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Dear Hugh:

As you requested, this is an attempt to summarize some of the many points regarding the Marshallese program that we have discussed on several recent occasions. Many of us have come to realize that political considerations as well as medical indications may heavily influence the course of future activities, so some of the following is written with deference to both.

Regarding past activities, I think that the program could well benefit from a greater dissemination of the enormous body of information that has already been generated. The comprehensive 20-year report compiled by Bob Conard was a tremendous contribution, but extremely important observations regarding probable or possible medical trends, populations in jeopardy, etc., have emerged subsequently and should be promulgated more prominently. This might be accomplished with annual summary reports to update the data already summarized in the Conard report, which could then serve as the definitive reference for background studies. I think it might be even more important, however, to publish more broadly in the general medical literature rather than only in BNL reports that generally aren't distributed as widely. Perhaps detailed annual BNL reports could be issued, and then cited as references in publications in the more open literature. I suspect a number of journals would welcome editorials or brief review articles on the subject, and these would reach an audience largely unaware of the events and their implications (which, in the aftermath of Three-Mile Island, take on added and current significance). A number of diverse medical and radiological meetings could also serve as useful forums for annual presentation and discussion of brief updates.

As members of a relatively closed (i.e., medical) society, I think we also have more than just a tendency to neglect the lay literature. It might be very useful to the program in general to have the public more aware of what has occurred (and is occurring) with the Marshallese. Several good science writers who are widely syndicated could contribute considerably to this end, and a public appreciation might hopefully have a positive influence not otherwise obtainable in Washington. Even brief articles authored by any of us

would probably be appropriate for editorial page publication in major newspapers, since the L.A. Times often carries similar presentations by nonprofessional writers. I don't mean to recommend an extensive crash PR program, but only to suggest that a number of causes could well be served by a consistent and wide dissemination of the findings of these studies past and present and contemplated for the future. It would certainly be to our benefit to put forth informative public presentations rather than awaiting negative reports to which we must react.

As a surgical pathologist (among other avocations), I have personally been puzzled by some of the pathological diagnoses rendered in the past, principally in regard to thyroid specimens. The diagnosis and classification of hyperplastic and neoplastic lesions of the thyroid remains an area of considerable difficulty and controversy, and it is not clear, reading the Marshallese literature, that all of these have been evaluated in a consistent and systematic fashion. This is certainly not to question the ability of the responsible pathologists, many of whom are obviously recognized and respected authorities. Rather it is a reflection of the controversial nature of this area of pathology that some of the diagnostic terms used in some previous reports would not now be acceptable in a number of other, equally prominent, medical centers. For example, on page 44 of the 20-year report it states that "many of the (thyroid) adenomas were papillary, but all except two...were considered benign." In a number of institutions, including UCLA, a papillary tumor of the thyroid is considered malignant by definition, since meticulous and thorough evaluation of such lesions almost invariably reveals at least local invasion.

With this in mind, I would strongly recommend the following: (1) A central repository of all pathological materials (operative reports, photographs, wet specimens, paraffin blocks, slides, path reports) should be established at Brookhaven rather than have these scattered among Tripler, Cleveland, Boston and wherever else they may be. (2) These materials should be reviewed by a number of recognized authorities empaneled specifically to establish consistent criteria for their evaluation and diagnosis, principally the thyroid lesions. (3) A relatively rigid protocol for handling all future specimens should be derived by consensus within the panel and adopted for future specimens.

A related area also deserves to be more thoroughly evaluated in the exposed populations. There is increasing evidence that radiation to the neck region, in doses comparable to those in the Marshallese, is associated with a high incidence of primary hyperparathyroidism, principally secondary to induction of parathyroid adenomas but also because of diffuse hyperplasia. The operative reports and pathologic materials on those patients receiving thyroidectomies or neck explorations should be reviewed with this in mind, and we should consider frequent measurements of serum calcium to detect preclinical hyperparathyroid states. A team member should become proficient in the technique of fine-needle aspiration biopsy, thereby providing the team with a supplementary capacity for in-field tissue diagnosis of any palpable masses, whether they be in thyroid, breast or elsewhere. These techniques are now well established, medically accepted, and, in experienced hands, have very low incidences of false negatives with virtually no false positives.

Any discussion of pathology brings up another point that will become progressively more important. The exposed population now includes many who may soon reach the end of their normal life expectancies, whether the precise causes of death be "natural" or radiation related. It seems paradoxical that we have extended such effort over the past 25 years to detect possible radiation related pathology only to neglect the most thorough of physical examinations possible, the autopsy. The importance of extending our annual physical examinations of these individuals by performing comprehensive postmortem examinations may be obvious to all of us but is clearly not generally accepted by the Marshallese nor feasible with our present facilities. I would strongly recommend first, that we establish a capability to perform such autopsies and second, that we embark on an educational campaign designed to make such an examination culturally acceptable.

There are obvious practical difficulties in such an endeavor: deaths may be unexpected and certainly unscheduled, so they are surely not likely to coincide with field trips by the survey team; communications and logistics are such that inordinate delays between times of death and autopsy may be expected; and local personnel and facilities to perform autopsies are essentially nonexistent. Nonetheless, such difficulties could be overcome if the expected value of the results justifies the effort, as I believe it might. The necessary surgical equipment and fixatives are really minimal and could be stored at Majuro or Kwajalein. Even the performance of autopsies on the outer islands might not be totally impractical. Limited autopsies, concentrating on in situ inspection of organs and judiciously selective tissue sampling, can be performed with minimal intrusion and cosmetic closure, possibly reducing the Marshallese reluctance to allow them. To decrease transportation times, pathologists possibly at Tripler or the University in Honolulu or certainly here at UCLA, could be recruited to be on standby for such activities.

The value of having a West Coast contingent of medical personnel intimately involved with the program clearly extends to numerous other areas. For one thing, it might obviate the need and expense to transport the Marshallese all the way to the East Coast for many diagnostic and/or surgical procedures that could be performed capably at a number of institutions closer and climatically more similar to their native environments. Further, it will become increasingly more important, if the program is expanded to include the Bikini group (and possibly those on other atolls who may have received previously unsuspected exposures), to develop an enlarged and stable reservoir of personnel from which to form the field teams necessary to provide medical and dental care or to continue appropriate clinical investigations. I would propose that consideration be given to a formal BNL affiliation with an institution such as UCLA (or a group of institutions) directed toward this end. It could take any of a number of forms. One that has special appeal to me could be established as a combined educational/public service endeavor that should be attractive to professional personnel with a broad range of experience and expertise. It should be relatively simple in an academic medical environment, for example, to establish elective rotations, clerkships or externships for advanced medical and dental students and residents in several different disciplines which could be supplemented by selected supervisory faculty members. Certainly, much of the routine survey work, such as general physical examinations, could be performed capably by advanced students under proper supervision, and the services of residents with training

In such specialties as pediatrics, gynecology, dermatology, infectious diseases, and general medicine could be invaluable in attacking the medical problems that most commonly plague the Marshallese.

Such a program would provide unique opportunities for students and house officers (as well as interested faculty members) to engage in a form of "ghetto medicine" unobtainable elsewhere. They would be exposed to a broad spectrum of pathology considerably beyond what they generally encounter at UCLA, while simultaneously providing a distinct public service in an unusual setting. Further, (and especially important if the program is soon to be expanded to a significant degree), they would free you and your staff of a large amount of time-consuming routine field work to concentrate on the investigative aspects of the program.

As the program has evolved over recent years, I have noticed that the survey team has really had to perform dual functions: the provision of general medical care and the clinical detection, evaluation and treatment of radiation related pathology. It doesn't necessarily follow that those best equipped by training and inclination to serve in one capacity are necessarily ideal for the other. Sophisticated geneticists, endocrinologists and other investigators who are interested in defining the late effects of radiation are not being utilized optimally if they are burdened with large numbers of routine physical examinations, even though they may enjoy doing them, and I also suspect that examinations by such individuals might not be as comprehensive as those performed by advanced medical students and house staff.

An elective program such as I have briefly outlined hopefully could provide the reservoir of general clinicians that I think we need to free the core personnel for the important clinical investigative aspects, a distinction that will be essential if we assume medical responsibilities for the Bikinians and others on a routine basis. That possibility would of course mean the addition of a substantial control population to provide valid comparisons, so that annual examinations required might number in the thousands rather than hundreds. The advantage of an affiliate elective program is that it should provide a ready, reliable, and flexible pool of clinical talent. If the program is extended, we simply offer the elective to two or more residents in a given discipline rather than one. If particular problems emerge that are deemed worthy of more intensive pursuit, we merely adjust the composition to include personnel from appropriate clinical disciplines. This is essentially what has been done in the past in recruiting physicians for the specific investigations of radiation effects, so a similar approach to the general medical care problems should be equally feasible. The success of such a program would be dependent upon several critical points: (1) Routine field trips must be scheduled rigidly and sufficiently in advance to permit student assignments and in a manner to avoid predictable conflicts with curricula and residency training programs, such as examination periods, National Board exams, and the onset and terminus of academic years when faculty as well as students <sup>and</sup> ~~are~~ trainees are generally committed. (2) Mechanisms for insuring consistent followup care must be established and approved by responsible agencies. As we experienced in the Spring survey, nothing is more professionally frustrating than detecting significant clinical problems in patients only to abandon them to whatever medical resources may be available after departure of the team. Diagnosis

without therapy and without the opportunity for followup observation of cases is not acceptable medical practice. At the very least, continuation of such restrictions could adversely affect the enthusiasm of participants and critically impair the effectiveness of such a program. (3) The physical facilities available for diagnosis and treatment are currently inadequate to deliver comprehensive medical care even to the relatively small number of individuals we are now serving. These might well be the critical deterrent to a significant expansion of the program. The trailers on Majuro and Ebeye are inappropriately partitioned, dimly lighted and ill equipped for their purposes. They, as well as the shipboard facilities currently available for outer island tours, are simply insufficient to serve present or anticipated needs. Perhaps serious consideration should be given to a consolidation: the marginal or inadequate facilities currently maintained on several different islands could well be replaced by an enlarged mobile facility that could be used at all the islands, including Majuro and Ebeye. The initial financial outlay for an appropriately modified ship should be balanced eventually by savings in transportation and maintenance costs, more efficient use of personnel, and by obviating the need to transport Marshallese patients to examination centers (often by unreliable means). It would make virtually every atoll and island accessible to the biomedical team and would provide an identity not necessarily comparable to the S.S. HOPE but nonetheless effective.

Currently, there is an extensive reduplication of fragmentary medical efforts in Micronesia. Facilities of varying capabilities are staffed by personnel from Trust Territories, Peace Corps, military, Micronesian, medical evangelist organizations and others besides our own. One cannot help but be impressed with how much more effective these efforts would be if consolidated toward their common purposes. A serious shipboard facility could serve as a focal point for such a consolidation, and personnel who currently provide individual medical care in one form or another could be more effective if incorporated into the team. It will become progressively more important, however, to define clearly the roles of participants and how they are expected to contribute to the dual missions of biomedical teams; i.e., the provision of continuous general medical care and the detection and scientific investigation of radiation related clinical problems as they may emerge. This duality of purpose should be emphasized both in the planning and staffing of future surveys.

Finally, I would like to address a point that, as physicians concerned with the health of welfare of people, we cannot ignore. Recently, Rissa Bernstein, the Peace Corp health representative on Ebeye, passed through Los Angeles on leave and discussed some of the problems she had encountered. In the two weeks prior to her departure, she was aware of four suicide attempts on Ebeye, all in teenagers, two of which were successful. The primary medical problems in the Marshallese are clearly not radiation related; they are dental, alcoholism and suicide, the latter constituting the leading ~~course~~ cause of death in young Micronesian men.

The sociological effects of outside influences (not necessarily American, but in large part) on the Micronesian cultures have been profound. They should be recognized and, if possible, remedied - not by pouring in more

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government funds, which in my opinion has been the major cause of many of these disasterous effects. As a former naval officer aboard a ship whose mission once was to protect Micronesian fishing grounds from Japanese intrusion, I had to be profoundly impressed by an incident on Majuro last May when we found our favorite grilled tuna sandwich unavailable because the Trust Territory ship had not yet delivered the shipment of canned tuna from Japan - tuna undoubtedly harvested from the fertile seas surrounding that very island.

Similar contrasts were evident to many of us on field trips back in the mid-sixties. Visitors to Utirik, where the population did not receive indemnities for radiation exposure, were impressed with the civic pride, care and participation of the natives, their industry in farming and fishing, the craftsmanship of their canoes, etc. Simultaneously, a short distance away, Rongelap had the early stigmata of a ghetto. The \$11,000 indemnity granted to each exposed individual had caused palpable effects. Fiber glass boats with twin Evinrudes had replaced outrigger canoes, and these were not often used for fishing. Purchases from Trust Territory ships had replaced farming and fishing, and a society was converted from self-sufficient bartering to a currency-based economy - in an environment where currency generating jobs are minimal. Of 17,000 paid positions in Micronesia, less than 5,000 are outside of government supported institutions.

The Marshallese may never be able to recover effectively from this cultural intrusion and economic conversion, but the problem deserves serious investigation by competent, interested professionals. Perhaps we should consider inclusion of sociologists and psychologists as well as epidemiologists in future teams. Certainly the problems should be emphasized in appropriate forums, and care should be taken not to compound them. In many ways, the Micronesians have been harmed by misguided, albeit altruistically motivated, outside influences. The problems now are not easily soluble, if at all, but, at the very least, they deserve recognition and attempts at correction.

I realize that these points have been set down in a somewhat rambling fashion. Certainly they should not be considered in order of importance. If you would like amplication on any, please let me know. I hope that some will be useful.

With warmest personal regards,

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