

## Radiation effects in the Marshall Islands

Jacob Robbins, William H. Adams

REPOSITORY BNL Records  
 COLLECTION Marshall Island  
 BOX No. MIMO Dept. Office (5-131)  
 FOLDER NA

*Clinical Endocrinology Branch, National Institutes of Health, Bethesda, Maryland; Medical Department, Brookhaven National Laboratory, Upton, New York, USA*

### ABSTRACT

On March 1, 1954, the detonation of a thermonuclear device on Bikini in the Marshall Islands resulted in the accidental deposition of fallout on several inhabited atolls and on a Japanese fishing vessel. The accident was unusual in that the explosion, occurring near ground level, resulted in a heavy, particulate fallout on Rongelap and Ailingnae, about 160km away. Utirik, further to the east, experienced a lesser, invisible fallout. Early radiation effects were observed in many of the 64 inhabitants of Rongelap and the 18 on nearby Sifo Island. During the second and third decades after the accident, most of the Rongelap children and many adults developed thyroid nodules, some of which proved to be malignant. In addition, thyroid atrophy accounted for severe growth retardation in 2 boys. The Utirik people (167 exposed) did not show early radiation effects, but thyroid nodules and thyroid cancer began to appear late in the second decade after exposure. The cancers in both groups were of the papillary type. There have been no deaths from thyroid cancer but one fatal case of acute myelogeneous leukemia occurred in a Rongelap boy. The radiation exposure resulted from both internal and external sources. Calculation of risk coefficients for thyroid nodules and cancer, adjusted for their occurrence in a comparison population, gave a mean nodule risk (all ages) of 8.3 per  $10^6$  person. rad. year. and a mean cancer risk of 1.5 per  $10^6$  person. rad. year. The latter value is similar to that resulting from purely external exposure (eg medical x-rays) and is compatible with an equal risk from external x-rays and internal radiation from short half-life isotopes of iodine. The Marshall Islands experience clearly identifies the risk to the thyroid gland from radioactive iodine fallout in man; however, it gives no information about the risk that can be attributed to iodine-131, the predominant iodine isotope in long-range fallout and in medical use.

The Medical Research Center  
 Brookhaven National Laboratory

Upton, L. I., New York

5007377