



Written by [Rebecca Terrell](#) on October 20, 2014

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## Fukushima's Children Aren't Dying

The latest news from Japan's Fukushima Prefecture sounds horrifying. "Thyroid Cancer in Children Surge in Fukushima Since Nuclear Meltdown," shrieked a recent EcoWatch headline. "More than 100 youngsters in Japan diagnosed with thyroid cancer after Fukushima nuclear meltdown," cried the *Mirror*. The gist of the stories is that, of the more than 350,000 youngsters exposed three years ago to radiation from a tsunami-ravaged nuclear power plant, 104 of them now have thyroid cancer. Both stories quoted Joseph Mangano of the Radiation and Public Health Project, who called the statistics "disturbing" and claimed that under normal circumstances only seven children in a population that size would be expected to develop the disease.



A closer look at the situation paints quite a different picture. In fact, current research indicates thyroid cancer rates in Fukushima may be lower than in other prefectures farther from the nuclear plant.

In August, the prefectural government published findings from its Fukushima Health Management Survey (FHMS), which conducted screenings of area residents who were age 18 or under when the accident occurred. They focused on this age group because children's thyroid glands are particularly susceptible to the carcinogenic effects of radioactive iodine (<sup>131</sup>I), which escaped from the power plant during the accident. FHMS reported 57 definitive cases of thyroid cancer, one benign tumor, and 46 other suspicious cases. The latter involve tiny precancerous nodules which are very common. According to the Mayo Clinic, "One in three people have a thyroid nodule," and these are rarely cancerous.

Government officials deny a link between these 104 young people and the 2011 nuclear accident, reported Japan's daily newspaper *The Asahi Shimbun*, reinforcing an ongoing coverup accusation by the media. EcoWatch opined, "It helps their denial that experts disagree on whether these cases of thyroid cancer can be traced back to the meltdown," without naming any challengers or their rationales. Perhaps the experts' reasons are too compelling for anti-nuclear propaganda outlets such as EcoWatch.

Writing for the *Wall Street Journal's* "Fukushima Watch" blog, journalist Jun Hongo provides a more balanced explanation. He says FHMS researchers could discern no regional difference in cancer rates. "The percentage of those found to have thyroid cancer in the town of Okuma near the plant and the town of Inawashiro, located approximately 100 kilometers to the west, was 0.05% in each case," writes Hongo. If power plant radiation were the cause, higher exposure areas closer to the facility would evince higher cancer rates.



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## Post Hoc Ergo Propter Hoc

Of course, the more important issue is how current rates compare to those prior to 2011. There's the rub; no baseline exists, despite Mangano's claim of expecting seven cancers in the population. Since the natural disaster, the Japanese government has screened the children of Fukushima Prefecture at an unprecedented rate, so no control group exists to which they can compare results. Only one study comes close: *Thyroid Ultrasound Findings in Children from Three Japanese Prefectures: Aomori, Yamanashi and Nagasaki*, published last December in PLOS One, an international peer-reviewed online science publication. Researchers screened 4,365 children in these areas of north, central, and southern Japan respectively, using the same equipment, procedures, and methodology as the FHMS. Though their sample size was limited and therefore statistically weak, scientists found that "the frequency of thyroid cysts and nodules was relatively high in our study, when compared with the data presented in the Fukushima Health Management Survey (56.83% vs. 42.56% for cysts and 1.65% vs. 1.15% for nodules)." To clarify, the survey found that there were more cysts and nodules further away from Fukushima. Unlike FHMS, the three-prefecture study made no headlines outside of PLOS One, but that is understandable since drama-seeking sensationalists have no nuclear power plants to blame.

Cancer tests in the wake of the 1986 nuclear accident at Chernobyl do not serve as FHMS controls either, despite unscientific media comparisons. An iodine-rich seafood diet provides Japanese children with natural thyroid protection, whereas, according to Dr. Gerry Thomas, a specialist in thyroid cancer with the Imperial College London, the Russian diet tends toward iodine deficiency. This is important because a thyroid gland saturated with non-radioactive iodine resists absorption of <sup>131</sup>I and is effectively immune to its cancer-inducing effects.

Moreover, Japan has conducted meticulous health screenings using highly sensitive Thyroid Ultrasound Examinations (TUE) made possible by technology unavailable in the 20th century. The *Fukushima Voice* reports that TUEs can detect growths as small as a few millimeters in diameter. Because small thyroid cysts and nodules are so common and inconsequential, they were not recorded prior to the 2011 tsunami. In the past, cases of childhood thyroid cancer were detected based on symptoms, not screenings. In other words, if a child showed signs of pain or swelling in the neck, developed a hoarse voice, or had trouble breathing or swallowing, his doctor would check for thyroid cancer. Smaller cysts and nodules without manifest symptoms would go undetected. Currently, all Fukushima youth are screened for the disease, and even the smallest lesions are recorded.

However, an apples-to-apples comparison may be within reach of the FHMS investigators in the ironic form of their own data. The latest research provides a "pre-Fukushima" baseline because it takes longer than three years for children to develop the disease. Thomas explained, "Radiation induced thyroid cancer has a minimal latency of around 4 years, so the initial screening carried out in Japan within 3 years of the accident would be predicted to give a measure of the background incidence of thyroid cancer in this population." CNN reported in August that the 58 FHMS children who had tumors have already had them removed and are now recovered or recovering from surgery, long before radiogenic cancers had time to develop. The fact that researchers found no regional differences in cancer rates strengthens the idea that current data provide a reliable baseline.



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## Past as Prelude

Most experts are hopeful for the future. In April the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) published a study addressing concerns about thyroid cancer in Fukushima. The paper concluded, “No discernable increased incidence of radiation-related health effects are expected among exposed members of the public or their descendants.” UNSCEAR had reported this already in 2012 and re-confirmed it in their 2014 findings.

How could the committee make such a bold prediction? First, both the Japanese government and the U.S. Department of Energy measured radiation air dose rates in Fukushima following the accident, rates which ranged from one to 10 microsieverts ( $\mu\text{Sv}$ ) per hour. (A “sievert” is a measure of health effects of ionizing radiation, and a microsievert is one-millionth of a sievert.) By comparison, “If you stood at the gate of the plant for 10 hours at the highest dose-rate, you’d get as much radiation as from [a] total-body CT scan,” explained Jane Orient, M.D., executive director of the Association of American Physicians and Surgeons, writing for *The New American* in 2011. Of course, a CT scan takes a matter of minutes, not 10 hours, but none of the general public was anywhere near the gate even for a few seconds. The earthquake and tsunami had demolished the countryside, claiming 1,607 lives in Fukushima Prefecture alone. Radiation claimed none. Furthermore, “The Japanese authorities operated a strategy of evacuation and sheltering and combined this with a prompt severing of the food chain,” noted Thomas. “These actions will have limited exposure to radioiodine by inhalation and by ingestion,” making radiogenic thyroid cancer extremely unlikely. Indeed, thyroid monitoring of the region’s youth following the disaster revealed that no child received a hazardous dose.

UNSCEAR attributes the immediate rise in Japanese thyroid cancers to a classical screening effect; more cancers are found because more people are tested. The same phenomenon occurred after the 1986 Chernobyl meltdown. Former UNSCEAR chairman Dr. Zbigniew Jaworowski, writing in 2010 in the international journal *Dose-Response*, noted that the first rise in thyroid cancers occurred only one year later, in 1987. Rates peaked seven years after that in 1994 — a mere 0.027 percent. Researchers have recorded declines ever since, in a pattern completely uncharacteristic of radiogenic thyroid cancer. Jaworowski stated that, had radiation been the cause, the first upsurge would have been expected “about 5-10 years after irradiation exposure” and would have peaked between “15-29 years after exposure.”

Furthermore, repeated UN studies over the past decades have found no increase in the incidence of any other cancers as a result of the Chernobyl catastrophe. This should be particularly encouraging to the Japanese because total radioactive release from Fukushima was roughly 5.5 percent that of Chernobyl, according to 2012 estimates by the UN’s International Atomic Energy Agency (IAEA). It took 10 days for the fire at Chernobyl to burn out, during which time the entire core melted and vast amounts of radionuclides spewed into the environment. In contrast, the reactor cores at Fukushima remained intact, and the only radioactive release came from spent fuel rods exposed to air. Despite the extremely adverse post-tsunami conditions, Japanese workers stabilized the situation within four days.

Regardless, popular opinion construes any radioactivity to be potentially lethal. Popular opinion fails to realize that everyone on the planet is exposed to radiation every day. Food, building materials, soil, cosmic energy, and even your own blood are some of the many sources of background radiation. Other activities such as medical procedures, watching TV, and taking jet flights add to exposure levels. Dr.



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T.D. Luckey, former chair of the biochemistry department at the University of Missouri School of Medicine, records the global average as 3 millisieverts (mSv; i.e. 0.003 sieverts) per year, a rate which varies considerably depending on location. For example, U.S. Environmental Protection Agency records reveal that Florida suffers a radiation deficiency at 1.3 mSv per year, whereas South Dakota enjoys an annual average of 9.6 mSv. The state of New York comes in just under the global average at 2.8 mSv per year, but anyone spending a year at Grand Central Station would soak up a radiation dose of 5.25 mSv because of uranium and potassium in its granite structure.

This is nothing compared to other parts of the world. Areas with large amounts of thorium-rich monazite sands tip the scales when it comes to background radiation. Jaworowski reported residents of Ramsar, Iran, absorb up to 400 mSv per year, and annual doses in certain areas of Brazil and southwestern France top 700 mSv. These rates also dwarf doses to which “victims” of Chernobyl were exposed. The Soviet government ordered some 400,000 people to evacuate from areas where the total radiation dose exceeded 1.6 mSv in the year following the accident, prompting Jaworowski to ask, “Why don’t they evacuate Norway?” where the natural dose in some regions reaches 11 mSv per year. It is small wonder that there has never been recorded a single adverse health effect in the general population due to Chernobyl radiation.

On the contrary, Jaworowski observes that “in comparison with the general population of Russia, a 15% to 30% deficit of solid cancer mortality was found among the Russian emergency workers, and a 5% deficit solid cancer incidence” among people living in the most highly contaminated areas. Jaworowski quotes dozens of studies that repeatedly confirm no increase in solid tumors, leukemia, or genetic diseases, and in many cases record significant health *benefits*. Writing in the Summer 2014 *Journal of American Physicians and Surgeons*, Orient notes the mortality rate of Chernobyl emergency crews has been lower than the averages in Ukraine (where the power plant is located), and in neighboring Belarus and Russia. In 2000, UNSCEAR concluded that even the people who had received the highest radiation doses at Chernobyl “need not live in fear of serious health consequences” and forecasted “generally positive prospects for the future health of most individuals.”

## **LNT vs. Hormesis**

Why, then, does Chernobyl remain the poster child of nuclear holocaust? Why has the 2,600 km<sup>2</sup> Chernobyl Exclusion Zone become a vast animal sanctuary dotted with ghost towns inhabited by a few hundred residents living there illegally? Why are Japanese officials following in the mistaken footsteps of Chernobyl over-reactionaries?

Nuclear experts blame a hypothesis known as “linear no-threshold” (LNT), the idea that radiation is unsafe at any dose. Orient calls it “implausible”; Jaworowski says it’s “absurd”; and in 1995, renowned Swedish radiobiologist Gunnar Walinder said, “The LNT hypothesis is a primitive, unscientific idea that cannot be justified by current scientific understanding. As practiced by the modern radiation protection community, the LNT hypothesis is one of the greatest scientific scandals of our time.”

Yet LNT has been shaping official policies worldwide since the International Commission on Radiological Protection (ICRP) first adopted it in the late 1950s as the basis of radiation protection standards. The change came “because of strong political pressure by scientists and other influential people to create a social fear of low radiation from a-bomb testing during the arms race and abhorrence of nuclear war,” writes Dr. Jerry Cuttler in the 2013 *Canadian Nuclear Society Bulletin*. Until then the



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internationally accepted “tolerance dose” — the dose that can be absorbed without harm — was 680 milligrays (mGy) per year. (A “gray” is a radiation absorption measure interchangeable with a sievert in terms of gamma and x-rays.) Since the discovery of radioactivity and x-rays in the late 19th century, lower exposures were known to produce beneficial health outcomes. Among these, Cuttler mentions rapid wound healing, infection cures, arthritis relief, and prevention or impairment of tumor growth.

Enter ICRP and its LNT assumption. Suddenly, “safe” levels of maximum annual occupational and public exposures were set at 50 and 5 mSv respectively, and later reduced to 20 and 1 mSv. Orient quips, “It raises the question of whether Denver and many other places should be evacuated immediately,” since both the global average and the average dose in Denver are 3 mSv per year.

Official reaction to both Chernobyl and Fukushima highlights the unscientific, political basis of LNT. Jaworowski offers the post-Chernobyl examples of Sweden, which allowed 30 times more radioactivity in imported vegetables than in domestic ones, and Israel, which placed higher limits on radiation in food imported from Eastern than from Western Europe. The Philippine limit for imported vegetables was 8,600 times as strict as that in the United Kingdom. Norway introduced a concentration limit in meat up to 200 times lower than the country’s natural background radiation. Orient relates that Japan has lowered its post-Fukushima standards to the point that it has effectively banned bananas (which contain radioactive potassium) and Brazil nuts (which contain radium).

Arbitrary standards such as these ignore thousands of studies disproving LNT and demonstrating radiation’s hormetic effect — the principle that “the poison is in the dose.” Hormesis applies to much of nature. Sunlight, food, and stress are a few examples; too little is just as bad as too much.

Hormesis applies to radiation, too. Jaworowski makes the impressive assertion that “no harmful health effects have ever been detected in high natural radiation background areas.” Compared to average-dose regions, rates of both cancer and congenital disease are consistently decreased rather than increased. In fact, every year thousands of tourists flock to beaches such as Guarapari, Brazil, where radioactive monazite sands, famous for their healing qualities, deliver almost 88 times the average background dose people receive in the United States. For centuries patients suffering chronic pain have found cures in radon mines such as Austria’s celebrated spa, Gastein Heilstollen. (Unfortunately the United States boasts no monazite beaches, but Montana’s Free Enterprise Radon Health Mine has been operating since 1952.)

Orient relates one of the most well-known hormesis experiments, made famous because it happened by accident. Residents living in an apartment building in Taiwan had no idea the structure contained highly radioactive cobalt. Dose rates these 10,000 people received during 20 years averaged 40 mSv per year, with a range of 18 to 525 mSv per year. LNT models predicted rampant cancers, but the opposite occurred. “Astonishingly, the cancer death rate for people living in these apartments steadily decreased until it was essentially zero,” writes Orient. Congenital defects nosedived from an expected 46 to only three children of parents living in the apartments.

Should we be surprised that Chernobyl “victims” are experiencing improved health, and that thyroid cyst and nodule rates in Fukushima are lower than in other parts of Japan? In terms of radiation, preventing people from returning to their homes may well be harming rather than helping public health.

It is certain that the evacuations have inflicted immense political, economic, and health damage. They



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have buttressed an unwarranted fear of nuclear power in the public mind, a public more ready now than ever to accept increasing government restrictions on what Jaworowski calls “the cleanest, safest, and practically inexhaustible means to meet the world’s energy needs.” Furthermore, Orient says that Japan, after nixing most of its nuclear energy, imports so much fuel that electricity prices have spiked more than 50 percent and Japan’s 20-year record of trade surpluses flipped to “a \$204 billion trade deficit between March 2011 and the end of 2013.” Countries such as Germany, Italy, Switzerland, and Belgium have similar post-Fukushima stories to tell. In Ukraine alone, economic losses from Chernobyl reached \$148 billion by the year 2000.

Most tragic of all, the Fukushima evacuation has claimed more lives than the prefecture’s tsunami death toll of 1,607. Earlier this year *Japan Today* reported that 1,656 people have died from stress and illness related to forced exile from their homes. Chernobyl’s evacuation produced epidemics of physical and psychological disturbances, alcohol and drug abuse, and suicides, caused not by radiation but by radiophobia. Radiation claimed no lives yet is condemned in the mere mention of the names Chernobyl and Fukushima.

Anti-nuclear activists and nuclear disarmament proponents cling to the discredited LNT hypothesis, sacrificing lives and economies for the sake of an imprudent political agenda. The ICRP website admits that its International System of Radiologic Protection is based in part on “value judgments” that “take into account societal expectations, ethics and experience gained in application of the system.” They do not explain how it is ethical to mislead society with a disproven hypothesis, no matter their success in applying such propaganda over the past 50-plus years. Instead of frightening the public with nuclear science fiction, it is their responsibility to come clean about radiation hormesis so policymakers can form rational, scientifically based decisions about nuclear power.

— Photo at top shows parents having their children screened for thyroid cancer in Fukushima : AP Images



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