February 12, 2022

Committee Members

Committee on Developing a Long-Term Strategy for Low-Dose Radiation Research in the United States, National Academies of Sciences, Engineering, and Medicine

Comment for the Committee's Report

Dear Committee Members,

We appreciate the opportunity to express our views on Developing a Long Term Strategy for Low-Dose Radiation. We are members of Takagi School founded by the late Jinzaburo Takagi, co-recipient of the Light Livelihood Award with Mycle Schneider, in 1999 to train citizen scientists. We are educating the public about the risks of low dose of radiation especially medical exposure in Japan.

One of the members, Hisako Sakiyama, is the Chair of the Board of Directors of the 3.11 Fund for Children with Thyroid Cancer[1] (3.11 Fund), which was established in 2016 to provide various forms of support for children diagnosed with thyroid cancer following the Fukushima Nuclear Power Plant Disaster. She served as a member of the National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission. She received M.D. and Ph.D. from Chiba University School of Medicine and was a research associate in the department of biochemistry at the Massachusetts Institute of Technology (MIT). She was a senior researcher at the National Institute of Radiological Sciences (NIRS) working on cancer cell biology.

**Background for our comments on the presentations**

We are interested in the radiation risk assessments published by the National Academy of Sciences because they influence the ICRP and UNSCEAR, which in turn influence the views of the Japanese government.

At the November 16-17, 2021 meeting, doctors from the National Institutes for Quantum Science and Technology Japan (QST) presented on low-dose radiation risk research and risk communication sponsored by the Japanese government, but they did not mention the views from the citizens' side. We would like to introduce citizen's views which we hope you will take into consideration when writing the report.

[1] The 3.11 Fund for Children with Thyroid Cancer (https://www.311kikin.org/english/nuclear-accident-thyroid-cancer/) (in Japanese and English)

**Our comments**

**1. The LNT model as a basis for supporting the legitimacy of evacuees from the contaminated area**

160,000 people have been evacuated from the areas contaminated by radioactive materials and about 70,000 people have not taken return option. The Japanese government have raised the public dose limit from 1 mSv per year to 20 mSv per year in Fukushima and have stopped providing housing support to evacuees, assuming that it is safe for them to return home. The evacuees, however, especially the younger generation with small children, claim that they cannot return to the contaminated areas to raise their children. About thirty lawsuits have been filed by evacuees in various parts of Japan against the Japanese government and TEPCO, claiming legitimacy of their evacuation and compensation for damages. The plaintiffs base their right to evacuate on the concept of the LNT model to protect their health.

Looking over the meeting there was no new scientific findings in the presentations that would require us to reconsider the LNT model, and the results of epidemiological studies, including the LSS, clearly show that there is a cancer risk at levels below 100 mSv. Therefore, we strongly recommend you to continue to adopt the LNT model.

**2. Risk communication by the Japanese government imposing the 100 mSv threshold theory**

Dr. Shimada of QST presented about risk communication by the Japanese government, but even though they call it communication, they don't listen to the voices of the victims. It is just one-way education on radiation safety. As you can imagen from Dr. Shimada's presentation, a huge amount of money is being spent for this purpose. The brochures used for advertising and the supplementary reading books distributed to schools tell students that there is no known risk of exposure to radiation below 100 mSv, and that there is no need to worry because the risk of exposure to 100 mSv is about the same as that of lack of vegetables or lack of exercise. The Ministry of Education, Culture, Sports, Science and Technology (MEXT), the Ministry of the Environment (MOE), the Reconstruction Agency (FEMA), and other Japanese ministries and agencies are trying to spread the 100 mSv threshold theory by questioning the LNT model. This approach is not risk communication and has been criticized by sensible experts and citizens.

**3. Comments on Dr. Kakinuma's presentation**

The large scale epidemiological studies have shown the validity of the LNT model even with low-dose and low-dose-rate like natural radiation. As shown in IARC Monographs on the Identification of Carcinogenic Hazards to Humans, the results of human epidemiological studies can't be overturned by the results of genetically modified animal experiments. We dare to comment on her

presentation because the Japanese government supports such experiments and uses them as a scientific basis to question the LNT model and persuade the public.

**4. High incidence of thyroid cancer in Fukushima and a flawed examination program**

(1) The UNSCEAR 2020 report on the high incidence of thyroid cancer in Fukushima relies on biased information from the Radiation Medical Center for Fukushima Health Management Survey, Fukushima Medical University, and stated that "excess thyroid cancer risk attributable to radiation exposure was most likely not discernible in any of the age group"

The research group of the Radiation Medical Center is responsible for everything from planning the thyroid examination to analyzing and publishing the data obtained. They report examination results to The Fukushima Prefectural Health Management Survey Oversight Committee (Oversight Committee), an advisory body to Fukushima Prefecture, but the data necessary to verify these results have not been made public. Therefore, outside researchers have no choice but to re-analyze the results based on the limited data published by the group.

(2) In Fukushima prefecture, thyroid radiation exposure doses were measured for only 1,080 children who were living more than 30km away from the nuclear power plant and the measurement was started only about 2 weeks after the release events[2]. Moreover, through the support activities of the 3.11 Fund it was discovered that the thyroid examination system was designed in such a way that the number of patients could not be accurately determined from the planning stage[3]. Under such conditions, 265 cases of thyroid cancer have been detected among 380,00 children under the age of 18 at the time of the accident, by October 2021. The Oversight Committee concluded that "The number of thyroid cancers found is in the order of dozens of times higher than the prevalence estimated from thyroid cancer incidence statistics." This means that even if they did not take into account more than 30 cases caused by the flawed examination program, the incident rate is still high.

(3) The research group of the Radiation Medical Center analyzed the correlation between exposure and cancer using doses estimated based on the contamination level of the affected people's residential areas and inaccurate number of cases, and reported that no dose-dependence was found

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[2] NAIIC, "The Official Report of the Fukushima Nuclear Accident Independent Investigation Commission", Fukushima Nuclear Accident Independent Investigation Commission, National Diet of Japan, 2012, https://dl.ndl.go.jp/info:ndljp/pid/3514606,

[3] Susumu Yokoya 甲状腺検査集計外症例の調査結果の速報 （Preliminary report on the results of the investigation of cases of missing thyroid test totals） The 10th Fukushima Health Management Survey Oversight Committee, Fukushima Prefecture, 8 July 2018, (in Japanese)
https://www.pref.fukushima.lg.jp/site/portal/kenkocyosa-kentoiinkai-b10.html

between radiation dose and cancer incidence[4]. In response to this report the Oversight Committee suggested that over-diagnosis[5] is the cause of the high incidence of cancer, and is trying to reduce the number of examinations in schools, claiming to prevent the risk of over-diagnosis. However, over-diagnosis has been ruled out by surgeons who have performed most of the surgeries based on their surgical findings[6] Moreover, according to a questionnaire survey conducted by the 3.11 Fund on people who have undergone surgery for thyroid cancer, they oppose the over-diagnosis argument, and more than 90% of them want to continue thyroid examinations in schools.[7]

**5. The knowledge about the LNT model is important for the public to protect their health.**

Dr. Shunichi Yamashita, an advisor to Fukushima Prefecture on radiation health management, gave lectures immediately after the accident in many places in Fukushima saying that radiation levels up to 100 mSv per year are safe and that there is no need to evacuate, thus exposing the people of Fukushima to radiation that could have been avoided. If the public does not understand the risks of radiation exposure or is taught that 100mSv is safe, they will not be able to protect their own health in the event of a nuclear accident. Radiation experts should provide accurate knowledge of the risks of radiation to the public. We request you to make the LNT model widely known to the general public to protect their health.

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[4] Ohira T. et al. External radiation dose, obesity, and risk of childhood thyroid cancer after the Fukushima Daiichi Nuclear Power Plant accident: The Fukushima Health Management Survey. Epidemiology, 30, 853-860, 2019.

[5] The 22nd Fukushima Health Management Survey Oversight Committee Fukushima Prefecture, 22 February 2012. https://www.pref.fukushima.lg.jp/sec/21045b/kenkocyosa-kentoiinkai-22.html (in Japanese)

[6] Shinichi Suzuki, "Surgical Treatment of Pediatric Thyroid Cancer in Japan" ["日本における小児・若年者の甲状腺がん診療"], Presented at the Second International Symposium of the Radiation Medical Science Center for Fukushima Health Management Survey, Fukushima Medical University, 2–3 February 2020 (in English and Japanese), http://kenko-kanri.jp/en/news/2nd_intl_symposium_ report_published.html,

[7] Sakiyama H. Health effects of the Fukushima daiichi nuclear power plant disaster. World Nuclear Industry Status Report 2021 (https://www.worldnuclearreport.org/World-Nuclear-Industry-Status-Report-2021-773.html

Proposals for future research

Cardiovascular deaths increase with radiation exposure as shown in numerous reports including follow-up studies of atomic bomb survivors[8] and the Ukrainian government's 25-year report on the Chernobyl accident[9]. Vascular damage due to radiation exposure is also discussed in NCRP report No.186. However, since the mechanism of vascular damage is not well understood, we request you to support research on this topic.
It is also well known that lymphocytes, which are responsible for immunity, are highly radiosensitive, therefor, basic studies on radiation effects on the immune system should be encouraged。

We hope that our comments will be incorporated into your reports and will be useful for the public's radiation protection.

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[8] Yukiko Shimizu, Kazunori Kodama et al., “Radiation exposure and circulatory disease risk: Hiroshima and Nagasaki atomic bomb survivor data, 1950–2003”, *BMJ*, 14 January 2010.

[9]Ministry of Ukraine of Emergencies, “Twenty-five Years after Chernobyl Accident: Safety for the Future”, National Report of Ukraine, 2011.

Dear Committee Members,

Developing a Long Term Strategy for Low-Dose Radiation に対する意見を表明する機会を頂き感謝致します。私たちはライトライブリフット賞をマイケルシュナイダーと共同受賞した故高木仁三郎が 2016 年に設立した市民科学者を養成するための高木学校のメンバーです。

## コメントを提出する背景

私たちが米国科学アカデミーから発表される放射線リスク評価に強い関心を抱くのは、その評価が ICRP、UNSCEAR に影響し、それが日本政府の見解にも大きな影響を及ぼすからです。2021 年 11 月 16–17 日のミーティングで National Institutes for Quantum Science and Technology Japan （GST）から政府側の情報が紹介され、市民の意見や政府に与しない専門家の見解は紹介されていませんでした。ここに市民の側からの見解も述べますので報告書の中に取り入れて頂けるよう要望致します。

## 私どものコメント

### 1. 汚染地域からの避難者の正当性を支持する根拠としての LNT モデル

*原発事故で放射能汚染された地域から 16 万人が避難し、現在まだ約 67,000 人が避難を続けています。国と福島県はこれまでの公衆の線量限度年間 1mSv を 20mSv に引き上げ、それを安全として避難住民に対する住宅支援を中止し、帰還を迫っています。避難住民、特に子どもを持つ若い世代は汚染地に帰って子育てをすることはできないと主張しています。そして国と東電に対し避難の正当性と損害賠償を訴えて裁判を起こしています。*その場合住民が健康を損なわないための主張のより所となるのが LNT モデルです。

ミーティング全体の発表には LNT モデルを考え直さなければならないような新しい科学的知見は見られませんでしたし、LSS はじめ疫学調査結果は 100mSv 以下での発がんリスクを明らかに示しています。従って LNT モデルを引き続き採用してゆくよう強く要望致します。

### 2. 日本政府によるリスクコミュニケーション

National Institutes for Quantum Science and Technology (QST) の Dr. Shimada から発表されたリスクコミュニケーションについてですが、コミュニケーションと称しても被害者の声を聞くということはなく一方的に放射線安全教育をしているだけです。そのために莫大な予算が使われています。宣伝に使われているパンフや学校に配布される副読本は 100mSv 以下の被ばくリスクは判っていない、100mSv の被ばくリスクは野菜不足や運動不足と同程度であるので心配する必要はないと教えています。文部科学省、環境省、復興庁をはじめとする日本の省庁は LNT モデルに疑問を投げかけることによって、100mSv しきい値論を広めようとしています。このようなやり方はリスクコミュニケーションになっておらず、良識ある専門家や市民から批判されています。

3,Dr.Kakinuma の発表について

低線量、低線量率である自然放射線によってもLNTモデルの妥当性は示されていますから、それを遺伝子改変した数百匹の動物実験の結果で覆すことはできないと考えます。

4. 福島県における甲状線がんの多発と漏れのある検査制度

福島県における甲状腺検査は福島県立医大の研究者が計画からデータの分析まで全て一手に行っています。これまでに県立医大から甲状腺検査結果についての多くの論文が発表されていますが、これらを外部から検証するために必要なデータは公開されていません。そのため、外部の研究者は県立医大が発表した限られたデータを基に再分析する以外に方法はありません。

福島県では甲状線被ばく線量も僅か1,080人しか測定されていません。そして甲状腺がんの子どもを支援するNGOである3・11甲状腺がん子ども基金の支援活動によって甲状腺検査が計画段階から正確な罹患者数を把握できないシステムになっていることがわかりました。そのような条件下で甲状腺がんは事故当時18歳以下の約38万人の中から2021年10月までに265人発見されていますが、これに加えて集計に入っていないがん患者が判っているだけで30人以上います。福島県の助言組織である健康調査検討委員会は不正確な線量と罹患者数を用いて被ばくと発がんの相関関係を分析し、甲状腺がんの多発は被ばくの影響とは考えられないと発表しました。検討委員会は多発は過剰診断が原因だとし、過剰診断の不利益を防ぐためと称して検査の縮小をはかっています。しかし、がんの手術を受けた当事者に対するアンケート調査によると、彼らは過剰診断論に反発し、90%以上が検査の継続を望んでいます。

5, 一般公衆にLNTモデルを教えることは健康を守るために重要である

福島県の放射線健康管理アドバイザーであった山下俊一氏は事故後講演会で年間100mSv迄は安全である、避難する必要はないと述べ、県民に避ける事のできた被ばくをさせました。このように公衆が平常時から放射線被ばくリスクを理解していないか、あるいは安全であると教え込まれてしまうと、原発事故が起きた場合に自分の健康を守ることができません。放射線専門家は公衆の放射線のリスクに関する正確な知識を提供すべきです。あなた方がLNTモデルを普及させることに力を尽くすことを強く要望します。