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The Limitations of Radiological Protection in the Fukushima Nuclear Accident from the Citizens' Perspectives: Towards Revision of the General Recommendations

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Conflict of Interests

■ None declared.

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Background and Aim

■Although there are various problems with radiation protection after the Fukushima nuclear accident, few have discussed them from the affected citizens' perspectives. The aim of this research is to identify the radiological protection problems after the Fukushima nuclear accident from the citizens' perspective and to clarify the major points which should be included in the revised General Recommendations.

Material and Method

■Both qualitative and quantitative research methods were employed to clarify the damage of residents in and outside of Fukushima Prefecture. For these reasons, we critically review the description of the ICRP 146 Annex B Fukushima nuclear accident (ANNEX B. THE FUKUSHIMA NUCLEAR ACCIDENT). Our team includes researchers who were affected by the disaster directly; their personal experiences were also reflected.

Results

■Trend of the number of events described in Annex B of ICRP 146 is displayed in Figure. The events described in the Annex are concentrated in March, 2011. Annex missed important events in the later stage.

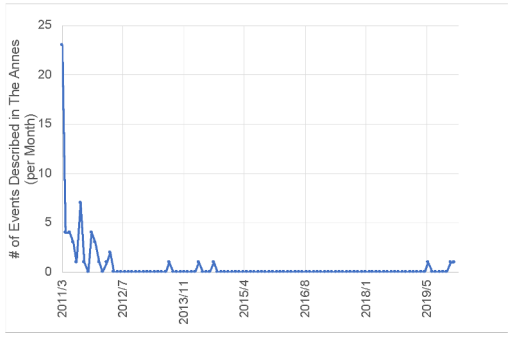

Figure The Number of Events Described in the Annex B of ICRP Publ. 146

Results

■Major events that are not described in Annex B of ICRP Publ. 146 are arranged in a timeline (Table).
■In the early stage of the accident, essential information, such as the possibility of a meltdown, was not provided by the Tokyo Electric Power Company (TEPCO) nor by the Japanese government.
■Experts delivered incorrect information on the health effects of radiation exposure. The most famous example was the following statement: "Radiation exposure less than 100 mSv is safe." These misleading information caused serious distrust toward TEPCO, the Japanese Government, and the experts of radiological protection and aroused a lot of anxiety, including among children at the time of the accident.
■A few months later, the problem of "the division of community" emerged from a rigid operation of the reference level. For example, only one part of the town was designated as an "evacuation zone" with governmental support, but no support was provided for the rest of the area of the same town.
■A similar issue of division was observed in decontamination projects as Cesium-contaminated areas near Fukushima Prefecture are excluded from decontamination areas.
■Moreover, merely six years after the accident, support for evacuees from outside the designated evacuation zone was cut off, while the Japanese and local governments have supported returnees disproportionately.
■In addition, ICRP 111 and ICRP 146 recommend that the reference level should be lowered in the long term, but the Japanese government keeps 20 mSv/year as the reference level, which contradicts the recommendations.
■For thyroid examination in Fukushima, although the Prefectural Oversight Committee for the Fukushima Health Management Survey concludes, "As of this time, no correlation can be found between thyroid cancer cases detected through the Full-Scale Survey (second-round survey) and radiation exposure," their opinion is not trusted, and seven young thyroid cancer patients filed lawsuits against TEPCO.
■Furthermore, descriptions in educational materials by the Japanese Ministry of Education also emphasize that the damage was minor, not serious.

Conclusions

■Through this research, important insights of affected citizens missed in ICRP Publ. 146 were obtained. ICRP Publ. 146 and the General Recommendation should be revised to address these issues pointed out by the affected population.

Reference

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Table Timeline of Major Events that are not described in Annex B of ICRP Publ. 146

Year	Limitations in Expert	Information (Un)disclosure and Autocratic decision-making	ICRP Related Topics	Thyroid Examination	Neighbour Area	Education	Personal Experience
2011	3/14 The body surface screening level was raised from 13,000 cpm to 100,000 cpm. Of the 114,488 people measured,	3/21 At public meeting in Fukushima City, Prof. Yamashita delivered misinformation "(Air dose rate) up to 100μSv/h is			March The monthly fallout reorted: Utsunomiya City: radioactive cesium approx. 10,000 MBq/k㎡ and radioactive iodine approx. 14 MBq/k㎡		3/18 The Iwaki City informed distribution of stabilized iodine tablets. As a child, I had no idea on function of the
	4/29 Councilor Kosako, a professor at the University of Tokyo, and a former ICRP member resign in protesting that the 20mSv level for	3/24 Tepco released "meltdown" first time in their new release. In the early stages of the accident, TEPCO did not use the	11/26-27 The 1st ICRP Fukushima Dialogue.		3/23 I131 was detected in drinking water purification facility in Tokyo.		March Clinic at the evacuated destination started free
		9/19 Ruiko Muto from Fukushima Prefecture made a speech saying that "the facts are hidden" and "the government does not protect the people."		Oct. Thyroid Ultrasound Examination started. 115 thyroid	Dec. 2011 MOE designeted 0.23 μSv/h or higher as as priority contamination survey areas.	Oct . MEXT published supplementary reading books on	March I experienced the accident as a pre-elementary school child at the time, and was frightened by the unusual appearance and confusion of the adults
	In May, 2012, the number of registered evacuees from Fukushima Prefecture alone reached 164,865 (the largest	10/3 The Mainichi Shimbun reports that a secret meeting was held with committee members prior to the Prefectural Health Study Review Committee meeting		Oct. Only the test results (A, B or C) are notified to the TUE participants, and in order to acquire the detailed information			At an evacuation destination, someone pointed out our car license plate "Iwaki" , and I felt discrimination against
2012				6/21 The Diet unanimously passed the "Act on Support for Child Victims of Nuclear Power Plant Accidents		4/19 MEXT decided 20mSv/y or 3.8 μ/h as reference level to utilize school ground.	
				6/21 Article 2, paragraph 1 of the "Act on Support for Child	June An expert panel concludes that a health survey in		6/7 Notice from Iwaki City on WBC measurement at Iwaki or even evacuees have to visit Iwaki.
				10/11 The Japanese government approved the basic policy of the "Act on Support for Children Victims of the Nuclear			
2013				April 2nd round TUE started. 71 thyroid cancers were		Feb . MEXT updated "Rariation" book.	
2014		8/25 TEPCO : "We will not carry out any treatment of					
2015		Undisclosure of detailed results of 3rd and later TUE was decided.		April 3rd round TUE started. 31 thyroid cancers were detected in			
2016	12/6 Miyazaki-Hayano 1st article(2016) was published in JRP.	June Tritium water task force report released; ocean discharge was considered superior in terms of time, cost, etc., as it would take 91					
2017	7/6 Miyazaki-Hayano second article (2017) was published in JRP.	Aug. ALPS Subcommittee held three briefings/public hearings; Most opposed against ocean discharge.				Apr. Reconstruction Agency published "True story of Radiation" that stressed unharmess of low dose exposure.	
2018				April 4th round TUE started. 39 thyroid cancers were detected		Sep. MEXT released 3rd ed. of "Radiation" book.	
2019	1/7 Date City residents notify the IOPP, publisher of the JRP, of an investigation by the University of Tokyo (to which Ryugo	2/10 Report of the Subcommittee on the Handling of Processed Water from Multinuclide Removal Facilities, etc.,	6/17 Draft of ICRP146 was released for public comment				
2020	7/28 Miyazaki, Hayano (2016, 2017) Articles- A retraction notice for the two papers was published in JRP.	4/13 5th Ministerial Conference on Decommissioning, Contaminated Water and Treated Water - Decided to	12/11 ICRP 146 was published with minor modification to	April 5th round TUE started.			8/7 Notrice from Iwakicity that inform extention of expiration period of stable Iodine tavlet. I never heard of
2021						Oct. MEXT released update "Radiation book" that enhanced description on decomission and discharge of contaminated	
2022		4/12 TEPCO disclosed that it will spend 43.5 billion yen from		1/27 3.11 Child Thyroid Cancer Lawsuit. The seven young cancer plients sued TEPCO.			
2023		8/24 TEPCO begins discharging ALPS-treated contaminated water		As of March 2023, a total of 316 people had been diagnosed with malignant or suspected malignant thyroid conditions as			March A university student who experienced the accident as a child in Fukushima Prefecture and was subsequently educated in Fukushima stated that she did not know what