

ONE DAY IN HIROSHIMA

-An Oral History-

By Nanao Kamada, M.D



*Dedicated to those who survived the atomic bombings
only to suffer continued fear and anxiety because of the lasting danger from radiation*

May the souls of the departed lie in peaceful repose

*May those still living and suffering be beacons shining brightly so that all humankind
can see the evil of nuclear weapons*

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One Day in Hiroshima – An Oral History

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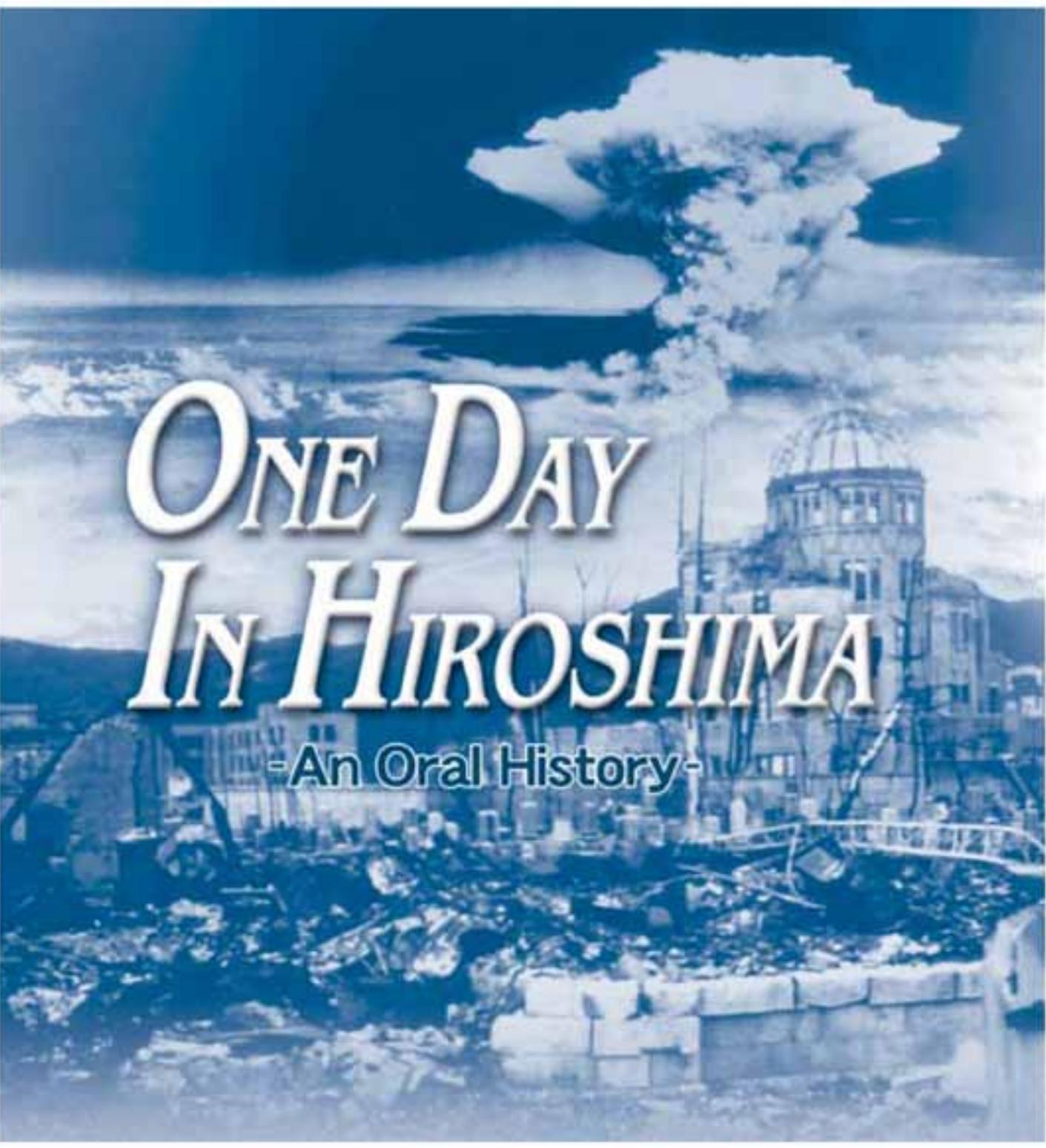
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ONE DAY IN HIROSHIMA

-An Oral History-

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Foreword

Although the dropping of the atomic bomb on Hiroshima and Nagasaki was chosen in a national poll of American journalists in the year 2000 as the top news story of the 20th century, not much is ever said about what it is like for those who experienced and survived the attacks. Furthermore, those countries that now possess nuclear arms continually flaunt their overwhelming military power and use the threat of their nuclear arsenals in order to maintain their economic advantage. Because the nuclear bomb is a weapon of mass destruction with tremendous power to kill indiscriminately, much work needs to be done to limit their numbers and not allow other countries to develop their own.

Having experienced the A-bombing and its suffering, Japan has a mission to convey the reality of the damage caused by nuclear weapons and speak out strongly against them ever being used again. Atomic bombs have the capacity to not only kill masses of people instantly, but they also emit radiation that destroys the genes of people who managed to survive the initial blast. Not only do the bombs cause physical harm, but they also are a source of crippling fear and anxiety to the survivors for the rest of their lives.

At present, the people of Japan have enjoyed peace without having to experience war for over 60 years and there are few countries in the world that can say this. I think we can say that the atomic bombs that were dropped on Hiroshima and Nagasaki were the catalyst that led us to renounce war and establish a new constitution to start the reconstruction of Japan. As a result we have been able to live in peace.

I wrote *One Day in Hiroshima-An Oral History* because although most people are aware there are lingering after-effects from radiation, few know that there are still survivors who continue to suffer from second or third cancers because of radiation damage. It is presented in three parts: “Past,” “Present” and “Future” with many photos and technical explanations to help you get a better understanding. It is an interview of an elderly woman who survived the bombing in Hiroshima and she answers various questions about her life after the attack. Her experiences were shared by many others and I hope this book helps you to understand the actual situation of the survivors. Unfortunately, she passed away before it was published.

It would be my greatest pleasure if this book contributes to peace activities by many people from all over the world. I hope it encourages you to start thinking about what you can do toward building a more peaceful world without nuclear weapons.

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The words or phrases emphasized in bold type in the text are defined in detail in footnotes.

Q1 How did you come to live in this nursing home?

A. When the atomic bomb was dropped on August 6, 1945, I was at my house. I was seriously injured but both my mother and my sister died that day. Later on, after my other sister married, my father and I lived together for many years. However, he eventually died of lung cancer and it was difficult for me to get used to living by myself.

In 1987, when I was 66 years old, I lived in a special nursing home in Hiroshima City. Then, when I broke my leg and was in a hospital, I was lucky enough to join this special home that is especially for A-bomb survivors- people who were exposed to the effects of the atomic bomb when it was dropped. It's been about seven years since I moved here.

How I came to live here begins on that day in 1945. It's a long story, so why don't you get yourself comfortable and let me tell you what happened.



Kurakake Nozomien Home



The Hiroshima A-bomb Survivors Relief Foundation: Based on "The Atomic Bomb Survivors' Support Law" national businesses, Hiroshima Prefecture and Hiroshima City have established nursing homes and are responsible for their operations.

Q1-2 Nursing Homes for the A-bomb Survivors

There are three types of nursing homes for the A-bomb survivors.

- General Nursing Home

A facility which provides care services for those who cannot receive daily care at their homes for physical, mental or environmental reasons.

- Special Nursing Home

A facility which provides care services for those who require constant nursing care, but cannot receive the care at their homes due to significant physical or mental difficulties.

- Short-Stay

A facility which provides short-term care services for those who are cared for by their families, but who temporarily cannot receive care in their home because their families are not available because of accidents, sickness, or travel, etc.

These nursing homes are located in Hiroshima and Nagasaki. The following is an explanation of the facilities in Hiroshima. The first nursing home, the "Funairi Mutsumien Home" was founded in 1970 with a total of 150 residents, where 100 live in a general nursing home and 50 in a special nursing home. Soon after 1970, the "Kandayama Yasuragien Home" was established as a special nursing home for 100 residents. Since a number of people were on the waiting list to enter these facilities, a special nursing home, "Kurakake Nozomien Home" for 300 residents was built in 1992. In 1983, "Funairi Mutsumien Home" was renovated to become a general nursing home which could accommodate 100 residents. Currently, Hiroshima provides the facilities of a general nursing home for 100 people, special nursing homes for 400, and short-stay for 8.

The Hiroshima A-bomb Survivors Relief Foundation is responsible for the business operation of these three nursing homes. As of the end of August 2004, more than 780 people were on the waiting list, hoping to stay in these homes.

Nursing Homes for the A-Bomb Survivors

Established in 1970 Funairi Mutsumien Home For 100 people	Established in 1982 Kandayama Yasuragien Home For 100 people	Established in 1992 Kurakake Nozomien Home For 300 people
 Renovated		
In 1983 		

Q2 Where were you when the A-bomb was dropped?

A. I was in my house in Kako-machi, about nine hundred meters away from the hypocenter, when the bomb went off. At that time, I was in the fifth grade at a girls' school. On the day of the bombing, I was drafted as a volunteer for the government at an arms factory, but I had felt sick and gone home. At 8:00 in the morning the air-raid sirens went off and soon after that the bomb was dropped.

My house was located near Sumiyoshi Shrine, but it and everything around there was completely destroyed.

10 days before the A-bombing



(provided by the U.S. Armed Forces)

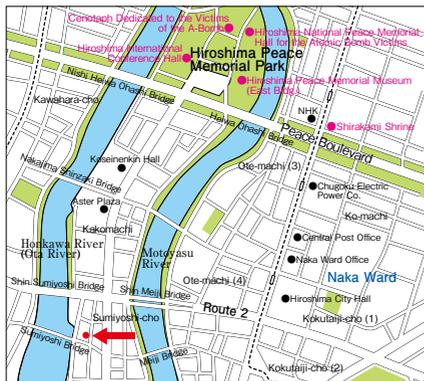
This photo was taken by U.S. Forces 10 days before the A-bombing. The right side of the Sumiyoshi Bridge clearly shows my home. The home was located four doors from the main street.

4 days after the A-bombing



(provided by the U.S. Armed Forces)

This photo was taken 4 days after the A-bombing. Not a house can be seen. (See Q11-2, Q26-2 for pictures drawn by survivors.)



This map shows the current location of my home. (Marked by the red arrow.)

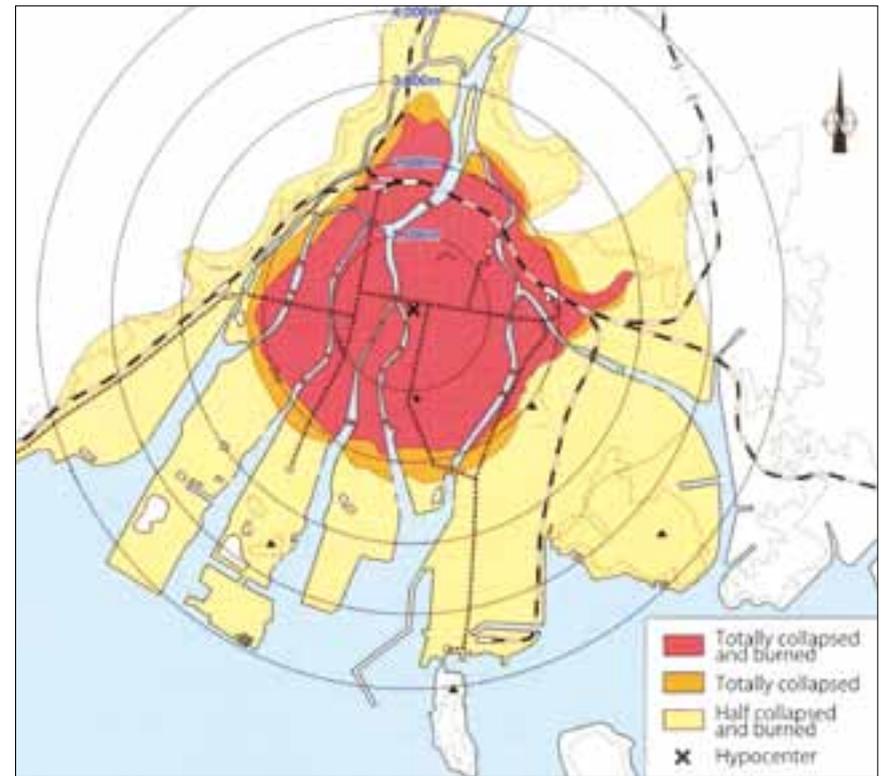
Q2-2 Disaster of the A-bomb

The city of Hiroshima, as a prefectural capital, used to play a key role as the center of government, economy, education, culture, and military. The population was approximately 350,000 and there were 76,000 buildings and houses in the city.

At 8:15, Monday morning, August 6th, 1945, when the students were attending morning meetings and the business people were starting their work, an American military **B-29 airplane (Enola Gay)** came and dropped the atomic bomb on Hiroshima.

Approximately 140,000 people died in the bombing. Almost everything within a 2,000 meter-radius of the hypocenter was completely burned down, with about 50,000 buildings and houses totally collapsed and burned.

The burned area reached approximately 13,250,000 square meters (a thousand times as large as a baseball stadium). Many important public facilities and services were seriously damaged, such as the Hiroshima Prefectural Government Office, City Hall, Hiroshima Station, telegram and post offices, schools, trains, gas and water supply stations.



B29 airplane (Enola Gay): The nickname for the American B29 bomber that dropped the A-bomb in 1945. The plane is currently on exhibit at the Smithsonian's National Air and Space Museum's Steven F. Udvar-Hazy Center near Dulles International Airport in Washington D.C.

Q3 What was your family doing when the bomb went off?

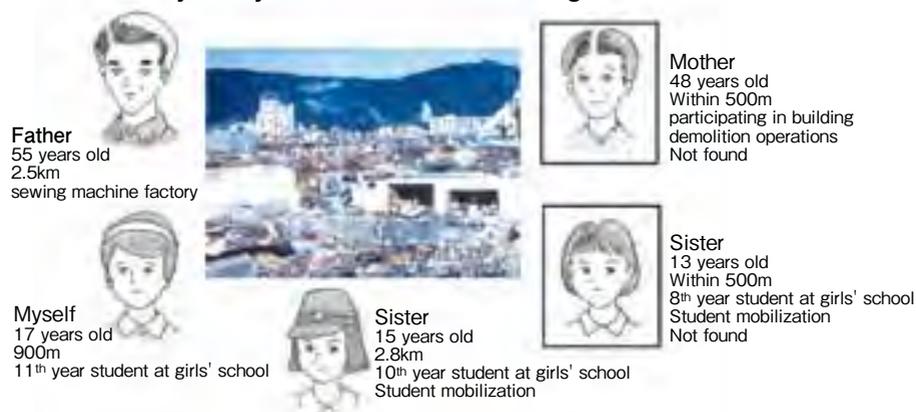
A. At the time of the bombing, there were five in my family: my father, mother, two younger sisters and myself. My father was running a sewing machine factory, where machine parts were delivered to the Clothing Department which manufactured military uniforms during wartime. He was bombed at his factory, two and a half kilometers from the hypocenter, but didn't get seriously injured. My mother wasn't so fortunate. She was attending **building demolition operations** near the hypocenter when the bomb was dropped. My father looked everywhere for her, but he couldn't find her, not even her dead body.

I was at home when my house collapsed. Fortunately, I survived thanks to the window frames knocking me over and propping up the wall, but my entire body was pitted with the shattered glass. Even ten years after that, some pieces of glass were still working themselves out of my body. I also took some extraction operations.

My immediate younger sister was exposed to the bombing while she was working in a **student mobilization** project at a military factory, just under three kilometers from the hypocenter. She luckily escaped serious injury. My youngest sister, a second grader at another girls' school, was also mobilized to work and was in Nakajima-cho, close to the hypocenter when it exploded. She was never found— not even a trace.

The atomic bomb was used for the first time on August 6, 1945 in Hiroshima, but even now, if you were to visit the graveyards of Hiroshima on August Sixth and see them crowded with friends, relatives and descendants honoring the dead in the Buddhist way, you still could not imagine the grief and horrors of that single atomic bomb.

My family at the time of the bombing



Building demolition operations: Destroying buildings for fire control and widening streets for evacuations.
Student mobilization: Everyone, even students, had to work in the war effort doing everything from heavy labor to code breaking.

Q3-2 Disintegration of Families due to the A-bombing

The degree of family disintegration (a situation where a family lacks unity because someone in the family dies or lives away from home) was so significant that the true figure has not yet been clarified. However, the results of collaborative research, "The Campaign to Reconstruct Pre-Bombing Map of the Hypocenter Area,"¹⁾ which was conducted by the **Hiroshima University Research Institute for Radiation Biology and Medicine**, the Hiroshima Central Station of NHK (Japan Broadcasting Corporation), and Hiroshima City, will be informative for this issue.

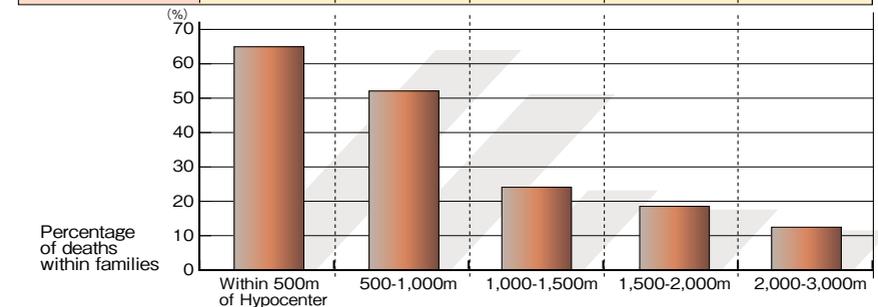
In the table below, the horizontal frames show the distance from the hypocenter and the vertical frames show, in order from the top, the average number of family members according to each family register, the average number of family members at the time of the bombing, the average number of deaths within each family, and the percentage of deaths within each family. Some people lived near the center of the explosion, but happened to be away from home and were exposed to the effects in other towns. Some escaped the bomb by being far away from their homes. Of those who lived within 500 meters of the hypocenter 64% lost family members.

The farther the residences are located from the hypocenter, the smaller the number of deaths within each family becomes.

In the case of the elderly woman on the left page, she was exposed to the effects of the bombing at her home, 900 meters away from the hypocenter. She lost 2 family members out of 5. Many similar cases are considered to have been seen at that time.

Death Rates within Families

	Within 500m (Hypocenter)	500-1,000m (burned area)	1,000-1,500m (burned area)	1,500-2,000m (burned area)	2,000-3,000m (partially-burned)
Average number of registered family members	4.88	4.85	4.78	4.83	4.69
Average number of family members at the bombing	3.54	3.51	3.65	3.89	3.74
Average number of deaths within families	2.28	1.82	0.86	0.72	0.42
Percentage of deaths within families	64.4%	51.9%	23.6%	18.5%	11.2%



Hiroshima University Research Institute for Radiation Biology and Medicine: Established in April 1961 for the "study and application of treatment and prevention of injury caused by A-bomb radiation"

Q4 How does the A-bomb differ from regular bombs?

A. Well, there were huge air raids in Tokyo. Especially on March 10, 1945, thousands of bombs were dropped and about 100,000 people lost their lives. Whole areas of the city were burned to the ground.

We had air raids all over Japan, such as in Yokohama and Nagoya, but the Hiroshima and Nagasaki A-bombs were different from the bombs dropped on other cities. In Hiroshima and Nagasaki, just a single nuclear bomb was dropped. These bombs contained the destructive power of thousands of regular bombs, but were concentrated in one huge explosion.

Hiroshima's bomb also significantly differs from the bombs used in air raids on Tokyo or other cities because it was an atomic bomb. **Genetic** damage due to radiation still remains even sixty years after the bomb was dropped.

Atomic bombs and regular bombs are completely different.



The photo shows Tokyo at the time of the air raids. (provided by the U.S. Armed Forces.)



The enlarged photo of the upper photo, showing burned out urban area similar to Hiroshima. (provided by the U.S. Armed Forces.)

Genetic (Genes): Factors in chromosomes that influence physical features and behavior. The genes are transmitted from parents to children.

Q4-2 A-Bomb Energy

Uranium 235 was used in the A-bomb dropped on Hiroshima, which was equivalent to 15 thousand tons of TNT. Different from other types of bombs, the bomb is characterized by a burst of fierce heat rays and radiation in addition to the initial blast. Of the energy emitted by the explosion, it is said that approximately 50% was in the form of the blast, 35% was heat rays, and 15% was radiation. (See the pie chart below)

1. Blast

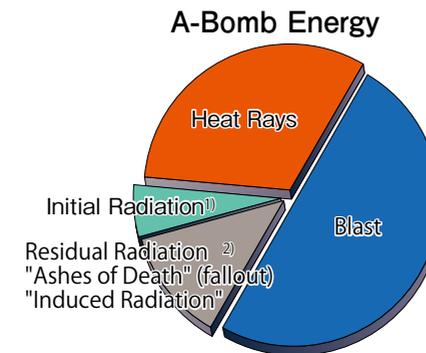
An immense shock wave traveled from the blast. At the hypocenter the blast reached a speed of 440 meters per second. (The location on the ground directly beneath the point where the bomb exploded is called the hypocenter. The point of explosion in the air, 580 meters above the city, is called the epicenter.) In the area of 3 kilometers away from the hypocenter, the speed was estimated to be approximately 30 meters per second.

2. Heat Rays

In the case of the bomb dropped on Hiroshima, the temperature in the epicenter is estimated to have reached several million degrees centigrade. One second after detonation, a fireball with a radius of 200 meters was generated whose surface temperature reached 7,000 to 8,000 degrees. People exposed on the street within 1.2 kilometers from the hypocenter sustained fatal burns. Even at 3.5 kilometers away, people suffered burns on exposed skin, which later caused the development of **keloids** (See Q20).

3. Radiation

The uranium bomb dropped on Hiroshima released massive amounts of radiation, which can be identified as two types. One is the initial radiation (approximately 5% of the total energy) emitted in the air within a minute of the explosion, and the other is the residual radiation (approximately 10% of the total energy) emitted later on the ground for a limited time.



- 1) The base component of initial radiation includes gamma rays (approximately 90%) and neutron rays (about 10%). (See Q5-2)
- 2) The residual radiation is further divided into two additional categories. One is primarily non-fissionable Uranium 235 (fallout) and was called the "ashes of death." It flew in all directions and damaged people who survived the initial explosion. The other is "induced radiation" in which neutron rays interacted with the nuclei of soil or building materials and induced radiation.

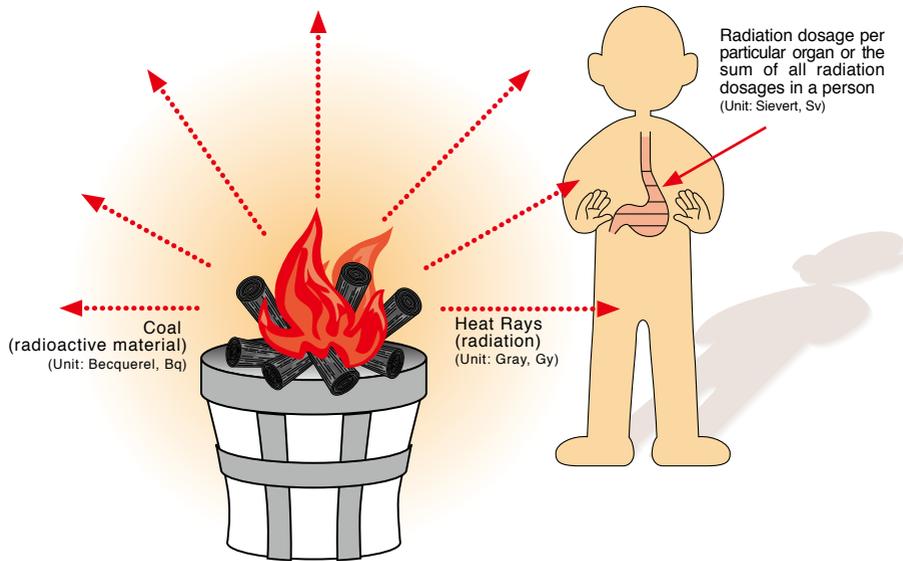
Uranium: A metal element used for nuclear fuel via a chained fission reaction in nuclear energy production. Uranium ore is found in pitchblende and carnotite.

Keloids: Scars from burns or cuts that become swollen after recovery. They have a copperish and shiny color, rubbery hardness, stabbing pain or itchiness. (See Q20 for details.)

Q5 What is radioactivity?

A. Let's use fire from a piece of coal as an example. Suppose the coal is burning red and a person is warming his or her hands over the fire. This person gradually feels warm because of the heat rays produced by the coal. These heat rays are equivalent to "radiation," a flow of very tiny particles. The coal itself is burning with a flame, and this coal corresponds to **radioactive materials**. The burning coal has the property to produce heat rays (radiation), and this property is called "radioactivity."

The unit of the amount of radioactivity is expressed in becquerel (Bq), the amount of radiation in Gray (Gy), and radiation dosage which affects a person's body in Sievert (Sv). In some cases, however, irrespective of radiation types, radiation dosage on a person's skin surface is expressed in Gray.



The property of releasing radiation is called "radioactivity."

The unit of the amount of radioactivity is expressed in Becquerel (Bq), the amount of radiation in Gray (Gy), and radiation dosage which affects a person's body in Sievert (Sv). In some cases, however, irrespective of radiation types, radiation dosage on a person's skin surface is expressed in Gray.

Radioactive materials: Materials which spontaneously release radiation, particularly when the nuclide is not identified or the materials are the mixture of a number of radioactive nuclides.

Q5-2 Types and Properties of Radiation

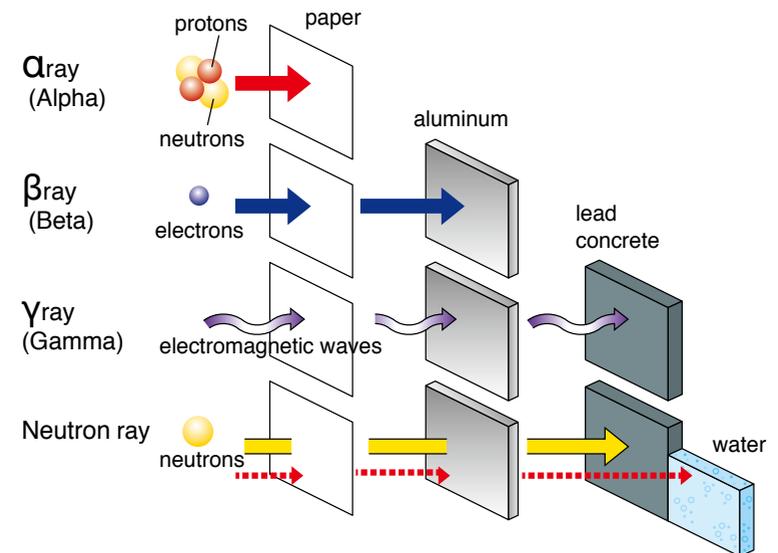
Energy flow exists in the air as electric and acoustic waves. Radiation is a kind of energy flow that travels through space.

The substance of radiation is an atom-nucleus (elementary particle), such as photons, electrons, protons and neutrons. Electric waves and microwaves (as in microwave ovens) are photons that, in a broad sense, can be categorized into the same radiation group. Radiation (ionizing radiation) can ionize air or water when it strikes them.

Below are the types of radiation and examples of their daily use. (See Q33-2)

Type of Radiation and Examples of Use

Radiation Type	Properties	Examples of Use
Alpha ray (α ray)	Heavy particle which carries a positive charge. Blocked below 1 mm within human bodies. Blocked by a piece of paper in the air.	Smoke detectors
Beta ray (β ray)	Light particle (electron) which carries a negative charge. Blocked by several meters in the air and several millimeters within human bodies.	Luminous paint dial
Gamma ray (γ ray)	Electromagnetic wave (similar to lights or electric wave in properties.) The power is weakened by lead plate or concrete.	Cancer treatment, Sterilization
Neutron ray	No electrical particle with a quarter weight of alpha rays. Attenuated by concrete or water.	Non-destructive inspection of shipyard



Q6 Who was the first to discover radiation?

A. When you receive regular check-ups at school, your teacher may say, “You’ll have a roentgen exam (often called an X-ray.) X-rays were first discovered by a person named Roentgen.

It was in the evening on November 8, 1895 at the University of Wurzburg in Germany. A physics professor named Wilhelm Konrad Roentgen was studying **vacuum discharges** in glass tubes which had high levels of vacuity, and he noticed that the photographic plate, which happened to be placed two meters away, was glowing with light.

The emission of this light stopped when he turned off the electricity, so Dr. Roentgen thought something invisible must have been transferred that made the photographic plate radiate light. He named this invisible thing an “X-ray” in the sense that he didn’t know what it was.

In December the same year, when Dr. Roentgen presented this discovery at an academic conference, everyone was surprised and proposed that this new type of ray should be named a “Roentgen Ray” after the finder. But Dr. Roentgen was not happy about the name, and he called it an “X-ray” for his entire life. In addition, someone recommended that Dr. Roentgen obtain a patent, but he didn’t apply for one and said, “An X-ray is not mine but everyone’s.” Thanks to his generosity, this X-ray is still being used all over the world. However, the use of X-rays also caused many people to be sick since the horrifying properties of an X-ray were not known. (See right page.)

In 1901, Dr. Roentgen received the first **Nobel Prize in Physics** for his great discovery.



X ray figure of spine

- Vacuum discharges:** Electrical discharges which occur under low pressure between two electrodes in a vacuum.
- Nobel Prize in Physics:** A prize awarded by the Nobel Foundation, whose founder was Alfred Nobel, a Swedish chemist who invented dynamite and cherished the desire for world peace and scientific progress. The prizes are presented in six categories: physics, chemistry, physiology or medicine, literature, peace, and economics.
- Radium materials:** A metallic element discovered by Marie and Pierre Curie. It was the first known radioactive element.
- Osteosarcoma:** A type of bone malignancy that mainly develops in shoulders or knee joints. It often metastasizes to the lungs.
- Angiographic drug:** A drug used with X-rays, and is injected into blood vessels. The drug is used to diagnose blood vessel disorders or malignancy.
- Nuclear meltdown at Chernobyl:** On April 26, 1986, Chernobyl Nuclear Plant reactor No.4 exploded in the Republic of Ukraine, near Kiev City, in the former Soviet Union. Due to this accident, radioactive materials were dispersed over 82,000 square kilometers of land including neighboring Belarus and Russia.

Q6-2 History of Radiation Damage²⁾

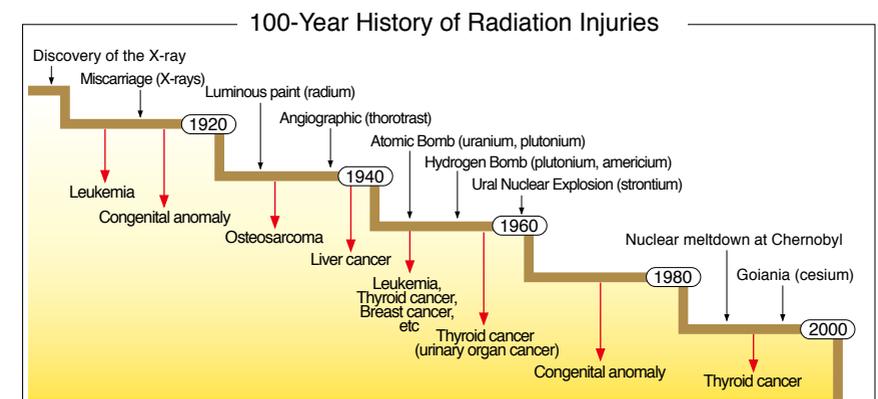
Soon after the discovery of X-rays, it was repeatedly revealed that X-rays cause considerable damage in human bodies. A report in 1898 said that X-rays caused red and swollen skin. A report in 1900 said they generated skin cancer. While another report in 1911 said they caused leukemia.

The figure below illustrates the history of major radiation damage since the discovery of X-rays. The upper portion of the graph shows dates, radiation types and purpose of its use, and below each date the graph indicates damages caused by the radiation.

X-Rays used in abortion, as an alternative to surgery, were not successfully utilized in treatment. Instead, they affected fetuses and caused various birth abnormalities as seen in children with microcephaly. In the 1920’s, it became obvious that many workers who used luminous paint at clock face factories, which used **radium materials**, had suffered **osteosarcoma**. Among the 253 workers involved, 54 (equivalent to 22% of the total workers) died of bone malignancy by 1966. In the 1930’s the radioactive element thorium was being used as an **angiographic drug** for sick and wounded soldiers in World War II. This treatment spread to Germany, Denmark, Portugal, and Japan. Due to the aftereffects, the number of patients with liver cancer and leukemia increased. According to research conducted in Japan up to 1992, of the 264 patients who received angiographic treatment, 69 people (26.7%) died of liver cancer, and 5 (1.9%) died of leukemia.

The radiation damage from the A-bombs dropped on Hiroshima and Nagasaki in 1945 will be explained later, but the total number of immediate deaths in both cities reached a little below 200 thousand. Furthermore, 300 thousand and several tens of thousands, respectively, were exposed to radiation, making the explosions the largest scale radiation damage in history.

After 1950, nuclear and hydrogen bomb tests were conducted on the ground, in the air, or underground, such as on Rongelap Island or in Semipalatinsk, which caused a critical problem for the residents exposed to radiation. In addition, radiological accidents occurred, including the **nuclear meltdown at Chernobyl** and approximately 1,600 accidents induced by radioactive materials for medical use.



Q7 What's the difference between Hiroshima's bomb and Nagasaki's?

A. First, the dates of the A-bombing are different. Hiroshima was bombed on August 6th and Nagasaki on August 9th.

The plane was an American B-29 and the crew originally planned to drop the bomb on Kokura in Northern Kyushu, but they were unable to identify the location due to thick clouds, and dropped it on Nagasaki City instead. Also, Uranium 235 was used in Hiroshima's bomb whereas Plutonium 239 was used in Nagasaki's.

The radiation released at the time of explosion in Nagasaki was mainly gamma rays, but some neutron rays also were emitted in Hiroshima's. The point of explosion in the air (epicenter) was calculated at 580 meters above the ground in Hiroshima, and 500 meters in Nagasaki. According to the report, the power of the explosion was equal to fifteen thousand tons of TNT in Hiroshima, and twenty one thousand tons in Nagasaki.

Comparison of the A-bombs' Characteristics		
	Hiroshima	Nagasaki
Dates of Explosion	August 6, 1945	August 9, 1945
Type of Nucleus	Uranium ²³⁵ U	Plutonium ²³⁹ Pu
Point of Explosion	580±15m	503±10m
Explosive Power	15±3kt	21±2kt



The Little Boy bomb (Hiroshima Bomb)
(Weight: approx. 4 tons, Diameter: 70cm, Length: 3m)
Materials declassified by the U.S. government on December 6, 1960.



The Fat Man bomb (Nagasaki Bomb)
(Weight: approx. 4.5 tons, Diameter: 150cm, Length: 3.2m)
Materials declassified by the U.S. government on December 6, 1960.

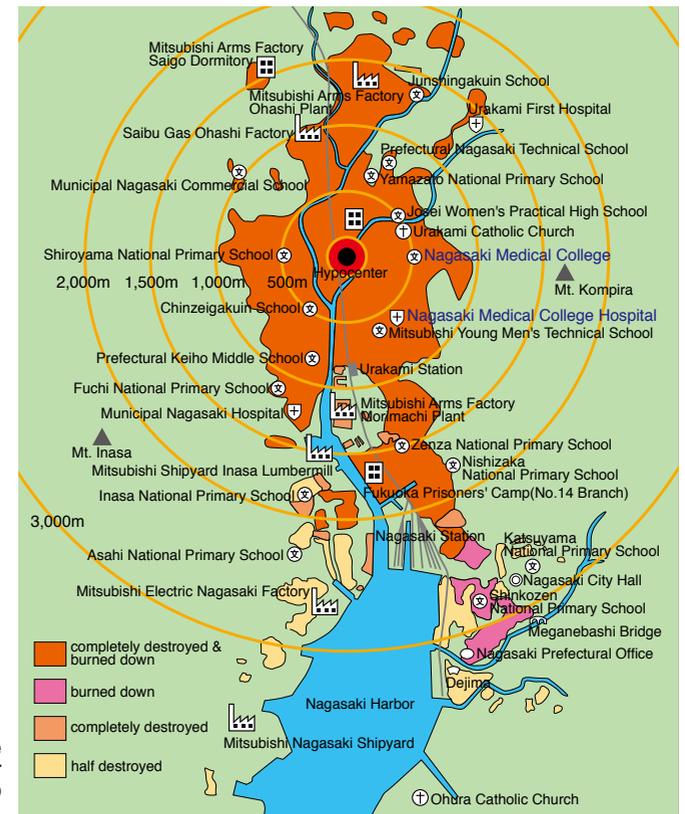
Q7-2 Hiroshima and Nagasaki Bombs' Differences

Uranium was used in the atomic bomb dropped on Hiroshima in contrast to Nagasaki's plutonium bomb. However, there was no major difference in the energy released between Hiroshima's 15 thousand tons and Nagasaki's 21 thousand tons. With regard to the components, Hiroshima's bomb released a larger amount of neutron rays.

The distribution of induced radiation indicates some areas in Nagasaki where radiation accumulated (Nishiyama area) due to geographic conditions.

As for radiation damage to the human body, major gaps have not been identified between Hiroshima and Nagasaki. In Hiroshima, however, there are more people with chromosomal abnormalities, who seemingly look healthy, than in Nagasaki. (See Q21-2.)

Both cities have similar incidences of leukemia, but the types of leukemia suggest Hiroshima has a higher incidence of chronic myeloid leukemia than Nagasaki, with the acute-chronic ratio of 1 to 1. (See Q14 and Q15.) Although this phenomenon has not yet been clarified, Hiroshima's bomb released approximately 10-percent neutron rays together with gamma rays, which may have caused the difference.



The map shows the effects of the disaster caused by the A-bomb dropped on Nagasaki.

Reprinted from "Medical Effects of the A-bomb in Nagasaki" by the Scientific Data Center for the Atomic Bomb Disaster, School of Medicine, Nagasaki University.³⁾

Q8 How many children lost their parents in the A-bombing?

A. Children who lost their families during the war became orphans, called “war orphans.” Among them, those who became orphans due to the A-bomb are called “A-bomb orphans.” The A-bomb orphans included children who lost their parents in the A-bombing, but unfortunately had no relatives to take them in. The orphans also include those who escaped death by having left Hiroshima in a group or with relatives, but lost their parents who had stayed in the city. Other children became **street children** because, even though a parent was alive, the parent couldn’t make a living due to injuries. These poor children were also considered A-bomb orphans. The number of A-bomb orphans has not been precisely calculated, but is said to have been between 4,000 and 5,000.

Let me tell you about my friend’s case. She had nine members in her family. Among them, her parents and four brothers and sisters died in the A-bombing. My friend and her oldest brother survived because of a school evacuation that day. (“School evacuations” were when classrooms of students were relocated as a group to live in the countryside where it was safer.) Her younger brother also survived as he was in the basement of a building. However, being just three children, they could not make a living and eventually became orphans. The oldest brother found a live-in job at a neighbor’s house, whereas my friend and her younger brother were taken in by relatives. However, her brother could not adjust to the life at the relative’s and entered an orphanage on Ninoshima Island.

There are many similar stories like this. The following picture shows the situation of my friend’s family after the bomb. The people in the pictures bordered with black died. It is hard to imagine how one bomb could cause so much suffering.



Street children: Children who did not have regular homes

Q8-2 Facilities for the A-bombed Orphans

Hiroshima City provided a “Lost Children’s Shelter” at the Hijiyama National Elementary School for children who lost their families and were left alone because of the A-bombing. The number of orphans being housed was more than 150.

The “Hiroshima War Orphan Support Center” was established through efforts by teachers and Buddhists “Shinsei Gakuen” and by the “Hiroshima Prefecture Sibling Support Foundation,” both of which opened by the end of 1945. Then, 6 shelters were built as the following table shows, but the occupancy load limit was approximately 600, only 10% of the total need.⁴⁾ The remaining orphans found shelter from the rain and wind at their relatives or by doing live-in jobs at employers’ houses.

The photo at the lower left depicts 5 children from the Hiroshima War Orphan Support Center on route to the ceremony to become Buddhist monks at Nishi Honganji Temple in Kyoto. Eight years later, a grown up and respected priest, reads a sutra aloud in front of his juniors from the orphanage as seen in the lower right photo.

Orphanage (Hiroshima)

as of June 1953

Names of orphanage	Opening	Occupancy load limit
Shinsei Gakuen	Oct. 1945	70
Hiroshima War Orphan Support Center	Dec. 1945	80
Hiroshima Prefecture War Orphan Support Center Ninoshima Gakuen	Sept. 1946	180
Hikarino-Sono, House of Setsuri	Aug. 1947	80
Hiroshima Monastery	Apr. 1948	92
Roppo Gakuen	Jan. 1949	96

Q9 Was everyone A-bombed in this facility?

A. Yes. Only those who were exposed to the A-bomb live here. The A-bomb survivors are categorized in four groups:

- (1) Direct A-bomb Survivors: those who were in Hiroshima City within four kilometers from the hypocenter. (Group One)
- (2) Those who entered the city after the A-bombing to look for relatives or friends and were within two kilometers from the hypocenter by August 20th. (Group Two)
- (3) Those who were exposed to radiation when disposing of the dead or taking part in rescue activities. (Group Three)
- (4) Children whose mothers were in the above-mentioned groups that were pregnant and were delivered by May 31, 1946.

Three hundred A-bomb survivors live in this facility now. The number of Direct A-bomb Survivors is 179, the Second is 97, and the Third is 24.

The map below shows the places where 64 people out of the 179 were A-bombed within two kilometers of the hypocenter. You can see how close some of the people were to the hypocenter at the time of the bombing.



Locations within two kilometers of the hypocenter where 64 residents of this facility were living.

Q9-2 A-bombed Lonely-Elderly

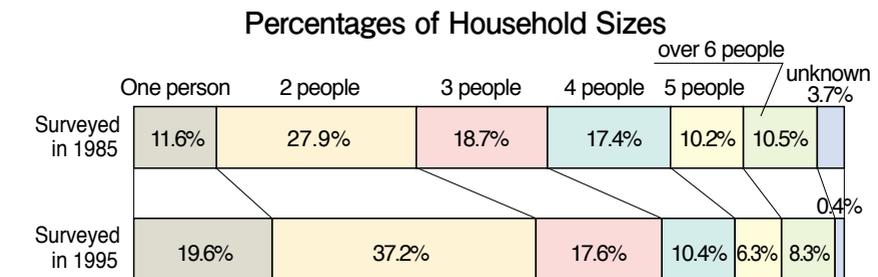
There are some unfamiliar phrases used regarding the A-bombs of Hiroshima and Nagasaki. “A-bombed lonely elderly” is one of them, which can be categorized into two types.

One is the “complete lonely-elderly” and the other is the “semi-lonely elderly.” The phrase “complete lonely-elderly” refers to old people who lost their spouse and children with no relatives. Some of them are bomb survivors and some escaped the bomb due to evacuation. The “semi-lonely elderly” phrase indicates the old who lost family members, except for their grandfather or grandmother and small children and had difficulty living properly. This type of the elderly also includes those who were forced to live alone away from their families after the bombing because of family matters.

According to the Elderly Household Survey as of November 1st, 1985, the bombed lonely elderly amounted to 11.6% in Hiroshima City (households without being bombed showed 3.7%), and 8.2% in Nagasaki City (households without being bombed, 4.7%.) Approximately 8% of the 65-year-olds and older were bombed lonely-elderly. In the 1995 A-bomb Survivors Survey, 19.6 % turned out to live alone, which amounted to about 20% of the total. This survey also shows 37% live with one family member, but most of them are old couples and few live with their children. (See the figure below.) Recently, the number of semi-lonely elderly seems to be increasing.

Sickly lonely-elderly or old couples tend to feel anxiety. There was a period in the past when a number of the old committed suicide. A survey conducted by **the Japan Confederation of A- and H- bomb Sufferers Organization** in June 1975 showed that 31 elderly allegedly committed suicide which were reported nationwide for the five years from January 1st, 1970 to the end of April, 1975. Among them, Hiroshima had 25 suicide victims, 8 of which were lonely-elderly. The major motive for their suicide is said to be the burden of disease.

The Hibakusha aging issue, including the lonely elderly, needs to be supported not only by government economic assistance, but also by mental health support that includes medical and nursing consultation operations and residents’ efforts to talk with or listen to the elderly.



From the Atomic Bomb Survivors Field Survey Report 1995 (Survey of Survivors)

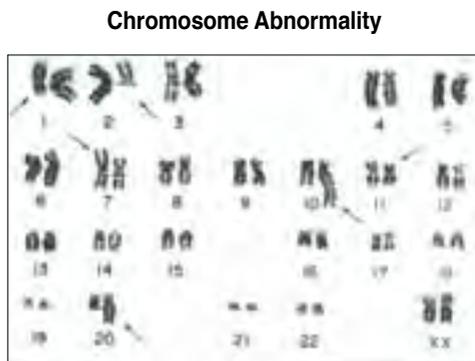
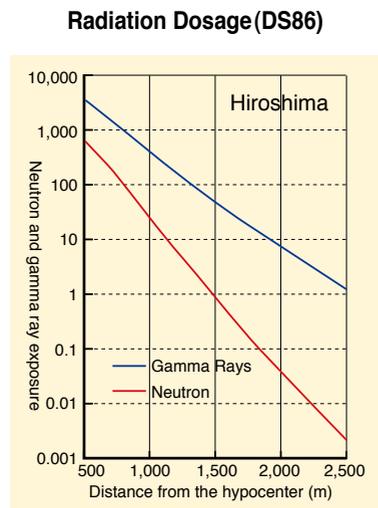
The Japan Confederation of A- and H-bomb Sufferers Organization: Promoting abolition of nuclear weapons, supporting survivors and providing counseling (also known as Hidankyo). The only nation-wide organization for survivors.

Q10 How much radiation were you exposed to?

A. A university professor told me that I had been exposed to an estimated 1,300 millisievert (mSv) of radiation, including both gamma and neutron rays. (See data on page 100.) A researcher once wanted to know where and what kind of building I was in when I was exposed because my house had been photographed from the air by the American army (See picture in Q2), and the exact distance from the hypocenter could be calculated. The radiation dosage of 1,300 mSv is about the same amount as when you have an X-ray on your stomach for 130 times in a row (on a skin dose basis.)

After the A-bombing, I felt nauseous and had diarrhea. I suffered hair loss about two weeks after the bomb and stayed in bed for about three months. This condition is called "acute radiation symptom." (See Q13 and 13-2.)

The picture at the lower right shows a chromosome (see Q21 and Q21-2) and the arrows point to the damaged parts. The graph at the lower left shows the distance from the hypocenter and the radiation dosage (DS86) at that point. You can see that the farther you were from the hypocenter, the less radiation you were exposed to.



Q10-2 Estimation of Radiation Dosage

1. Method of Physical Dose Estimation

The method for physical dose estimation, called the "Dosimetry System (DS86)",⁵⁾ was established in 1986. The DS86 is entirely based on calculations, whereas the previously-used "T65D" method is based on particular experimental data from Nevada, in the U.S. This DS86 ensures accuracy by reflecting the following elements in the calculation formula: first the bomb power, (the Hiroshima bomb was 15 thousand tons), the amount, energy, and angle of radiation released, mechanism of propagation, shielding by buildings, and the degree the radiation reached each human organ. However, the report also states that this calculation formula bears an "uncertainty" of approximately 25%.

2. Method of Biological Dose Estimation

When radiation passes through cells, it damages the cytoplasm and the nucleus. When cells need to be increased in accordance with body needs, the DNA of the nucleus will be doubled and become filamentous chromosomes to be divided into two cells. (In other words, one cell becomes two by cell division. See Q21.) In this process where chromosomes are formed, damaged chromosomes can be identified.

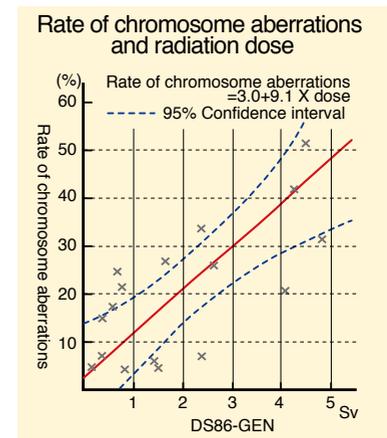
These chromosome aberrations increase with the radiation dose reaching the cells, which means the less the exposure, the less the damage. Thus, the radiation dose can be estimated by measuring the number of chromosome aberrations, which counts the number of "dicentric" chromosomes immediately after the exposure to radiation and the number of "stable-type" chromosome aberrations per 200 cells, 30 to 50 years after the exposure.

The photo at the lower left shows chromosomes immediately after exposure to radiation, in which a lot of abnormality can be verified. The figure at the lower right is a diagram of the rate of chromosome aberrations and radiation dose 30 to 50 years after the A-bomb exposure.

Chromosome Abnormality in Acute Phase



The marked chromosomes show abnormalities.



Dicentric: Chromosome with two or more constricted parts. See the chromosome with a star mark in the left figure.

Q11 What was the city like after the bombing?

A. Well, many people wrote books and spoke about their experiences on video, but I think the experience was beyond description. Read the following text. It describes the wounded people who were brought to a Naval Hospital. It's unimaginable...

"Meanwhile, I heard the sound of a car's horn in the darkness, then a military transport vehicle and a truck arrived. The wounded were crammed in the transport vehicle, but the truck was worse. On the open-top loading space, as many people as possible had been piled on top of each other. I couldn't tell if they were dead or alive. All the people's hair was burned and crimped. Their clothing was ragged and their exposed skin was terribly burned and soaked with blood. As I shined my flashlight over them, I could see countless pieces of wood chips, glass and metal shards stuck into their faces, backs and limbs. I couldn't believe they were human beings. A coal tar-like substance was oozing from every single person's face and body."

"A foul odor struck my nose. It was an odor particular to burn injuries that smells like roasted, dried-cuttlefish mixed with the stench of death. I started to carry one of the piled up bodies. The first person was terribly burned and it was difficult to tell if it was a male or female with only a flashlight. My hands kept slipping because of blood from the person's burns and the coal tar-like sticky liquid. However, I managed to unload the first person. The next person was swollen up with blisters. It was hard to believe that this was a human being. I couldn't tell the person's age, but it was a man. After I carried him down, something gave out a cry. There was a dead baby under him. The baby must have been crushed by the wounded people piled on top of each other while they were going over the rough mountain path. The baby's body was cold." (Masao Shiotsuki, My First Assignment was Mercy Killing – Testimony of August 9, 1945, Kobunsha, 1978)

There are books resources for children and young adults that describe what the city was like after the atomic bomb was dropped . There are even movies and animation on videotape. (refer to p104.)



Around Temma-cho on August.7 (by Fumie Ishikawa) (Hiroshima Peace Memorial Museum)



Nakajima hon-machi on August.8 (by Sagami Ogawa) (Hiroshima Peace Memorial Museum)

Q11-2 Preserving A-bomb Survivors' Memories in Drawings

The Hiroshima Broadcasting Station, NHK (Japan Broadcasting Corporation), conducted a campaign called "The People's Pictures: Drawings of the A-bomb Aftermath" and collected 2,225 drawings by A-bomb survivors from 1974 to 1975.⁶⁾ Twenty-eight years later, in the summer of 2002, NHK, the Chugoku Shimbun and other organizations co-hosted another campaign in Hiroshima and Nagasaki to collect "A-bomb drawings."

In the second campaign, 1,388 and 300 drawings were received from Hiroshima and Nagasaki respectively, making the total number 3,863. The project was triggered when Mr. Iwakichi Kobayashi, a 77-year-old survivor, brought his drawing titled "Around Yorozyu Bridge" to NHK on May 15, 1974. The drawing was striking and had a power that appealed to people's minds. It was telling that there was a spectacle still remaining so vivid in the survivors' minds after almost 30 years. The campaign staff thought of asking survivors to draw the unforgettable scenes they had witnessed as a way to pass their memories down to future generations during their lifetime.

Some of the drawings collected were exhibited in major cities in Japan together with documentary photographs and other articles. It created a sensation and the following words were found in the remarks from the people who saw the exhibition. "Never had I seen an exhibition like this that displayed such unskilled drawings. These drawings stirred my deepest emotions like none ever before."⁷⁾



August 6 (by Yoza Tanaka) (Hiroshima Peace Memorial Museum)



August 7 (by Hiroko Yamamoto) (Hiroshima Peace Memorial Museum)



August 7 (by Ichiro Yamada) (Hiroshima Peace Memorial Museum)



August 7 "Bodies of A-bomb Victims with Bulging Bellies: Floating and Drifting" (by Kenjiro Mukai) (Hiroshima Peace Memorial Museum)

Q12 How was your health after the A-bomb was dropped?

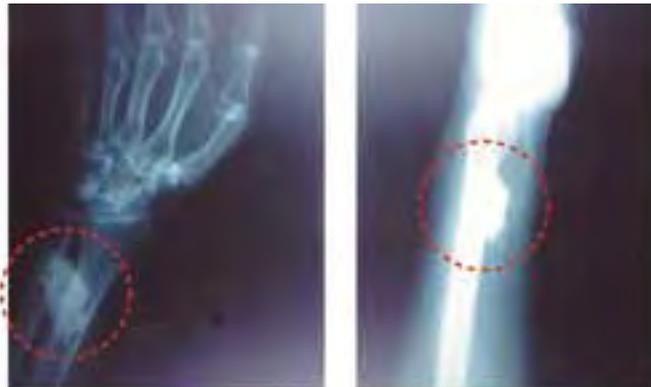
A. I was somehow alive— thanks to the window frame that prevented my house from crushing me— but I was soaked with blood and learned later that pieces of glass had lodged themselves all over my body. My father came to rescue me and took me to a relative's who lived in a town called Itsukaichi. A doctor there who lived nearby came to see me and took out all the bits of glass that he was able to, but I still felt tingling pains. After a couple of years, a piece of glass worked its way out from my skin all by itself. The last one to come out was about ten years after the bombing. Still some remain inside my body.

My aunt would go to the mountain to collect an herb called dokudami and brewed it for me. She always said, "Dokudami is good for your health. Drink as much as you can."

About two weeks after being exposed to radiation, my hair started to fall out. I remember when I woke up in the morning I would always see lots of hair on my pillow. I was mostly in bed for about two years.



Hair loss (material provided by US Forces)



X-ray pictures of a survivor's right arm taken 55 years after the bombing

Q12-2 Acute Physical Disorders

Physical disorders caused by the effects of the A-bomb can be divided into acute disorders (Acute Radiation Symptoms), which developed within 4 months from the exposure to the radiation, and late disorders (late effect), which appeared after that. Acute disorders are furthermore divided into 3 phases.

Phase 1: Two weeks, beginning immediately after exposure to the end of the 2nd week

Death resulting from shock or from burn injuries and by acute radiation exposure.

Symptoms: thirst, weakness, nausea, fever, diarrhea, vomiting blood, blood discharging, blood in the urine (death in about 10 days.) (Dr. Takashi Nagai notes that mental derangement symptoms such as stupor, excessive irritability and, amnesia were also seen.)⁸⁾

Phase 2: Six weeks, from the beginning of the 3rd week to the end of the 8th week (2nd month)

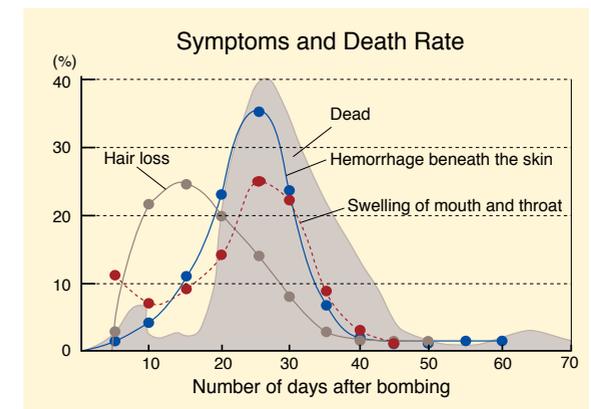
Death by malfunction of bone marrow which generates blood, by ulcerative bleeding from intestines and by bacterial infection

Symptoms: In addition to the symptoms of phase 1, loss of hair, bleeding from gums, genitourinary bleeding, hemorrhage beneath the skin, stomatitis, sore throat, decreases of the red and white blood cells and platelets, pneumonia and severe enteritis.

Phase 3: Eight weeks, from the beginning of the 3rd month to the end of the 4th month (December)

Symptoms: Sufferers from symptoms seen in phase 1 and 2 start to recover in this phase. Decrease in sperm count and menstrual disorders are still observed. Development of keloid skin lesions begins.

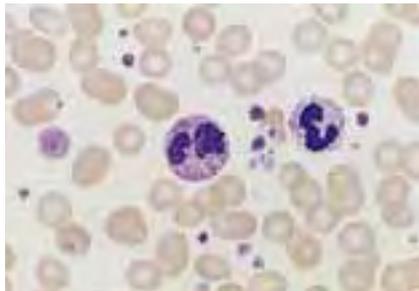
The figure shows the death rate and appearance ratio of each symptom seen during the acute phase. The death rate peaked from the 4th to the 7th week after the exposure.³⁷⁾



Q13 Why did you become sick after two weeks?

A. Many people who appeared healthy and were able to care for the injured became sick about ten days after the bomb was dropped. Those people were free from immediate injury but had been exposed to radiation. Their bone marrow cells (where blood is made in the bone) were damaged by the radiation and unable to produce blood anymore.

The number of **white blood cells** and **platelets** (figures at upper left and upper right) made before being exposed to radiation gradually begins to decrease and in about two weeks, the human body will not be able to function normally. At that time, the bone marrow is unable to produce blood (figure to lower right).



Red blood cells, white blood cells and platelets from a healthy person

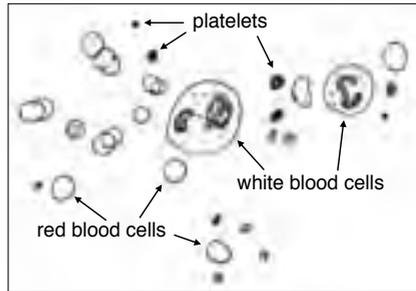
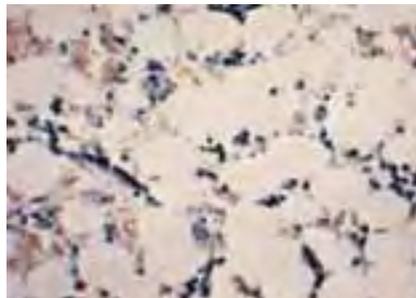


Illustration of the left photo



Normal bone marrow



Bone marrow exposed to radiation (provided by US Forces)

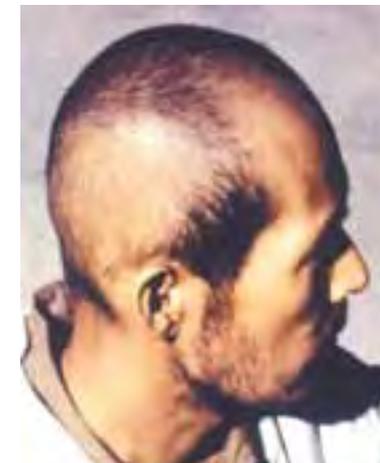
White blood cells: There are mainly five types of cells in the blood, including cells that kill germs and cells related to the immune system or allergies. Normally, there are from 4,000 to 8,000 cells in 1 cubic millimeter.

Platelets: Blood cells that work to stop bleeding. Unlike white blood cells, platelets and red blood cells do not have a nucleus. Normally, there are from 150 to 200 thousand platelets in 1 cubic millimeter.

Q13-2 Radiation Dose and Acute Radiation Symptom

Each element of the energy from the bomb, the explosion, heat rays and radiation, affected the survivors' health. Their symptoms seem to have appeared in diverse ways as the interrelation of those elements varied.

However, from the effects caused by radiation exposure itself, such as nuclear reactor accidents or mishandling of radioactive sources, it is possible to estimate the exposure dose by carefully observing physical symptoms, because the physical symptoms that appear are well related to the exposure dose. In particular, the rate of decrease in the lymphocytes is a useful reference.



A soldier with hair loss one month after A-bomb exposure (provided by US Forces)

Radiation Dose and Appearance of Symptoms/Abnormality

Radiation Dose (mSV)	0-500	500-1,000	1,000-2,000	2,000-6,000	6,000-10,000	10,000-20,000
Systemic symptoms						
Physical symptoms appearing later	—	—	Fatigue	Hair loss	Bleeding	Diarrhea Fever
Appearance of nausea and vomiting	—	—	3hrs	2hrs	1hrs	30min
Blood abnormality						
Lymphocyte	—	Slight decrease	50% Decrease	Drastic decrease	500/ μ l or less	0

Q14 What is leukemia?

A. Leukemia is cancer of the blood. It's a health disorder in which the number of malignant and irregular white blood cells increases. While the number of abnormal white blood cells increases, the amount of red blood cells and platelets decreases and the sufferers tend to have anemia and bleed from their gums. Leukemia can be described as acute or chronic, and by cell type whether it is lymphatic or myeloid. Until about twenty years ago, when bone marrow transplant technology and effective medicines were developed, almost all the sufferers of any type of leukemia died.

Sadako Sasaki's classmates and children from all over the nation raised money to build the Children's Peace Monument. It was built to comfort not only the soul of Sadako, who died of leukemia, but all the children who died because of A-bomb related illnesses.

The picture below at the upper left shows acute myeloid leukemia cells and below it is a photo of someone who suffers from a swollen spleen (from the center to the left) and enlarged liver (left)— often seen among sufferers of chronic myeloid leukemia.

The upper right picture is a note written by Sadako. She was writing down her red and white blood cell count from the day she was hospitalized. In the picture below it, you can see the paper cranes that Sadako folded while she was in hospital.



Acute myeloid leukemia cells



The record of the number of white blood cells and red blood cells that Sadako had begun to keep after she was admitted to hospital. (Hiroshima Peace Memorial Museum)



The outline of a swollen spleen (right side of the photo) and enlarged liver (left)— often seen among sufferers of chronic myeloid leukemia.



Paper cranes folded by Sadako while she was in hospital. (provided by Hiroshima Peace Memorial Museum)

Q14-2 Erection of the “Children’s Peace Monument”

Sadako Sasaki was exposed to the radiation at her house, 1.6 km from the hypocenter, when she was 2 years old. She fell sick in the autumn of 1954 and was admitted to the Red Cross Hospital of Japan on February 21, 1955.

At that time, her white blood cell count (WBC) had risen to 37,400, which was five times higher than the average, and unusually shaped leukemia cells were found in large numbers. Two months later, her WBC count came down to normal at 4,400 with the help of medicine, but the medicines became ineffective in July, so she started to receive repeated blood transfusions. However, she passed away on October 25. Four days after her death, 39 of her junior high school classmates gathered to discuss establishing a monument determined to “give meaning to Sadako’s life.” On November 11, they began passing out leaflets at the site of the national meeting of junior high school principals to ask for support.

On January 18, 1956, about 100 representatives from elementary schools, junior and senior high schools in Hiroshima City attended the first preparatory committee at Noborimachi Junior High School, Sadako’s school, for the establishment of the Children’s Peace Monument. They decided to raise funds for the monument by collecting contributions on the streets.

The monument was unveiled on May 5, Japan’s Children’s Day, 1958. On the top of the monument, a statue of a girl is holding up a paper crane. It was designed for Sadako, who had been folding paper cranes every day, believing that she would get well if she folded one thousand of them. A bell hanging inside the monument was donated from Nobel prize physicist, Dr. Hideki Yukawa. On the surface of the bell, the following words are engraved; “Peace on the Earth and in the Heavens.” The inscription carved on the stone beneath the bell of the monument reads, “This is our cry, this is our prayer, for building peace in the world.”

The inscription on the Children’s Peace Monument reads: “With the support of friends nationwide, we elementary school pupils and junior and senior high school students in Hiroshima City have worked together to establish this monument to console the souls of all the children who died from the Atomic bombing and to speak out for world peace. The Hiroshima Society of School Children for Building World Peace, May 5, 1958”

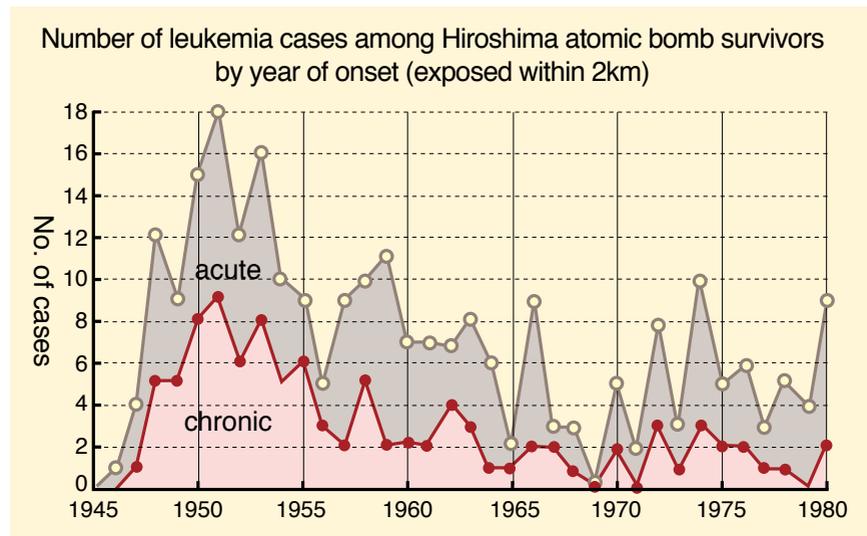


Q15 When did leukemia become more common?

A. Well, the first case of leukemia related to the atomic bomb was found (diagnosed at Kyushu University Hospital) in November 1946. The victim was in Nagasaki when it was bombed. In Hiroshima, it was found in 1947, and after that many people started to develop the illness. The cases of leukemia peaked in 1952, especially among children. I've heard that the number of cases slowly began to lessen after that.

As you may know, Sadako developed leukemia in 1954. The development of leukemia among adults usually appeared later than in her case and I heard that it tended to continue until about 1988. The total number of leukemia patients had risen to about 300 by 1985.

The figure below shows the number of **acute or chronic leukemia** cases who had been exposed to the effects of the A-bomb within a 2km radius. The risk of developing leukemia was ten times higher in 1961 and three and a half times higher on average compared to people who weren't exposed. How horrible!



Acute or chronic leukemia: Details described in Q14.

Q15-2 A-bomb Radiation and Leukemia

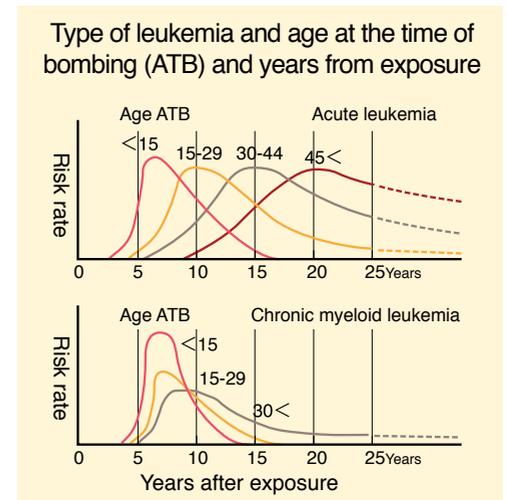
Characteristics of leukemia among A-bomb survivors are: ⁹⁾

- (1) The incidence rose in direct proportion to the amount of radiation dosage.
- (2) The younger the age at the time of exposure, the greater the risk for leukemia.
- (3) The incidence peaked during 1952-1953, which was 7-8 years after exposure.
- (4) The incidence of chronic myeloid leukemia was significantly higher in Hiroshima than in Nagasaki.

Being exposed to radiation does not necessarily increase the incidence of leukemia. The effect varies with the type of radioactive ray.

For example, osteosarcoma is frequently seen among people repeatedly using **luminous paint** (cobalt/beta ray), such as in clock face factories. The incidence rate of liver cancer increased during World War II because a blood vessel contrast medium (thorotrast/alpha ray), that was used for diagnostic evaluations, was used on sick and wounded soldiers. In the case of the nuclear meltdown at Chernobyl (radioactive iodine, strontium, cesium) in 1986, no leukemia was seen, but the incidence of pediatric thyroid cancer rose.

The figure on the right shows the relationship between the age ATB and the incidence or risk rate of acute leukemia (top) or chronic myeloid leukemia (bottom), and the years from the age ATB to the development of the diseases. It illustrates that leukemia develops earlier as the age ATB gets younger, and that the risk rate for acute leukemia remains high compared to chronic myeloid leukemia.

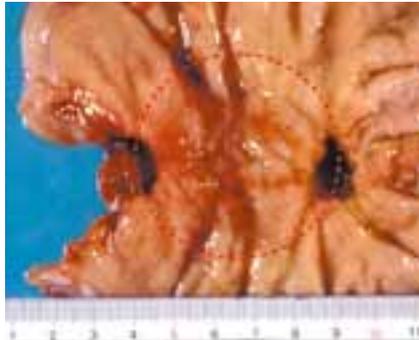


Luminous paint: Glowing paint. Adding traces of a radioactive substance, such as radium, to a substance of organic fluorochrome or zinc sulfide mixed with a slight amount of copper makes it glow in the dark. Luminous paint takes advantage of this phenomenon.

Q16 What other cancers were seen besides leukemia?

A. About ten years after the bomb was dropped, a doctor noticed how many survivors were developing cancer and started to investigate. Other doctors in Hiroshima city joined this investigation, and they found out that the risk of developing cancer was indeed high among those exposed to the radiation. The cancers, thought to be triggered by radiation, are cancers of the thyroid, breast, lung, stomach, colon, skin, meningioma (a type of brain tumor) and others. People who were exposed to a higher radiation dosage and those who were exposed at a younger age, were more likely to develop cancer when they reached the cancer-prone age. My father also died of lung cancer seventeen years ago.

In the upper left is a photo of stomach cancer and the upper right is colon cancer. At the lower left is a case of skin cancer and the lower right is a CT scan of meningioma. Developing cancer is a fear all survivors of the bomb never get over.



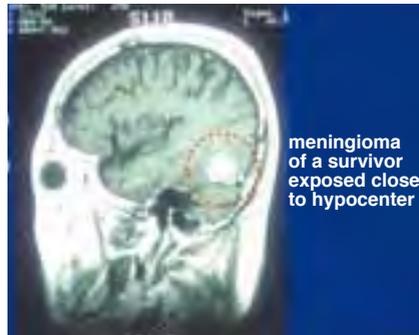
Stomach cancer



Colon cancer



Skin cancer (Provided by Naoki Sadamori)



Meningioma

Q16-2 Time of Occurrence of Malignant Tumors Vary with Illness

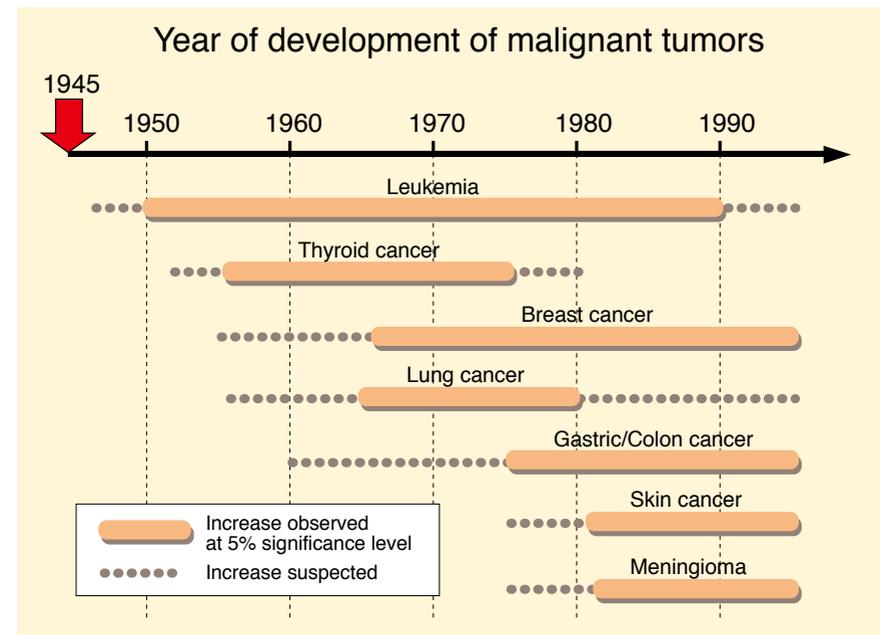
When you have been exposed to radiation, cancer will not appear in all the organs at the same time.

Closely studying the incidence of cancer in each organ, it was found that when the human body is exposed to a vast amount of radiation at a single time, such as by an A-bomb, the time of the occurrence of cancer differs from organ to organ.

Five years after exposure, leukemia is seen particularly among children. Next comes thyroid cancer at about 10 years after exposure, and the incidence rates of breast and lung cancer, stomach and colon cancer, skin cancer and meningioma (a type of brain tumor) increase respectively 20, 30 and 40 years after the exposure.

This increase in the incidence of specific cancers is not in an accidental order. It happens because human cells have different sensitivities to radiation. In general, organs with frequent cell divisions, regeneration and propagation are very sensitive to radioactive rays. Cancers of the skin or brain tumors appeared decades after exposure because cell divisions are not frequent in those tissues. With some of the illnesses, such as leukemia and thyroid cancer, significant increases were not seen after 1990 and 1975, respectively.

The figure below shows the timing of significant increases of malignant tumors among A-bomb survivors by illness.



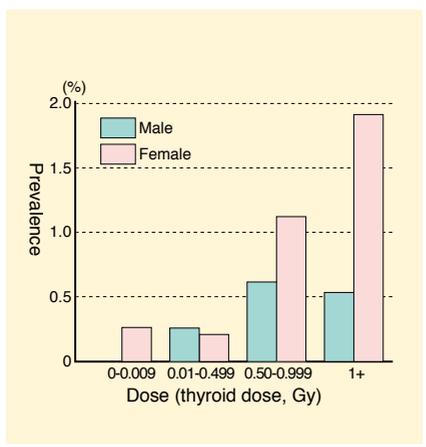
Q17 What other illnesses were seen besides cancer?

A: Well...the following disorders were often seen:

- Microcephaly- Among people who were in their mother’s womb when the bomb was dropped, some of them turned out to have very small heads. (See Q18 and Q18-2.)
- Cataracts (See Q19 and Q19-2.)
- Hyperparathyroidism
- Keloid burns and scars (See Q20 and Q20-2.)
- Stunted growth- The weight and height of people who were under eleven years old and exposed to radiation did not increase at the same rate as those who were unexposed.
- Increasing mortality from brain or blood vessel disorders- Researchers who were looking up the names of diseases of the dead found out that people who were exposed to a radiation dosage of 1,500 mSv or higher had more strokes or heart diseases, which are related to blood vessels.

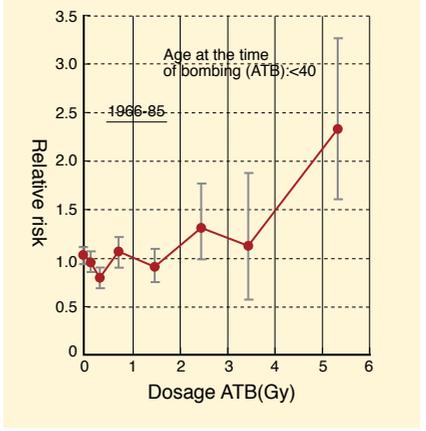
The figure on the left shows the prevalence of hyper-parathyroidism increasing in proportion to radiation dosage, and the figure on the right describes the mortality rates from brain or blood vessel disorders. You’ll notice that survivors exposed to a radiation dosage of 1,500 mSv are likely to die from a stroke or rupture of an artery. I’ve heard that there are also many survivors who appear healthy, but in fact have physical and functional abnormalities, but not clearly defined disease.

Prevalence of hyperparathyroidism



Partially modified figure 1, page139 of Effects of A-Bomb Radiation on the Human Body⁹⁾

Mortality rate from non-malignant disease (brain/vascular disorders)



Partially modified figure 2, page 326 of Effects of A-Bomb Radiation on the Human Body⁹⁾

Hyperparathyroidism: An illness in which cancer or hypertrophy is seen in the parathyroid which is behind the thyroid, and produces excessive parathyroid hormones. Calcium is diverted to the blood resulting in weakened bones and kidney stones.

Although Not Ill, Health Irregularities Are Seen Among Survivors Exposed to Radiation

Q17-2

1 Immune Compromise: Lymphocytes that can be divided into “T” cells and “B” cells play an important role in **immunity**.

- a) Compromised function of **T lymphocytes:** According to research using PHA, a reagent used to measure the sensitivity of “T” lymphocytes against foreign objects, the reaction of the lymphocytes in people who were exposed at the age of 15 or later showed a slowdown. A decline in the actual count of suppressor killer T lymphocytes (CD8+ cells), which directly attack foreign substances, was also seen.
- b) Abnormal function of “**B**” lymphocytes: A normal human body is infected by the **EB virus** at up to 3 years old as a temporarily skin inflammation, but nothing usually happens after that. But in the case of people exposed to vast amounts of radiation who cannot suppress the increase of the EB virus due to the weakened function of “T” lymphocytes, they may be in a recurrent infection state. As a result it was found that the number of their antibodies (anti-EB antibodies) was high.

2 Acquired Gene Abnormality: According to the level of exposure dose, chromosome aberrations could be seen even in a seemingly healthy person. Defect in chromosome means defect in gene.

- a) Not ill, but have chromosomal aberrations. (Refer to Q21-2)
- b) Tumor mass grew in a mouse when DNA from bone marrow cells from a seemingly healthy A-bomb survivor was injected into it.¹⁰⁾ There are genes called RAS in our cells and they usually act in a normal behavior, but if part of these genes mutates, it is known that they are able to cause/develop cancers. To verify this, treated DNA extracted from bone marrow cells of A-bomb survivors was injected into immune-compromised mice. The shots were made to their groins of the right forelimb and the left hind leg, both soft parts of their bodies. They developed tumors in 3-4 weeks. It was confirmed that mutated human RAS genes were seen in those tumors.

Conducting follow-up research among the survivors who were positive for the test, one developed brain cancer 3 years later, one developed leukemia 4 years later and one developed breast cancer 9 years later, excluding one who died from stroke a year later.



A mouse with tumor mass

Case	Estimated dosage (Sv)	Number of tumor masses developed/ number of points of injection	Detected defective genes	Clinical course after experiment
IK	4<	1/4	N-ras	Cerebral apoplexy 1 year after initial exam(AIE)
SM	3.0	3/4	N-ras	Refractory anemia 2 yrs AIE Acute leukemia 4 yrs AIE
HY	3.6	2/4	N-ras	Brain tumor 3 yrs AIE
TS	3.9	4/4	K-ras	Breast cancer 9 yrs AIE

The table shows the estimated dosage and cancer development of seemingly healthy survivors whose DNA developed tumor masses in mice.

Immunity: An ability to resist pathogenic organisms and toxins that have entered the body and remain healthy.

T lymphocytes: A type of white blood cell. It detects foreign substances.

B lymphocytes: A type of white blood cell. It generates a substance that neutralizes toxins from foreign substances.

EB virus: A virus identified by Dr Epstein and Dr Barr in 1964. Ninety eight percent of the Japanese will be affected by this virus by age three, but if being affected for the first time at an age over 20 years old, it will develop into infectious mononucleosis.

Q18 Were babies exposed to radiation in their mothers' wombs affected?

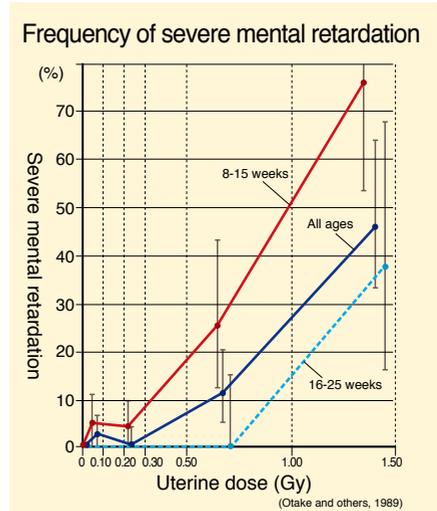
A. It seems so. Many babies died before reaching one year of age. Measuring their height, weight, head and chest girth every year until they became seventeen years old, it was found that their average sizes were smaller than unexposed children's. Especially, there were many children with microcephaly, which means they had unusually small heads and severely limited mental development. Many children also developed cancer after they grew up. These symptoms were seen in proportion to the radiation dosage their mother had been exposed to.

As for microcephaly, it is said to have a strong relationship to the mother's period of pregnancy (weeks eight through fifteen). I heard that there were well over two thousand babies who were born by mothers who were exposed to radiation within three kilometers of the hypocenter (prenatally exposed A-bomb survivors, details described in Q18-2).

You can see in the photo below an average twelve-year-old boy standing next to a boy with microcephaly who is just under sixteen. The patient's mother was exposed to radiation about one kilometer away from the hypocenter in her eighth week of pregnancy. The figure to the right shows the percentage of microcephaly by radiation dosage. You can see microcephaly appears depending on the length of pregnancy and dosage.



An average 12-year-old boy (left) and a boy with microcephaly at the age of 15 years and 8 months (right). (Reprinted from The Medical Effects of the Nagasaki Atomic Bombing, Scientific Data Center for the Atomic Bomb Disaster)

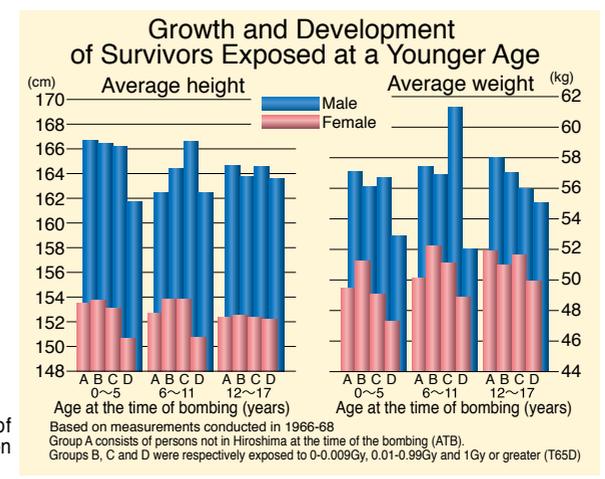


Partially modified figure 2, page 233 of Effects of A-Bomb Radiation on the Human Body⁹⁾

Q18-2 Radioactive Effects on Prenatally Exposed A-bomb Survivors

Prenatally exposed A-bomb survivors are those children who were exposed to the radiation when they were in their mothers' wombs on August 6 and born by May 31, 1946 or earlier. The main effects on them are as follows:

- 1. High Mortality Rate Among Newborn and Infants:** This tendency was particularly seen when the mother was exposed to the radiation within a 2km radius and had suffered acute radiation symptoms (such as hair loss and a bleeding tendency-See Q12-2 and Q13-2) . The mortality rate rose to 26.1%. (Yamazaki J.N 1954)¹¹⁾
- 2. Frequent Cases with Microcephaly:** According to research performed in 1972, there were 48 cases of microcephaly in children prenatally exposed in Hiroshima and 15 cases in Nagasaki. Microcephaly means that a person's head circumference is smaller than twice the standard deviation for his/her age. There were 10 cases in Hiroshima and 4 in Nagasaki where both small head size and mental retardation were seen. The incidence of microcephaly was frequent when the mother was exposed within the 18th week of pregnancy and the frequency became higher in proportion to the radiation dose. (Miller & Blot 1972)¹²⁾
- 3. Growth Impairment:** Body measurements of 1,608 prenatally exposed A-bomb survivors were taken every year on their birthdays from ages 9-17 years old. According to the results, a decrease in head circumference, height and weight were seen among children whose mothers were exposed to radiation within a 1.5km radius in comparison with children who did not have a small head size. Observing their growth process from 9-17 years old, a decrease in those figures was similarly seen at the age of 17 as at the age of 9, while their growth increment over these years was similar to that of children not exposed to radiation.¹³⁾ It could be said that prenatally exposed A-bomb survivors had grown similarly as non-exposed children although they were carrying developmental disturbances from an early phase.
- 4. High Risk of Cancer (ad interim report):** Statistics from 1950-1984 show that 13 out of 920 (group exposed over 0.01 Gray) developed cancer, which is statistically significant, compared to the control group. This group had not yet reached the cancer-prone age and the incidence of cancer is anticipated to increase, but it could not be said for certain. (Yoshimoto 1988)¹⁴⁾



Modified figure 1, page 309 of Effects of A-Bomb Radiation on the Human Body⁹⁾

Q19 What are cataracts?

A: When you develop a cataract, the lens of the eye becomes cloudy. There are “senile cataracts” that come from aging, “diabetic cataracts” that some diabetic patients develop, and “traumatic cataracts” when the lens is damaged. There are also “radiation cataracts” that are caused by radiation.

In the picture in the lower right, you can see where the lens is. It’s located in the front part of the eye ball.

In the upper left is a photo of a cataract in the eye of a 45-year-old who was exposed at 950 meters from the hypocenter when the person was twelve years old. As in the description of the picture in the upper right, the black spots and the clump of spots in the middle of the eye is a “radiation cataract.”

The lower left photo shows the eye of the same person ten years after the picture above it was taken. Do you see how the eye has black from about four to seven o’clock? This is a “senile cataract.” People who were exposed develop “senile cataracts” at an early age. This person probably has to undergo surgery. Now it is much easier to have an operation, but it was very difficult in those days.

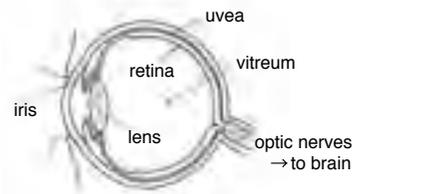
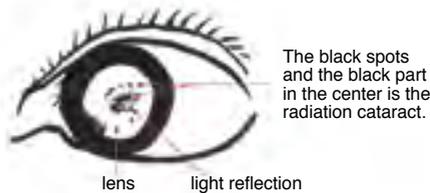


A cataract from a 45 year-old person who was exposed to the effects of the atomic bomb 950m from the hypocenter at the age of 12



Ten years after the picture above was taken when the person was 55 years old (senile cataract has progressed as well as radiation cataract in the center).

Illustration of the left photo



Q19-2 Radiation Dose and Incidence of Cataracts

The first A-bomb related cataract in Hiroshima was found in the autumn of 1949. The diagnosis was given to a 22-year-old male who was exposed to the radiation from the bomb when he was riding on a streetcar 780m from the hypocenter, which was heading south.¹⁵⁾ Research into A-bomb related cataracts has been conducted from time to time.

1949-1955 research (Hirose¹⁶⁾): 16.2% of the survivors within a 1,300m radius from the hypocenter

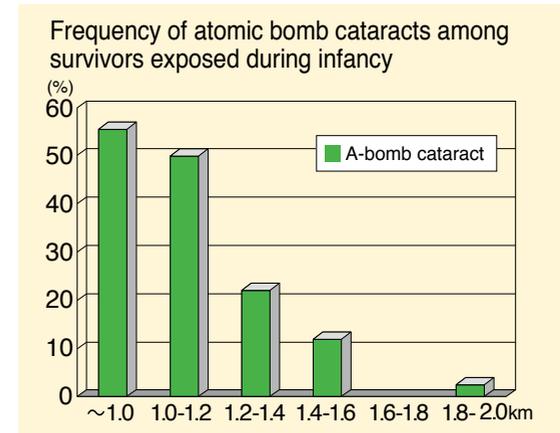
1956-1958 research (Masuda - Hiroshima Red Cross Hospital¹⁷⁾): 79 out of 723 or 10.9% of the survivors within a 2km radius

1957-1961 research (Doto- Hiroshima University Hospital¹⁸⁾): 80 out of 364 or 21.9% of the A-bomb survivors within a 2km radius

1958-1959 research (Toda - Hiroshima University Hospital¹⁹⁾): 31 out of 107 or 28.9% of the A-bomb survivors within a 2km radius during their infancy were found to have an onset of cataracts.

A-bomb related cataracts started to be seen several years after exposure and it is thought that all the possible cataracts had developed from 1957 to 1961. The incidence rate of cataracts among survivors within a 2km radius is assumed to be about 20%. In addition, the incidence of cataracts is likely to be higher for survivors exposed during their infancy.

Kamada’s research had been indicating that an A-bomb related cataract hastens the senile cataract²⁾, and it was proved right with research from 2000-2002 conducted by the RERF, observing 837 subjects individually.²⁰⁾ The incidence of A-bomb related cataracts is high among survivors who were not in shadow or were close to the hypocenter and had suffered acute radiation symptom.



The figure shows the correlation between frequency of atomic bomb cataracts among survivors exposed during infancy and distance from the hypocenter. The incidence increases as the distance decreases.¹⁹⁾

Q20 What is a keloid?

A. When the atomic bomb exploded, a great amount of heat rays was released with the radiation. Parts of the body which were directly exposed to heat rays and radioactive rays were seriously burned, but by December of that year, most people had recovered from their burns and were very relieved. However, their burns started to swell from about January of 1946. A keloid is defined as “an overgrowth of tissue with a rubbery consistency at the site of a skin injury with a copper-colored shiny surface that causes stinging pain or itchiness.”²¹⁾ Normally burns rarely develop keloids, but sixty to seventy percent of the burns caused by the bomb did.

People had a hard time because when they removed the elevated part, soon a new keloid grew. Surgery eventually became more effective for restoring range of motion around the joints but there was little doctors could do to restoring cosmetic damage. People with keloids on their face or arms were embarrassed to be seen in public and they must have been suffering mentally. I felt so sorry for them.

Some people still seem to have stinging pains and keloids sometimes turn red after forty to fifty years. The upper photo is of keloids on a patient's left hand six months after the bomb. The lower photo is of a female patient with keloids seen on her nose, chin and both hands. How horrible...



Keloids on a left arm six months after the bombing (male) (Provided from US Forces)



Keloids seen on nose, chin and both arms (female) (Provided from US Forces)

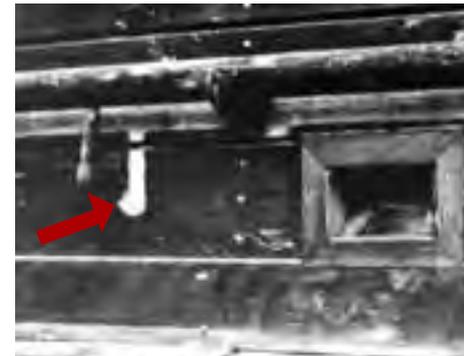
Q20-2 Visible Effects of A-bomb Heat Rays



Shadow of railings on the bridge floor of the Yorozyu Bridge. It remained white where the rays were blocked by the railings. (from US Forces B-105)



Ruins of a steel reinforced theater 800m north of the hypocenter. (Photographed by Shunkichi Kikuchi, provided by his bereaved family.)



A shadow of a valve etched on the wooden wall of Yoshijima-cho prison, approx.2.1km from the hypocenter (from US Forces B-117)



A roof and ladder etched on a gas tank where they were in shadow retained their original black color. (from US Forces B-127)



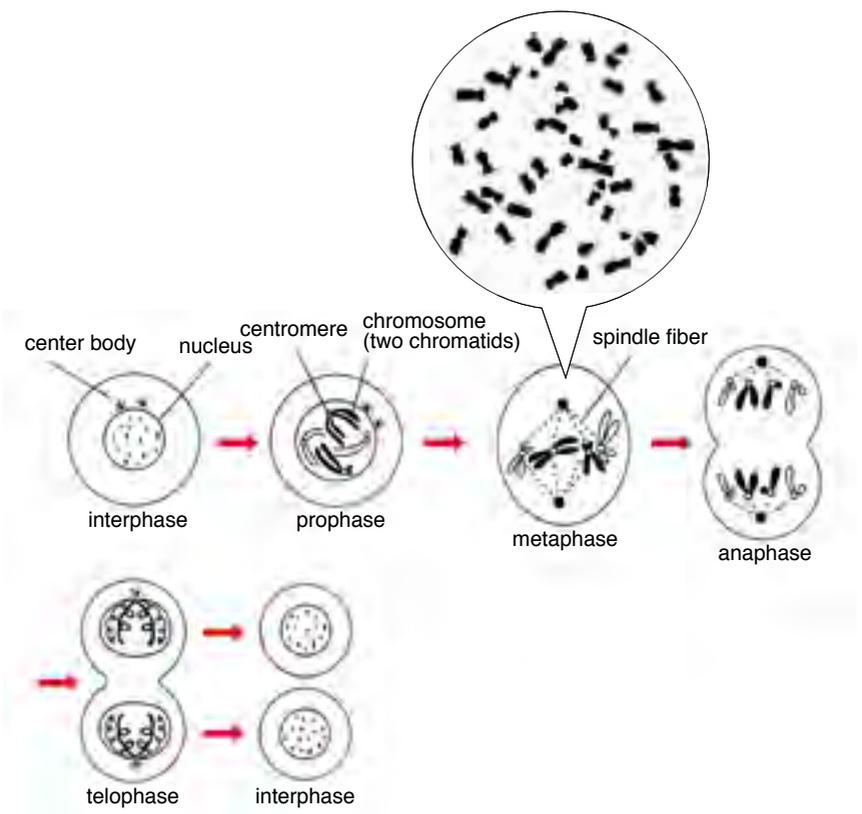
A burned orange (photographed by Shunkichi Kikuchi, provided by his bereaved family)

Q21 Where are chromosomes located?

A. It is said that there are sixty trillion cells in the human body. Each of the sixty trillion cells has a nucleus that carries a substance that develops into a gene called **DNA**. Chromosomes replicate in both cells when a cell divides into two and can be seen with a microscope. Let me explain it to you in detail.

Normally, each cell nucleus does a particular job. Cells in bone marrow where blood is produced, and epithelial cells in intestines or skin, are used everyday, so new cells have to constantly be made by cell division to cover the number of the cells used. That is why divisions are frequently seen in those cells.

The figure shows how a cell divides into two. Chromosomes are shaped in metaphase. You can see that a cell divides into two cells with each having the same amount of DNA. The upper part of the figure is a close-up of chromosomes in metaphase. The amount of chromosomes is the same among animals or plants of the same species. The number of chromosomes in a human being is forty-six.



DNA: Details described in Q10-2.

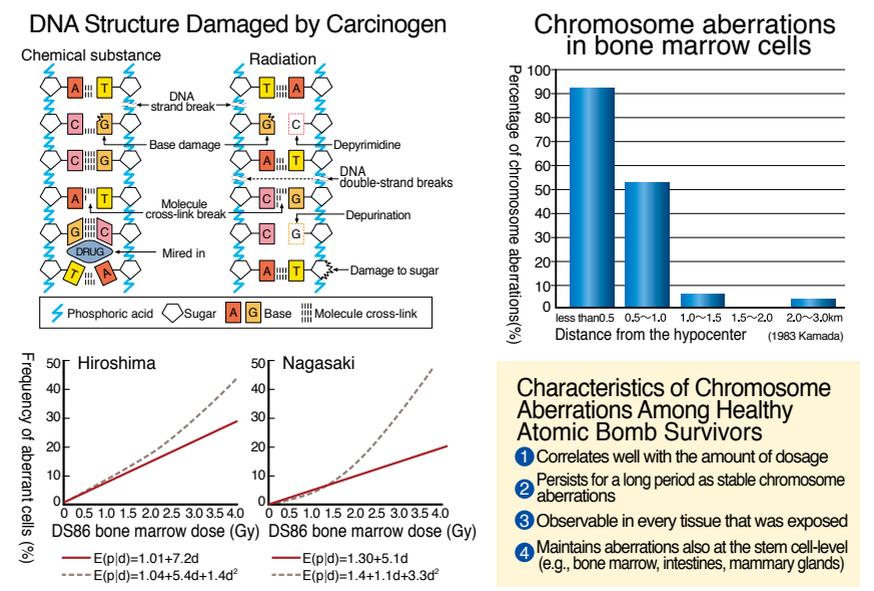
Q21-2 Frequency of Chromosome Aberrations is Proportional to Radiation Dose

Radioactive rays damage DNA or cut the strands (vertical blue line in the upper left figure below) just as some chemicals do, but what is particular in radiation is that it cuts two strands at once. In many cases the radiation cuts two strands next to each other. This would not be a problem as long as the disconnected DNA strands were reconnected to the same places, but if the two strands are reconnected in a wrong way, abnormal shapes will be seen in the chromosome.

Research on chromosomes of A-bomb survivors in Hiroshima and Nagasaki has been held from about 1963, observing their peripheral blood lymphocytes (PBL), B-lymphocytes, **bone marrow cells**, skin cells, etc.

The figure on the upper right below shows the percentage of PBL T-cells with chromosome aberrations (Hiroshima, Nagasaki,)²²⁾ The figure to the left on bottom describes bone marrow cells with chromosome aberrations 20-25 years after the exposure. Seeing the number of cells with chromosome aberrations and the frequency of aberration per cell, both in Hiroshima and Nagasaki, those percentages become higher as radiation dose gets higher. In addition, the frequency of abnormal cells was higher among survivors in Hiroshima than in Nagasaki.

This might be related to the fact that the bomb dropped on Hiroshima was a uranium bomb of which the amount of neutron rays was higher than the bomb dropped on Nagasaki. The characteristics seen in survivors' chromosome aberrations are shown in the figure at the bottom right.



Modified figure 6, page 254 of Effects of A-Bomb Radiation on the Human Body 9)

Bone marrow cells: A general name for white blood cells (such as neutrophils and monocytes) or red blood cells residing in bone marrow, where blood is produced, at their younger stage.

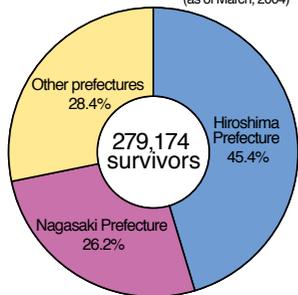
Q22 How many A-bomb survivors are there in Japan now?

A. About 270,000 A-bomb survivors live in Japan now. The registration of A-bomb survivors started in 1957, I think, and almost 200,000 A-bomb survivors registered that first year; however, there were many survivors who didn't register because they feared it would ruin their daughters' marriage prospects if people knew they were A-bomb survivors.

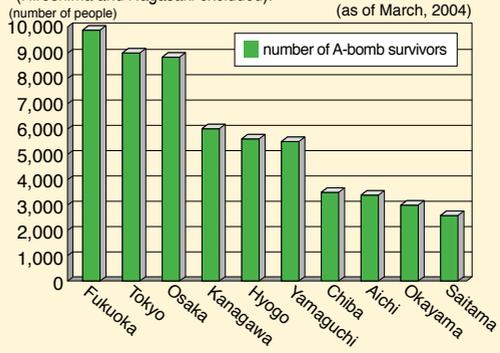
The registration of A-bomb survivors first became known to the wider public because of surveys conducted in the **national census** in 1965 and 1975. About 400,000 A-bomb survivors registered in 1982. However, these numbers still don't include those who had died before the first registration started. Other investigations showed that about 133,000 survivors had already died by then. Through other data and materials, we found that over 544,000 people were exposed to the A-bomb²³⁾ and about half of them are alive at present.

The distribution chart on the left shows the A-bomb survivors who are alive, and the bar graph on the right shows the top ten prefectures where most A-bomb survivors are living now, other than Hiroshima and Nagasaki. Hiroshima and Nagasaki are not the only places where A-bomb survivors live, and many survivors are living in other prefectures as well. Wherever you go in Japan you can find A-bomb survivors.

Distribution chart for all A-bomb survivors (as of March, 2004)



Number of A-bomb survivors by prefecture (Hiroshima and Nagasaki excluded). (number of people) (as of March, 2004)



National census: a survey of the basic attributes of the entire population such as age, household members, employment, housing, etc., conducted every 10 years.

Q22-2 Changes in A-bomb Survivors' Population

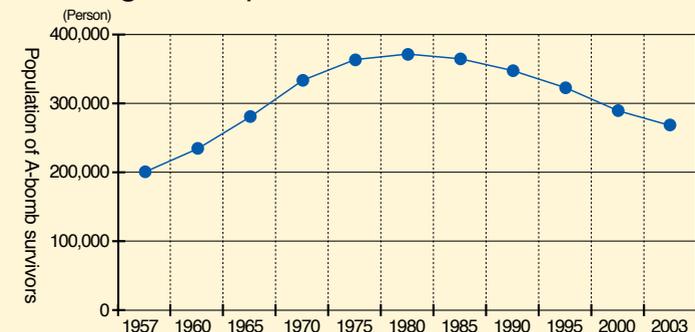
Some A-bomb survivors in Hiroshima and Nagasaki fled to outlying areas and some of them returned to their hometowns after their military service. This resulted in survivors being scattered all around the country. How many died from the atomic bombing in Hiroshima and Nagasaki? How many survived? In what living conditions do those survivors live now? It is very important to verify the reality of their situations with the A-bomb survivors in order to reveal the whole picture of the atomic bombings.

A lot of surveys have been conducted and the results from the major ones are as follows:

Year	Name of survey	Responsible organization	General Comments
August, 1946	Survey on human suffering in Hiroshima city	Hiroshima City	320,081 deaths including missing people
October, 1950	Nationwide survey on A-bomb survivors (incidental to national census)	Atomic Bomb Casualty Commission (ABCC)	283,508 survivors
November, 1965	Survey on actual condition of A-bomb survivors (incidental to national census)	Ministry of Health and Welfare	277,955 survivors
November, 1975	Survey on actual condition of A-bomb survivors Basic survey, living survey, anecdotal survey	Ministry of Health and Welfare	Questionnaire sent to 357,141 survivors based on the A-bomb Survivor Health Book register book. 293,693 responded (82.2%)
October, 1985	Survey on actual condition of A-bomb survivors Survey on survivors, survey on A-bomb victims (incidental to national census)	Ministry of Health and Welfare	Questionnaire sent to 361,672 survivors, and 313,499 responded (86.7%). The number of the dead was 173,925. 11,929 new deaths were confirmed by this survey.
November, 1995	Survey on actual condition of A-bomb survivors (incidental to national census)	Ministry of Health and Welfare	Questionnaire sent to 324,072 survivors and 248,553 responded (76.7%)

The Hiroshima City government comprehensively analyzed the results of these surveys and also the results of surveys at related facilities and announced that the total number of A-bomb survivors was 541,817 as of 1995.²³⁾

Change of Population of A-bomb Survivors



Q23 How many A-bomb survivors are living overseas?

A. As of December 2003 about 2,200 A-bomb survivors were in South Korea, about 1,100 survivors in North America, and about 180 in South America (mostly in Brazil and Argentina). It is also estimated that 1,500 survivors are in North Korea. The survivors in North and South Korea were exposed to the A-bomb while they were in Japan, often by force, to work in shipbuilding plants in Hiroshima and Nagasaki, in accordance with the **National Mobilization Order** during World War II. All of the A-bomb survivors in North and South America are Japanese who emigrated to the United States or South America (mainly Brazil) after the war or came to live there after marrying foreigners.

The building in the upper photo below is the A-bomb Survivors Welfare Center in Cholla-Namdo, South Korea, and the building in the lower photo is Nipo-Brasileira Hospital in Sao Paulo. A-bomb survivors living in South Korea and Brazil can receive support and medical treatment in those facilities.



A-bomb Survivors Welfare Center (South Korea)



Nipo-Brasileira Hospital (Brazil)

National Mobilization Order: forcing people (mainly from the Korean Peninsula) to move to Japan to work in support of the war effort.

Q23-2 Medical Examinations of A-bomb Survivors Living Abroad

A-bomb survivors living in North America:

Since A-bomb survivors had fears that they could develop A-bomb diseases, medical examinations for those survivors were provided for the first time in April 1977 for humanitarian reasons. The Hiroshima Medical Association and Radiation Effects Research Foundation played a central role in the examinations. Since the second examination in 1979, physicians in Hiroshima have set up a team to give medical examinations to A-bomb survivors living in North America every two years with a commission from the Ministry of Health and Welfare.

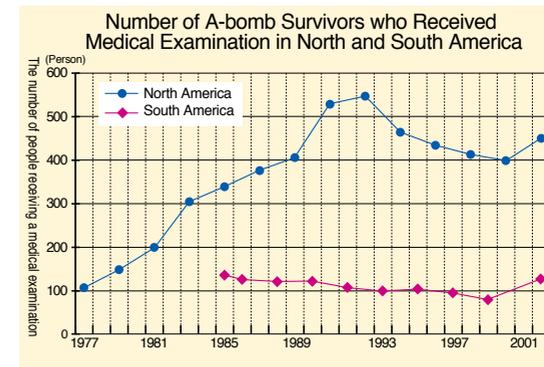
These medical checkups have been carried out mainly in San Francisco, Los Angeles, Seattle, and Honolulu. As shown in the following chart, 40 to 50% of the 1,100 survivors in North America have received a medical examination.

A-bomb survivors living in South America:

The same as for A-bomb survivors in North America, medical examinations for A-bomb survivors in South America have been provided, in principle, once every two years since 1985 with the aim of providing them with a health checkup and counseling relating to the aftereffects from the atomic bomb, and to help eliminate their psychological fears. The Foreign Ministry, Ministry of Health, Labor and Welfare, Hiroshima Prefectural Government, and Nagasaki Prefectural Government have carried out these medical examinations with physicians from university hospitals, Red Cross Hospitals, and other hospitals in Hiroshima and Nagasaki, and send doctors to South America. Brazil, Argentina, Paraguay, Bolivia, and Peru are the main countries where these medical checkups are given. There are a little less than 180 survivors in South America and 50 to 60 % of them have received medical examinations as shown in the figure below.

A-bomb survivors living in South Korea:

It is said that there are about 2,200 Korean survivors of the atomic bombings in Hiroshima and Nagasaki. In 1990, Japan's Prime Minister and the South Korean President had a meeting and expressed that both governments offer 4 billion yen each as funds for an assistance project to A-bomb survivors in South Korea. With the funds as a major financial source, the Korean Red Cross Society conducted the project following the assistance system for A-bomb survivors in Japan. After that, it was decided that a medical examination by Japanese physicians would be provided in South Korea from July 2004 as an important pillar in the assistance project in Japan for survivors living overseas. Doctors and health counseling nurses are sent from Nagasaki prefecture.



Q24 Don't you feel lonely at times?

A. Well, I don't have any children, but many junior and senior high school students come from all over Japan to visit our nursing home to comfort us or study about peace. Also, my younger sister visits me sometimes and talks to me. That's why I usually don't feel lonely.

We have a special event each season and a birthday party every month. We also have club activities including music and making pottery, so we are usually busy and seldom feel lonely.

But we do feel very sad when our friends leave the nursing home to be admitted to the hospital because of a disease related to the bomb. No one could understand the deep sadness we feel when this happens. Atomic bombs should never be used again. We should never have another A-bomb experience anywhere in the world, with all its widespread, never-ending grief.



Residents dressed like hina dolls (emperor and empress dolls) at a Japanese Doll Festival



Monthly birthday party



Practicing Ikebana (flower arrangement)



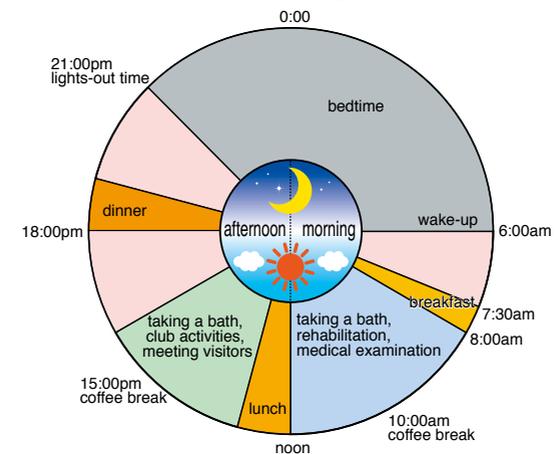
Pounding rice cake at the end of the year

Q24-2 A Day at the Nursing Home and Yearly Events

Residents at the nursing home start each day at 6 o'clock when they get up, and finish off the day at 9 o'clock at night when the lights are turned off. However, they spend their time during the day in their own way. Some of them might have breakfast at 10 o'clock. Also they can take a bath everyday other than Saturday and Sunday if they like, even though they usually take a bath twice a week. Club activities at the nursing home include Ikebana (flower arrangement), tea ceremony, Taisho koto (Japanese harp), making pottery, and knitting. Each club has its activity once or twice a month.

The figure below shows an example of a schedule of "a typical day at the nursing home."

A Day at the Special Nursing Home (24 hours)



Annual Events at the Nursing Home

Month	Events*
January	Hatsugama (First tea ceremony)
February	Setsubun (Bean-Throwing Festival celebrating spring)
March	Hina Matsuri (Japanese Doll Festival)
April	Cherry blossom viewing party, Day trip
May	Family day
June	Overnight trip
July	Visit Memorial Cenotaph
August	Summer festival
September	Respect for aged day, Moon-viewing tea ceremony
October	Overnight trip
November	Family and pets day, Day trip
December	Year-end party, Mochi (rice cake) pounding, Christmas party

*Birthday party every month

Q25 How do you spend August Sixth?

A. When I was more energetic and healthier I used to visit my ancestors' grave in the early morning before it got hot. Many families who lost loved ones on August Sixth visit their graves then. Those who lost a family member on that day but couldn't find a body visit the Atomic Bomb Memorial Mound in Peace Memorial Park before a special ceremony starts.

These days on August Sixth, I have breakfast at seven thirty and watch a TV program at eight o'clock. At times government officials visit us around ten in the morning. For the last fifteen years Kotaro Yamamoto, Kousetsu Minami, and Kohei Otomo have been coming to the nursing home in the afternoon every year and singing for us. But in the evening when the darkness begins to set in, we feel sad and lonely when we remember the loss of our families. These days especially that memory has become a heavier burden because of my poor physical condition. All life is precious and we should not have any more wars.



The inscription of the date of death, August 6th, 1945 can be seen on many gravestones in Hiroshima.



Burial mound for the unidentified (A-bomb Memorial Mound)



Residents at the nursing home are watching a TV program of the Peace Memorial Ceremony on the morning of August 6th.

Q25-2 Key Points of the Peace Declarations²⁴⁾

The Hiroshima mayor has delivered the Peace Declaration every year at the Peace Memorial Ceremony since 1947. On the 50th anniversary of the atomic bombing in 1995, children's representatives, who were elementary school students at the time, began delivering the Commitment to Peace at the ceremony.

The Peace Declaration reflects the social conditions of the times and includes the Mayor's thoughts strongly. (The shortest peace declaration (Japanese version) was delivered in 1952 with 327 Japanese characters and the longest one was in 2003 with 1671 Japanese characters.) Let's see the key points of the Peace Declarations.

Key Points of the Peace Declarations Delivered by Previous and Present Mayors of Hiroshima

Year	Key point
1947	First Peace Declaration. The mayor emphasized rejection of war and appealed for world peace in the declaration.
1959	The horror of radiation effects on the human body was emphasized.
1960	Mayor called for "prohibiting all nuclear weapons and abolishing wars completely."
1971	For the first time, the mayor raised the issue of the importance of conveying to posterity the idea of "in order that the meaning of war and peace may be handed down infallibly to the coming generations, education for peace should be promoted with vigour and cogency throughout the world." It was in 1993 when the issue was raised again in the declaration.
1973	"Solidarity and co-operation of the entire world" was appealed for.
1976	Mayor strongly criticized nuclear powers; raising specific names for the first time with the mention that "the nuclear powers of the world led by the United States of America and the Union of Soviet Socialist Republics."
1980	Mayor made a significant request to the Japanese government saying "the Government of Japan should take the initiative in advocating....."
1982	Concept for "solidarity of cities throughout the world" was announced. Three years later in 1985, first World Conference of Mayors for Peace through Inter-city Solidarity was held.
1985	Included other issues besides the nuclear issue with the mention that "sharing our planet's finite resources in the spirit of mutual understanding and cooperation, we must eliminate starvation and poverty."
1990	Support for A-bomb survivors who were outside Japan was called for with the mention of, "support for those hibakusha residents on the Korean Peninsula, in the United States, and elsewhere....."
1991	Referred to the responsibility of Japan as a victimizer with the mention of, "Japan inflicted great suffering and despair on the peoples of Asia and the Pacific during its reign of colonial domination and war."
1996	Mentioned necessity of "the extensive documentation on the bombing be archived."
1999	Language style changed to be less formal. The three contributions A-bomb survivors have made were honored, and especially the mayor expressed his deepest gratitude to them for one of their accomplishments, they effectively prevented a third use of nuclear weapons. Also referred to in the preamble of the Constitution.
2000	Six reconciliations in the declaration are distinctive. "The road to reconciliation, human reconciliation, symbol of reconciliation, reconciliation by helping to resolve conflict and animosity, global reconciliation, a genuine reconciliation."
2001	First peace declaration in the 21st century was worked out under the concept of humanity: humanity, a city of humanity, a century of peace and humanity, make reconciliation and humanity top priorities.
2002	Emphasized "the path of reconciliation severing chains of hatred, violence and retaliation," and urged President Bush to visit Hiroshima and Nagasaki for the first time.
2003	Called for taking emergency action to promote the abolition of nuclear weapons toward the NPT Review Conference in New York in 2005.

Refer to History of Peace Declaration page 106 – 111

Q26 How does radiation physically and mentally affect people?

A. At the time, I couldn't do anything other than escaping by myself immediately after the atomic bombing. I couldn't even rescue a small child who was calling for help. To feel remorse won't get me anywhere, but.....

Now I fear I'll develop cancer because of my weakened body. Some residents in this nursing home have developed breast cancer or lung cancer, so it is probable that I might too.....

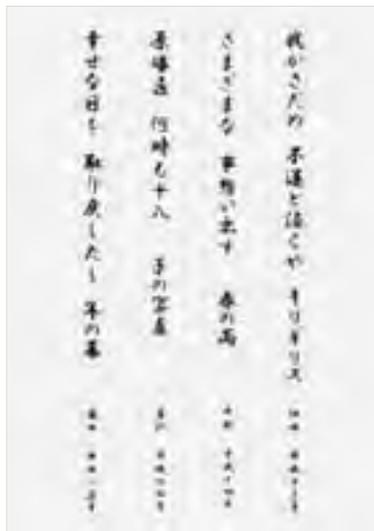
In another facility, an A-bomb survivor committed suicide because of the fear of catching a disease. Radiation is terrible. It continues hurting the body and soul for many years.

I understand that the Great Tokyo Air Raids and the Great Hanshin Earthquake also gave terrible damage to many people, but the damage caused by the atomic bombing is quite different. It continues for many years. The nursing home staff and my relatives take good care of me, so I know I should do my best to get over it. I am sorry to be so grim.

The residents here also publish a haiku collection every year. Some of them depict their feelings of suffering from that terrible experience.



Cover of Sumire, a haiku collection, which is published every year.



Some haiku poems from the Sumire haiku collection

Dr. Takashi Nagai: He was diagnosed with chronic myeloid leukemia and was within three years of death in June 1945 when he was working as an associate professor in the radiology department of Nagasaki University School of Medicine. On August 9th of the same year, he was exposed to the A-bombing in his office in the university hospital 700 meters from the hypocenter. Although he had been in a severe physical condition, he had conducted relief activities for the A-bomb survivors for two months and he submitted a report with a detailed description of injuries among A-bomb survivors. He died in May 1951 at the age of 43. "Konoko wo Nokoshite (Leave These Children)" is one of his books.

Q26-2 Psychological Burden Borne by A-bomb Survivors

Dr. Takashi Nagai began relief operations for A-bomb survivors at an early stage, and he identified "instant death, external injuries, burns, and psychological disorders" as the four immediately occurring disorders in his report. From his report, we can see that the symptoms of psychological disorder; stupor, excessive irritation, and amnesia in A-bomb survivors was quite strong from the beginning. Dr. Robert Lifton, professor of Psychiatry at Yale University, interviewed A-bomb survivors in Hiroshima in 1962 to investigate how the bomb experience had remained in their memory.²⁵⁾ He made a detailed report regarding the psychological influence seen on the bomb survivors. His report can be summed up as follows:

1. Remorse and the feeling of guilt:

A feeling of guilt that only they survived while leaving family members and students who were calling for help to suffer alone, a strong regret that they did not rescue them, although, in fact, it was really impossible for them to do that. A feeling of guilt that they have led their present lives pretending they are not A-bomb survivors (if they have declared that they were, they could not have gotten married or been employed). Such feelings could be changed to a feeling of apology and atonement and could provoke an act of offering water to the memorial monument for mobilized students because they were not able to give any water to them at the time of the A-bomb.

2. Infinite fear:

A fear that they might suffer the same fate as their family members or friends who died of A-bomb diseases. A fear that radiation could affect their children when they married and had children. We could easily see that such fears caused suicides among A-bomb survivors and continued until around 1975.

3. Escape from memories of the A-bomb experiences:

Those who witnessed the horrible scenes from hell feel strongly that they never want to meet the same situation again so they create a mental barrier. Their intentions to keep the barrier lead to their unusual fear and rejection to lightning and strong flashes of light, their act of keeping away from A-bomb survivors with keloids, and their rejection of recalling those days and talking about it to the others.

4. Respect and sense of awe towards the deceased:

A-bomb survivors judge their own behavior or other survivors' actions with a measure of to what extent they have respect and sense of awe towards the deceased. For example, they harshly criticize behavior featuring or capitalizing on A-bomb experiences or insulting the deceased to attract attention from other people. To sincerely console the spirits of the deceased is the very least they can do to atone for their guilt feelings. They offer the deceased every courtesy from such feelings.



Around 2:00pm on August 6th (Hisao Kato) (Hiroshima Peace Memorial Museum)



In front of Shirakami Shrine, date unknown (Masato Une) (Hiroshima Peace Memorial Museum)

Q27 How did you begin teaching others about your A-bomb experience?

A. Well, when I was 64 years old, I suffered from heart disease and stayed in a hospital for a while. That was the same period as the first Iraq war. In the hospital watching TV, I saw many people die in the war everyday. I saw many children get hurt in the war, too. I felt terrible and I didn't know how I could handle such feelings again.

Then, I came to think that we should not have war in any country or between races or religions. A patient in the bed next to me was also an A-bomb survivor. We started sharing our own experiences of the war with each other little by little, and gradually that made my feelings soften and opened me up. At the same time, my anti-war opinions became stronger.

I came to this nursing home in 1997, and since then I have talked about my A-bomb experience to students from all over Japan who visit here to study about peace. I always tell them that all war is bad. You should learn from the start how to get along with not only your friends and people around you, but also people from different races, nationalities, and religions.



provided by US Forces

Q27-2 Trend in Number of Publications Concerning A-bomb Experiences

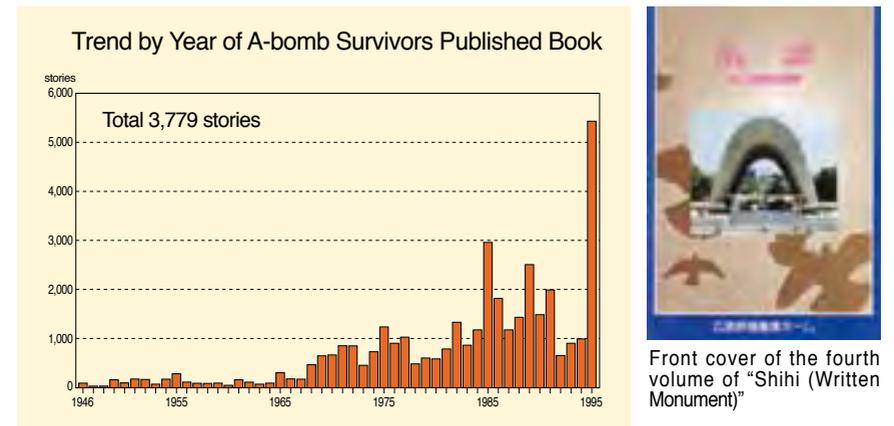
General Douglas MacArthur came to Japan as the Supreme Commander of the General Headquarters (Occupational Forces) on August 30th, 1945 and enforced a press code starting on September 19th that provided for strict censorship of published and broadcast reporting related to the A-bomb.

Every newspaper company had to obtain prior permission for their articles concerning the A-bomb before printing. Most of the news reports were not permitted and they were partly cut, forbidden, or suspended. Gradually such news reports were reduced. Not only news reports, but also books, poems, and all other literature regarding the A-bomb were considerably restricted.

The press code was suspended after the **Japan-US Security Treaty** was signed on September 8th, 1951.

The figure below shows the trend by year²⁶⁾ in the number of A-bomb experience stories written by A-bomb survivors between 1946 and 1995. A-bomb survivors began writing about their A-bomb experiences in notes about 10 years after the bombing and the movement reached a peak on the 50th anniversary of the Atomic Bomb. A subsidy system for publishing such stories was established by the city government; however, since 1996 with the aging of A-bomb survivors very few books have been published.

The Hiroshima Nursing Homes for A-bomb Survivors have been publishing the booklet named "Shihi (Written Monument)" since 1981 to help the residents leave their A-bomb testimonies. The fifth volume of the booklet was published in 2005.



Modified figure 2 on page 392 of "The general catalog of books and magazines carrying A-bomb experience stories from 1945 to 1995".

Japan-US Security Treaty: This treaty was signed between the US and Japan in September 1951 at the same time as the San Francisco Peace Treaty. The presence of US troops in Japan was determined under the treaty in order to ensure security in Japan's unarmed condition after the withdrawal of occupation forces from Japan when the Peace Treaty was ratified. Some parts were revised in 1960, and since then it has been extended automatically.

Q28 Does radiation still cause cancer to A-bomb survivors?

A. Yes, it does. Cases of leukemia and thyroid cancer are decreasing, but many A-bomb survivors are still likely to suffer breast or colon cancer. Most of the A-bomb survivors who develop breast cancer were twenty years old or younger at the time of the bombing.

One of my friends was exposed to the atomic bomb near the hypocenter and she suffered burns on her face and arms. Then, at the age of 57, she suddenly developed uterine cancer, then breast cancer nine years later. At the age of 69, she suffered from a brain tumor (meningioma). (Please refer to Q28-2.)

Similarly, other A-bomb survivors have multiple cancers, developing thyroid, colon and brain tumors at certain ages. Many A-bomb survivors suffered, or are suffering, from their second or third cancer.

Survivors with Triple Cancers

Exposed to the A-bomb at former Hiroshima Central Telegraph and Telephone Bureau (530 meters from the hypocenter) at age 15
Estimated radiation dose of 3,800 mSv (based on the abnormality rate of chromosomes)

- 1945 : Facial burn scar
- Upper right arm and forearm burn scar
- 1988 : Surgery of **uterine cancer** (at age 57)
- 1991 : Surgery of left **breast cancer** (at age 60)
- 1999 : **Meningioma** (at age 68)

Exposed to the A-bomb at Honkawa Elementary School (410 meters from the hypocenter) at age 11
Estimated radiation dose of 4,900 mSv (based on the abnormality rate of chromosomes)

- 1973 : Bilateral damage to hearing
- A-bomb cataract
- 1985 : **Thyroid cancer** surgery (at age 51)
- 1991 : Constrictive lung disorder
- 1996 : **Colon cancer** surgery (at age 62)
- 1998 : Glaucoma
- 2001 : **Meningioma** surgery (at age 67)

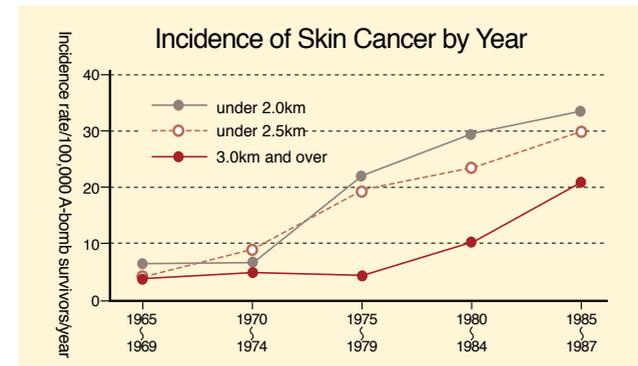
Q28-2 High Incidence of Cancer in Recent Days

The incidence of leukemia and thyroid cancer, which was the highest five to ten years after the A-bombing, has decreased recently to the same level as non-exposed people. However, it has become clear that an increase in skin cancer²⁷⁾ and meningioma²⁸⁾ among the survivors began around 40 years after the bombing. (Please refer to the photo on the lower right of Q16.)

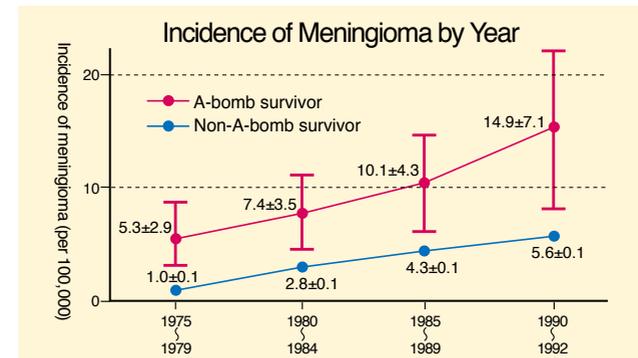
Outbreaks of skin cancers occurred around 40 years later when the red in the keloids that were formed from the exposure to the A-bomb began fading. Meningioma is a benign brain tumor; however, even though it is benign, it has to be treated with surgery as a malignancy when the tumor becomes large in the limited volume of the cranial bone.

As explained in Q16-2, the occurrence of cancer in the skin and cranial membrane had not been expected because they don't have many cell divisions. However, further statistics revealed that the incidence of the cancers has increased in proportion to the exposed dose of radiation. They are clearly the seventh and eighth most frequent radiation-related tumors respectively.

The upper figure shows the incidence of skin cancer by year, and the lower figure shows the situation for meningioma. Both of them began increasing around 1975.



Modified figure 7, page 562 from reference 27



Q29 Why do survivors have to suffer from three cancers?

A. As I said earlier (in Q21), the radiation that the A-bomb survivors were exposed to was over the whole body and damaged the chromosomes. Abnormal chromosomes inevitably bring gene abnormalities. We understand that cancer develops when several genes become abnormal. In the case of colon cancer, it is said to be caused by seven related genes becoming abnormal.

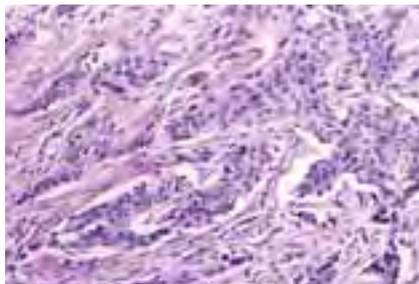
A-bomb survivors were exposed to radiation on many parts of their body (organs), and the radiation caused damage to many of their genes at one time. So on the grounds that their genes would become cancerous (fifth and sixth genetic aberrations) they were already seriously injured. But also they develop cancers on various parts of their body easier and faster when they are exposed to things like tar from cigarettes or curative medicines for cancer (some medicines are harmful to genes) compared to other people who were not exposed to radiation. It is so terrible to have cancer once, let alone three times. That's why we definitely should never allow nuclear arms to be used in war.

Survivors with Triple Cancers

Exposed to the A-bomb outside in Funairi-cho (1.0km from the hypocenter) at age 3

- 1982 : Mediastinal tumor surgery (at age 40)
- 1995 : Thyroid cancer surgery (at age 53)
- 1998 : Left breast cancer surgery (at age 56)

A-bomb survivor exposed to radiation at age 3, then developed three cancers.



Breast cancer tissue in an A-bomb survivor at age 56

Exposed to the A-bomb inside a Japanese-style house in Hakushima Higashinaka-machi (1.7km from the hypocenter) at age 15 (estimated radiation dose 100mSv)

- 1996 : Uterine cancer surgery (at age 66)
- 1997 : Right lung cancer surgery (at age 67)
- 2000 : Malignant lymphoma surgery (at age 70)

A-bomb survivor exposed to radiation at age 15, then developed three cancers.



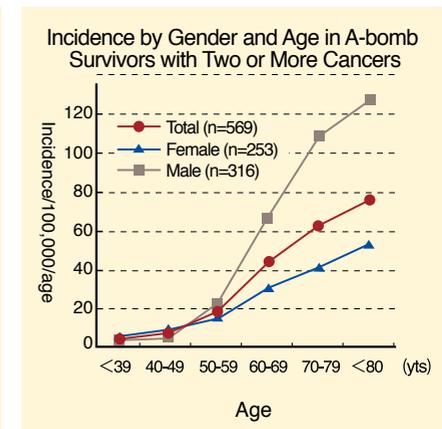
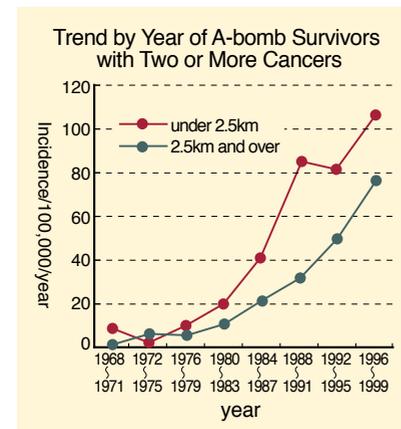
Tissue of malignant lymphoma in an A-bomb survivor at age 70

Q29-2 Increasing Incidence of a Second Cancer

Doctors²⁹⁾ from Nagasaki University have reported that the number of A-bomb survivors with a second cancer increased in the 1990s. Based on the results of pathological specimens collected for 31 years from 1968 to 1999, they found that 1.) with increasing age, the rate of incidence of a second cancer becomes higher and 2.) the rate has become higher among those who were exposed to radiation within 2.5 kilometers.

The second cancers include stomach cancer, colon cancer, lung cancer, skin cancer, breast cancer and prostate cancer in descending order of rate of incidence. The most common cases of the combination are the occurrence of stomach cancer after developing colon cancer, colon cancer after stomach cancer, lung cancer after stomach cancer, and liver cancer after colon cancer.²⁹⁾ Statistics on single cancers among Japanese demonstrated that stomach cancer, colon cancer, lung cancer and liver cancer have occurred most frequently among both men and women as the four major cancers.

We cannot say that non-exposed people will not have a second cancer. Statistics regarding the combination of these cancers have not been investigated because there are very few cases of developing a second cancer among them. As explained in Q29, we can understand that the incidence rate of second cancers among aging people is high from the fact that they have more chances to encounter substances that may damage their genes as they age.



Modified figure 1 on page 34 and figure 4 on page 35 from reference 29

Q30 What do you do when you get sick?

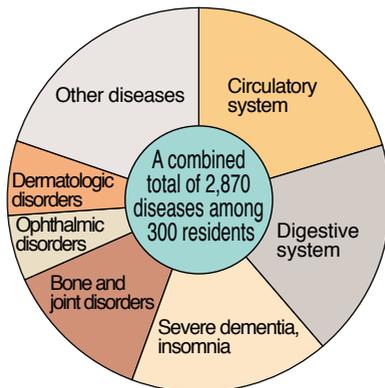
A. Usually every two weeks a doctor examines us to check on our general physical conditions. We also have health checkups twice a year under the “Health Checkup system for A-bomb Survivors” and once a year we have detailed examinations for lung and breast cancer, and multiple myeloma. Not only general physicians but also specialists like eye doctors, psychiatrists, dermatologists, orthopedists, and urologists visit our nursing home once or twice every month to treat the residents with diseases.

First of all, once we are diagnosed with disease, a specialist examines us. Then if it is necessary, the physician writes a referral to send the patient to a nearby general hospital. According to the nurses, however, some residents get sick suddenly and they are taken to the hospital by ambulance. Such cases happen about thirty times a year. I’ve also heard that the number of hospitalizations among our 300 residents with diseases is about 200, including residents hospitalized more than once.

The charts below show the kinds of diseases among the A-bomb residents. We can see from the charts that the residents have about nine to ten diseases on average.

Most common diseases of residents

1. Circulatory system (cardiac disease, hypertension, etc.)..... 20.7%
2. Digestive system (gastric ulcer, esophagitis, hepatitis, etc.)..... 18.5%
3. Severe dementia, insomnia..... 17.2%
4. Bone and joint disorders (spondylosis deformans, lower back pain, etc.)... 12.3%
5. Ophthalmic disorders..... 6.0%
6. Dermatological disorders 5.9%
7. Other diseases (pneumonia, diabetes, urinary disorders, etc.)... 19.4%



Q30-2 Radiation Induced Diseases Designated by the National Government and Various Allowances

The radiation induced diseases designated under the ordinance of the Ministry of Health, Labor and Welfare are listed in the table below; however, when the diseases are not clearly related to radiation, they are excluded. A-bomb survivors can receive an allowance according to the type and extent of the disease.

Allowance Classification	People Eligible for Allowance	
(1) Special Medical Allowance	Survivors who are suffering from diseases or injuries designated by the Minister of Health, Labor, and Welfare to be attributable to atomic bomb radiation (certified patients).	
(2) Special Allowance	Survivors who have received the certificate mentioned above by Minister for Health, Labor, and Welfare, and have been cured of the diseases or injuries.	
(3) Atomic Bomb Microcephaly Allowance	People afflicted with microcephaly due to A-bomb radiation (excluding those who haven't had physical or mental disorders specified under the ordinance by Ministry of Health, Labor and Welfare)	
(4) Health Management Allowance	Those suffering from any diseases with disorders below specified under the ordinance by Ministry of Health, Labor and Welfare.	
	Disorders specified by Minister of Health, Labor and Welfare	Major diseases
	1. Hematopoietic disturbances	Aplastic anemia, Iron deficiency anemia
	2. Liver function disturbances	Liver cirrhosis etc.
	3. Cell proliferation disturbances	Malignant tumors, Myeloid leukemia etc.
	4. Endocrine disturbances	Diabetes, Thyroid disease, etc.
	5. Cerebrovascular disturbances	Sub-arachnoid hemorrhage, Cerebral hemorrhage, Cerebral thrombosis, Cerebral embolism, etc.
	6. Circulatory disturbances	Hypertensive heart disease, Chronic ischemic heart disease, etc.
	7. Kidney function disturbances	Chronic nephritis, Nephrotic syndrome, etc.
	8. Visual disturbances due to lens opacity	Cataract
	9. Respiratory disturbances	Pulmonary emphysema, Chronic interstitial pneumonia, etc.
	10. Motor disturbances	Osteoarthritis, Osteoarthritis of the spine, Osteoporosis, etc.
11. Gastrointestinal disturbances due to ulcers	Gastric ulcer, Duodenal ulcer, etc.	
(5) Health Allowance	Those exposed and also the fetuses of those who were pregnant at that time, less than 2km from hypocenter at time of A-bomb. However, a person who corresponds to any of the following among the people above can receive a higher amount of the allowance. 1. People who have had physical disorders specified under the ordinance by Minister of Health, Labor, and Welfare. 2. People over 70 years old who don't have a spouse or any children or grand children, and also are living alone.	
(6) Nursing Aid Allowance	- Those A-bomb survivors who need nursing care because of mental or physical disorders specified under the ordinance by Ministry of Health, Labor, and Welfare, and have received nursing care. - (When people who have received special disability allowances specified under the law concerning special child-care allowance receive the nursing allowance, provision of the special disability allowance is controlled. - When expenses for nursing care have paid. - When expenses for nursing care have not paid (only for severely disabled persons)	

Q31 What about hospital payments?

A. The medical examination for A-bomb survivors is very important, because it can help them find a disease at an early stage. We receive notification saying that survivors should have a medical examination as soon as possible, and the national government pays all of the expenses for the medical checkup. This system began in 1957. Indeed, there are many cases of a disease being found among survivors at an early stage through the medical checkup. This is important because the sooner you find disease the easier it is to treat.

When we get a disease, we can go to hospitals designated by the national government and the hospitals charge the government for the medical expenses of survivors. They can charge for both out-patient treatment and regular hospitalization. Prefectures other than Hiroshima and Nagasaki have few hospitals designated by the national government to do this. If we have a medical examination at a hospital that is not designated by the government, we have to pay for the medical expense by ourselves on a temporary basis. After that we can go through a procedure to ask the government to pay us back. I understand that the survivors who are not living in Hiroshima and Nagasaki can have a hard time traveling to designated hospitals and paying their medical expenses even though it is a temporary inconvenience. For this reason I feel grateful to be in Hiroshima.

The picture below on the left is the cover page of the **A-bomb Survivor Health Book**, and the one on the right is of a page with the results of a general medical checkup.



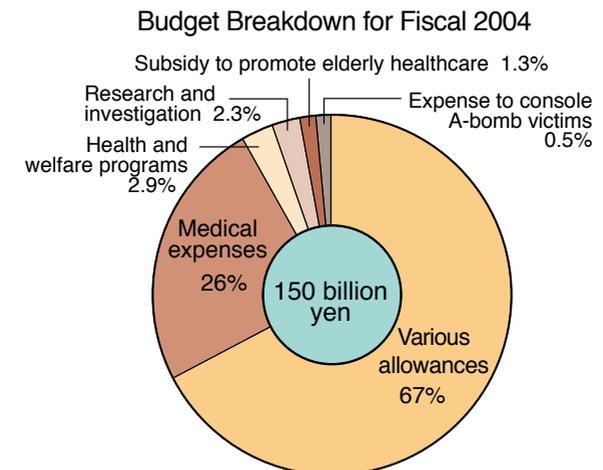
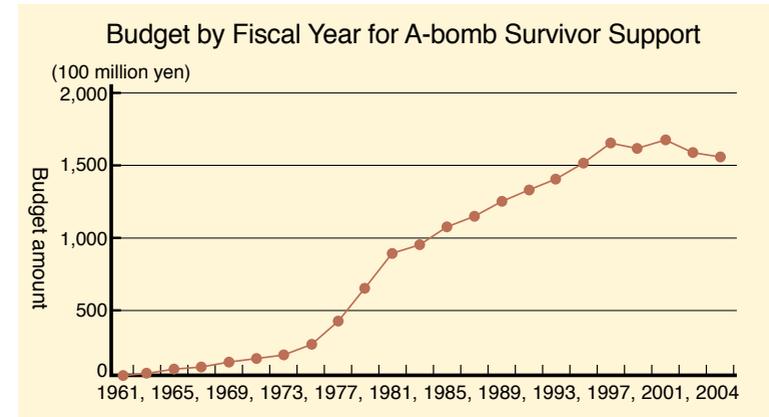
The **A-bomb Survivor Health Book** is granted to survivors who have two witnesses that can certify one was exposed to either of the atomic bombs. The Health Book provides for regular examinations, various allowances, and other medical benefits.

Q31-2 National Budget for A-bomb Survivors

About 150 billion yen has been allotted for support measures for A-bomb survivors. The amount of the expenditure has increased year by year, however, since 1998 the trend is toward a reduction in these funds. Sixty seven percent of the budget has been spent on Special Medical Care, Health Management, and Nursing Aid Allowances.

Twenty six percent of the budget for medical treatment has been paid to medical institutions when A-bomb survivors had a disease and received medical treatment. The remaining 7% has been expended for health and welfare programs (nursing-care insurance, assistance programs to enable A-bomb survivors living overseas to visit Japan, and other programs), research and investigation (mainly subsidies for the Radiation Effects Research Foundation), and healthcare programs for the elderly.

The upper chart below shows the budget by year and the lower chart shows the breakdown of the fiscal 2004 budget.

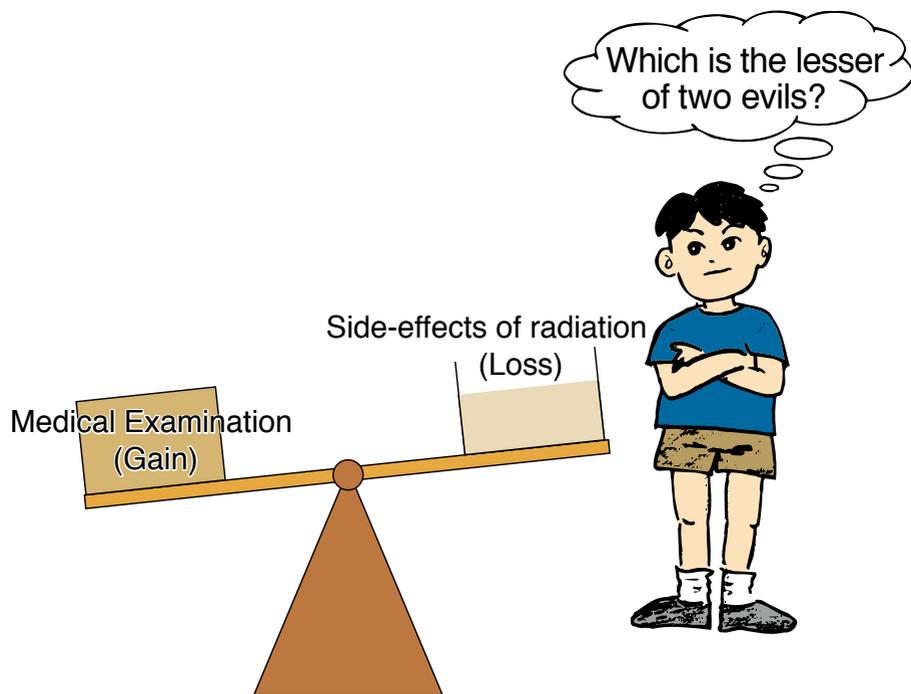


Q32 Can survivors have X-rays?

A. Well, I don't want to have anything that does more damage to the genes, but those tests can help doctors find the presence of disease or cancer even before we are aware of something being wrong. If cancer can be found through a full examination with the proper equipment– even though it uses radiation– we can receive medical treatment at an early stage, and that early intervention could save one's life. I think it is worth having it even if the radiation could further damage the genes.

On the other hand, I wouldn't want to take that sort of test unless it was absolutely necessary and strongly recommended by a doctor.

An examination using radiation should be accepted only when the information obtained by the examination to evaluate the disease is much more essential than the adverse effects of radiation. This problem is illustrated in the picture below.



Q32-2 What Level of Radiation Are We Exposed to from an X-ray Medical Examination?

Radiation, including X-rays, is used in the medical field for diagnostic purposes. These days it is widely accepted that the level of radiation exposure is 0.06 millisievert (mSv) for each chest X-ray and 4 to 7 mSv for a computerized tomography examination, although it varies according to the type of device or method which is used for the examination. (Please refer to Q33.)

Radiation is also utilized in general examinations of the stomach. We are exposed to radiation when we have these examinations and the level of radiation exposure from each stomach examination is 10 times as much as from an X-ray of the chest. It is very unusual for people under 40 years old to develop stomach cancer, so it is not recommended for people without symptoms to have stomach examinations every year.

The table below shows the level of radiation exposure from medical examinations using X-rays in Japan.



A MRI figure

Level of Radiation Exposure from Medical Exams in Japan (Effective dose equivalent)

Type of medical exam	Level of radiation exposure (mSv/times)	
X-ray of the chest	0.06	
Computerized tomography exam	Chest	6.9
	Abdomen	4 to 7
General exam for tuberculosis and lung cancer	0.05	
General exam of the stomach	0.6	

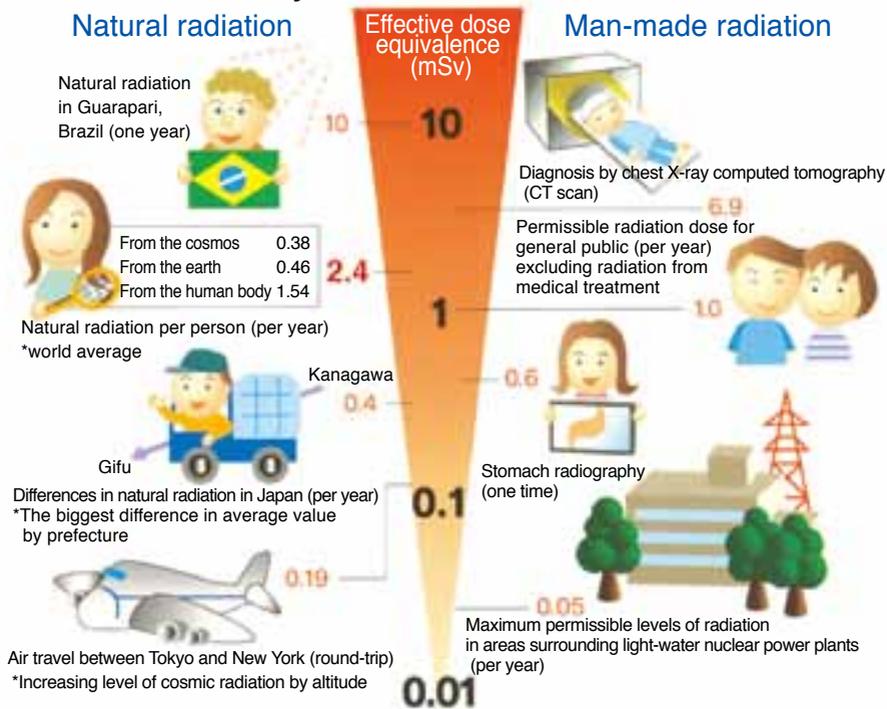
Source: T. Maruyama, et al: Radiation Protection Dosimetry, Vol. 43 No. 1/4 213-216 (1992)
T. Maruyama: Life and Radiation, National Institute of Radiological Sciences Environmental Seminar series No. 22 (1995)(in Japanese)

Q33 Does everyone receive radiation in daily life?

A. Yes, they do. One kind occurs naturally and the other is man-made. Natural radiation includes cosmic and gamma rays which are emitted from natural radioactive materials into the body, or found naturally on the earth. As for cosmic rays, if we take an airplane on a round trip between Tokyo and New York, we receive the same amount of radiation as the total amount of radiation received from four chest X-ray examinations. Man-made radiation includes gamma rays emitted from scattered radioactive materials in the air by the atomic and hydrogen bomb tests conducted before. It also includes radiation that is used for medical examinations (X-rays and gamma rays). We are all exposed to various amounts of radiation. The picture below shows radiation related materials.

The permissible radiation exposure limit is one millisievert (mSv) each year of one's life. It refers to the maximum permissible dose of radiation one is naturally exposed to. One mSv of radiation exposure cannot cause any disease. We are exposed to less than three mSv per year even when we don't have any X-rays or overseas trips by airplane.

Radiation in daily life



From the UN Scientific Committee report in 1993/ National Institute of Radiological Sciences (From the Title List of ATOMICA)

Q33-2 Radiation Is Used in Many Fields

Medical field:

In the diagnosis of diseases, various types of radiation are used for chest and stomach radiographic examinations that are performed in regular health checkups. Also they are used for detailed computerized tomography exams of various parts of the body and contrast studies of the brain, heart, liver, and other organs. In the treatment of diseases, irradiation by X-ray, gamma rays of cobalt 60, and heavy particles are applied widely to cancers in various parts of the body. Gamma rays are also used for sterilization of medical equipment.

Science and engineering fields:

- Sulfur is added to natural rubber latex and irradiated to make resilient rubber. This process produces thin and strong rubber gloves, contraceptives, and other useful daily commodities.
- When silicon is exposed to neutrons, its electrical conductivity is improved creating superior silicon for semiconductors. It has excellent uniformity for electric resistance and can be used widely in the field of household appliances.
- Exposing high-molecular silicon to electrons in the manufacturing process creates a fiber with a high quality electrical insulation and heat resistance. The material is used for the exterior walls of space ships and for a wide range of daily commodities as well.
- Automobiles are manufactured with about 30,000 parts. Radiation is used in extremely effective ways in the process, such as for producing radial tires, heat-resisting electrical wires, and abrasion and friction tests.

Agricultural field:

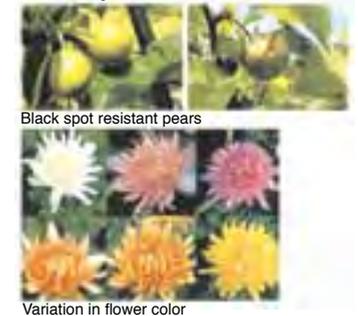
Radiation is used for strain improvement in agricultural crops, disease and pest control, and sterilization of food. It can be also utilized to control budding of potatoes so that they can be stored for a long time period.

As you can see, radiation is closely and widely related to our lives in every aspect including clothing, food, and housing, either directly or indirectly. The photos below show some examples of its utility. (Source: ATOMICA,³⁰ atomic energy encyclopedia)

Radiation use in the engineering field



Radiation use in agriculture, forestry and fisheries



Source: Title List of ATOMICA

Q34 What was the Atomic Bomb Dome used for before the A-bombing?

A. Before the bombing the building was called the “Hiroshima Prefectural Industrial Promotion Hall,” and was used to promote the export of regional specialty products from Hiroshima prefecture to areas across Asia, such as Dalian, or present day Shanghai. The building was built in 1915 as the “Hiroshima Prefectural Commercial Exhibition Hall,” and it attracted many sightseers because of its European style design. The building began to be called the Hiroshima Prefectural Industrial Promotion Hall from 1933 and was used as a museum for art shows and other expositions.

The atomic bomb exploded almost directly over the building and because of that it was able to withstand the blast. Everything at an angle to the force of the explosion was knocked over.

People started to call it the “A-bomb Dome” around 1953. In 1966 a nationwide fund-raising campaign was begun to raise money for reinforcement work to ensure its preservation. In 1967 the first reinforcement work was completed. Since then, reinforcement work has been done twice.

At present it is registered as a **World Heritage Site**. I hope the building will always be used as a reminder of the horrors of war.



Industrial Promotion Hall before the A-bombing (provided from US Forces)



After the A-bombing (provided from US Forces)

World Heritage: Convention concerning the Protection of the World Cultural and Natural Heritage adopted by the General Conference of the United Nations Education, Scientific, and Cultural Organization in 1972. Universal and worthwhile natural and cultural heritage sites in member countries are registered on the World Heritage List by UNESCO

Q34-2 Designation as a World Heritage Site

It took a long time before the Atomic Bomb Dome was designated as a World Heritage Site. First of all, there was a discussion about whether the Dome should be preserved at all. Also, even though the Dome was included in the design concept of Peace Park, the Hiroshima City and Prefecture governments had not determined their direction concerning the Dome. In June 1958, the **national government expressed its opinion** regarding preservation. In 1964, a council composed of survivors began a campaign for the “Preservation of the Dome.”

In January 1965, the Hiroshima Paper Cranes Association submitted a petition, which included many people’s signatures and donations collected through their fund-raising activities, to the mayor of Hiroshima calling for the preservation of the Dome. After that, the Hiroshima Tourist Association also urged preservation of the Dome, and it led to a bigger campaign for the preservation involving the Hiroshima mayor. In response, the Hiroshima City government decided to collect donations for expenses for preservation work in 1966.

The preservation work (first reinforcement) was completed in August 1967 using the donations to reinforce the building. Because damage to the Dome appeared again 20 years after the first reinforcement, the Hiroshima City government decided in 1987 to conduct a second reinforcement and asked for donations again for the permanent preservation of the Dome. Many people throughout Japan and the world responded to the appeal and about 400 million yen, far beyond the target of 100 million yen, was collected. The reinforcing work (second reinforcement) was completed in April 1990 costing a total of 200 million yen.

The movement toward designating the Dome as a World Heritage Site began in 1986. The Japan Society for Archaeology and the Hiroshima Paper Cranes Association began a petition drive toward designating it as a special historical site. On the occasion of Japan ratifying the Convention concerning the Protection of World Cultural and Natural Heritage, in 1992, Hiroshima City submitted an “Opinion Paper Seeking Registration on the World Heritage List for the A-bomb Dome.” The petition was adopted by the House of Councilors and then by the House of Representatives in 1994. However, the Dome first had to be designated as a National Cultural Asset or Historical Site. Following submission of the application for designation as a historical site in March 1995, the Dome was designated as a Japanese Historical Site in June of the same year. This led to the national government’s formal submission to UNESCO for its nomination of the Dome for registry on the World Heritage list. As a result of these efforts, the Dome was registered in December 1996 as a symbol of the “vow to seek the abolition of nuclear weapons and bring peace to humankind.”

A major point of difference between the Dome and the other World Heritage Sites is that the Dome gives us a serious warning of what could happen in the future besides witnessing what happened in the past. The registration of the A-bomb Dome as a World Heritage Site conveys this strong message to people all over the world.

National government’s opinion: “The A-bomb Dome, in which the tragedy of war has been engraved, should be never removed. It should be redesigned as a principal axis of Peace Park and be preserved permanently.”

Q35 Do any other A-bombed buildings remain besides the Dome?

A. There were many A-bombed buildings before, but only a few now. Two examples of buildings that remain in whole are the former Bank of Japan Hiroshima Branch (380 meters away from the hypocenter) and the main building of the former Hiroshima University, Faculty of Science (1,420 meters away from the hypocenter).

The Bank of Japan building was built in 1936 and both its external and internal appearances were very uncommon at that time because of their Grecian and Roman styles. The blast and radiation was blocked out on the first and second floors because all of the windows were shuttered. The third floor was severely damaged, however, because the windows were open. As of 1972 twenty people who were inside the building during the bombing had managed to survive. Six of those twenty people are still alive. We can only guess that the well-built building was able to shut out the radiation.

The building was repaired and extended twice from 1945 to 1948 and from 1969 to 1970. Since 2000, many peace and A-bomb related events have been held in the building under the control and management of the Hiroshima city government.



Bank of Japan Hiroshima Branch built in 1936 (provided by US Forces)



Bank of Japan Hiroshima Branch immediately after the A-bombing (provided by US Forces)



Inside a room on the third floor. This room was heavily damaged because all the windows were open (provided by US Forces)



Bank of Japan, Hiroshima Branch, at present

Q35-2 Preservation of A-bombed Buildings

In a surviving record, it is said that about 140 ferro-concrete buildings were in Hiroshima. Among those buildings, about 40 collapsed from the bombing and 40 were repaired after the bombing, but were torn down 10 to 30 years later. Regarding the other 40 bombed buildings, most of each building was rebuilt keeping one or more of the remaining parts without changing their appearance.

The A-bomb Dome speaks loudly, as a symbol of peace, of the hollowness of war and the preciousness of peace to overseas visitors and to students who come to Hiroshima on school excursions. It is of great significance. On the other hand, the former Bank of Japan, Hiroshima branch, has been used for events such as fine art, music, literature, drama, and others as a place to express the importance of lasting world peace. It has been a precious place where citizens can come in contact with an A-bombed building.

Major buildings which were exposed to the bomb within one kilometer are listed in the table below.³¹⁾ Besides these, there are still over 10 buildings that were exposed to the bomb beyond one kilometer. It is important to create an environment where those buildings can be preserved as long as possible so that their bomb stories can be conveyed to future generations.

Major Buildings within a Kilometer of the Hypocenter

Pre-bomb name (date of construction)	Distance from hypocenter (km)	Post-bomb name (remarks)	Survivor number as of 1972
Fuel Hall (March 1929)	0.17	Rest House in Peace Park (September 1982) (Only the basement has been preserved.)	1
Imperial Bank Hiroshima Branch (February 1925)	0.36	Hiroshima Andersen (April 1967) (Basically it was rebuilt but has been partially preserved.)	0
Bank of Japan, Hiroshima Branch (August 1936)	0.38	Transfer of control and maintenance of the building to Hiroshima city government (June 2000) (It was repaired and the building has been preserved.)	20
Honkawa National School building (July 1928)	0.41	Peace Museum (April 1988) (Only some parts of the building (basement and a part of the first floor) have been preserved.)	2
Fukuromachi National School (January 1937)	0.46	Fukuromachi Elementary School	4
Fukuya Department Store (March 1938)	0.71	The building was repaired and extended (The exterior appearance of the present building has retained some aspects of the building before the A-bombing).	



Rest House in Peace Park (Former Fuel Hall) Basement



Former Hiroshima University, Faculty of Science, BLDG 1, 1,420m from hypocenter

Q36 When was the Cenotaph for the A-bomb Victims built?

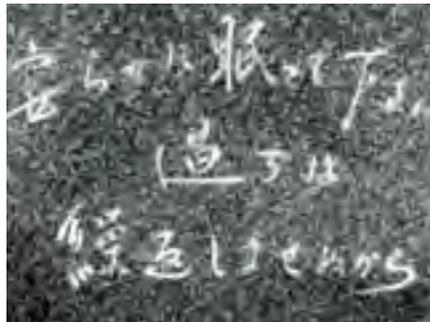
A. The official name of the cenotaph is the Memorial Monument for Hiroshima, City of Peace. It was unveiled on August 6, 1952. The arch-shaped cenotaph was built based on a design by Isamu Noguchi and Kenzo Tange, who were also involved in the design and establishment of the facilities in Peace Memorial Park.

The Peace Memorial Ceremony is held every August Sixth in front of the monument and the register of the A-bomb victims is kept inside the arch-shaped cenotaph. Every year the names of A-bomb survivors who died during the year are entered into the register and during the ceremony they are dedicated to the cenotaph. The names of over 5,000 A-bomb victims were added to the register in 2004. At present, there are 83 books with just under 240,000 names of A-bomb victims.

The characters meaning “Let all the souls here rest in peace, for we shall not repeat this evil” are carved on the front of the stone coffin in the cenotaph. You can see the cenotaph, the A-bomb Dome, and the Peace Memorial Museum in alignment. When you pray in front of the cenotaph, you can see the A-bomb Dome through it. It serves as a visual reminder that the use of atomic bombs can cause catastrophic damage.



The arch-shaped Cenotaph for the A-bomb Victims and the A-bomb Dome seen through the cenotaph.



These characters carved on the front of the stone coffin in the Cenotaph for the A-bomb Victims means “Let all the souls here rest in peace, for we shall not repeat this evil.”

Q36-2 Historical Changes in the Peace Memorial Ceremony

The Hiroshima City government has hosted the Peace Memorial Ceremony every year, except 1950, to console the souls of the A-bomb victims who died on that day or later from its effects. The ceremony was suddenly canceled in 1950 because the Korean War broke out. The ceremony has been held in front of the Cenotaph for the A-bomb Victims every year since 1952 when it was built.

Comparing the programs of the ceremonies in 1952 to that in 2004, it is impressive that the program in 1952 clearly reflects the state of affairs after the A-bomb and the end of the war through the unveiling of the Cenotaph by A-bomb orphans, offering incense to A-bomb victims, and an address by the commander of the British Allied Forces. It also seems obvious that the program for the ceremony in 1952 has been a prototype for subsequent ceremonies.

Peace Memorial Ceremony Program

Year	1952	2004
Date	August 6	August 6
Time	8:00~9:00	8:00~8:45
Official name	Hiroshima Peace Memorial Ceremony	Hiroshima Peace Memorial Ceremony
Program	Opening Address	Opening Address
	Unveiling of the Cenotaph for the A-bomb Victims by five A-bomb exposed orphans	Dedication of the Register of the Names of the Fallen Atomic Bomb Victims by the Mayor of Hiroshima and representatives of the bereaved families
	Dedication of the Register of the Names of the Dead by Mayor of Hiroshima	
	Offering incense to A-bomb Victims by two A-bomb exposed orphans	
	Address by Chairperson of Hiroshima City Council	Address by Chairperson of Hiroshima City Council
		Dedication of Flowers by Mayor of Hiroshima Chairperson of Hiroshima City Council Representatives of the bereaved families and children Representatives of the atomic bomb survivors Distinguished guests
	Silent Prayer and Peace Bell	Silent Prayer and Peace Bell
	Peace Declaration by Mayor of Hiroshima	Peace Declaration by Mayor of Hiroshima
	Release of Doves	Release of Doves
		Commitment to Peace by Children's representatives
	Addresses by Prime Minister (acting prime minister) Chairman of House of Representatives (acting chairman) Chairman of House of Councilors(acting chairman) Governor of Hiroshima Chairman of Hiroshima Prefectural Assembly Commander of Kure Base of the British Allied Forces	Addresses by Prime Minister of Japan Governor of Hiroshima and Secretary General of the United Nations
	Chorus of Peace Song by NHK Hiroshima Station Choir	Hiroshima Peace Song (chorus)
	Closing Address	Closing Address

Q37 How many monuments are there in Peace Memorial Park?

A. Peace Memorial Park covers just over ten hectares in a trapezoid shape. The A-bomb Dome is on the north side and the park is bordered by Peace Boulevard on the south, the Honkawa River on the west, and the Motoyasu River on the east. The area of the park is just over one hundred thousand square meters, or about the size of ten baseball stadiums. The whole area around the hypocenter was developed into Peace Park for the purpose of using it as a symbolical place to wish for everlasting peace.

In 1949, soon after the atomic bomb was dropped, a special law aimed at the development of Hiroshima was established called the "Hiroshima Peace Memorial City Construction Law." Because of this law many monuments have been made possible. Some of them are the Cenotaph for A-bomb Victims (1952), Peace Boulevard, known as the 100 Meter Road (1950), the Peace Memorial Museum (1952), and recently the Hiroshima National Peace Memorial Hall for Atomic Bomb Victims (2002). There are about 50 monuments in Peace Memorial Park. (Please refer to the map on the right.)

A few of the main monuments in the guide map page are: A-bomb Dome (6), Memorial Tower to the Mobilized Students (8), Children's Peace Monument (11), Atomic Bomb Memorial Mound (15), Monument in Memory of the Korean Victims of the A-bomb (18), Cenotaph for the A-bomb Victims (47). You can apply in the Hiroshima Peace Memorial Museum (East Building) (41) to have volunteer staff explain the monuments and the A-bomb.



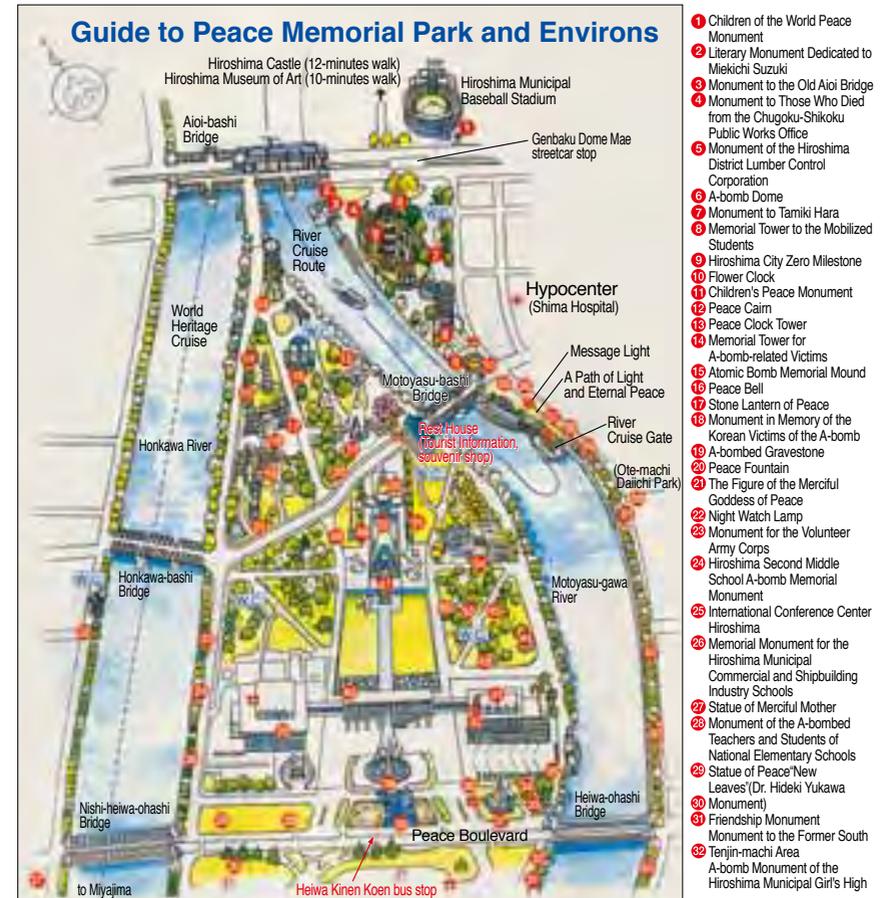
Monument in Memory of the Korean Victims of the A-bomb



Memorial Tower to the Mobilized Students

Q37-2 A Map of Hiroshima Peace Memorial Park and its Surrounding Areas

This is a guide map to Hiroshima Peace Memorial Park and its surrounding areas so that readers can learn the park beforehand. Please refer to it. (Source: Hiroshima Convention & Visitors Bureau; partially modified.)



- 33 School
- 34 Monument in Memory of Dr. Marcel Junod
- 35 Monument in Memory of Mr. Norman Cousins
- 36 Clock Commemorating the Repatriation of Those Who Chose to Return to the Democratic People's Republic of Korea
- 37 Peace Memorial Post
- 38 Peace Tower
- 39 Statue of Mother and Child in the Storm
- 40 Fountain of Prayer
- 41 Hiroshima Peace Memorial Museum (West Building)
- 41 Hiroshima Peace Memorial Museum (East Building)
- 42 Building
- 43 Monument Commemorating Pope John Paul II's Appeal for Peace
- 44 Phoenix Trees Exposed to the A-bomb
- 45 Monument of "Zensonpo" (All Japan Casualty Insurance Labor Union)
- 46 Monument Dedicated to Sankichi Toge
- 47 Monument to the Former Zaimoku-cho Cenotaph for the A-bomb Victims (Memorial Monument for Hiroshima, City of Peace)
- 48 Statue of a Prayer for Peace
- 49 Linden Tree Monument
- 50 Flame of Peace
- 51 Monument of Prayer
- 52 Pond of Peace
- 53 Hair Monument
- 54 Monument of the Former North Tenjin-machi Area
- 55 Hiroshima National Peace Memorial Hall for the Atomic Bomb Victims
- 56 Monument to the Employees of the Hiroshima Post
- 57 Office
- 57 Prayer Monument for Peace
- 58 Monument Dedicated to Construction Workers and Artisans
- 59 Prayer Haiku Monument for Peace
- 59 Hiroshima Monument for the A-bomb Victims
- 60 Monument to the Employees of the Coal Control-related Company
- 61 Monument of the Hiroshima Gas Corporation
- 62 Monument for the A-bomb Victims from the Hiroshima Agricultural Association
- 63 Hair Monument
- 64 Merciful Consoling Kannon for Mobilized A-bomb Victim-Students

Q38 Are there trees damaged by the bomb that still survive?

A. Yes, it's true. The fire caused by the bomb and the explosion itself knocked over and burned many trees. Yet we found that many trees among the fallen put forth new buds or managed to survive and produce leaves again despite the shock and fire. It is said that plants are ten times more resistant to radiation than animals.

Ten years ago the Hiroshima city government decided to designate the A-bombed trees as symbols of reconstruction and took steps to preserve them. At present, there are about 150 trees in 52 places within two kilometers of the hypocenter that have been designated as A-bomb trees. However, about fifty trees among them have become much weaker and they need special care. At the time of the bombing, there was a rumor that nothing would grow in Hiroshima for 75 years, but the sight of the damaged and fallen trees putting forth new buds kindled hope in the hearts of citizens in Hiroshima and encouraged them. I hope those A-bombed trees³²⁾ will live well and long. I recommend you read the story about the A-bombed phoenix trees and learn to sing the song about them.



Oleaster tree in Seijuji Temple, 530 meters away from the hypocenter



Phoenix tree that was exposed to the A-bomb 1,300 meters from the hypocenter and later transplanted to Peace Memorial Park.



Camphor tree at the Tenma Elementary School located 1,160 meters from the hypocenter



Cherry tree at the Ikari Shrine, 1,800 meters from the hypocenter

Q38-2 Surviving Trees

Now about 150 A-bombed trees of 31 types exist in Hiroshima. Those trees designated as A-bombed have yellow explanation boards, so that you can find them easily. When you pass nearby the trees, please speak to them saying "thank you for surviving the A-bombing."

Only 20 A-bombed trees are listed in order of distance from the hypocenter in the table below. (For details, please refer to the Internet website of Hiroshima City government <http://www.city.hiroshima.jp/> or Reference³¹⁾)

Existing A-bombed Trees (excerpt)

Name of Tree	Location	Distance from Hypocenter (km)	Address
1 Weeping willow	West of Hiroshima Youth Center	0.37	14 Moto-machi Naka-ku
2 Round leaf holly	Rai Sanyo Shiseki Museum	0.41	5-14 Fukuro-machi Naka-ku
3 Weeping willow	East of Hiroshima Children's Museum	0.45	5 Moto-machi Naka-ku
4 Camphor Tree and Camellia	Shirakamisha Shrine	0.49	7-24 Naka-machi Naka-ku
5 Japanese Hackberry	In front of Shirakamisha Shrine	0.53	Peace Boulevard, Komachi Naka-ku
6 Elaeagnus	Seijuji Temple	0.53	2-5-13 Honkawa-cho Naka-ku
7 Eucalyptus	Ninomaru of Hiroshima Castle	0.74	21 Moto-machi Naka-ku
8 Camphor tree	Chuo (Central) Park Jiyuhiroba	0.76	15 Moto-machi Naka-ku
9 Japanese Fern Palm	Jyoonji Temple	0.79	3-10-4 Ote-machi Naka-ku
10 Peony	Honkyoji Temple	0.89	3-13-11 Ote-machi Naka-ku
11 Round leaf holly	In Hiroshima Castle	0.91	21 Moto-machi Naka-ku
12 Round leaf holly	Kinryuji Temple	0.94	9-27 Komachi Naka-ku
13 Camphor tree	West of Hiroshima Municipal Moto-machi Apartment No.1	1.01	16 Moto-machi Naka-ku
14 Prunus yedoensis (Someiyoshino)	Hiroshima City Hall	1.05	1-6-34 Kokutaiji-cho Naka-ku
15 Crape Myrtle	Zenshoji Temple	1.10	3-11 Tera-machi Naka-ku
16 Camphor tree	Moto-machi Koso (high-rise) apartment	1.11	20 Moto-machi Naka-ku
17 Camphor tree	South of moat in Hiroshima Castle	1.12	21 Moto-machi Naka-ku
18 Camphor tree	In front of Saibansho (Court) apartment	1.12	2 Kami-hacchobori Naka-ku
19 Maidenhair Tree	Hosenbo	1.13	3-3 Tera-machi Naka-ku
20 Japanese Fern Palm	Hiroshima Betsuin Temple	1.15	1-19 Tera-machi Naka-ku

Q39 Are the A-bombed buildings and trees the only things that still remain?

A. There are some surprises for you. There are four streetcars, which still serve Hiroshima commuters.

At the time of the A-bombing, 92 streetcars were operating and most of them were burned and crushed in an instant. Although 31 streetcars were in the car barn, most of them were destroyed as well. The A-bombed streetcars which are still operating were manufactured three years before the attack. Two streetcars, No.653 and No.654, were running in the area of Eba (2.9km away from the hypocenter), and No.651 streetcar was running near Hiroshima City Hall (1km away), and No.652 streetcar was running in the Ujina area (4.2km away).

All of them were damaged during operation; however, the staff of the streetcar company at the time worked very hard to repair them and they enabled the A-bombed streetcars to operate again only three days after the A-bombing. Even though they could only operate in limited sections of the track, the sight of the streetcars running encouraged everyone. There are four A-bombed streetcars still running everyday during rush-hour in the morning and evening, so you might have a chance to ride them. A plaque with a brief explanation of the A-bomb is just behind the driver's platform in each streetcar, so you should read it after you get on.



This A-bombed streetcar is still operating.



A plaque with a brief explanation behind the driver's platform in the streetcar

Q39-2 Excavation of Victims' Remains

Discovering the remains of the deceased is a sad fact which continues to this day. At the time of the bombing, many injured people were taken to Ujina to have medical treatment; however, the place was very soon filled with about 6,000 injured people. Others were carried to Ninoshima Island, 4 kilometers off the coast of Ujina, because a military related quarantine was located on the island at that time. It is said that the total number of injured people was about 10 thousand.

The Hiroshima City government collected the remains of the deceased that had been left on Ninoshima Island. It is easy to imagine how many remains were collected. They were enshrined in a mound for the unidentified victims while the total number remains unclear.

The remains of 2,000 bodies were discovered in 1955. These remains were stored in the Atomic Bomb Memorial Mound in Peace Memorial Park. Excavation work was conducted in 1971, with the help of memories and experience reports from the local people, and the remains of 617 dead bodies were discovered. A third excavation project was conducted in May 2004, which recovered the remains of 87 more bodies.

Even now scars from the A-bomb can be seen, though 59 years have already passed. At that time, many fathers and mothers walked about, here and there, to search for their children. Even though some of them found that their children were injured and taken to Ninoshima Island, they couldn't meet them and couldn't even receive their remains. How do these people view the discovery of remains 59 years after the A-bomb?



Ninoshima Island

Q40 The number of A-bomb survivors is going to decrease, right?

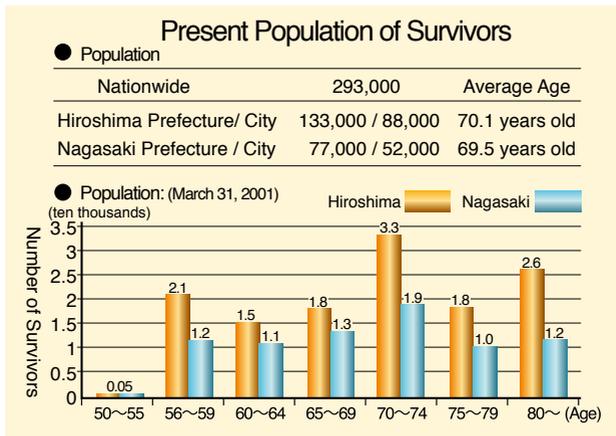
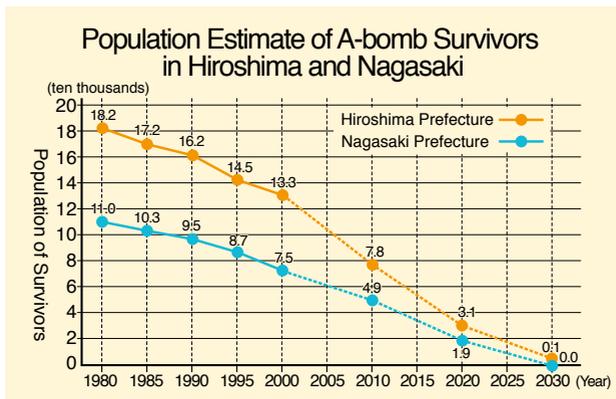
A. Yes, I think so. Some of my relatives and friends, even those who are younger than me, have passed away. It makes me sad.

About 180,000 A-bomb survivors used to live in Hiroshima Prefecture 25 years ago, but there are around 130,000 now. The number of survivors is going to continue to decrease and in 25 years (the year 2030), the number in Hiroshima Prefecture will probably be in the thousands.

I truly hope that, even after the survivors are gone, people around the world will share the spirit in which no one forgets Hiroshima and Nagasaki. I also hope they will strengthen their desire for peace, eliminate nuclear arms, and always strive to live in harmony.

The first graph below shows a population forecast of A-bomb survivors in Hiroshima and Nagasaki prefecture.³³⁾ The number in 2030 seems to decrease significantly.

The second graph shows the population both in Hiroshima and Nagasaki prefecture as of 2001.



Q40-2 The Study of A-bomb Survivors Contributes to International Society

The results of the studies on the continued effects of A-bomb radiation and the experience of medical care for the survivors in Hiroshima and Nagasaki, which do not exist in other countries, will always be valuable. These findings should be used to contribute to everlasting peace.

Some data concerning Hiroshima and Nagasaki have been already utilized in international organizations, such as ICRP (International Commission on Radiological Protection), in setting standards for the prevention of radiation hazards. In addition, the research methods used in the study of A-bomb survivors including epidemiology to determine incidence of cancer, etc., physical dosimetry procedures, chromosome analysis techniques, were applied to the study of residents exposed to the Chernobyl nuclear reactor accident, the south Ural accident in Russia, the Semipalatinsk nuclear test site in Kazaphstan, etc.

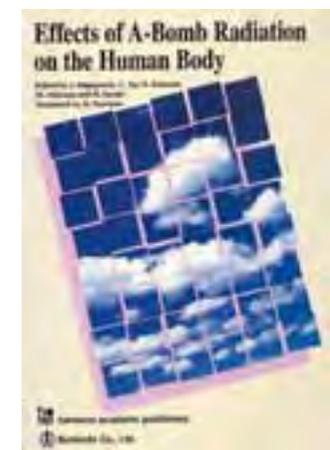
Furthermore, the realities of medical, social and man-made damage due to the bomb have been providing significant rationale for global peace movements and campaigns to support the reduction and disposal of nuclear weapons.

Still, the study of A-bomb survivors has not yet been completed. In order to ensure the accuracy of lifetime incidence of cancer, epidemiologic studies have to be thoroughly conducted for those who were exposed to the bomb at the age of 10 and younger. The results will be useful as standards in radiation protection or control for everyday use in international society.

The photo on the lower left shows a book published by the International Physicians for the Prevention of Nuclear War (IPPNW),³⁴⁾ which also covers the damage to A-bomb survivors. The lower right is a book published by the Hiroshima International Council for Health Care of the Radiation-Exposed (HICARE) which gathers data on A-bomb effects on the human body.³⁵⁾



The damage to A-bomb survivors is written about in "War and Public Health" published by the International Physicians for the Prevention of Nuclear War (IPPNW).

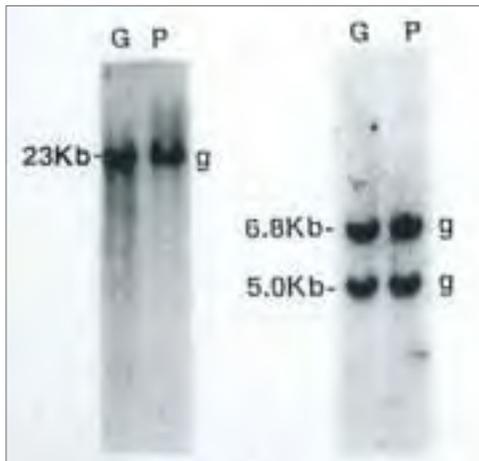


The A-bomb effects on the human body are put together in a book, published by the Hiroshima International Council for Health Care of the Radiation-Exposed (HICARE).

Q41 Were the children of A-bomb survivors affected?

A. I didn't have a chance to become a mother, but many A-bomb survivors were very worried if there would be any abnormalities in their children.

Until twenty to thirty years after the bombing, there was a rumor that the bomb affected the children of survivors. However, various research was conducted showing that there were no abnormalities in children's chromosomes, a higher frequency of cancer, and no unusually high **mutation rate**. At least, no evidence of negative effects on children has been found so far.



An example of genetic examination

Survey of Genetic Effects for the Survivors in Hiroshima and Nagasaki

Survey Items	Number Surveyed	Genetic Effect
Abnormal Pregnancy (malformation, stillbirth, death just after birth)	71,280 people	None
Change in ratio of male and female	47,624	None
Abnormal Chromosome	16,298	None
Incidence of Malignancy	72,000	Not found
Death Rate	68,000	Not found
Mutation Rate of Genes (Protein)	30,000	None
DNA Study	1,000 families	To be decided

Mutation rate: A rate of inheritance of genes with characteristics different from the parents.

Q41-2 Health Study of Children of A-bomb Survivors (Second-Generation)

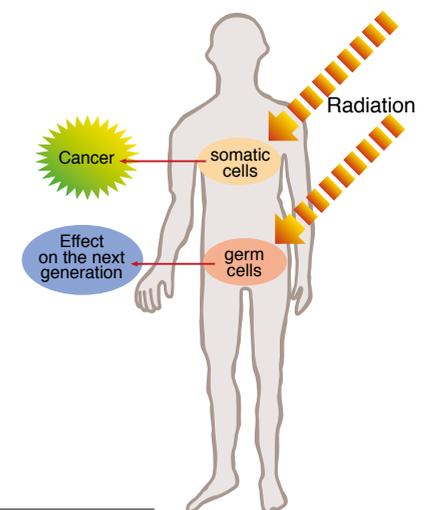
After the discovery of X-rays in 1895 and their frequent use later, skin cancer or leukemia came to be reported. Thereafter, this also raised concerns that radiation might affect the children of "next generations" via **germ cells** (genetic effects). In fact, in 1927, H.J. Muller observed an increased incidence of mutations among drosophila exposed to X-rays and proved that an increase of mutation in the next generation of drosophila occurred in proportion to radiation dosage. In the following year, similar results were found in plants, whose phenomenon was thought to apply to living organisms in general.

The second generation of A-bomb survivors means the children who were born from those who were exposed to the bomb. If these children have genetic effects, it could be possible only when the "germ cells" of their father or mother are damaged by radiation. In Q21-2, it is explained that lymphocyte or bone-marrow cells of the survivors have chromosomal abnormalities, but these cells are "somatic cells," not "germ cells." Even when "somatic cells" have abnormalities, it will have nothing to do with inheritance as long as "germ cells" are normal.

As the table in Q41 indicates, the children of A-bomb survivors were tested in terms of chromosome and protein, but no evidence of effects on the children has been found so far.⁹⁾ Some research was conducted to study the effects on children of those who were exposed to radiation due to medical treatment, those who deal with radiation in their jobs, or those who live in the areas where high levels of natural radiation are emitted such as in Brazil and India. However, there is no proof to show genetic effects.

Recent molecular biology and studies of genetics suggest that multiple genes are related to people's diseases (multiple gene factor). The Radiation Effects Research Foundation (RERF) started a large scale study for the second-generation children of A-bomb survivors in 2001. The planned participants for this study were around 24,000 Hiroshima residents, but the actual number was around 11,000. Their lifestyle habits and health checkups will be examined in detail from now on, and the research is finally planned to advance the level of the study of genetics (molecular biological study.)

The figure on the right shows the difference of effects on the next generation between "somatic cells" and "germ cells."



Germ cells: Male sperm and female eggs of living organisms, which produce offspring in order to maintain and perpetuate their species.

Q42 What can we do to stop the use of atomic bombs?

A. Now you are getting to the crucial point. We are told “atomic bombs will never be used again” but what can we do to ensure it doesn’t happen?

First, we have to preserve the historical fact that A-bombs were dropped on Hiroshima and Nagasaki and mainly targeted civilians. They caused— and continue to cause— severe hardships for the citizens of Hiroshima and Nagasaki.

It is said that wise people always refer to history. For those who study history, the facts that include why the A-bombs were used should be left on the record.

Next, we have to stop wars. No one drops an A-bomb all of a sudden. There might be a situation where an A-bomb is used due to disagreements between countries, but whatever the case, we shouldn’t make war.

Today, about fifty wars killing more than 100 people break out in a year. Especially the weak, like innocent children, lose their lives or get injured. So it is important for each one of us to make efforts to eliminate the causes of wars.

We need to pay attention to these issues, such as to support poor countries, to become tolerant of different religions, not waste resources, nor waste food. There seem to be a lot of things even junior or high school students can do. When you grow up a little, please refer to some of the practical examples of “peace studies” on the page on the right.

There is a global “Peace Watch” clock within the museum in Hiroshima Peace Memorial Park. The digital board displays 21,616 at the top, the number of days that have passed since the A-bombing of Hiroshima. Below that shows the number of days since the most recent nuclear test. The photograph below shows 138 days, which is the number of days after the U.S. conducted an underground sub-critical nuclear test (a controversial nuclear weapons test that is low enough to not create critical mass of fissile material) in Nevada. When you look at this clock, I hope the lower number on the board will have increased.



The “Peace Watch” clock

Q42-2 Practical Examples of “Peace Study” by Junior and High School Students

A-bomb survivors are making an outcry: “We must not have anyone in any country experience what we suffered. No more wars. Let’s make a peaceful world.”

The survivors are also expressing their feelings in different styles such as writing books, making paintings, composing poems about their experience, getting together to form human letters, walking in peace marches, running in peace relay races, holding sit-ins, tying ribbons, giving testimony, etc.

Junior and high school students have been taking respectable actions. Here are some examples. Everyone needs to think about what he or she can do and take action.

Examples:

- (1) An A-bomb drama based on the war was created and performed in the annual school festival. (By the first graders of Kaita junior high school students in Hiroshima Prefecture, 1979. See the photo on the upper left at bottom.)
- (2) Erection of “The Cenotaph of Hiroshima”. (By the Peace Seminar of High School Students in Hiroshima Prefecture. In collaboration with high school students in Kansai and Kanto regions, 1982. See the upper right photo at bottom.)
- (3) Circle round the A-Bomb Dome with peace ribbons. (By nationwide grass-roots peace movement groups, 1984. See the lower left photo at bottom.)
- (4) Peace event planned and operated by high school students. (By students at Miyajima Industrial High School and Hatsukaichi-Nishi High School in Hiroshima, 2004. See the lower right photo at bottom.)



(1) (Chugoku Shimbum, Nov. 10, 1979.)



(2) (Chugoku Shimbum, Aug.5, 1982.)



(3) (Chugoku Shimbum, Aug.4, 1984.)



(4) (Chugoku Shimbum, Jul.19, 2004.)

Q43 What are adults doing to seek peace?

A. They are doing a lot of things. A-bomb survivors are composing poems and haiku about their experience at the time of the bombing, or joining campaigns for **nuclear disarmament**.

Some adults, who were not exposed to the A-bomb, are holding international conferences to help decrease the number of countries which possess nuclear weapons (**Non-Proliferation Treaty**). Some are also applying pressure on Russia and the U.S. to have discussions in order to decrease their nuclear arsenals (**Comprehensive Nuclear Test-Ban Treaty**).

On the other hand, others are making appeals to remind us of the preciousness of peace by holding dramas or concerts, or promoting campaigns to oppose the possession and use of nuclear weapons (No-Nuke Movement) or joining peace-building campaigns (peace movement). Many groups from the grass roots level to international organizations meet regularly to prepare and promote these campaigns.

The Peace Memorial Ceremony is held every year on August Sixth in Hiroshima and on August Ninth in Nagasaki. These ceremonies can be considered nation-wide events. The important thing is that campaigns and group activities should be conducted every year repeatedly.

The IPPNW (International Physicians for the Prevention of Nuclear War), a Nobel Peace Prize laureate, and the World Conference for Mayors for Peace, a winner of the World Citizen Award, have been taking action for a long time in order to stop the use of nuclear weapons. Please support their activities.



A photo taken at the world congress of IPPNW in 2000 (Paris)



A photo taken at the World Conference for Mayors for Peace held in Hiroshima, (Material from Hiroshima Peace Culture Foundation)

Nuclear disarmament: To abolish nuclear weapons.

NPT (Non-Proliferation Treaty): See Q45-2

CTBT: The Comprehensive Nuclear Test-Ban Treaty (CTBT) prohibits both nuclear weapon test explosions and nuclear explosions in all spaces, including outer space. In order to ensure the implementation of this treaty provision, the CTBT organization was established along with a verification system. In June 1996, the final draft was submitted to disarmament talks. In September the same year, the draft adoption was sent to the United Nations General Assembly, where Japan signed and ratified the treaty. However, due to some nations' refusal, the treaty has not come into effect at the present time. This treaty does not force current nuclear powers to abolish nuclear weapons.

Q43-2 “Nuclear-Weapon Free Zones” Declaration³⁶⁾

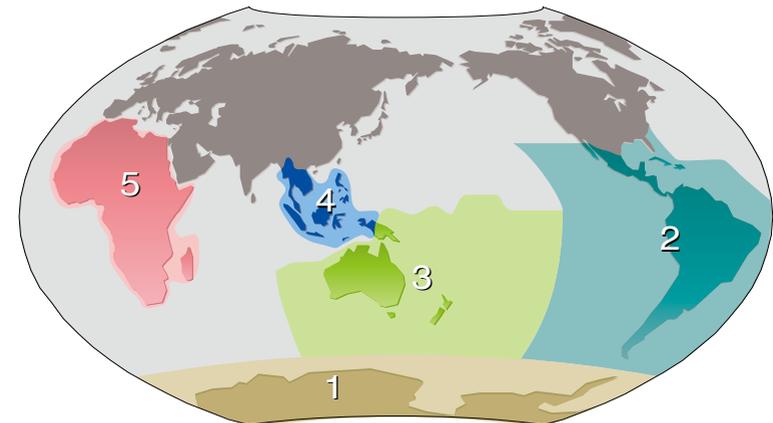
There are already five international treaties for a “Nuclear Weapon Free Zones Declaration” in the world, which promise (1) not to bring nuclear weapons into their zones or not to transfer these weapons to other countries, and instead ask (2) not to threaten or attack their zones with nuclear weapons.

“Nuclear Weapon Free Zone” Declaration (Treaty)	Signing and Effective Dates
1 Antarctic Treaty	Dec. 1959 signed and effective (See No.1 in map)
2 Latin America and the Caribbean Nuclear Weapon Free Zone	Feb. 1967 signed and effective (See No.2 in map)
3 South Pacific Nuclear Free Zone	Aug. 1985 signed and effective (See No.3 in map)
4 Southeast Asia Nuclear Weapon Free Zone	Dec. 1995 signed and effective (See No.4 in map)
5 African Nuclear Weapon Free Zone	Apr. 1996 signed, still-pending (See No.5 in map)

One hundred thirteen countries out of 191 in the world are involved in these treaties. More than 50% of the people on earth strongly wish for nuclear weapon free zones and side with these treaties. The conclusion of a nuclear free treaty in five countries in Central Asia has been in progress. Japan is located in Northeast Asia (Japan, Korea, North Korea, and China), where lots of efforts have been taken but unfortunately the talks do not seem to be progressing.

The idea of “eliminating nuclear weapons” is an extension of the idea that Hiroshima and Nagasaki should never be repeated again. 77% of cities and towns in Japan declared their wish for a “Nuclear Free Government.” However, many residents do not even know the fact of their cities’ nuclear free declaration. Students and members of society, let’s think about how much the earth would lose if nuclear weapons were used.

Recall that today’s nuclear weapons have 3,300 times the power and energy compared with Hiroshima’s bomb and after reflecting on what he or she has learned so far, think what each person can do. One person’s power is small, but great power is never to be generated unless one takes the first step.



Q44 What can we do to make the world more peaceful?

A. You've made a very good point. It is important to think about what you can do. It is not enough just to be aware of what you've heard from me and count it as "knowledge."

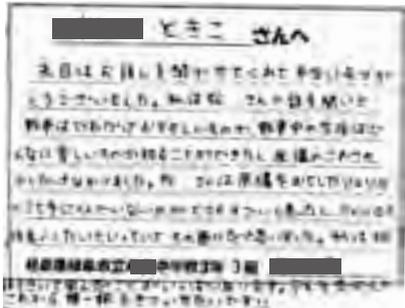
Peace does not come of itself. "Peace" simply means "No war."

Peace is created from the point where everybody understands and respects each other's viewpoints, actions, and ways of life and works together. For instance, even when you are young, you need to listen to what others say as well as learn how to express your own opinions. It is important to remember to not fight with your friends and be more tolerant of people from different countries, races, and religions.

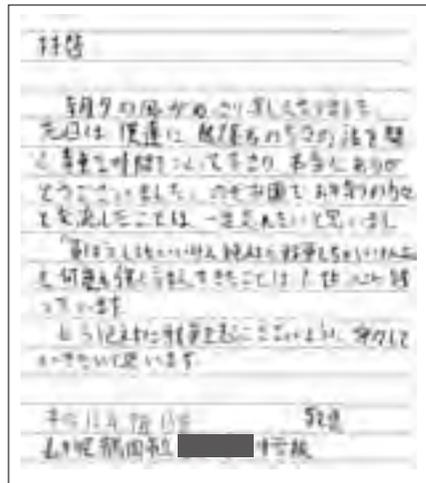
When you grow up you may have a chance to talk with people from foreign countries. Regardless of the differences in both countries' culture, religion, or system of government, the feeling that you respect others is more important than anything else for making a more peaceful world.

If you were ignored, you would feel bad, right? You can start by respecting others from now on. It would be useless if you didn't act on this idea but just kept it in mind. Always do your best on this point.

The following letters are the impressions written by students who came to Hiroshima for peace studies.



Dear Tokiko-san,
Thank you very much for sharing your sad story with us the other day. Listening to you speak, I could know how fearful the war was and how much people suffered. I had never imagined the horrors of war. I was especially impressed by your not hating America which dropped the A-bomb. You said you wanted to get along with America, which I thought was right. I learned many things from you. Because of the things I learned from you, I will make the most out of every single day!!
(From a 15-year-old student in Gifu)



Greetings. Thank you so much for sharing your time so we could listen to survivors' experiences the other day. I will never forget my time spent with the elderly at Nozomi-en Home. I was very impressed by the appeals you made over and over again: "You must not make war," and "It is better to be poor than to be in a war." I want to make efforts to never allow a war to start.
September 13, 2004
(From a junior high school student in Tsuruoka City, Yamagata Prefecture)

Q44-2 Telling the Effects of the A-bomb to the Next Generations-What Can We Do?

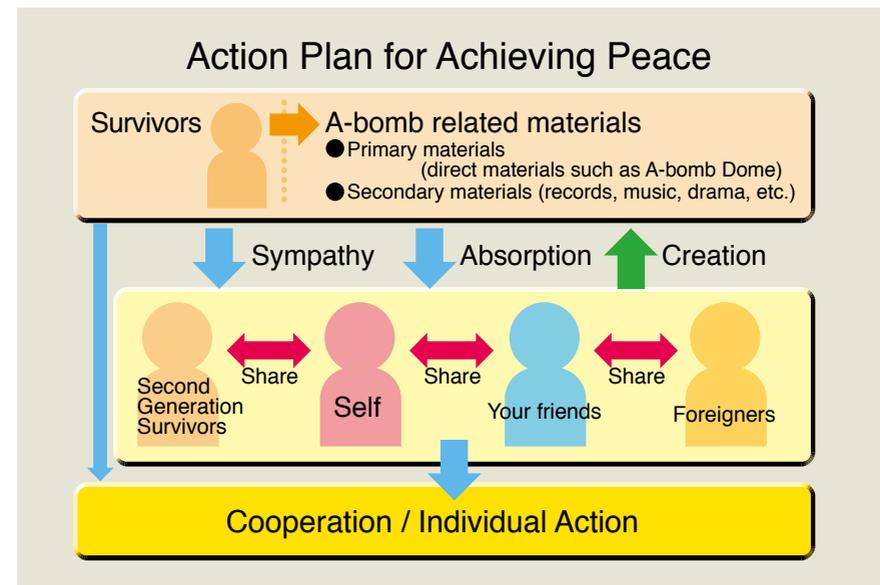
A-bomb survivors in Hiroshima and Nagasaki have "lived a life", overcoming suffering, economic, social and physical difficulties. With assistance from various people, the survivors have been joining campaigns, under risk to their lives, for "prevention of A-bomb use" in order to stop a third A-bomb being used. They have been appealing with the feeling that "they do not want other people in any country to experience what they have suffered."

The survivors' movement shall be valued and considered to have borne fruit in part in the sense that a third A-bomb has never been used. However, their bodies are completely exhausted. Some are concerned a second or third cancer will be found. The survivors have been involved in various campaigns because only Hiroshima and Nagasaki's survivors can do this. Your turn is next. It is your turn to convey the message to the world – "How A-bomb survivors live and think and then take action."

The Japanese have played a very important part in history. They research and record in detail the A-bombs' destructive power and what social breakdown is like. Long-lasting physical and psychological effects are thoroughly studied and the findings are continuously being recorded. You, the reader, have learned various things about the effects of the A-bomb through this book.

It is you, the reader, who can tell many people how the A-bomb is cruel and abject, and can work as a bridge for world peace. Transmitting survivors' lives and effects of the A-bomb are left to you.

Conveyance of peace and the A-bomb effects becomes possible through individual, group, and international cooperation. Sharing hearts and minds is first required to achieve this.



Q45 Thank you for sharing your experience with me

A. Is my talk enough? I hope you were able to learn something new. Keep in mind that there are a lot of people with different circumstances in the world. Please come back again when you grow up, though I may be gone by then.

Take care, and never forget the importance of peace.



Q45-2 Hiroshima and Japan's Roles for Building Peace

Damage caused by the A-bomb was recognized in Hiroshima and Nagasaki for the first time in history. Many residents of large areas in the world are also suffering radiation damage due to accidents in the process of making bombs (Ural region in Soviet) or nuclear tests to verify the bombs' power. Still, the haves will not give up nuclear bombs.

In 1970, five countries which had A & H bombs- the US, the UK, the USSR, France and China signed the Non-Proliferation Treaty (NPT). The treaty designated these allied five nations as nuclear powers and prohibited all other countries from possessing nuclear weapons and the validity was set for 25 years. In 1995, the conference was held to discuss "whether the treaty would be extended definitely or indefinitely."

Being worried, the treaty was determined to be extended "indefinitely" in the UN plenary session. However, with efforts and resistance by nonaligned countries and no-nuke NGOs, "conditions" were added. Documents were adopted, which said that "the Review Conferences of NPT" should be held every five years to consider whether the treaty is adhered to properly and what needs to be done in the future.

Five years later, in April, 2000, "the Review Conference of NPT" was held, in which the document of "The Clear Commitment to the Total Abolition of Nuclear Weapons" was adopted, including the nuclear powers. The content remained ambiguous. The next year, on September 11, 2001, the series of terrorist attacks in the US occurred. This reversed progress and gradually allowed easy execution of nuclear tests or use of nuclear weapons. It is Hiroshima and Nagasaki that know the most about the fear of nuclear weapons. The mayors of Hiroshima and Nagasaki have been holding "World Conference of Mayors for Peace" since 1985. Already 1,036 cities in 112 countries have become members.

In May 2005, "the Review Conference of NPT" was organized. The "World Conference of Mayors for Peace," led by Mr. Akiba, mayor of Hiroshima, and Mr. Ito, mayor of Nagasaki, appealed to all nations "to start negotiations for the total abolition of nuclear weapons with a clear deadline" and suggested action programs to eradicate nuclear weapons by 2020. However, the disagreements between the allied and nonaligned nations were not ended and the conference closed with no significant achievement. The characteristic of the Review Conference of NPT itself – unanimous voting – highlighted a problem.

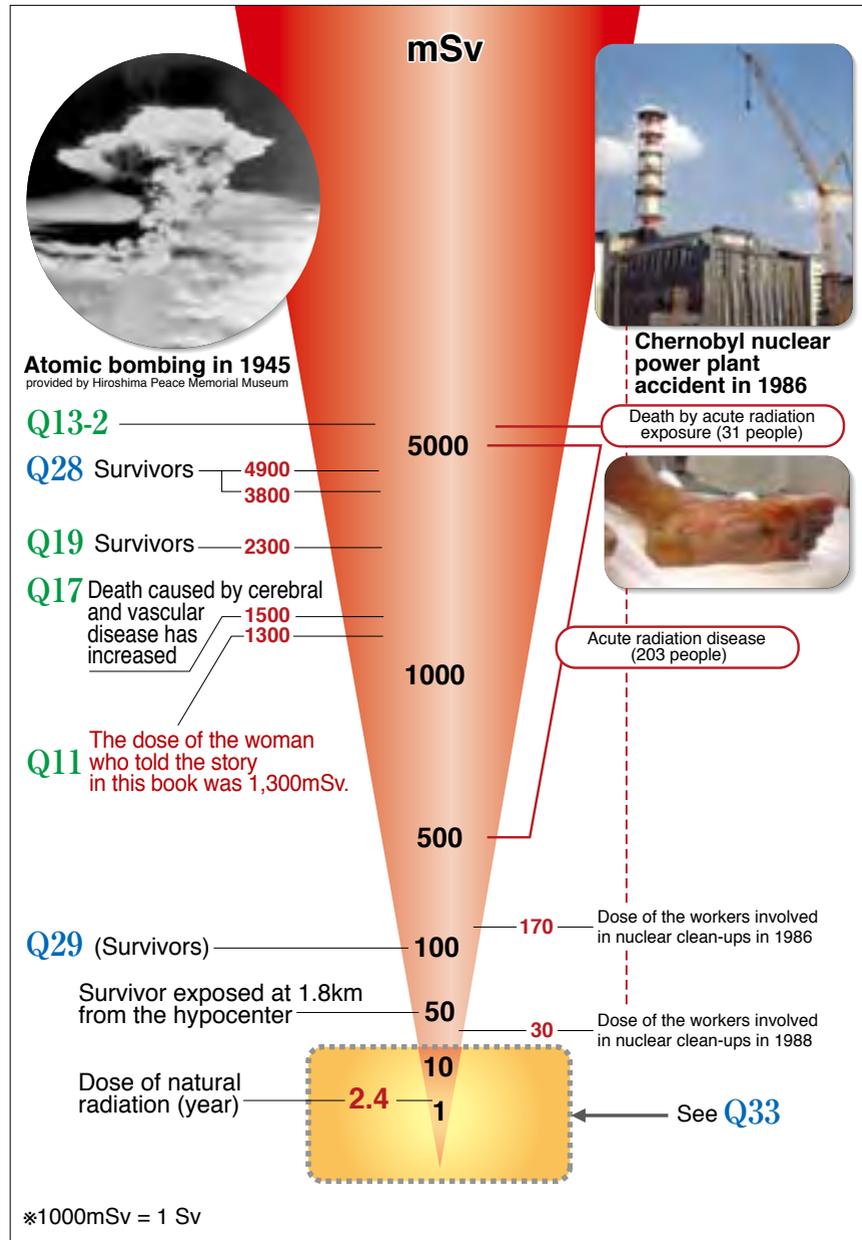
As written in Q43, even when 113 countries claim the total abolition of nuclear weapons, but make no progress, Japan should not wait for the next "Review Conference of NPT" in another 5 years but should lead each city and each civic group in the world, including movements outside the framework of the "Review Conference of NPT," and make efforts to abolish nuclear weapons. The role of the "World Conference of Mayors for Peace" has become more and more important for the future.



Resource Materials

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Radiation dose



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Material Sources

- Cover page: The U.S. Armed Forces, provided by Hiroshima Peace Memorial Museum
- Q2: The U.S. Armed Forces, provided by Prof. N. Hayakawa, Hiroshima University
- Q2-2: Partially modified Figure 3, page 13 from Architectural Witnesses to the Atomic Bombing-A Record for the Future
- Q3: From The U.S. Armed Forces
- Q4: From The U.S. Armed Forces
- Q5: Partially modified material from National Atomic Energy Safety Commission
- Q7: From The U.S. Armed Forces
- Q7-2: The U.S. Armed Forces, reproduced from Medical Effects of Nagasaki A-Bomb by Scientific Data Center for the Atomic Bomb Disaster Nagasaki University School of Medicine Nagasaki University
- Q8: From The U.S. Armed Forces
- Q8-2: Chugoku Shimbun, Nov.11, 1946 and Aug.1, 1954
- Q9-2: From the Atomic Bomb Survivors Field Survey Report 1995 (Survey of Survivors)
- Q11-2: Hiroshima Peace Memorial Museum
- Q12: From The U.S. Armed Forces
- Q13: From The U.S. Armed Forces
- Q13-2: From The U.S. Armed Forces
- Q14: Hiroshima Peace Memorial Museum
- Q14-2: Chugoku Shimbun April 8, 1956 and May 5, 1958
- Q17: Partially modified from Ref.9, pages 139 and 326
- Q18: Reproduced from Medical Effects of Nagasaki A-Bomb by Scientific Data Center for the Atomic Bomb Disaster Nagasaki University School of Medicine Nagasaki University and modified from page 233 of Ref.9
- Q18-2: Modified from page 309 of Ref.9
- Q20: From The U.S. Armed Forces
- Q20-2: From The U.S. Armed Forces
- Q21-2: Modified from Figure 6, page 254 of Ref.9
- Q26-2: Hiroshima Peace Memorial Museum
- Q27-2: Modified Figure 2, page 392 of Ref.26
- Q28-2: Modified Figure 7, page 562 of Ref.27
- Q29-2: Modified Figure 1 (page 34) and Figure 4 (page 35) of Ref.29
- Q33: Utility of radiation, Ref.30
- Q33-2: Utility of radiation, Ref.30
- Q34: From The U.S. Armed Forces
- Q35: From The U.S. Armed Forces
- Q37-2: Partially modified from brieflet of Hiroshima Convension Beourou
- Q39-2: Chugoku Shimbun My 28, 2004
- Q41: Partially modified from the figure, page 26 of Ref.9
- Q42-2: Chugoku Shimbun Nov.10, 1979, August 5, 1982, August 4, 1984 and July 19, 2004
- Q43: Hiroshima Peace Memorial Museum
- Q43-2: Ref.36

Suggested Reading List³⁸⁾

- Compiled by Tomoko Nakamura
<http://homepage2.nifty.com/tomokonet/>
- Among 446 English-language books concerning the destruction by A-bomb of Hiroshima and Nagasaki, listed by Tomoko Nakamura, 16 basic books are introduced here. They are selected according to the following criteria: availability, and reliability; i.e., the books which have been reprinted with a large circulation by major publishers, and read by many people, and those which report the facts about the atomic bombings comprehensively.
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Museum Special Services

I Loan of Photo Posters and Videos for Education Purpose

In order to pass on the reality of the A-bombings to as many people as possible and to heighten the awareness of peace, we loan exhibit materials listed below to governmental and non-beneficial entities. Part of the materials can be donated on condition that the entities wish to continuously use them for the purposes of peace promotion.

Hiroshima – Nagasaki Photo Posters <Printed Version>

This set of 30 posters is a collection of photographic posters describing the conditions of the A-bomb damage including the A-bomb mushroom clouds and the A-bomb dome. Each poster's dimensions are 90cm _ 60cm. The total weight of all 30 posters comes to 3kg.

Available languages: Chinese, English, French, German, Italian, Japanese, Korean, Russian, Spanish

Hiroshima – Nagasaki Photo Posters <Digital Version>

Digital data of 48 posters in DVD or CD-ROM describing the conditions of the A-bomb damage including the A-bomb mushroom clouds and the A-bomb dome. Slightly different from the contents of the Printed Version. Adobe Illustrator or PDF

Available languages: English

Also Video Tapes (VHS) · DVD are available

Hiroshima: A Mother's Prayer (English, French, German, Italian, Spanish etc.)
 Children of Nagasaki (English)
 Hiroshima Witness (English)
 On a Paper Crane (English, French)

II Guided Tours by HIROSHIMA PEACE VOLUNTEERS (Free of charge)

A) Guided tour of the exhibition in the Peace Memorial Museum

(Group size: 1 to 10 people)

B) Guided tour of the peace monuments in the Peace Memorial Park

(Group Size: 1 to 15 people)

Approximate time required: 60-90 minutes for both A and B

Tour Days: January 4 to December 28 (*Not available on August 6)

Tour Hours: 10:30 to 15:30

Reservation are available by fax or e-mail:

*Reservations are accepted from 9:00 to 17:00 (Museum is closed from December 29 to January 1)

*Reservations for English tour are available from 3 months to one week before the day you wish to visit the museum.

*Same day reservations: Please ask the information desk of the East Building from 10:30 to 14:30

Further information:

Outreach Division, Hiroshima Peace Memorial Museum,
 1-2 Nakajima-cho, Naka-ku, Hiroshima 730-0811, Japan
 FAX: +81-82-247-2464 (In Japan 082-247-2464)
<http://www.pcf.city.hiroshima.jp/>

Past Peace Declaration

Archive of all Peace Declaration

Select the year by clicking on it.

1947- 49 1947, 1948, 1949

1951- 59 1951, 1952, 1953, 1954, 1955, 1956, 1957, 1958, 1959

* Due to the cancellation of the Peace Memorial Ceremony, Peace Declaration was not announced in 1950.

1960' 1960, 1961, 1962, 1963, 1964, 1965, 1966, 1967, 1968, 1969

1970' 1970, 1971, 1972, 1973, 1974, 1975, 1976, 1977, 1978, 1979

1980' 1980, 1981, 1982, 1983, 1984, 1985, 1986, 1987, 1988, 1989

1990' 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999

2000' 2000, 2001, 2002, 2003, 2004, 2005

http://www.city.hiroshima.jp/shimin/heiwa/pd/pd_e_archive.html

1947

Today, on this second anniversary of the atomic bombing of Hiroshima, we, Hiroshima's citizens, renew our commitment to the establishment of peace by celebrating a Peace Festival at this site, and expressing our burning desire for peace.

The citizens of Hiroshima will never be able to forget August 6, 1945. On that morning, exactly two years ago today, the first atomic bomb to be unleashed on a city in the history of mankind fell on Hiroshima; it instantly reduced the city to ashes and claimed the precious lives of more than 100,000 of our fellow citizens. Hiroshima turned into a city of death and darkness. Yet as some slight consolation for this horror, the dropping of the atomic bomb became a factor in ending the war and calling a halt to the fighting. In this sense, mankind must remember that August 6 was a day that brought a chance for world peace. This is the reason why we are now commemorating that day by solemnly inaugurating a festival of peace, despite the limitless sorrow in our minds. For only those who most bitterly experienced and came to know most completely the misery and the guilt of war can utterly reject war as the most terrible kind of human suffering, and ardently pursue peace.

This horrible weapon brought about a "Revolution of Thought," which has convinced us of the necessity and the value of eternal peace. That is to say, because of this atomic bomb, the people of the world have become aware that a global war in which atomic energy would be used would lead to the end of our civilization and extinction of mankind.

This revolution in thinking ought to be the basis for an absolute peace, and imply the birth of new life and a new world. We know that, when in a crisis discover a new truth and a new path from the crisis itself, by reflecting deeply and beginning afresh. If this is true, what we have to do at this moment is to strive with all our might towards peace, becoming forerunners of a new civilization.

Let us join to sweep away from this earth the horror of war, and to build a true peace.

Let us join in renouncing war eternally, and building a plan for world peace on this earth.

Here, under this peace tower, we thus make a declaration of peace.

August 6, 1947

Shinzo Hamai
President of Hiroshima Peace Festival Association
Mayor of Hiroshima City

1955

Today, on the occasion of the tenth anniversary of the atomic bomb dropping, we mourn with solemnity for the souls of the dead victims, and renew our fervent desire for and commitment to world peace, which have been earnestly expressed to the world on the basis of our tragic experience.

Six thousands of those who are suffering from A-bomb aftereffects are not still entitled to receive a proper medical treatment and are struggling against a hard life. Furthermore, ninety-eight thousands of survivors are incessantly threatened by the anxiety that they might be contracted with the A-bomb disease. We point out with great emphasis that the A-bomb radiation which gradually affects human body bears a danger that could lead the sound human society to the way for ruin.

We are not trembling with a groundless and exaggerated apprehension only because we did experience the atomic bomb explosion. We cannot remain an idle spectator of the status quo that all rest of the world seems as if it neglected that holocaust as a happening that took place at a tiny spot on the earth. We look on it as our great duty to tell this truth to the whole world and convey our appeal of "Never have the tragedy of Hiroshima repeated," until the day when we see the advent of an everlasting world peace in a true sense.

August 6, 1955

Tadao Watanabe
Mayor
The City of Hiroshima

1965

The twentieth anniversary of the atomic bombing is here with us today.

We, who witnessed the catastrophic ravages of that atomic bomb, have been led to the realization that our conventional view on wars must undergo a radical change. In the nuclear age, war has come to mean nothing less than an act inviting ruin upon mankind itself, without distinction of friend or foe, for an atom bomb is not merely a dreadfully destructive weapon of barbarous cruelty, but it has also become clear that its radioactivity, while undermining human bodies over a long period of time, will ultimately make the very earth uninhabitable for man.

It is this realization that has constantly urged us, the people of Hiroshima, to voice our strong appeal for the banning of atomic and hydrogen bombs and for the complete renunciation of all war.

During the past twenty years, however, not only have nuclear weapons undergone prodigious development, both in quality as well as in quantity, but the countries possessing them have gradually grown in number, all contributing to increasingly confuse the situation. Truly alarming is the further fact that armed conflicts involving grave risks are being repeated in Vietnam and elsewhere in the world. In our apprehension, never before has humanity faced a crisis greater than that of today.

This viewpoint should require all nations and peoples to strive for the prevention of man's downfall by exerting their utmost efforts, to which all previous international entanglements should give way in view of the gravity of the situation. This, we firmly believe, is the imperative need of the present moment.

Today we reiterate this appeal to the whole world as we once again propitiate the manes of those who perished in the atomic bombing.

August 6, 1965

Shinzo Hamai
Mayor
The City of Hiroshima

1975

On August 6, 1945, an atomic bomb exploded, without warning, high above the citizens of Hiroshima.

A searing heat flashed from the bomb, a cataclysmic detonation shook the earth, and in an instant Hiroshima City was levelled.

The toll of the dead and injured mounted, while in a pall of dense black smoke an unearthly inferno became a reality.

Beneath the collapsed structures of buildings, in the midst of raging flames, people lay dying, desperately pleading for help. In the streets people collapsed and died; in the rivers bodies drifted, floating and sinking; and a ragged and bloody procession wandered blindly, seeking safety away from the mad and frantic streets, while voices begged 'water, water' as they weakened and neared death. Thirty years have elapsed, and all still linger in our minds today, penetrating our hearts with pain and regret.

And beyond this, countless survivors in their lives today cannot rid themselves for a day of agony and fear that radio-activity has inflicted on them. Hiroshima testifies with her body and soul against this inhumanity.

Moved by the ordeal of suffering that has stemmed from the atomic bomb, the citizens of Hiroshima have called for and sought peace for mankind, unceasingly and steadfastly pleading that the Hiroshima disaster never again be repeated.

And still in the world today we see nations and people everywhere perturbed by the menace of nuclear weapons.

The countries possessing nuclear weapons have ignored the protest of Hiroshima and not only continue nuclear tests, but absorb themselves in developing these bombs. Following their lead, other countries are oriented towards arming themselves with nuclear weapons and thus intensify the proliferation of nuclear arms.

The world today is in an era of chaotic nuclear competition, at the threshold of a grave crisis that could lead to the annihilation of mankind, a reality that the citizens of Hiroshima absolutely cannot make light of.

Individual human beings must realize that we live on the same earth as respective members sharing a destined community, and so must stand out resolutely for the abolition of all nuclear weapons.

Facing this formidable situation, Hiroshima City has renewed her resolution to build a true world of

peace by formally affiliating with Nagasaki, the city like Hiroshima suffered the horror of nuclear bombing. We wish that our concept of peace be in harmony with that of mankind in entirety.

On this day when we remember and mourn the souls of those who were sacrificed, we hereby plead with all our strength to the people of the whole world that it is high time to abolish all nuclear weapons since they are threatening the extinction of the humanity we should be trying to protect.

August 6, 1975

Takeshi Araki
Mayor
The City of Hiroshima

1985

No more Hiroshimas.

It was forty years ago today during the hot summer that the heat waves, fiery blast, and radiation emitted by the first nuclear weapon ever used against a human target burned all living things in a blinding flash and turned the city of Hiroshima into a plain of scorched rubble.

Standing in the ruins, we, the citizens of Hiroshima, foresaw that any war fought with nuclear weapons would mean the annihilation of humanity and the end of civilization - and we have consistently appealed to the world for the total abolition of nuclear weapons.

Despite these untiring efforts, more and more nuclear weapons have been produced; they have been made more and more sophisticated; and they have been deployed ready for strategic and tactical use. Humankind continues to face the threat of nuclear annihilation.

Although the nuclear superpowers, the United States and the Soviet Union, finally resumed their long-suspended negotiations on nuclear disarmament this March, the talks have made deplorably little progress as the superpowers use the facade of negotiation to jockey for advantage while they expand the nuclear arms race into outer space.

Today's hesitation leads to tomorrow's destruction.

In order that Hiroshima's inferno never be repeated anywhere, we strongly urge the United States and the Soviet Union, who hold the fate of humankind in their hands, to halt all nuclear testing immediately and to take decisive steps at the summit talks in Geneva toward the total abolition of nuclear weapons in the interests of all humankind.

As the only country to have experienced nuclear devastation, Japan and the government of Japan should steadfastly adhere to its three non-nuclear principles policy and should take the initiative in seeking the elimination of nuclear weapons. A census of A-bomb victims is being conducted this year, and it is our sincere hope that all due measures will be taken to mitigate the suffering of A-bomb survivors on the basis of the principle of national indemnity, taking into consideration the distinctive characteristics of ailments induced by atomic bombing.

Along with these efforts, Hiroshima, an A-bombed city, has been devoting itself to building a city dedicated to peace - a living symbol of the ideal of lasting world peace. It is in this spirit that we are hosting the First World Conference of Mayors for

Peace through Inter-city Solidarity this year, for it is our hope that all the cities of the world aspiring to lasting peace will be able to develop inter-city solidarity transcending national boundaries, ideologies and creeds and will impart added momentum to the international quest for peace.

This year also marks the International Youth Year. We hope that the young people of the world - the leaders of the twenty-first century - will inherit the Spirit of Hiroshima, strengthen friendship and solidarity among themselves, and exert their utmost efforts in the cause of peace.

The fates of all of us are bound together here on earth. There can be no survival for any without peaceful co-existence for all. Humankind has no future if that future does not include co-prosperity. In order to save this verdant planet from the grim death of nuclear winter, we must draw upon our common wisdom in overcoming distrust and confrontation. Sharing our planet's finite resources in the spirit of mutual understanding and cooperation, we must eliminate starvation and poverty.

No more Hiroshimas.

We must strengthen the bonds of friendship and solidarity among all peoples so as to save the world from the evil of war.

Today, on the occasion of the fortieth anniversary of the atomic bombing of Hiroshima, we pray for the souls of the A-bomb victims and rededicate our lives to the eradication of nuclear weapons and the pursuit of lasting peace.

August 6, 1985

Takeshi Araki
Mayor
The City of Hiroshima

1995

It is now half a century to the day since Hiroshima was devastated by the atomic bomb. Along with recalling that fateful day and praying for the souls of the many who died, and being acutely aware of the difficulties the aging hibakusha face, I cannot but repeat in the strongest possible terms that the development and possession of nuclear weapons constitutes a crime against humanity.

Throughout this half-century, we have told all the world of the human devastation that the atomic bombs wrought, particularly the unprecedented damage of radiation, in a consistent appeal that nuclear weapons be abolished. Yet distrust among nations is deep-rooted and there are vast stockpiles of nuclear weapons around the globe, creating a formidable barrier to the attainment of our ideal. It is profoundly saddening that some people see the possession of nuclear weapons as symbolic of a nation's strength.

Nuclear weapons are clearly inhumane weapons in obvious violation of international law. So long as such weapons exist, it is inevitable that the horror of Hiroshima and Nagasaki will be repeated - somewhere, sometime - in an unforgivable affront to humanity itself.

If humanity is to maintain hope for the future, we must act now with courage and decisiveness to achieve a nuclear-free world. As a first step, we call for an immediate and comprehensive nuclear test ban and the establishment of a new nuclear-free zone in the Asia-Pacific. In keeping with the Constitution's pacifist ideals and proclaiming its three non-nuclear principles (of non-possession, non-manufacture, and non-introduction), the government of Japan should take the lead in working for the abolition of nuclear weapons. Likewise, we also call upon the government to be more supportive of all hibakusha - these witnesses to the nuclear era - in Japan and elsewhere.

The possession of nuclear weapons is no guarantee of national security. Rather, the proliferation of nuclear weapons, the transfer of nuclear weapons technology, and the leakage of nuclear materials are all threats to the survival of the human race. Like the suppression of human rights, impoverishment and starvation, regional conflict, and the destruction of the global environment, these are all major threats to world peace.

This is an era in which we must think of global security. It is a time to foster human solidarity transcending national borders, to pool our wisdom, and to work together to establish world peace.

At this 50th anniversary of the end of World War II, it is important to look at the stark reality of war in terms of both aggrieved and aggriever so as to develop a common understanding of history. The suffering of all the war's victims indelibly etched in our hearts, we want to apologize for the unbearable suffering that Japanese colonial domination and war inflicted on so many people.

Memory is where past and future meet. Respectfully learning the lessons of the past, we want to impress the misery of war and the atomic bombing on the generations of younger people who will be tomorrow's leaders. Similarly, we also need to emphasize the human aspects of education as the basis for peace. Only when life and human rights are accorded the highest priority can young people enjoy lives of boundless hope.

At this Peace Memorial Ceremony commemorating the 50th anniversary of the atomic bombing, I am resolved to spare no effort in achieving the abolition of nuclear Weapons and the attainment of world peace.

August 6, 1995

Takashi Hiraoka
Mayor
The City of Hiroshima

2004

"Nothing will grow for 75 years." Fifty-nine years have passed since the August sixth when Hiroshima was so thoroughly obliterated that many succumbed to such doom. Dozens of corpses still bearing the agony of that day, souls torn abruptly from their loved ones and their hopes for the future, have recently re-surfaced on Ninoshima Island, warning us to beware the utter inhumanity of the atomic bombing and the gruesome horror of war.

Unfortunately, the human race still lacks both a lexicon capable of fully expressing that disaster and sufficient imagination to fill the gap. Thus, most of us float idly in the current of the day, clouding with self-indulgence the lens of reason through which we should be studying the future, blithely turning our backs on the courageous few.

As a result, the egocentric worldview of the U.S. government is reaching extremes. Ignoring the United Nations and its foundation of international law, the U.S. has resumed research to make nuclear weapons smaller and more "usable." Elsewhere, the chains of violence and retaliation know no end: reliance on violence-amplifying terror and North Korea, among others, buying into the worthless policy of "nuclear insurance" are salient symbols of our times.

We must perceive and tackle this human crisis within the context of human history. In the year leading up to the 60th anniversary, which begins a new cycle of rhythms in the interwoven fabric that binds humankind and nature, we must return to our point of departure, the unprecedented A-bomb experience. In the coming year, we must sow the seeds of new hope and cultivate a strong future-oriented movement.

To that end, the city of Hiroshima, along with the Mayors for Peace and our 611 member cities in 109 countries and regions, hereby declares the period beginning today and lasting until August 9, 2005, to be a Year of Remembrance and Action for a Nuclear-Free World. Our goal is to bring forth a beautiful "flower" for the 75th anniversary of the atomic bombings, namely, the total elimination of all nuclear weapons from the face of the Earth by the year 2020. Only then will we have truly resurrected hope for life on this "nothing will grow" planet.

The seeds we sow today will sprout in May 2005. At the Review Conference for the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) to be held in New York, the Emergency Campaign to Ban Nuclear Weapons will bring together cities, citizens, and NGOs from around the world to work with like-minded nations toward adoption of an

action program that incorporates, as an interim goal, the signing in 2010 of a Nuclear Weapons Convention to serve as the framework for eliminating nuclear weapons by 2020.

Around the world, this Emergency Campaign is generating waves of support. This past February, the European Parliament passed by overwhelming majority a resolution specifically supporting the Mayors for Peace campaign. At its general assembly in June, the U.S. Conference of Mayors, representing 1183 U.S. cities, passed by acclamation an even stronger resolution.

We anticipate that Americans, a people of conscience, will follow the lead of their mayors and form the mainstream of support for the Emergency Campaign as an expression of their love for humanity and desire to discharge their duty as the lone superpower to eliminate nuclear weapons.

We are striving to communicate the message of the hibakusha around the world and promote the Hiroshima-Nagasaki Peace Study Course to ensure, especially, that future generations will understand the inhumanity of nuclear weapons and the cruelty of war. In addition, during the coming year, we will implement a project that will mobilize adults to read eyewitness accounts of the atomic bombings to children everywhere.

The Japanese government, as our representative, should defend the Peace Constitution, of which all Japanese should be proud, and work diligently to rectify the trend toward open acceptance of war and nuclear weapons increasingly prevalent at home and abroad. We demand that our government act on its obligation as the only A-bombed nation and become the world leader for nuclear weapons abolition, generating an anti-nuclear tsunami by fully and enthusiastically supporting the Emergency Campaign led by the Mayors for Peace. We further demand more generous relief measures to meet the needs of our aging hibakusha, including those living overseas and those exposed in black rain areas.

Rekindling the memory of Hiroshima and Nagasaki, we pledge to do everything in our power during the coming year to ensure that the 60th anniversary of the atomic bombings will see a budding of hope for the total abolition of nuclear weapons. We humbly offer this pledge for the peaceful repose of all atomic bomb victims.

August 6, 2004

Tadatashi Akiba
Mayor The City of Hiroshima

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International Physicians for the Prevention of Nuclear War (IPPNW)

We, more than one hundred thousand medical doctors, scientists and students who know the medical consequences of Atomic-bombing very well, have been endeavoring to prevent nuclear war and aiming for the world free of nuclear weapons and free of war.



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Hiroshima International Council for Health Care of the Radiation-exposed (HiCARE) - Contributions from Hiroshima -

1. Purpose of HiCARE

HiCARE aims to develop a system to proliferate the medical records and research accumulated in Hiroshima, improving worldwide radiation related healthcare and promoting international cooperation.

2. Activities

2-1 Training of Medical and Other Technical Personnel

HiCARE provides training for physicians and other technical workers worldwide who are involved in health-care activities for the radiation-exposed people. In many regions which have suffered from radiation accidents, the areas around Chernobyl, the Semipalatinsk nuclear testing site, and other similar areas, physicians and technical workers who have received HiCARE training are fulfilling new and more important roles, more effectively aiding those suffering from the unfortunate effects of radiation.

2-2 Dispatch of Physicians and Other Specialists

HiCARE dispatches medical and other specialists from Hiroshima to radiation-affected regions worldwide, providing training and medical information to those providing health care to the radiation-exposed people and patients.

In order to improve the efficiency of these activities, HiCARE cooperate with other international organizations and institutions such as the World Health Organization (WHO), Japanese government, local and regional governments, local medical and research institutions, and NGO's in the vicinity of our activities.

2-3 Public Relations and Educational Activities

In order to enhance the general public's understanding of the importance and necessity of our radiation and health care related activities, HiCARE holds frequent lectures, conferences, as well as other educational and public relations activities.



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1 Purpose

The Mayors for Peace, through close cooperation among the cities that support the "Program to Promote the Solidarity of Cities toward the Total Abolition of Nuclear Weapons", strives to raise international public awareness regarding the need to abolish nuclear weapons and contributes to the realization of genuine and lasting world peace by working to eliminate starvation and poverty, assisting refugees fleeing local conflict, supporting human rights, protecting the environment, and solving the other problems that threaten peaceful coexistence within the human family.



2 Activities

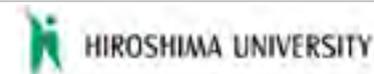
- Calls for worldwide solidarity among cities
- Holds a general conference once every four years to facilitate efforts to eliminate nuclear weapons and solve the various problems that obstruct peace
- Holds executive meetings as the need arises
- Sends the Hiroshima and Nagasaki Peace Declarations to supporting cities
- Presents appeals to the United Nations and other organizations regarding the elimination of nuclear weapons, promotion of disarmament, solutions to human rights and refugee problems, alleviation of starvation and poverty, and protection of the environment
- Implements projects that contribute to solving the problems of peace, disarmament, human rights, refugees, starvation and poverty, and environmental destruction; publicizes the results of such projects and promotes exchanges of information
- Supports for the Hiroshima-Nagasaki A-bomb Photo Posters Exhibition
- Publishes a newsletter

2020 Vision (An Emergency Campaign to Ban Nuclear Weapons)

Mayors for Peace launched an "Emergency Campaign to Ban Nuclear Weapons" to promote its "2020 Vision," a program to eliminate all nuclear weapons by the year 2020, the 75th anniversary of the atomic bombings in Hiroshima and Nagasaki. We are promoting Cities Are Not Targets (CANT), a concrete, global project of the Good Faith Challenge, a new aspect of our 2020 Vision Campaign for the abolition of nuclear weapons.



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 Member: 1,578 cities in 120 countries and regions (as of February 21,2007)



The University Connected with the World

Intercultural Learning Environment

Through the Hiroshima University Study Abroad Program (HUSA), Hiroshima University promotes the dispatch of students to 49 universities. Students can cultivate an international feeling and understanding of a variety of cultures through interchanges with approximately 800 international students on campus.

Cross-Boarder Education

Hiroshima University deepens educational exchange through international exchange agreements with 74 universities and research institutions in 21 countries and as a member of the International Network of Universities (INU). The Hiroshima University Beijing Research Center (in Capital Normal University, China) is used as an international education and research base.

Aiming at a Peaceful World

The "Hiroshima Peace Message" is sent out by the Institute for Peace Science. The International Radiation Information Center in the Research Institute for Radiation Biology and Medicine investigates, gathers information and analyzes cases of radiation contamination around the world, such as at Chernobyl and Semipalatinsk.

International Projects

Hiroshima University provides assistance to developing countries through the Graduate School for International Development and Cooperation (IEDC) and the Center for the Study of International Cooperation in Education (CICE) and makes efforts in international cooperation through collaboration with the Japan International Cooperation Agency (JICA) and the Japan Bank for International Cooperation (JBIC).

University with International Students and Researchers

To promote exchange with international students and in education and research, Hiroshima University is establishing and expanding university-wide systems. To attract outstanding international students and researchers from around the world, Hiroshima University provides the latest and highly advanced education and research opportunities through enhanced education programs and research facilities. Hiroshima University promotes distance education corresponding to the internationalization of society using media contents for education activities, and also promotes support and exchange for international students who have returned to their home countries by creating a database of international students.



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In the original Japanese version, *Hiroshima no Obaa-chan*, the left hand page was a transcription of the spoken language and was kept in the Hiroshima dialect. This made it easier for young students– the intended audience– to understand, but presented tremendous difficulties for the translators. *One Day in Hiroshima-An Oral History* is intended for a wider audience and I would like to thank Yoshie Ozaki, Megumi Shimo and Megumi Morita and for their tireless efforts to render the Japanese into easily understood English. Many compromises had to be made between word-for-word and intended meaning and for this reason this book cannot be said to be a direct translation.

Richard C. Parker and Rick Nelson also helped me as translation editors. Mr. Parker gave assistance not only in the editing and proofreading of the translation, but also gave advice regarding layout and appearance from his experience in layout as a graphic designer. I also received extensive cooperation from Mr. Nelson based on his past experience in the publishing industry.

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All profits from this book will be donated as a support fund to the nursing homes for atomic bomb survivors.

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