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# 7 Questions About the Japan Radiation Scare

The radiation from Japan's power plants has everyone worried about the potential worldwide health impact. Here, top nuclear energy and radiation experts explain why you shouldn't panic.

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**Tuesday March 15, 2011 —** As fires and explosions continue at Japan's Fukushima Daiichi nuclear complex, anxiety about radiation sickness mounts, including whether the disaster will ultimately affect the United States. A new explosion Tuesday morning was the third in four days at the plant — prompting Prime Minister Naoto Kan to encourage citizens within about 20 miles of the Fukushima complex to stay indoors to avoid exposure to radiation.

Not surprisingly, Japan's tragedy has revived frightening memories of nuclear meltdowns at Chernobyl in 1986 and Three Mile Island in 1979, but the truth is all three were very different events. And as a result of Three Mile Island and Chernobyl, nuclear power plants today have adopted more stringent safety measures and backup containment programs.

"It's important to remember that when Three Mile Island melted down, there was no unplanned release of radiation, and there were no deaths from radiation," says Jeff Geuther, nuclear reactor facility manager at Kansas State University. People tend to get frightened by threats of radiation, but so far the levels detected outside of the immediate vicinity of the Fukushima power plant are not considered dangerous.

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According to news reports, officials in Tokyo (about 150 miles south of the Fukushima Daiichi nuclear reactors) said radiation there was 10 times the usual level but still posed no threat to human health.

So just how concerned about radiation poisoning should *you* be? Everyday Health took your top questions to experts for answers.

**1. Should West Coasters worry about radiation sickness?**

Residents of Hawaii, the U.S. Territories, Alaska, and Washington, Oregon, and California should stay calm, experts say. Those contacted by Medpage Today (a sister company of Everyday Health) for the most part agreed that while radioactive particles will eventually reach the United States, the levels will be too low to impact people's health.

"You have to consider a number of factors," according to Tom Hei, PhD, Associate Director of the Center for Radiological Research at Columbia University Medical Center in New York, in an interview with Everyday Health. "How much radiation is being released into the atmosphere, the direction of the wind current, which compounds are being released, and their half-life — the amount of time it takes them to decay. From what we've heard so far, the radioactivity detected [in Japan] has been minimal."

That's because, thankfully, the release of radioactive particles seems to be confined to containment structures within the Japanese plant.

To further put things in perspective, keep in mind that when the United States tested nuclear and hydrogen bombs in the Pacific Ocean and dropped atomic bombs in Japan during World War II, they released "far more radiation than these [Japanese] power plants would ever come close to releasing, and it all dissipated in the atmosphere, at least from the standpoint of any health implications in the U.S," said James Thrall, MD, radiologist-in-chief at Massachusetts General Hospital in Boston and president of the American College of Radiology, in an interview with MedPage Today.

**2. Are there any long-term risks from the radiation leakage?**

While acute radiation sickness is currently not a threat to people other than Fukushima workers or those who live in close proximity to the plant, the radiation leakage may have long-term health implications. After a large leak, about 75 percent of the radiation eventually winds up in the ground and water supply nearby, which means it can contaminate vegetation, livestock, and cow's milk, says Leslie M. Beitsch, MD, director of the Center for Medicine and Public Health at Florida State University College of Medicine in Tallahassee. As people ingest contaminated food and water, their long-term risk for thyroid and other cancers, such as leukemia, increases. Thyroid cancer can take 8 to 12 years to develop after radiation exposure, according to the American Thyroid Association; leukemia can strike within a few years, according to the American Cancer Society.

The remaining 25 percent of the leaked radiation can stay in the atmosphere for extended periods of time, depending on particle size. "If that happens, it does become a global concern, because once these particles reach the upper atmosphere, they can disseminate

everywhere," says Dr. Beitsch. "It's a potential risk, but a small one at this point."

However, the radioactive particles would be so widely dispersed that the risk of exposure to any one person is extremely minor, Beitsch adds.

**3. Who's most at risk from radiation exposure?**

Fetuses, infants, and small children face the greatest potential harm from radiation. That's because radiation causes damage by mutating DNA in cells, which can lead to cancer. Because young children's cells divide at a much faster rate than those of adults, they face potentially more serious long-term health issues, including neurological problems as well as cancer.

**4. What are the symptoms of radiation sickness?**

While acute radiation sickness is extremely unlike to affect anyone who lives outside a small radius of the Japanese nuclear complex, symptoms include nausea, vomiting, and diarrhea. Without medical intervention, acute radiation sickness can lead to death.

But keep in mind that you wouldn't experience acute radiation sickness without knowing that you were exposed. "The radiation coming from the reactors is being monitored. If levels get to a point where they can affect people far away, authorities will let you know about it," says Kansas State's Geuther. "After Chernobyl, people ascribed symptoms to radiation sickness that were actually not due to the accident. People, especially here in the United States, should stay calm."

Those who think they've been exposed, such as Japanese plant workers or nearby residents, should go to a major medical center to be decontaminated. Simply removing clothes and shoes can get rid of 90 percent of external contamination, according to the Mayo Clinic. Washing with soap and water also helps eliminate radiation from the skin.

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Further treatment depends on the kind of radiation you've been exposed to. Potassium iodide tablets can counteract the effects of radioactive iodine and help lower the risk of thyroid cancer (the iodine tablets prevent radioactive iodine from collecting in the thyroid). Other treatments include Prussian blue, which binds to and helps eliminate radioactive particles cesium and thallium, and diethylenetriamine pentaacetic acid (DTPA), which binds to metals such as plutonium, americium and curium. These two treatments help the body to excrete the radioactive material thus decreasing its absorption by cells.

**5. Should I stock up on potassium iodide anyway to be safe?**

Alarmed Americans are making a run on supplies of potassium iodide tablets, according to a *Wall Street Journal* report. In fact, Anbex, a major supplier, has already run out of its supply of 10,000 14-tablet packages. But experts say these panicky purchases are unnecessary. "If you live close to a power plant that's melting down, the risk is real, not theoretical," says Beitsch. "For the rest of us, unless something huge and dramatic happens, the risk of significant radiation exposure is infinitesimal."

Potassium iodide pills are available over the counter, but Americans should not take them preventively, Beitsch says. Some people may not process potassium iodide well (side effects include nausea, vomiting, and diarrhea), and for people with certain health issues, such as kidney disease, the pills can do more harm than good.

**6. Should I be worried if I live near a nuclear power plant in the United States?**

It's natural to feel alarmed that a similar nuclear malfunction could happen here, but experts say it's highly unlikely. "Americans who live near power reactors should feel secure, considering that no citizens have died from U.S. commercial nuclear power production, which is a half-century old industry," says Geuther.

All nuclear power plants must have emergency plans in place, conduct periodic drills, and hand out informational literature to residents in a potential emergency zone. If you do live near a nuclear plant, you should know where to go and what to do in the event of an emergency. If you're not sure, contact your local power plant or government for information.

Note also that the situation in Japan was the result of extraordinary circumstances occurring simultaneously. "Three things went wrong — the earthquake, the tsunami, and the failure of the backup power system," according to Beitsch. "It was a perfect storm, and there's a remote possibility such an accident would ever occur in this exact way again."

Adds Geuther, "American nuclear power is no more dangerous now than it was a week ago."

As a result of Chernobyl, we learned a lot of things and added additional safety features to our power plants. Plus, the U.S. Nuclear Regulatory Commission (NRC) will be looking at improving containment and power backups, says Beitsch. "The U.S. nuclear industry will further learn from [Japan] and develop more engineering solutions."

**7. That said, are U.S. nuclear power plants really prepared to weather earthquakes and natural disasters?**

Yes, though some experts think that it's not possible for nuclear power plants to prepare for every possible natural disaster scenario.

According to information gathered by MedPage Today, the NRC says plants must be designed to withstand "the most severe natural phenomena historically reported for the site and surrounding area. The NRC then adds a margin of error to account for the historical data's limited accuracy."

However, unexpected natural disasters or greater-than-expected magnitude earthquakes are always a possibility.

In fact, MedPage's investigation found two instances in California where the cities in which nuclear power plants were built had historically experienced earthquakes of greater magnitude than those plants were designed to withstand: the Diablo Canyon station near Santa Barbara and the plant in San Onofre near San Diego.

And a study recently published in the journal *Disaster Medicine and Public Health Preparedness* found that U.S. states may be unprepared for large-scale nuclear disaster; fewer than half of those surveyed had written plans for such things as assessing radiation exposure and human health impact, according to MedPage Today.

If you live near a nuclear power plant and have concerns about your state or local government's level of preparedness, contact your local representatives to share your concerns.