Scientists Concerned About Future of Atomic Bomb Survivors Project

On the summit of the highest hill in Hiroshima, Japan, the low-slung Radiation Effects Research Foundation affords scientists a sprawling view of the landscape devastated by Little Boy 60 years ago. They can see a corner of the International Peace Park and its "A-bomb Dome," a badly damaged exposition hall that somehow survived the fireball that detonated directly above it. It is an enduring symbol of the resilience of the city and its people.

Inside the Truman-era complex, though, endurance is being tested. Dated research facilities, waning U.S. interest, and uncertain funding are damaging morale, says Eiji Akimoto, RERF's top Japanese administrator. On top of that, the building leaks.

"Typhoons blow water and leaves in. The rooms become so messy," Sumiko Kumano, the daughter of a survivor, told a visitor during a tour of the six Quonset huts and connecting buildings. She points out an architect's bright sketches of a new complex planned for the heart of the city, a project abandoned in the 1990s. The corridor also holds black-and-white photos of the famous figures who visited during RERF's heyday. In one, Marilyn Monroe is arriving with her entourage. Outside, the dormitory that once housed hundreds of scientists and support staff is dark and underused.

The foundation's scientists are proud of their work, Kumano adds, but they worry about the ultimate fate of their projects. The thousands of blood and tissue samples that crowd the complex's freezers induce the most concern. Collected from 23,000 study participants every 2 years, the samples may harbor a half-century-long tale of the sometimes subtle effects of radiation exposure. Scientists at RERF have just begun studying the material with modern genetic and genomic techniques.

"When people say, 'What are you going to do with the samples?' I have to tell them I don't know, but I think we should keep them," said chief scientist Charles Waldren, Ph.D., an American that RERF coaxed out of retirement from the University of Colorado in 2001.

Stateside scientists who work with RERF tend to agree. John Boice Jr., Sc.D., scientific director of the International Epidemiology Institute in Rockville, Md., called the collection "extremely, extremely" valuable. "With this material and all the new technologies, we could learn a lot about inherited susceptibility [to radiation-induced cancers]. We could learn a lot about genes that we don't know a lot about. It's difficult to say how much knowledge we could gain."

Impending Funding Cuts?

Concerns over RERF's future emerged last fall after the White House

The Radiation Effects Research Foundation

Since its founding in 1947 as the Atomic Bomb Casualty Commission, the Radiation Effects Research Foundation has made fundamental contributions to radiobiology and cancer epidemiology. The hundreds of research articles generated by RERF were instrumental in dramatically lowering international occupational radiation limits over the past five decades. Some 280 scientists and staff work at the main laboratory in Hiroshima and at a satellite facility in Nagasaki.

Their life-span study, begun in 1950, includes 120,000 people; most were within 2.5 kilometers of each bomb's detonation center. A subset of 23,000 participants donates blood and tissue samples every 2 years.

RERF is also studying 53,000 children of survivors born between 1946 and 1958. Participation rates hover around 80%, a remarkable figure for such long-term studies. Nearly 284,000 people were exposed to atomic bomb radiation in Hiroshima and Nagasaki. More information is available at http://www.rerf.or.jp.

Office of Management and Budget recommended cutting in half RERF's $14 million annual allocation. Editorials in several journals sounded an alarm about the proposed cuts. Supporters rallied around key legislators, who restored full funding for fiscal year 2005. But because Congress spent last fall crafting the federal budget, payments were delayed; the Department of Energy, which funds the project, finished disbursing the funds in January, 4 months behind schedule.

Despite all this, a DOE source who asked not to be named said funding questions have been blown out of proportion. "The U.S. will continue to support [RERF] as long as there are still A-bomb survivors," he said. Such a pledge would carry U.S. funding into the 2020s or beyond.

At the moment, however, funding is secured only through June 2006. Waldren said that the U.S. ambassador to Japan, Howard H. Baker Jr., reaffirmed this commitment by "reminding the DOE and the U.S. government that this is a long-standing bi-national agreement, and it's not up to any one agency to fiddle with it too much."

Renegotiations have already been delayed. Baker and other top officials were to meet with their counterparts at the Japanese Ministry of Health, Labor, and Welfare last fall. But the DOE source said that talks will begin only after RERF's three directors—one American and two Japanese—are replaced in July. In addition, he said, Japanese administrators need to complete accounting reforms, and two steering bodies—the science council and the board of directors—need to approve a research plan.

This final point is the stickiest, said Waldren. During a November interview in his office, he patted a draft of the plan and said, "This is what we're focused on."

Scientific Limbo

When the science council meets in March, it will make recommendations based on its reading of that plan. Boice is hoping that the group, comprising U.S. and Japanese scientists, takes heed of his August editorial in *The Lancet*. Joining two dozen other radiation scientists, Boice argued that "it would be a scientific tragedy to stop midstream." Nearly half of the study survivors are alive, with an estimated 60% to 70% of radiation-associated deaths yet to occur. "The scientific questions addressed by RERF are not yet fully answered," he wrote.

At the edge of the International Peace Park in Hiroshima, Japan, the "A-bomb Dome" stands as a symbol of the endurance of the city and its people. Little Boy detonated about 500 meters above the former Prefectural Products Exhibition Hall at 8:15 a.m. on Aug. 6, 1945.

Waldren said that, although Boice is correct, he does not foresee much change in RERF's basic epidemiology. "There will be some important additions to the data, but I don't think it will change in any fundamental way," he said. "We'll keep seeing 5% to 10% of cancers [in survivors] caused by A-bomb radiation."

However, Waldren sees the potential for new tools to distinguish radiation-induced cancers from the spontaneous type. On top of helping cancer researchers, such advances in molecular identification would be attractive to the DOE, which is developing compensation policies for its 75,000 current and former nuclear plant workers. If the agency was able to tell which workers developed cancer specifically from working in its facilities, it could weed out many other claims. "They literally have billions and billions of dollars at stake," said Waldren.

There have been other important scientific observations. As data from the project accumulated, radiobiologists discovered that risk of cancer occurs at much lower doses than once thought. The discovery led to tighter occupational exposure limits.

"In the early years, standards were set by how much radiation turned a person's skin red," said Boice, who serves on the United Nations Scientific Committee on the Effects of Atomic Radiation, formed in 1955. This "standard" gradually became more conservative. In 1990, the U.N. committee recommended an annual exposure limit of 2 rem—the amount received in an instant by thousands of Japanese. "The A-bomb survivors have been critical in our judgments," he said. "The foundation of our risk knowledge comes from Hiroshima and Nagasaki."

The atomic bomb tissue repository could be valuable in other ways. Waldren sees the samples as a potential gold mine for scientists studying the genetics of aging. Boice sees benefits at the other end of the life cycle. His research focuses on risks of radiation treatment among children. Many childhood cancer patients now survive into adulthood—much like the thousands of Japanese children who survived the atomic bombs. "They had one exposure in 1945, and 60 years later, they're still manifesting the risk," said Boice. "It's mind-boggling in terms of cancer cytogenetics. The question today is, how concerned should we be about therapeutic radiation given to children?"

But other scientists, especially at the DOE, say that Japanese reluctance to ship study samples to other countries has limited some collaborations. In addition, they say that a smaller but more accessible tissue repository from survivors of Soviet nuclear accidents diminishes the value of the Hiroshima cache.

Akimoto, the administrator, simply wants a new freezer. "The biological specimens are a world heritage," he said through an interpreter. "And we are quickly running out of space."

—Brian Vastag