

Report

Activities of the Organization for Radiation Emergency Medicine and Cooperation Promotion in Hiroasaki University

Ikuko Kashiwakura^{1*}, Naofumi Akata², Masahiro Hosoda^{2,3}, Tomisato Miura²,
Chieko Itaki^{3,4}, Takakiyo Tsujiguchi¹, Sadakiyo Kameya¹, Katsutoshi Ito^{1,5},
Hiroyuki Hanada⁵ and Shinji Tokonami²

¹Organization for Radiation Emergency Medicine and Cooperation Promotion, Hiroasaki University

²Institute of Radiation Emergency Medicine, Hiroasaki University

³Graduate School of Health Sciences, Hiroasaki University

⁴Nursing Department – Hiroasaki University Hospital

⁵Advance Emergency and Critical Care Center, Hiroasaki University Hospital

Received 18 April 2022; revised 17 May 2022; accepted 20 May 2022

Hiroasaki University has been working on the development of a radiation emergency medical care system since FY 2008. Since FY 2015, it has been responsible as a national radiation emergency medical care center and has been engaged in various activities and produced human resources. Currently, with the “Organization for Radiation Emergency Medicine and Cooperation Promotion” (established in FY 2019) at its core, the university is engaged in related education and research, human resource development, regional contributions, and international collaborations. The current report presents the outline and activities of the Organization for Radiation Emergency Medicine and Cooperation Promotion at the Hiroasaki University.

Key words: Radiation emergency medicine, Organization for Radiation Emergency Medicine and Cooperation Promotion, Nuclear Emergency Medical Support Center, Advanced Radiation Emergency Medical Support Center.

1. Activities to date

Agriculture and fishery are the main industries of Aomori Prefecture, where Hiroasaki University is located. Additionally, with many nuclear-related facilities and research facilities the Aomori Prefecture has an important regional background for the national energy policy (Fig. 1). At the beginning of FY 2000 (prior to the launch

of the before), there were few experts on radiation emergency medicine (REM) in Aomori Prefecture, and the national tertiary radiation emergency medical institution (National Institute of Radiological Sciences) was also remote. In other words, it was necessary to establish an advanced radiation emergency medical system to develop: i) an advanced effective radiation emergency medical care system; and ii) human resources with highly specialized knowledge and skills. In view of this background, efforts to improve the medical system and education/research system related to REM were launched under the strong leadership of then President Endo of Hiroasaki University in FY 2008.

Under the guidance of the Ministry of Education,

*Ikuko Kashiwakura: Organization for Radiation Emergency Medicine and Cooperation Promotion, Hiroasaki University 1 Bunkyo-cho, Hiroasaki, Aomori 036-8560, Japan

E-mail: ikashi@hirosaki-u.ac.jp

https://doi.org/10.51083/radiatenvironmed.11.2_75

Copyright © 2022 by Hiroasaki University. All rights reserved.

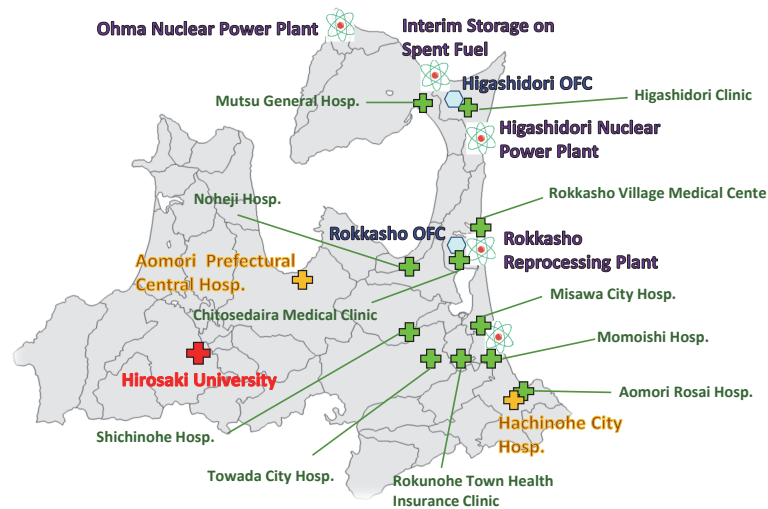


Fig. 1. Distribution of nuclear power facilities and radiation emergency medical care-related facilities in Aomori Prefecture

+ Advanced radiation emergency medical support center and Nuclear emergency medical support center,
+ Nuclear emergency core hospitals, + Major nuclear emergency medical cooperative institutions, + Off-Site Center (OFC), ☛ Nuclear power facility

Culture, Sports, Science and Technology (MEXT), Hirosaki University started a special education and research project “Human Resource Development and System Improvement for Emergency Exposure Medicine Support” (FY 2008-FY 2012) in FY 2008, before the Great East Japan Earthquake. Since FY 2010, the project has also been engaged in the “Fostering of Professionals in Radiation Medicine” (five years), a project developed by MEXT for integrated promotion of social system reform and research and development. 31 personnel have been trained to contribute to the field of radiation medicine in the prefecture (final evaluation: S). In July 2010, the Advance Emergency and Critical Care Center was inaugurated at the Hospital of the Faculty of Medicine. This was followed by the establishment of the “Radiation Safety Organization” (August, 2010; renamed the “Radiation Safety Promotion Council” in FY 2012) as a body to discuss radiation related matters at the University with the President as the head of the body.

The work of the Radiation Safety Organization was evident after Fukushima Daiichi nuclear power plant accident in March 2011. 20 teams with 365 members were dispatched to survey > 5,000 evacuated residents at the request of MEXT. Post the initial survey, 11 teams with 202 members were dispatched to support the “Temporary Entry Project for Residents” in the warning area. In addition, in September 2011, Hirosaki University concluded a cooperation agreement with Namie Town in Fukushima Prefecture, and organized a cross-faculty “Namie Town Reconstruction Support Project” within the university, which has continued its activities to the

present.

To promote education and research both in the region and internationally, Hirosaki University has set “Promotion of international education and research in radiation science to ensure safety and security in REM” as one of its strategies in the third medium-term plan. This strategy makes use of the strengths and characteristics of the University in the fields of radiation science and REM. In addition, in accordance with the revision of the government’s nuclear countermeasure guidelines for reviewing the system of REM at the time of a nuclear power plant accident; Hirosaki University was designated as the “Advanced Radiation Emergency Medical Support Center” and the “Nuclear Emergency Medical Support Center” - a core institution responsible for REM on August 26, 2015. The Center for Radiation Safety and Integrated Support was established to strengthen the organization in the University for further promotion of these efforts related to REM.

The center has started projects of the national government with a full-time Administrative Director and one specially appointed full-time Assistant Professor under the Director of the Center. Subsequently, the current “Organization for Radiation Emergency Medicine and Cooperation Promotion (OREMCooP)” was established in October 2019 with the aim of consolidating activities related to REM within the Hirosaki University.

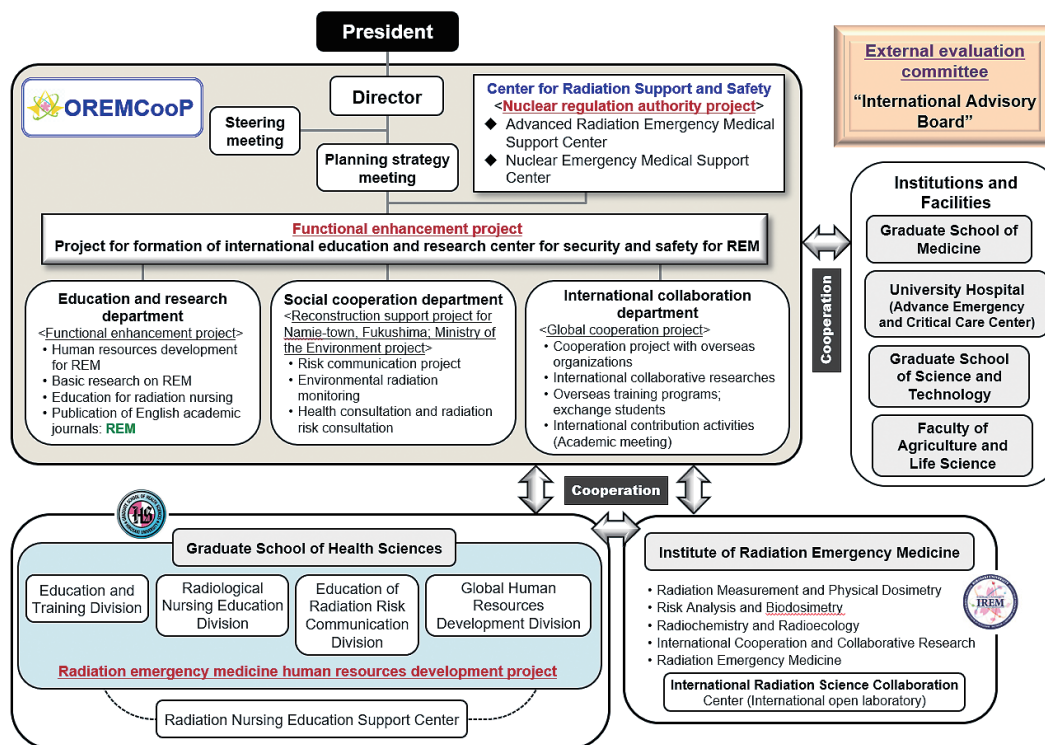


Fig. 2. The structure of Organization for Radiation Emergency Medicine and Cooperation Promotion (OREMCooP) (As of March, 2022).

2. Fundamental Goals: The Hirosaki University Vision of the Future¹⁾

Hirosaki University, in its role as one of the comprehensive public universities in the north of Japan, has set as its foundation a commitment to serve as a core actor for regional revitalization. Taking this commitment into consideration, we established four strategic areas of concentration, renewable energy, the environment, REM, and food, positioning them as objectives in the second medium-term plan. We have subsequently integrated these strategic and related themes into our research and educational programs. We have also made great headway in establishing ties with local organizations and governmental bodies. Moreover, as we enter the third round of medium-term plan, we will continue to contribute to local society through human resource development and the fostering of innovation.

Hirosaki University has recently implemented a university-wide reorganization. We have 1) strengthened human resource development programs in the fields of science, technology and agriculture that contribute to innovation, 2) made qualitative improvements in the teacher training program for elementary school teachers, and 3) built up both the educational and research arms of the graduate schools. Moreover, among our third medium-term plan, we will continually review

the themes and reevaluate and reform the system by which research is implemented in the original four core areas of concentration. Furthermore, although we have independently implemented university governance reforms through wide-ranging on-campus discussion and debate, we must continue to verify and reexamine these outcomes. We must do so in order to enhance the functioning of and to implement the reforms instituted under the management system that was introduced after the establishment of the national university corporation system. Ultimately, our mission is to live up to our slogan of “communicating to the world, creating with our community”.

3. Structure and activities of OREMCooP

OREMCooP was established in October 2019 for the purpose of centralizing REM activities performed in the university (Fig. 2). Two major projects were carried out by this organization: i) The Nuclear Regulatory Agency Project; and ii) Functional Enhancement Projects.

The Nuclear Regulatory Agency project by the “Center for Radiation Support and Safety”, which is responsible for national radiation emergency medicine and carries out the missions of the “Advanced Radiation Emergency Medical Support Center” and “Nuclear Emergency Medical Support Center”. The second is the university’s

Table 1. Main activities undertaken by the Center

Activity items	Activity content
1. Network construction	<ul style="list-style-type: none"> • National and regional network construction support • Regional network construction support • Expert network construction support • Information collection for network construction, etc.
2. Education/training program for ourselves	
3. Highly specialized education/training	<ul style="list-style-type: none"> • Nuclear emergency medical training for core human resources • Training for Nuclear Emergency Medical Assistance Teams (NEMAT) • Participation in training hosted by other organizations
4. Regular drill for ourselves	
5. Participation in nuclear disaster response drills nationwide	<ul style="list-style-type: none"> • Training on 'dispatch' of NEMAT • Participation and advice for nuclear emergency drills
6. Maintenance and management of materials and equipment	

four priority strategic projects: functional enhancement projects. This project consists of three divisions: "Education and Research," "Social Contribution," and "International Collaboration".

Both the projects are being undertaken with the cooperation of the university departments, including the Institute of Radiation Emergency Medicine (IREM), the Graduate School of Health Sciences, the Advance Emergency and Critical Care Center in Hirosaki University Hospital, and the Graduate School of Medicine.

3.1. Center for Radiation Support and Safety

In 2015, the Nuclear Regulatory Authority designated the "Nuclear Emergency Medical Support Center" and the "Advanced Radiation Emergency Medical Support Center" as facilities that provide medical care for nuclear disasters, and they have been active for about six years. This year, in cooperation with related organizations in and outside of the prefecture, the center will develop and maintain a medical treatment system, provide basic training for the staff within its facilities, conduct training to coordinate the dispatch of "Nuclear Emergency Medical Assistance Teams." Additionally, the center will build and strengthen the network of people involved in nuclear disaster medical care, and provide education, trainings, drills and prepare for the occurrence of a nuclear disaster. The company actively engaged in a number of related activities, including training for core personnel such as physicians, nurses, and radiology technicians at base hospitals. The main activities are summarized in Table 1.

3.2. Functional Enhancement Projects

As one of the comprehensive universities in the North Tohoku region, Hirosaki University, is based on pursuing the role of "core center for regional revitalization." During the period of the third mid-term plan, food,

health, renewable energy, environment, and REM were designated as important strategic projects of the university. The university aimed to utilize regional resources to promote education and research to create innovations and develop "human resources for regional development." These steps would help to solve regional issues such as lack of "places" to work, the decline in the working population, and the lowest average life expectancy in Japan (Table 2).

At the time of this writing, FY 2021 is the final year of the third medium-term targets and plan period (FY 2016-FY 2021). One of the projects to strengthen the university's functions, "Strategy 3: Formation of an international education and research center for safety and security in REM," will come to an end, but we will continue our activities as an organization toward the fourth medium-term period of the project.

This report provides an overview of the activities of this project in the areas of "Education and research," "Social cooperation," and "International collaboration," which comprise the OREMCooP. The results of the activities have been produced through the cooperation and collaboration of many facilities and departments within the university. All REM projects at Hirosaki University are cooperated beyond the fields and the organizations systematically and strategically conforming to REM and Cooperation Promotion activity.

The following is an overview of the activities of each department within OREMCooP.

3.2.1. Education and research department

Main activities of this department are as follows;

- Human resources development for REM
- Basic research on REM
- Education for radiation nursing and publication of English academic journals: REM

Table 2. Outline of four strategies undertaken by the Hirosaki University in the third medium-term plan

Strategy	Outline
Strategy 1	<p>“Innovation and human resource development utilizing regional specifics and resources in the fields of Agri, Life and Green”</p> <p><u>Activity 1:</u> Innovation and human resources development in the fields of science, technology aiming to utilization of regional specifics and resources</p> <p><u>Activity 2:</u> Human resources development for regional innovation of food</p> <p><u>Activity 3:</u> Establishment of “Aomori model regional revitalization cycle” aiming to innovation of internationally competitive Aomori brand food industry</p>
Strategy 2	<p>“Formation of comprehensive education and research center with knowledge of social medicine aiming to mental and physical health promotion”</p> <p><u>Activity:</u> Establishment of Center of Health Aging Innovation, and study of social medicine and social support activities aiming to refresh “short lived prefecture”</p>
Strategy 3	<p>“Promotion of international education and research of radiation sciences to secure security and safety for REM”</p> <p><u>Activity:</u> Project for formation of international education and research center for security and safety for REM</p>
Strategy 4	<p>“Construction of education system with focus on the region for development of regional revitalization human resources”</p> <p><u>Activity:</u> Consistent and integrated promotion of educational reform based on 3 policies by university –wide management of teaching and learning</p>

3.2.2. Social cooperation department

Main activities are as follows;

- Reconstruction support project for Namie Town, Fukushima; Ministry of the Environment project
- Risk communication project
- Environmental radiation monitoring and health consultation and radiation risk consultation.

3.2.3 International collaboration department

Main activities are as follows;

- Cooperation project with overseas organizations, international collaborative researches
- Overseas training programs; exchange students and international contribution activities (Academic meeting).

3.2.4. Namie Town Reconstruction Assistance Project

In September 2011, immediately after the Great East Japan Earthquake, a partnership agreement was signed with the Namie Town in Fukushima Prefecture. This led to the continuation of various support activities led by a working group consisting of several faculties and research institutes in Hirosaki University. In addition, since FY 2013, a risk communication project for residents of Namie Town was adopted by the Ministry of the Environment, and two full-time public health nurses and one radiation specialist have been engaged in activities at the Hirosaki University Reconstruction Support Office in the Namie Town Hall. In addition, we are also working on the Ministry of the Environment’s “Exposure Dose Survey for the residents in Namie Town” in the field of Namie Town and are contributing to various reconstruction support for Namie Town.

4. Institute of Radiation Emergency Medicine (IREM)²⁾

The IREM consists of five departments: Radiation measurement and physical dosimetry, risk analysis and biodosimetry, radiochemistry and radioecology, international cooperation and collaborative research and REM.

In response to the Fukushima nuclear power plant accident, the government’s system of medical care for REM in the event of a nuclear disaster and in normal times has undergone a major review, and Hirosaki University has been designated as the National Center for Nuclear Disaster Preparedness. Hirosaki University has been designated as the National Center for Nuclear Disaster Response, and the IREM serves as the Advanced Radiation Exposure Medicine Support Center.

As a group of experts in radiation exposure medicine that promotes one of Hirosaki University’s highly strategic and ambitious goals and plans “Formation of international education and research center for security and safety for REM,” IREM is also engaged in the development of expert personnel with an international perspective and world-class research and development.

In addition, IREM has been qualified as the core center on Environmental transfer and biological effects due to radionuclides together with University of Tsukuba, Center for Research in Isotopes and Environmental Dynamics by MEXT since FY 2018. It aims to form an international center of excellence for research on the environmental fate of radioactive materials.

5. Graduate Schools of Health Sciences

The Hirosaki University Graduate School of Health Sciences has four areas of study: Nursing, Radiological

Technology, Biomedical Laboratory Science, and Comprehensive Rehabilitation Science. The Master's Course aims to foster leaders and advanced professionals with management practice skills, while the Doctoral Course aims to foster educators and researchers with advanced specialized knowledge and skills, while contributing to the society.

The Graduate School of Health Sciences started activities related to REM in FY 2008, and currently the four departments continue their own activities while collaborating with OREMCooP.

5.1. Education and Training

- Conduct a Radiation Disaster Preparedness Training to ensure to keep nuclear emergency preparedness in the northern part of Japan, and to develop human resources to deal with radiation emergency
- Development of human resources who engage in radiation disaster preparedness on master course
- Development of some e-learning material for beginner level learners
- Preparation of English handout for visitors including graduate students and faculties from overseas
- Continuously improve skills of the staff members involved in Radiation Disaster Preparedness Training

5.2. Radiological Nursing Education

- Support for the "Program of Certified Nurse Specialist in Radiological Nursing (Master's course)" and the continued professional development of graduates
- Various activities related to the preparation, application, and certification needed to apply to be screened by the Japanese Nursing Association as a Certified Nurse Specialist in the specialized field of "Radiological Nursing (provisional name)"
- Support radiological nursing education programs targeting nurses and nursing teachers
- Establish and develop the field of radiological nursing through the dissemination of information in and outside Japan, international exchange, overseas training, conclusion of agreements with overseas organizations, etc.

5.3. Radiation Risk Communication

As radiation risk communication support project (FY 2015~), health specialists residing at Namie Town government office perform the following activities:

- Health or radiation consultation using various opportunities
- Holding salons in the town (including sessions dealing with radiation anxiety) (about 10 times a year): "Apple Salon"
- Holding dialogue meetings on radiation outside the

town (about 12 times a year): "OSHABERI-Kai"

- Evaluation and modification of activities and transmission of information.

5.4. Global Human Resources Development

- Supporting the development of human resources capable of creating systems for international exchange and cooperation
- Developing an educational program to train human resources in REM, open to overseas students
- Accepting exchange students in the REM course and Radiological Nursing Specialist Education Program

6. Advance Emergency and Critical Care Center – Hirosaki University Hospital / Graduate Schools of Medicine

Advance Emergency and Critical Care Center in Hirosaki University Hospital is the only advanced critical care center in Aomori Prefecture, providing 24-hour care for a wide range of serious cases, including life-threatening illnesses, trauma, burns, and poisonings. The hospital aims to treat patients are those who are transported by ambulance or doctor helicopter and those who are difficult to treat at other hospitals. The hospital has a system to provide the latest treatment in collaboration with other departments within the hospital, making full use of the advanced medical treatment capabilities of a university hospital. In addition, the hospital maintains close ties with the local fire department to provide high-quality medical services and strives to serve as the last bastion of emergency medical care in Aomori Prefecture so that the citizens of the prefecture can live with peace of mind.

In the basement of the center, there is a decontamination room and an initial treatment room with an independent ventilation system with filters and waste fluid storage tanks to receive exposed wounded and sick patients. In addition, the facility is equipped with a whole-body counter to monitor the degree of radiation exposure, various measuring devices, and facilities for intensive care for those who have been exposed to radiation. In the future, as a facility of the Advanced Radiation Emergency Medical Support Center and the Nuclear Emergency Medical Support Center, we will promote the establishment of a medical system as a base hospital for REM in Tohoku and Hokkaido.

7. International Advisory Board

The Advisory Board was established with the purpose of evaluation of activities by external experts. Two overseas experts were added to the International Advisory Board in FY 2017, but due to the spread of COVID-19 in FY

2020 and FY 2021, the meetings were held on paper and on the web. We regret that we were unable to exchange opinions in person.

8. Future issues

A new human resource development project related to complex disasters (applied in summer 2021) was accepted, and a new “Education Center for Disaster and Radiation Emergency Medicine” will be established in the Organization in FY 2022. The project titled “Project for human resource development of radiation exposure medicine for complex disasters,” aims to develop highly specialized professionals who can respond to complex disasters in the region. This will be facilitated in cooperation with multiple professions in the event of a nuclear disaster (which is expected to become a complex disaster); in order to realize the basic policy of the fourth medium-term targets and the medium-term plan: “to develop human resources to lead the region through education and research useful for solving regional issues and social implementation.”

9. Conclusion

The activities of OREMCooP have expanded over the years and its social responsibility has increased. Currently, the social situation surrounding REM is

becoming more diverse and complex. In recent years, in addition to pandemics, various natural disasters such as typhoons, heavy rains and heavy snow falls caused by abnormal weather have frequently occurred and become intensified. The threat of large earthquakes increases year by year, and the occurrence of large earthquakes is a factor in inducing nuclear disasters. Furthermore, although 10 years have passed since the Fukushima nuclear power plant accident, and full recovery is not yet complete. In addition, while the construction of nuclear power plants is progressing due to the increase in energy demand, especially in Asian countries, the unstable international situation poses a threat to cause large-scale nuclear power accidents, and radiation disasters. In order to respond to such diversified and complicated education, research, and social contributions related to REM and radiation science, the organization needs to continue to be a center for sustainable, regionally oriented international human resource development and contributes to the local and international communities.

References

1. 2021 HIROSAKI UNIVERSITY Overview, P01 [updated 2021 May 1; cited 2022 May 10]. Available from: https://www.hirosaki-u.ac.jp/en/wp-content/uploads/sites/2/2019/05/2021_overview.pdf
2. HIROSAKI UNIVERSITY INSTITUTE OF RADIATION EMERGENCY MEDICINE [cited 2022 May 17]. Available from: <https://irem.hirosaki-u.ac.jp/en/>