



61st Pugwash Conference on Science and World Affairs
Nagasaki's Voice: Remember Your Humanity
Nagasaki, Japan
1-5 November 2015

Working Group 1 Report: Humanitarian Impact of Nuclear Weapons

Co-conveners: Venance Journé and Masao Tomonaga

Co-rapporteurs: Toshihiro Higuchi, Silene Theobald and Till Weyers

Introduction

During the 61st Pugwash Conference on Science and World Affairs “Nagasaki’s Voice: Remember Your Humanity” held in Nagasaki City, Japan, on the occasion of 70th anniversary of the second atomic bombing, Working Group 1 convened to address the issue of the humanitarian impacts of nuclear weapons, a topic most appropriate to discuss in Nagasaki in 2015, which marks also the 60th anniversary of the Russell-Einstein Manifesto and the 20th anniversary of the Nobel Peace Prize being awarded to Pugwash and Joseph Rotblat.

The working group comprised of 16 professors and professionals in medicine, physics, political science, and doctors as well as an activist from 9 different countries (France, Germany, Italy, Japan, Palestine, Russia, South Africa, the United States and Vietnam). This report reflects different views offered in the working group discussion, but does not necessarily represent all the views of participants.

Most items of the discussion have evolved around the theme of the Conference “Remember Your Humanity”, including the effects of the use of nuclear weapons on the human body, experiences of Hibakusha around the world, ecological and socio-economic effects of nuclear weapons and their deliberate or accidental use, and the inability to respond to a nuclear weapon detonation-related disaster today.

Discussion Summary

Radiation hazards due to thermonuclear explosions featured prominently in the Russell-Einstein Manifesto of 1955, even more than the issue of physical damages. The first Pugwash conference in 1957 mainly discussed effects of high doses as well as low doses of nuclear radiation.

According to the linear non-threshold hypothesis recommended by the International Commission on Radiological Protection, health risk due to radiation increases linearly with the dose whatever the dose rate. There are two points of view in assessing the risk of low doses of radiation. The first one deems the risks from radioactive fallout from nuclear bombs detonated high in air as for Hiroshima or Nagasaki or for weapon testing in the atmosphere as negligible compared with those from radiation sources used for peaceful purposes. In this case, it is considered that the ensuing number of casualties is small and cannot be distinguished from numerous identical illnesses due to other factors such as tobacco smoking. Another point of view considers the cumulative and long term

impacts on a large number of people around the world, which can reach high absolute numbers, in the range of 10000 to 100000 lethal cancers. Although the dilemma between the two points of view about risk assessment was not resolved in the First Pugwash Conference - and is not till now -, Pugwash took a new approach to this dilemma between the relative and absolute measures of risk. It argued that exposure from radiation sources used for peaceful purposes were fundamentally different from that from fallout since the former would bring "great benefits to man", and that it would be possible to reduce exposures from these sources " to levels that are justifiable in the light of the benefits obtained ". In other words, exposure was justifiable only when the source was beneficial and controllable. This is not the case for radioactive fallout. The most important contributions that Pugwash made in this context was therefore ethical in nature.

One participant cited a recent epidemiological study on the cancer occurrence of 300 000 workers in nuclear facilities, in France, United Kingdom and the United States since 1943¹ which favors the linear non-threshold hypothesis according to which the response is proportional to the doses as low as 10 mSv. With accidents such as Chernobyl or Fukushima, this raises several issues as to the possibility of controlling nuclear energy or ensuring that it is beneficial to all, given the large number of persons displaced in both cases. It was mentioned that radiation protection is part of fundamental human rights. The importance of designing a new code of ethics in radiation protection, as was discussed in the first Pugwash conference in 1957, was stressed.

The question as to whether or not it is still valid today to draw a line between peaceful and military uses from the ethical points of view was raised several times. In this context, it was noted that Japan has a large stock of plutonium as waste product from its 52 nuclear power plants. From the point of view of victims of low doses of radiation, how to approach the difference between nuclear testing, nuclear weapon explosion in war, and accidents in the peaceful uses of nuclear energy?

A study on the health effects of radiation on atomic bomb survivors was discussed. Official studies conducted jointly by Japan and the United States on the health effects of the bombing in Hiroshima and Nagasaki have always considered only initial radiation (radiation emitted less than one minute after detonation), and have always neglected fallout and residual radiation, including internal exposure, since they considered, and still consider today, that it was negligibly small. The study presented shows a significantly higher relative risk in leukemia and a few other diseases compared with national averages in the distant regions where the initial radiation could not reach ; the proposed hypothesis is that it would be due to fallout and residual radiation which could have impacted survivors on wider regions. The radiation to which survivors were exposed has been estimated with the incidence rates of acute radiation disease symptoms (epilation) and it was estimated that it was mainly due to internal exposure. In the discussion, it was pointed out that the results are still questionable since the study used questionnaires although a reliable method to obtain the data should be based on clinical observations by physicians. There are similarities between exposure to nuclear power plant accidents and fallout due to nuclear weapon explosion. Since the ICRP radiation protection standard is based on those joint studies ignoring considerable fallout exposure effects, the risks are probably underestimated.

¹ Risk of cancer from occupational exposure to ionizing radiation: Retrospective cohort study of workers in France, the United Kingdom, and the United States (INWORKS) British Medical Journal vol 351, 2015

IPPNW's activities for preventing illnesses due to nuclear radiation were discussed. It was observed that unfortunately, since the end of the cold war, medical doctors pay less attention to the nuclear weapon threat. Among activities aimed at banning nuclear weapons, - the core mission of the organization -, IPPNW participated in 1996 the project to **bring the case of the legality of nuclear weapons to the International Court of Justice (ICJ)** in The Hague. IPPNW together with ICAN again considers to bring this case for legal discussion at the ICJ. Some participants cautioned about this idea since the Court could judge it on the basis of existing legislation : unless there is a new treaty or new legislation, the Court would come to the same conclusion as in 1996. Moreover, the Court gives an advisory opinion which is not legally binding.

Recent studies on the **effects of a nuclear exchange** of 50 bombs each with a yield equivalent to the Hiroshima bomb, for example as could be the case of a nuclear war in South Asia, show that it would result in about 20 million deaths in the first week, lead to large radioactive contamination in the region and global climate disruptions causing great agricultural crises and famines not only in the Asian region but also in wider areas, so that two billions of people could be affected. Such an issue needs a global study to be conducted jointly under the auspices of concerned organizations, the World Health Organization, the World Meteorological Organization and the Food and Agricultural Organization. It should explore all aspects of nuclear weapon use, including nuclear weapon tests. It was stressed that the results of the study should be published independently from the International Atomic Energy Agency. In this regard, the 1959 agreement that binds the World Health Organization, to the International Atomic Energy Agency, giving the latter a *de facto* veto power over all World Health Organization's activities and publications regarding ionizing radiation, should be reconsidered, giving the World Health Organization total independence in publications on all matters related to human health.

Together with the International Federation of Red Cross/Crescent Societies, IPPNW and civil society NGOs such as ICAN were instrumental in promoting **international conferences on humanitarian impact of nuclear weapons**, which were the first ever intergovernmental conferences focused on the actual effects of nuclear war which are now unequivocal and indisputable. The third conference held in Vienna in 2014 issued the Humanitarian Pledge, signed by 116 countries, to seek a new treaty to fill a gap in international law to prohibit the possession of nuclear weapons.

Participants stressed the importance of recalling the **personal experiences of the Hiroshima and Nagasaki hibakushas**, pointing out that these survivors are now getting quite old. The issue of how to convey their experiences to the next generations was also raised. The group discussed the importance of keeping alive the testimonies of all victims from the nuclear tests around the world (Marshall Islands, Semipalatinsk, Nevada, Sahara, Polynesia, Lop Nor) as well as those from the civilian nuclear accidents (Chernobyl and Fukushima) and other activities from nuclear energy industries (uranium mining, plutonium production, etc). It was noted that fallout effects and internal radiation illnesses for hibakushas in Hiroshima and Nagasaki have been categorically denied by the joint studies by the American and Japanese governments, and therefore no medical support was provided to them. Moreover survivors faced social discrimination and their suffering from radiation was also suppressed through censorship.

It is very difficult to get **access to biomedical data** for fallout victims. After the Bikini Atoll

thermonuclear weapon test on 1 March 1954 - which was one of the main events that lead to the Russell-Einstein Manifesto one year later - approximately 1,000 Japanese fishing boats, including the Daigo Fukuryū Maru (Lucky Dragon), were in the area. It is estimated that over 10,000 fishermen were involved. After this test, the United States issued a formal statement denying the effects of radioactive fallout but one year later issued another formal statement admitting the effects of fallout in this case, since contrary to the Hiroshima and Nagasaki bombs, the bomb did not explode high in the atmosphere and the fireball touched the ground. The scientific investigation of the Marshallese victims was done for military purposes. Data was classified. In the instances of Chernobyl and Fukushima also, all data is still not completely available to the public.

Other sites around the world where military nuclear activities took place have been discussed. In Russia, a high level of radiation has been measured in the Altai mountain region about 1000 kilometers downwind from the Semipalatinsk test site. In Israel, there is no public information on the potential health effects of the activities conducted at the Dimona nuclear center. In China, atmospheric nuclear tests were conducted in the 1960s and 1970s at the Lop Nor test site, not far from the populated Xinjiang region. China refuses to open data on the yield of the weapons, however it is known that they were in the range of megatons. It had been reported by a Chinese doctor that the cancer rates in this region were 35 % above average. It was noted that there is a major cancer hospital in Lop Nor. This region includes now some famous sightseeing sites as part of the Silk Road. It is located within 1,000 km from Kazakhstan, and effects in border cities are being investigated. With regards to the victims of the French tests, conducted in the Sahara desert and later in French Polynesia atolls, a small but very effective French NGO, together with the association of veterans, has been instrumental to the passing of a recent legislation offering compensations for atomic veterans. The French government has so far accepted only a handful of the applicants. The association of veterans is still pushing onwards.

Again, in the case of victims from nuclear tests, biomedical information related to radiation victims should be made public [and](#) shared with scientists for independent research and expertise. For example, in the case of China, transparency is very important since large regions could have been affected.

The **Vietnamese experience with chemical weapons** (Agent Orange) was discussed. Suits against Monsanto and other chemical companies to clean up and help victims were not successful. It was pointed out that some effects of chemical weapons are similar to those of nuclear weapons, and that there should be exchanges between survivors in Vietnam and in Japan. It was also pointed out that companies producing elements for weapons of mass destruction should be sued.

Participants discussed the **effects of climate change – sea level rise - as a risk multiplier**, in particular in the case of Runit Dome in the Marshall islands which is a cement-made dome containing debris and contaminated material from the U.S. nuclear tests. Rising sea levels could potentially aggravate the leakage of radioactive materials from the dome.

The issue of **radioactive waste** was discussed. In Russia, there are 18,500 tons of spent nuclear fuel in storage as of 2007. Some containers are corroded and leak. Some are left in open water reservoirs like Lake Karachai, with no computer-aided monitoring. Up to 2007, Russia closed twelve industrial reactors producing weapon-grade plutonium. The Russian legislation ordered that the

safety of waste must be guaranteed for more than 1000 years. Since 2007, there is a federal program for radiation safety with storage improvements and new reprocessing plants are to be constructed. A new technology for extremely long-term disposal of spent nuclear fuel and other high-level radioactive waste was presented. It was pointed out that in other countries, Japan, South Africa, or the United States, the situation regarding nuclear waste is not satisfactory either and transparency is lacking. In Fukushima, huge residential areas are contaminated. Twenty to 30 years from now, there will be no more place to store such large quantities of waste materials. It was suggested that disposal should be added to any new nuclear plant building and operating contract, also as a measure to strengthen non-proliferation policy.

To draw on the momentum of the Vienna conference, a **proposal for the organization of a workshop series exploring the (im)possibility of responding to the challenges of providing an adequate humanitarian response in the event of a nuclear detonation**, either accidental or intentional, was submitted to the working group. A key scenario would be a nuclear exchange between India and Pakistan. These workshops would be organized in cooperation with humanitarian relief organizations and would involve humanitarian professionals from a range of relevant countries skilled in field operation, as well as retired nuclear planners. It was noted that no relief agency has ever said that it would be impossible to respond in such a case. The workshops would examine the possibility of providing relief for victims of nuclear weapons use and for the many people who would become displaced internally or as refugees. The workshops would also examine ways in which nuclear weapon use can be prevented since it would obviously be the only way to ensure the protection of civilians. It was noted that countries which have dropped nuclear bombs (in a war or in tests) have attempted to hide the humanitarian effects. Hibakushas should be involved in such workshops.

The creation of the Research Center for Nuclear Weapon Abolition in Nagasaki, the first in the world dealing specifically with nuclear abolition, was welcomed by the group. There are about 50 students at present, and there is a master's program.

Another issue discussed was related to the **legal gap around nuclear weapons**, on what could be learnt from previous civil society coalitions built to ban specific types of weapons like landmines and cluster munitions. Some participants argued that the distinctive character of nuclear weapons at the heart of national security might make it difficult to adopt such approaches. According to them, it will not go anywhere unless all nuclear weapon states are involved in the negotiations of a treaty prohibiting nuclear weapons. Other participants argued that the legal approach could be one first step to build on for disarmament.

Policy recommendations

The momentum resulting from the discussions on the humanitarian impacts of nuclear weapon use should be kept. Raising world public awareness of the humanitarian impacts of nuclear weapons use is one key element in promoting nuclear disarmament. Working Group 1 recommends the following concrete proposals regarding what Pugwash can bring into the current discussions about the humanitarian impact of nuclear weapons.

- 1) Call upon the governments concerned to increase transparency and make publicly available all

their data on the biomedical and environmental effects of the use of nuclear weapons and of nuclear weapons tests as well as other relevant data on nuclear energy.

2) Call upon international organizations such as the WHO, WMO and FAO to launch research exploring all aspects of nuclear weapon use, including the nuclear weapon tests, independently from the IAEA.

3) Reconsider the importance of radiation hazards, recalling the ethical principles established during the first Pugwash conference in 1957. Pugwash should take the lead

- in the ongoing discussions of - long-term - radiation hazards as part of the humanitarian impacts of nuclear weapons,
- and, as it was proposed in its first Conference in 1957, in the formulation of a new code of ethics in radiation protection in the light of the past experience with civilian use of nuclear power.

4) Contribute in keeping the momentum on the humanitarian consequences of nuclear weapon use by:

- encouraging the creation of a worldwide network of hibakushas (online testimony pooling, international meetings, etc.) and victims of all nuclear activities (military and civilian);
- organizing workshops in cooperation with experts around the world, including strategic nuclear war planners and humanitarian relief organizations, on the required means in order to respond to a nuclear weapons explosion, at different levels of exposure to radiation.

5) Call upon the world's moral and spiritual leaders to host a conference, with hibakushas from all around the world, to discuss the ethical implications of atomic energy use in peace and war.

6) Strengthen the importance of awareness and education, including in the countries which do not possess nuclear weapons or nuclear power plants. In this respect, a UN international day for the memory of all victims of radiation could be established.