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SUMMARY OF MEDICAL FINDINGS OF THE 1976 SURVEY OF THE MARSHALLESE
EXPOSED TO FALLOUT IN 1954

A 22nd year post exposure Medical Survey of the Marshallese was carried out March 12- April 8, 1976. The medical team personnel with affiliations are listed in appendix 1. Accompanying the team to Wotje, Utirik, Rongelap and Bikini were Representative John Haglelgam of the Congress of Micronesia, and a 3 man Japanese TV group (also listed in appendix 1).

Complete physical and hematological examinations were done on all exposed Rongelap people and all unexposed Rongelap people on the control list (about 210 people). Thyroid examinations were done on exposed Utirik people. In addition, in order to obtain better statistics on normal incidence of thyroid tumors in the Marshallese, thyroid examinations (neck palpitations) were done on all available residents of Wotje atoll greater than 15 years of age and on unexposed Utirik and Rongelap people. A number of people were examined and treated at sick call daily by the physicians at Wotje, Utirik, Rongelap and Bikini.

Examinations were done at:

- Majuro - ERDA trailer at hospital; also thyroid surveys in village.
- Ebeye - New ERDA trailer at hospital; also village thyroid surveys.
- Wotje - Village dispensary, village thyroid surveys.
- Utirik - Sick call at ERDA building, village thyroid surveys.
- Rongelap - ERDA trailer, sick calls at dispensary, village thyroid surveys.
- Bikini - Sick calls, dispensary.

Medical Findings:

Of the 86 (including 4 in utero) exposed Rongelap people, 66 are now living; of 157 Utirik people, 116 are now living. There are 149 people now on the unexposed control Rongelap group. This latter group changes somewhat from year to year due to attrition and addition.

General Health:

Complete physical examinations and sick call examinations revealed no unusual numbers or types of diseases compared with previous years either in the Marshallese living in the district centers or outer islands.

Nutrition appeared to be reasonably good with the possible exception of people living on Bikini. Many babies and young children were examined and treated at sick calls on the outer islands. Skin infections, otitis, upper respiratory infections were commonly seen. No deaths from cancer or other causes were reported in the Rongelap people during the past year. Preliminary review of blood counts and physical examinations did not reveal any evidence of leukemia. Venereal disease is not uncommon and sera were collected on all Rongelap people for test for syphilis to be done at the Communicable Disease Center at Atlanta. Gonorrhea is being surveyed separately by the Trust Territory. Skin test for tuberculosis were done on the Rongelap people. The prevalence of positive reactions was somewhat lower than expected (19%). As previously noted diabetes (middle age onset type) is prevalent and a number of glucose tolerance tests were run as a continuation of this study.

Reading glasses (a gift of "New Eyes For The Needy") were distributed at Utirik, Rongelap and Bikini and were gratefully received by the people. Tooth brushes were distributed to all individuals on Utirik and Rongelap and a Peace Corp representative on each island promised to instruct the people in their use.

Thyroid Findings:

Table 1 summarizes the thyroid findings to date. Examinations this year revealed one new thyroid nodule in a 36 year old exposed Rongelap woman and 3 new ones in exposed Utirik people (male 36, females 56 and 59). The Rongelap case and the two Utirik cases will be brought to BNL in the near future for examinations and possible surgery. The other new nodule in the Utirik group will be observed under treatment. Two new nodules were found in the unexposed Rongelap people making a total of 5.3% in that group. These cases will also be observed following hormone treatment. Thyroid surveys of people living on Wotje and unexposed Utirik people revealed an expected prevalence of nodules, 4.4% and 3.6%.

In view of the indications of slightly reduced thyroid function in some of the exposed people without clinical evidence of thyroid abnormalities, a new sensitive test of thyroid function was done by measuring TSH response 20 minutes after an injection of TRH (thyroid releasing hormone) which is now available. Tested were 9 exposed Rongelap with 7 unexposed matched for age and sex, 13 exposed Utirik people in the youngest age group with 8 unexposed controls matched for age and sex. These sera are being analyzed by Dr. R. Larsen at Peter Bent Brigham Hospital.

Examinations at Tripler Hospital:

The 3 cancer cases from Rongelap were examined at Tripler Army Medical Center following the survey. Thyroid studies revealed no evidence of thyroid cancer. In one case (#18, age 42), however, a tumor was noted in the

region of the pituitary gland. There were no obvious symptoms related to this tumor. Since there was no uptake of radioiodine in the region of the tumor it was considered unlikely that it was a metastatic lesion from the thyroid cancer. Since the patient had to return to Rongelap to be with her daughter for birth of her baby she will be brought to the United States for further studies and possible surgery, along with the 3 nodule cases possibly in May.

Attitudes of the People:

On arrival at each island the team was most cordially received by the people who were on hand in large numbers with the customary flower leis. Cooperation in the examinations by the people was excellent.

Village Meetings: Prior to examinations village meetings were held at Utirik, Rongelap and Bikini. At these meetings team members were introduced along with Congressman Haglelgam and the Japanese group. The purpose of the visit was outlined and their cooperation in the examinations requested. Time for sick calls were announced and arrangements were made for movies and party. Gifts for the village were presented (rice, flour, sugar, toothbrushes, soap, towels). At the meetings (2-3 hours long at Utirik) many questions were asked. Almost all of the questions asked at Utirik and Rongelap concerned Public Law 5-52 (hospital benefits for those on our examination list). It was apparent that there was considerable uncertainty about the law and the ERDA-T.T. agreement. At Utirik there was great dissatisfaction expressed that the unexposed Utirik people were not placed on our examination list (to obtain benefits of bill) since the unexposed Rongelap people were on it. At Rongelap there was dissatisfaction expressed that the children of exposed people were not included. Repeated attempts were made to explain to both island groups that the unexposed control list of Rongelap people did not include all of the unexposed Rongelap people; that the control group was established in 1957 to include persons picked to match for age and sex of the exposed Rongelap group; that this control group was as large as necessary; that no children were in the group now since there were no longer any children in the exposed groups; that no exposed Utirik control group was necessary since the Rongelap control group served adequately for both Utirik and Rongelap exposed groups. It is feared that the medical team is being blamed for not including the other groups in spite of explanation that the Law and the agreement were written by the Congress of Micronesia and ERDA and T.T. and not by the medical team. Congressman John Haglelgam unfortunately had not been sufficiently briefed on the situation and was at an disadvantage when questioned by the people. (It was also apparent in meeting with Dr. M. Kumangai and Health Service personnel of the Trust Territory at Majuro that there were many uncertainties in their minds about implementation of the agreement, particularly regarding per diem payments). It would seem that further clarification of the bill and agreement are indicated. Another complaint at Rongelap was that the fruits from their trees were reduced in size and number which they relate to radiation effect. This is a recurring subject which should be clarified.

Bikini Visit:

It had been thought unwise for the medical team to visit Bikini on this survey in view of the Bikini legal suit pending and the earlier adverse criticism by the Bikini people at Kili. However, just prior to the survey the people living at Bikini sent a letter requesting that the medical team visit Bikini routinely and indications were that that group did not share the sentiments of their brethren living on Kili. The people's lawyer, Mr. G. Allen, agreed to the reinstatement of the medical visits. After conferring with ERDA representatives it was agreed that the team should visit Bikini but with careful explanation to the people of reasons for being there.

On arrival at Bikini Island we were greeted warmly and held a meeting with the Bikini people in one of the empty houses. Dr. J. Iaman acted as interpreter. Briefly, the following points were made: 1) We appreciated the confidence of the people in asking us to return. 2) The levels of radiation at Bikini and Enyu Islands are not high enough to constitute a hazard to the health of the people living and working there, and so ERDA sees no requirement for medical examinations or medical monitoring of the Bikini people. 3) Following the Rongelap examinations it is often convenient for the doctors to go to Bikini when our ship is here for survey purposes. When visiting here our doctors are glad to hold sick calls and assist the Trust Territory in general health care of the people. Our doctors do not come here to examine for radiation effects, since there is no need for such examinations. 4) ERDA does have a responsibility to continuing checks on the inhabited islands in order to be sure that things we have done and are doing are effective in keeping radiation exposures to a minimum. These checks include measurements of the soil, air, water, plants, animals and fish. In addition, one of the most effective sensitive checks is a check of the people themselves. Radioactive materials can be detected in the body in such small quantities that they have no significance to health. Using sensitive instruments and taking samples of urine we can find out if radiation is entering the people's body and if necessary make additional recommendations for the people's protection. These measurements have been and will continue to be made on Bikini people who are willing to participate. However, our doctors are not needed to make these measurements. 5) We are here today because you asked us to come and give general medical care to the people. Doctors Knudsen and Kotrady will remain several days to do this. If the people wish we will continue to visit Bikini whenever our doctors are nearby.

Following these explanations there were some questions by the people most of which we believe we were able to adequately answer. Very briefly, some of the questions asked and subjects discussed were: Why has fish poisoning increased since their return? Is this related to the bomb? Why are breadfruit and pandanus restricted? (The people have been eating some); Why were they not told not to eat them on their return? (Lack of availability of such fruits at that time was pointed out). Also discussed were radiation levels on Bikini compared with other areas of the world and urine analyses and whole body counts as an index of internal radiation.

Dr. Knudsen and Dr. Kotrady reported that, though they observed no frank malnutrition, they felt the nutrition of the Bikini people was somewhat deficient mainly with regard to protein, vitamins and possibly trace metals. General complaints of joint and muscle aches may have been related to such deficiencies, though psychosomatic effects of their apprehension regarding radiation may have played a role. Diet, subsidized by the T.T., appeared to be heavy on the starches with less protein and practically no fresh fruit or vegetables. Recently powdered milk has been added to the diet but advice in uses would be helpful. It is recommended that since it is difficult to get fresh fruits or vegetables to Bikini, that ample vitamin supplies be made available to allow for daily tablet distribution to all the people.

Urine samples, rats, chickens and pigs samples were obtained for analysis. In addition, Mr. Greenhouse's group collected water, water catchment sediment, dust samples from houses etc. for analysis.

The Japanese TV Group:

This group headed by Dr. Hayakawa (a surgeon from Tokyo, who had been with us on a previous survey) accompanied the team on the LCU to Wotje, Utirik, Rongelap and Enyu. They were not allowed on Bikini nor were they permitted to take pictures at Kwajalein. They took many sound movies of the medical team in action in the outer islands. They were a pleasant group and interfered as little as possible with the survey. A 50 minute TV movie of the survey will be shown in Japan at 8-9 p.m. on May 20th, Channel 1, NHK (Japanese Broadcasting Company). The group also visited ERDA in Washington and BNL after the survey. We have every reason to believe that the program will reflect favorably on BNL and ERDA. We have requested certain personnel to view the program in Japan and send us reports.

R. A. Conard, M.D.

TABLE 1

Thyroid Lesions in Marshallese, April 1976

Group	Age at exposure	Est. thyroid dose, ^a rads	% Subjects ^b with thyroid lesions	No. subjects with surgery	% Subjects ^b with malignant lesions
Rongelap exposed (175 rads)	< 10	810-1150	89.5 (17/19)	15	5.3 (1/19)
	10-18 ^c	335-810	25.0 (3/12)	1	
	> 18	335	9.1 (3/33) ^d	3	6.1 (2/33)
	All	556 ^e	35.9 (23/64)	19	4.7 (3/64)
Ailingnae exposed (69 rads)	< 10	275-450	33.3 (2/6)	1 ^f	
	10-18	190	0.0 (0/1)	0	
	> 18	135	36.3 (4/11)	3	
	All	217 ^e	33.3 (6/18)	4	
In utero exposed		175+?	33.3 (1/3)	1	
		69+?	0.0 (0/1)	0	
Utirik exposed (14 rads)	< 10	60-95	1.7 (1/58)	1	1.7 (1/58)
	10-18	27-60	9.5 (2/21)	1	4.8 (1/21)
	> 18	27	9.0 (7/78)	3	
	All	50 ^e	6.4 (10/157)	4	1.3 (2/157)
Rongelap unexposed	< 10		0.0 (0/72)	0	
	10-18		15.4 (2/15)	1	
	> 18		7.4 (9/122)	2	
	All		5.3 (11/209)	3	
Likiep unexposed	< 10		0.0 (0/31)	0	
	> 10		4.7 (5/106)	0	
	All		3.6 (5/137)	0	
Wotje unexposed	< 10		3.4 (3/88)	0	
	> 10		5.7 (4/70)	0	
	All		4.4 (7/158)	0	
All unexposed	< 10		1.6 (3/191)	0	
	> 10		6.4 (20/313)	0	
	All		4.6 (23/504)	0	

^a Dose from ¹³¹I, ¹³²I, ¹³³I, and ¹³⁵I plus gamma; mean dose extrapolated from calculations²⁶ for adults and 3-year olds (see Section II).

^b Based on number of people exposed, excluding those in utero (number of cases/total number in group).

^c The thyroid is considered to be fully developed by about age 18.

^d One additional case of adenoma, found at autopsy, not included here.

^e Weighted mean dose.

^f Pathologists differed as to whether this lesion was malignant; it was scored as benign.

APPENDIX 1

MEDICAL TEAM

BNL

R. Conard, M.D.
K. Knudsen, M.D.
K. Kotrady, M.D.
W. Scott
P. Heotis
D. Clareus

NIH

J. Robbins, M.D.

UCLA Medical Center

D. Paglia, M.D.

Congress of Micronesia

Rep. J. Haglelgam

Trust Territory

J. Iaman, M.O.
S. Shoniber
N. Zetkeia
L. Elanjo

Japanese TV Group (Tokyo)

C. Hayakawa, M.D.
M. Hayama (NHK)
Y. Kohno (NHK)

MEMO ROUTE SLIP

Form AEC-93 (Rev. May 14, 1947) AECM 0240

See me about this.
Note and return.

For concurrence.
For signature.

For action.
For information.

<p>TO (Name and unit)</p> <p><i>Dr. Biles</i></p>	<p>INITIALS</p> <p><i>MB</i></p> <p>DATE</p>	<p>REMARKS</p>
<p>TO (Name and unit)</p> <p><i>J. Deat</i></p>	<p>INITIALS</p> <p><i>[Signature]</i></p> <p>DATE</p>	<p>REMARKS</p>
<p>TO (Name and unit)</p>	<p>INITIALS</p> <p>DATE</p>	<p>REMARKS</p>
<p>FROM (Name and unit)</p> <p><i>T. McCraw</i></p>	<p>REMARKS</p> <p><i>Attached for your info and return are two items related to Bikini Resettlement.</i></p>	
<p>PHONE NO.</p>	<p>DATE</p> <p><i>5/3/76</i></p>	

USE OTHER SIDE FOR ADDITIONAL REMARKS

GPO : 1971 O - 445-469

BROOKHAVEN NATIONAL LABORATORY

U. S. 1976

Memo to *Tommy M. O'Neil* Dept.

Thought you might like a summary of crew
summary findings. As you can see we still
have problems.

Perhaps a Behavior booklet would help. I still
think we should not pedal the genetics effort in
children since the Mendelian process continues to the
point. Perhaps we should talk over the Pm findings
at some time in view of the crew findings. - Regards
Bob C.

from Dept.