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Anxiety Up as Tokyo Issues Warning on Its Tap Water

By **DAVID JOLLY** and **DENISE GRADY**

TOKYO — Radioactive iodine detected in Tokyo's water supply prompted Japanese authorities on Wednesday to warn that infants in Tokyo and surrounding areas should not be given tap water to drink, adding to the anxiety about public safety posed by Japan's unfolding nuclear crisis.

Ei Yoshida, head of water purification for the Tokyo water department, said at a televised news conference that **iodine 131** had been detected in water samples at a level of 210 becquerels per liter, about a quart. The recommended limit for infants is 100 becquerels per liter. For adults, the recommended limit is 300 becquerels. (The unit is named for **Henri Becquerel**, one of the discoverers of radioactivity.)

The announcement prompted a run on bottled water at stores in Tokyo and a pledge from the authorities to distribute bottled water to families with infants. Prime Minister **Naoto Kan** said earlier Wednesday that the public should avoid additional farm produce from areas near the Fukushima Daiichi Nuclear Power Station, severely damaged by the March 11 earthquake and tsunami, according to the Japanese news media.

The Health Ministry said that it was unlikely that there would be negative consequences for infants who were given the water, but that it should be avoided if possible and not be used to make infant formula. There was some confusion about the public health advice, with experts saying it should also apply to pregnant women, since they and fetuses were vulnerable.

"It's unfortunate, but the radiation is clearly being carried on the air from the Fukushima plant," Yukio Edano, the chief cabinet secretary, said Wednesday. "Because it's raining, it's possible that a lot of places will be affected. Even if people consume the water a few times, there should be no long-term ill effects."

As authorities tried to maintain calm in Tokyo, residents were racing to buy as much bottled water as they could, clearing the shelves of the city's stores. Mr. Edano said Thursday that

officials were considering a plan to import water from overseas, to supplement the bottles they planned to begin distributing across the city.

Despite the frequent rain in recent days, it was not entirely clear why the levels of iodine were so high, said a senior Western nuclear executive, noting that the prevailing breezes seemed to be pushing radiation out to sea. "The contamination levels are well beyond what you'd expect from what is in the public domain," said the executive, who insisted on anonymity and has broad contacts in Japan.

It was possible that the levels were an indirect indication that the problems at the plant were deeper than had been publicly acknowledged.

The daily Asahi Shimbun cited the Health Ministry as saying that drinking the water would hurt neither a pregnant woman nor her fetus, and that it was safe for bathing and other everyday activities.

But experts say that pregnant women, [nursing mothers](#) and fetuses, as well as children, face the greatest danger from radioactive iodine, which is taken in by the thyroid gland and can cause [thyroid cancer](#). Children are at much higher risk than adults because they are growing, and their thyroid glands are more active and in need of iodine. In addition, the gland is smaller in children than in adults, so a given amount of iodine 131 will deliver a higher dose of radiation to a child's thyroid and potentially do more harm.

According to the [Centers for Disease Control and Prevention](#), if an adult and a child ingest the same amount of radioactive iodine, the thyroid dose will be 16 times higher to a newborn than to an adult; for a child under 1 year old, eight times the adult dose; for a 5-year-old, four times the adult dose.

Pregnant women also take up more iodine 131 in the thyroid, especially in the first trimester. The iodine crosses the placenta and reaches the fetus, and the fetal thyroid takes up more iodine as [pregnancy](#) progresses. During the first week after birth a baby's thyroid activity increases up to fourfold and stays at that level for a few days, so newborns are especially vulnerable.

Potassium iodide can protect the thyroid by saturating it with normal iodine. People in Japan have been advised to take it.

The 1986 accident at Chernobyl caused an epidemic of thyroid cancer — 6,000 cases so far — in people who were exposed as children. The culprit was milk produced by cows that had grazed on grass heavily carpeted by fallout. The epidemic could probably have been

prevented if people in the region had been told not to drink milk and if they had been given potassium iodide.

The warning Wednesday applied to Tokyo's 23 wards, as well as to the towns of Mitaka, Tama, Musashino, Machida and Inagi to the west. At a press briefing on Thursday, Mr. Edano said radiation had also shown up in tests of water supplies for two of Tokyo's neighboring prefectures, Chiba and Saitama, in levels above the maximum recommended limits for infants, but below levels considered dangerous to adults.

At a Lawson convenience store in the Tsukiji neighborhood of central Tokyo, the shelves were about half-stocked with water. A clerk said he had restocked them just an hour before.

"People came in and cleared us out in the first hour after the announcement," he said, saying he did not want to be identified because he did not want to anger his boss. "They were taking 20 or 30 bottles at a time."

Outside the store a man struggling to load more than 30 half-liter bottles on his bicycle said he had bought the water for his wife, who is seven months pregnant.

"Tap water is O.K. for me," he said, asking that he be identified only by his family name, Takahashi. "But all they said was that babies shouldn't drink it. They haven't said anything about what pregnant women should do."

"We're going to stay in Tokyo for now," Mr. Takahashi, 31, said, "unless the reactor problem gets worse."

The city government said it would begin distributing 240,000 bottles of water on Thursday to families with children younger than 1 year, the broadcaster NHK reported. There are about 80,000 such children in the affected zone, NHK said. Outside Tokyo, the government said it had found radioactive materials exceeding legal limits in 11 vegetables in Fukushima Prefecture, the Kyodo news agency reported. Shipments of the affected vegetables from there ended on Monday. On Wednesday, Prime Minister Kan also suspended shipments of raw milk and parsley from neighboring Ibaraki Prefecture, Kyodo reported.

The [United States Food and Drug Administration](#) said on Tuesday that it would prohibit imports of dairy goods and produce from the affected region. Hong Kong also banned food and milk imports from the area. Canada on Wednesday imposed stricter controls on milk products, fruits and vegetables, and Australia on Thursday imposed new restrictions on food products including seaweed and seafood.

Mr. Kan's office said Wednesday that rebuilding after the 9.0-magnitude quake and tsunami would cost up to \$309 billion. The [World Bank](#), citing private estimates, said on Monday that the figure could reach \$235 billion.

The economic cost of the disaster has hit the Tokyo Electric Power Company, which operates the crippled nuclear plant and is in negotiations with its bankers for loans of as much as \$24 billion, according to a person with direct knowledge of the situation who asked not to be identified.

The Associated Press reported on Wednesday that the official death toll from the disaster had been raised to more than 9,500, with more than 16,000 people missing, although officials said there could be overlap between the figures.

Meanwhile, a magnitude 6.0 quake shook Fukushima Prefecture in the morning, according to the Japan Meteorological Agency, followed by a magnitude 5.8 [tremor](#) about 20 minutes later.

David Jolly reported from Tokyo, and Denise Grady from New York. Chika Ohshima contributed reporting from Tokyo, and Keith Bradsher and Kevin Drew from Hong Kong.