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Radiation exposure: What we know from Hiroshima and Nagasaki

By Shari Roan, Los Angeles Times
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Radiation exposure is sadly all too familiar to the people of Japan. The health effects of radiation were poorly understood until the United States dropped atomic bombs on the cities of Hiroshima and Nagasaki toward the end of World War II. Prior to that time, scientists had widely mixed views on the impact of radiation exposure.

"There was a strange kind of love-hate attitude about radiation before that," said Dr. William McBride, a professor of radiation oncology at UCLA and a Jonsson Cancer Center researcher who has looked at the consequences of radiation exposure after a radiological or nuclear terrorist attack. "Some people felt radiation was a wonder drug that could cure all illnesses. And there were people who felt that radiation could be quite dangerous."

The aftermath of the bombings of Japan clarified things with certainty, he said. An organization called the Radiation Effects Research Foundation was set up to study the survivors of the bombings. The foundation is a joint effort between the United States and Japan.

"Large numbers of people were exposed to high doses, and they were studied at some depth," McBride said. "We learned an enormous amount from that."

Because of those studies, researchers now have a good idea of just how much radiation it takes to produce particular health effects. For example, an exposure of 50,000 microsieverts (μSv)-- a unit that measures the biological effects of radiation -- can lead to nausea and fatigue within hours. A dose of 50,000 μSv causes hair loss within two or three weeks while a dose of 1 million μSv will cause hemorrhage. Death usually occurs at a dose of 4 million μSv .

"In many ways radiation is the one environmental carcinogen that we know an enormous amount about," McBride said. "The risk estimates that were developed as a result of these exposures [at Hiroshima and Nagasaki] are quite precise. Every other kind of incident is compared with that."

The rate so far experienced by Hiroshima and Nagasaki survivors is about 0.08 fatal cancers per sievert of dose, as estimated by the the U.S. National Academy of Sciences Committee on the Biological Effects of Ionizing Radiation. In comparison, a chest X-ray produces radiation in the amount of 100 microsieverts. One sievert equals 1,000,000 microsieverts.