4. Epidemiological Studies on Emergency Workers

4.1 Overview of the Report of the Expert Meeting on Epidemiological Studies Targeting Emergency Workers at the TEPCO Fukushima Daiichi Nuclear Power Station

MHLW compiled a report of the expert meeting series held since February 2014 in which discussions were made about how to make plans for epidemiological studies targeting emergency workers concerning radiation effects on human health.

The purpose of the report is to compile the basic concept and matters of note in establishing the abovementioned plans.

(1) Study targets and method

- Around 20,000 emergency workers should be covered with the study period lasting throughout their respective lifetimes.
- Follow-up for the target group should be done and the current-state survey conducted by the MHLW should be utilized and maintained in the course of the long-term health care database management.
- Health and psychological effects to be examined should cover cancers (tumors), leukemia and non-cancerous diseases.
- The cumulative dose should be set as an exposure factor. Dose-response relationships of health effects are to be examined, and classification by exposure conditions should be done.
- The prospective cohort study method should be employed.
- When compiling study results, analysis results that show both presence and absence of statistically significant differences using a suitable statistical test should be reported.

(2) Health effects examinations

- The abovementioned diseases, for which radiation effects have been previously suspected, should be covered broadly. In addition to health checkups, other systems and data should also be referred to.
- Examination items and frequencies should be determined based on the MHLW Minister's guidelines, while referring to the examinations targeting WWII atomic bomb survivors. However, these may be changed or added to in accordance with technological advancement.
- Questionnaires to ascertain psychological effects should be used.

(3) Ascertaining cumulative doses

- Primary source materials for both internal and external exposures should be preserved as original documents where possible for data verification in the future.
- A chromosomal test to biologically measure exposure doses should be conducted for workers whose effective doses exceed 100 mSv.

(4) Control of confounding factors

- As the epidemiological studies take time and cover cancers and various other diseases, it is important to control confounding factors.
- In addition to examinations of items adopted in previous studies in Japan, examinations of each worker's history of exposure to toxic substances and work details should be collected.

(5) Implementation system of the studies

- A controlling research institute should first be designated and cooperative research institutions in respective sectors should be selected thereunder.
- Consigned health check organizations should be selected.

(6) Study period, evaluation and publication of study results

- As the studies will take time, research institutions should be evaluated by an international third-party panel at 5-year intervals.
- Research institutions should regularly report their results to the MHLW and publicize them in the controlling research institute's publications, and compile and publish achievements in international academic journals.

Further information is available on the following sites.
https://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/lhc/pr_140604.html

4.2 Overview of the report results, Research on Thyroid Gland Examinations, etc. of Workers at the TEPCO Fukushima Daiichi Nuclear Power Station (Sobue et al. 2014)

A report was compiled regarding the Research on Thyroid Gland Examinations, etc. of Workers at the TEPCO Fukushima Daiichi Nuclear Power Station (chief researcher: Tomotaka Sobue (Professor, Environmental Medicine and Population Sciences, Graduate School of Medicine, Osaka University)).

This research funded by the Health and Labour Science Research Grants aims to epidemiologically analyze radiation effects on the thyroid gland by setting an exposed group (emergency workers exposed to radiation exceeding a thyroid equivalent dose*1) of 100 mSv) and a control group (thyroid equivalent dose of 100 mSv or less), performing ultrasonic examinations for both groups and comparing the results. The results of the analysis are to be evaluated from the viewpoint of clinical medicine in terms of radiation effects on the thyroid gland. Major findings and discussions were as follows.

*1) Thyroid equivalent dose: Dose only focusing on thyroid exposure, which is calculated as the total of internal exposure and external exposure (including exposure prior to the accident); 1/20 of the whole-body exposure dose (effective dose)

(1) No difference was found in the percentages of workers assigned as level B (a secondary examination was recommended) and level C (secondary examination was necessary) between the exposed group and the control group, and there was no correlation with thyroid equivalent doses. However, the percentage of workers assigned as level A2 (a secondary examination was unnecessary) was relatively high for people with high doses, and the same trend was observed in analysis using re-evaluated thyroid equivalent doses.

(2) While no correlation was found between nodule size and

thyroid equivalent dose, the incidence of relatively larger cysts[*2)] was high for workers with high doses.

*2) Cysts themselves need not be treated. However, as large cysts may cause neck symptoms, a cyst 20.1mm or larger is judged as level B (only one case).

(3) This is an interim report based only on the ultrasonic examination and prepared before definite diagnoses have become available. Conclusions drawn based only on the results of this research could be faulty due to the following uncertainties.

- According to the research results, the percentage of workers who received ultrasonic examinations before the present ultrasonic examinations was high for the exposed group while that for the control group was low, and the percentage of workers who received the present examination was low for the exposed group. This suggests the possibility of considerable bias in cyst and nodule incidence among workers with high doses.
- Namely, there is a possibility that workers judged as levelA2 in earlier ultrasonic examinations selectively participated. Also, workers judged as level B or level C in their ultrasonic examinations might have selectively dropped out of the research program.
- For workers whose internal exposure evaluation results are considered less reliable, quantitative evaluation of internal exposure should be conducted.

(4) Efforts need to be made to collect and analyze the detailed examination results where abnormalities were detected in the examination and for past thyroid gland ultrasonic examinations for the exposed group.

- The ultrasonic examination results and secondary examination results have not been collected.

Further information is available on the following sites.
https://www.mhlw.go.jp/english/topics/2011eq/workers/tepco/ort/pr_140805.html