# Chapter 41

## The Future of Infectious Disease Control

Field of expertise: Division of Infectious Diseases

Yuko Makino & Eiichi N. Kodama

Translated by Catherine Sachi Kikuchi

**Summary**

Disruption of lifelines (electricity and water), living in dense shelters, and interruption of information networks due to widespread disasters such as the Great East Japan Earthquake are factors that cause the spread of infectious diseases that would otherwise be controllable. Infectious diseases themselves, such as COVID-19, are now being recognized as a type of disaster. It is important to be prepared for disasters and infectious diseases, including through adequate predictions, training, and education.

**Keywords:** infectious disease, outbreak, training, education, network

## Introduction

What measures should be taken to prevent serious outbreaks of infectious diseases in emergencies and disasters? What kind of preparations and attitudes are necessary in ordinary times and during emergencies? We consider this question with reference to the Great East Japan Earthquake.

## 1: Infectious Disease Problems Revealed by Disasters

### Disasters and infectious diseases

The Great East Japan Earthquake caused unprecedented damage mainly in the coastal areas of the Tohoku region due to the earthquake and huge tsunami. In fact, in Miyagi Prefecture alone, more than 320,000 disaster victims were forced to live together in evacuation centers at the peak of the disaster (Miyagi Prefectural Government, 2015). Evacuation centers, where many victims live together in a limited space, are prone to spread of infectious diseases. Since the communication infrastructure was also damaged, it was difficult to identify which infectious diseases were occurring in the approximately 1,300 evacuation centers in the early stages of the disaster. Delayed information is a major problem in infection control, where initial response is crucial.

### The reality of disaster-related infectious diseases

Infectious diseases that occur during disasters vary depending on the type of disaster, region, season, environment of the affected area, and phase of the disaster (Figure 41-1) (Japanese Society for Infection Prevention and Control, 2014). In the Great East Japan Earthquake, immediately after the disaster, legionella infections from contaminated water caused by the tsunami, tetanus from trauma, seasonal influenza and norovirus infections from crowded living situations in the evacuation centers were observed. It was difficult to maintain environmental hygiene in the evacuation centers due to the lack of water for essentials like hand washing and flushing toilets. There was also an inadequate supply of physical resources such as disinfectants and masks for infection control.

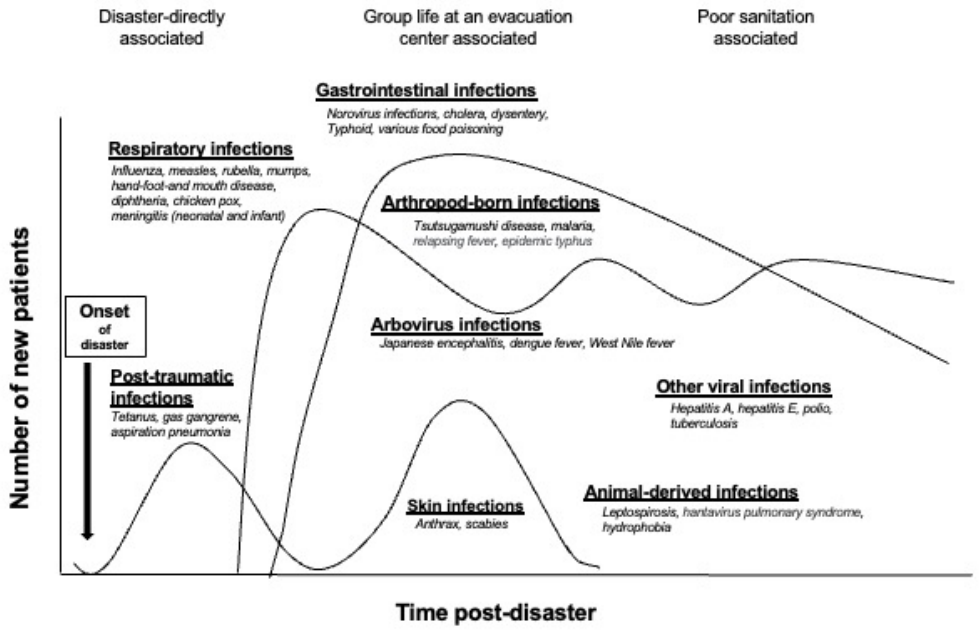


Figure 41-1. Infectious diseases and their onset times after a disaster[1]

Immediately after a disaster, influenza and norovirus increase, both which occur in trauma. Water for hand-washing and drinking is essential to prevent gastrointestinal infections. We must also pay attention to the fact that the time from infection to onset differs, depending on the disease.

## 2: Paradigm shift: New Measures are Necessary

### Conventional support is not sufficient

Effective infection control requires a rapid understanding of the situation of infectious disease outbreaks. However, at the time of the Great East Japan Earthquake, the system for grasping the status of infectious disease outbreaks during disasters was not sufficiently established. Furthermore, understanding the situation was extremely difficult due to the large number of evacuation centers scattered over a wide area in the early stages of the disaster, the

[1] (Japanese Society for Infection Prevention and Control, 2014)

shortage of human resources and supplies for surveying, and the lack of telephone, fax, and other information networks. In the future, it will be important for local governments, medical institutions, specialized organizations, and universities to cooperate in order to build a support and cooperation system for understanding and analyzing information.

**New concerns**

In the event of a large-scale disaster, a large number of medical personnel, local government officials, and volunteers from various regions often enter and leave multiple evacuation centers and support facilities in order to assist the affected areas. This means that there is a possibility that pathogens may be brought to evacuation centers. Therefore, infection control measures for support personnel and visitors are also necessary (Japanese Society for Infection Prevention and Control, 2014; Kodama, 2019). We must also consider the possibility of herpes zoster and tuberculosis, which are chronic or latent infections that manifest due to stress and fatigue caused by living in evacuation centers for a long period of time (Figure 41-2).

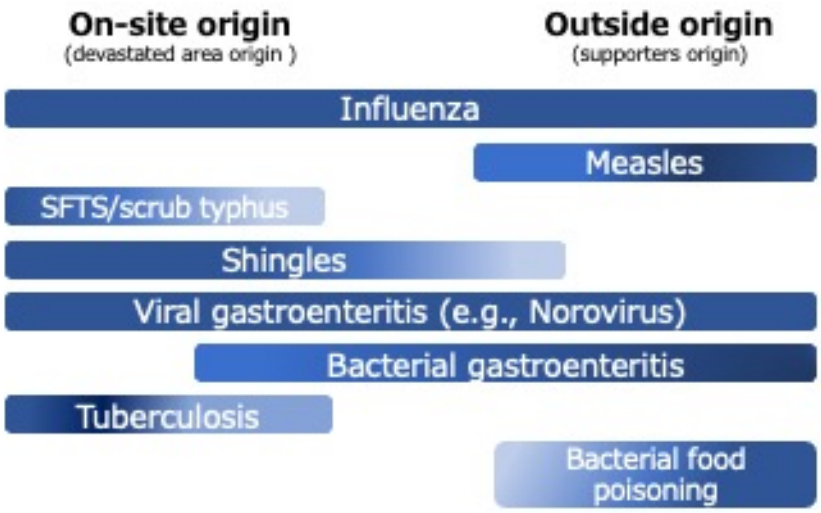


Figure 41-2. The source of infectious diseases is not always the devastated area[2]
Unlike infectious diseases such as influenza and norovirus that can be seen even in ordinary times, most infections, including food poisoning, are brought in by support personnel.

## 3: A New Approach

In a large-scale disaster, medical institutions and local governments in the devastated area are also affected, resulting in a situation where support for victims can be delayed. In the wake of the Great East Japan Earthquake, the Disaster Infection Control Team (DICT) was established mainly by the Japanese Society for Environmental Infectious Diseases. The DICT has established a support system of experts to prevent outbreaks of infectious diseases in evacuation centers and to respond to outbreaks of infectious diseases (Figure 41-3) (Japanese Society for Infection

[2] (Japanese Society for Infection Prevention and Control, 2014)

Prevention and Control, 2014). Risk assessments and educational materials for prevention of infection in evacuation centers have been prepared and are being used for rapid response to disasters. The Guide to Infection Control Management in Areas Affected by Large-Scale Natural Disasters (Japanese Society for Infection Prevention and Control, 2014), compiled by the above-mentioned society based on the experience of the Great East Japan Earthquake, describes countermeasures against infectious diseases in times of disaster from the perspective of multiple professions and organizations that experienced this disaster. In the future, we must continue to learn from the past and consider infectious disease control measures that can manage various disasters.

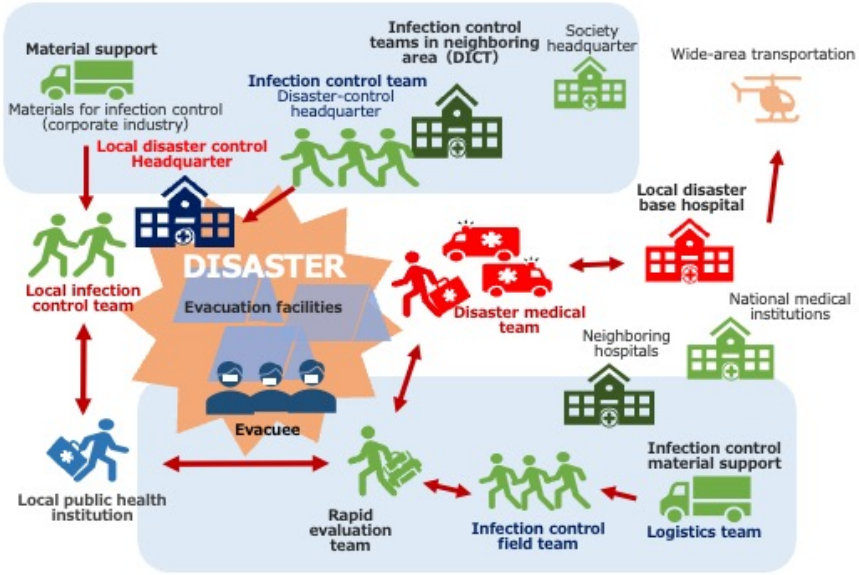


Figure 41-3. The activities of the Disaster Infection Control Team (DICT)[3]

## 4: Achievements and the future

### Preparation during ordinary times

From the experience of the Great East Japan Earthquake, it has become possible to provide human and material support for infectious disease response as well as information and awareness-raising materials at an early stage. On the other hand, infectious disease outbreaks vary depending on the type of disaster and other factors, so it is important to practice making assumptions and training during ordinary times (Kodama, 2019).

### Effort during ordinary times

1. Infectious disease control education: It is important to provide education on hygiene and health management, including basic preventive measures such as hand washing and masks, so that disaster victims can take preventive actions against infection. In fact, in July 2020, a torrential rain disaster occurred during the novel coronavirus pandemic, but daily education on infectious diseases was useful in preventing and stopping the spread of infection. 2. Vaccination: Vaccination

[3] (Japanese Society for Infection Prevention and Control, 2014)

is necessary not only for local residents, but also for volunteers and local government employees who provide support in times of disaster (Japanese Society for Infection Prevention and Control, 2014). 3. Networks: In the event of a large-scale disaster, medical institutions and local governments will be affected at the same time, and the response to infectious diseases will be delayed. It is important for local governments, medical institutions, universities, etc. to share information on infectious diseases in the region and build a network. 4. Animals: It is also important to pay attention to zoonotic diseases (infectious diseases common to both humans and animals) during disasters. We must take measures against mosquitoes and other insects, avoid contact with rodents and other wild animals, and vaccinate pets since we can assume that they will evacuate with their families.

## Conclusion - from the author

"Natural disasters will strike just when you forget about them". Dr. Torahiko Terada, a professor at Tokyo Imperial University, spoke these words in the wake of the Great Kanto Earthquake. In order to prepare for disasters, families, communities, workplaces, and other organizations should continue to make sufficient assumptions, as well as train, and educate themselves. "Don't make fun of the mundane tasks, do them properly" (abbreviated in Japanese to ABC). This will protect us and those around us.

**References**

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