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SUMMARY OF THE 20TH POST EXPOSURE MEDICAL SURVEY OF
THE RONGELAP AND UTIRIK PEOPLE

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The twenty year survey was highlighted by several special examinations and the use for the first time of an LCU newly acquired by the AEC for medical and radiological surveys in the Marshall Islands. In addition to routine medical examinations several special medical studies were conducted, a thyroid reserve study and a diabetic and genetic study. Radiological surveys including personnel monitoring by γ -spectroscopy and environmental radiation studies were carried out at Utirik, Rongelap and Bikini. Results of these examinations must be considered quite preliminary at this time.

The survey team consisted of 19 members: from the U. S. - 4 M.D.'s, 2 P.H.D.'s and 7 technical specialists; from the Trust Territory 1 M.D., 1 practitioner, 1 Medex and 3 technicians. Also Mr. William Streenan from the AEC and Mr. John Rosario representing the Congress of Micronesia accompanied the team. On the LCU there were 8 men in the crew plus a cook and as assistant making a total of 31 people on the ship. Medical examinations were conducted on a total of about 500 people at Majuro March 18-23, at Ebeye (Kwajalein) March 25-29; then via LCU to Utirik April 1-3, Rongelap, April 5-10 and Bikini, April 11-15. A roster of team personnel is attached.

Village meetings were held at Utirik and Rongelap during which the objectives of the survey were discussed, team members introduced and questions answered. The meeting at Utirik was pleasant and uncomplicated, but the Rongelap meeting was disappointing in that there were questions presented by the Rongelap Fallout Survivors Association which indicated continued misunderstanding about the medical examinations and results. A transcript of this village meeting is attached. It appears that there must have been outside influence in presenting the questions since the people could not have read our reports, those of the medical observers or the Congress of Micronesia since they have not been translated into Marshallese. Further education of the people is necessary and a booklet written in Marshallese is being prepared by the Trust Territory which will help answer many of their questions. Support of the medical surveys voiced last year at Rongelap by Senator Borja and Congressman Balos needs further reinforcement by these congressmen.

SURVEY FINDINGS

Thyroid. Two additional exposed Rongelap people were found to have thyroid nodules, one in a 45-year old woman exposed on Ailingnae Island (whole body gamma dose estimated at 69 rads) and in a 20-year old boy who was exposed in-utero near the end of the second trimester. The latter case is interesting since this is the first thyroid abnormality developing in any of the four in-utero exposed children. There was also one unexposed 41-year old Rongelap

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woman in the control group who had developed a thyroid nodule. All of these cases are being brought to Brookhaven for more complete thyroid studies followed possibly by surgery in Cleveland by Dr. B. Dobyns. There were two other exposed Rongelap people with borderline thyroid lesions and they will be observed carefully on thyroid treatment.

Thyroid Reserve Study. Drs. Jan Wolff and Kund Knudsen were in charge of this study. In view of uncertainty of complete compliance with the thyroid treatment program in some people a test of thyroid reserve was done in 41 people in this group who had not developed thyroid abnormalities. Thyroid hormone treatment was discontinued for 2 months prior to our examinations and then plasma samples were taken before and after the injection of 10 units of TSH for later analysis of hormone levels. Plasma samples for hormone levels were also taken on other people. In order to test environmental iodine levels on Rongelap diet and urinary samples were taken for iodine analysis.

Diabetic Study. Dr. Reed Larson, headed this survey. This disease which is known to be of high incidence along with cataracts of the eyes in the Marshalls, and this survey was carried out in Rongelap and Utirik people to determine its prevalence and attempt to advise the Trust Territory medical people concerning this serious medical problem. The volunteer response for this study was most gratifying - a total of 360 people being tested. Diabetic questionnaires and pre and post prandial blood sugars are being analyzed. Judging by the number of positive urine sugars, there appears to be a high prevalence of the disease mainly in those greater than 40 years of age. Infections and need for amputations are a source of great concern to the Marshallese medical personnel.

Genetic Studies. Studies for possible inherited defects in children of people of exposed parents was under my supervision, and is being carried out in collaboration with Dr. James Neel and Dr. Arthur Bloom of the University of Michigan. During this survey blood samples were collected for a variety of tests for metabolic defects and bucal smears for sex chromatin studies on 71 children of exposed parents, 24 exposed parents, 58 children of unexposed parents and 37 unexposed parents were examined in this study. A brief physical examination was carried out on each child. No obvious congenital defects were noted. In view of the general negative nature of the studies of the first generation Japanese children of exposed parents it seems unlikely that positive results will be seen in this group. However, the psychological benefit associated with negative findings would be reassuring to the people.

Radiological Surveys. Radiological surveys were carried out at Utirik, Rongelap and Bikini Islands. At Bikini there were about 80 people living there, 30 of whom (3 families) of Bikinians who have moved back, and the remainder are workmen and their families. In view of the anticipated return of larger number of Bikini people to their home island in the near future additional data collected on this island will be given prompt attention.

Whole-body gamma spectrographic analyses were carried out by Dr. Cohn and Mr. Rothman and environmental sampling by Messrs. Greenhouse and Ash and Dr.

Nelson. At Rongelap and Utirik samples were gathered to attempt to correlate radiation levels in soil with adjacent fruit trees (pandanus, coconut, breadfruit) and arrowroot, messerschmidia, scaveola plants for a possible extrapolation purposes at Bikini and Eniwetak where vegetation samples are limited. Other samples collected included 24-hour urine samples, water, coconut crabs and certain marine specimens. It will be some time before radiochemical analyses of these samples is completed and the data analyzed.

Gamma spectrographic analysis (whole-body counts) were carried out on 22 people at Utirik, 46 at Rongelap and 31 people at Bikini, including members of the families who had returned. These data are undergoing computer analysis. Preliminary analysis of these data give the following estimated average body burdens of ^{137}Cs :

| | MALES | | | FEMALES | | |
|-------------------|-------|-------------------------------|--------|---------|-------------------------------|--------|
| | No. | μCi Body burden | % MPC* | No. | μCi Body burden | % MPC* |
| Bikini | 18 | 0.129 | 4.3 | 13 | 0.073 | 2.6 |
| Utirik | 9 | 0.262 | 8.7 | 13 | 0.133 | 4.4 |
| Rongelap | 22 | 0.475 | 15.8 | 24 | 0.317 | 10.6 |
| U.S. Medical Team | 6 | 0.0021 | 0.07 | | | |

* Using 3 μCi MPC-based on the standard 1/10 of the maximum permissible burden for industrial populations which is 30 μCi according to the Recommendations of the International Commission on Radiological Protection, ICRP Public.2 (1959).

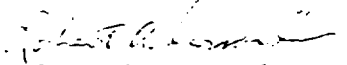
A gamma survey was carried out on Bikini Island using a scintillation type survey meter calibrated for ^{137}Cs which represents about 95% of the gamma radiation on the island. Preliminary analyses showed roughly the following levels on the island:

| A. Village (Living area) | Average $\mu\text{R/hr.}$ |
|--|---------------------------|
| Inside cement houses with coral covered yards | 2.38 |
| Outside cement houses with coral covered yards | 3.95 |
| Inside cement houses without yard covered coral | 2.98 |
| Outside cement houses without yard covered coral | 9.44 |
| Along village road | 13.1 |
| B. - Interior-coconut groves | 41.6 |

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It is gratifying that the levels are below those previously reported. Assuming that the average Bikini person spends 85% of their time in the village and 15% in the interior area the whole body dose would be about the same as the average U. S. citizen receives from natural background, the background level being higher in the United States than on Bikini. A more definitive gamma survey with thermoluminescent dosimeters will be made at Bikini on the next survey.

The LCU. The newly acquired LCU immensely improved the survey procedures and living conditions. The ship was clean and freshly painted (quite a contrast to the previous cargo ships used) and the air-conditioned sleeping trailer, clean galley with wholesome foods served and canvas covered afterdeck for eating and lounging greatly improved living conditions even though crowded. The vessel was slow. For instance, only an average of 4.8 knots were made between Kwajalein and Utirik (about 240 miles) hitting into the winds and waves. Beaching the vessel was a distinct advantage allowing easy access for people coming aboard for whole body counts and for moving equipment back and forth. On my return from the islands, I attended a meeting held at the University of Hawaii, Marine Biology Laboratory, at Coconut Island. LCU alterations for improved specialized operations and scheduling of the vessel were discussed. It is obvious that from the number of people who want to use the vessel that supervised prior scheduling of the vessel will be necessary.


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