

Radiation Phobia in Korea Provoked by Fukushima Accident

Keon Kang, MD, PhD

Department of Nuclear Medicine

Seoul National University Hospital, KOREA

Fukushima Radiation vs. CT scan

Levels of radioactivity measured at different points around the perimeter of the power plant since midday on Friday.



TYPICAL RADIATION DOSES, FOR COMPARISON

Whole body CT scan

Annual dose in U.S., from all sources

Annual dose in U.S., from natural sources

Chest X-ray

A measurement of 400 millisieverts was taken between two of the reactors, but 11.9 millisieverts was the highest measurement recorded Tuesday on the plant's perimeter.

12 millisieverts per hour

10

8

6

4

2

Explosion at reactor No. 1.

Explosion at reactor No. 3.

Explosion at reactor No. 2.

Fire near reactor No. 4.

Friday

Saturday

Sunday

Monday

Tuesday

Wednesday

Koreans Exposed to Medical Radiation a Lot, Due to Repeated CT Scans

Exposure levels received by medical radiography

Units: Millisievert (mSv)
the amount of radiation that is evaluated for its effect on the human body according to the type of radiation or energy

8~10mSv.
Brain, head and neck CT

10~15
chest CT

0.2~0.34
a chest X-ray

5~10
angiography, spinal fluoroscopy

10-15 abdominal and pelvic CT

20~30
PET-CT (effect of taking 200 chest X-rays at once)

PET/CT

Tips for Reducing Medical Radiation Exposure

- Avoid taking CT scans of the same area within a month.
- Avoid examining several areas at once, such as the abdomen and chest, with CT.
- Refrain from performing CT scans on other areas after taking PET-CT at a medical examination (e.g., taking PET-CT and abdominal CT to see pancreatic cancer)
- Ask if you can replace the examination with ultrasound or MRI, which does not produce medical radiation.
- Ask the medical staff how much radiation exposure they will receive from CT or X-ray.
- Familiarize yourself with the test tips in advance so that the test can be completed at once.

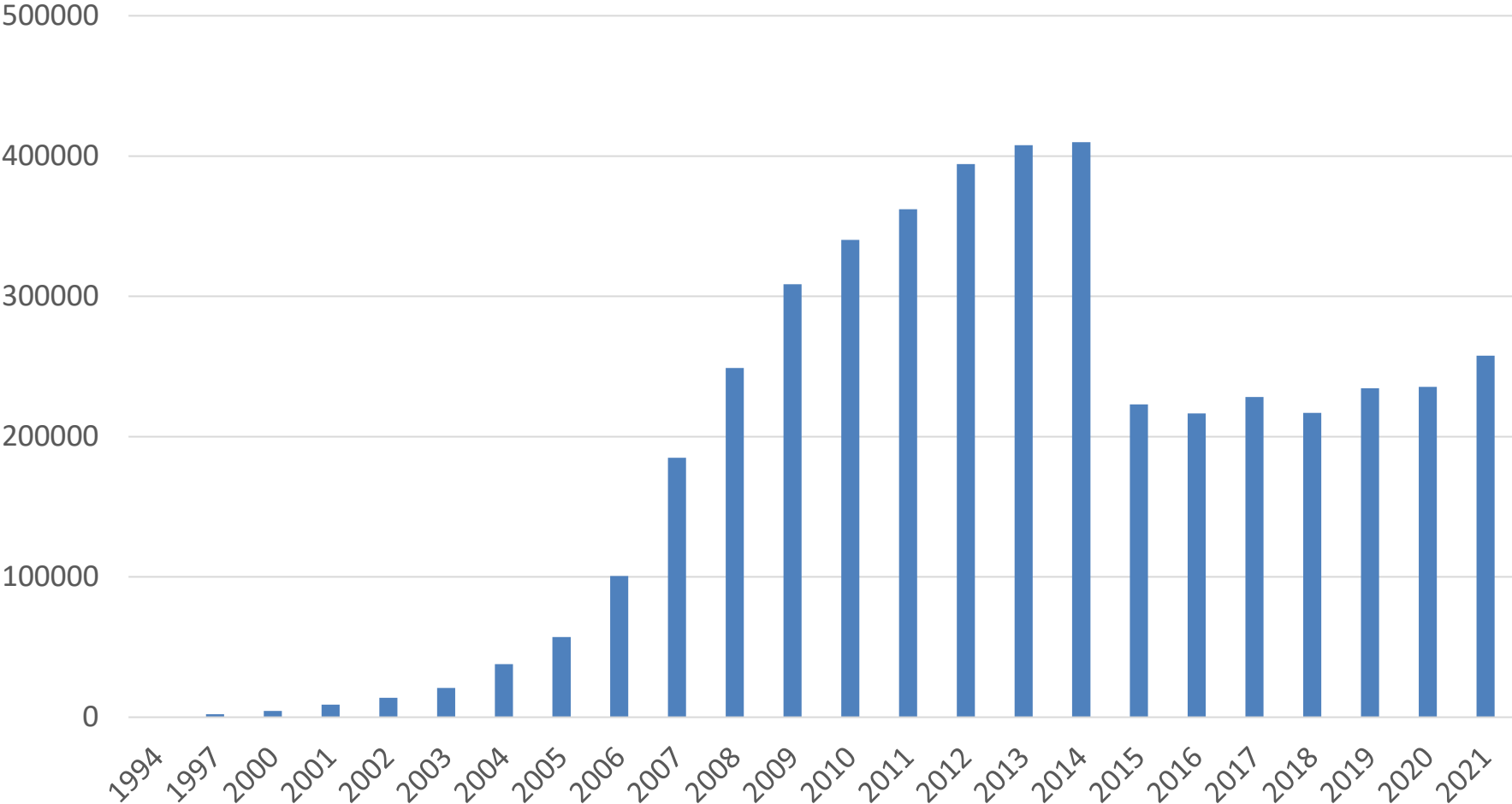
Recommendation Criteria for International Radiation Protection Committee

Public - 1 mSv or less per year

Radiation-related occupations - not more than 50 mSv per year

Patient - Depends on disease status and condition

No. of PET exams in Korea



National Insurance Coverage Start

Reimbursement Policy Change

Staffs at PET center



Annual doses of staffs (mSv)

Specialty	2013	2014
Nurse 1	1.44	1.40
Nurse 2	3.61	3.57
Nurse Assistant 1	1.59	2.50
Nurse Assistant 2	0.91	0.70
Technologist 1	3.28	1.36
Technologist 2	2.54	1.68
Technologist 3	2.65	2.28
Technologist 4	1.86	1.96
Technologist 5	1.67	1.00
Technologist 6	2.58	2.72
Technologist 7	0.79	2.13
Technologist 8	1.88	2.16
Technologist 9	2.16	1.36

Annual number of handling patients after FDG injection at the same day

1 Nurse at Nuclear Medicine	7006
Endoscopy	212
Ultrasonography	296
Echocardiography	220

Radiation dose from patients

Exposure time	5 min	10 min	15 min	20 min
Calculated dose (mSv)	0.0017	0.0033	0.0048	0.0063
Measured dose (mSv)	0.0007	0.0013	0.0019	0.0025

- 2 h after injection of 8 mCi FDG
- Average of 9 patients is 0.0148 mSv/h(± 0.003) at 1m

$$0.0013 \text{ mSv} \times 300/\text{y} = 0.39 \text{ mSv/y}$$



7. Can a pregnant woman accompany a friend, partner or child who is having a scan?

It is not desirable. Although the radiation dose from the person undergoing a scan is fairly low, it is desirable to keep the radiation exposure to the foetus as low as reasonably achievable. Should a pregnant woman's presence be necessary to comfort a small child, specific advice to keep their distance from the child and from other patients who have undergone PET scans or other diagnostic and therapeutic radionuclide procedures should be provided. In such a case, the contact time should be as short as possible.

9. What if an ancillary staff member is in the early stage of pregnancy and is exposed to a patient who has undergone PET/CT?

There is no significant risk involved in such an exposure. For details »

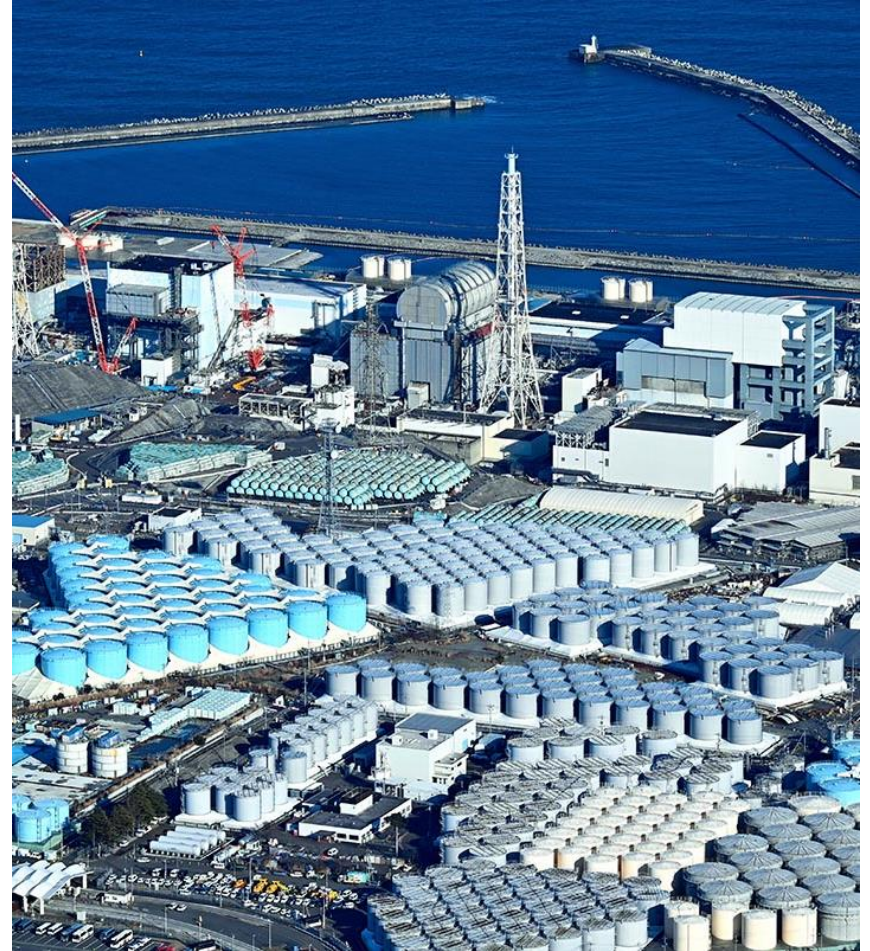
14. Are there any radiation risks to other non-radiation workers, e.g. anaesthetists, para medical staffs, nurses?

No, there is no need for restrictive advice for non-radiation workers who have only occasional contact with patients who have undergone a PET/CT examination. The usual principles of reducing contact time and keeping distance apply.

Fukushima treated water



Mar 2011



Apr 2021

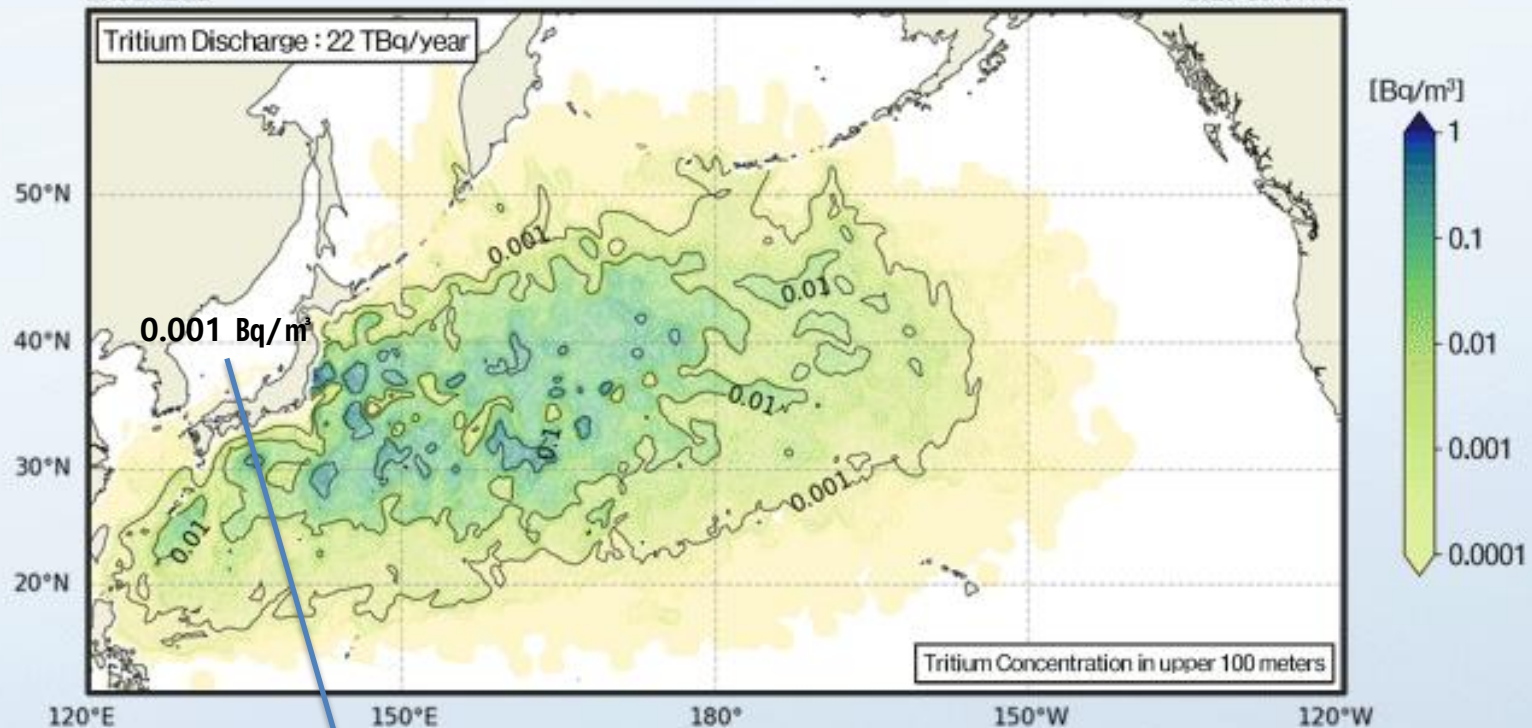
Simulation of marine diffusion by discharging contaminated water from Fukushima nuclear power plant

2년

Tritium concentration
years after release

ENSEMBLE

2025-03-01T00



자료 : 한국해양과학기술원, 한국원자력연구원 NOCUTNEWS

0.000001 Bq/L: average tritium concentration of 0.17 Bq/L in domestic seas

South Korean fishermen protest against Fukushima discharge water

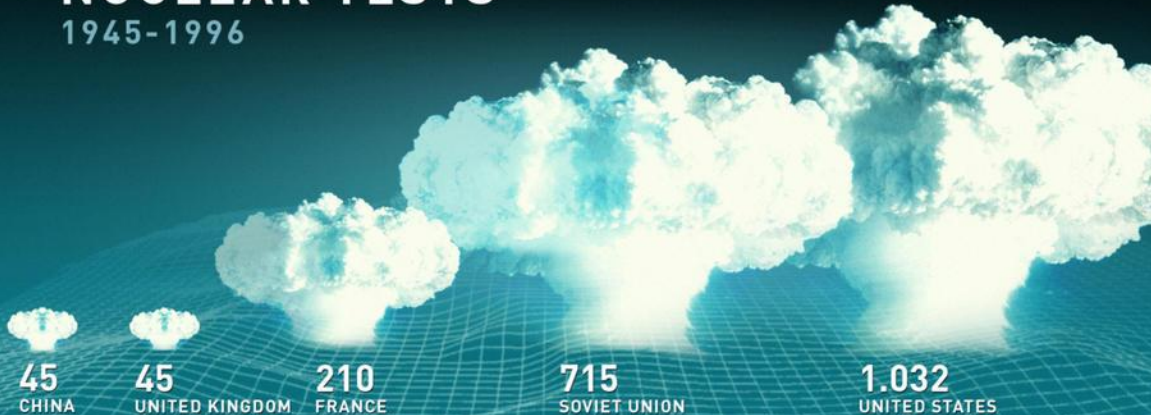


Fear Marketing and Gaslighting

- Politicians during cold war era
- Experts in radiation safety
- NGO for environment protection
- Media (Press, Film, Social Networks, etc.)

NUCLEAR TESTS

1945-1996



CBS



김현정의
NEWS

All about news

SHOW

김현정의
뉴스쇼



서군열 교수

핵고수 맞토론



강건욱 교수

Showdown of Nuclear Experts over Treated Water in Fukushima

Korean government starts daily press briefings on Fukushima water release

Jun 15, 2023



Lessons for communications

- **Difficulty to get understand the public on the radiation risk** for extremely low dose level, as well as the radioactivity, radiation doses, or dose limits, with the linear no threshold (LNT) model and the current radiation units, Bq, Gy, Sv, etc.
- Re-evaluation of the effectiveness and the appropriateness of **communication** system among the regulatory body, relevant organizations, academies, and the public.
- ICRP recommends that the computation of cancer deaths based on **collective effective doses** involving **trivial doses to large population is not reasonable** and should be avoided, but many of the intellectuals do so anyway (on the base of the LNT model)
- It needed to emphasize a **recommendation for extremely low dose** effect.