Full report of nuclear test fallout released

Everybody got a little, and some got quite a bit—possibly more than was good for them.

On Oct. 1, the National Cancer Institute released the full report on its nationwide study of exposure to atmospheric fallout from 90 above-ground nuclear tests conducted 65 miles northwest of Las Vegas throughout the 1950s and 1960s. Wind and rain deposited the fallout from each of the tests in different areas.

Faye Austin, director of NCI's division of cancer biology in Rockville, Md., says the report shows that everyone in the continental United States was exposed to radioactive iodine-131 for about 2 months following each of the tests. The amount of exposure depended on where people lived and what they ate. Because I-131 accumulates in the thyroid gland, doctors have raised concerns that fallout might pose a threat of thyroid cancer to people exposed to it as children.

Exposure to I-131 came about mainly through drinking milk from cows or goats that had eaten fallout-tainted vegetation. Smaller exposures arose from breathing contaminated air or eating other foods, such as eggs and leafy vegetables, Austin says.

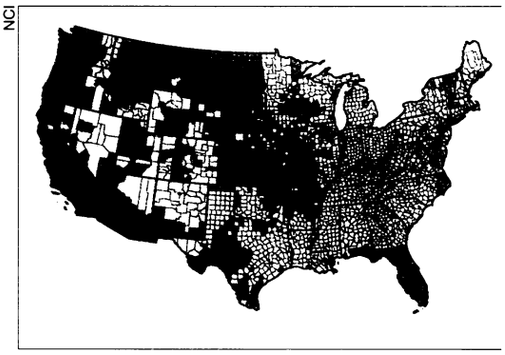
People who drank milk from backyard cows probably received higher doses of radiation than those who drank commercially processed milk. Unprocessed milk was likely to have been consumed more quickly after milking, and half of the radioactivity associated with I-131 disappears every 8 days.

Although NCI's report is the first widely known account of exposure, federal officials suspected as early as 1953 that I-131 could show up in milk products, say Pat Ortmeyer and Arjun Makhijani of the Institute for Energy and Environmental Research in Takoma Park, Md. Ortmeyer says the officials also knew details of fallout patterns. After Eastman Kodak Co. in Rochester, N.Y., complained to the government in 1951 about radiation-fogged film, the Atomic Energy Commission agreed to provide routine fallout predictions and follow-up information to several film manufacturers.

Ortmeyer and Makhijani found no evidence that the government informed the dairy industry or the public, they report in an article scheduled for publication in the November-December BULLETIN OF THE ATOMIC SCIENTISTS.

For each nuclear test and for each county in the lower 48 states, NCI researchers used fallout measurements and weather data from the time of the tests to estimate average I-131 doses for people in 13 age groups, including fetuses. They then estimated average doses for four subgroups, categorized by their milk-drinking habits, within each age group.

NCI



Average amount of radiation absorbed by thyroid tissue from nuclear fallout in the 1950s and 1960s. The highest average doses (12 to 16 rads) are shown in dark red, the lowest (less than 0.1 rad) in dark blue.

The highest average amounts of radiation absorbed by thyroid tissue, in the range of 5 to 16 rads, occurred in parts of Utah, Idaho, Montana, Colorado, and Missouri. In contrast, a routine 1950s test for thyroid abnormality in children, which used I-131, delivered a dose of about 200 to 300 rads.

Limited data from a previous study of Utah "downwinders" provided "suggestive, but not conclusive" evidence that childhood exposure to I-131 is linked to thyroid cancer, Austin says. The NCI study does not address the question of cancer risk directly, she cautions.

The National Academy of Science's Institute of Medicine plans to convene a panel to review the full NCI report, as well as other studies, to see if the health risks from exposure to fallout can be quantified. The panel will also seek to develop guidelines for physicians on how to identify persons who might be at increased risk for thyroid cancer, Austin says.

In a separate analysis, NCI also looked at seven previous studies of people exposed to external radiation from sources as diverse as treatment for disease and the atomic bombings of Hiroshima and Nagasaki. These data show that, on average, persons exposed as young children to 100 rads of external radiation had 8.7 times the risk of developing thyroid cancer as nonexposed children.

Each year, about 16,000 U.S. residents are diagnosed with thyroid cancer, and an estimated 1,230 die. The disease, often curable, accounts for just under 1 percent of all cancers in the United States.

Researchers at NCI estimate that the nuclear fallout from the Nevada Test Site may ultimately cause between 7,500 and 75,000 cases of thyroid cancer, an increase of 2 to 20 percent above the normal number. —*S. Perkins*

Big gun: Pistol shines in the infrared

The Pistol is an apt name for the brilliant star and surrounding nebula shown in this false-color composite taken in the near-infrared with the Hubble Space Telescope. To astronomers, the nebula is shaped like a gun. At least 60 times as massive as the sun and nearly 10 million times as powerful, the Pistol could be the most energetic star in the heavens. At its birth, when it packed as much as 200 times the sun's mass, it may also have been the heaviest.

Located 25,000 light-years from Earth, the star is intrinsically bright, but intervening dust prevents it from being seen in visible light. That explains why the star was not discovered until sensitive infrared detectors became available in the early 1990s. In 1995, Don F. Figer of the University of California, Los Angeles proposed that the star had generated the surrounding nebula during two violent outbursts 4,000 and 6,000 years ago. The Hubble image, released this week, confirms the association. It also provides further evidence that the Pistol is a rare, unstable type of star known as a luminous blue variable—only the seventh such star detected in our galaxy, Figer says.

These objects may represent a brief transitional phase between ordinary massive stars, known as O stars, and Wolf-Rayet stars, which have ejected their outer layers. Figer's team plans to study the composition and velocity of the Pistol's expanding nebula with the Keck II telescope atop Hawaii's Mauna Kea. —R. Cowen

Figer/NASA