

Scientists lack complete answers on radiation risk

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Mother and daughter receive radiation exposure scanning in Fukushima, northern Japan Friday, March 18, 2011, one week after a massive earthquake and tsunami. (AP Photo/Kyodo News) JAPAN OUT, MANDATORY CREDIT, NO LICENSING IN CHINA, HONG KONG, JAPAN, SOUTH KOREA AND FRANCE

(AP) -- Thyroid cancer for sure. Leukemia, probably. Too much radiation can raise the risk of developing cancer years down the road, scientists agree, and the young are most vulnerable. But just how much or how long an exposure is risky is not clear.

Those are among the unknowns scientists are contemplating as the crisis unfolds at Japan's stricken [nuclear power plant](#).

In Japan, the Science Ministry said [radiation levels](#) about 19 miles northwest of the [Fukushima](#) Dai-ichi plant rose at one point Friday to 0.15 millisieverts per hour, about the amount absorbed in a chest X-ray. But levels have been fluctuating, and radiation at most sites that distance from the facility have been far below that.

Long term, it is clear radiation can induce cancer. But researchers can't just count cancer cases after a disaster and declare radiation responsible. Rates before and after must be compared to know if more cases occurred than would be expected.

That is why, 25 years after the Chernobyl accident, there is still controversy over its effects beyond the undisputed 6,000 cases of thyroid cancer. Of these cases, only 15 had proved fatal as of 2005, even though the Soviets were slow to treat victims of the catastrophe.

The records necessary to spot trends in other types of cancer as a result of Chernobyl are poor, said Dr. Fred Mettler, a University of New Mexico scientist who led a United Nations-sponsored team investigating Chernobyl's [health effects](#).

"At the end of the day, the scientific data isn't there. My instinct is, there probably is an increase there, but it's too small to see," he said.

The U.S. [Environmental Protection Agency](#) says that no amount of radiation is absolutely safe above the 3 to 6 millisieverts a year that most of us get from normal living. In contrast, the Nuclear Regulatory Commission says that low doses - less than 100 millisieverts spread out over years - are not harmful. Researchers have not documented danger from such low levels, said Kelly Classic, a radiation physicist at the Mayo Clinic and a spokeswoman for the Health Physics Society, an organization of radiation safety specialists.

High doses - over 500 millisieverts - can raise the risk of [leukemia](#), breast, bladder, colon, liver, lung, esophageal, ovarian and stomach cancers, and the blood cancer multiple myeloma, government scientists say.

In between the high and lower levels, the picture is murky. Much depends on the type of radiation people are exposed to, how old they are, and how well each person's body repairs any DNA damage the radiation may cause.

"There's no linear relationship to say if you got this amount, it would cause a certain percent of cancer down the road," said Dr. Clifford Chao, chief of cancer radiation at New York-Presbyterian Hospital.

Children are the ones at risk for radiation's most obviously related cancer - thyroid. Radioactive iodine collects in the thyroid gland in the neck. Potassium iodide pills can block its absorption and minimize harm, but they must be given within 12 hours of exposure to do much good.

When Chernobyl exploded, health workers "had millions of square kilometers to cover and it was all rural areas and they didn't really have anything stockpiled," Mettler said. Children also drank milk from cows that grazed on contaminated grass for weeks after the disaster, compounding their exposure and risk. More than 6,000 thyroid cancers have been documented in people who were children in the Ukraine, Belarus and Russia when the disaster occurred. But In Poland, where the antidote pills were given out, there were no higher rates of thyroid cancer.

Properly treated, thyroid "is one of the least deadly cancers," the American Cancer Society says. And low levels of radioactive iodine exposure have not been shown to increase [thyroid cancer](#) risk in studies of fallout from nuclear weapons testing in the western United States

during the 1950s, the society says.

Studies of atomic bomb survivors have found higher rates of cancer. But those disasters involved different radioactive elements than the type emitted from the Japanese nuclear plant so far.

The International Agency for Research on Cancer also commissioned a study of more than 400,000 nuclear industry workers in 15 countries to estimate cancer risk following protracted low doses of radiation. The 2007 study found a dose-related higher risk of cancer death, but questions have been raised about its methods.

The results also were driven largely by higher rates in Canada; once that country's results were excluded, no increase is seen, Mettler said. There have been questions about the data from Canada, Mettler said. Also, the authors of the study say they need to do more work to assess how smoking and other factors affected their estimates.

So for now, the clearest information on cancer risk from a nuclear plant accident may come from Chernobyl. That disaster exposed 5 million people in Belarus, Russia and Ukraine to large amounts of radioactive material for 10 days, according to the 2008 report that Mettler helped write for the United Nations' Scientific Committee on the Effects of Atomic Radiation, which represents 22 nations on nuclear safety.

Exposure to cesium was a big concern because it affects the whole body, not just the thyroid gland. And exposure among cleanup workers and emergency responders ranged as high as a few hundred millisieverts over the following few years. Evidence suggests a higher rate of leukemia in these workers, "but it's not certain," Mettler said.

Research is continuing in that group, and longer follow-up should establish that more clearly, he said.

"Leukemia increases have not been seen in the children" who are now adults, he said. Nor have increases in breast, lung, stomach or other cancers been documented, though this population became very mobile after Chernobyl and the breakup of the Soviet Union, so the true rates are hard to establish, and rates before the accident in some cases are unknown, Mettler said.

As bad as Chernobyl was, the average radiation dose over 20 years to people who live in contaminated areas was "relatively low" - 9 millisieverts, nearly the equivalent of a CT scan - once the short-term doses to the thyroid were subtracted, the UN report said. That means there should not be "substantial health effects in the general population that could be attributed to radiation," the report concludes.

The NRC has said that typical annual background exposure to radiation shaves 18 days off the expected lifespan. Working in a nuclear plant under ordinary conditions - not in a crisis like the one unfolding in Japan - shortens life expectancy by 51 days. By comparison, being 15 percent overweight cuts two years; smoking a pack of cigarettes a day costs six years of life.

More information:

Chernobyl: chernobyl.cancer.gov

www.unscear.org/unscear/en/chernobyl.html

Thyroid cancer: tinyurl.com/5t5vpfu

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