted, full–scale relief operations were instituted within 12 hours. Medical services were provided at homes and at the 50 evacuation centres in Tono city. Emergency supplies such as blankets, food, water and kerosene were procured and sent to several of the coastal towns within a few days. In addition to community support and voluntary donations, the private sector's donations such as powdered milk, diapers and sanitary products were mobilized. With the help of the Japan Postal Services and the Iwate Trucking Association, the city was able to make three return trips per day to the affected towns. These efforts were possible because the municipalities collaborated with each other rather than adhering to the country-prefecture-city structures. As a result, the donated items perfectly matched with the needs of the people in the affected areas.

Another crucially important factor in carrying out this rapid response was the preparedness measures taken by the city for the provision of both material and emotional support in the event of a large–scale disaster. The city had drafted a framework of support measures to be taken, which included emergency support teams, temporary support centres and utilization of sports facilities and parks as heliports. The city conducted two comprehensive emergency response drills for Iwate Prefecture which involved training in emergency triage, first aid, food preparation and distribution and the establishment and management of emergency communications networks. This degree of foresight in preparedness as well as the resilience from the community to overcome the challenges resulted in rapid response and relief operations to the affected areas and the victims.

Making predictions about earthquakes and the extent of damage they may cause are difficult. However, the human toll and suffering and the economic costs associated with such disasters may be mitigated through better planning and preparedness measures. As witnessed during the Great East Japan Earthquake, the resilience of the community to support each other will accelerate relief and reconstruction efforts. With regard to health care and public health systems, the experience from the Tohoku region has provided a basis for post-disaster surveillance systems in developed nations.

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