

図 15 脱毛発症率による長崎の被曝線量

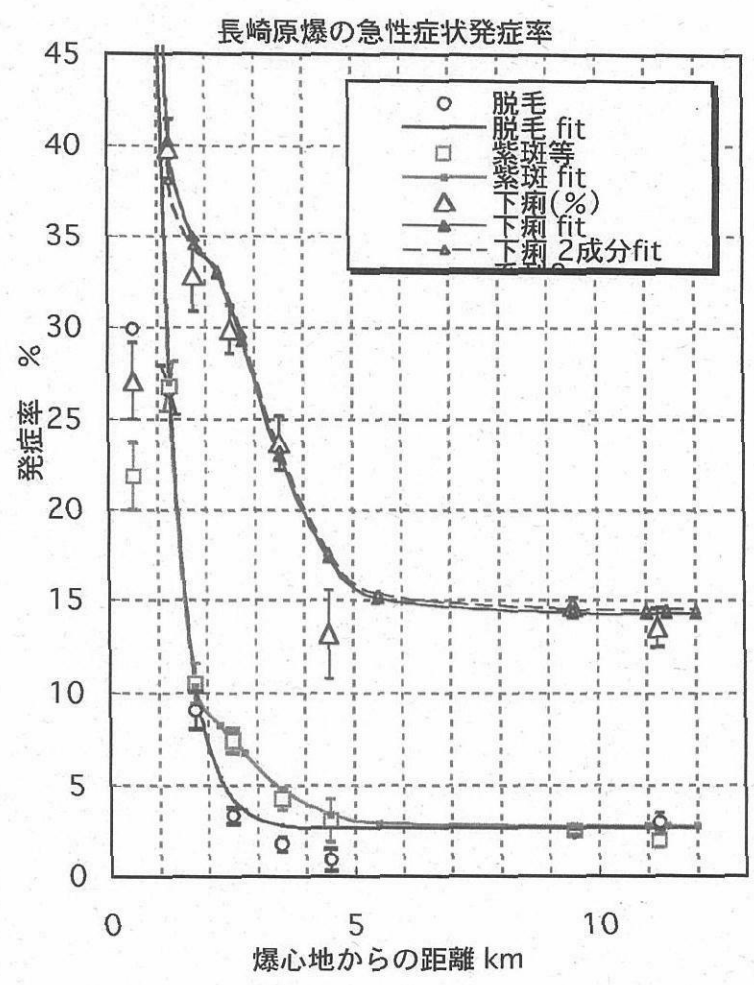


図 16 長崎における急性症状発症率

Cover-up of the effects of internal exposure by residual radiation from the atomic bombing of Hiroshima and Nagasaki

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Abstract

The criteria certifying atomic bomb disease adopted by the Japanese government are very different from the actual state of the survivors. The criteria are based on epidemiological research by the Radiation Effects Research Foundation, the successor to the Atomic Bomb Casualty Commission (ABCC). The ABCC studied only the effects of primary radiation from the atomic bombing on the survivors of Hiroshima and Nagasaki, and ignored the damage from residual radiation. Analysis of the incidence of acute radiation disease, the rate of chromosomal aberrations, and the relative risks of chronic disease among the survivors, shows that the effects of residual radiation from fallout exceeds that of primary radiation in the area more than 1.5–1.7 km distant from the hypocentre of the Hiroshima bombing. The effects of internal exposure due to intake of tiny radioactive particles are more severe than those of external exposure, explaining the difference between the official criteria and the actual state of the survivors.

Keywords: *Atomic bombings, Hiroshima, Nagasaki, Radiation effects, Radioactive fallout, Residual radiation*

Present state of atomic bomb survivors and estimation of radiation effects

Sixty years after the atomic bombing of Hiroshima and Nagasaki, many survivors are still suffering from illness as an after-effect. The Japanese government has provided special medical and livelihood assistance to survivors whose diseases are certified as due to the effects of atomic bomb radiation. However, the criteria adopted by the subcommittee on Atomic Bomb Survivors Medical Care of the Ministry of Health, Labour and Welfare are very strict and far removed from the actual situation of

many survivors. Figure 1 shows the number of legally accepted atomic bomb survivors who hold a health care notebook issued from 1957 and the number of survivors who have been certified by the Japanese government that their illnesses are the effects of atomic bomb radiation on the basis of Medical Service Law for Survivors. After 1980, the number of certified survivors rapidly decreased from more than 4000 to about 2000. This is less than 0.9 per cent of the total survivors and reflects only the official political and financial grounds as represented in the Report of Discussion on Basic Problems of Survivors Administration. Since 2003 there has been a collective lawsuit against the Japanese government by atomic bomb survivors demanding the withdrawal of the rejection of their applications to be certified as suffering from atomic bomb disease. Prior to this collective lawsuit, seven successive judgments, including those of the Supreme Court and two high courts, pointed out that the criteria for certifying atomic bomb disease differ from the actual condition of the survivors, and called for the withdrawal of the rejections. However, in 2001, the Japanese government introduced stricter criteria, introducing probabilities of causation for radiation disease under which even the applications of survivors who had received successful judicial decisions would be rejected. At the end of August 2006, this collective lawsuit involved 188 atomic bomb survivors in 16 local and two high courts.

In May 2006 the Osaka District Court supported the claim of nine survivors that the state's refusal to certify that their illnesses were caused by atomic bomb radiation should be revoked. On 4 August 2006 (two days before the 61st anniversary of the Hiroshima bombing), 41 plaintiffs in Hiroshima, where 49 per cent of the 260,000 Hibakusha who carry health care notebooks live, also won their lawsuits. In his ruling, the presiding judge at Hiroshima pointed out that the contribution of external and internal effects of residual radiation in causing illness needs to be fully examined. The government appealed to the Osaka and Hiroshima higher courts against these decisions on 22 May and 11 August respectively.

The criteria for certifying atomic bomb disease were based on the Atomic Bomb Radiation Dosimetry System 1986 (DS86) and the results of epidemiological research at the Radiation Effects Research Foundation (RERF), the successor to the Atomic Bomb Casualty Commission (ABCC). The RERF epidemiological survey emphasised only the primary radiation (gamma rays and neutrons) emitted within one minute of the explosion, and the effects of residual radiation were not considered. Primary radiation caused acute external exposure – irradiation from outside the human body.

There are two sources of residual radiation from atomic bombs, firstly from matter rendered radioactive by primary neutron irradiation, and secondly radioactive fallout. This latter includes fission products,

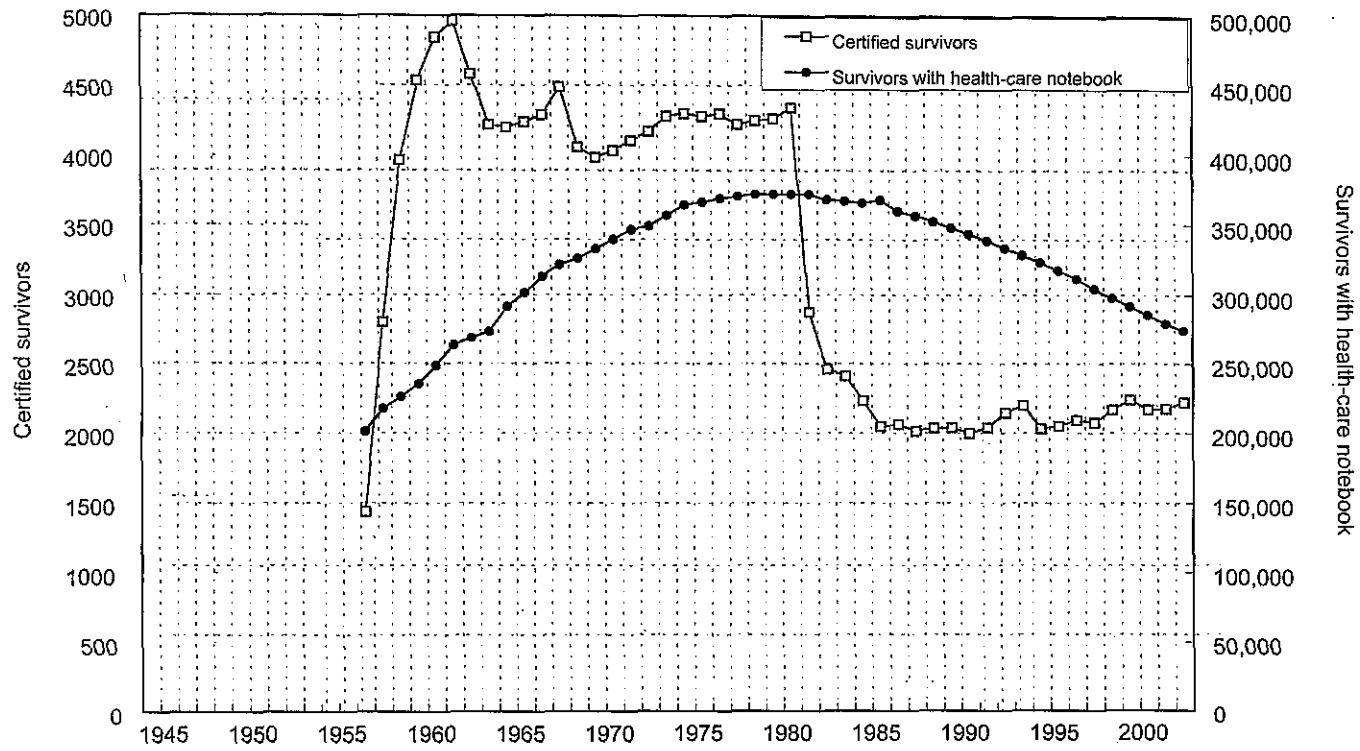


Figure 1. Atomic bomb survivors with health care note and certified atomic disease.

neutron-irradiated material from the structure of the atomic bombs, and unfissioned radioactive materials (uranium or plutonium). The major effects of residual radiation are from chronic internal exposure following intake of radioactive material by respiration or ingestion.

The nuclear-weapon states, principally the United States, have concealed the severe effects of internal exposure, in order to maintain their argument that the harm from nuclear explosions can be restricted. The International Commission on Radiological Protection (ICRP), which has set international standards for radiation protection, has been influenced by the policies of the US and former Soviet Union governments, and has relied on the epidemiological studies of the RERF; its standards of radiation protection are therefore unreliable. To clarify the severe effects of internal exposure from the scientific standpoint is therefore important for the future of humanity.

United States cover-up policy on nuclear effects

Soon after the occupation of Japan by the Allied Forces on 6 September 1945, Brigadier General T. Farrel, of the research commission of the Manhattan Project, gave a press interview. He said that at that time in Hiroshima and Nagasaki all those fatally ill had already died and no one was suffering from atomic radiation. Faced with opposition from the journalist W. Burchett, who had seen the real situation in Hiroshima – 100 survivors dying daily – Farrel's counter-argument denied the facts. He stated that to reduce the risk of residual radiation the bomb was exploded at considerable altitude, making it impossible for there to be radioactivity in Hiroshima at that time. If someone died later it would not be due to residual radiation but to injuries received at the time of bombing. Gen. Farrel was in charge of research on the human effects of radiation in the Manhattan Project, including experiments on the human body, so that he would already be well aware that tiny radioactive particles accumulating in the lung could be fatal.

On 19 September 1945, the General Headquarters of the Allied Forces issued a press code that insisted on strict inspection and control of press reports and literature concerning the atomic bomb, requiring permission before publication of any research on the harmful effects of atomic bombing. In effect it practically banned such publications, beginning the US policy of covering-up radiation damage, particularly of the effects of internal exposure to residual radiation.

The observations of Japanese scientists soon after the bombing and the results of research by the Special Committee for Investigation and Research on Damages of Atomic Bomb established by the Japanese Academic Council were taken by the Americans. Late in September 1945 the US Army and Naval Surgeons' group organised the Joint Commission for the Investigation of the Effects of the Atomic Bomb in Japan, making the

Medical Faculty of Tokyo Imperial University a collaborator. The Joint Commission carried out investigations for about a year; all collected materials were taken back to the US.

Atomic Bomb Casualty Commission and Radiation Effects Research Foundation

The US, by adopting a policy to dominate the world through nuclear weapons, was forced to study their effects, particularly of primary radiation, on the human body, both for offensive and defensive reasons. On 26 November 1946, President Truman ordered the establishment of the Commission on Atomic Bomb Casualties (CAC), which decided to found the Atomic Bomb Casualty Commission (ABCC). After preparatory investigations the ABCC built permanent institutions at Hiroshima and Nagasaki in 1950 and began investigations of the atomic bomb survivors. In interviewing survivors, the ABCC thoroughly examined the sites of exposure (such as indoors or outdoors, and in a thick or thin-walled house) and the position of the survivors at the instant of bombing, in order to estimate the exposure dose to their organs by primary radiation from the atomic bomb. However, the ABCC did not inquire into the behaviour of survivors after the explosion, which is necessary to estimate the residual exposure of the survivor.

Due to the inherently closed character of the ABCC and frequent changes of American expert staff, as well as bad feelings among the citizens of Hiroshima and Nagasaki, the activities of the ABCC became sluggish by 1955. Following the Francis Committee's recommendations, the ABCC restarted the Adult Health Study (AHS) on about 20,000 survivors in 1958 and the Life Span Study (LSS) on about 100,000 survivors in 1959. In 1975 the ABCC was closed and the RERF came into being, but the staff, institutions and projects of the ABCC were passed on to the RERF together with its problems. The character of the epidemiological research in the RERF remained unchanged, ignoring the effects of residual radiation.

The Bikini Incident and studies on radiation damage

The 'Bravo' hydrogen bomb test at Bikini atoll in the Marshall Islands on 1 March 1954 had a major impact on the Japanese people, leading to a nationwide movement against nuclear weapons. The first World Conference against A & H Bombs was held in August of the following year. As a result, many scientists and experts in various fields, such as radiation physics and chemistry, radiobiology and fisheries science, took an active part in the investigation of harm due to the Bikini nuclear tests. They established that the fallout effects of hydrogen bomb tests were spread over a wide region of the Pacific Ocean. These investigations, and other research

by Japanese scientists, showed that the radiation effects of fallout by these nuclear tests were very severe.

Reflecting these findings, the Russell-Einstein Manifesto of 1955 stated the dangers of radioactive fallout:

Such a bomb, if exploded near the ground or under water, sends radioactive particles into the upper air. They sink gradually and reach the surface of the earth in the form of a deadly dust or rain. It was this dust which infected the Japanese fishermen and their catch of fish. No one knows how widely such lethal radioactive particles might be diffused, but the best authorities are unanimous in saying that a war with H-bombs might possibly put an end to the human race. It is feared that if many H-bombs are used there will be universal death, sudden only for a minority, but for the majority a slow torture of disease and disintegration [1].

The year 2005 was the 50th anniversary of the Russell-Einstein Manifesto.

Exposure of Marshall Islanders

Following the Bikini nuclear tests, not only the crew of the Japanese fishing boat, *Lucky Dragon*, and the inhabitants of Rongelap atoll (who were evacuated), but all the people of the Marshall Islands were exposed to radioactive fallout. Despite their heavy exposure they were left unattended for a considerable time. In 1967, the US army returned the inhabitants of Rongelap to their atoll as it was considered safe from radioactivity. However, due to frequent illnesses among the inhabitants, including those not exposed to fallout, they left of their own accord again in 1985. Recently it has been found that the US Atomic Energy Commission, who conducted the tests, had made thorough observations of radioactive fallout during these tests but did not divulge the results to the public.

Even today, half a century later, the inhabitants of Rongelap are forced to neglect their own birthplace. When the Republic of the Marshall Islands became independent in 1989, it concluded a Free Alliance Agreement with the US. This includes compensation for the use of Kwajalein atoll, the largest in the Marshall Islands, as a test site for military missile launches and for the damaging effects of nuclear tests. In the 2004 revision of this agreement, compensation for nuclear test damage was discontinued by the US, which argued that there are no ill effects from residual radiation.

The result of an investigation into abnormal births among Marshallese Islanders [2] is shown in Figure 2. The rate of abnormal births per woman in each atoll of the Marshall Islands decreases with distance from the Bikini atoll. This clearly indicates that the effects from nuclear test fallout extend over the whole of the islands: the average rate of abnormal births in the Marshall Islands before nuclear testing was only 0.04 per

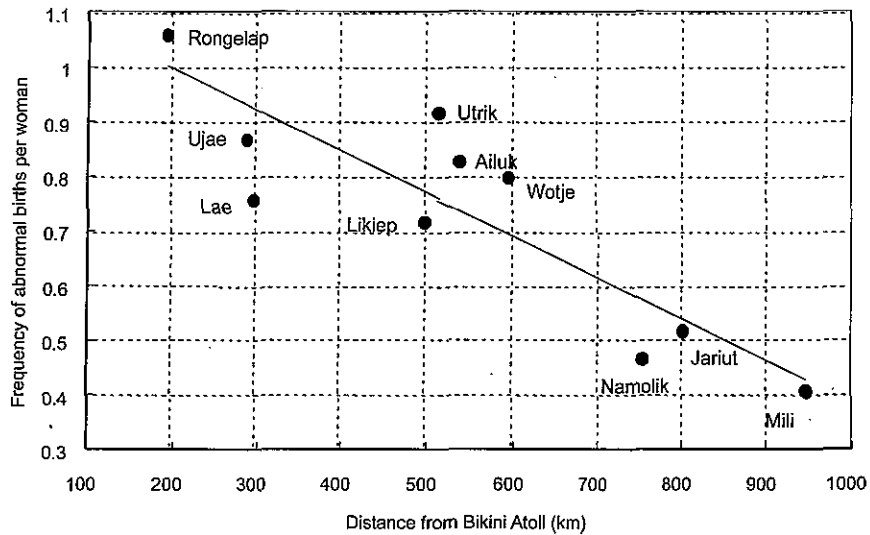


Figure 2. Abnormal birth rates among Marshallese Islanders.

woman. The inhabitants of the severely contaminated atolls, Enewetok, Rongelap, Utrik and Bikini, set up the organisation ERUB on the fiftieth anniversary of the Bravo test and began petitioning for compensation to the US Congress.

Revision of dosimetry system of atomic bomb radiation from DS86 to DS02

For the ABCC and RERF epidemiological studies it is necessary to estimate the primary radiation dose to which the atomic bomb survivors were exposed. The US estimated the radiation exposure, the Tentative Dose 1957 (T57D) and the Tentative Dose 1965 (T65D) on the basis of nuclear tests. The dosimetry system DS86 is the first computer-calculated estimation of primary radiation exposure from the Hiroshima and Nagasaki atomic bombs. DS86 emphasises the primary radiation over a short distance but largely neglects residual radiation from fallout and induced radioactivity.

At present, the Dosimetry System 2002 (DS02), a substitute for DS86, is being prepared for publication. In DS02, to resolve the over-estimate of primary radiation dose at short distances in DS86, the height of the Hiroshima bomb explosion has been changed from 580 m to 600 m and its explosive yield from 15 kt to 16 kt equivalent of TNT. Leaving aside the problem of clarifying the discrepancy between estimated values under DS86 and the experimentally measured values further from the hypocentre, the preparation of DS02 is influenced by US arguments that measurements at a distance involve background effects other than radiation from the