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## **Almost All in U.S. Have Been Exposed to Fallout, Study Finds**

By JAMES GLANZ

### **Correction Appended**

In a preliminary study that takes into account not only nuclear tests in Nevada but also nearly all American and Soviet nuclear tests conducted overseas until they were banned in 1963, the Centers for Disease Control and Prevention has found that virtually every person who has lived in the United States since 1951 has been exposed to radioactive fallout.

These new findings expand on those from five years ago by the National Cancer Institute that showed that people living in a long, plume-shaped region stretching from Idaho and Montana to the Mississippi River and beyond had a slightly higher risk of developing thyroid cancer because of the Nevada tests.

The new study, which was completed in August 2001 and was first revealed yesterday in USA Today, suggests that for all Americans born after 1951 "all organs and tissues of the body have received some radiation exposure." The study says in highly guarded terms that the global fallout could eventually be responsible for more than 11,000 cancer deaths in the United States.

But the study said any medical implications were uncertain because the average American had received almost 20 times as much radiation from medical procedures like chest X-rays as from fallout of all kinds over the same period.

Dr. Charles Miller, chief of the radiation studies branch at the agency's National Center for Environmental Health, said the report was merely a "feasibility study" that showed it was possible -- should Congress request it -- to carry out a full analysis of the health risks of above-ground nuclear testing.

"We were trying to illustrate what could be done," Dr. Miller said, adding that "it would be irresponsible for me to speculate" on how accurate the estimate of 11,000 deaths might be.

Still, given the widespread exposures indicated by the study, its tentative conclusions show that the government has inadequately explained the cancer risks from nuclear tests, said Senator Tom Harkin, Democrat of Iowa, who says the follow-up research must be carried out.

"If the threat of exposure had been related to Americans sooner, early diagnosis and treatment may have saved many of these lives," said Mr. Harkin, who has seen four siblings die of cancer. "The release of this report is long overdue."

The United States conducted more than 200 above-ground, or atmospheric, tests of nuclear weapons from 1951 to 1963, about half of those at the Nevada Test Site, 65 miles northwest of Las Vegas, and the others in the Marshall Islands and elsewhere in the Pacific Ocean. Over the same period, the Soviet Union exploded some 200 nuclear weapons in tests on its own territory.

Such tests release radioactive iodine, which decays away in a matter of days, as well as longer-lived isotopes like radioactive cesium and strontium, which take many decades to disappear. The previous study, by the National Cancer Institute, examined fallout patterns and cancer risks caused by the release of iodine from the Nevada tests.

"Their report, as far as determining the fallout levels, was probably as good as could be done," said David Wheeler, a health physicist at the Nevada Test Site.

But he said that deriving cancer rates was a highly uncertain process at best. Accordingly, the cancer institute estimated that from 11,300 to 212,000 thyroid cancers would result from this exposure. Most thyroid cancers are treatable, but a small percentage result in death.

The Centers for Disease Control study also looks at exposures to the long-lived radioactive elements, which can be carried thousands of miles, potentially causing leukemia, breast cancer, liver cancer and other types of cancer. The study estimated the exposure patterns by taking into account the winds after tests, the amount of fallout created in each type of explosion and the rates at which different kinds of radioactive particles fall from the sky.

While the average exposure of an American because of the fallout is low, it increases each person's chance of developing cancer by a tiny amount, potentially leading to a larger number of deaths by cancer.

The study finds that nearly all cancers caused by tests at the Nevada site are likely to be related to the iodine that was the focus of the earlier work. The overseas tests could cause cancer only through the long-lived elements. The United States is not special in this regard; all nations will have received the long-lived radioactivity, but the Centers for Disease Control did not estimate cancer rates elsewhere.

Dr. Arjun Makhijani, president of the Institute for Energy and Environmental Research, an organization dedicated to nuclear disarmament, said that while the average exposures indicated by the C.D.C. study were low, concentrations in specific areas -- which still have not been determined -- are likely to have been far above those values.

"There are people in these high fallout areas who are seriously affected," Dr. Makhijani said. "There is no cause for alarm, but there is a public health issue, and the government is not facing up to it."

Chart/Map: "Exposure From Nuclear Tests" Average radiation dose received per county, 1951-2000, from American and Soviet atmospheric nuclear testing, which ended in 1963. The average medical radiation exposure per capita over the same period, from X-rays and other procedures: 20 milliGrays. (Source: Centers for Disease Control and Prevention) Map of the United States highlighting the average dose of medical radiation exposure.