# WHO SITREP NO. 35

World Health Organization
Western Pacific Region

**Japan earthquake and tsunami**
**Situation Report No. 35**
**6 July 2011**

**All times stated below are in Tokyo time.**

## SITUATION SUMMARY

### Human impact of the disaster

- Magnitude of the impact: The Tohoku earthquake on 11 March did not damage many buildings itself, as evidenced by the integrity of buildings that were unaffected by the tsunami. The large tsunami that followed caused widespread damage to buildings, lifeline infrastructure, communication, transport and human health. Multiple disasters occurred including fires, aftershocks and damage to nuclear power plants. Several hospitals were destroyed and other health services impacted by loss of electricity and essential supplies. The overall response was robust and timely (with rapid deployment of medical responders and clearing of affected roads), given the extent of damage and the overwhelming situation. Acute health outcomes included hypothermia, carbon monoxide poisoning, tsunami-associated pneumonia, skin irritations caused by chemical exposure, and adverse outcomes associated with dehydration and lack of appropriate access to toilet facilities.

- Population statistics: As of 5 July, almost four months after the disaster, the number of deaths stands at 15 534 and missing at 7092. These numbers have largely stabilized since the last sitrep on 8 June. The majority of deaths were from Miyagi (9293), Iwate (4575) and Fukushima (1600) prefectures. As of 16 June (latest data available), a total of 112 405 persons remain displaced; however, less than 1/3 remain in evacuation centres. Relocation to temporary housing units is ongoing, and the majority of those in need in Iwate are expected to be relocated to these communities by the end of July, and in Miyagi, the relocation rate from the evacuation centre to temporary housing units is 5-10% per week.

### Current situation and transition from response to recovery

- In both Iwate and Miyagi, evacuation centre populations are declining rapidly as they are relocating to temporary housing units, representing an important transition to a recovery situation. While restoration of the information system and the loss of medical charts and past records has been an ongoing challenge, much of the medical care system and its infrastructure (including laboratory diagnostic capacity) have now recovered. Public health systems and services have also overall returned to baseline levels, with clinics having been re-established in many areas that were highly affected. With the publication of a national recovery plan, many recovery-based activities are now beginning.

**Health situation monitoring, assessment and response**

- The early risk assessment identified mental health, non-communicable diseases, and communicable diseases as the major public health concerns post-disaster. While no new major public health concerns have emerged, the situation has since evolved. The current assessment indicates that there are ongoing and long term concerns for mental health, an overall reduced but an evolving concern for communicable diseases, and a largely reduced non-communicable disease concern.

**Nuclear facilities**

- Activities to bring the nuclear reactors and the spent fuel pools at the Daiichi plant to a stable cooling state and to mitigate radioactive release are ongoing in accordance with the Tokyo Electric Power Company (TEPCO) Roadmap towards Restoration from the Accident at Fukushima Daiichi Nuclear Power Station plan.

- Temperatures and pressures remain stable in Units 1, 2 and 3. The operation of circulation injection cooling was initiated by injecting water from the filter water tank combined with treated water into the reactor. The injection of fresh water into the spent fuel pool facilities of Units 1, 3 and 4 is periodically being undertaken.

- Contaminated water with high radioactive levels in the turbine buildings of Units 1 and 3 are being transferred to the condensers, the radioactive waste treatment facility, the high-temperature incinerator building and temporary storage tanks. Water from the turbine building of Unit 6 is also being transferred to a temporary tank. Spraying of anti-scattering agent is continuing on site.

**Food safety**

- A total of 6516 food samples results have been obtained from the MHLW, with 1974 sample results received since 8 June 2011 (date of the previous sitrep). Of the 1974 samples tested since last reported on 8 June 2011, no samples were positive for Iodine and 77 samples were positive for Caesium. Sixty-one samples were from the Fukushima prefecture (79%). Other prefectures with positive for Caesium samples include Chiba (1), Gunma (1), Kanagwa (6), Shizuoka (7) and Tokyo (1).

- Imported food control measures remain in place in a number of countries with regard to this event. WPRO is aware of only a few samples taken from imported foods reported to be above Codex guideline levels. Most recently, tea imported into France from Shizuoka Prefecture was found to contain radioactive Caesium levels at 1038 Bq/kg (the relevant Codex level is 1000Bq/kg and the European Maximum Authorized Level is 500Bq/kg). Controls have been put in place in Japan and France in association with these findings.

**Drinking water**

- All the restrictions on drinking water for adults and infants in all 13 affected prefectures had been lifted by Ministry of Health, Labor and Welfare (MHLW) since 10 May, based on the regular monitoring of drinking water by the Ministry of Education, Culture, Sports,

Science and Technology (MEXT) and MHLW in these prefectures which showed values below the maximum permissible limits. The recent monitoring results of both ministries showed that I-131, Cs-134, and Cs-137 in drinking water were below the provisional regulation limits. I-131 had not been detected since 09 May up to 04 July. Cs-134 was not detected except in 7 sampling instances in Saitama Prefecture but in low concentration. Cs-137 was sporadically detected in Utsunomiya City (Tochigi), Saitama City (Saitama), Ichihara City (Chiba), Maebashi City (Gunma) and Shinjuku Ward (Tokyo) but values were also below the provisional regulation limit.

**Environmental monitoring**

- Sea water: Seawater monitoring was carried out by the MEXT at off-shore seawater monitoring stations and by TEPCO near the discharge areas of the Fukushima nuclear power plant.

  The latest monitoring data collected by the MEXT on 20-23 and 25 June showed that the levels of I-131, Cs-134, and Cs-137 were not detected in all the sampling points located beyond 30 km offshore of Fukushima prefecture.

  TEPCO's seawater monitoring at sampling points near the discharge areas up to 15 km offshore showed that the concentration of I-131 and Cs-137 were declining and were below the maximum permissible levels.

- Soil: The readings of radioactivity in soil at all sampling points have generally been declining since 20 March and remained stable and similar as previous readings.

- Air: While higher radiation levels continue to be clustered around the north-west area of the plant, overall, radiation levels surrounding the nuclear plant continue to remain stable. Levels in nearby prefectures have also continued to decline.

**Long term planning: road to recovery**

- As activities focus more on recovery efforts, a national recovery plan has now been produced that takes an integrated, comprehensive regional approach. Large scale societal changes are proposed to improve both tsunami preparedness and the overall makeup of the city/town structure, while maintaining community ties that are important in the region. The blueprint incorporates the health sector in a holistic manner by coordinating it with the sectors of education, medical care, and welfare (including disability services, pharmaceutical services and mental health services). This blueprint recommends a whole of the community approach, recognizing the importance of the community ties and networks.

- Many long-term assessments are also now being planned and initiated to assess the health effects of the nuclear accident in Fukushima; other large-scale health assessment studies are also being put in place in the affected populations in Miyagi.

## EVENT INFORMATION

A 9.0 magnitude earthquake occurred on 11 March 2011 in Japan at 5:46:23 GMT, hitting the northeast coast of Honshu in Japan. The worst affected area is in Tohoku region. Tsunamis caused the majority of the devastation in the coastal areas of Tohoku, but the extent of the damage was widespread, Chiba in the south to the southern part of Hokkaido.

## HUMAN IMPACT OF THE DISASTER AND RESPONSE

### Magnitude of impact

The extent of damage to lifelines, basic infrastructure and essential functions of local governments in the tsunami-affected areas is far worse than that perceived through media reports. Despite the 9.0 magnitude scale of the initial earthquake, very few buildings were damaged by the earthquake itself. The subsequent devastating impact of the tsunami affected not only human health but also transportation, communication, and other logistical aspects that are required for disaster response. To understand the ongoing situation in Japan, both the extent and magnitude of the impact of the tsunami must therefore be considered.

The following briefly outlines the impact of the tsunami:

- The tsunami hit a very large area along the coast line of Honshu Island, from Tohoku to Kanto regions, with direct impact on coastal areas covering a continuous stretch of land more than 500 km in length. The height of the tsunami was considerable, with preliminary reports measuring the wave at approximately 38 meters high (Earthquake Research Institute, University of Tokyo). The high level of preparedness for tsunamis in the historically tsunami-prone northeast Tohoku region (e.g. well-known tsunami evacuation sites in high elevation areas, presence of tsunami barriers, tsunami drills and education in schools), appeared to mitigate the relative impact on the population compared to the absolute level of physical destruction.

- It caused wide spread devastation to essential lifelines (gas, water and electricity), transportation (including the destruction of vehicles for first responders [police and fire department vehicles], public trains and buses, and personal vehicles), and communication (cell phones, landlines, satellite phones and satellite cell phones [made useless as the satellite transmitters were destroyed). This paralyzed or severely limited the functioning of local governments, including initial assessments and reporting of the extent of the disaster. The loss of gasoline fuel supply was crucial limiting factor for all response activities.

- The tsunami brought about multiple disasters that followed the initial devastation. Extensive fires followed the tsunami in a number of areas, many from spilled fuels and explosions of combustible materials. The water did not recede back to the ocean in several areas for some time, and in others, the earthquake completely altered the landscape as the land sunk and rivers near the sea became a permanent part of the sea, completely

inundating nearby roads and other infrastructure. Large aftershocks also continued, with associated tsunami warnings. Such multiple hazards severely limited the normal disaster response capacities, along with restrictions associated with the radiation from the damaged nuclear power plants.

- Medical care was severely impacted. The tsunami directly hit hospitals, including Yamada Hospital and Otsuchi Hospital in Iwate and Ishinomaki Hospital and Shizugawa Hospital in Miyagi, which provided key clinical services in the areas. In addition, the lack of electricity and water paralyzed hospitals located further inland.

- The tsunami affected public health workers in a number of other ways that limited their capacity to respond, including: 1) Workers died as a direct result of the tsunami; 2) The loss of their homes (and often their personal vehicles) forced the workers to also live in evacuation centres, limiting their usual response capabilities and 3) They had to tend to the immediate needs of the large evacuee populations that transformed their usual work office into an ad hoc evacuation centre, where they were expected to cover multiple functions other than their normal duties (e.g. Miyako). Prior links to the community and capacity for adapting to unforeseen circumstances ensured that the public health workers delivered the best outcome possible.

**Initial impact to human health and the acute response**

The impact of the tsunami on human health was very different compared to the Hanshin-Awaji Earthquake in 1995. The outcome of the Tohoku earthquake and tsunami was much more "black or white", in that people either died or survived with few physical injuries. More than 90% of deaths were due to drowning, and the majority of deaths were in the elderly. Table 1 below outlines the differences in the number of dead, missing and injured for the Hanshin-Awaji and Tohoku earthquakes. With fewer injuries in the Tohoku earthquake, there was less need for emergency medical care than expected, suggesting that the focus could have been shifted to public health interventions at an earlier stage.

**Table 1:** Comparison of the human impact in the Hanshin-Awaji and Tohoku earthquakes

| | Hanshin-Awaji | Tohoku |
|---|---|---|
| Dead | 6 434 | 15 534 |
| Missing | 3 | 7 092 |
| Injured | 43 792 | 5 685 |

(Source: Cabinet Office)

## Mortality and morbidity data

The majority of deaths are from Miyagi (9293), Iwate (4575) and Fukushima (1600) prefectures (Table 2). These prefectures also share almost all reported missing persons: Miyagi (4617), Iwate (2169) and Fukushima (302). To date, there have been 5685 persons injured since the disaster.

**Table 2:** Confirmed number of deaths and missing persons
**Source:** The National Police Agency (5 July)

| Prefectures | Death | Missing |
|---|---|---|
| Hokkaido | 1 | |
| Aomori | 3 | 1 |
| Iwate | 4575 | 2169 |
| Miyagi | 9293 | 4617 |
| Akita | | |
| Yamagata | 2 | |
| Fukushima | 1600 | 302 |
| Tokyo | 7 | |
| Ibaraki | 24 | 1 |
| Tochigi | 4 | |
| Gunma | 1 | |
| Saitama | | |
| Chiba | 20 | 2 |
| Kanagawa | 4 | |
| Niigata | | |
| Yamanashi | | |
| Nagano | | |
| Mie | | |
| Kouchi | | |
| Shizuoka | | |
| **Total** | **15 534** | **7092** |

The number of missing persons reached a peak on 25 March (17 541) and has continue to decrease as dead bodies have been recovered (Figure 1).

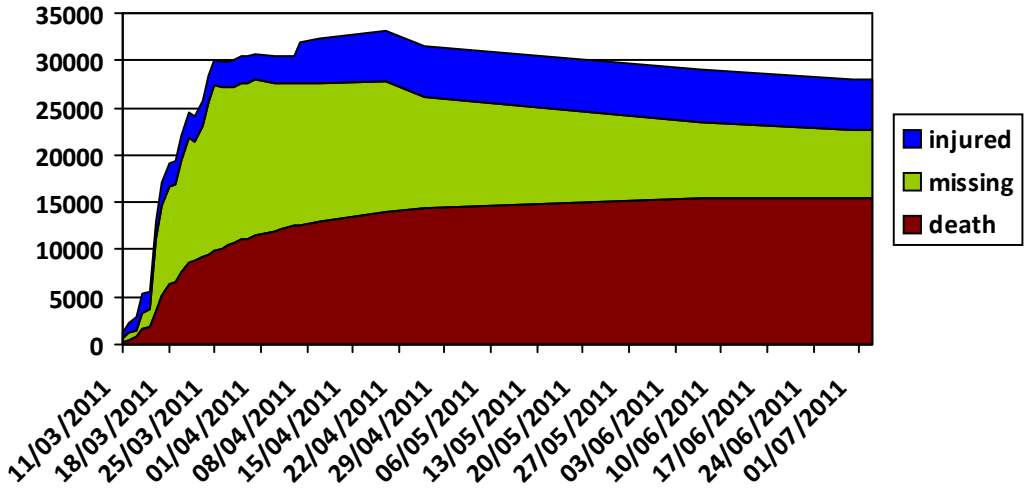


**Figure 1:** Trend of deaths and missing numbers since the event on 11 March

## Acute health outcomes directly resulting from the Tsunami disaster*

- Hypothermia cases among the elderly were reported during the acute phase of the response due to the unusually cold weather in March.
- Tsunami-associated pneumonia ("soujou haien") cases were reported by Iwate Medical University and other hospitals in Iwate and Miyagi. These cases were received several days after the event, and were associated with consumption of large quantities of polluted, oily water; they were in critical condition and did not survive. As these cases were picked up only early in the response phase, it does not appear to be a threat at this point.
- Cases of chemical burns on the skin (mostly on the hands) of persons working through the rubble of damaged properties have been reported in some affected locations. This may be because of chemical factories that were destroyed with associated release of chemical pollutants into the environment.
- Respiratory problems, such as coughing, were observed due to cleaning activities in dusty environments; these conditions were non-febrile and it is unlikely that they were due to pathogenic infections.

** Information based on informal communication with field health staff*

## Situation of displaced persons

As of 16 June (the latest available official data), 112 405 persons have been displaced in total:

- 31 297 in evacuation centres
- 27 427 in hotels
- 25 612 in homes of friends or relatives
- 28 069 in temporary housing units

Since the number of persons in evacuation centres peaked on 15 March at 440 000 persons, the number of evacuees has continued to decline, with approximately 30 000 persons remaining in evacuation centres in mid June. In both Iwate and Miyagi, evacuation centre populations are declining rapidly as they are relocating to temporary housing units, representing an important transition from a response to recovery situation. These transitional temporary housing units will serve the majority of the displaced persons for two or more years (Mainichi, 11 June). Figure 2 presents the trend in evacuee numbers since the event on 11 March.

In Iwate, among the 13 824 temporary housing units planned, approximately 80% (10 305) have now been made as of 4 July. There is about a 2 week lag in the time from completion of an evacuation centre to taking up residence in a housing unit, but it is assumed that by the end of July the majority of the units will be filled. In Miyagi, approximately 5-10% of the evacuation centre population is decreasing weekly as the residents relocate to temporary housing and other more permanent communities. Approximately 14 000 temporary housing units are planned for Miyagi. While the situation has thus vastly improved for the evacuees, there are

emerging challenges. For example, in Iwate, as temporary housing communities are relatively small, it has been difficult to recreate the pre-disaster community environment which could readily provide basic social/community services.

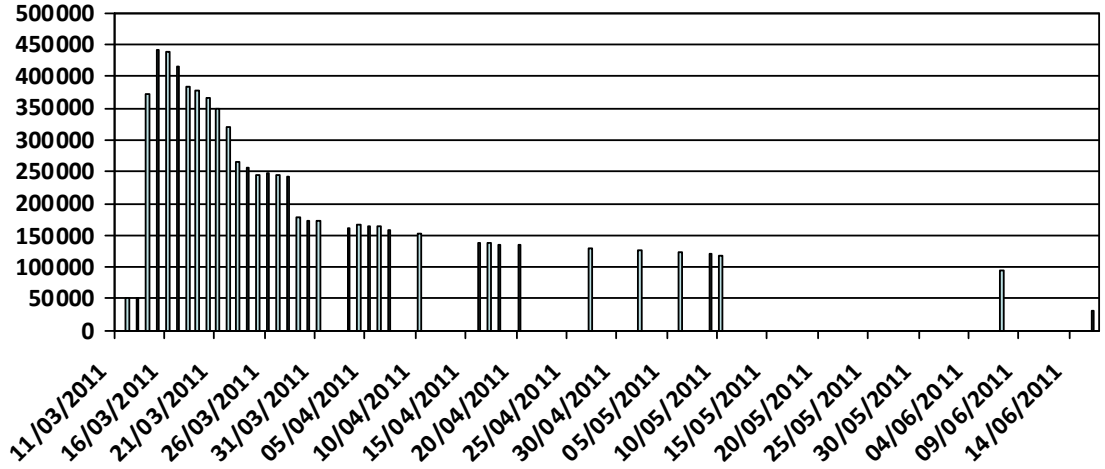


**Figure 2:** The number of evacuees in evacuation centres since 11 March to 16 June

**Health and general conditions in evacuation centres**

In a very recent assessment of the data collected from the Miyagi evacuation centres, preliminary analysis showed that, overall, three factors appeared to be associated with better health conditions of residents at evacuation centres: 1) smaller size of the shelter 2) presence of running water, and 3) presence of health or care providers on site. These findings broadly agree with the key findings from an earlier assessment based on our field mission (below).

Five key factors were identified to be associated with well functioning (low public health risk) evacuation shelters:

- Availability of clean water for both drinking and washing and a sewage system – water and sanitation are basic conditions for good public health.
- Strong leadership within the evacuee group to provide order and maintain morale. These individuals were typically leaders within the community before the disaster. Better leadership would help maintain order and cohesiveness, which benefits the level of sanitation and general health in the centre (e.g. keeping the toilet area clean by respecting public space and organizing rotating cleaning groups).
- Strong existing relationships, a community base and familiarity among the evacuees. This promotes mutual support, and together with the strong leadership, is a key factor that contributes to the level of functioning of evacuation centres, which are still largely dependent on self-governance even after a month since the event.
- Smaller evacuation centres seem to be functioning better, perhaps due to the better inter-personal relationships, more privacy, and an environment that enables the emergence of strong leadership.
- The role of the public health nurse is also essential to maintain good public health practices and conditions in the shelters.

**Major health concerns and assessments**

In addition to the findings reported under "magnitude of the impact" and "situation of displaced persons", specific findings and assessments, are reported later in this document, categorized into the general health concerns of: 1) Mental and psychosocial health; 2) Non-communicable diseases and 3) Communicable diseases.

## GENERAL HEALTH INFORMATION

### Pre-disaster health information of affected prefectures

The main prefectures affected by the earthquake and tsunami include Miyagi, Iwate and Fukushima Prefectures located on the north east coastline of Japan. Combined, these prefectures have a population of 5 720 000. For detailed demographic and health information for the affected prefectures pre-disaster, please see Appendix 1.

## Post-disaster health facilities and services in affected prefectures

### Current Situation and recovery of medical care system and public health services

At four months following the earthquake, many health care facilities are now fully operational. As of 16 June, the majority (30/33 (91%)) of designated disaster hospitals in Miyagi, Fukushima and Iwate were capable of accepting out-patients: 13 of 14 in Miyagi, 7 of 8 in Fukushima, and 10 of 11 in Iwate (MHLW). However, for some hospitals and clinics other than designated hospitals, particularly in the coastal areas of Miyagi and Iwate, full recovery will take several years, as some of those areas were completely destroyed (informal communication).

While restoration of the information system and the loss of medical charts and past records is an ongoing challenge, much of the medical care system and its infrastructure (including laboratory diagnostic capacity) have recovered.

- In Miyagi, medical team assistance from other prefectures has now ended, and medical facilities are now mostly managing on their own. Among hospitals that were not destroyed, all of them have now returned to their normal operations. Public health systems have also overall returned to baseline levels, with clinics having been re-established in many areas that were highly affected (informal communication).

- In Iwate, much of the external medical care providers have now left the affected sites, and major hospitals are now on track towards recovery, and new clinics are being set up. The municipal level is taking the lead to provide both medical care and public health services. However, medical assistance from other parts of the prefecture and other prefectures are still being utilized in some severely affected locations, and some services with external assistance will continue through the summer and possibly for a longer period (e.g. mental health and psychosocial services (MHPSS)). The public health system is largely restored now in areas that were not severely affected, as lifelines and infrastructure have recovered. Due to the increase in workload (i.e. baseline routine activities plus the recovery activities), activities in the public health sector (i.e. routine activities such as maternal and child care, basic MHPSS, cancer prevention activities) are being prioritized based on current needs. The lack of sufficient infrastructure pertaining to transportation is an ongoing challenge--Iwate is highly dependent on the use of automobiles as a primary mode of transportation, and good transportation access is still a challenge in some remote coastal areas (informal communication).

### Transition from Response to Recovery

A current priority for this disaster event is the effective transition from the response phase to the recovery phase (**Figure 3**). Four months since the disaster, lifeline services have recovered and the number of persons residing in evacuation centres has declined to approximately 30 000 from 440 000 persons in mid March, with many relocating to temporary housing facilities (which will become the residence for at least two years for the majority).



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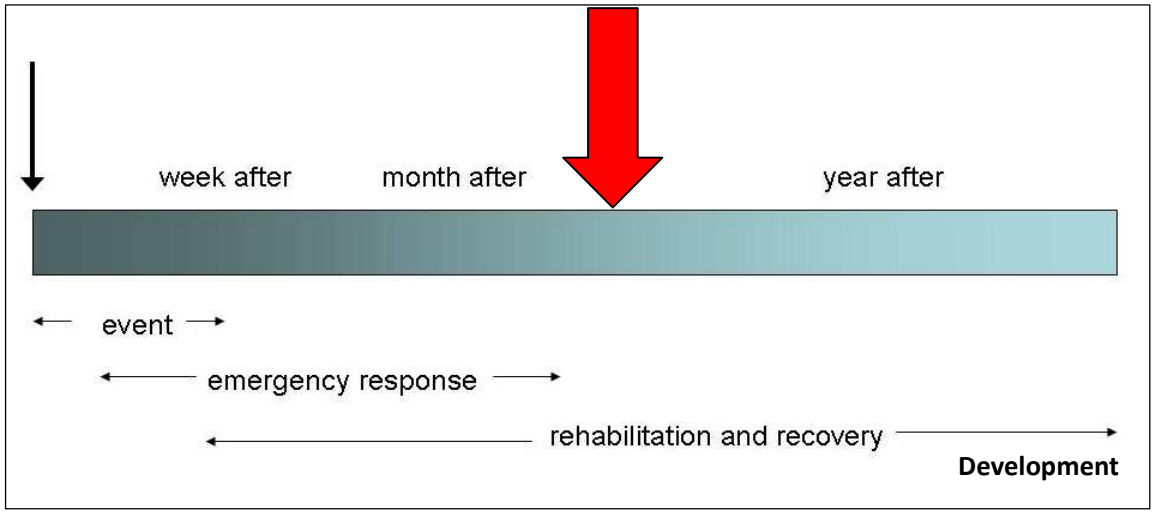


**Figure 3**: Timeline of post-disaster response stages, adapted from "Assessing the Impact on Health Systems: A Toolkit for Needs Assessment and Recovery Planning, WHO, 2009**".** The red arrow indicates the current period, indicating the transitional period from a mostly response to a mostly recovery phase.

Importantly, as the response phase changes, new sets of exposures and hazards may arise and existing exposures and hazards may cease to exist (**Figure 4**). However, some earlier exposures/hazards may continue to be important even if the exposure is no longer present. Mental health concerns, for example, will likely remain for several years due to long term effects from the initial exposures (e.g. visual memory of parent being washed away by tsunami). Non-communicable disease concerns, on the other hand, will likely decline with the progression of phases as conditions continue to improve (i.e. improvements in living conditions, diet, physical activity levels). Lastly, communicable disease concerns will likely overall decline from the emergency response to the recovery phase as large numbers of evacuees leave shelters which have several factors that increase communicable disease risk (e.g. high population density, challenges in sanitation/hygiene, higher stress levels). However, at the current time, gastrointestinal outbreaks will likely remain as an important communicable disease concern as summer approaches.

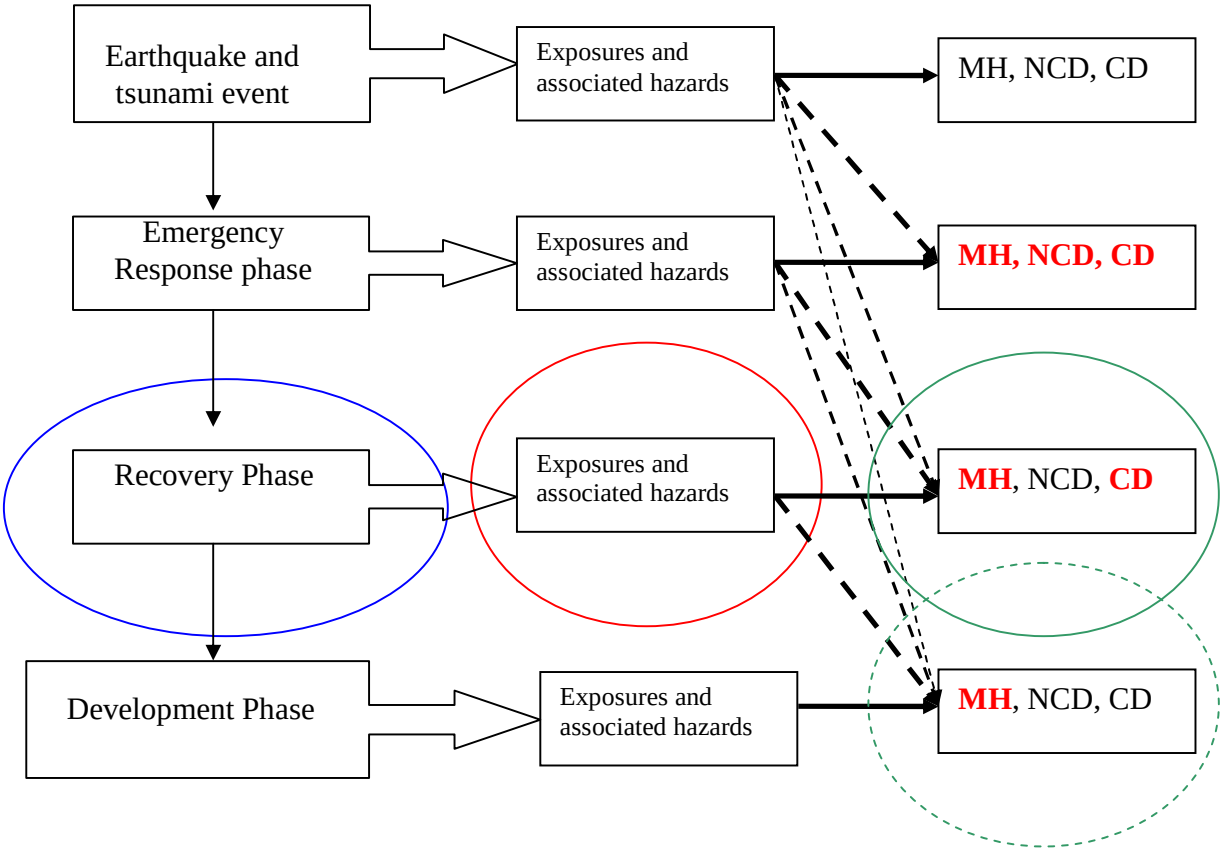


**Figure 4:** Timeline of post-disaster response indicating the exposures and associated hazards that correspond to each response phase; each phase has its own specific set of conditions that affect mental health (MH), non-communicable diseases (NCD) and communicable diseases (CD). The current response phase and associated exposures and hazards are circled (at the current recovery phase, NCD concerns have largely ceased to exist). New exposures and hazards may arise and existing exposures and hazards may no longer be relevant when the response phase changes. On the other hand, some hazards may continue to be important even if the exposure is no longer present (dashed lines and circles; e.g. memories of seeing people being washed away by the tsunami may continue to impact MH).

## HEALTH SITUATION MONITORING, ASSESSMENT AND RESPONSE

### Summary of health situation monitoring, assessment and response

The early risk assessment identified mental health, non-communicable diseases, and communicable diseases as the major public health concerns post-disaster. While no new major public health concerns have emerged, the situation has since evolved, as efforts transition from the response phase to the recovery phase; there are ongoing concerns for mental health, an overall reduced but an evolving concern for communicable diseases, and a largely reduced non-communicable disease concern.

Mental health remains a constant and ongoing concern, as certain conditions such as post-traumatic stress disorder (PTSD) may take a long period of time to appear and those currently

affected will need sustained care for an extended period. Thus, there is a need for long term care, for both preventive services for potential future adverse outcomes (e.g. suicides) in addition to providing ongoing care for current needs. Indeed, provision of long term mental health and psychosocial services (MHPSS) for both children and adults is currently being actively discussed among local, prefectural, and national level counterparts. Topics include how to maintain such delivery, coordination with other sectors and matching the services to the needs. Thus, the current period represents an important opportunity for instituting system-level changes. As the evacuees are now largely relocating to temporary housing communities, and will again relocate at a later time to more permanent housing, sustaining care will be an ongoing theme throughout the long term needs required for MHPSS.

For NCDs, there were initial concerns of a large increase in the incidence of NCDs due to interruption of regular medical care (including provision of prescription medicines). Effective and rapid response early in the acute phase to transport patients requiring specialty care and provision of necessary medicines thus proved to be effective against such concerns. Next, there were concerns that living in evacuation centres would increase the risk of NCDs, since multiple factors that increase the risk of NCDs exist in this environment, such as higher stress levels, dietary imbalances and reduced physical activity levels. Fortunately, due to regular exercise routines, more nutritionally well-balanced meals, and various methods to reduce stress levels, no notable increase in NCD incidence occurred. As medical and pharmaceutical systems have either fully or nearly fully recovered in most areas and the affected populations residing in evacuation centres continue to relocate to more permanent and well-furnished environments (where there is lower exposure to such risk factors), the excess in NCDs beyond expected baseline levels is now likely low and is no longer expected to be a major concern. However, the NCD situation among the elderly who are remaining in evacuation centres should continue to be monitored, analyzed and reported on a periodic basis, with appropriate response as necessary.

Lastly, for communicable diseases, while sporadic cases or small clusters of communicable diseases have been reported, there continue to be no reports of major outbreaks. The continued low incidence might be attributed to aggressive infection control education and preventive measures at the evacuation centres. As the affected populations continue to relocate to temporary housing units from the evacuation centres which have certain factors that increase communicable disease risk (e.g. high population density, challenges in sanitation/hygiene, higher stress levels), overall, the relative concern for large communicable disease events will likely decrease. However, as the summer months approach, gastrointestinal diseases are a concern, and continued vigilance is required. Due to such seasonality of communicable disease, there is an ongoing need to routinely reassess the public health risk posed by communicable diseases. In addition, volunteers will likely continue to provide support at the evacuation centres and it is important that they practice safe food handling for their own well-being and for the health of the evacuees. Importantly, an ongoing priority is communicable disease surveillance systems in the affected areas, which are currently in transition from a mostly syndromic to a more disease-specific, sentinel system. There is active discussion on how to capture the target populations effectively and efficiently, which will be important to validly

and reliably assess the communicable disease situation among the affected populations of interest.

## Mental and psychosocial health

### Background

Compared to Japan in general, the Tohoku region has historically had a higher prevalence of mental health conditions. For example, prior to the disaster that hit the region on 11 March, the Iwate and Miyagi prefectures had higher suicide rates (34 and 28 per 100 000 population, respectively) compared to Japan (25 per 100 000 population) (official government data, 2008). Tohoku residents are also known throughout Japan as being a characteristically reserved group of people who do not readily express their feelings. It has also been reported that there is a significant amount of stigma associated with mental health conditions and limited mental health and psychosocial support (MHPSS) available in some of the rural coastal areas.

Japan has had experience with responding to MHPSS issues from earthquakes in the past, including the Hanshin-Awaji Earthquake in 1995 and the Chuetstu Earthquake in 2004. Compared to the Hanshin-Awaji disaster, the MHPSS response to the current disaster has improved, with the rapid deployment of MHPSS providers. However, the mental health and psychosocial impact caused by the current event is unique in that multiple disasters occurred successively, with extensive and potentially unknown consequences (i.e. earthquake with ongoing aftershocks, tsunami, and the radiation/nuclear situation). In such unpredictable situations, the MHPSS needs may be complex and dynamic.

### Current situation and response

Nearly four months post-disaster, sporadic reports of possible PTSD are now being reported. External support from unaffected prefectures is still being utilized in areas lacking MHPSS expertise. According to the official government report by MHLW on 1 July, there were 18 "Kokoro no kea" (Care of mental health) teams, including 71 workers working on the ground (43 workers in Iwate, 21 workers in Miyagi and 7 workers in Fukushima). In Iwate, 10 teams remain active on the ground as of 1 July. (External team deployment is coordinated through MHLW.)

While MHPSS via counseling has been routinely provided in many evacuation centres, it was earlier noted that the separation of MHPSS providers from other medical care providers (i.e. doctors, nurses, and pharmacists) is not ideal. Creating a single, multidisciplinary team that includes MHPSS and provides comprehensive health care would help to reduce any stigma associated for those who seek such care. Indeed, broader municipal-prefectural-national scale discussions on the MHPSS approach from a facility-based to a community-based model (including community-wide screening program and provision of MHPSS at the school and work setting) are beginning, and reflected in future recovery plans.

Given the Hanshin-Awaji earthquake experience, pediatric MHPSS continues to be identified as major, ongoing concern that will require long-term care and vigilant attention. For instance,

even 10 years after the disaster, 1337 students affected by the Hanshin-Awaji earthquake were diagnosed as requiring special observation (Ryukyushimpo, 15 April). As many children have lost their families, friends, and homes, they are considered to require MHPSS. While acute stress is a normal response to major trauma, the concern is the progression to post traumatic stress disorder (PTSD) (Mainichi, 30 April); possible cases of PTSD are now being reported four months after the disaster. There are now 1120 officially confirmed orphans, and long term MHPSS are deemed important (Ashinaga Ikueikai, 27 June). In addition, among children who have lost both or either parent, a large proportion are very young--43% are elementary school students or younger. Fortunately, MHPSS is being provided to orphans, and the Iwate Board of Education has decided to increase the number of school-based counselors to support affected students and to deploy counselors to elementary and middle schools located along the most affected coastal area. Miyagi and Fukushima prefectures are also going to maintain their larger counselor workforce for a long period of time.

In addition, provision of MHPSS for responders is an ongoing issue, as recently reported from Iwate prefecture. Japan's defense ministry has been providing mental health checks for SDF personnel involved in the recovery of bodies in the affected areas. Check ups occurred one month since the event, and are planned six months and one year after their mission in the field (Media, 26 April).

**Main issues**

It is important that provision of care for currently identified needs continue, in addition to preventive care for potential future adverse mental health and psychosocial outcomes. Thus, there is wide acceptance that there is a need for long term monitoring and care. Indeed, the current period represents an important opportunity for making system-level changes.

Mental health and psychosocial issues cover a broad spectrum, such as dementia in the elderly, acute stress disorder, post-traumatic stress disorder (PTSD), depression, and suicide. Thus, different populations require different types of mental health and psychosocial support. While some of the more resilient proportion of the population have passed their acute stress stage and have begun to return to a more normalized state, others may continue to experience mental health and psychosocial issues, having no clear future direction and a loss of livelihood. The broad needs of the affected population caused by this massive disaster pose a considerable challenge for service providers under the current MHPSS system. Given the overlap in both the definitions of some of these conditions and the service providers for some of these conditions, there appear to be challenges in coordinating provision of care, in terms of health systems, legal regulations, insurance and funding (e.g. who is responsible for which disorder, and the existing payment scheme). In order to better understand the magnitude and trend of the problem, long term surveillance of mental health and psychosocial health-associated morbidity and mortality also need to be considered. Indeed, the need for sustained, long term MHPSS (for both children and adults) is recognized by local, prefectural, and national level counterparts, and plans on how to maintain such delivery, coordination with other sectors and matching the services to the needs are currently being actively discussed.

Furthermore, some of the main issues for MHPSS derive directly from the unique characteristics of the affected Tohoku people, described below.

***Culturally sensitive and appropriate MHPSS***

Given the reserved nature of the Tohoku population, certain sensitivities need to be taken into consideration for the provision of MHPSS in this population.

- Delay in the identification of PTSD among individuals is a major concern. Given the Tohoku people's reservations in expressing emotions, the presentation and recognition of PTSD may be delayed. While some symptoms of PTSD, such as insomnia, flashbacks and nightmares (i.e. re-experiencing the original trauma), have been reported by some victims, vocalizing the presence of such symptoms and recognizing the need for professional care may be delayed. Indeed, pretending to be "fine" is a major concern among the victims (Mainichi, 2 May). In addition, some physical symptoms such as insomnia, high blood pressure and gastrointestinal symptoms, may be due to somatization or a physical presentation of a mental health issue. Such somatization may mask the mental health states of both the evacuees and the medical care providers and delay the identification and appropriate treatment of PTSD.

- Connecting back to the community is essential for MHPSS in the affected regions. While the people in the region are known to rarely openly express their feelings, such behavior appears to be modified by who it is they interact with. For example, it was noted by some public health nurses, that although the affected are reluctant to open up to health care providers from other prefectures, they are in fact quite open to their usual care providers. Such challenges can be opportunities for local public health workers as they are familiar with the community being an integral part of MHPSS, and are well aware of how to provide culturally appropriate and sensitive care. Others have noted the need for longer term assignments for MHPSS workers coming from outside prefectures, such that rapport can be established with the victims to provide meaningful support (Mainichi, 26 April). As external MHPSS support from other prefectures is still ongoing, these concerns remain important for the affected populations.

***Gender disparities***

In Japan, there are immense gender differences in adverse mental health outcomes. In 2010, the national male suicide rate was 36 per 100 000 compared to 14 per 100 000 in women (Japanese National Police Agency). While sex-stratified suicide data subsequent to 11 March in the disaster-affected regions is unknown, one affected city in Iwate prefecture reported that there was a disproportionately lower number of men who received MHPSS relative to women. This could be due to the fact that men may request MHPSS less in this area; however, some men who would like to receive MHPSS may have reduced access to such services. For instance, as many working age men have started to return to their homes during the day to clear up the debris (and other, more fortunate men, have started to return to work during the day), they may be at risk of missing MHPSS provided at evacuation centres during the day, even though

they would like to receive such care. As the affected populations are now largely relocating from the evacuation centre to temporary housing communities, follow-up and sustaining care is important, keeping equitable access to such care in mind for both genders.

***Other at-risk vulnerable groups***

The accident at the nuclear power plant has also caused anxiety and other mental health concerns, particularly for people from the designated evacuation zones who were not directly affected by the tsunami. Not only are these people anxious about their prospects of returning to their homes and work and regaining their livelihood, but they also face possible discrimination in the future (e.g. report of evacuees from the affected site being prohibited from entering a facility due to their origin), causing further anxiety. It is important to reassure the evacuees and to provide scientific information on the situation at the nuclear power plant to continuously educate the public, in order to avoid unnecessary discrimination.

Foreigners should also be continuously provided with MHPSS; foreigners may be particularly prone to become isolated, suffer from a lack of information in their mother tongue, easily become confused by rumours, and suffer from anxiety (Japan Times, 30 April). To address such concerns, the Philippine government has deployed three MHPSS experts who will provide MHPSS at evacuation centres to approximately 200 Filipina women who married Japanese men, in addition to their children (Asahi, 25 June).

## Non-communicable diseases

**Background**

Patients with major non-communicable diseases (NCD) are particularly vulnerable to exacerbations of their conditions during disasters. Factors contributing to this vulnerability include the interruption of regular medical treatment, severe stress and anxiety, overcrowding and reduced living standards in shelters, shortages of water and regular food supplies, degraded environmental conditions and physical injuries. The Tohoku area has a large proportion of elderly people and one of the highest salt intake levels in Japan; high blood pressure and chronic diseases were already priority concerns before the disaster event occurred.

Considering the urgency and severity of anticipated outcomes and health risks related to this disaster, NCDs could be categorized into the following groups:

Group 1: Patients with dialysis, type-1 diabetes mellitus (DM) (insulin-dependent), respiratory support, post-organ transplant, and acute coronary care
Group 2: Type-2 DM, heart disease, asthma, cancer, chronic lung disease
Group 3: Hypertension, hypercholesterolemia and other NCD risks

Figure 5 represents the management priority for NCDs in emergency situations.

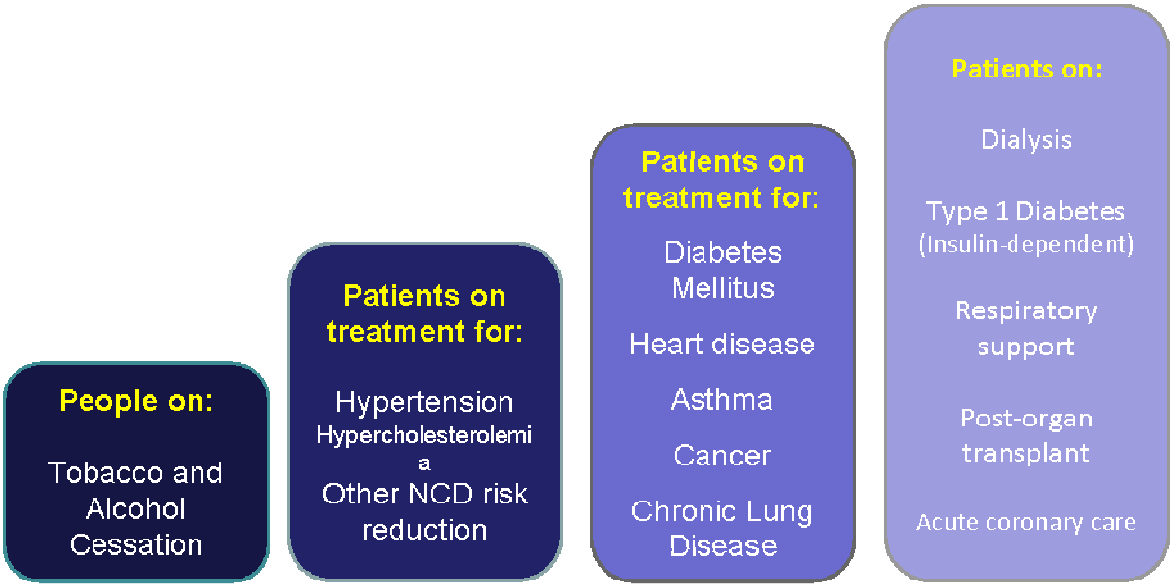


**Figure 5:** Non-communicable disease management priority conditions for interventions in emergencies (by level of risk [size of box] and size of population [intensity of shading]).

Basic background information on the number of people with NCD conditions in Iwate, Miyagi and Fukushima prefectures before the event is outlined in Table 3.

**Table 3:** Pre-existing non communicable disease health conditions in main affected prefectures

| | | Iwate | Miyagi | Fukushima |
|---|---|---|---|---|
| **Group 1** | Dialysis | 2 872 | 4 753 | 4 705 |
| | Type-1 Diabetes Mellitus (DM) | * | * | * |
| | Respiratory support | - | - | - |
| | Post-organ plant | 5 | 36 | 17 |
| | Acute coronary care | - | - | - |
| **Group 2** | Type-2 DM -> No data separated b/w Type1 and 2* | 34 000 | 39 000 | 46 000 |
| | Heart disease | 15 000 | 25 000 | 32 000 |
| | Asthma | 1 100 | 2 100 | 1 700 |
| | Cancer | 17 000 | 24 000 | 25 000 |
| | Chronic lung disease | 3 000 | 4 000 | 4 000 |
| **Group 3** | Hypertension | 109 000 | 167 000 | 187 000 |
| | Hypercholesterolemia | 18 000 | 24 000 | 19 000 |

(Source: Japanese Association of Dialysis Physicians, MHLW, Japan Transplant Network)

**Current situation and response**

The acute aggravation of NCDs has been avoided due to immediate and sustained interventions. While systematic assessment and detailed analysis are lacking, so far, no large scale NCD events have been reported, despite initial concerns of a large increase in the incidence of NCDs. Earlier, the media had reported that at least 101 people, mostly the elderly, had died due to the degradation of existing NCDs after the disaster. The deaths were associated with existing respiratory disorders, cardiovascular disease and cerebrovascular diseases in the three affected prefectures (11 April). As medical and pharmaceutical systems have either fully or nearly fully recovered in most areas and the affected populations residing in evacuation centres (where there are factors that can increase the risk of NCDs, such as higher stress levels, dietary imbalances and reduced physical activity) continue to relocate to more permanent and well-

furnished environments, the excess risk of NCDs attributable to the disaster is now likely low and will no longer be a major concern from now onwards.

In order to address the concern regarding lack of physical activity, evacuees have been encouraged to engage in routine exercises, such as "radio taiso" (stretching exercise broadcast by a radio programme) and performing light chores. In addition, insomnia (due to stress, lack of privacy and fear of aftershocks) and deep vein thrombosis (associated with limited supply of food, little privacy, cold weather, and reduced hydration) were also concerns for further increasing the risk of NCDs (Yomiuri, 25 April), but fortunately, no notable increase in NCD incidence have been reported.

Effective and rapid responses early in the acute phase of the disaster proved to be helpful in reducing the overall NCD impact. The provision of prescribed medicines to control chronic diseases and transport of patients requiring specialty care were the initial priority, and these needs were met quickly, thanks to the highly effective DMAT and other medical missions, a direct lesson learnt from the Hanshin-Awaji earthquake experience. Most necessary medications (e.g. those needed to control diabetes, high blood pressure, high cholesterol, and other cardiovascular conditions) reached the evacuation sites within one week and the DMAT, with the assistance of the SDF and others, had transported patients requiring dialysis and other special medical care to appropriate locations. Pharmacists were also deployed as part of the medical teams or stationed in most evacuation sites.

**Main issues**

While there were earlier reports of hypertension and concerns for associated NCDs, fortunately, no notable increase in NCD incidence attributable to hypertension or other risk factors have occurred. Earlier, it was widely reported that prolonged residence at the shelters, continued exposure to relatively low physical activity levels, stress and unbalanced diets, high blood pressure may result, with associated increase in the incidence of diabetes and heart diseases among the mostly elderly population. Many sites have since improved in providing exercise routines, more nutritionally well-balanced meals, and various methods to reduce stress. However, with approximately 30 000 still residing in such environments, NCDs attributable to hypertension among the affected, particularly the elderly, should continue to be monitored, analyzed, assessed and reported on a periodic basis, with appropriate response as necessary.

## Communicable diseases

**Background**

The National Institute of Infectious Diseases (NIID) is responsible for infectious disease surveillance in Japan. Surveillance of infectious diseases consists of two components: 1) reporting detected pathogens and 2) reporting infectious disease cases. Reportable infectious diseases are categorized into target diseases that need to be notified for all cases and those that are reported on a sentinel basis from sentinel clinics and hospitals. Information is supplied by prefectural and municipal public health institutes, quarantine stations, designated hospitals

and health centres. Monthly Infectious Agents Surveillance Reports are available based on this data.

The five most common notifiable communicable diseases reported from the three affected prefectures, and for Japan in total, before the disaster (in 2008) are shown in Table 4. In the three affected prefectures, only three cases of tetanus (two in Iwate and one in Miyagi) were reported in 2008. There were no reported cases of plague, typhoid or leptospirosis in the affected prefectures in 2008. Sentinel reporting of influenza and gastroenteritis occured in each affected prefecture, with more cases reported in Fukushima and Miyagi than in Iwate.

**Table 4:** Incidence per 100 000 of five most common infectious diseases reported in affected prefectures compared to national figures.*

| | **Iwate**<br><br>Incidence per 100 000 (number of cases) | **Miyagi**<br><br>Incidence per 100 000 (number of cases) | **Fukushima**<br><br>Incidence per 100 000 (number of cases) | **Japan Total**<br>Incidence per 100 000 (number of cases) |
|---|---|---|---|---|
| **Tuberculosis** | 10.0 (234) | 30.3 (406) | 17.2 (350) | 22.2 (28 459) |
| **Enterohemorrhagic *E. coli*** | 7.1 (165) | 7.9 (106) | 2.6 (52) | 3.4 (4 321) |
| **Scrub typhus** | 0.2 (4) | 0.4 (5) | 3.3 (67) | 0.4 (442) |
| **Measles** | 0.5 (11) | 1.6 (22) | 1.1 (22) | 8.6 (11 012) |
| **Legionellosis** | 0.7 (17) | 2.1 (28) | 0.3 (7) | 0.7 (892) |

* Numbers of notified cases were sourced from NIID, incidence rates calculated based on population data available for each prefecture.

Following the disaster, NIID conducted its initial risk assessment of communicable diseases in the affected prefectures soon after the disaster on 14 March, based on the routine surveillance data, immunization status and environmental conditions of the affected sites. Risk assessments have been routinely updated since by NIID to reflect the latest situation. The Tohoku region is situated in northern Japan and some infectious diseases often of concern after natural disasters are not as relevant in this event. For instance, as indicated by NIID, while the bacteria *Vibrio* exists in most regions of Japan, *V. cholera* is very rare and not likely to be present in the region affected. Typhoid and leptospirosis occur rarely, and mainly in southern Japan. Plague is not endemic in the country. Even with an increase in mosquitoes with warmer weather, it is unlikely that these will directly lead to increases in vector-borne disease incidence, as dengue and malaria are not endemic in Japan.

**Current situation and response**

While sporadic cases (e.g. legionella-associated pneumonia, tuberculosis, tetanus, chickenpox) or small clusters (e.g. norovirus infections, gastroenteritis, influenza, acute respiratory illness) of infectious diseases have been reported, there continue to be no reports of major outbreaks, or notable increase in the incidence of communicable diseases. Even during the Golden Week holiday in May, which was earlier a concern due to the large number of volunteers entering the evacuation sites, no communicable disease events were reported. As the affected populations continue to relocate to temporary housing units from the evacuation centres which have certain factors that increase communicable disease risk (e.g. high population density, challenges in sanitation/hygiene, higher stress levels), overall, the relative concern for large communicable disease events will likely continue to decrease. However, as the summer months approach, food safety and associated gastrointestinal outbreaks are important communicable disease concerns, and continued vigilance is required. According to the latest risk assessment results conducted by NIID (Appendix 2), acute watery diarrhea, acute respiratory infections, measles and tetanus also remain as ongoing or current public health concerns.

Since the tsunami disaster, establishing post-disaster surveillance has been a major priority but challenging due to the considerable reduction in lifeline infrastructures and health facilities, loss of local staff and logistical difficulties caused by this unprecedented disaster. Earlier, event-based and/or syndromic surveillance systems were utilized to capture important information rapidly from the evacuation centres. Information from media reports was also used by surveillance workers to detect disease events as event-based surveillance. Local governments and universities have been collaborating to collect information on syndromes and events by phone or fax from evacuation centres, hospitals and mobile medical teams, including those using personal digital assistants (PDAs). Currently, infectious disease surveillance systems in the affected sites in Miyagi and Iwate are in a transition period from a mostly syndromic to a more disease-specific, sentinel system. The national sentinel surveillance system had already recovered 90% of its reporting sites in May 2011; the latest information (as of week 26) indicates that Iwate has recovered 98%, Miyagi 97%, and Fukushima 100% of their reporting units. The reestablishment of sentinel sites from the severely affected areas has been adapted to the latest local situation and public health capacity (including laboratory capacity). There is also active discussion on how to capture the target populations effectively and efficiently, which will be important to validly and reliably assess the communicable disease situation among the affected populations of interest.

However, such activities to improve surveillance of the target populations will take additional time. In Miyagi, where a web-based surveillance systems has been implemented by NIID, approximately 10 000 persons are still included under a syndromic system as of early July, and establishing additional sentinel sites to capture temporary housing communities are mostly still in the planning phase. Similarly, in Iwate, the use of PDA-based syndromic reporting systems at shelters will continue until the end of July. Visits at the evacuation centres by public health workers are also still being performed. For sentinel medical sites that were severely damaged, it will take several years to recover, and for now, reporting from such sites is planned to be conducted through different care centres being established. In order to enhance the sensitivity

of the system to ensure that cases from the underlying population of interest are not missed, surveillance through schools and other institutions are also being considered.

Although surveillance and reporting was limited earlier, the continued low incidence of communicable diseases since the event might be attributed to good infection control education and preventive measures at the evacuation centres. For example, rigorous hygiene and sanitation protocols were observed in evacuation centres, with plenty of alcohol disinfectants and masks stationed at the entrance of shelters, as well as in food preparation and dining areas. Chlorine-based solutions for bathroom cleaning were also readily present at many evacuation centres, with many posters, handouts, and other educational materials at shelters communicating the preventive measures for communicable diseases. In addition to infection control education, rapid public health response to ILI cases with Tamiflu prophylaxis for vulnerable persons and family members of cases, plus the use of designated isolation rooms were likely effective. The importance of good ventilation was also recognized at an early stage by responders, and despite the cold weather earlier, air circulation was incorporated wherever possible. According to some experts, the somewhat unique cultural norm among the Japanese to not burden neighbors (e.g. using face masks not to protect oneself from ill persons but to protect others from a sick self) may have also assisted in preventing widespread communicable disease outbreaks; however, such mentality may have also caused additional stress to the evacuees.

**Main issues**

As discussed, surveillance for communicable diseases in the affected areas is currently in a transition period. From event-based and syndromic approaches, surveillance is returning into a more permanent sentinel-based system that existed prior to the disaster. With continuing relocation of the affected populations from shelters to more permanent communities and baseline medical and laboratory infrastructure returning, a disease-specific approach becomes more meaningful. A concern is that traditional catchment areas are generally not sensitive enough to capture the smaller and rural coastal populations that were affected, and monitoring the moving population targets is another issue. The specific details to address such issues (e.g. the number of sentinel sites, the location of sentinel sites) are being actively discussed by local governments who will adapt to their local situation, needs, and capacities.

To date, strong awareness, education, and responses by the responders, combined with the timing of the disaster at the end of the influenza season, and cold conditions for food storage and transport seemed to have reduced the risk of communicable diseases. In addition, as the population residing in high density evacuation centres continue to decline, the risk for large outbreaks will likely continue to decline. However, with more than 30 000 still residing in such environments, and the possibility of reduced vigilance and poorer practice in hygiene over time, there needs to be sustained vigilance and awareness levels against communicable diseases.

Additionally, with an increase in temperature, food safety and associated food-borne disease events are an ongoing concern. Evacuees themselves have started to conduct their own cooking, and there is a need to educate groups in evacuation centres regarding safe food

handling for large communities in order to prevent foodborne disease. This also applies to volunteers who may be minimally trained or less-experienced in safe food handling; volunteers continue to provide support at the evacuation centres and it is important that they practice safe food handling for their own well-being and for the health of the evacuees. The risk of introduction of other communicable diseases from volunteers (or other persons entering from outside) is also an ongoing concern; for example, it was reported that a foreign journalist infected with measles in April continued his activities in Japan while infectious. Due to its high transmissibility and severity, NIID continues to recommend that volunteers heading to evacuation centres be confirmed for their vaccination status.

### Other conditions and diseases

Currently, with the coming summer, heat-associated conditions, such as heat exhaustion, heat strokes and heat-associated fatalities, are an emerging concern. While these outcomes have not been reported to date from Miyagi or Iwate, there may be a delay in these northern prefectures relative to the rest of Japan. Fortunately, coastal areas in Iwate may be less affected due to the relatively cool temperature in those areas. Another notable observation from affected sites in both prefectures is the large increase in the population of various fly species, likely due to the presence of rotting fish and other biologic material that resulted from the tsunami. Exposure of such materials has been an ongoing problem since mid May, and has led to unpleasant odors, which can in turn increase the stress level of the residents. Large numbers of flies have been documented both at evacuation centres and near temporary housing units (Mainichi, 11 June)

## NUCLEAR FACILITIES

### Updates on Fukushima Daiichi plant

The incident at Fukushima Daiichi Nuclear Power Station was raised to level 7 on the International Nuclear Event Scale (INES) on 12 April. The state of the power station remains serious. However, overall, the situation has been stabilized and progress is being made towards containment.

Major activities and status updates since 8 June:

- Activities to bring the nuclear reactors and the spent fuel pools at the Daiichi plant to a stable cooling state and to mitigate radioactive release are ongoing in accordance with the Tokyo Electric Power Company (TEPCO) Roadmap towards Restoration from the Accident at Fukushima Daiichi Nuclear Power Station plan.
- Temperatures and pressures remain stable in Units 1, 2 and 3. The operation of circulation injection cooling was initiated by injecting water from the filter water tank combined with treated water to inject water to the reactor. The injection of fresh water into the spent fuel pool facilities of Units 1, 3 and 4 is periodically undertaken.
- Contaminated water with high radioactive levels in the turbine buildings of Units 1 and 3 are being transferred to the condensers, the radioactive waste treatment facility, the

high-temperature incinerator building and temporary storage tanks. Water from the turbine building of Unit 6 is also being transferred to a temporary tank. Spraying of anti-scattering agent is continuing on site.

### Updates on Response to the Nuclear situation

On 22 April, the area within the 20 km radius zone of the Fukushima Daiichi Nuclear power plant was officially declared as a 'No-entry Zone'. In addition, areas within the 20-30 km radius zone were officially established as 'Planned Evacuation Zones' and 'Emergency Evacuation Preparation Zones' reflecting estimated annual radiation exposure. The 'Planned Evacuation Zones' (areas with estimated annual radiation exposure of 20 milli sv) included the villages of Katsurao, Namie and Iitate, part of Kawamata town, and part of Minamisoma city. Evacuation for the Planned Evacuation Zones was planned by the national government to be implemented in approximately one month to provide enough time and preparation for the residents to evacuate. It was assessed that remaining on site for a month would not have health effects among the residents. The national government confirmed that this evacuation was almost completed on 30 June (NHK News, 30 June). For the 'Emergency Evacuation Preparation Zones', the towns of Hirono and Naraha, the village of Kawauchi, and parts of the cities of Tamura and Minamisoma are included. Those living within the 20 km radius zone were already evacuated, but these declarations imposed legal restrictions on the area in light of public safety concerns.

On 16 June the National Government established guidelines to deal with "hot spots" which are located outside the "Planned Evacuation Zone" but with an estimated annual radiation exposure level of 20 milli Sv, based on detailed environmental investigations. These sites are located mostly in the northwest area of the Daiichi nuclear power plant. Radiation measurements will be conducted at these sites on a monthly basis, and if it is confirmed that the cumulative annual measures will not exceed 20 milli Sv, the hot spot designation will be removed (Asahi, 30 June).

On 22 April, Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLIT) issued guidelines for radiation measurements in ports in Japan in order to provide information for foreign port authorities (e.g. measurements of export shipping containers; decontamination criteria, reporting).

On 30 April the Chief Cabinet Secretary announced that the Government had adopted an “Interim policy regarding decisions on whether to utilize school buildings and outdoor areas within Fukushima Prefecture”. This policy sets a limit of annual radiation exposure level of 20 milli Sv for the use of elementary schools in Fukushima. This is consistent with the recommendation of the International Commission on Radiological Protection (ICRP). If for 365 days a child spends eight hours a day in schoolyard at a dose rate 3.8 micro Sv/h, and stay indoor 16 hours, where the dose rate does not exceed 1.52 micro Sv/h, the annual dose received would reach 20 milli Sv. Consequently, the use of elementary schools should be restricted if the outdoor radiation dose rate exceeds 3.8 micro Sv/h.

The Ministry of Education is considering exchanging soil layers as a method to lower radiation levels in the affected areas. At one Fukushima kindergarten, the radiation levels dropped from 2.1-2.3 microSV/hour to 0.2 microSv/hour when the surface soil was replaced with soil that was 50 cm deep (Mainichi, 9 May). In Fukushima, 15 elementary and middle schools are part of a project to remove the upper layer of soil where radiation levels measured above 3.8 micro Sv/hour, as well as 13 nursery schools where levels of over 3.0 microSv/hour were detected (Japan Times 28 April). On 27 May, it was announced by the Ministry of Education that all schools in Fukushima will receive radiation measurement devices. It was also announced that 20 000 pregnant women will receive such measurement devices (Asahi, 25 June). Instead of the earlier announcement of the 3.8 micro Sv/h limit, the Ministry also announced that they will aim to minimize radiation exposure to children so that cumulative exposure will be 1 mili Sv/year or less. There are media reports that indicate that local municipalities and schools in Fukushima are taking their own actions to reduce radiation exposure (e.g. reducing outdoor play time for children, wearing additional clothing to reduce exposure, limitations on opening of windows, restricting outdoor swimming pool use). The Ministry also announced that they will financially assist activities that are designed to minimize radiation exposure at schools.

IAEA conducted an international fact-finding mission in late May; the mission was agreed by IAEA and the Government of Japan to identify lessons learnt from the accident in order to improve nuclear safety globally. Preliminary findings and lessons learnt include the following: Japan's response to the accident had been exemplary and dedicated under exceptional circumstances; long-term response, including evacuation of the area, has been well organized; periodic assessments of measures against natural hazards are recommended; value of Emergency Response Centres, including communication roles.

### Long term assessments and studies for the affected populations in Fukushima

Many long-term assessments and studies are now being planned and initiated to assess the health effects of the Fukushima accident. Long term epidemiologic studies are important as there is very limited epidemiologic data and understanding on the health outcomes of long term exposure to radiation at very low levels (informal communication)

- On 23 May 2011, the United Nations Scientific Committee on the effects of Atomic Radiation (UNSCEAR) reported that experts on the effects of atomic radiation agreed to start an assessment of the radiological impact of the events at the Fukushima-Daiichi plant. UNSCEAR expects to have preliminary findings by May 2012. The aim is to provide scientific insight on the magnitude of the releases to the atmosphere and to the ocean, and the range of radiation doses received by the public and workers.
- WHO's International Agency for Research on Cancer (IARC) offered its cooperation in developing a long-term epidemiologic follow-up study (informal communication); IARC had just recently called for long-term support for research to fully evaluate the health consequences of the Chernobyl accident.
- Fukushima Prefecture has started initial activities for a long-term health study of all its residents. The study is planned to include surveys on demographics, health conditions and geographic location to estimate the cumulative radiation dose exposed and planned for several decades (Yomiuri, 28 May). First, a preliminary investigation was performed

on 30 June among the population from the Planned Evacuation Zone (population size of about 26 000 to 28 000) using questionnaires to estimate the external radiation exposure. External exposure will be evaluated using data from air radiation levels and estimations based on SPEEDI. Surveys will also document location and food consumption data. For internal radiation exposure, a random sample of 120 persons will undergo a whole body scan at National Institute of Radiological Research in Chiba, and this activity has also begun. Second, the entire prefectural population (approximately 2 000 000) will be assessed, which is planned for August start and completion by the end of 2011. Lastly, a follow-up plan with further health examination will be produced to monitor those who are estimated to have had relatively high radiation exposure and those residing in the no-entry zone (estimated to be approximately 200 000) (internal communication).

- Fukushima Medical University reportedly announced on 2 June an academic collaboration with Hiroshima and Nagasaki Universities based on the latter two's knowledge and experience in the field. The need for long-term epidemiologic studies was recognized as the current radiation exposure (low level, long period) differs from that of the atomic bomb experience (high level, short period) (Yomiuri 3 April).
- Fukushima prefecture has been conducting since 13 March screening of its residents for radiation exposure. As of 28 May, 194 371 have been screened. As reported previously, 102 have had levels equal to or above 100 000 cpm; however, they were all detected during March, with none having any health effects.
- The Sasakawa Foundation has set up a special fund is accepting grant applications for proposals on relief efforts to address the long-term rebuilding of the lives of those affected both physically and mentally.

# FOOD SAFETY

## Monitoring and risk management actions – Japan

As of 17 March 2011, all local food safety inspection authorities were directed to monitor/investigate radionuclide levels in foods for identification/prevention of potential food safety risks associated with radioactive nuclide contamination. The notice indicates the provisional regulation values for radionuclide in different types of foods.

Foods that exceed these levels are regulated under the *Food Sanitation Act*. As such, actions to prevent consumption of foods that exceed the provisional levels must be applied. In addition to these measures, restrictions on foods exceeding the provisional levels can be put in place following Article 20.3 of the *Act on Special Measures Concerning Nuclear Emergency Preparedness (Act No. 156, 1999)*. A summary of the restrictions on foods that have been put in place is available on the MHLW website at: http://www.mhlw.go.jp/english/topics/2011eq/index.html

Analysis results of foods originating from Aichi, Aomori, Chiba, Ehime, Fukushima, Gifu, Gunma, Hokkaido, Hyogo, Ibaraki, Iwate, Kanagawa, Kyoto, Miyagi, Miyazaki, Nagano, Niigata, Saitama, Shizuoka, Tochigi, Tokyo, Yamagata and Yamanashi prefectures have been received.

A total of 6516 food samples results have been obtained from the MHLW, with 1974 sample results received since 8 June 2011 (previous SITREP)[1]. Samples were tested for both radioactive Iodine and Caesium or Caesium or Iodine alone. Table 5 and Table 6 provide a summary of the results received to date.

Of the 1974 samples tested since last reported on 8 June 2011, no samples were positive for Iodine and 77 samples were positive for Caesium. Sixty-one samples were from the Fukushima Prefecture (79%). Other prefectures with positive for Caesium samples include Chiba (1), Gunma (1), Kanagwa (6), Shizuoka (7) and Tokyo (1).[2]

[2] Since 6 July, when this SITREP was written, MHLW reported finding radioactive Caesium in beef sampled on 8 July from Fukushima at a level of 2300Bq/kg. At the time of writing this update the investigation was continuing and controls measures had been put in place.



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**Table 5:** Food sampling results from MHLW for radioactive cesium and/or iodine, tested between, 19 March – 4 July 2011 (Table provided by MHLW[3])

Sum up of radionuclide test results carried out since 19 March 2011

(Up-to-date Report as of 20:30, 4 July 2011)

| Food origin (Prefecture) | Food group | Number of food samples tested | Number of foods positive at levels exceeding provisional regulation limits (action levels) | Food concerned (numbers) |
|---|---|---|---|---|
| Fukushima | milk | 290 | 18 | raw milk (18) |
| | vegetable | 1994 | 218 | bamboo shoot (55), spinach (39), shiitake(38), broccoli (21), ume(11), rapeseed (6), komatuna (6), kukitachina (5), cabbage (5), shinobuhuyuna (5), kosaitai (4), mizuna (3), ostrich fern(3), turnip (3), sea oak (3), chijirena (1), hana wasabi (2), bitaminna (2), santona (2), Japanese parsley(2), wakame seaweed (1), hijiki (1) |
| | meat | 128 | - | |
| | egg | 39 | - | |
| | fishery products | 327 | 51 | ayu(12), cherry salmon (8), juvenile sand lance (6), white bite(4), hen-clam(4), japanese dace (3), greenling (3), japanese smelt(2), brown hakeling (2), blue mussel (1), sea urchin (1), northern sea urchin (2), char (1), spotted halibut (1), japanese mitten crab (1) |
| | others | 2 | 1 | raw tea leaf (1) |
| | **subtotal** | **2780** | **288 (10.4%)** | |
| Ibaraki | milk | 68 | 5 | raw milk (5) |
| | vegetable | 475 | 38 | spinach (29), parsley (7), mizuna (1), red leaf lettuce (1) |
| | meat | 7 | - | |
| | egg | 3 | - | |
| | fishery products | 242 | 5 | juvenile sand lance (5) |
| | others | 91 | 13 | raw tea leaf (13) |
| | **subtotal** | **886** | **61 (6.9%)** | |

[3] Subtotal and total percentages added by WPRO.

| | | | | |
|---|---|---|---|---|
| Tochigi | milk | 26 | - | |
| | vegetable | 210 | 11 | spinach (9), garland chrysanthemum (2) |
| | meat | 6 | - | |
| | egg | 1 | - | |
| | fishery products | 6 | - | |
| | others | 9 | 2 | raw tea leaf (2) |
| | **subtotal** | **258** | **13 (5%)** | |
| Gunma | milk | 53 | - | |
| | vegetable | 355 | 3 | spinach (2), kakina (1) |
| | meat | 8 | - | |
| | egg | 1 | - | |
| | fishery products | 8 | - | |
| | others | 6 | 2 | raw tea leaf (1), unrefined tea leaf (1) |
| | **subtotal** | **431** | **5 (1.2%)** | |
| Saitama | milk | 27 | - | |
| | vegetable | 195 | - | |
| | fishery products | 2 | - | |
| | others | 37 | - | |
| | **subtotal** | **261** | **0** | |
| Chiba | milk | 24 | - | |
| | vegetable | 359 | 11 | garland chrysanthemum (4) qing-geng-cai (1), celery (1), sanchu asian lettuce (1), parsley (2), spinach (2) |
| | meat | 4 | - | |
| | egg | 2 | - | |
| | fishery products | 140 | - | |
| | others | 18 | 7 | raw tea leaf (6), refined tea leaf (1) |
| | **subtotal** | **547** | **18 (3.3%)** | |
| Tokyo | milk | 4 | - | |
| | vegetable | 79 | 1 | komatuna (1) |
| | fishery products | 6 | - | |
| | others | 18 | 1 | refined tea leaf (1) |
| | **subtotal** | **107** | **2 (1.9%)** | |
| Kanagawa | milk | 32 | - | |
| | vegetable | 90 | - | |
| | meat | 6 | - | |
| | fishery products | 36 | - | |
| | others | 30 | 13 | unrefined tea leaf (7), raw tea leaf (6) |

| | | | | |
|---|---|---|---|---|
| | **subtotal** | **194** | **13 (6.7%)** | |
| Niigata | milk | 30 | - | |
| | vegetable | 449 | - | |
| | meat | 6 | - | |
| | fishery products | 2 | - | |
| | others | 6 | - | |
| | **subtotal** | **493** | **0** | |
| Nagano | milk | 4 | - | |
| | vegetable | 81 | - | |
| | fishery products | 3 | - | |
| | others | 4 | - | |
| | **subtotal** | **92** | **0** | |
| Miyagi | milk | 22 | - | |
| | vegetable | 100 | - | |
| | fishery products | 32 | - | |
| | egg | 1 | - | |
| | others | 2 | 0 | |
| | **subtotal** | **157** | **0** | |
| Yamagata | milk | 5 | - | |
| | vegetable | 62 | - | |
| | fishery products | 1 | - | |
| | meat | 6 | - | |
| | **subtotal** | **74** | **0** | |
| Shizuoka | milk | 2 | - | |
| | vegetable | 3 | - | |
| | fishery products | 2 | - | |
| | others | 137 | 7 | refined tea leaf (7) |
| | **subtotal** | **144** | **7 (4.9%)** | |
| Yamanashi | vegetable | 4 | **-** | |
| | others | 9 | **-** | |
| | **subtotal** | **13** | **0** | |
| Aichi | others | **9** | **-** | |
| | **subtotal** | **9** | **0** | |
| Hokkaido | meat | 1 | **-** | |
| | vegetable | 3 | **-** | |
| | fishery products | 10 | - | |
| | **subtotal** | **14** | **0** | |
| Aomori | milk | 11 | **-** | |
| | vegetable | 1 | **-** | |

| | | | | |
|---|---|---|---|---|
| | fishery products | 2 | **-** | |
| | **subtotal** | **14** | **0** | |
| Iwate | vegetable | 4 | **-** | |
| | **subtotal** | **4** | **0** | |
| Gifu | vegetable | 1 | - | |
| | **subtotal** | **1** | **0** | |
| Kyoto | milk | **1** | - | |
| | vegetable | 10 | - | |
| | egg | 1 | - | |
| | fishery products | 3 | - | |
| | others | 1 | - | |
| | **subtotal** | **16** | **0** | |
| Hyogo | vegetable | 18 | - | |
| | **subtotal** | **18** | **0** | |
| Ehime | vegetable | 2 | - | |
| | **subtotal** | **2** | **0** | |
| Others | milk | 1 | **-** | |
| | **subtotal** | **1** | **0** | |
| **total** | | **6516** | **407 (6.3%)** | |

Restriction of distribution and/or consumption within the whole and/or part of prefecture are imposed for the underlined foods.

**Table 5:** Food sampling results from MHLW for radioactive Iodine and Caesium, tested between 19 March and 4 July 2011

| | Iodine – 131 | | | Caesium (134 and 137) | | |
|---|---|---|---|---|---|---|
| No. samples tested | Total No. samples above provisional regulation value | Total No. samples tested | Proportion above limit (%) | Total No. samples above provisional regulation value | No. samples tested | Proportion above limit (%) |
| Meat and eggs* | 0 | 202 | 0.0% | 0 | 215 | 0.0% |
| Milk** | 23 | 600 | 3.8% | 1 | 591 | 0.2% |
| Produce*** | 106 | 4529 | 2.3% | 246 | 4556 | 5.4% |
| Seafood* | 3 | 815 | 0.4% | 56 | 830 | 6.7% |
| Tea products* | 0 | 306 | 0.0% | 44 | 307 | 14.3% |
| Total | 132 | 6452 | 2.0% | 347 | 6501 | 5.3% |

*Acceptable level for meat, eggs, fish, tea products: 500 Bq/kg for radioactive caesium. Fish: 2000 Bq/kg for Iodine-131.
**Acceptable level for dairy: 200 Bq/kg for radioactive caesium, 300 Bq/kg for Iodine-131
***Acceptable level for fresh produce: 500 Bq/kg for radioactive caesium.

## Monitoring and risk management actions – International

Member States around the globe have put in place imported food control measures with regard to this event.

WPRO is aware of only a few samples taken from imported foods reported to be above Codex guideline levels. Most recently, tea imported into France from Shizuoka Prefecture was found to contain radioactive Cesium levels at 1038 Bq/kg (the relevant Codex level is 1000Bq/kg and the European Maximum Authorized Level is 500Bq/kg). Controls have been put in place in Japan and France in association with these findings.

Updates continue to be provided to Member States through the International Food Safety Authorities Network (INFOSAN) and members have been requested to report results undertaken on imported food from Japan. Japan is informed of these findings through INFOSAN and WPRO. An information documents titled 'INFOSAN Information on nuclear accidents and radioactive contamination of foods' and 'Impact on seafood safety of the nuclear accident in Japan' have been provided to food safety authorities through the INFOSAN network.

Food Safety Frequently Asked Questions are available at:
http://www.who.int/hac/crises/jpn/faqs/en/index7.html and
http://www.wpro.who.int/media_centre/jpn_earthquake/FAQs/faqs_foodcontamination.htm

## DRINKING WATER QUALITY

### Advice on refraining from drinking water

MHLW issued a notice on the provisional regulation values for drinking water (300 Bq/kg for Iodine; 200 Bq/kg for Caesium) and restriction on use of drinking water by the general population on 19 March, and issued an additional notice on the provisional regulation value of 100 Bq/kg for Iodine for infant's intake of tap water on 21 March. On 10 May, the remaining restriction on drinking water for infants in Iidate Village, Fukushima Prefecture was lifted after regular monitoring showed levels of I-131, Cs-134 and Cs-137 below the maximum permissible limits.

MEXT monitors drinking water in one selected sampling location in each prefecture while MHLW collects drinking water quality data from local water districts operating in a prefecture. Both ministries collect data on I-131, Cs-134, and Cs-137 in drinking water.

Based on MEXT monitoring reports in 47 prefectures, I-131 had not been detected since 1 May up to 29 June except for the result recorded in Tochigi Prefecture, 1 May. Cs-134 readings showed that it was not detectable in all these prefectures except for the results recorded in Saitama City on 10, 20, 22, 24 and 27 May, 24 June and 2 July. The Cs-134 values were, however, below the provisional regulation limit.

In almost all the prefecture monitoring stations, the concentration of Cs-137 was non-detectable. There were only five prefecture sampling stations where Cs-137 was recorded, namely, Utsunomiya City (Tochigi), Saitama City (Saitama), Ichihara City (Chiba), Maebashi City (Gunma) and Shinjuku Ward (Tokyo). Cs-137 was detected in Saitama Prefecture on 9, 20, 23 May; in Tochigi Prefecture on 16 May; in Chiba Prefecture on 23 May; in Gunma Prefecture on 3 June; and in Tokyo Prefecture on 2 July. The detected levels of Cs-137 were below the drinking water provisional regulation limit with values ranging from 0.11 to 0.39 Bq/kg.

The MHLW monitoring data from local water districts showed that a total of four local water districts in Ibaraki, Tochigi and Saitama detected I-131 ranging from 0.3 to 8.1 Bq/kg from 10 May to 15 June. Cs 137 was detected in 10 water districts in Ibaraki, Tochigi, Gunma and Saitama prefectures. The detected levels of Cs-137 were below the drinking water provisional regulation limit with values ranging from 0.13 to 16 Bq/kg. Cs137 detected in eight water districts in Tochigi, Gunma, Saitama and Miyagi prefectures. The detected levels of Cs-137 were below the drinking water provisional regulation limit with values ranging from 0.1 to 17 Bq/kg.

# ENVIRONMENTAL MONITORING

## Monitoring of radiation levels in seawater

Seawater monitoring was performed by MEXT at the offshore seawater sampling stations while TEPCO conducted sampling near the discharge areas of Fukushima nuclear power plant (NPP). On 23 March, the MEXT began surveillance of off-shore coastal waters near Fukushima NPP site. Seawater samples have been collected in coastal waters along transects that are separated by 10-km intervals. Sampling was performed along each transect to a distance of about 30 kms offshore. Measurements of ambient dose rate in air above sea, ambient dust above the sea, surface samples of seawater, and seawater collected at 10 m above the sea bottom and in mid-layer were performed. MEXT added off-shore sampling stations in Ibaraki Prefecture on 25 April.

Recent monitoring conducted by MEXT on 20-23 and 25 June indicated that levels of I-131, Cs-134 and Cs-137 were not detected in all sampling points (Figure 6).

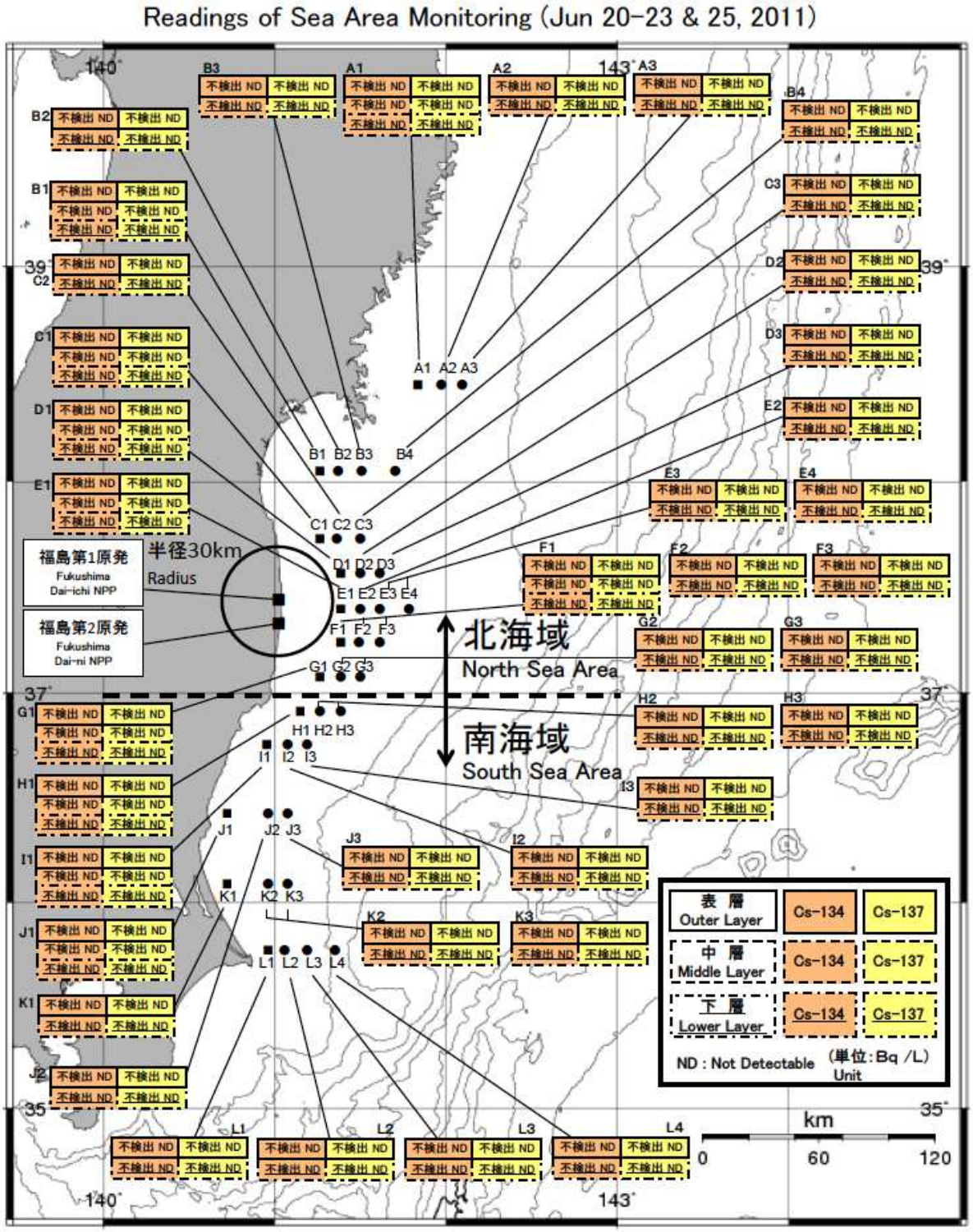



**Figure 6:** Readings of radiation levels for I-131, Cs-134 and Cs-137 at all sampling points (20-23 and 25 June 2011) Source: MEXT. ND: Not Detectable.

On 23 March, TEPCO began surveillance at the discharge canals of two NPPs, Fukushima Daiichi

and Daini (which is 10 kms south of Daiichi), and near seashore sites including Iwasawa shore, located 6 kms south of Daini. More monitoring stations were added by TEPCO. As of 6 June, there were three sampling points at 3 km offshore of, 2 points at 8 km offshore of the power station, 6 points at 15 km offshore of the power station, and 4 points near the north and south of the discharge channels. Upper and lower layer samples were collected by TEPCO.

The latest seawater monitoring results from TEPCO showed that the concentration of I-131 at the upper and lower layers had decreased and were below the maximum permissible level (Figure 6).

The trend in the concentration of Cs-137 in seawater continued to drop from the initial levels of about 68 000 Bq/L on 07 April to non-detectable levels on 1 and 3 July at approximately 30 m north of the discharge channel. There were no recorded concentrations of Cs-137 above the maximum permissible level of 90 Bq/L since 5 June at about 30 m north of the discharge channel.

At about 330 m south of the discharge channel, the Cs-137 concentration also shows a decreasing trend. Non-detectable levels of Cs-137 were also recorded on 1 and 3 July. There were no recorded Cs-137 concentrations above 90 Bq/L since 18 May. (Figure 8)

At 15 km offshore, the I-131 and Cs-137 concentrations were found to be below the maximum permissible levels of 40 Bq/L and 90 Bq/L, respectively.

The monitoring results from MEXT and TEPCO indicate that the highest levels of radioactive substances were measured at monitoring stations near the Fukushima power plant. The recorded levels near the discharge areas were decreasing but remained relatively constant.

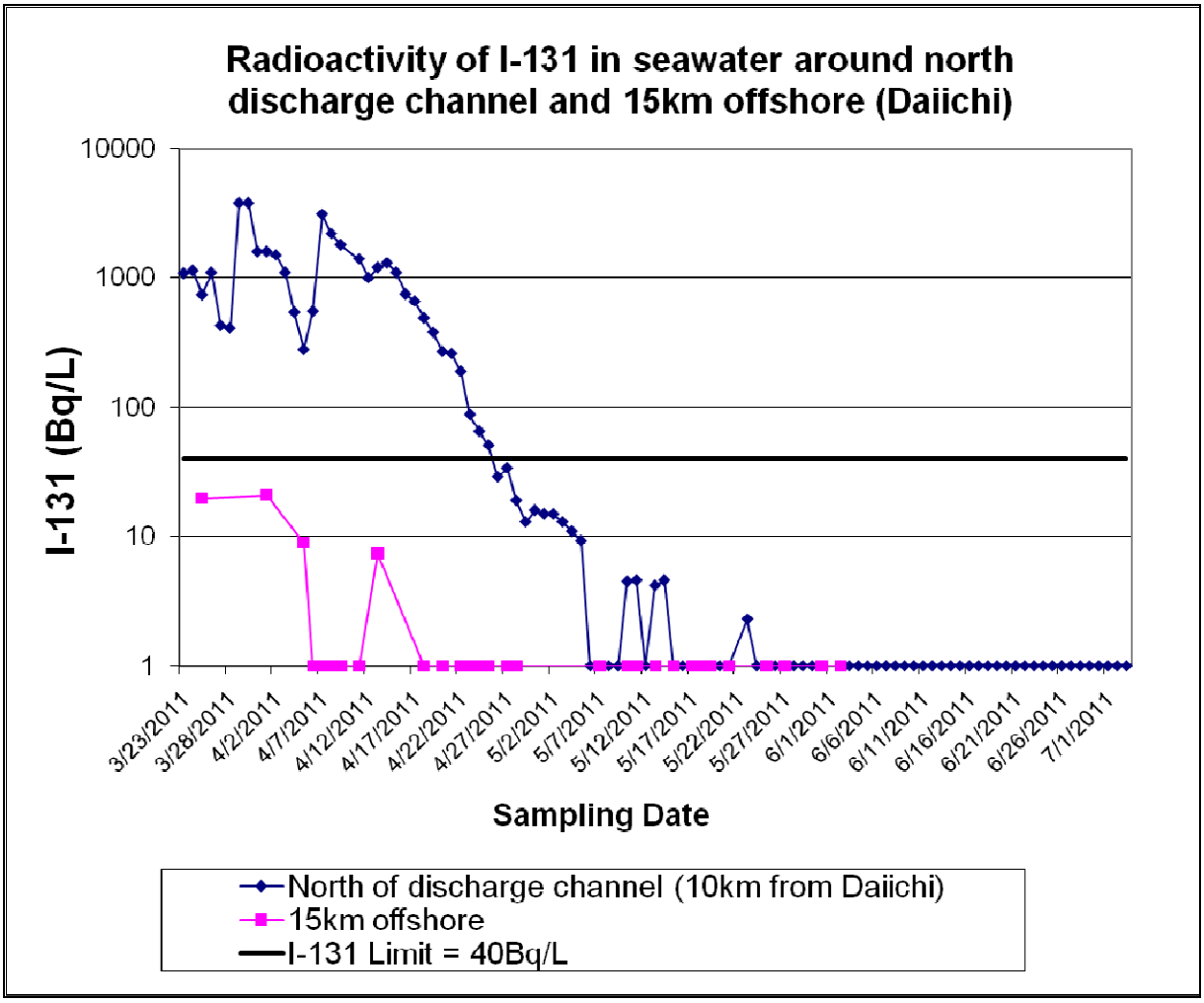



**Figure 6:** Radiation levels (Iodine-131) in seawater north and south of Daiichi discharge channels and at 15 km offshore (Daiichi) (until 3 July)

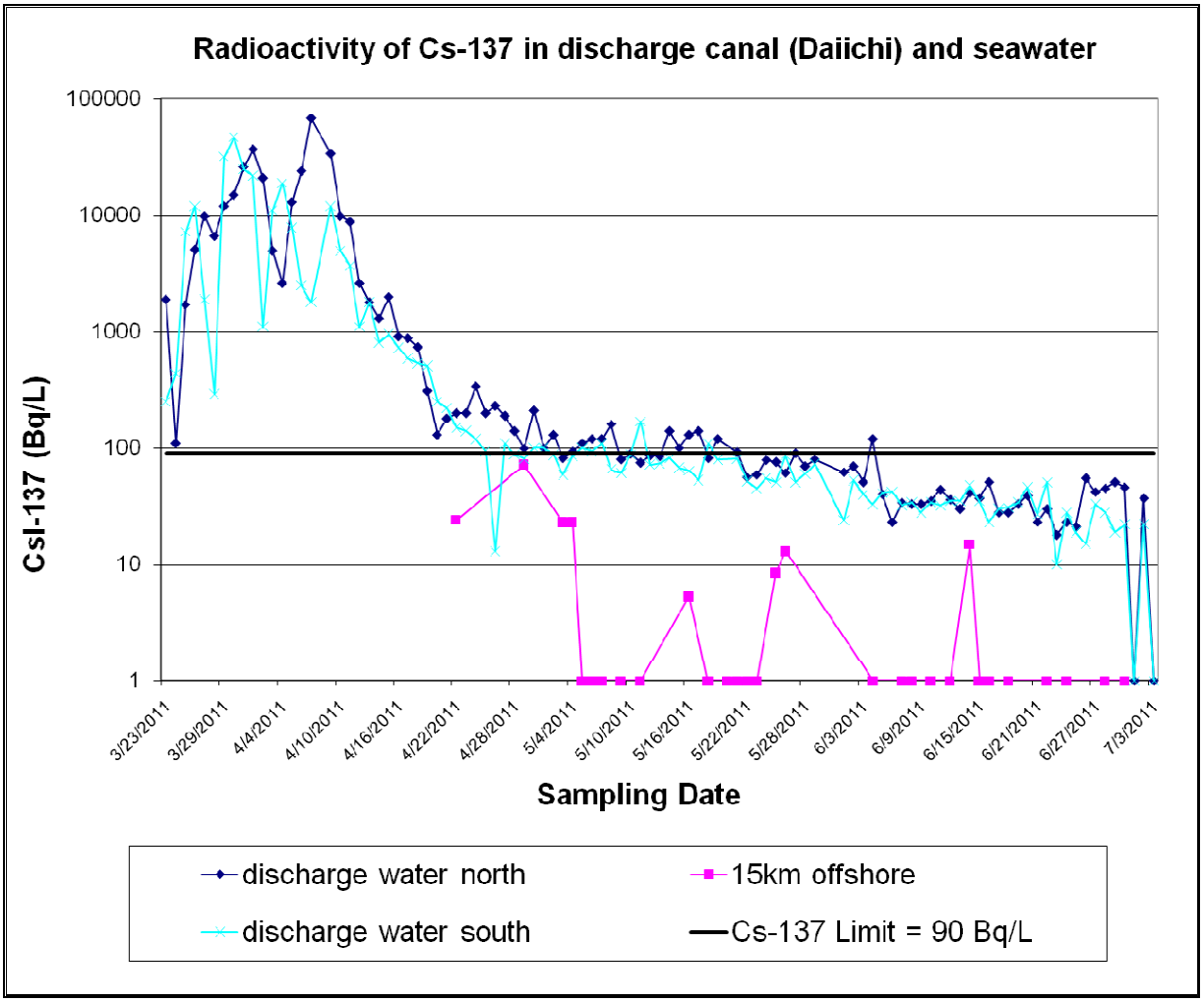
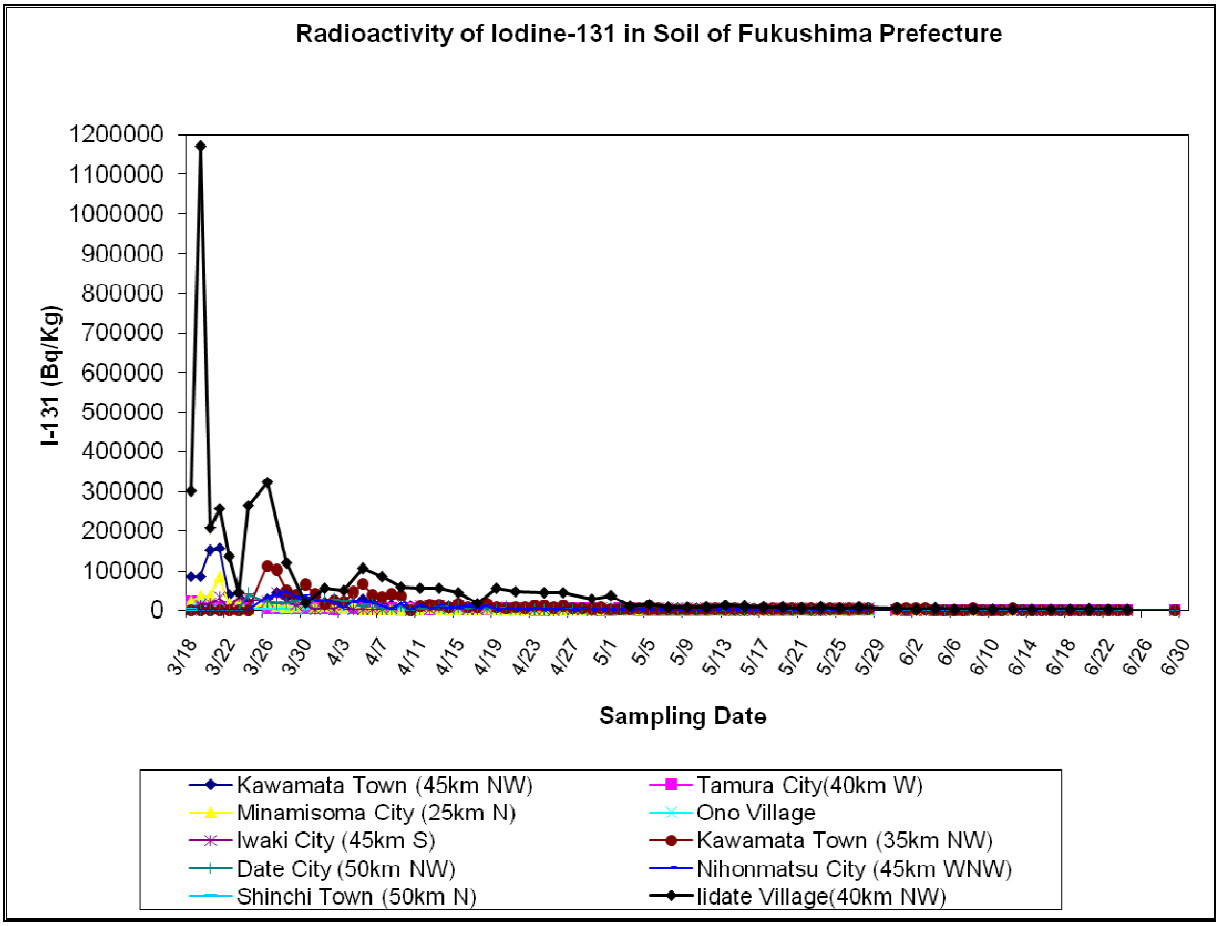



**Figure 7: Cs-137 in seawater near north discharge channel and at 15 km offshore (until 3 July)**

## Monitoring of radioactivity in soil

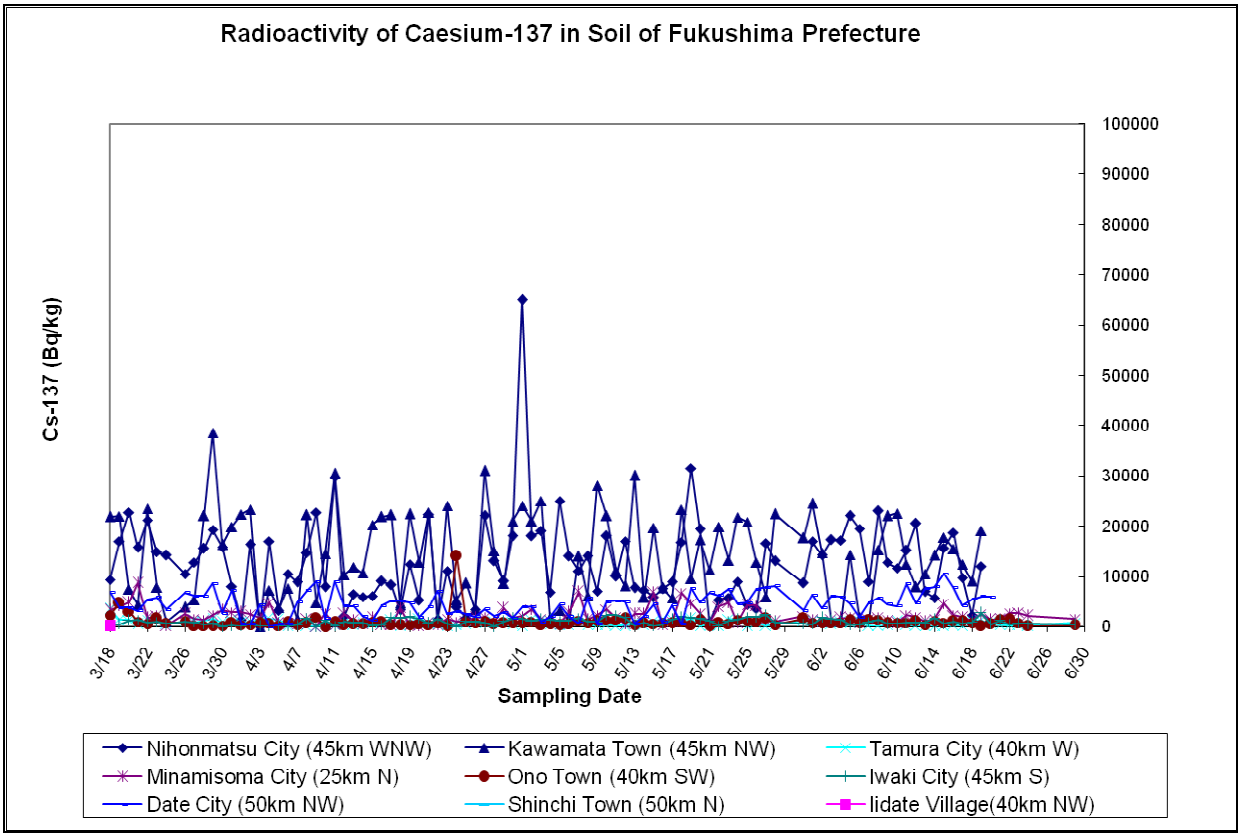
MEXT began publishing the results of the monitoring of radioactivity levels in soil on 18 March. Soil sampling had been done at a total of 36 points ranging from 20 km to 55 km from the Fukushima Daiichi NPP.

I-131 concentration in soil continued to show declining trend while Cs-137 levels were fluctuating. The highest radiation levels were recorded in Iidate Village (40 km northwest of the Fukushima Dai-ichi NPP on 20 March with 1.17 megaBq/kg for I-131 and 0.163 megaBq/kg for Cs-137). In all other sampling stations, radiation levels had been low. Since 20 March, the trend in all sampling stations had been declining.




*The values for Iidate Village shown in the graph are the average of two daily readings.*
*There is no provision guideline in place for radioactivity in soil*

**Figure 8:** Radioactivity levels of I-131 in soil of Fukushima Prefecture (as of 29 June)




*The values for Iidate Village shown in the graph are the average of two daily readings.*
**Figure 9:** Radioactivity of Cs-137 in soil of Fukushima Prefecture (as of 29 June)

### Joint MEXT - U.S. Department of Energy (DOE) Monitoring

MEXT and the US Department of Energy conducted a joint aerial monitoring starting in March to provide assessment of contamination in soil. Aerial measuring systems and ground detectors were deployed to determine Caesium deposition from aerial and ground-based measurements, in areas within 80 km to 100 km from Fukushima Dai-ichi NPP and as far as to around 120 km south of the NPP. About 136 in situ ground samples were taken through Japan for laboratory analysis in the US while 115 soil samples were received and processed in Japan (Figure 8 and Figure 9). The initial results were published on 6 May 2011 and a second airborne monitoring result was published by MEXT and US DOE on 16 June 2011. It was reported that the measurements continue to show decreasing radiation levels and that there were no measurable radiological material since 19 March.

## Monitoring of radiation levels in air

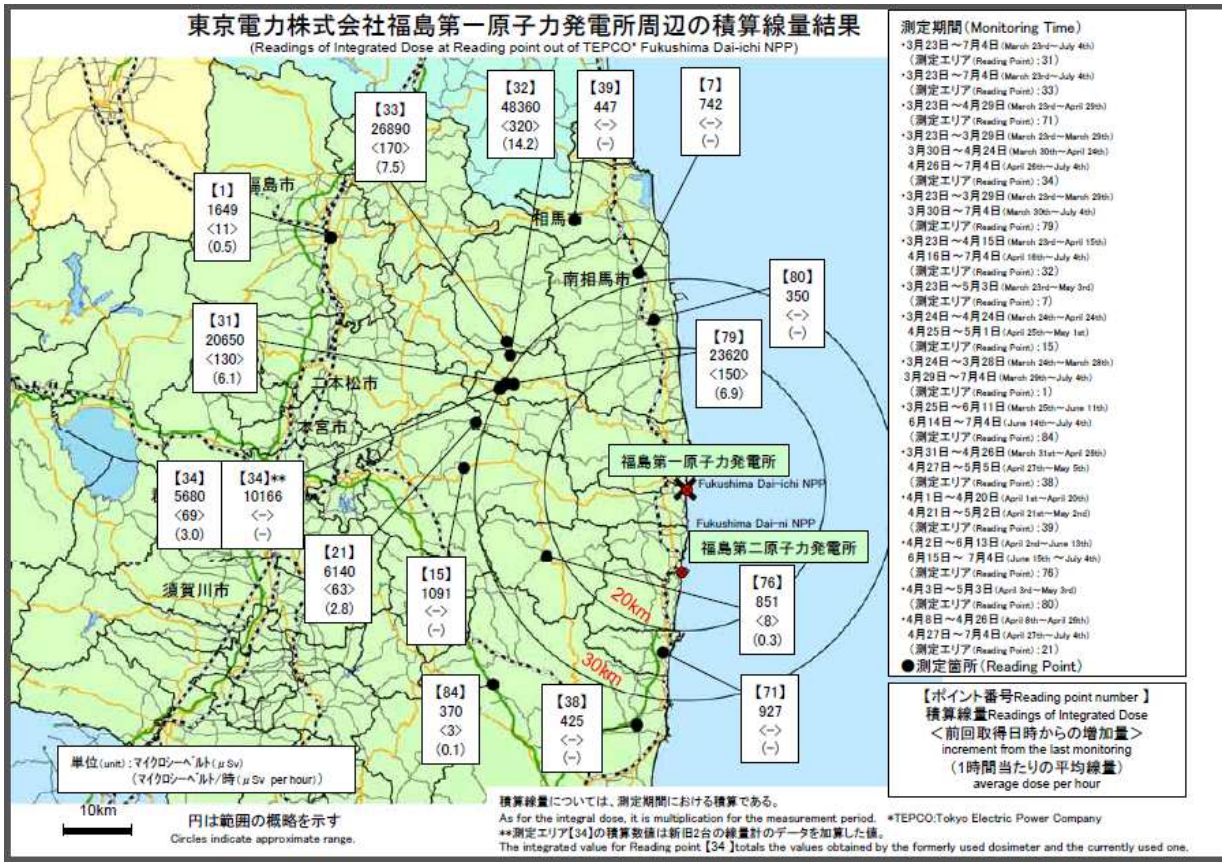
Overall, radiation levels between a 20 km and 60 km radius from the nuclear plant continue to remain stable, with higher levels continuing to be clustered around the north-west (NW) area of the plant (Figure 10, Figure 11). Levels in nearby prefectures have also continued to decline—

while a few prefectures report levels still above background levels, the levels are low in terms of human health risk.


The parenthesis refers to the location number and the number below that refers to the radiation level detected in micro Sv per hour.

**Figure 10: Reading at monitoring posts out of Fukushima Dai-ichi NPP (5 July 2011)**

Cumulative doses at various locations between 20 km and 60 km since 23 March are shown for I-131 (Figure 11). The highest cumulative levels continue to cluster around the NW area of the plant.




Explanatory note: [Monitoring Post Number] Readings of cumulative dose in micro Sv, <increase from the last monitoring period> (average dose in micro-Sv per hour).
**Figure 11:** Readings of cumulative dose at monitoring posts out of 20 km zone of Fukushima Dai-ichi NPP from 23 March to 4 July 2011 (dates variable by monitoring post)

Radiation levels in the air in nearby prefectures that had earlier reported higher than background levels (9 prefectures: Miyagi, Fukushima, Ibaraki, Tochigi, Gunma, Saitama, Chiba, Tokyo and Kanagawa) continue to show stable low-levels. As of 4 July, Miyagi, Fukushima and Ibaraki (since the last update on June), continue to report levels above background levels:

- Miyagi: 0.099 micro Sv per hour (background 0.018-0.051 micro Sv per hour)
- Ibaraki: 0.092 micro Sv per hour (background 0.036-0.056 micro Sv per hour)
- Fukushima: 1.33 micro Sv per hour (background 0.037-0.046 micro Sv per hour)

(Source: Japanese Ministry of Education)

## LONG-TERM PLANNING: ROAD TO RECOVERY

A national recovery plan has been produced and published on 25 June, representing an important post-disaster point as affected communities transition from a mostly-response phase to a mostly-recovery phase. Large scale societal changes are proposed to improve both tsunami preparedness and the overall makeup of the city/town structure (e.g., relocating the city/village/town to safer areas). The blueprint envisions that this event be taken as a unique opportunity to revive the affected communities and to go beyond basic recovery activities.

Importantly, an integrated, comprehensive regional approach for health and its relevant sectors is proposed. Maintenance of an adequate medical workforce was a long-standing issue prior to the disaster in this rural Tohoku region, and the new, holistic approach plans to enhance the coordination between the systems of medical care, public health and welfare (including disability services and pharmaceutical services), and provide sustainable MHPSS, including services at the school setting (i.e., counselors).

Restoring existing relationships in the affected areas in terms of both local community ties and individuals ("kizuna") is recognized as a priority. As these social relationships and ties are integral factors in this region, communication with community leaders and other local stakeholders is imperative. Given the important role that public health workers, particularly public health nurses, play in the community, such key players should be emphasized in recovery activities.

Long-term planning is also ongoing actively at the prefectural and local levels. At the affected sites, there is great variability in the level of impact and the associated current state of recovery. In Iwate, the prefecture is coordinating between the municipal level and the national level to help implement such plans. A prefectural master plan is being developed (including funds for temporary housing, community buildings and medical system development), with an estimated completion this summer. Discussions on the recovery "vision" plans by the municipal government are also beginning in Iwate Prefecture.

## WHO RESPONSE

Within two hours of the 11 March earthquake, WHO activated its "situation room" equipped with an event management team to monitor the evolving events of the disaster. For the first two weeks post-event, the situation room maintained 24/7 surveillance. WPRO has continued its event monitoring, information collection, synthesis and dissemination in communication and coordination with MHLW, WHO Kobe Centre, the WHO Headquarters and other partners.

Throughout this time, WPRO has worked closely with the International Health Regulations (IHR) National Focal Point of Japan and WHO Headquarters to facilitate sharing of information through the IHR Event Information Site (EIS) that is open to all WHO Member States. Technical advice has been provided to address the issues related to potassium iodide prophylaxis, food

safety and drinking water, and FAQs have been developed and updated as needed. More intensive information collection from the field and areas affected by the earthquake and tsunami was conducted in order to further understand the health situation and needs.

In total, WPRO has provided 35 situation reports since the disaster event on 11 March 2011 that have been posted on WHO websites for public availability; this report, no. 35, is the final situation report in this series. These reports were also translated into Japanese and made available on the WHO Kobe Centre website. Although information provision in the form of situation reports will cease, to ensure that information documentation continues, WPRO will continue to monitor and assess the situation.

WPRO would like to take the opportunity to express sincere gratitude to all staff and partners involved in this process which included a team of dedicated volunteers for the duration of the time situation reports were generated.

It is envisaged that the information generated by the situation room will serve as a reference tool for Japan when documenting "lessons learnt" from the disaster, when the appropriate time comes. Through sitrep generation, we have learnt that Japan is currently working on a blueprint for reconstructing communities destroyed by the earthquake. It is hoped that lessons learnt be reviewed in due course and that this documentation will serve as an educational tool to both Japan and the international community for future disaster response efforts, as did the documentation generated after the Hanshin-Awaji earthquake.

WPRO expresses deep condolences to the people of Japan whose lives have been affected by this disaster. While the situation reports will cease, in the spirit of continued solidarity, WPRO will continue to monitor and assess the situation so that appropriate support can be provided if necessary.

## CONTACTS FOR MORE INFORMATION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# APPENDIX 1

## Pre-disaster health information of affected prefectures

### Demographic profile of affected prefectures

The main prefectures affected by the earthquake and tsunami include Miyagi, Iwate and Fukushima prefectures located on the north east coastline of Japan. Combined, these prefectures have a population of 5 720 000.

Table 6 presents a demographic profile breakdown by age and sex of these prefectures. (http://www.soumu.go.jp/main_content/000076361.xls)

**Table 6:** Demographic profile of main affected prefectures

| | Miyagi | Iwate | Fukushima |
|---|---|---|---|
| ***Population*** | *2 340 000* | *1 340 000* | *2 040 000* |
| **Sex (M)** | 1 130 000 | 640 000 | 990 000 |
| **(F)** | 1 200 000 | 700 000 | 1 050 000 |
| **Age (< 15 yrs)** | 13.4% | 12.6% | 13.8% |
| **15-64 yrs** | 64.5% | 60.0% | 61.5% |
| **65 + yrs** | 22.1% | 26.8% | 24.7% |

Figures 13, 14 and 15 present the population distribution, by age for each prefecture. The elderly, older than 80 years (women proportionately higher than men) form a significant age group in these prefectures.

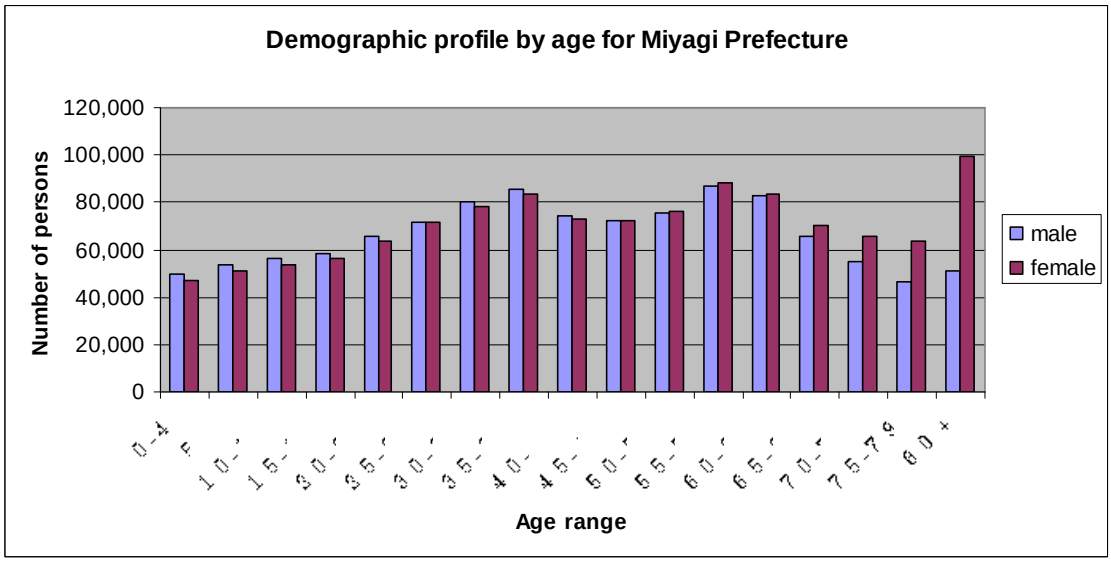


**Figure 13:** Population distribution by age for Miyagi Prefecture

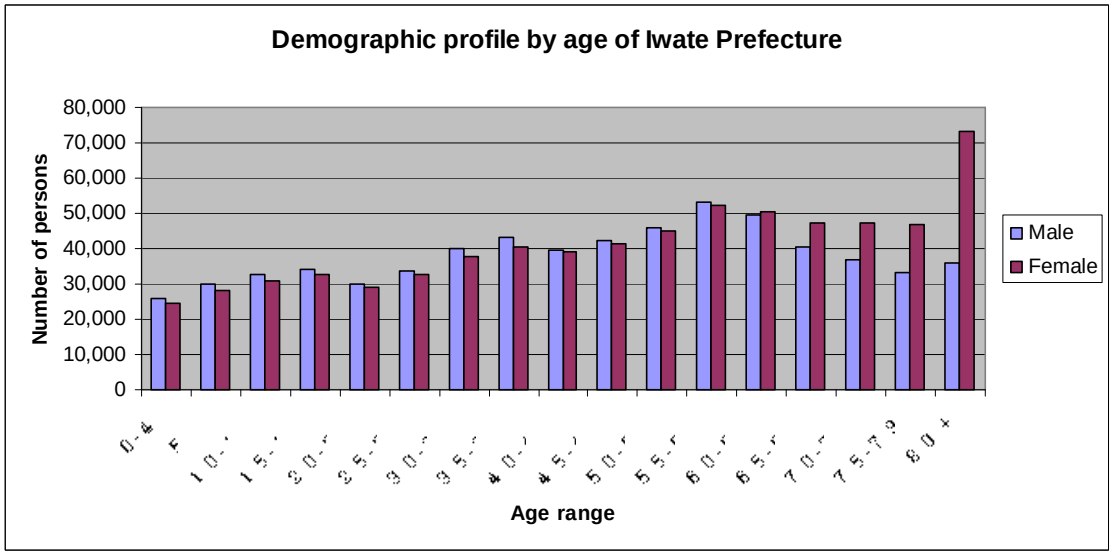


**Figure 14:** Population distribution by age for Iwate Prefecture

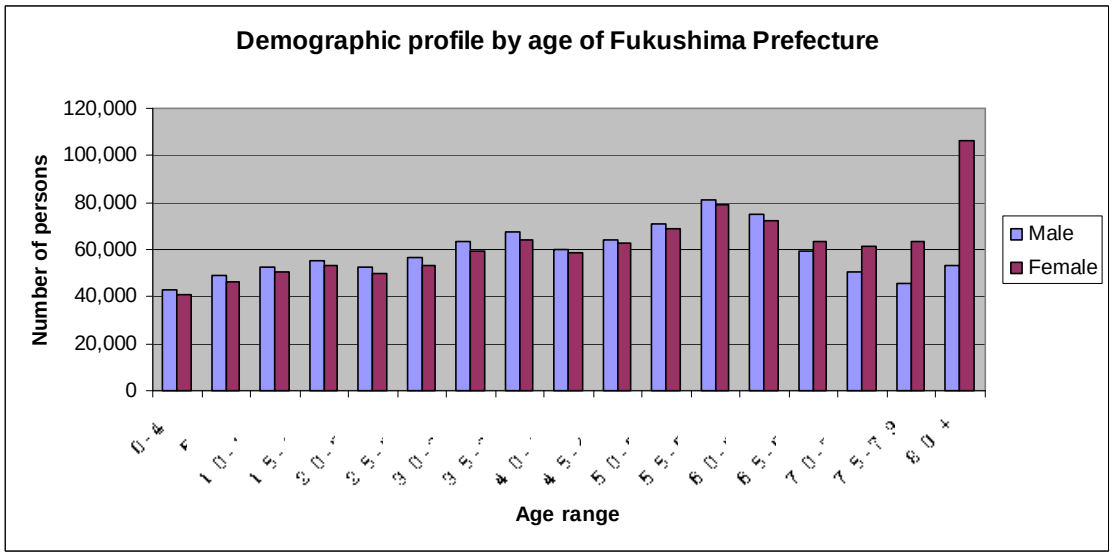


**Figure 15:** Population distribution by age for Fukushima Prefecture

### Pre-disaster disease burden in affected prefectures

Number of people with major diseases and disorders in the three main prefectures affected by the earthquake and tsunami is as listed below (Table 7).

**Table 7:** Number of patients in affected prefectures, by disease groups, in 2008

| | Miyagi | Iwate | Fukushima |
|---|---|---|---|
| Communicable and parasitic disease | 3000 | 2400 | 3000 |
| Neoplasm | 6100 | 4100 | 5900 |
| Blood, hematopoietic and immune mechanism disorder | 400 | 300 | 400 |
| Internal Secretion, Nutrition and metabolism disorder | 5900 | 4400 | 6400 |
| Mental & physical disorder | 8000 | 7000 | 9500 |
| Nervous system disorder | 3400 | 3700 | 3700 |
| Circulatory disease | 20 600 | 13 900 | 22 200 |
| Respiratory disease | 10 700 | 7200 | 12 500 |

(Source: MHLW)

**Pre-disaster health infrastructure in affected prefectures**

The total number of medical institutions (hospitals and clinics) nationally and for the affected prefectures are shown in Table 9. The number of medical institutions per 100 000 population, and full-time doctors per 100 000 people are shown in Table 10 compared to the national average. All three affected prefectures were facing problems in providing adequate level of medical services pre-disaster due to shortages of doctors working full time (below the national average) and shortages of medical institutions.

**Table 9:** Total number of medical institutions in Japan and the main affected prefectures.

| | Number of Medical Institutions | |
|---|---|---|
| | **Hospitals** | **Clinics** |
| Miyagi | 147 | 1578 |
| Iwate | 96 | 927 |
| Fukushima | 142 | 1476 |
| **National Total** | **8739** | **99 635** |

(Source: MHLW)

**Table 10:** Medical institutions and doctors per 100 000 population in affected prefectures and national averages.

| | **No. of institutions per 100 000 population** | | **No. of doctors (full time) per 100 000 population** |
|---|---|---|---|
| | **Hospitals** | **Clinics** | |
| Miyagi | 6.3 | 67.6 | 132.4 |
| Iwate | 7.2 | 69.2 | 139.9 |
| Fukushima | 7.0 | 72.4 | 125.4 |
| **National Average** | 6.9 | 78.1 | 149.9 |

(Source: MHLW)

The number of medical institutions available for some public health services in the affected prefectures is as shown below (Table).

**Table 11:** Number of medical institutions for public health services in affected prefectures

| | Aged care | Mental Health Institution | Centre for Disabled |
|---|---|---|---|
| Miyagi | 89 | 53 | 11 |
| Iwate | 126 | 33 | 15 |
| Fukushima | 117 | 47 | 9 |

(Source: MHLW)

As shown below (Table), among the three affected prefectures, Miyagi prefecture suffers most from shortage of beds available for some specific diseases.

**Table 12:** No. of beds available per 100 000 population, by disease groups.

| | | Beds for Specific Disease Groups | | | | |
|---|---|---|---|---|---|---|
| | General Hospital beds | Mental Health | Tuberculosis | Communicable Disease | Chronic Care | **Total** |
| Miyagi | 717.0 | 277.4 | **5.3** | **1.2** | **138.2** | 1139.0 |
| Iwate | 824.7 | 347.1 | 12.5 | 2.7 | **213.6** | 1400.5 |
| Fukushima | 806.6 | 362.4 | 9.1 | 1.8 | **219.9** | 1399.7 |
| **National Average** | **710.8** | **273.0** | **7.0** | **1.4** | **263.7** | **1256.0** |

(Source: MHLW)

**Pre-disaster plans - health emergency preparedness of affected prefectures**

- Miyagi
  - 14 hospitals are designated as Disaster Designated Hospitals.
  - Manual for disaster medical assistance activities in the event of a large scale disaster exists.

- Iwate
  - 11 hospitals are designated as Disaster Designated Hospitals.
  - Disaster Designated Hospitals are decided to be in charge of deployment of DMAT.
  - Public health team based in health care centres to be in charge of public health activities, including consultation with affected people, health surveillance and mental health care.
  - A system to provide medical goods reciprocally among medical assistant teams was established in case medical institutions are affected.
  - "Iwate Emergency Medical Information System" was established in order to collect and disseminate information including availability of receiving patients and situation of essential lifeline infrastructure.

- Fukushima
  - 8 hospitals are designated as Disaster Designated Hospitals.
  - Disaster emergency medical equipments are stockpiled at 6 health centres for early response.
  - Team has been trained to be part of DMAT, as conducted by the government.
  - (Source: Prefecture websites)

# APPENDIX 2

## National Institute of Infectious Diseases risk assessment of infectious diseases

| | Baseline information: Baseline incidence/reported cases in involved area (1) or whole country (2) | vaccine coverage in involved area (1) or whole country (2) | likelihood of epidemic in the quake zone: 1 = low; 2 = medium; 3 = high | acute impact on population (morbidity/mortality/political): 1 = low; 2 = medium; 3 = high | Level of risk: 1 = low risk; 2 = medium risk; 3 = high risk | comments |
|---|---|---|---|---|---|---|
| **Water/food borne disease** | | | | | | |
| **AWD** | | | **3** | **2** | **3** | Norovirus infections have been reported from evacuation centers |
| **bacterial AWD (e.g. salmonellosis, campylobacter, enteropathogenic E. coli, Clostridium perfringens)** | | | **3** | **2** | **3** | An outbreak has been reported at an evacuation centre (69 cases) due to improper storage of a large quantity of meat that was cooked several days prior to consumption. Due to increase in temperature, it is important to practice food safety. |
| **hepatitis A** | | | **1** | **2** | **1** | |
| **hepatitis E** | | | **1** | **2** | **1** | |
| **Vector borne/zoonosis** | | | | | | |
| **leptospirosis** | | | **1** | **2** | **1** | infection possible from exposure to fresh water/soil |
| **tsutsugamushi disease** | | | **2** | **2** | **2** | 2 peaks from spring to early summer and fall to early winter; associated with outdoor activity; since June, Tohoku region has reported increase in cases |
| **CDs associated with over crowding** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **ARI** | | | **3** | **2** | **3** | Many cases, mostly among elderly, from evacuation centers reported. Various etiologic agents suspected. Continued vigilance important for elderly and those with disabilities. |
| **ILI/influenza** | | | **1** | **3** | **2** | Influenza activity declining nationally and activity at evacuation centers in Tohoku also assessed to have lower activity levels. |
| **TB**** | | | **2** | **2** | **2** | Elderly case from evacuation centre reported |
| **Vaccine preventable** | | | | | | |
| **measles** | | | **3** | **3** | **3** | Since week 15, measles reports increased in the capital region, but have since declined. However, for those who have not had the 2 course immunization, they are recommended to be fully immunized prior to visiting evacuation centers. |
| **Rubella** | | | **3** | **1** | **2** | |
| **mumps** | | | **2** | **2** | **2** | |
| **chickenpox** | | | **2** | **2** | **2** | Child from evacuation center has been reported with chickenpox |
| **tetanus*** | | | **2** | **3** | **3** | Possible from exposure to soil after injury with open scars |
| **pertussis** | | | **2** | **2** | **2** | |
| **Skin infections** | | | | | | |
| **scabies** | | | **1** | **2** | **1** | |
| **Mycosis such as *Trichophyton* infection** | | | **2** | **1** | **1** | |
| **Other** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| **blood related diseases (HBV/HCV/HIV)** | | | **1** | **2** | **1** | transmission possible from body fluids/blood from infected |
| **injury related infection*** | | | **2** | **2** | **2** | |
| **bacterial, viral meningitis** | | | **1** | **2** | **1** | |

*risk high for rescue and recovery work

**health impact beyond acute phase

**Table updated 20 June 2011.**