



The Nuclear Accident in Japan: Impacts on Food

Almost three weeks into the nuclear crisis in Japan, efforts to contain radioactive emissions are still underway. Officials there have indicated that it will take years to fully cool the facility's nuclear fuel,¹ a process that is currently releasing radioactive material into the environment.

Reports from Japan bring almost daily evidence of continued radioactive releases. Eleven types of vegetables have been found to contain radioactivity and have been deemed unfit for consumption. Tokyo's drinking water has been deemed unsafe for children based on its levels of radioactivity.

The full impact of the Japanese nuclear crisis remains to be seen, but the health risks posed by radioactive contamination are well documented. In 2006, the National Academies of Science issued a definitive report on radiation exposure that concluded that even low levels of radiation can cause human health problems, including cancer, heart disease, or immune disorders.² Children are especially susceptible to the impact of foodborne exposure to radioactive materials, making safeguards of food and water particularly critical.³

While government officials have thus far downplayed the significance of radioactivity from the Japanese nuclear crisis, the science shows that the radioactive materials will have an impact somewhere, and that impact could last for decades.

Health Impacts of Radiation

Japan's nuclear disaster has released several kinds of ionizing radiation. This radiation can create or break chemical bonds in cells, causing chemical changes that damage the DNA in living organisms, leading to cell death and cancer. Once inside a living organism, radioactive materials continue to radiate—and cause the body harm – until they are excreted or naturally decay, which can take a lifetime.⁴

Officials have identified two main radioactive materials being emitted in Japan, iodine and cesium — both of which are extremely dangerous to human health. There is also concern about two other highly dangerous radioactive materials, strontium and plutonium, which may have been released as well.⁵

How Radiation Spreads

Japan's nuclear plants have emitted radioactive materials into the air and also into the ocean through water seeping out of the nuclear facility.⁶ Water inside one of the

nuclear power plant buildings showed radiation levels 100,000 times the normal level.⁷

Once in the environment, radioactive materials like iodine and cesium will spread. Radioactive particles in the air can be deposited directly on land or are deposited on land by rain. If it is deposited on grass, the radiation can be taken up by grazing cows. The cow's milk can then carry radiation to people who drink it. Another route of exposure is from contaminated ocean or fresh water, which affects fish and in turn consumers, with radiation accumulating as it moves up the food chain. Some types of radiation stay in the body, but even if people are able to excrete or expel radiation, it will again return to the environment—to waste treatment plants and then back on to agricultural lands and in waterways, where it can continue to create a public health problem.

Radioactive material does degrade over time, but different materials degrade at different rates. Cesium has a half-life of 30 years,⁸ so radioactive cesium released from Japan today will remain in the environment for decades.

Iodine has a much shorter half-life of only eight days, but poses a threat to public health, largely through its potential to cause thyroid cancer. The thyroid gland depends on iodine to function normally.⁹ The use of potassium iodide tablets after nuclear accidents is intended to provide people with sufficient iodine, which will limit the amount of radioactive iodine their bodies will try to take up from food or the environment.

Other radioactive materials like strontium and plutonium have half-lives of 29 and 24,000 years, respectively.¹⁰ Radioactive plutonium has been detected in the soil around the nuclear facility in Japan.¹¹

How Much Radiation Has Been Released?

As of March 22, 2011, scientists said that the Japanese nuclear crisis has released more radioactive material than the Three Mile Island accident in 1979, the worst nuclear accident in U.S. history, and approximately ten percent of the far-more extensive nuclear meltdown in Chernobyl in 1986.¹²

The government of Japan and international nuclear authorities have consistently downplayed the extent of the disaster and changed public advisories and data on radiation releases,¹³ making it difficult for scientists to estimate the full scope of the ongoing radioactive releases.

The U.S. government has issued stricter safety guidelines for Americans residing near the nuclear plant in Japan than the Japanese government has issued for its

citizens, highlighting the apparent disagreement over the extent of the radioactivity releases.¹⁴

Contamination of Food and Water

A major avenue for exposure to radioactive contamination comes through food and water. Decades after the Chernobyl accident, the United Kingdom still maintains restrictions on large sectors of the country's sheep production because radioactive cesium—dispersed through wind and rain—still contaminates grazing lands.¹⁵

Additionally, thousands of square miles of land experienced radioactive iodine contamination from Chernobyl, ending up in the grazing paddocks of animal herds,¹⁶ and then in the milk and animal products that humans consumed. After Chernobyl, there were 6000 cases of thyroid cancer reported from 1991 to 2005 in Belarus, Ukraine, and four affected regions of Russia, many of which were attributed to consumption of radioactive milk after the accident.¹⁷

Radiation contamination remains a fact of life for parts of Europe following Chernobyl, especially for wild foods like mushrooms, berries, and game that have not been effectively treated for contamination.¹⁸ In Germany, the government continues to pay hunters compensation for lost revenue from wild boar meat found to have high levels of cesium, and the problem is expected to continue for decades.¹⁹

It remains unknown where or to what degree the radioactive material emitted from Japan's nuclear facilities will cause similar problems. But already in Japan, tests have found eleven types of vegetables to contain levels of radioactive iodine exceeding national standards by as much as a factor of seven²⁰ as well as milk.²¹ A soil sample taken 40 kilometers from the nuclear reactors showed levels of radioactive cesium 1630 times higher than normal.²² This is especially disconcerting because of cesium's long half-life and its unique chemical composition that allows it to move freely through the environment.²³

Impacts on the United States

Fifty mile-per-hour winds can blow radioactive material from Japan across the Pacific Ocean.²⁴ Radioactive emissions from Japan have been detected throughout the United States at low levels, from California to Colorado and as far east as Massachusetts.²⁵ Monitors in the Carolinas have detected the presence of radioactive iodine, the first time this material had been detected there since the Chernobyl accident 25 years ago.²⁶

The U.S. government repeatedly has stated that the radiation reaching U.S. shores should not concern the public because it is arriving in such small concentrations.²⁷



No amount of radiation exposure is safe, however, and it is imperative that the federal government conducts comprehensive, transparent monitoring of food and water, especially given the possibility that radioactive emissions from Japan may continue or worsen in the weeks and months ahead.

Currently, the Environmental Protection Agency (EPA) is charged with the bulk of monitoring radiation levels that may reach the United States from Japan, including taking samples of air, drinking water, precipitation, and cow's milk, which it does at dozens of locations throughout the country. Disconcertingly, 20 of the EPA's 124 air-monitoring sites were not functioning properly for some period after the accident in Japan, and much of the agency's monitoring depends on volunteers.²⁸ In California alone, four of the 11 air monitors were out of commission after the accident.²⁹ These revelations have prompted the EPA's Inspector General to state that it might be necessary to review the agency's radiation monitoring system.³⁰

Despite these gaps in the monitoring system, the EPA has said all air samples have been normal so far, except those in Hawaii, which the agency says are not high enough to warrant public concern.³¹

The EPA has received reports of elevated levels of radiation in rainwater in Massachusetts and Pennsylvania.³² Radioactive iodine was present in levels of rain that actually exceeded EPA standards for safe drinking water, though the agency said the presence of these levels in rain on a short-term basis is not a concern to the public.³³

Less clear, however, is who is monitoring what happens when radiation falls to the earth, getting into the soil or coating the grass and vegetation that feeds dairy cows, livestock, or deer and other wild game consumed by hunters. The FDA has not spelled out how it will specifically address this issue if it becomes a problem.³⁴

The EPA has 36 milk-monitoring stations nationwide,³⁵ but the agency does not appear to provide detailed data to the public about radiation levels it is finding in milk sampling. EPA did move up a milk sampling program that was scheduled for the first week of April.³⁶ As of March 31, testing revealed radioactive iodine in milk samples in California and Washington.³⁷

The three agencies that monitor almost all of the food Americans eat—the Food and Drug Administration (FDA), United States Department of Agriculture (USDA) and National Oceanic and Atmospheric Administration (NOAA)—have insisted that the U.S. food supply is safe from radiation and that their agencies have the regulatory capability to keep radiation out of food should it become a problem.³⁸ The agencies, however, have done very little to detail specific ways in which they are responding to the threat of radiation in food. It is also

unclear if these agencies, along with the EPA and other divisions of the government, have a cohesive structure for addressing the issue of radioactive materials entering the food supply.

One obvious place to begin would be to increase the locations and amount of monitoring of air and water in agricultural areas of the United States, such as California's Central Valley. This data should be used to determine an appropriate testing program for soil, water used to irrigate or process crops or livestock, and crops, milk, and meat.

Imported Food Risks

American consumers could also be at risk through consumption of food products from other countries that experience radioactive fallout from the nuclear accident in Japan. The United States imports around 80 percent of its seafood as well as an increasing share of its fruits and vegetables. Unfortunately, the FDA inspects less than two percent of these imports, leaving consumers at risk to a host of food-borne issues, which now includes potential radioactivity.

The U.S. imported around 150 million pounds of food from Japan in 2010, a small percentage of what Americans consumed, but not an insignificant amount.³⁹ Imports from Japan included nearly 600,000 pounds of crab and anchovies and nearly 5 million gallons of bottled water, soft drinks and other non-alcoholic beverages containing water,⁴⁰ products that may be potentially higher risk if contamination continues to spread to the ocean and fresh water sources.

The FDA, like regulators in Russia, Australia, Singapore, China and South Korea,⁴¹ has placed a ban on some food imports from the regions of Japan closest to the site of the nuclear accident.⁴² However, the FDA has not banned seafood imports from Japan,⁴³ even as trace amounts of radioactive cesium are beginning to appear in anchovies in Japanese waters, which the United States imports.

The FDA contends that it is taking special precautions with all food imported from Japan.⁴⁴ But given the FDA's budgetary limitations and notoriously weak capacity to conduct inspections, it seems unrealistic that the agency can ensure it can keep radioactive products out of the United States. A more thorough action would be an outright ban of all food from Japan until the nuclear accident is under control and data shows that food producing regions of the country are no longer contaminated.

Recommendations

- The Food and Drug Administration should immediately ban all food and water imports from Japan, expanding on the FDA's original step of restricting imports of milk and produce from the region near the accident site.
- The Environmental Protection Agency should increase its monitoring in the United States of air, water, precipitation, and milk for radiation. This includes getting any disabled or offline monitoring equipment back into service as soon as possible, as well as expanding the monitoring program into agricultural regions such as California's Central Valley. This data should be made publicly available.
- The data generated by this environmental monitoring should be used by the Food and Drug Administration and the U.S. Department of Agriculture to design sampling programs for soil, water used for irrigation, livestock or crop production, crops including leafy greens, and meat and milk in areas of the United States that are affected by radiation. This data should be made publicly available.
- Congress should provide adequate funding for food inspection, both at home and abroad, instead of attempting to cut both USDA and FDA's funding, which would weaken their ability to meet their current obligations even without the additional burden posed by this nuclear accident.
- Congress should rethink our agricultural and trade policies, which encourage importation of an increasing share of our food from countries with weak regulatory regimes. If radiation from Japan ends up affecting these countries' food systems, regulators there will not have the tools to ensure that food production is safe.

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