From Japan to the World

Experience and Perspective on Radiation Dose Registry in Japan

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Since 1977, the Radiation Dose Registry Center (RADREC) of the Radiation Effects Association has been operating a central radiation dose registration system for workers at nuclear facilities, funded by nuclear power operators and nuclear plant construction companies. The RADREC operates a central registration database, to which nuclear operators should submit electronic data of dose records once a year. The system also includes issuance of “radiation passbooks”, which record previous doses and the histories of medical examinations and radiation education for each worker, because the contract workers may move from site to site frequently along with their passbook. The registration system for nuclear workers has been well established through more than forty years of experience. As of March 2019, the radiation doses of 665,250 workers are registered in the RADREC database, allowing the dose statistics and the personal radiation dose data used for the Japanese epidemiological study on low-dose radiation effects, which was explained in a previous issue of the Japanese Journal of Health Physics.¹⁾

Other than nuclear workers, “The Act on Prevention of Radiation Hazards due to Radioisotopes, etc.” for radioisotope licensees, which includes various bodies such as academic research institutes, hospitals, and industrial research organizations using radioisotopes and radiation generators, requires employers to keep the radiation dose and health records of each worker for a prescribed period. Most of the records of the radioisotope workers had been kept by each employer; however, these employers are relatively small, and gaps in long-term records were anticipated. In 1984, the radiation dose registry system for radioisotope licensees was established. However, the radiation passbook system has not necessarily been adopted because radioisotope workers do not have to carry previous radiation dose records, as changing work is not common among these workers. The radioisotope-using offices and institutes total approximately 8,000 in Japan as of March 2018; however, a limited number of radioisotope workers are registered in the framework of the RADREC database. As of March 2019, 173,597 radioisotope workers are registered in the database, and the registration should be improved.

The Great East Japan Earthquake and Tsunami on March 11, 2011 was followed by the Fukushima-Daiichi Accident, resulting in contamination of environments, mainly by

radioactive cesium. In order to facilitate lifting the evacuation orders issued by the government after the accident, the government enacted “The Act on Prevention of Ionizing Radiation Hazards at Work to Decontaminate Soil and Wastes Contaminated by Radioactive Materials Resulting from the Great East Japan Earthquake and Related Work” in January 2012 and started decontamination. In 2013, the radiation dose registry of workers engaged in the decontamination of environment started to centrally manage the radiation dose of decontamination workers.²⁾ As the employers of workers are not familiar with radiation dose, the radiation dose of the decontamination workers has been registered through the general contractors to the RADREC database. As of March 2019, 282,334 decontamination workers are registered in the RADREC database.³⁾

The transitions of the number of radiation workers, and the average dose for nuclear and decontamination workers registered during 2012–2017 are given in **Fig. 1**. After the Fukushima-Daiichi accident, large periodical maintenance work at nuclear power reactors was not implemented, except for the decommissioning of the Fukushima-Daiichi reactors, so that average radiation dose has been dominated by the contribution from decommissioning. On the other hand, the number of decontamination workers increased from 2012 to 2015, then decreased from 2016 to 2017, because the operation in the special decontamination areas⁴⁾ was mostly completed by the end of March 2017.

As described in this article, the radiation dose registry of the RADREC consists of three types of database: nuclear, decontamination and radioisotope workers. There are more than 600,000 radiation workers in a year in Japan. More than half of them are medical workers, but registration is limited. It is important for related organizations to cooperate to set up a national dose registry that includes the medical workers. Furthermore, the radiation dose registry set up for radioisotope workers in various industries is encouraged to improve using the existing framework. More than forty years of experience of the radiation dose registry in the RADREC for nuclear and other workers will be of help to establish a centralized national dose registry system.

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Fig. 1 Transitions of number of radiation workers and average dose for nuclear and decontamination workers.