

## A-bomb survivor risks are revised upward



U.S. Military



J. Sifferner

Nagasaki-bomb survivor in 1981.  
Left: Hiroshima after the bomb.

Previous estimates of the number of cancer deaths attributable to atomic-bomb radiation are at least three times too low, according to results of a reexamination of published mortality statistics for Japanese bomb survivors. And, the study reports, those earlier estimates were at least 10 times too low in calculating *all* deaths due to radiation among bomb victims surviving five years or more. The analysis, which appears this month in the *BRITISH JOURNAL OF EPIDEMIOLOGY AND COMMUNITY HEALTH*, contradicts the prevailing view that there have been no delayed effects of radiation other than cancers among five-year bomb survivors. The study, by epidemiologist Alice Stewart at the University of Birmingham in England, indicates that two conflicting factors may have served to mask the real incidence of radiation-related deaths — one in four — among Japanese bomb survivors.

Numerous studies of Japanese bomb survivors have reported an early epidemic of cancers. Since the incidence of all other causes of death among bomb victims tended to mirror those for the rest of Japan, an assumption was made that cancers were the primary, and possibly only, delayed effect of bomb radiation affecting death rates. But Stewart now suggests that this finding reflects a subtle oversimplification.

One of the first and most notable effects of the atomic bombs dropped on Japan in World War II should have been a “healthy-survivor effect”: those surviving the blasts would have “proved themselves to be fitter than average by surviving,” Stewart claims. Yet whether one could see this effect would depend on there being no residual disabilities. That, she contends, is unlikely — especially since the threshold

radiation dose for bone-marrow damage is relatively low. At a minimum, Stewart says, one would expect a number of those who survived the bomb blasts to have received some degree of bone-marrow damage that did not repair. And that damage might be expressed, Stewart explained in an interview, as nothing more obvious than a decreased immunity to disease — especially infection.

In the absence of an obvious indication of either the “healthy-survivor” or “residual disability” effect, Stewart says one should investigate whether each might have been at play, exerting an equal but opposite influence — essentially canceling out the other. To test her hypothesis, Stewart looked at statistics for a cause of death that would have been relatively unaffected by either factor — sudden death from a cerebral hemorrhage.

After matching populations for demographic factors, Stewart says, “You take the death rate for this disease and compare it with what it was in the country as a whole. If the death rate in the survivor population turned out to be lower than normal — and it has done so — it would then set the standard for how much you had to reduce the other causes of death” relative to national levels, to establish what would be normal for the survivors. And the 3,355 deaths from cerebral hemorrhages among bomb survivors in Hiroshima indicate a mortality rate for the disease that is only “70 percent of normal.”

Using this statistic as her baseline indicator, Stewart finds that death rates for all other noncancers in Hiroshima are slightly below average, though not as low as the hemorrhage figure. Low mortality is suggestive, Stewart says, of a population that indeed is healthier than normal. How-

ever, she adds, since mortality rates for noncancers other than cerebral hemorrhages were slightly higher than 70 percent of the Japanese average, one is led to suspect that residual radiation-related disabilities do affect this population.

Recalculating the survivor population’s cancer mortality — assuming it too should be only 70 percent of the Japanese average — one finds the number of bomb-related cancer deaths is at least three times higher than figures reported by atomic-bomb research institutions and rates accepted by the International Commission on Radiation Protection. Interestingly, in her earlier study of Hanford workers exposed to low levels of radiation (SN: 1/20/79, p. 44), Stewart found a rate of cancer 10 times higher than what existing atomic-bomb-survivor studies had predicted.

“Alice Stewart’s article is the second ‘bomb’ that has been dropped on the previously sacrosanct Japanese A-bomb survivor studies,” according to Victor Archer, a radiation epidemiologist at the University of Utah. The first was a repudiation of bomb-dosimetry calculations (SN: 5/30/81, p. 343). He notes that the calculations made in 1965, and “used ever since,” have been found incorrect for several reasons. Once better estimates are available, some of Stewart’s numbers “will undoubtedly change,” Archer says, “but her main argument — that observed mortality was probably strongly affected by the healthy-survivor effect and by noncancer effects — will still be applicable.” He adds that although such effects have been mentioned in the past, they received little attention “because no one knew how to handle them and we all suspected that their effect, if any, would be very small. Stewart has shattered that assumption.” —J. Raloff