A Critique of the ICRP recommendations and the health risk assessments of severe accidents by WHO and UNSCEAR
- Chernobyl and Fukushima-

Katsumi Furitsu MD Ph.D.
Hyogo College of Medicine
Genetic Department
IPPNW Conference in Frankfurt
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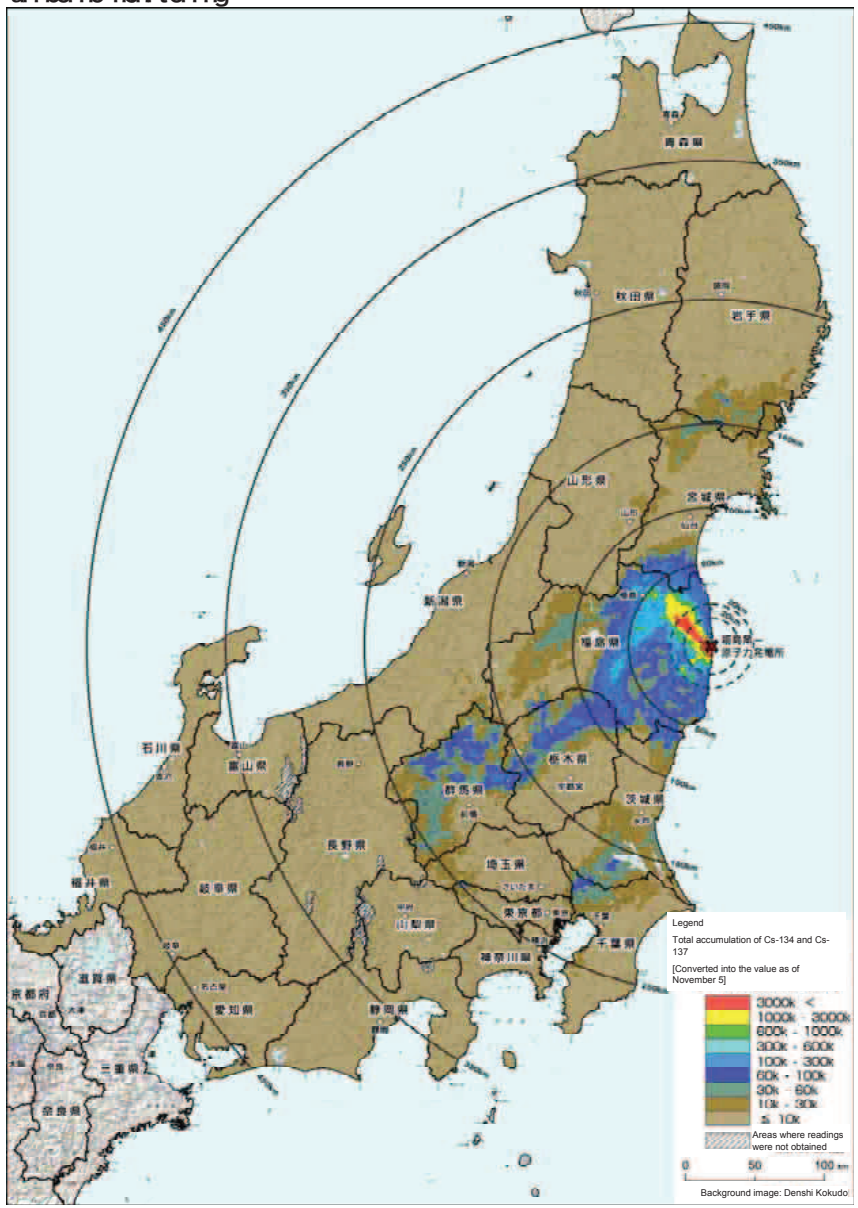
(Reference 2)

The total deposition of Cs-134 and Cs-137 on the ground surface throughout all of East Japan, reflecting the results of the fourth airborne monitoring



Results of the Fourth Airborne Monitoring Survey by MEXT, December 16, 2011
<http://radioactivity.nsr.go.jp/en/contents/4000/3179/24/1270_1216.pdf>

The triple crimes and responsibilities of the Japanese government for the Fukushima Daiichi Power Plant Accident

1. They caused the severe accident and brought serious damage to Fukushima as the result of the national policy to promote nuclear power plants.

2. They did not provide the true, accurate information regarding radioactive contamination and its risk for the people.

3. They have left people in the affected area under the condition of insufficient support and protection for the past three years.

The Japanese government has to take responsibility for these crimes!

ICRP Statement on Fukushima, March 21, 2011

Based on the 2007 Recommendation (Pub.103), Pub.109, Pub.111

INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION

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March 21, 2011

Fukushima Nuclear Power Plant Accident

The International Commission on Radiological Protection (ICRP) does not normally comment on events in individual countries. However, we wish to express our deepest sympathy to those in Japan affected by the recent tragic events there. Our thoughts are with them.

Throughout we have kept and continue to keep abreast of events as they unfold, particularly those at the Fukushima Nuclear Power plant, through some of our Japanese colleagues and information being provided by national and international organisations and professional societies.

We hope that the current effort to regain control of the situation will soon be successful and that our recent recommendations on radiological protection in emergency situations and for contaminated territories have and will prove helpful in dealing with the present and future circumstances.

The Commission continues to recommend optimisation and the use of reference levels to ensure an adequate degree of protection with respect to exposure to ionising radiation in emergency and existing exposure situations.

ICRP Statement on Fukushima, March 21, 2011

Based on the 2007 Recommendation (Pub.103), Pub.109, Pub.111

1. Recommend principle:

- optimisation and the use of reference levels
  - ＊ It is actually based on "cost-benefit analysis"

2. Emergency situation:

- reference levels for the public : 20 to 100 mSv

3. Existing exposure:

- the radiation source is under control.
- allow people to continue to live in the contaminated area
- reference levels for the public: 1 to 20 mSv/ year
- the long-term goal: 1 mSv/ year

"No clear evidence of health effect under 100mSv" is not scientifically true!

➢**The lifespan study (LSS) of A-bomb survivors by the RERF**: *"A formal dose-threshold analysis indicated* ***no threshold****", "The linear dose–response relationship provided the best fit to the solid cancer data across the entire dose range in this study..."* (Ozasa, 2012)

➢**Retrospective cohort study of cancer risk of nuclear workers in 15 countries**: The largest study of nuclear workers ever conducted. The overall average cumulative recorded dose was 19.4 mSv. "There is a small excess risk of cancer, even at the low doses and dose rates typically received by nuclear workers in this study." (Cardis, 2006)

➢**UK nuclear workers:** Evidence for an association between **mortality from non-cancer causes of death**, particularly circulatory system disease, and external exposure to ionizing radiation. Mean external cumulative dose was 32.8 mSv for "external" workers and 85.0 mSv for "internal" workers. (McGeoghegan, 2008)

➢**The increased incident rate of childhood cancer after in utero exposure** by medical diagnostic X-ray was observed at **2.5 mSv of the fetus dose**. (Stewart, 1971)

➢**The increased risk of childhood leukemia and brain tumor by medical CT** was reported in the large cohort studies. (Pearce, 2012. Mathews, 2013)

The policies of the Japanese government after the Fukushima accident, based on the ICRP Recommendations of 2007 – 1

- **Standard for evacuation: 20 mSv/year**

- **Early standard for clean-up of schoolyards: 20 mSv/year**
  They reduced the standard to 1 mSv/year later after facing strong objections from mothers.

- **Goal for Clean-up of the contaminated areas:**
  - **The tentative goal: 20 mSv/year**
  - **The long-term goal: 1 mSv/year.**

- **The standard for returning the evacuated people: 20 mSv/year**

The policies of the Japanese government after the Fukushima accident, based on the ICRP Recommendations of 2007 – 2

- **The object area of the supporting policies is limited:**
  The government refused the request of the people "At least the area above 1mSv/year should be supported under the special law."

- **Education of children using a textbook based on the ''ICRP recommendations'':**
  In the textbook published by the Ministry of Education, it is written that "There is no clear evidence of getting sick including cancer only because of ionizing radiation if the exposure dose is less than 100 mSv at a time."

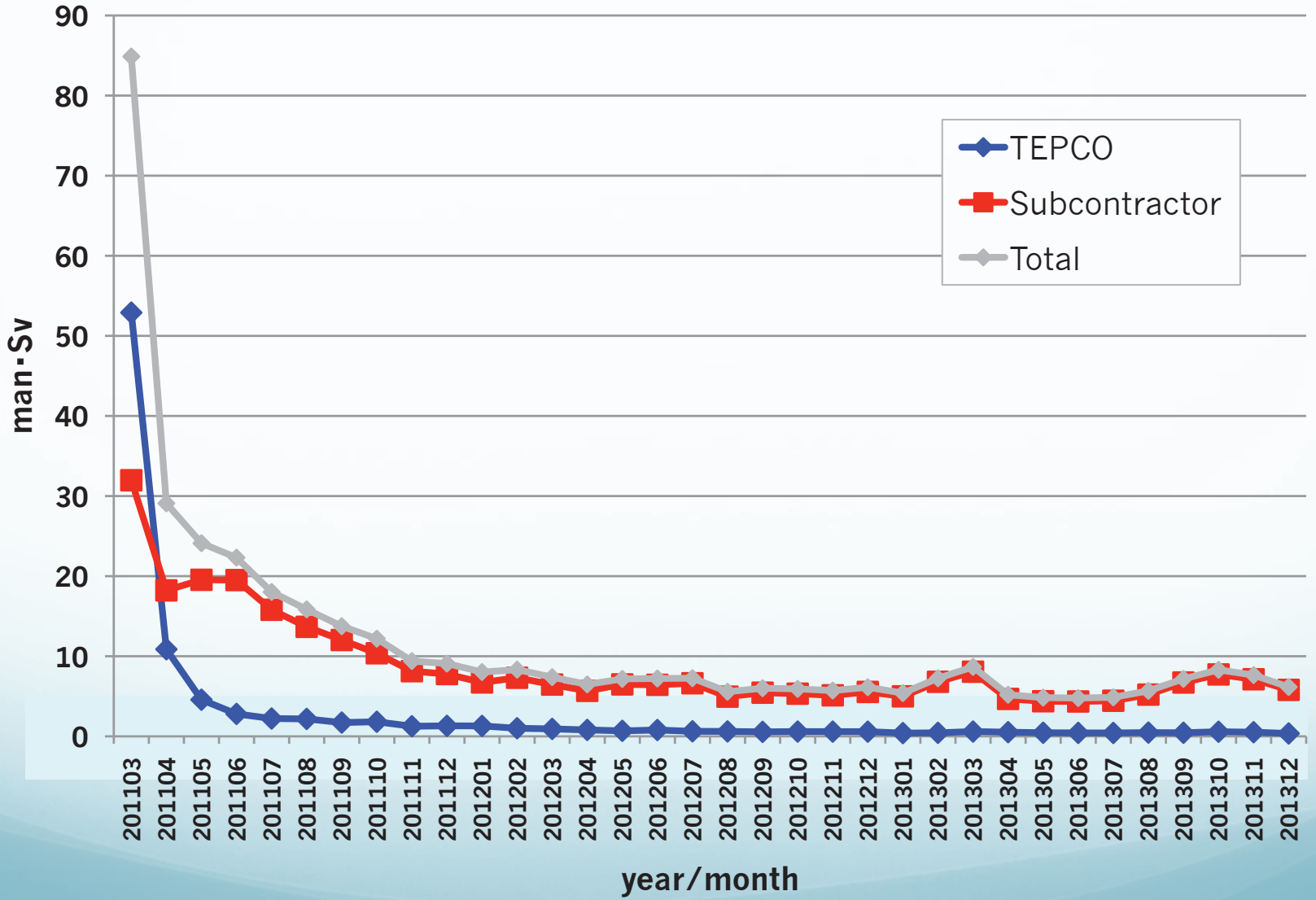
The policies of the Japanese government for the emergency workers at the Fukushima Diichi Nuclear Power Plants, based on the ICRP 2007 Recommendation

- The reference level of occupational exposure at an emergency exposure situation in the 2007 Recommendations:

  - life-saving (informed volunteers):
    No dose restrictions if benefit to others outweighs rescuer's risk
  - other urgent rescue operations: 1000 or 500 mSv
  - other rescue operations: less than 100 mSv

- They raised the dose limit for the emergency workers:
  100mSv → 250 mSv (March 2011)

Collective Dose of the workers at the Fukushima Diichi Site



Based on the data from TEPCO:
http://www.tepco.co.jp/cc/press/betu14_j/images/140131j0403.pdf

March 22. 2011
From the Web-site of TEPCO <http://photo.tepco.co.jp/library/110322/110322_1f_kirin_2.jpg>

July 18.2013
From the Web-site of TEPCO <http://photo.tepco.co.jp/date/2012/201207-j/120719-01j.html>

The principles of ICRP

1. Justification:

"Any decision that alters the radiation exposure situation should do more good than harm."

**Only the protective measures which produce "net benefit" can be "justified".*

2. Optimization of protection:

"the likelihood of incurring exposures, the number of people exposed, and the magnitude of their individual doses should all be kept as low as reasonably achievable, taking into account economic and societal factors." (ALARA)

**Balance cost and benefit and manage to get the biggest benefit.*

3. Application of dose limits:

"Total dose to individual should not exceed the appropriate limits."

**The politically decided standard of dose for individual.*

ICRP recommends measurement and dose limits based on "Cost-benefit analysis" not science

An example of optimization of radiation protection by the design of a simple shield

$$e^{-\Gamma w_o} = \frac{X_V}{\tau\alpha\Gamma\dot{H}_u f_t \rho}\frac{hl}{N}$$

$$= \frac{10^2\ \$\ m^{-3}\ 15\ m^2\ man^{-1}}{10^4\ \$\ (man\ Sv)^{-1}\ 14\ m^{-1}\ 5\ 10^{-2}\ Sv\ y^{-1}\ 0.1\ 20\ y}$$

Thus,

$$e^{-\Gamma w_o} = 0.1$$

They evaluated "the life of a person" by counting dollars with the factor of 10^4 \$ / man·Sv.

ICRP Pub. 37, 1983, "Cost-Benefit Analysis in the Optimization of Radiation Protection"

ICRP recommends measurement and dose limits based on "Cost-benefit analysis" not science

Another example of calculation: value of relocation in the case of nuclear accident.

Table C-1. Values of relocation and detriment costs for different countries

Type of country	c (US$ per man-month)	α (US$ per man Sv)	c/α (mSv per month)
Rich developed	500	100,000	5
Developed	200	20,000	10
Developing	40	3000	15 (rounded)

They consider that the value of people is more than 10 times cheaper in "developing" countries than in "rich developed" countries. Thus they recommend the higher radiation standard for protective measure for developing countries.

ICRP Publication 63 - Ann. ICRP 22 (4), 1992, "Principles for Intervention for Protection of the Public in a Radiological Emergency"

The tricks and problems of underestimating radiation risk, in the ICRP 1977 Recommendations - 1

1. Introduction of the model of ‘‘Effective dose equivalent’’ which converts the internal organ dose to the whole body dose.

2. Using the underestimated risk assessment on cancer and leukemia of A-bomb survivors to calculate the radiation risk.

3. Relative evaluation of the radiation risk in comparison to the different quality of risks such as traffic accidents and workers accidents in other industries.

4. Considering only the radiation risk of a standard adult man without considering those who are more sensitive to radiation such as children and fetuses.

5. Considering only the risks of the death from cancer and leukemia and serious genetic disorders, and ignoring the risk of non-cancer diseases and the genetic effect on and beyond the 3rd generation.

Life span study (LSS) of A-bomb survivors

- **The data of A-bomb survivors clearly show Linear-non threshold theory (LNT) is best fit to the radiation risk assessment of solid cancer.**

  * *The low dose under 100 mSv can add certain risk of cancer in proportion to the exposure dose.*

- **Dose and dose rate factor (DDREF) is close to 1.**

  * **that chronic and low-dose-rate exposure can make the equal amount of risk of cancer to acute exposure.**

  "The expected DDREF based on the ratio of ERR per dose in those studies to that in the LSS appeared to be close to 1.0, nominally lower than the factors suggested by BEIR VII (1.5) and ICRP (2.0)." (Ozasa, 2012)

The critical review on the WHO report on Fukushima -1

1. The health risk assessment is limited only on leukemia, female breast cancer and thyroid cancer.

2. They estimated increased life time risks of
   all solid cancer (4%)
   leukemia (7%)
   breast cancer (6%)
   thyroid cancer (70%)
   over baseline rates in the highest dose location.
   For the people in the second most affected location, risk is estimated to be about one-half.

3. They consider "70% increased risk" is not very much.

The critical review on the WHO report on Fukushima -2

4. They ignore the risk in the rest of the Fukushima prefecture population and that of neighboring prefectures.

5. They support the Japanese government's underestimation of radiation risk and endorse the inadequate health management policies in the affected area.

6. They suggest that psychological factor is more important than the risk of radiation.

7. They tried to minimize the possibility of underestimation.

The critical review on the UNSCEAR report on Fukushima -1

1. Underestimating the health risk of low-dose of radiation

* Not based on the Linear Non-threshold-theory (LNT)
* "No discernible", "indistinguishable from other cancers"
* Not using the "collective dose" to estimate the health risk

2. Problem of the dose estimate

3. They consider health risk of workers is "indiscernible"

The critical review on the UNSCEAR report on Fukushima -2

4. Emphasizing “health effect is on mental and social well-being”

5. They give endorsement to the inadequate health management and support to the affected people from the Japanese government.

6. They ignore the health risk on non-cancer disease.

WHO and UNSCEAR

- Both the WHO and UNSCEAR say that the estimated health risk is within the "normal spatial fluctuation", "not discernible" or "indistinguishable from other cancers"

- We have to note, "not statistically significant at certain point" is not equal to "no health effect" from radiation exposure.

- For us, from the point of view to protect people, it is important to estimate the health risk of both residents in the contaminated area and nuclear workers based on the LNT without using DDREF and by using the collective dose of the population.

- Note that UNSCEAR even criticize WHO because WHO estimated the risk based on the LNT without using DDREF and by using the collective dose.

The Japanese government quotes WHO and UNSCEA as the “international authorities” for the communication of radiation risk to the public.

■■福島における放射線の状況■■

9．WHO、UNSCEARの評価

○　世界保健機関(WHO)が2013年2月に公表した「2011年東日本大震災後の原発事故に関する予備的被ばく線量推計に基づく健康リスクアセスメント」では、2011年までの限られた情報に基づき、全体的に過大評価になるように線量を推計しており、健康影響については、

被ばく線量が最も高かった地域の外側では、福島県においても、がんの罹患のリスクの増加は小さく、がん発生の自然のばらつきを越える発生は予測されない。

としています(※1)。

【出典】World Health Organization. Health risk assessment from the nuclear accident after the 2011 Great East Japan earthquake and tsunami, based on a preliminary dose estimation. 2013.

○　原子放射線の影響に関する国連科学委員会(UNSCEAR(アンスケア))では、その後の情報も取り入れ、より現実的な線量評価を行っており、2014年に「福島原発事故による放射線影響評価」報告書が発表される予定になっています。

この発表に先立ち、2013年10月の国連総会に提出されたUNSCEARの活動報告書において、

福島第一原発事故の放射線被ばくによる急性の健康影響はなく、また一般住民や大多数の原発従事者において、将来にも被ばくによる健康影響の増加が認められる見込みはない。

との影響評価が示されています。

【出典】United Nations. Report of the United Nations Scientific Committee on the Effect of Atomic Radiation Sixtieth session (27-31 May 2013). General Assembly Official Records Sixty-eighth session Supplement No.46. 2013.

IAEA and other international bodies have been underestimating the radiation health impacts of Chernobyl

IAEA-Chernobyl Forum, Sep. 2005

They reported that only childhood thyroid cancer and leukemia of clean-up workers are significant radiation health effects found after the Chernobyl accident.

The doctors and scientists of the three affected countries and all over the world made argument against the statement from IAEA.