# Fukushima Radiation Health Risk Management

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## Tomoko Inamasu

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*A Summary of the International Academic Conference on Radiation Health Risk Management which was held in Fukushima, Japan from February 25–27, 2013.*

## Background

More than two years have passed since the Fukushima Daiichi Nuclear Power Plant Accident of March 2011, which made a tremendous impact internationally. The first international expert symposium, 'Radiation and Health Risks' was held in Fukushima from September 11-13, 2011, joined by world's leading radiation experts who discussed health risks of low-dose radiation exposure according to different dose level scenarios, and underscored the importance of the Fukushima Health Management Survey launched in May 2011, in establishing solid scientific evidence on dose evaluation and risk assessment (References 1-3). The primary objective of the second conference in February, 2013 was to respond to the expectation of the global community eager to understand the progress of the survey. The conference was intended to review domestic and international responses to the accident, and based on the latest findings, it aimed to identify more realistic directions for current and future actions. Speakers were selected from domestic entities within the government nuclear emergency framework, international authorities of radiation protection, and leading academic institutes throughout the world. Discussions highlighted responsibility of scientists in ongoing and future radiation health management efforts and reconstruction of public trust.

## Initial Medical Response

The opening session focused on experience of front-line first responders, presented by a specialist of radiation emergency medicine who was missioned to support Fukushima, and a Fukushima-based emergency physician who coped with unexpected multiplex disaster. The speakers described how timely and carefully medical responses were performed according to the worst-case scenario, and confirmed that there was no serious injury or acute radiation syndrome from the accident. Problems associated with evacuation planning were identified including means of transportation, evacuation routes and availability of medical resources. Both speakers pointed out the urgent need to develop disaster-emergency medical systems and education for medical practitioners.

## Current Actions

As the first official occasion for the survey project team to share the progress with wider global audience, the second session reported several key findings. The estimated external effective radiation dose of vast majority of the population of Fukushima was confirmed far lower than initially projected. The thyroid screening program found three confirmed and seven suspected malignant cases among 38,224 children screened so far, indicating the need for large screening supported by high detection efficiency.

Notable increase in prevalence of metabolic disorders was reported particularly in male evacuee population, possibly due to lifestyle changes associated with forced evacuation, while there was no obvious increase in miscarriage, induced abortion, or congenital malformation. The purpose of the current screening test is to know the current number of children with thyroid cysts/nodules. Therefore, the number of detected cases here should be considered as 'prevalence' rather than 'incidence'. However, if it is unclear, it could simply be 'the number of detected cases. Significant psychological impacts seen in affected people suggested that mental health care would be an immediate and substantial task in Fukushima, given the minimal radiation damage caused by the accident.

## Coordination and Cooperation

These two sessions highlighted actions taken by domestic responsible organizations during the two years since the disaster. Well experienced in treatment and long-term survey of A-bomb survivors, in radiation emergency

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medical preparedness or in other areas, and some physically based in the center of Japan's nuclear industry, areas of their contribution ranged from health and medical support to environmental monitoring or social reconstruction. Efforts to train radiation specialists were initiated, and local perspectives for improved institutional solidarity were presented. One thing shared by the speakers was the need for education or training in radiation medicine, which target wider multidisciplinary participants. Improved communication skills were recognized as vital, which include public risk communication to mitigate the public anxiety. The sessions hinted on the emerging and future roles of scientists.

## International Responses

One of the few hopeful outcomes from the accident was that Fukushima benefitted from advancement of globalization and information technology, which enabled immediate response and support from the global community. This session featured different approaches taken by the leading international organizations in their responses. Starting with concerns which rose from the floor on the possible social impact of speedy but overestimating dose evaluation, the discussion centered on the speed and scientific quality of information provided by an international authority. As a stance to favor a more time-consuming approach, it was pointed out that there cannot be detailed risk assessment without accurate dose measurement. Closed with suggestions derived from intimate dialogue initiatives in an affected area, the session implied a massive influence that an international organization might have in public value judgment, a judgment of radiation risk compared with other risks. People make decisions like whether they should evacuate or not, usually based on scientific evidence of radiation health risks, but the decisions are also based on other factors like social, economic legal and ethical considerations. Perhaps this is where the responsibility of international authority lies to sustain high-quality science, and the role to play in the recovery of public trust.

## Chernobyl Experience

Chernobyl studies provide valuable knowledge on radiation exposure and health. The session tried to address similarity and difference between the two accidents. Scientists from Belarus, Ukraine and Russia shared their research outcomes on thyroid cancer, which is known as the only confirmed health effect from Chernobyl accident. Although speakers found no excess risk in Fukushima, they agreed that continued research on cancer risk would be necessary for the purpose of public reassurance. Highlighted was large screening effect reported in Chernobyl health studies, which was indicative of more scientific interpretation of screening and other health test results in Fukushima. The common issue identified was psychological impact, which was recognized as more serious than direct physical problems, and thus it was advised to integrate mental health measures in medical research. Another suggestion was that multiple health tests, while alleging the risk to be negligible, might raise levels of anxiety, posing an important and fundamental question of the legitimacy of ongoing interventions in Fukushima.

## International Experience

This session explored, in addition to maintaining high level science, what else scientists can do to assist public with their value judgment and appropriate decision-making. Topics featured included series of scientific evidence and social consideration to be taken into account for proper and effective use of potassium iodine, and significance of dose construction efforts in Chernobyl which is still ongoing to produce scientific risk assessment, on which an important point was made that science alone would not be a solution, and that direct involvement of persons exposed and multidisciplinary expertise were an integral part. The issue of science and value was discussed from another angle, touching upon scientific consistency required to deal with different views. To conclude the session, social consequences of a nuclear disaster were emphasized once again, and as a role at the present stage, the radiation protection community was encouraged to develop self-help protection, caring for the dignity of affected people.

## Science and Responsibility

Following previous discussions, panel discussion began with research participant perspectives, warning for top-down research projects. Panelists then reviewed expected level of science in the event of a nuclear emergency, and scientist's duty to be transparent and accurate. Another role the scientists pointed out was to influence the society. The Fukushima accident altered the traditional scientist responsibility of improving scientific knowledge which did not necessarily require link to the society. Public trust was lost and scientists are increasingly expected to involve in direct communication with the public as a trusted information source. The open floor discussion focused on struggles of scientists with public communication, and discussed ways to bridge the knowledge gap, including possibility to simplify the language or train specialists for scientific communication.

## Risk Management

Towards the end of the conference, the session clarified the goal of risk management so as to assist people with their value judgment to make appropriate decisions that would mitigate risk. The speakers introduced ongoing projects and discussed future directions aimed at this goal. An interesting research result was reported on the level of knowledge of radiation dose and risk that physicians have as trusted information source, and

the suggestion was made that Fukushima can potentially be the model case in the effort to increase their knowledge. An international initiative of interdisciplinary research and education in radiation medicine that Fukushima is already taking part was introduced, which entails scientific knowledge and technology in social context. With the risk perception which remains high among residents of Fukushima despite the low population exposure to detect any health effects, the validity of any actions including ongoing health surveys was questioned once again, whether they could really reduce levels of concern. The key issue underlying the risk management efforts in Fukushima was communication, and it was proposed to develop plans and materials for communication.

## Summary

The conference agreed that population exposure from Fukushima Daiichi Nuclear Accident was very low and radiation-induced health effects would be highly unlikely. However, risk perception of the public in Fukushima remains high. Radiation health risk management in Fukushima, thus, is no longer in the radiation protection phase, but in the phase of human problem. The ultimate goal of this phase is to reduce anxiety of the public, and to alleviate socio-psychological impacts. To overcome the existing huge perceptional and knowledge gap between scientists and the public, scientists will have to ensure reliable evaluation of population exposure and health risks for confirmation and reassurance. Continued scientifically competent dose measurement and systematic collection of discretely measured dose data would be essential for this effort. Scientists are also responsible for improving effectiveness of interventions including the health survey, and applying research results to daily medical practices.

Urgently needed is radiation emergency medicine training for physicians, who can be reliable information source for the public. Education and risk communication are required for all the stakeholders involved. With improved knowledge of both sides, public trust in Fukushima would be recovered. International solidarity plays an important role in reconstruction of public trust, by increasing credibility of scientifically consistent procedures and research outcomes.

**References**


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