



Title	2022 Fukushima Medical University International Symposium on the Fukushima Health Management Survey Build Back Better, Together. "Science for Society: Advancing Fukushima's Well-Being"
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Citation	Fukushima Journal of Medical Science. 70(2): 103-106
Issue Date	2024
URL	<a href="http://ir.fmu.ac.jp/dspace/handle/123456789/2237">http://ir.fmu.ac.jp/dspace/handle/123456789/2237</a>
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DOI	10.5387/fms.24-00006
Text Version	publisher



## 2022 Fukushima Medical University International Symposium on the Fukushima Health Management Survey Build Back Better, Together. “Science for Society : Advancing Fukushima’s Well-Being”

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(Received February 13, 2024, accepted March 29, 2024)

### Abstract

The Fukushima Medical University (FMU) International Symposium on the Fukushima Health Management Survey (FHMS) convened for the fourth time in March 2022 to share FHMS findings within Fukushima and beyond. Dr. TAKENOSHITA Seiichi, FMU President, underscored Fukushima’s restoration journey, while Governor UCHIBORI Masao committed to partnering with FMU for residents’ welfare.

The Introduction by Dr. KAMIYA Kenji highlighted FHMS results for more than 460,000 participants, of whom 99.8% were exposed to radiation doses below 5 mSv post-accident. Thyroid examinations detected tumors, but no dose-response relationship was found. The Comprehensive Health Check showed increased lifestyle-related diseases among evacuees, with improvements in some health markers. Mental health issues initially prevalent after the accident decreased over time, and perinatal outcomes were consistent with national data.

Session 1 focused on radiation effects in Fukushima. The UNSCEAR 2020 Report indicated significantly reduced radiation exposure estimates and negligible cancer risks. Studies from Hiroshima, Nagasaki, and Chernobyl found no radiation-induced genetic effects.

Session 2 explored post-disaster well-being, emphasizing the evolution of psychological responses. Practices like Psychological First Aid (PFA) and emotional resilience promotion were highlighted. Katsurao Village’s post-evacuation health measures addressed lifestyle diseases, but faced challenges. The WHO framework for mental health and psychosocial support in nuclear emergencies emphasized the importance of mental health care throughout all disaster phases.

The symposium facilitated valuable insights, underlining comprehensive health strategies and the significance of long-term studies for Fukushima’s recovery and health management.

### Introduction

The Fukushima Medical University (FMU) International Symposium on the Fukushima Health Management Survey (FHMS)<sup>1)</sup>, which first convened in 2019, aims to share the results of the FHMS with

people in Fukushima prefecture and beyond. The fourth symposium was held on 5 March 2022. This meeting report introduces the content of the symposium and the discussions that took place.

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## Program of the symposium

### *Opening session*

Dr. TAKENOSHITA Seiichi (FMU President) stated: “In the eleventh year post-disaster, Fukushima begins a new journey towards restoration and rejuvenation. This symposium aims to gain diverse insights and perspectives to fulfill our mission in the coming decade.”

Mr. UCHIBORI Masao, the Governor of Fukushima Prefecture, pledged continued collaboration with Fukushima Medical University to address residents’ concerns and promote their health. (His message was read by Mr. IDE Takatoshi, Vice Governor of Fukushima Prefecture.)

In the Introduction, Dr. KAMIYA Kenji (FMU and Hiroshima University) presented an overview of FHMS results. Key points:

Over 460,000 individuals were studied post-accident, with 99.8% having radiation doses under 5 mSv.<sup>2)</sup>

Thyroid examinations identified 266 cases of malignant or suspected malignant thyroid tumors, but no dose-response relationship was found in the analysis using regional exposure doses reported in the UNSCEAR 2020 Report.

The Comprehensive Health Check revealed increased cases of overweight, hypertension, diabetes, dyslipidemia, and liver dysfunction among evacuees, with improvements over time in average blood pressure and LDL cholesterol levels.

The Mental Health and Lifestyle Survey initially showed high levels of mental health issues and trauma-related symptoms post-accident, but these have decreased over time.

The Pregnancy and Birth Survey indicated that rates of preterm birth, low birth weight, and congenital anomalies were consistent with national data, with a decrease in depressive tendencies among pregnant women over time. The survey also includes support based on test results, including health promotion activities and consultations.

### *Session 1: Thinking about the effects of radiation in Fukushima*

Session 1 provided a multifaceted perspective on the health impacts of the Fukushima disaster, combining scientific data with real-world implications to deepen the understanding of radiation-related effects on human health.

1-1 The UNSCEAR 2020 Report on Fukushima: Implications of Information published since the UNSCEAR 2013 Report. Gillian HIRTH (UNSCEAR: United Nations Scientific Committee on the Effects of Atomic Radiation)

The UNSCEAR 2020/2021 Report, updating the 2013 Report on the Fukushima accident, was released in February 2022 with findings reported through the end of 2019. Notably, its revised estimates showed lower average effective radiation doses for the public, with as much as a 90% reduction in lower dose areas and 40% in higher dose areas. The report also indicated substantial reductions in the average absorbed thyroid doses in the first year after the accident. By 2021, the annual average effective dose in Fukushima’s non-evacuation areas was under 0.5 mSv, and below 0.1 mSv in other prefectures, generally staying below 1 mSv in areas where evacuation orders were lifted. The Committee concluded that the low radiation doses make significant increases in cancer unlikely, even for those exposed in childhood. The risks of thyroid cancer and adverse pregnancy outcomes, such as congenital anomalies and low birth weight, are also considered low. These findings reflect a significant decrease in radiation exposure and related health risks compared to previous assessments.

1-2 Genetic Effects of Radiation: Lessons learned from Hiroshima, Nagasaki, and Chernobyl. NIWA Ohtsura (Chairman, Radiation Effects Research Foundation)

Since the discovery of X-rays in 1895, the health effects of radiation, particularly cancer at irradiated sites, were recognized early on. The atomic bombings of Hiroshima and Nagasaki in 1945 underscored these effects, showing increased cancer rates among survivors. Long-term studies by the Radiation Effects Research Foundation confirmed a correlation between radiation dose and higher cancer rates in survivors, but no genetic effects were found in their children.<sup>3)</sup> A 2021 study by the National Cancer Institute on Chernobyl nuclear plant workers’ children also found no increase in DNA mutations due to parental radiation exposure, suggesting no significant radiation-induced genetic effects in humans, thus challenging previous assumptions about the hereditary impact of radiation.<sup>4)</sup>

1-3 What the Fukushima Health Management Survey has revealed about the risk of thyroid cancer. SHIMURA Hiroki (FMU)

The FHMS, through its fourth and fifth round of

comprehensive thyroid examinations, revealed a consistency in Grade B findings (cysts > 20 mm or nodules > 5 mm), with no significant changes observed. Notably, the rate of detecting potentially malignant thyroid nodules has declined from previous examinations, although the trend of increased detection with age persists. Analysis incorporating thyroid absorbed doses from the UNSCEAR 2020 report indicates no dose-response relationship between radiation exposure and the identification of suspicious or malignant nodules.<sup>5)</sup> These findings suggest a lack of clear evidence linking post-accident radiation to thyroid cancer development. However, the need for more detailed future analyses is recognized, including consideration of external radiation exposure data and new cancer case findings, to deepen understanding in this area.

1-4 Lessons learned from the Fukushima Health Management Survey : Effects of radiation exposure on physical and mental health. OHIRA Tetsuya (FMU)

In Fukushima's evacuation zones, residents have experienced increased lifestyle diseases and mental distress after the earthquake and nuclear incident.<sup>6)</sup> The FHMS showed that higher radiation doses initially correlated with increased disease incidence, but this link weakened after considering evacuation and lifestyle changes. The observed increase in mental distress among women with higher radiation exposure also reduced when these factors were accounted for.<sup>7)</sup> Furthermore, no clear link was established between radiation exposure and perinatal outcomes.<sup>8)</sup> These findings suggest that health impacts in these areas are likely more related to lifestyle changes and evacuation experiences than direct radiation exposure. Ongoing long-term studies are essential if any low-dose radiation effects are to be found.

*Session 2 : Thinking about well-being of the body and mind after a disaster*

Session 2 provided valuable insights into the complex interplay between mental and physical health following disasters, drawing on experiences from Fukushima, 9/11, and the COVID-19 pandemic. This session underscored the importance of comprehensive health strategies, mental health care, and community involvement in post-disaster scenarios. Additionally, there was a statement from Ms. Luna KINOSHITA, a fifth-year medical student at Fukushima Medical University.

2-1 Disasters and Mental Health : Lessons from 9/11 and the COVID-19 Pandemic. CRAIG L. KATZ (Icahn School of Medicine at Mount Sinai)

Disasters have visible physical impacts, but they also create hidden psychological effects on first responders and victims. Studies from events like 9/11, the Great East Japan Earthquake, and the COVID-19 pandemic reveal that psychological responses to disasters evolve over time. Addressing these mental wounds involves professional care and activities that build resilience. Immediate grief reactions can manifest in various forms, and whether they lead to maladaptive symptoms or mental disorders like depression or PTSD depends on the balance between risk and resilience factors. Understanding the potential for positive psychological growth, known as 'post-traumatic growth' (PTG), is crucial. Psychological First Aid (PFA) is a method used to protect mental health after a disaster, including providing shelter, food, emotional support, and care for intense distress. Practices that support emotional and behavioral control to enhance resilience are also promoted.

2-2 Health measures in Katsurao Village after the lifting of evacuation orders from the entire village due to the Fukushima nuclear accident. BABA HIROSHI (Former Deputy Mayor of Katsurao Village and Incumbent Assistant Director General of Social Health and Welfare Department of Fukushima Prefecture)

Katsurao Village, previously a peaceful agricultural area, faced significant health and lifestyle impacts due to forced evacuation following the Fukushima nuclear accident. This led to increased health issues like obesity and hypertension, particularly among the elderly. In 2018, the village established a nursing care policy review team to address these challenges through community-led health initiatives, focusing on exercise, diet, and social participation. However, the widespread displacement of villagers and resource limitations complicate these efforts. The village recognizes the need for more comprehensive health strategies and enhanced training for health personnel.

2-3 Introduction of a WHO framework for mental health and psychosocial support in nuclear emergencies : what should we learn from Fukushima disaster? MAEDA MASAHARU (FMU)

The 2011 Fukushima disaster highlighted the need for international guidelines on mental health in

radiation disasters.<sup>9)</sup> This led to WHO's development of a framework, published in 2020, focusing on integrating 'radiation protection' and 'mental care.' The framework, translated into Japanese in 2021, targets professionals involved in radiation response and risk management. It emphasizes a multi-disciplinary approach, covering coordination, communication, community participation, capacity building, and ethical considerations. The framework is informed by lessons from past nuclear incidents like Chernobyl and Fukushima and is applicable to a range of emergency situations. It underscores the importance of mental health care across all phases of nuclear emergencies and the need for special support for vulnerable groups affected by such disasters.

2-4 Non-communicable diseases and health support : a perspective from the Fukushima Health Management Survey. SHIMABUKURO Michio (FMU)

The Comprehensive Health Check identified increased risks of lifestyle diseases such as obesity, metabolic syndrome, and chronic kidney disease, particularly following the disaster.<sup>10)</sup> Key initiatives include providing health check-up opportunities, especially for younger adults, collaborating with municipalities, and analyzing the impact of evacuation on physical health. The survey results have been used to enhance health awareness and lifestyle improvements among residents. The team involved in the survey also emphasizes the importance of physical activity, nutrition, mental health care, and social participation in their recommendations to local communities.

### Conflicts of interest

The authors declare no conflicts of interest pertaining to this manuscript.

### Disclosure Summary

The authors have no disclosures pertinent to this manuscript.

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