From Asia-Pacific Journal: Japan Focus
http://www.japanfocus.org/-Say_Peace-Project/3549

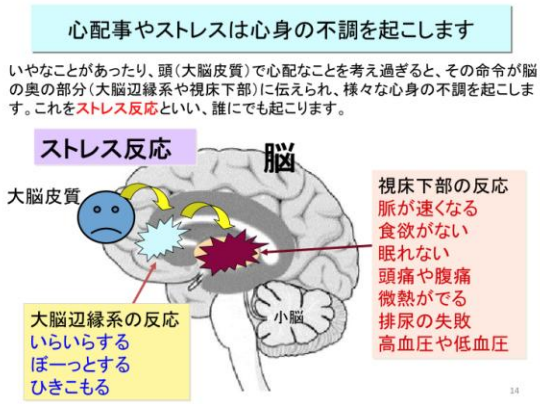
Proteting Children Against Radiation: Citizens Take Radiation Protection into Their Own Hands

Say-Peace

Introduction by Norimatsu Satoko

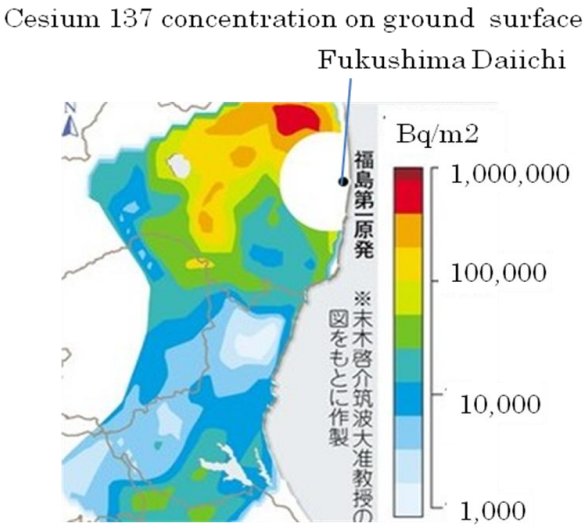
Robert Alvarez, a former senior policy adviser at the U.S. Department of Energy said in a Democracy Now! interview on June 10, "The nuclear industry, particularly in the United States, and elsewhere—Russia and Japan—has had a very long history of withholding information and misleading the public about the hazards of their activities." Being no exception to Alvarez's generalization, the Japanese government, since the multiple meltdowns and explosions at the Fukushima Daiichi nuclear power plant in mid-March, has withheld or controlled information about health risks of radiation, expected dispersion of radioactive materials,[1] and their actual contamination measurements in areas surrounding Fukushima Daiichi and beyond.[2] Instead of providing candid information to the public, the government started campaigns in the opposite direction – to lull the public into worrying less about radiation and its health risks.

For example, the Ministry of Health, Labour and Welfare's pamphlet for pregnant women and mothers,[3] of which three million copies were distributed to preschools, nurseries and clinics across the country, emphasizes that food, water, and breast milk are all safe within the government's provisional standards. It is a "Don't Worry" pamphlet with little concrete information to support their safety claims or about how to minimize radiation risks for infants, children and pregnant women. The Japanese Ministry of Education (MEXT)[4] also produced a guide for teachers and parents in Fukushima, which stressed that "weak" radiation doses such as 250 mSv(millisieverts) over a number of years will have no health effects,[5] and increased cancer risk was not recognized with cumulative doses of under 100 mSv, while the existing exposure limit for



Page 14 of the Japanese government's guide for Fukushima educators and parents, which explains how anxiety (over radiation) can trigger stress reactions in the brain, causing various physical ailments.

ordinary people is 1 mSv/year, and that for nuclear workers is 20mSv in Japan.[6] Yet nuclear workers have been recognized as having radiation-caused sickness at an exposure level averaging as low as 5.7 mSv/year.[7] Again, the entire guide emphasized "Don't worry too much," including a large section to describing the negative psychological effects of worrying about radiation.



A "Hot spot" map: Cesium 137 contamination in Fukushima and prefectures to the south (Ibaraki, parts of Tochigi, Chiba, Saitama) based on measurements by the University of Tsukuba. (Map from Chunichi Shimbun)

These attempts by the government to downplay radiation effects have been successful. Even in Fukushima, life seems to go on as usual. Most people are not wearing masks, and children are at play on dusty playgrounds. But the tide is changing now, as more revelations are made about the government's and the electric company's failure to disclose information in a timely manner, and as more people use the Internet and social media to exchange information and organize networks. Francis Boyle, an international law professor at the University of Illinois and a nuclear policy specialist, urged people in Japan "to protect themselves from their own government and from the nuclear industry."[8] Despite the government's and the mainstream media's massive campaigns to promote the idea that the affected areas are safe and to encourage consumption of produce from those areas, people are finally starting to take safety into their own hands, where it belongs. This is partly because more and more "hot spots," or, irregularly-formed highly contaminated areas, are being discovered, not only in relatively populated areas within Fukushima Prefecture such as the cities of Fukushima and Koriyama, but also throughout the Kanto region, including Tokyo, with forty million people, one third of the nation's population. People can no longer regard the nuclear crisis as being restricted to Fukushima and its people only.

Parents' groups, being formed everywhere,[9] are conducting their own independent radiation measurements and demanding that their cities do more to protect residents, especially children, who are more susceptible to radiation. In Fukushima, a university professors' group,[10] town mayors,[11] and even prefectural assembly members have raised doubts over the credibility of the government's official radiation guidelines. They are demanding dismissal of Yamashita Shun-ichi, the prefecture's "expert radiation adviser," who has been teaching seminars and appearing frequently in the media to convince people in Fukushima not to worry and to stay where they are.[12]

One such citizen-initiated effort is "Protecting Children from Radiation Exposure" by SAY-Peace, a Tokyo-based NGO, among the first comprehensive guides of its sort,[13] published in late May and immediately revised in June. We at The Asia-Pacific Journal have felt the need for such a citizen-initiated radiation guide being made available in English, especially now that the Western media's interest has declined, and much of the latest information about contamination and radiation risks are not as readily accessible in languages other than Japanese. The struggle continues between the government, which wants to hide information and minimize radiation fears in order to evade responsibility and to minimize economic losses, and citizens, who want to know and share the truth in order to minimize radiation risks for themselves, their children and their communities, by creating, using, and spreading tools like this radiation protection guide.

The original Japanese version of the guide is downloadable at this LINK.

Protecting Children from Radiation Exposure

Produced by the SAY-Peace Project
Editorial Supervision by Dr. Matsui Eisuke, Gifu Environmental Medicine Research Institute

Translation by John Junkerman

Introduction: Our Basic Stance

The accident at the Fukushima Daiichi nuclear power plant that occurred after the Great East Japan Earthquake on March 11 has released large amounts of highly radioactive material into the air, sea, and soil, and it continues to affect our lives. Young children are particularly susceptible to the effects of radiation. In order to protect children from exposure to radiation, pregnant women and parents of small children are required to exercise caution in their daily lives and to act on the basis of accurate information.

The government has made announcements such as "There is no immediate danger to health" and "We have established safe standards." But there has been little effort to explain the mechanisms of radiation exposure (in particular, the internal exposure from breathing, eating, or drinking contaminated matter), and no attention has been paid to the danger of delayed effects that may appear in 10 or 20 years.

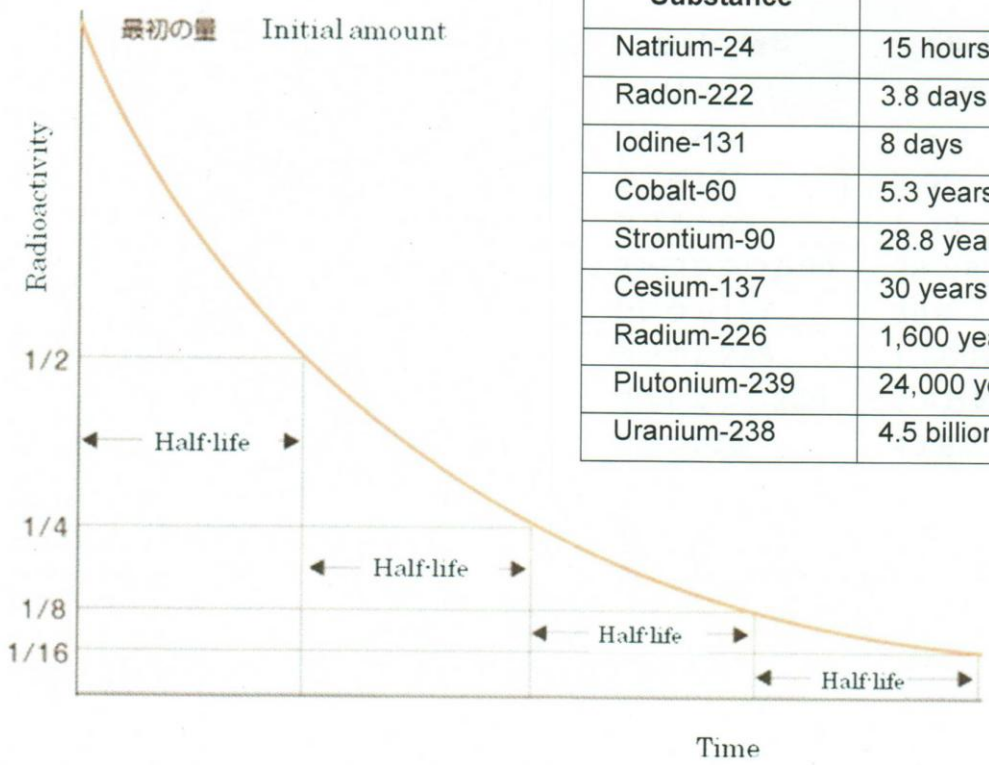
Many specialists in radiation medicine have pointed out that the standards for exposure that the government has set cannot be considered "absolutely safe." Nonetheless, a pamphlet published on April 1 by the Ministry of Health, Labor, and Welfare assured pregnant women and the mothers of small children that "there is no need to worry," without providing any scientific basis for the claim. This is the height of irresponsibility. (The photo at the right is the cover of the pamphlet.)

There are still many things we do not know about the physical effects of radiation, but this lack of understanding should not lead us to relax. Rather, it is important to maintain this stance: since we do not know, we should exercise the utmost caution, and avoid exposure to radiation to the furthest extent possible.

We hope this pamphlet will be of use in protecting children from exposure to radiation.

What is Radioactivity?

"Radioactivity" is the ability to emit radiation, and substances with that ability are called "radioactive substances." Radiation takes the form of rays that are able to pass through matter. Through a process called "ionization," they can damage the cells and DNA that make up the human body, resulting in a variety of physical effects. One of the insidious features of radiation is that it cannot be seen or smelled; it is not perceptible to normal human senses.



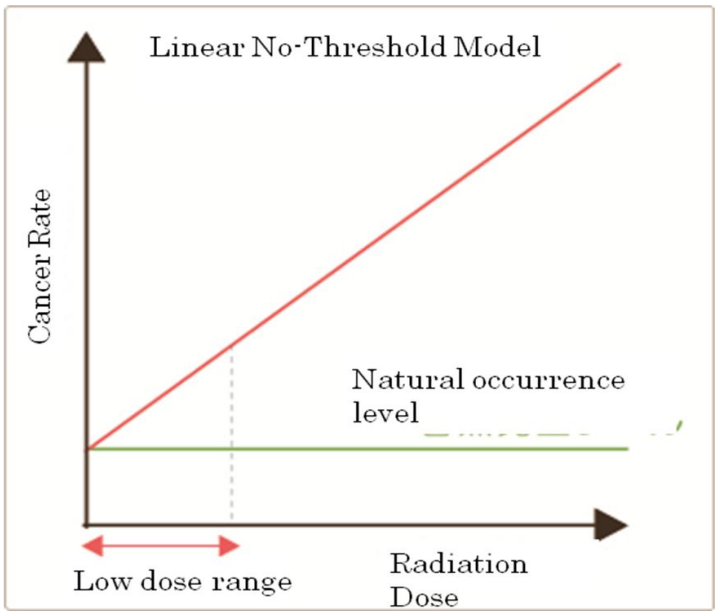
Radioactive Substance	Half-Life
Natrium-24	15 hours
Radon-222	3.8 days
Iodine-131	8 days
Cobalt-60	5.3 years
Strontium-90	28.8 years
Cesium-137	30 years
Radium-226	1,600 years
Plutonium-239	24,000 years
Uranium-238	4.5 billion years

"Half-life" refers to the time it takes for a radioactive substance to lose half of its original strength. For example, the half-life of iodine-131 is eight days, while cesium-137 has a half-life of 30 years. It is often said that radioactivity dissipates over time, but it is important to remember that a substance retains half of its radioactive strength after its half-life has passed; after another half-life, it still retains one quarter of its original strength, and so on. We must also remember that until the Fukushima accident is fully under control, the reactors will continue to discharge radioactive substances into the environment.

What are the Effects of Radiation on the Human Body?

When the physical effects of radiation are discussed, it is common to hear the term "threshold." The threshold is the standard value or permissible amount for the risk from exposure to radiation, and it is often said that being exposed to radiation below threshold levels has no effect on the human body.

However, it is not possible to assert that exposure below the threshold is "safe" or that it "has no effect on one's health." No matter how weak radiation is, it causes damage to human cells. Therefore, there is no such thing as a "safe level." The more you are exposed to radiation, the greater the danger of damaging one's health.

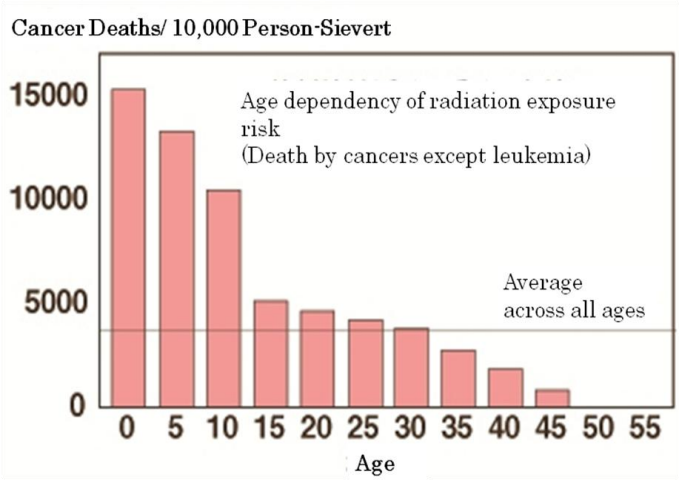


In fact, a committee of the National Academies of Science in the US issued a report in 2005 that concluded that there is no threshold: the risk of exposure exists in direct proportion to the amount of exposure, beginning at low levels. Minimal exposure represents a potential danger to humans. Even the International Commission on Radiological Protection (ICRP), which uses measurement techniques that underestimate internal exposure and low-level radiation exposure, supports this "linear no-threshold model" and acknowledges that doses of radiation under the threshold of 100 millisieverts annually still increase the risk of developing cancer. In other words, it is now accepted wisdom internationally that, even at low levels, radiation affects the human body.

As a consequence, the proper approach when thinking about radiation is not to say, "It's OK to be exposed to this amount," but rather, "We should exercise the utmost caution, and avoid exposure to radiation to the furthest extent possible."

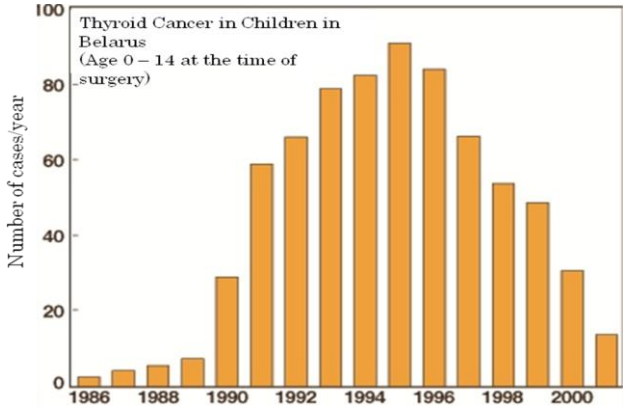
What are the Effects on Fetuses and Babies?

Fetuses, babies, and young children are far more susceptible to the effects of radiation than adults. It has been estimated that babies and infants are four times as vulnerable as adults in their 20s or 30s, so the risk of exposure is much greater. This is because cell division takes place much more vigorously in small children, so cells that are damaged by radiation are reproduced before they can be repaired.



Based on data in J. W. Gofman, *Radiation and Human Health* (Sierra Club Books, 1981). "10,000 person-sieverts" means the collective dose of 1,000,000 people exposed to 0.01 sievert of radiation in a year (also equivalent to 100,000 people being exposed to 0.1 sievert in a year). "15,000" for age zero means the expected number of deaths when 1,000,000 babies are exposed to 0.01sievert (10 millisieverts) in a year.

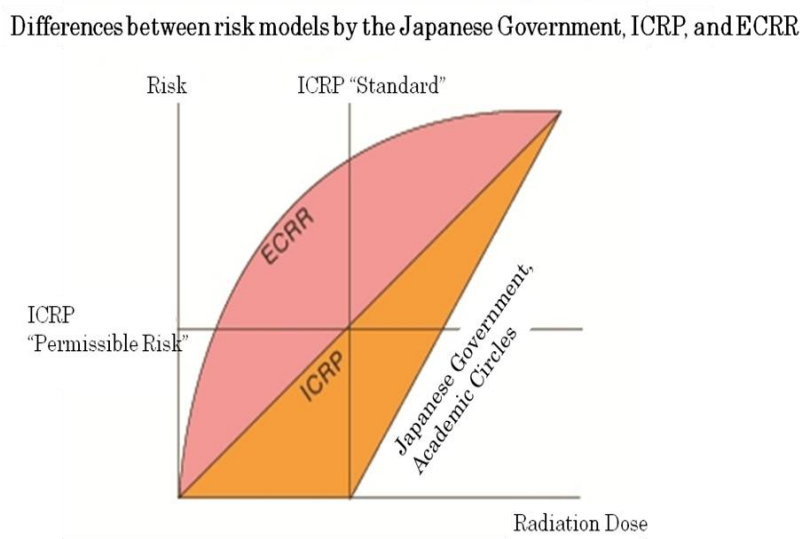
In Belarus, where the effects of the Chernobyl nuclear accident were most severe, the rate of thyroid cancer among children increased rapidly 5 to 10 years after the accident. One should not be reassured when the government announces that "there is no immediate health risk."



Based on a lecture in Japan by M. Malko, "Assessment of Chernobyl Cancers in Belarus" (2003).

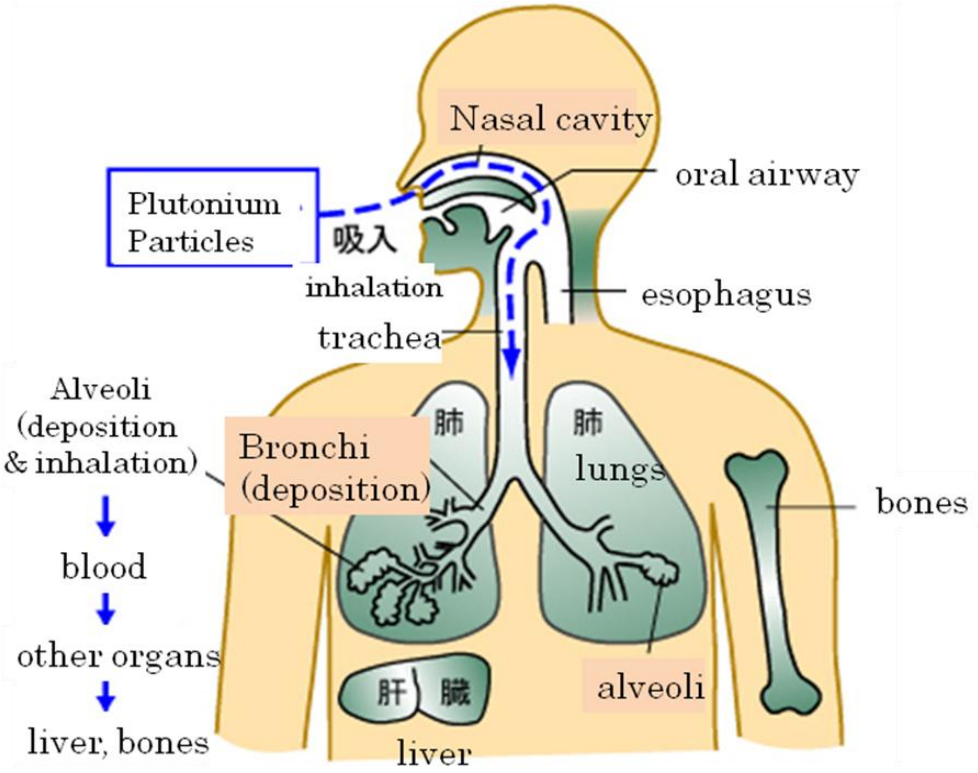
Why is "Internal Exposure" Dangerous?

Exposure to radioactive substances outside of the body is referred to as "external exposure." On the other hand, when tiny particles of radioactive substances are breathed into the lungs, or ingested through mother's milk or cow's milk, water or food, the exposure to this radiation is termed "internal exposure." Internal exposure differs from the short-term external exposure caused by X-rays and CT scans, because the exposure is at a very close distance and it continues over a long period of time. This has led the European Committee on Radiation Risk (ECRR) to conclude that even low levels of radiation pose high risk.



Pink zone: Risk that the International Commission on Radiological Protection ignores,
Pink + orange zones: Risk that the Japanese governmnent and academic circles ignore.
Simply expressing radiation dose in sieverts is insufficient, as we need to know which nuclides are involved. Risk models are also affected by other variables, such as age, sex, genetic makeup, immunity, and time period, so the standard level is no more than an averaged-out, rough guideline. Matsui Eisuke, "Health Effects on Children of Internal Radiation Exposure," *Gekkan Hodanren*, 6, No. 1067 (2011).

Radioactive substances that enter the body accumulate in various organs and continue to emit radiation. The chemical composition of the substances determines how they are absorbed by the body's organs and how long they remain in the body (biological half-life). Iodine-131 concentrates in the thyroid, where it causes thyroid cancer. Cesium-137 is considered dangerous because it lodges throughout the body, in the bones, liver, kidney, lungs, and muscle tissue. Strontium-90 and plutonium-239 remain in the body for a long time, so once they have entered the body, they continue to affect it over the course of many years.

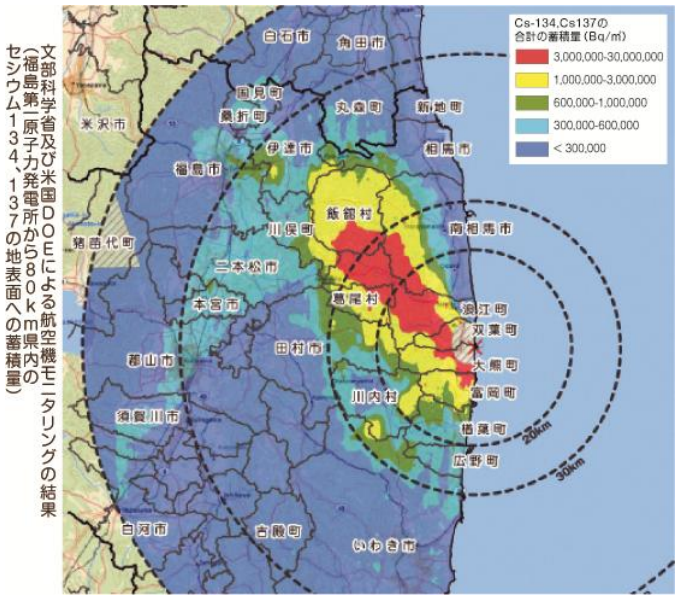


This diagram depicts the inhalation of plutonium, but the process is essentially the same for other radioactive isotopes. Iodine binds to thyroglobulin, the protein that forms the base of the thyroid hormone, so it concentrates in the thyroid and can cause thyroid cancer.

When the air and soil have been contaminated, the contamination first spreads to plants and agricultural products, and then to animals. Through the food chain, the radiation is carried from one animal to the next, until it reaches human beings. In many cases, the radiation becomes more concentrated through this process. Even if the nuclear accident is brought under control and radiation levels fall, highly contaminated food products may continue to enter the market in the future because of this process of biological concentration. It is estimated that iodine in the air becomes concentrated up to ten million times in plants and 620,000 times in milk. Cesium becomes concentrated five times in mollusks, and twenty times in other marine products.

The Contamination Zone

"Hot spots" are areas where rain and snow bring down radioactive substances from the clouds and where high concentrations of these substances are then detected. This applies particularly to the area downwind of a reactor; in the case of the Chernobyl accident, areas 300 kilometers downwind of the plant were contaminated. Because of this dispersal, it is necessary to put into place detailed countermeasures, utilizing the computer system called SPEEDI (System for the Prediction of Environmental Emergency Dose Information). Recently discovered "hot spots" are in the cities of Fukushima, Koriyama, Nihonmatsu, Date, and Iwaki.



The result of MEXT (Japanese Ministry of Education, Culture, Sports, Science and Technology) and the US Department of Energy's aerial monitoring (accumulation of cesium-134 and cesium-137 within the 80 kilometer radius of the Fukushima Daiichi nuclear power plant).

In areas that are considered hot spots, national and regional governments must take measures to evacuate people, particularly pregnant women and young children. Government authorities must take responsibility for providing nursery schools, day care centers, and other schools in areas that are freer from contamination.

In areas outside of these hot spots, it is often suggested that parents need not be overly concerned about allowing their children to play out of doors. However, in Tokyo's Suginami Ward, for example, the airborne radiation level was 0.13 microsieverts/hour on April 20, but it was as high as 6.39 microsieverts/hour on the surface of the ground. In addition, radiation levels rise during and after rainfall. In such areas, children should avoid getting wet in the rain. Since small children are especially vulnerable to radiation, great care should be taken; they should avoid going outside, and when they do, they should wear a facemask.

Radiation in Tap Water and Breast Milk

The government insists that the water supply is monitored to ensure its safety, but standards in Japan are dramatically higher than in other countries. On March 17, the government raised the standard for iodine-131 from 10 Bq/L (becquerels per liter) to 300, and the standard for cesium-137 from 10 Bq/L to 200. Further, under the Food Sanitation Law, the provisional guideline for liquids given to infants is 100 Bq/L; this level "poses no health risk," even to infants under 1 year old.

However, standards for iodine-131 elsewhere in the world range from the World Health Organization's 10 Bq/L to German Technical and Scientific Association for Gas and Water (DVGW)'s 0.5, with the US Environmental Protection Agency (EPA) maintaining a guideline of 0.111. In other words, Japan's standard is 2,700 times higher than that of the US EPA in the case of iodine-131.

World Standards for Iodine-131 in Tap Water (Bq/L)

US EPA	DVGW (Germany)	Ukraine	Belarus	WHO	Japan's Provisional Guideline
0.111	0.5	2	10	10	300 (200 for cesium-137) [100 for infants]

In addition, there is the problem of inadequate monitoring. The Bureau of Waterworks in the Tokyo metropolitan government, for example, publicly announced as "undetected" radiation contamination at levels less than 20 Bq/L until April 14. Until the government tightens safety standards, pregnant women, nursing mothers, and small children should use tap water only for bathing and washing clothes and dishes, in areas surrounding Fukushima Daiichi plant including the Kanto area. Avoid drinking tap water as far as possible, to reduce the risk of internal exposure to radiation.

As for breast milk, we cannot simply generalize that mothers should avoid breastfeeding, considering nutritional (immunity) and safety benefits of breast milk, especially when babies less than three-months old are concerned. According to a survey by the Breast milk Survey and Mother-Child Support Network, there were cases in which no radioactivity was detected in breast milk of mothers living in hot spots, while radioactivity was detected in breast milk of a mother in Mitaka, which is not a hot spot. Therefore, breastfeeding mothers should avoid internal radiation as much as possible, regardless of where they live. Also, increased testing of breast milk must be done in order to take appropriate protection measures.

Radiation in Food

First, since radioactive iodine is still being detected, we must abstain from eating leafy vegetables, herbs, and wild plants from contaminated areas. In particular, vegetables with broad leaves (spinach, lettuce, etc.) carry a high risk because they have large surface areas. The government is prohibiting the shipping of produce with radiation surpassing the standards, but on April 26, for instance, spinach produced in Chiba Prefecture was shipped despite a government ban. Further, the Food Safety Commission has raised the provisional standard for radioactive cesium in vegetables from 370 Bq/kg (previously set by the Ministry of Health, Labor, and Welfare) to 500 Bq/kg.

World Standards for Radiation in Food (Bq/kg)

Isotope	Food group	Ukraine	Belarus	US	Codex Commission	Japan
Radioactive iodine	Baby food, drink			170	100 (Total of five nuclides: Sr 90, Ru106, I129, I131, U236)	100
	Milk, milk products					300
	Meat, eggs, fish, etc.					2000
Radioactive cesium	Baby food, drink	40 (food for small children)	37	1200	1000 (Total of eight nuclides: S35, Co60, Sr89, Ru103, Cs134, Cs137, Ce144, Ir192)	200
	Milk, milk products	100	100			200
	Vegetables	40 (70 for fruits)	100 (40 for fruits)			500

Citing the uncertainty of the criteria for safety testing and regulation, the German Society for Radiation Protection recommends not giving food or drink that contain more than 4 Bq/kg of cesium-137 to infants, children, or young people.

Again, even if the nuclear accident is brought under control and radiation amounts return to low levels, biological concentration may result in highly contaminated food products still entering the market after the passage of some time. In order to prevent internal exposure to radiation, it is necessary to tighten the safety standards, increase testing for radiation, and thoroughly enforce bans on shipping contaminated produce. Of course, the government and Tokyo Electric Power must compensate farmers and other producers for the losses suffered by bans on the shipping of contaminated produce.

Summary of Protection Measures

Here we summarize the protection measures that have been suggested. It is difficult even for specialists to agree on such measures, and these steps will not necessarily ensure one's safety. Rather, they are no more than some areas where we can exercise caution in our daily lives. In giving first priority to safety, evacuation measures taken by the national and local governments are an indispensable element of prevention, to protect the lives of children. Evacuation must be seen as a right, with the government bearing the burden of moving expenses and employment measures, rather than something that is the responsibility of the individual.

Below is a list of temporary measures that individuals can take.

Air: This applies particularly to areas that are contaminated hot spots.

1) Remain indoors as far as possible. Keep outside air from entering (It is difficult not to use air conditioners, fans, or to keep windows closed in the summer time. Some air conditioners allow very little outside air to come indoors. Please consult with manufacturers.)).
2) When you go outdoors, wear a facemask or cover your mouth and nose with a towel.
3) Wear a hat, do not expose skin, and wear a jacket that will not collect dust.
4) Before entering the house, with the facemask still on, brush dust off your clothing.

Even outside of hot spots, radiation is highest during and after a rainfall. In areas surrounding the Fukushima Daiichi plant including the Kanto area, avoid getting wet in the rain. Avoid going out. Wear a facemask.

Breastfeeding: We cannot simply generalize that mothers should avoid breastfeeding, considering nutritional (immunity) and safety benefits of breast milk, especially when babies less than three-months old are concerned. Regardless of whether breastfeeding mothers live in hot spots or not, it is necessary to minimize internal radiation exposure and to increase the testing of mother's milk in order to develop appropriate protection measures.

Tap water: Until the government tightens safety standards, pregnant women, nursing mothers, and small children should use tap water only for bathing and washing clothes and dishes. It should not be used for mixing formula. Avoid drinking tap water as far as possible.

Food: For the time being, abstain from eating leafy vegetables, herbs, and wild plants from contaminated areas. Also avoid milk, meat, and fish, which can be highly contaminated due to bioaccumulation. It is necessary for municipalities and schools to thoroughly disclose where food comes from, and increasing the testing of radioactivity in food is urgently required.

In Conclusion

Since March 11, many people have found it difficult to relax in their normal lives, out of concern for earthquakes and the nuclear accident. At the same time, we are told repeatedly, “There is no need for excessive worry, which is actually bad for your health.” Or, “There is absolutely no problem with food on the market.” Or, “Misinformation and rumors are causing harm.” Some of us may feel that we are the only ones who are worried, or that those around us think that we are being alarmist.

However, it is only natural to be concerned. With radiation, it is not possible to say, “You’ll be fine as long as you limit your exposure to this level.” We do not understand with any certainty the physical effects of radiation. If we assign the highest priority to safety, then exercising utmost caution and adopting the strongest preventive measures is not out of line. It is the obvious thing to do.

But it is also true that there are limits to the preventive measures that individuals can adopt. No matter what you do, if there are radioactive materials present, you will be exposed. The best possible route is to remove oneself as far as possible. Those who can evacuate should do so. It is very dangerous for those people in highly contaminated areas of Fukushima to remain there. Policies and measures for evacuation should be implemented to the furthest extent possible.

It is best not to worry over radiation in isolation. There are many people living close by who share your concerns. It is important to talk with these people, to make connections, and to provide mutual support.

The nuclear accident and the scheduled power outages that followed have caused us to think a great deal about our own lives and the problems of electricity and energy. If we didn’t have nuclear power plants, we wouldn’t have to be concerned like this about the risks of radiation.

Japan is beginning to reconsider its nuclear energy policy. The Hamaoka nuclear power plant in Shizuoka, which is at risk of causing a catastrophic radiation disaster if the predicted Tokai earthquake occurs, has already stopped operation. The time has come to think about how society could function without relying on nuclear energy.

What is the SAY-Peace Project?

SAY-Peace Project is a non-profit organization run by young people in their teens and 20s, who have come together under the slogan "Solidarity among the Asian Youth for Peace." We provide a space for young people to learn about, think, and act for peace. We engage in a variety of activities with the aim of bringing about peace, from Asia, through dialogues about disarmament and history.

Contact information:
SAY-Peace Project
Coop Matsuo #103, Daizawa 5-7-8, Setagaya-ku, Tokyo 157-0032
Tel/Fax 03-4413-3929 E-mail: mail@saypeace.org Home page: http://www.saypeace.org

Dr. Matsui Eisuke, editorial supervisor

Born 1938. Director, Gifu Environmental Medicine Research Institute. Previously taught radiology at Gifu University School of Medicine. Japanese Respiratory Society certified specialist. A special member of the Japan Lung Cancer Society and the Japan Society for Respiratory Endoscopy. One of the few specialists in Japan to address the problem of internal exposure to radiation. Matsui has been involved for many years with class-action suits over the certification of atomic-bomb victims, and has also written extensively on the health effects of asbestos. His latest book is *Mienai kyôfu: Hôshasen naibu hibaku* (Invisible Terror: Internal Exposure to Radiation) (Junpôsha, 2011).

***Norimatsu Satoko**, an Asia-Pacific Journal coordinator, is Director of the Peace Philosophy Centre, a peace-education centre in Vancouver, Canada, and Director of Vancouver Save Article 9. She leads youth and community members in promoting and learning about Article 9, historical reconciliation in Asia, Hiroshima/Nagasaki and nuclear disarmament, and issues surrounding U.S. military bases in Okinawa.*

***John Junkerman** is an American documentary filmmaker and Asia-Pacific Journal associate, living in Tokyo. His most recent film,* Japan's Peace Constitution, *won the Kinema Jumpo and Japan PEN Club best documentary awards. It is available in North America from First Run Icarus Films.*

For updates on the Fukshima nuclear crisis in English, see Green Action's blog Fukushima Update, and follow Twitter accounts @FukushimaEng, @nonuke_jp (both in English), and @PeacePhilosophy (Japanese and English).

Recommended Citation: Say-Peace, Protecting Children Against Radiation: Citizens Take Radiation Protection into Their Own Hands, The Asia-Pacific Journal, Volume 9, Issue 25, No. 1, June 20, 2011.

Related articles

Peter Karamoscos, Fukushima Burning: Anatomy of a Nuclear Disaster

Gavan McCormack, Hubris Punished: Japan as a Nuclear State

APJ Editors, Alternatives to the IAEA: Greenpeace and Japanese Municipalities Measure Radiation

Norimatsu Satoko, Worldwide Responses to 20 Millisieverts Controversy

APJ Editors, 20 Millisieverts for Children and Kosako Toshiso's Resignation

See other articles on Fukushima on the "HOT" section of Asia-Pacific Journal: Japan Focus.

Notes

[1] The Japanese government has the advanced SPEEDI (Realtime radiation data collected via the System for Prediction of Environment Emergency Dose Information) simulation system, which allows them to calculate and estimate radioactive dispersion and radiation exposure in a matter of minutes. The first disclosure of any SPEEDI data by the government was on March 23, twelve days after the quake/tsunami, and the government has been criticized for only disclosing parts of the thousands of calculation results belately, and not using the system for evacuating people quickly enough. Link to the SPEEDI data disclosed:
http://www.mext.go.jp/a_menu/saigaijohou/syousai/1305747.htm
http://www.nsc.go.jp/mext_speedi/index.html
The Japanese government also has failed to have their weather authorities inform the public about predicted wind directions. Weather forecasts in the Japanese media predict vigorously how pollen fly and when cherry blossoms bloom across the nation, but never talk about radiation from Fukushima Daiichi. Many of those who have access to the Internet rely on radiation dispersion predictions provided by weather authorities in other countries, such as Germany, the UK, and Austria.

[2] The US Department of Energy (DoE) and Japan's MEXT conducted aerial measuring of ground level dose rate and cesium disposition within a 100km radius of Fukushima Daiichi. Although the results have been disclosed both on the DoE and MEXT websites, they were hardly explained in the government's press conferences and media. This is perhaps because these results would reveal "hot spots," or highly contaminated areas outside the designated evacuation areas, to the eyes of the general public. The cesium 134

and 137 disposition maps on both websites used blue and light blue to colour the areas with contamination levels of more or less than 300,000 Bq/m^2, making "hot spots" widely dispersed over densely populated areas such as the cities of Date, Fukushima , and Koriyama indistinguishable.
Links: http://www.mext.go.jp/a_menu/saigaijohou/syousai/1305818.htm (MEXT)
http://blog.energy.gov/content/situation-japan (DoE)

[3] Ministry of Health, Labour, and Welfare, "Ninshin chû no kata, chiisana okosan o motsu okasan no hôshasen e no goshinpai ni okotae shimasu" (We will respond to the questions about radiation of pregnant women and mothers with small children)." Link: http://www.mhlw.go.jp/stf/houdou/2r98520000014hcd.html

[4] MEXT is a short for the Ministry of Education, Culture, Sports, Science and Technology.

[5] MEXT, "Hôshanô o tadashiku rikai suru tame ni" (To understand radiation correctly), April 20, 2011. Link: http://www.pref.fks.ed.jp/sinsai/advice/rikai.pdf

[6] The exposure limit for workers who handle radiation in Japan is the total of 100 mSv over five years, not exceeding 50 mSv in any one year, so the averaged per year allowable dose is 20 mSv. From the website of Departmnet of Radiation Protection, Japan Atomic Energy Agency. Link: http://rphpwww.jaea.go.jp/senkan/monitor/d.html

[7] Shimabashi Nobuyuki, who worked at the Hamaoka nuclear power plant, died in 1991 from leukemia. He had a total exposure of 50.65 mSv over 8 years and 10 months, from March 1981 to December 1989. His illness was recognized as work-related. Link: http://peacephilosophy.blogspot.com/2011/05/blog-post_15.html. See No.5 in the list of confirmed cases of workers'radiation illnesses recognized as work-related.

[8] Francis Boyle, "Genshiryoku sangyô 'jindô no tsumi,'" *Ehime Shimbun*, March 23, 2011.

[9] See Mariko Sanchanta and Mitsuru Obe, "Moms Turn Activists in Japanese Crisis," Wall Street Journal, June 17, 2011. Link: http://online.wsj.com/article/SB10001424052702303499204576389094076351276.html

[10] Twelve associate professors at Fukushima University submitted a letter of request to Fukushima Governor Sato Yuhei on June 6, asking for clarification of the process in choosing Yamashita Shun-ichi as a leader of long-term epidemiological study of Fukushima residents and for re-selection of experts who take internal radiation into account and consider risks of low dose radiation from a preventative standpoint. Link: http://fukugenken.up.seesaa.net/image/E8A681E69C9BE69BB8ver8.pdf

[11] Nihonmatsu Mayor Miho Keiichi expressed regret over having organized a seminar by Yamashita Shun-ichi, after Yamashita told citizens just to listen to the government without providing scientific grounds for evacuation guidelines. Link: http://www.youtube.com/watch?v=s9e8rslKFhc

[12] "'Fukushima genpatsu no risuku o keishi shiteiru' – 'Anzen setsu' Yamashita kyôju ni kainin yôkyû shomei," *J-CAST News*, June 14, 2011.
Link: http://www.j-cast.com/2011/06/14098424.html?ly=cm&p=1

[13] Also notable is graphic novelist Nishioka Yuka's manga "Hôshanô te nani? (What Is Radiation?)," May 2011. Available for download at http://sky.geocities.jp/yuka37jp/