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The 1968 Annual Medical Survey of the Rongelap People Exposed to Fallout
in 1954

Interim Report

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The 1968 Annual Medical Survey of the Rongelap People Exposed to Fallout in 1954
Interim Report

The 1968 annual medical survey of the Rongelap people who had been exposed to fallout radiation in 1954 was carried out in March 14 years after exposure. Since this an "off year survey" only the exposed Rongelap people were given complete examinations. However any unexposed Rongelap people who had complaints were examined and treated. The examinations were carried out at Rongelap, Ebeye, and Majuro. All but about 6 of the exposed people were examined. They were on outlying atolls and not readily accessible. Utirik atoll was also briefly visited for the purpose of a thyroid check of the people there. A number of Utirik people had received a slight exposure to fallout in the 1954 accident.

The medical team consisted of 1 practitioner, 1 photographer, and 2 technicians from the Trust Territory, and 4 doctors and 2 technicians from the United States. Transportation from Kwajalein to Rongelap, Utirik and back to Kwajalein was via the Ralik Ratak, a cargo ship run by a local trading company. The ship proved very unsatisfactory for transportation of personnel since it was overcrowded, unclean and with no adequate accommodations for the team. Moreover many of the group became seasick. Offloading and loading of survey equipment was handled reasonably well by the ship. The trip to Majuro was made from Kwajalein by plane.

Interval Health Status. Interrogation of the health aide and examination of medical records indicated that during the past year the Rongelap people had been generally in good health. There were no major epidemics of disease

and most of the sicknesses were those usually seen such as upper respiratory infections, gastroenteritis, skin infections, etc. No deaths occurred in the exposed group. One death in an older unexposed woman occurred while the team was at Rongelap. Death was due to infections complicating diabetes. No miscarriages or stillbirths were reported and a number of healthy babies had been born to both the exposed and unexposed people.

Examinations included: 1. Interval case histories; 2. complete physical examinations including careful thyroid examinations; 3. laboratory analyses included routine blood work with collection of sera for later examinations in the U.S., routine urine analyses and collection of 24 hr. urine samples for determination of body burdens of radioactive material; 4. x-rays of selected case with routine x-rays of the hands and wrists of children for growth and development studies; 5. special cultures of white blood cells were carried out on blood samples collected from some 50 exposed and 140 unexposed people to determine if radiation exposure had any effect on the ability of cells to grow in culture.

Findings. Except for the thyroid abnormalities no unusual findings were noted in the exposed people. The general health of the people appeared good and no nutritional deficiencies were noted. This was reflected in the general impression that we had that there were fewer infections, respiratory, skin, etc., present this year.

Thyroid examinations revealed 2 new cases with thyroid nodules. Both of these were in children exposed at less than 10 years of age. This brings the total number of cases of thyroid abnormalities to 20 of the 67

exposed Rongelap people now living. Of the 19 children in the more heavily exposed group, who were exposed at less than 10 years of age, 17 or 90% have developed thyroid abnormalities. Thyroid surgery, previously carried out in 11 cases had revealed benign adenomatous goiters in all but 1 case, an exposed woman who had a cancer of the thyroid gland. During the examinations it was decided that 4 cases should be returned to Brookhaven National Laboratory for complete studies and evaluation for the need for surgery. Three were cases with thyroid nodules who had not responded satisfactorily to treatment and the fourth, a 29 year old woman with a tumor lateral to the thyroid gland. Arrangements were made with DISTAD Marshalls to take these cases from Rongelap to Ebeye in May 1968 where they would be outfitted with clothing. The patients would be accompanied by a technician from Majuro, who speaks English and Marshallese fluently. He will stay with these people in the United States and return with them later. The present status of the thyroid abnormalities are summarized in the accompanying Tables I and II.

Failure of People to Take Thyroid Treatment Satisfactorily. Following the 1967 survey, based on blood samples returned for study, it became apparent that many of the people have not been taking their thyroid medication properly since they showed a thyroid deficiency. The thyroid tablets if taken regularly will maintain normal thyroid hormone levels. It is most important that these children take their medication regularly, particularly the surgical cases, since they need the hormone to develop properly and remain healthy. Therefore during the survey every effort was made to correct this serious situation. A strict treatment schedule is to be carried out. Instead of daily medication,

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TABLE I

THYROID NODULES (INCLUDING HYPOTHYROIDISM)

IN MARSHALLESE POPULATIONS (3/68)

(R=Rongelap; A=Ailingnae; UT=Utirik; C=Unexposed)

<u>Group</u>	<u>Age At Exposure</u>	<u>No. in Group</u>	<u>Gamma Dose (rads)</u>	<u>Estimated Thyroid Dose (I*, rads)</u>	<u>% Thyroid Nodules</u>
R	<10	19	175	700-1400	90.0
A	<10	6	69	275-550	0.0
UT	<10	40	14	55-110	0.0
C	<10	61	0	0	0.0
R	>10	36	175	160	5.5
A	>10	8	69	55	12.5
UT	>10	59	14	15	3.4
C	>10	133	0	0	2.3

*In estimating the thyroid doses to the Ailingnae and Utirik exposed group, it was assumed that such doses were proportional to the thyroid doses of the Rongelap exposed group, based on relative whole body gamma dose received.

TABLE II

Thyroid Abnormalities in Exposed Rongelap People, 1968

(arranged in order of appearance of abnormality)

Subject No. and sex	Present age, yr.	Age at exposure, yr.	Time of Development		Findings
			Year	Age, yr.	
3 M	15	1	1965	12	Hypothyroid, PBI <2 μ g% March 1965; re- tardation of growth preceded these findings by a number of years. 3/68 growth spurt and improved appearance on thyroixine.
5 M	15	1	1965	12	Hypothyroid, PBI <2 μ g% March 1965; re- tardation of growth preceded these findings by a number of years. 3/68 growth spurt and improved appearance on thyroxine.
17 F	17	3	1963	12	Adenomatous goiter; total thyroidectomy, 1964. No recurrence.
21 F	17	3	1964	13	Adenomatous goiter; total thyroidectomy, parathyroidectomy, 1964. No recurrence.
69 F	18	4	1964	14	Adenomatous goiter; partial thyroidectomy, 1964. 1968 slight roughening right lobe persists.
2 M	15	1	1965	12	Adenomatous goiter, partial thyroidectomy, 1965. No recurrence.
20 M	21	7	1965	18	Adenomatous goiter, partial thyroidectomy, 1965. No recurrence.
64 F	44	30	1965	41	Mixed papillary and follicular carcinoma, total thyroidectomy-surgical and therapeutic radioiodine, 1965. No recurrence.
72 F	20	6	1965	17	Three-mm nodule left lobe. Nodule not palpable 9/66.
42 F	17	3	1965	14	Two-mm nodule right lower lobe. 3/66 nodular enlargement (~1½ X normal) entire gland; firm 5-mm nodule right lobe. 7/66 subtotal thyroidectomy: adenomatous goiter.

Table - Thyroid Abnormalities in Exposed Rongelap People, 1968 (arranged in order of appearance of abnormality) cont.

Subject No. and sex	Present age, yr.	Age at exposure, yr.	Time of Development		Findings
			Year	Age, yr.	
61 F	42	8	1965	19	Six to 8-mm smooth nodule left lower pole. 3/66 1-cm nodule left lobe. 7/66 subtotal thyroidectomy: adenomatous goiter.
40 M	43	29	1965	40	Two-mm nodule right lower pole. 3/66 no nodules detected (Reduced on hormone treatment?).
59* F	48	34	1965	45	Five-mm nodule midline. 3/66 same. 7/66 subtotal thyroidectomy: adenomatous goiter.
54 M	15	1	1966	13	Nodular enlargement (~1½ X normal) left lobe and isthmus with 2-mm firm nodule. 1968 nodule left lobe 2 cm.**
19 M	19	5	1966	17	Multinodular soft enlargement entire gland (~1½ X normal). 1-cm nodule right lower pole. 1968 new 1 cm nodule left lobe.**
36 M	21	7	1966	19	Slight nodular enlargement, entire gland. 1-cm nodule, not clearly demarcated at left lower pole. Many tiny nodules over surface of gland. 1968-nodule still present.
33 F	15	1	1966	13	9/65 questionable irregular gland. 3/66 definite 5-mm nodule left lobe. 7/66 subtotal thyroidectomy: adenomatous goiter, Hurthle cell adenoma.
65 F	15	1	1966	13	9/65 questionable small nodule. 3/66 5-mm nodule right lobe. 7/66 right subtotal thyroidectomy: adenomatous goiter.
23 M	18	4	1967	17	1.5-2 cm nodule right lobe. 1968 slight increase in size of nodule**
15 F	21	7	1968	21	Slight nodularity both lobes.
70* F	29	15	1968	29	2-3 cm firm mass to left of thyroid**,***

*Exposed to only 69 rads of whole body radiation and presumably proportionately less thyroid dose.

**To be brought to Brookhaven National Laboratory in June 1968 for an evaluation for surgery.

***Not included in thyroid statistics since there is uncertainty if the lesion is thyroid tissue.

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a weekly dose of 7 thyroid tablets will be taken once a week in the presence of a responsible individual who will use a check-off list. The Director of Public Health, Marshalls has agreed to see that the treatment schedule is enforced. Ample medication for the coming year was left on each of the islands with responsible individuals.

Based on preliminary evidence, some of the children who have been taking their medication appear to be responding favorably by showing an improvement in growth and development. In particular the 2 boys who were most dwarfed have shown a definite spurt in growth in the past year.

A thyroid survey of some 100 unexposed Rongelap people and about 90 Utirik people was carried out this year. This house to house survey included careful neck examinations. No evidence of any unusual thyroid abnormalities were detected in these people.

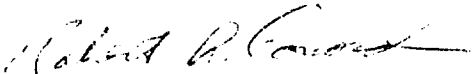
Status of Body Burden of Radioisotopes in the Rongalapese. It was encouraging that radiochemical urine analyses during the past year of the people living at Rongelap revealed that the body burdens of the 2 major isotopes ^{90}Sr and ^{137}Cs are apparently diminishing. Analyses of urine from the present survey will not be available until later. Also encouraging is that the level of these isotopes in the coconut crab is apparently reducing. Since this is a delicacy among the people it is hoped that before long permission can be given for them to eat the crabs.

The more precise measurement of some of these isotopes by whole body counting procedures has not been carried out in several years. This type of analysis may be repeated in the next few years. If the Bikini people should be moved back to their home island perhaps such an analysis could be carried out on both peoples during the same survey.

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Attitude of People. During the 1968 survey the Rongelap and Utirik people were most friendly and cooperative. It is a rarity for an individual to refuse an examination. Since they have received their monetary compensation the people appear to be eating more imported foods and also some are buying kerosine refrigerators, motor boats and pickup trucks. During the survey the people enjoyed the movies. The luau, that was prepared jointly with the Rongalapese, was well attended and enjoyed by all.

The 1969 Survey. It is planned that the next annual survey at 15 years postexposure will probably be a full scale survey with complete examinations to include the control population. The thyroid examinations will naturally be an important part of the study including an evaluation of the response to the thyroid treatment. These effects of fallout exposure in the Rongelap people have created a great deal of interest among medical circles and the further course of these developments is of great importance.


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**POPULINE RADIATION-INDUCED AGING AS MEASURED BY IMMUNOLOGICAL CHANGES
IN A MARSHALLESE POPULATION EXPOSED TO RADIOACTIVE FALLOUT**

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Immunological competence was evaluated to test radiation-induced aging in a Marshall Island population of 55 people who had received 175 rads of gamma radiation 15 years before as a result of exposure to radioactive fallout. The results were compared in 150 unexposed Marshallese living on the same island. Electrophoretic studies showed an increase in albumen and significant depression of gamma and alpha globulins in the exposed group. Immunodiffusion studies showed the IgA and to a lesser extent the IgG moieties and also the L light chains were below unexposed levels. These findings were interpreted to indicate reduction in immunological reserves. The tendency was for the depression of these moieties to be relatively greater in the older groups. The percent transformation of cultured peripheral blood lymphocytes following phytohemagglutinin stimulation was found to show depression with age in both exposed and unexposed populations. The results in the exposed however, were not significantly different from those in the unexposed group. Peripheral blood levels of thrombocytes and neutrophils were depressed in the older exposed Marshallese compared with unexposed groups of the same age. In spite of the above findings loss of immunological capacity in the exposed population has not been apparent based on comparison of incidence and severity of diseases in the exposed compared with the unexposed groups.