2025 Fukushima Medical University International Symposium on the Fukushima Health Management Survey

Q & A

The questions from participants and answers
(including those that could not be answered on the day of the Symposium)

Date: Thursday, February 20, 2025

Venue: FMU Fukushima Ekimae Campus

Basic Survey

1	Q	Is it safe to assume that there are no significant effects compared to Hiroshima and Nagasaki, regarding thyroid lesions malignant or suspicious for malignancy following the nuclear accident?
	A	In Fukushima, no consistent dose-effect relationship, such as an increase in thyroid cancer detection rates with increasing radiation doses, has been observed since the nuclear accident. Conversely, an increase in thyroid cancer detection has been observed in Hiroshima and Nagasaki atomic bomb survivors exposed to much higher radiation doses than those in the aftermath of the Fukushima nuclear accident. The results from Fukushima are not contradictory to those from Hiroshima and Nagasaki.

Thyroid Ultrasound Examination (TUE)

1	Q	I think it is essential to increase the number of medical institutions that conduct the Thyroid Ultrasound Examination. What are the criteria for becoming one of these institutions?
	A	We have established criteria that institutions must meet to ensure the accuracy of thyroid examinations. These criteria include having a specialist accredited by at least one of the following academic societies: the Japan Thyroid Association, the Japan Association of Endocrine Surgery, the Japan Society of Ultrasonics in Medicine, and the Japan Endocrine Society (Pediatrics). Alternatively, a specialist can be accredited by completing a qualification examination administered by the Fukushima Prefecture Thyroid Examination Support Joint Committee.
2	Q	Very few institutions in the Aizu and Minamiaizu regions conduct TUE. Is it possible to receive the examination at other places or institutions?
	A	In areas where few institutions conduct TUE, such as the Aizu and Minamiaizu regions, we are working to set up and schedule examinations more often, at public facilities. We will continue with efforts to increase the number of institutions conducting examinations, as well as to conduct more examinations at public venues for examinees' convenience.
3	Q	Regarding the cumulative detection rate of malignancies or suspected malignancies on page 22* of your presentation slides, what is the population of the covered participants? Also, what is the reason for grouping exposure doses into 3 mSv or less, 3 to 10 mSv, and 10 mSv or more?
	A	The Kaplan-Meier method of statistical analysis that we use covers participants who have undergone at least one examination or those registered in the cancer registry who can be followed up. The number of such people is decreasing over time. The baseline number of participants (at the start of follow-up) is not disclosed. Regarding the grouping of exposure doses, this is determined by subject matter experts in the Thyroid Examination Evaluation Subcommittee. Subsequent analysis is performed as directed by the Subcommittee. *P22 Cumulative detection rate of malignant or suspected malignancy
4	Q	How do you calculate the participants' radiation exposure doses for TUE? Also, I assume that these are post-accident estimates, but how reliable are they?
	A	The radiation exposure doses for TUE participants are estimates calculated from behavioral records obtained in the Basic Survey. We have confidence in the estimates because they are calculated using a method that has been peer-reviewed and published in the international scientific literature.
5	Q	In TUE, eligible participants are monitored and examined. However, the question remains whether there is a linear relationship between radiation exposure of 100 mSv or less and the risk of cancer.
	A	Based on data released by the Thyroid Examination Evaluation Subcommittee, no statistically significant relationship between radiation exposure dose and thyroid cancer detection has been identified thus far.
6	Q	According to the results of the TUE to date, there has been no significant association found between thyroid cancer and radiation exposure doses in Fukushima. However, the question remains as to whether there is any reason to continue the survey in the future. What is the necessity of conducting the examinations on this scale, even though it requires a considerable amount of effort or workload in terms of staffing, etc.?
	A	Currently, there is no scientific evidence of an association between thyroid cancer and radiation exposure in Fukushima following the disaster. However, respondents to a questionnaire survey conducted by Fukushima Prefecture included people who would like to continue receiving checkups. We believe it is important to ensure that those who wish to participate in TUE can continue to do so.

7	Q	Given the time that has passed since the nuclear accident, do you think that thyroid cancer is increasing due to aging or lifestyle factors rather than radiation? What are your thoughts on future TUE in light of this?
	A	Yes, age brings an increased risk of developing thyroid cancer, with or without known risk factors such as obesity or smoking. Going forward, it will continue to be important to analyze the circumstances associated with thyroid cancer onset.
8	Q	The current examination method may not be entirely objective due to potential biases and confounding factors, which makes it challenging to determine the association between radiation exposure doses and thyroid cancer detection. Perhaps it would be beneficial to demonstrate to the public how our methods differ from ideal epidemiological survey methods.
	A	As you point out, the analysis of survey results is subject to confounding factors and other biases, so we are proceeding with analytic methods with expert guidance from the Thyroid Examination Evaluation Subcommittee.
9	Q	Fukushima Prefecture has the lowest number of doctors per 100,000 population in Japan. Isn't normal medical care being squeezed by continuing TUE?
	A	As TUE continues at the request of residents, it is part of normal medical care. We believe that TUE also contributes to general health by helping to detect and prevent other diseases among TUE participants.

Comprehensive Health Check (CHC)

1	Q	I understand that FMU shares the results of the Comprehensive Health Check analysis with municipal officials and discusses the physical effects of evacuation life after the disaster. What feedback have you received from the municipalities?
	A	Municipalities have inquired about specific measures to reduce the high rates of heart attack and stroke, along with ways to address obesity among adult males, and strategies to enroll adult males in health guidance classes.
2	Q	How are the results of the CHC utilized to maintain and promote the health of residents in Fukushima Prefecture?
	A	Analysis reports summarizing the results of health examinations are used to identify health issues and guide health policies in municipalities, thereby contributing to the maintenance and promotion of health among residents. In addition, our Center is working to enhance health awareness among participating residents by dispatching staff to hold health seminars and give lectures. This serves to inform residents about trends in health checkup results and suggest preventive measures.
3	Q	Do you intend to delve deeper into gender differences in diabetes onset due to psychological burden in the future, such as in joint research or collaboration with the KOKOKARA Survey?
	A	Yes, we have initiated follow-up studies on gender differences in diabetes onset due to psychological burden, including gender differences in diabetes complications and life expectancy.
4	Q	I understood that psychological burden was associated with the new onset of diabetes in men. Is it possible that psychological burden or the presence or absence of evacuation experience had health effects outside the 13 evacuation zone municipalities?
	A	Since this Survey covers residents of the 13 municipalities in the evacuation zone, we cannot evaluate residents outside this area to the same extent. In general, psychological burden affects the development of diabetes regardless of whether or not a person has evacuated, so we cannot rule out the possibility that the presence or absence of psychological burden also affected residents outside the 13 municipalities in the evacuation zone.
5	Q	Can we see a reverse causal relationship between "psychological burden increases the onset of diabetes in men" and the result that men with diabetes tend to have psychological burden as a consequence?
	A	The possibility of such a reverse causal relationship is indeed a question worthy of evaluation with the help of CHC data.

Mental health and Lifestyle Survey - KOKOKARA Survey

1	Q	How did school shutdowns due to COVID-19 affect children? Were there any factors related to the experience of the 3.11 Disaster?
	A	As for the impact on children of school shutdowns due to COVID-19, our telephone support team reports that many of those who called for assistance reported that their children were constantly playing video games at home, and that parent-child fights and sibling rivalries had increased. Many respondents reported that their children were frustrated and clashed with each other because family members were together day and night due to school shutdowns and remote work. In the 3.11 Disaster, there were situations where parents' anxiety influenced their children, suggesting that anxiety, because they could not see an end in sight, was also common during the COVID-19 pandemic.
2	Q	KOKOKARA Survey indicates that there has been no progress in improving sleep satisfaction. What are the possible factors?
	A	During telephone support, many respondents stated that they were not satisfied with their sleep compared to before the 3.11 disaster. Among them, many expressed anxiety about their future lives, including concerns about work, returning home, and the ongoing COVID-19 pandemic. Therefore, sleep quality should continue to be monitored closely.
3	Q	Do you plan to provide support to KOKOKARA Survey respondents, not only telephone support, but also chat, etc.?
	A	Although tools such as chat are very effective for delivering support to large groups of people, implementation is difficult due to issues such as manpower and system construction. However, we would like to consider it.
4	Q	From your presentation, I understand that a lack of places or people to consult is associated with lower overall mental health. Are there any age- or gender-related trends among those who do not have anyone or anywhere to consult?
	A	A paper derived from the KOKOKARA Survey describes the characteristics of those without places or persons to consult. According to the research, the following characteristics tended to be associated with having nowhere or no one to consult: being male, being middle-aged, being financially disadvantaged, being a person living alone, being elderly, and living outside the prefecture. For more information, please see the paper abstract below. Vulnerability of Evacuees Having No One to Consult after the Fukushima Nuclear Disaster: The Fukushima Health Management Survey
5	Q	I assume that telephone support outreach is covered for those who responded to the KOKOKARA Survey. How should you approach those who did not respond?
	A	We regret that we are unable to check the status of those who have not yet responded or provide telephone support to them. Therefore, we are developing methods to facilitate their response, including the option to respond online. Additionally, given that the Survey can be disseminated to all respondents, we enclose materials such as lists of consultation resources and pamphlets.

6	Q	According to the results of the KOKOKARA Survey, problem drinking due to the effects of the COVID-19 pandemic has decreased* among both men and women. Please specify the reasons or factors involved. What about other relevant factors, beyond gender? These could include factors such as place of residence, type of residence (single or two-or-more-person households), and age group.
	A	About the prevalence of problem drinking during the COVID-19 pandemic, there has been a decrease in overall rates for both men and women, though these trends vary by age group. Therefore, it is critical to continue monitoring problem drinking by age group as well as overall. Furthermore, the ongoing pandemic has led to a notable rise in problematic drinking among residents who live outside the prefecture, and we assist with this through our telephone support. *Presentation slide 14 - Proportion of those suspected of problematic drinking by gender
7	Q	You indicated that one potential reason to prevent the increase in the percentage of high-risk individuals with overall mental health in the COVID-19 pandemic may have been that they had already gained resilience from their experience in the Great East Japan Earthquake and Tsunami. Please provide a simple explanation of the term "resilience."
	A	Resilience is commonly described as "supple recovery," which conveys an image of bending rather than breaking or snapping under stress. What is bent by stress can gradually return to its original shape.
8	Q	Based on the results of the KOKOKARA Survey, the increase in the percentage of high-risk individuals with overall mental health in the COVID-19 pandemic is minor*, but isn't it an underestimation?
	A	The percentage of high-risk individuals in general health, which has been decreasing since the 3.11 disaster, increased in the COVID-19 pandemic, but only slightly. Given the number of individuals who have experienced mental health issues due to the pandemic, it is crucial to continue monitoring the situation, in part to be sure that we are not underestimating any health problems. *Presentation slide 15 - Proportion of adults at high risk of general mental health problems, based on K6

Others

1	Q	I understand that there are many disaster-related deaths due to long-term evacuation or other reasons, other than the effects of radiation exposure. But please tell us about the effects of radiation exposure.
	A	Disaster-related deaths are considered those resulting from the aggravation of original injuries caused by a disaster or illnesses resulting from the physical burden caused by the evacuation, and at this point, there are no such case reports caused by direct effects of radiation exposure.
2	Q	The Fukushima Daiichi nuclear accident has highlighted issues with Taiwan's medical response system. Please explain the specific issues that have been identified and the measures being taken to address them.
	A	After the Fukushima nuclear disaster, we realized that our previous plan for nuclear emergency hospitals had some weaknesses. Some of the 19 designated emergency hospitals for nuclear disasters in Taiwan are too close to nuclear power plants. If a nuclear accident happens, these hospitals may not be able to function. After the Fukushima disaster, three hospitals near the nuclear plant lost their function due to the tsunami or had to be evacuated because they were inside the emergency response zone. In Japan, some hospitals designated for nuclear disasters were not well-prepared for general disasters, meaning they could not treat regular patients. On the other hand, hospitals that could treat regular patients often could not handle patients exposed to radiation. To address this issue, Taiwan decided that large emergency hospitals should also be able to handle patients with mild radiation contamination. However, some hospitals are resistant to this change, and efforts are still being made to push forward. Currently, basic radiation patient management has been added as a required course for emergency doctors in training and is even included in their certification exams. The goal is to ensure that all emergency doctors have at least the basic skills to handle radiation-exposed patients and do not fear treating them. Most importantly, the Fukushima accident showed Taiwan’s medical community that worst-case scenarios can happen. We must be well-prepared to respond effectively when needed.

3	Q	What has Taiwan learned from Japan's efforts in reconstruction, recovery, and disaster response?
	A	Taiwan has learned several important lessons from Japan’s disaster response and recovery efforts: **Disaster Response** 1. Disasters can be complex: The Fukushima nuclear disaster was not just a nuclear accident—it was also affected by an earthquake and a tsunami. This showed that emergency response plans may not always work as expected, so they must be flexible and continuously updated. 2. Communication is critical, and backup plans are needed: During a disaster, communication systems may fail. Japan’ s experience showed the importance of having multiple backup communication methods, such as satellite phones and radios, to ensure effective coordination. 3. Evacuation is much harder than in drills, especially for hospitals and nursing homes. In real disasters, evacuation is far more difficult than in training exercises. Patients in hospitals and residents in nursing homes often have mobility issues, making evacuation complicated. More detailed planning is needed to ensure their safety. 4. The psychological impact of a nuclear disaster is huge, and early risk communication is essential: After the Fukushima accident, fear of radiation affected many aspects of life, including the economy and community recovery. Japan’s experience showed that clear and transparent communication about risks in the early stages of a disaster is crucial to prevent panic and misinformation. **Recovery** Recovery is a long-term process: The effects of the Fukushima disaster did not disappear quickly. Rebuilding land, industries, and communities takes many years. Taiwan has learned that disaster recovery is not just about rebuilding infrastructure; it also requires long-term social and economic support to help affected areas fully recover. These lessons have helped Taiwan improve its disaster preparedness and understand the challenges of long-term recovery.
4	Q	What kind of international cooperation do you think is important for disaster preparedness in Taiwan?
	A	I think that “information” is most important. Since Taiwan has very few actual radiation emergency events and limited research resources, international cooperation is very important for us. We hope to focus on two key areas: 1. Sharing real case experiences: By working with countries that have handled radiation emergencies, we can learn from their response experiences, medical treatment processes, and long-term health monitoring. This helps fill the gap in Taiwan’s practical experience. 2. Innovation in radiation disaster medical science: This includes improving training methods, such as virtual reality simulations, joint international drills, and standardized guidelines for diagnosis and response. These efforts can help medical professionals improve their skills and response efficiency. Through these international collaborations, we hope to strengthen Taiwan’s ability to respond to radiation disasters and ensure a quick and effective reaction in case of an actual event.

5	Q	During the COVID-19 pandemic, Taiwan used a digital system to monitor mask purchases and prevent hoarding. Could this method be applied to monitor individual radiation exposure doses in the event of a nuclear accident, and to determine which medical facilities should receive patients based on their exposure levels?
	A	Taiwan does have an IT emergency patient tracking system for pre-hospital care and an IT system for hospital transfers during disasters. Thank you for your suggestion—integrating radiation dose tracking into the existing system is indeed worth considering. Currently, radiation-exposed patients from nuclear power plants are documented on paper, and they are sent to designated partner hospitals. However, this process has not yet been integrated into a digital system.
6	Q	The possibility of a crisis in Taiwan (China's unification of Taiwan) has been a growing concern in Japan in recent years. In light of these changes in the situation, it seems that the vulnerability of nuclear power plants to military attacks and cyberattacks is also increasing. Are manuals for medical personnel involved in radiation-related matters being revised as necessary to respond to these issues?
	A	Indeed, the threats facing Taiwan have increased significantly in recent years. Last year, Taiwan’s Ministry of Health and Welfare launched a Resilient Medical System Plan, and one of its initiatives includes developing manuals for both surgical and non-surgical medical personnel, referencing international tactical medicine practices. These manuals are not limited to radiation-related medical staff but cover a broader range of emergency and disaster response situations.
7	Q	Dr. Chen Ming-tai, you specialize in emergency medicine, but what sparked your interest in radiation disasters?
	A	In Taiwan, disaster medicine is a part of emergency medicine, and radiation disaster response is a subfield of disaster medicine. As I mentioned in today’s talk, in 2007, while completing my emergency medicine training, I had the opportunity to receive short-term radiation disaster medical response training in Japan. After 2012, I frequently visited Fukushima and other countries to learn more, and over time, I developed an interest in this field.
8	Q	I believe that Taiwan has a conscription system. Are conscripts educated or trained to respond to radiation emergencies, such as radiation protection, as part of preparations for a radiation emergency?
	A	Over 20 years ago, I served as a naval medical officer in Taiwan and am still in the reserve force. At that time, we did receive some basic training in nuclear, biological, and chemical (NBC) protection. However, since I have been out of active service for a long time, I am not entirely sure about the current situation. That being said, such training is likely still included in the military's preparedness programs.
9	Q	In Taiwan, are preparations being made for health surveys similar to those conducted in Fukushima if radioactive materials are released from a nuclear power plant?
	A	As far as I know, after the Fukushima nuclear disaster in Japan, Taiwan’s Nuclear Safety Commission has continued to pay close attention to related issues and has been actively learning and preparing. Based on past experiences, such as the handling of radioactive rebar incidents in 1982, I believe the Taiwanese government would also implement similar measures.

10	Q	Is the LNT (linear no-threshold) model commonly accepted in Taiwan?
	A	As a medical professional, I understand that while the LNT (linear no-threshold) model remains a topic of debate in academia, in clinical practice we generally follow the ALARA (as low as reasonably achievable) principle. This means minimizing radiation exposure as much as reasonably possible without compromising diagnostic or therapeutic quality. This practical approach is, in a way, based on the idea that even low doses of radiation may carry some risk—an idea consistent with the LNT model. While I cannot speak for policy-level decisions, this risk awareness and protective practice are certainly part of our everyday work in healthcare.
11	Q	Please tell us the normal exposure limits for radiation workers in Taiwan.
	A	In Taiwan, under normal circumstances, the radiation dose limit for occupationally exposed workers is not to exceed 50 mSv in any single year, and the average annual dose over any consecutive 5-year period must not exceed 20 mSv, which means a total of no more than 100 mSv over 5 years. These limits are stipulated in the Ionizing Radiation Protection Act and the Standards for Protection against Ionizing Radiation, enforced by the Nuclear Safety Commission (NSC) of Taiwan.
12	Q	In Taiwan, is there a standard protocol regarding training for medical professionals who work outside of the designated radiation emergency response hospitals?
	A	In Taiwan, regardless of whether a hospital is designated for radiation emergency medical response or not, medical personnel who are occupationally exposed to radiation—such as those involved in radiological procedures—are required to receive radiation protection training, especially if they need a radiation safety license as mandated by the Nuclear Safety Commission. For radiation emergency medical response, the Ministry of Health and Welfare has commissioned the Taiwan Society of Emergency Medicine's Disaster Medical Education Center to provide free training courses across different regions. These courses are publicly announced and open to all hospitals—designated or not— with no mandatory participation. Interestingly, in recent years, participation from non-designated hospitals has been even higher than from designated ones.
13	Q	How are local governments and medical institutions in Taiwan coordinated, and how do they share information in an emergency? How are medical institutions involved in releasing information on radioactive material releases and measurements, and distributing and administering iodine tablets?
	A	In Taiwan, coordination and information sharing between local governments and medical institutions during a nuclear emergency are carried out under the Nuclear Emergency Response Act and related regulations. The Central Emergency Operations Center issues instructions based on the situation, and local emergency response centers—usually led by city or county governments—are responsible for implementing protective actions, including the distribution of KI tablets. Medical institutions are not the primary units responsible for KI distribution; this task is handled by the local public government. However, if a hospital is assigned a role in the regional emergency response plan, it may assist during emergencies by providing support or medical consultation. In general, medical institutions focus on public education, health advice, and assisting local authorities, but they do not directly manage the storage or distribution of KI tablets.