"For the good of mankind": The legacy of nuclear testing in Micronesia

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Abstract

US government research on the health effects of exposure to radiation from nuclear weapons involved gross violations of the human rights of people in the Marshall Islands. In all likelihood, fallout from US nuclear weapons testing in the Pacific was deposited on other Micronesian islands. The US government should release the classified data it possesses on the history of nuclear testing, fallout patterns, and the effects on the people of the Marshall Islands and the rest of Micronesia. Health workers should work to ensure that nuclear-armed states fulfill their treaty obligations to pursue negotiations toward the elimination of nuclear weapons. As a matter of social justice, in order to ensure the human right to health, the federal government should extend Medicaid eligibility to all Micronesian people from the Compact of Free Association nations.

Introduction

Since the first use of nuclear weapons in war at the end of World War II, efforts by the US government to test the effects of these weapons on humans have run roughshod over human rights. The example of US nuclear testing in the Pacific Islands is instructive. In the wake of the World War II, extensive nuclear testing was performed in the Marshall Islands in Micronesia. Nuclear fallout is a known risk factor for cancer and other adverse health outcomes in populations exposed to it. However, the long-term effects of this testing is controversial. This article examines the health consequences of US nuclear testing in the Marshall Islands, the impact of which have been underestimated by the US government.

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Antecedent radiation studies in Hiroshima and Nagasaki

In the aftermath of World War II, the US government created the Atomic Bomb Casualty Commission (ABCC) to study the health effects of radiation in Hiroshima and Nagasaki, the Japanese cities on which the US dropped atomic bombs in August 1945. In 1975, the ABCC was reorganized into a joint US-Japanese effort known as the Radiation Effects Research Foundation (RERF), which has followed those affected ever since. RERF scientists estimate that approximately 1,900 people developed cancer from radiation in Hiroshima and Nagasaki in the decades after the bombings through the year 2000.[1] Compared to the approximately 150,000 to 200,000 people (90,000 to 120,000 in Hiroshima and 60,000 to 80,000 in Nagasaki) who had died by the end of 1945,[2] 1,900 cancer cases is not a very large number.

Because the Hiroshima and Nagasaki bombings represent the first time in history that large numbers of people were exposed to radiation, it must be emphasized that much of what we know about the effects of radiation on humans is based on the work of the ABCC/RERF. Although the products of the explosions in Hiroshima and Nagasaki formed fallout, which came down after the blast in the form of "black rain," the epidemiological and medical mod-

els of the radiation effects of the Hiroshima and Nagasaki bombings have been based on direct exposure to alpha, beta, and gamma radiation from the overhead explosion itself. In Micronesia, in contrast, people were exposed to radiation from the fallout cloud settling on or being taken into their bodies.

Nuclear testing in the Marshall Islands: Castle Bravo and Project 4.1

In the immediate post-World War II period, the US took over Bikini Atoll in the Marshall Islands in order to continue nuclear weapons testing. As recounted by Holly M. Barker,[3] in 1946 US Navy Commodore Ben H. Wyatt told Juda, the traditional leader of Bikini Atoll, that the Americans were trying to learn how to use the atomic bomb "for the good of mankind and to end all world wars." Commodore Wyatt asked Juda for him and his people to sacrifice their island "for the welfare of all men."[3] For the initial kiloton (equivalent to thousands of tons of TNT) range Crossroads tests of 1946, Marshallese on Bikini and nearby atolls such as Rongelap were evacuated. Bikinians did not return to Bikini until the 1970s. Subsequently, they acquired body burdens of radiation so high that they needed to be evacuated again.[4]

As the US developed a new generation of more powerful thermonuclear weapons, the government continued to study the effect of radiation on humans. In November 1953, the planning documents for the Castle series of nuclear tests outlined Project 4.1: "Study of Response of Human Beings Exposed to Significant Beta and Gamma Radiation Due to Fall-Out from High Yield Weapons."[5] Conducted on March 1, 1954, at 15 megatons, the equivalent of 15 million tons of TNT, Castle Bravo tested the largest thermonuclear device ever detonated by the US. It is important to keep in mind that Bravo itself was an experiment. As only the second thermonuclear test carried out, its yield had been predicted to be 6 megatons, but the actual yield was 15 megatons.[6] In the 1950s there was public discourse about the "humanity" of thermonuclear weapons that would use "clean" fusion. Devices such as Bravo, however, produced massive quantities of radioactive fallout. Weapons using fission alone are limited in size because any single fission weapon cannot contain more than a critical mass of plutonium or highly enriched uranium. However, a fusion reaction can produce fast neutrons, which cause unenriched uranium to undergo fission. The fusion core of Bravo was encased in one ton of unenriched uranium. In fact, 10 megatons of the 15-megaton yield was from fission.[7]

Bravo was detonated at Bikini, and winds took its fallout toward populated islands to the east. Fallout fell most directly on approximately 65 people on Rongelap Atoll, 17 or 18 Rongelapese visiting Ailinginae, more than 150 people on Utrik Atoll, 23 Japanese fishermen on board the Fukuryu Maru, and 28 US military weather personnel on Rongerik Atoll.[8,9] Lesser amounts fell on other atolls as well, most notably Ailuk and Likiap.

Navy radiobiology research physicians Cronkite, Conard, and Bond – assigned to the original Department of Defense/Atomic Energy Commission (AEC) medical team that made up the staff of Project 4.1 – were gathered within days of Bravo.[8] All three were subsequently involved in long-term medical surveillance at Brookhaven National Laboratory on Long Island. As the people of Rongelap were the most heavily exposed, followed by the people of Utrik, the residents of the two atolls were recruited for a US government medical program. The medical program followed the radiation-exposed people together with a "control population" of unexposed Rongelapese and Utrikese people who were not in the Northern Atolls on March 1, 1954.[8]

In contrast to the mostly overhead, line-of-sight radiation exposure in Hiroshima and Nagasaki, the fallout from Bravo fell on Rongelap and Utrik, contaminating people's food and cooking utensils in addition to settling on their bodies, leading to radiation exposure in a range believed to be potentially lethal even by radiation experts today.[10,11] Many experienced acute radiation sickness. Radioactive particles falling to the ground also caused long-term health effects, as people were exposed by eating plants that grew in the contaminated soil as well as animals consuming those plants.

As a consequence of nuclear testing at the Nevada Test Site on the US continent, dairy cows ate grass contaminated with radioactive iodine, I-131. The cows produced milk that was consumed by

children. In the children's bodies, the I-131 was concentrated by the thyroid gland. As the I-131 decayed, it released radioactivity within the thyroid gland, inducing mutations that led to thyroid cancer. In 1997, a National Cancer Institute report cited estimates that 11,300 to 212,000 excess cases of thyroid cancer, with a median estimate of 49,000, would be produced by nuclear testing at the Nevada Test Site.[12]

The half-life of radioactive isotopes varies widely. Iodine, for example, has a half-life of 8 days while strontium-90 and cesium-137 have half-lives of 29 and 30 years, respectively. Other radioactive elements have half-lives of thousands of years. Plutonium-239, for example, has a half-life of 24,100 years. While there is no dairy farming in Micronesia, coconut crabs, (considered a delicacy in the Pacific Islands) concentrate strontium-90 in their shells, which the crabs eat as they molt.

After they were told that it was safe to move back to Rongelap in 1957, "exposed" and "unexposed" test subjects of Project 4.1 returned home and ate locally grown food. By 1961, body burdens of cesium-137 were "300 times that of the medical team."[13,p47] With regard to Utrik Atoll (further downwind from Rongelap), in a 1956 research planning meeting of the AEC Advisory Committee on Biology and Medicine, Merril Eisenbud, the director of the AEC Health and Safety Laboratory, noted (as quoted by Barbara Rose Johnston[14]):

> *They had been living on that Island; now that Island is safe to live on but is by far the most contaminated place in the world and it will be very interesting to go back and get good environmental data, how many per square mile; what isotopes are involved and a sample of food changes in many humans through their urines, so as to get a measure of the human uptake when people live in a contaminated environment.*
>
> *Now, data of this type has never been available. While it is true that these people do not live, I would say, the way Westerners do, civilized people, it is nevertheless also true that these people are more like us than mice. So that is something which will be done this winter.*

RERF's ongoing study of the people of Hiroshima and Nagasaki has not detected genetic abnormalities being passed on from atom bomb survivors to their children.[15] While RERF is now conducting DNA studies at the molecular level, no such studies are being conducted in Marshallese people. In the Marshall Islands and perhaps in other parts of Micronesia, we also need to be concerned about radioactive substances continuing to directly affect subsequent generations as they consume food grown on contaminated land.

Human radiation experiments

In subsequent years, as the AEC/Brookhaven project evolved, the Project 4.1 physicians conducted medical experiments on the survivors of Bravo and the other people of Rongelap and Utrik (the "control group") without their knowledge or consent under the guise of following them for their initial exposure to Castle Bravo fallout. From 1961 to 1966, they conducted experiments on Marshallese people utilizing the radioactive agents chromium-51 and tritium in order to determine the physiological handling of radioisotopes by the human body.[13] Presumably the researchers reasoned that since these individuals had already been exposed to radiation and were going to suffer the consequences anyway, it was acceptable to expose them to further radiation. Formerly classified correspondence among the researchers, with their offhand remarks preserved for posterity, was freely available on the Internet until 2004. In one letter from 1961 regarding the tritium-labeled water studies to determine total body water, Dr. Robert A. Conard, the director of medical research at Brookhaven, suggested, "I suppose we could try it on the unexposed people."* Such cavalier attitudes regarding the health and well-being of Marshallese people are clear reflections of racist attitudes.

How much radiation was released by nuclear testing in Micronesia?

* From a letter that was available in 2004 at the Human Radiation Experiments Information Management System (HREX) website, subsequently taken down during the Bush Administration

The total yield of all tests conducted at the Nevada Test Site was one megaton. In contrast, 109 megatons were detonated in 66 tests at the Bikini and Enewetak test sites from 1946 to 1958. (Enewetak, another northwest atoll of the Marshall Islands, was used for nuclear testing beginning in 1948. In 1952, it was the site of the 10-megaton Ivy Mike test, the first thermonuclear detonation.) If the Johnston Atoll and Christmas Island tests are factored in, a total of 152 megatons were detonated in Micronesia from 1946 to 1962.[16]

Robert Whitcomb of the Centers for Disease Control and Prevention estimated that just the 1954 Castle series of tests released more than 4 billion curies of I-131, more than 28 times the total amount of I-131 released by weapons testing at the Nevada Test Site.[17]

How much cancer was caused by radiation in Micronesia?

In Micronesia, the prevailing trade winds blow from the northeast. Bikini and Enewtak are situated in the northwest corner of the Marshall Islands – the locations presumably chosen so that fallout could be expected to head out over open ocean, though this means towards the rest of Micronesia. At the time of the Bravo detonation there a west-to-east wind at the altitude of the fallout cloud that took it in the direction of the populated Northern Marshallese atolls. However, given the sheer amount of radiation released from sum total of the Pacific tests, it is likely that the islands of Micronesia to the west of the Marshall Islands also received radioactive fallout.

The individual paths of every fallout cloud from the Nevada Test Site were tracked very closely by the military as these clouds made their way across the continental US. Presumably, such data exist for the fallout clouds from the Pacific Island tests, but these details have not been released by the US government.

Many Micronesians from other jurisdictions other than the Marshall Islands were also exposed while working on radiation cleanup activities in the Marshall Islands. Thus far, these individuals have been excluded from analyses of the health effects of nuclear testing.[18] In general, we have little data on the morbidity caused by radiation in Micronesian jurisdictions other than the Marshall Islands from the 1940s to the present. Collection of cancer data is hindered by the fact that accurate diagnosis of cancer is contingent on the ability to obtain tissue biopsies; many people, especially in remote districts, have inadequate access to health care, resulting in fewer clinical diagnoses. In retrospect, it is difficult to say with any certainty how much of the burden of morbidity and mortality in Micronesia is attributable to nuclear testing.[19,20] Going forward, the establishment of cancer registries, which are starting to be implemented now, should improve data collection and utility. Steven Simon headed the Marshall Islands Nationwide Radiological Study of 1990-1994, a study funded by the Nuclear Claims Tribunal (NCT), the quasi-governmental body of the Republic of the Marshall Islands dedicated to disbursing compensation for damages arising from the US nuclear weapons testing program in the Marshall Islands. Since 2000, he has worked for the US government at the National Cancer Institute. In an article published in August 2010, Simon, together with his colleagues at the National Cancer Institute, utilized a mathematical model to estimate that among the 25,000 Marshallese born before 1979, there would be a total of 170 excess cancers related to radiation exposure from the Bikini and Enewetak detonations.[21] This is a lower estimate than in a 2004 National Cancer Institute report (a similar mathematical modeling exercise) for the US Senate, which estimated approximately 500 excess cancers related to radiation.[22]

Simon and colleagues estimate that *without* nuclear testing in the Marshall Islands, there would have been 10,600 cancer cases.[19] So, Simon and colleagues are saying that only 1.6% of cancer cases (170/10,600) occurring in Marshallese born before 1979 are due to radiation exposure. It must be kept in mind that this is an estimate derived from a predictive model of cancer occurrence that – on the face of it for those who care for Marshallese patients – seems excessively low. That is to say, if there had been a complete and accurate cancer registry, the number of cancers caused by radiation would certainly be greater than 170. It should be interpreted in light of the US government's vested interest in minimizing the consequences of its nuclear testing.

In assessments by US government scientists, it is now recognized that the Bravo test of 1954 was not the only test that deposited measurable radiation on the Marshall Islands. In fact, Simon and his colleagues at the National Cancer Institute have identified 20 of the 66 tests conducted from 1948 through 1958 as having deposited radiation on both the mid-latitude atolls, including Kwajalein, and southern atolls, including Majuro.[23] Ivy Mike and Castle Bravo are on this list, but no one talks about Castle Romeo (11 megatons) on March 27, 1954, a few weeks after Bravo or Castle Yankee on March 5, 1955 (13 megatons). And what about the other 46 tests? Where did the fallout from those tests go? As noted above, most likely toward the rest of Micronesia. In a 2012 report,[24] Calin Georgescu, the United Nations Special Rapporteur on the implications for human rights of the environmentally sound management and disposal of hazardous substances and wastes, called upon the US government to release the heretofore classified information on the history of nuclear testing in the Pacific, the fallout patterns of the radiation clouds, and the data collected on people of the Marshall Islands and the rest of Micronesia.

We think that the estimate of 170 cases of cancer from radiation in the Marshall Islands is excessively low. Perhaps the problem rests in the excessive reliance of conventional radiation science on models derived from Hiroshima and Nagasaki data. Several scientists associated with the European Commission on Radiation Risk (ERCC)[25] think that radiation causes much more disease than do the conventional radiation scientists. Rosalie Bertell (1929–2012), of the International Institute of Concern for Public Health, in her review of the National Cancer Institute studies, noted that the principal authors, Steven Simon and Andre Bouville, are physicists and that author Charles Land is a statistician who is "largely responsible for estimating the dose response to nuclear radiation at Hiroshima and Nagasaki."[26] Drawing on exposure data from Simon et al., Bertell calculated that the radiation exposure for Marshallese even in the Southern atolls was greater than the maximum amount allowed by the US government at that time. Conventional scientists note that these alarmists do not publish their findings in peer-reviewed journals and call the ERCC report "poor science" that "should not be taken seriously in any deliberations on radiological protection policy and standards."[27] Even the Green Party has distanced itself from the first author of the ERRC report, Chris Busby, who has been accused of selling expensive and useless radiation products and services to the people of Fukushima in the aftermath of the March 2011 nuclear power plant disaster.[28]

How do we tell which cancers occurring now are the result of radiation?

Because thyroid cancer, particularly papillary thyroid cancer, is so radiogenic, we can say with confidence that most of the thyroid cancers in the Marshall Islands, and perhaps to a lesser extent in the rest of Micronesia as well, are attributable to radiation exposure. However, we cannot say with certainty that radiation is responsible for any particular cancer in any particular person. Behavioral factors such as smoking, diet, alcohol use, and betel nut use, environmental exposures, and factors such as obesity and infections also contribute to cancer burden in the region.

Besides cancer, were there other health consequences of nuclear fallout?

Marshallese women report giving birth to many deformed infants. One abnormality, known as "jellyfish babies," is described by Marshallese women as looking like a mass of grapes, and probably represents hydatidiform moles.[29,30,31] Abnormal births described as looking like "peeled grapes" have also been described by women in Utah who were downwind of the Nevada Test Site.[32] In 1990-1991, Glenn Alcalay conducted a survey of 830 women living in the Marshall Islands, comparing pre-1952 and post-1952 data. (The first test in the megaton range was Ivy Mike of 1952.) For the period after 1952, he found a strong correlation between the number of congenital anomalies, stillbirths, and miscarriages and the distance of residence from Bikini. In addition, the incidence of congenital anomalies increased after 1952.[33] The US government, however, has consistently denied that such reproductive abnormalities are the result of nuclear testing.[34]

Radioactive iodine, one of the by-products of nuclear testing, has the ability to destroy normal thyroid tissue in addition to its role in producing mutations that lead to thyroid cancer. Radioactive iodine is used to therapeutically ablate overactive thyroid tissue or to ablate any thyroid tissue that remains in the body after surgical removal of the thyroid gland. For the Rongelapese and Utrikese who were followed by the Brookhaven program, growth lag in children was not initially attributed to low thyroid function since the program lacked the laboratory technology to detect it in its early years. When hypothyroidism was eventually recognized in these populations, affected individuals were treated with thyroid hormone.[8] This, along with the physiologic experiments utilizing radioactive isotopes, is an example of how the findings of the Project 4.1/ Brookhaven/AEC study of Marshallese people have contributed to medical science, raising issues of whether it is ethical to use these findings. While the US government continues to insist that the Marshallese people were accidentally exposed to fallout by the Bravo test of March 1, 1954, the existence of planning documents, outlining Project 4.1, from the fall of 1953 indicates that the exposure of Marshallese to fallout was deliberate and by design.

Diabetes has been shown to disproportionately affect Marshallese.[35] The question has been raised as whether nuclear testing has contributed to the incidence of diabetes among this population. This depends, however, on how the question is posed. Ionizing radiation has not been demonstrated to be a pathophysiologic cause of diabetes. However, the disproportionately high prevalence of diabetes in the Marshall Islands is certainly related to the social disruption caused by nuclear and other weapons testing.[36,37] Micronesia is a strategic asset for the US After the period of nuclear tests on Bikini and Enewetak Atolls in the Marshall Islands (1946-1958), nuclear weapons testing continued on Johnston and Christmas Islands in Micronesia (1958-1962), and nuclear weapon delivery systems testing continues today on Kwajalein Atoll in the Marshall Islands. The Ronald Reagan Ballistic Missile Defense Test Site on Kwajalein Atoll in the Republic of the Marshall Islands has been the target for intercontinental ballistic missile testing and ballistic missile defense testing. The displacement of people by weapons testing has diminished the people's ability to produce staples such as taro and breadfruit. Marshallese have become more dependent on imported white rice and processed foods such as canned meat. Much of Micronesia has witnessed a breakdown of traditional cultural values and an increased prevalence of obesity and alcohol, tobacco, and other drug use. As communities lose their ability to produce their own food, people lead more sedentary lives. This has led to an epidemic of obesity and diabetes throughout the Pacific Islands.

Is there any possibility for compensation for Micronesians affected by nuclear testing?

The US provided the Republic of the Marshall Islands with $150 million in 1983 as compensation for all claims of damage to property and persons.[38] The Nuclear Claims Tribunal in the Marshall Islands compensated individuals for a variety of conditions, mostly cancers of various organs.[39] The amount provided was manifestly inadequate, particularly to compensate for property damage, and the NCT funds have been exhausted.

Micronesians' access to health coverage in Hawai'i

Some decades after the period of nuclear testing, which took place while Micronesia was a United Nations-mandated Trust Territory administered by the US, most of the jurisdictions became independent nations in the 1980s. Under the Compact of Free Association (COFAs), citizens of the Republic of the Marshall Islands, the Federated States of Micronesia, and the Republic of Palau have the right to free entry into the US without a visa. Drawn by the prospect of education, employment, and health care, Micronesians are migrating to the US in increasing numbers, many entering through Hawai'i. According to the US Census Bureau, the official Marshallese population in the US tripled between 2000 and 2010, from an estimated 6,700 to 22,434. Many believe that this is an underestimate. The majority of Marshallese migrants in the US reside in Hawai'i (33%) and Arkansas (19%).[40]

Health services in many jurisdictions of Micronesia are only able to provide basic cancer diagnos-

tic and treatment services. As the cost of US health care is prohibitive, many jurisdictions preferentially refer to the Philippines. However, because the Compacts allow free entry into the US, many with health conditions choose to move to Hawai'i.[41]

The Personal Responsibility and Work Opportunity Act of 1996, part of welfare reform during the Clinton administration, eliminated funding for participation by citizens of the Compact nations in Medicaid. However, individual states were able to choose to include COFA migrants. Initially, the State of Hawai'i had chosen to allow Micronesians to participate in Med-QUEST, Hawai'i's managed care Medicaid program, funding their participation through state funds. In an attempt to cut the State of Hawai'i's budget during the recession, Republican Governor Linda Lingle took Micronesians off of Med-QUEST during the period of July through December 2010 and put them on a severely inadequate insurance program called Basic Health Hawaii. It took a concerted effort on the part of the Micronesian community in Hawai'i, together with allies in the legal and medical community, to have their participation in Basic Health Hawaii overturned in federal court. In his decision, Judge Michael Seabright agreed that Micronesians being excluded from Med-QUEST was a violation of the equal protection clause of the 14th Amendment to the US Constitution.

Appeals regarding the federal legal responsibility to fund health care for COFA citizens carry little weight these days in Washington, DC. When he was in the House of Representatives, Hawai'i's current Democratic governor, Neil Abercrombie, inserted into the House version of the health reform bill that became the Affordable Care Act language reinstating Medicaid for people living in Hawai'i who are citizens of the Compact nations. This language was not included in the final version of the law. As Governor, however, Abercrombie has opposed the mandate to include COFA migrants in Medicaid and his administration appealed Judge Seabright's decision. On April 1, 2014, a three-judge panel of the Ninth Circuit Court of Appeals handed down a ruling that the State of Hawai'i's has no obligation to fund Medicaid for COFA migrants. The plaintiffs' request for a full panel ("en banc") review from the Circuit Court has since been denied. The Attorney General of the State of Hawai'i has announced that coverage would continue until the lawsuit is completely resolved.[42]

There is rampant discrimination against Micronesians in Hawai'i.[43,44] Generally, people in Hawai'i like to congratulate themselves for their post-racial attitudes. However, racism is alive and well in Hawai'i, and the main target of discrimination in Hawai'i are Micronesians. Racism takes a number of forms. Political authorities in Hawai'i point out that Micronesians utilize resources out of proportion to their numbers. The amount that the state spends on services for migrants from the Compact nations is emphasized as part of a demand for more "Compact Impact" federal funds. In the health care system, it is not unusual to hear comments such as these remarks reported in 2007 by a medical student at the University of Hawai'i John A. Burns School of Medicine:

> *Everybody is sick of caring for and wasting their taxes on these people that have no appreciation for what is being done for them and fake their illnesses to stay in the hospital for free food and board…We shoulda just wiped the islands off the earth when we had the chance.*[45]

Preventing nuclear war

As Helen Caldicott taught us, we must "eradicate nuclear weapons because they are medically contraindicated." Her observation is not simply that nuclear war will ruin your day. Rather, her insight is that it is our duty as health workers to work to prevent nuclear war. As Caldicott noted,

> *Rudolph Virchow… said, 'Medicine is a social science and politics is medicine writ large,' and I've realized in this work that the only way to stop the nuclear arms race is to educate the politicians that nuclear war is medically contraindicated and, if they don't believe us, remove them from office for the public health of the people of the world.*[46]

In April 2014, the Republic of the Marshall Islands initiated lawsuits in the International Court of Justice in The Hague against the nine nuclear-armed nations of the world for failing to fulfill their obligations to the 1968 Nuclear Non-Proliferation Treaty,

which requires signatories to negotiate to end the nuclear arms race and for a treaty on their eventual elimination. The nine named countries were the US, Russia, the UK, France, China, Israel, India, Pakistan, and North Korea. A parallel lawsuit against representatives of the US government was initiated in the Federal District Court in San Francisco, California.[47]

All health workers should support this effort to prevent others from suffering the consequences of nuclear weapons that the people of Micronesia have endured. Simply put, preventing nuclear war is good medicine and good public health.

Conclusion

If Micronesians are starting to feel that they and their lands have been sacrificed for the military and marketplace, unfortunately they are not alone.[48] The particular role that Micronesia has played in the most extensive empire that the world has known has been to serve as the proving grounds for its most fearsome weapons. Micronesian people were subjected to experimentation without their knowledge or consent. Their lands were contaminated - and in the future, with global warming, sea level rise, and severe weather – they may be unable to sustain human habitation.[49]

In 1946, the US sought permission from Bikinians to use their islands for nuclear testing. It was proffered that this was God's will and the testing would be "for the good of mankind." Homelands were vacated. Fallout from nuclear testing was deposited on the people of the Marshall Islands and probably the rest of Micronesia. Adverse outcomes resulted not only from the direct effects of radiation, but also from the social upheaval caused by nuclear testing. In concert with the United Nations Special Rapporteur, we call upon the US government to release its classified information on nuclear testing in the Pacific, the fallout patterns of the radiation clouds, and its data collected on people of Micronesia. Together with the Republic of the Marshall Islands, we call upon the nuclear-armed states to comply with treaty commitments to work toward the elimination of nuclear weapons. Whether or not US federal funding for health care for Micronesians is forthcoming, the compelling reason for Micronesians to have access to health care are the simple premises that health is a human right and that all humans should be included "under the rubric 'human.'"[50]

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