A mammoth atomic cloud
Photographed from a U.S. aircraft about one hour after the bombing, August 6th, 1945

A rising mushroom cloud
Photographed from a U.S. aircraft about one hour after the bombing, August 9th, 1945
A-bomb Yield by Type and Distance

- **Blast or shock wave (50%)**
- **Heat (35%)**
- **Radiation (15%)**

Distance from the hypocenter:

- 0 km
- 1 km
- 2 km
- 3 km
- 4 km
- 5 km

Energies:

- Hiroshima bomb
- Nagasaki bomb

Types of radiation:

- γ ray
- neutron
## Estimates of Exposed and Casualties

<table>
<thead>
<tr>
<th>Location</th>
<th>Number exposed</th>
<th>Died by the end of 1945</th>
<th>Surviving at the end of 1945</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hiroshima</td>
<td>360,000</td>
<td>140,000</td>
<td>220,000</td>
</tr>
<tr>
<td>Nagasaki</td>
<td>250,000</td>
<td>70,000</td>
<td>180,000</td>
</tr>
<tr>
<td>Total</td>
<td>610,000</td>
<td>210,000</td>
<td>400,000</td>
</tr>
</tbody>
</table>
Hiroshima International Council for Health Care of the Radiation-Exposed (HICARE)

Established by the Governor of Hiroshima in 1991
HICARE members

8 research and/or medical organizations pertaining
A-bomb health effects + City and Prefectural Government

- Hiroshima City Medical Assoc.
- Hiroshima Prefectural Medical Assoc.
- Hiroshima Atomic Bomb Casualty Council
- Hiroshima Red Cross Hospital & Atomic-Bomb Survivors Hospital
- Radiation Effects Research Foundation
- Hiroshima Atomic Bomb Casualty Council
- Hiroshima University Hospital & Atomic-Bomb Survivors Hospital
- Hiroshima University Faculty of Medicine
- Hiroshima Prefectural Medical Assoc.
- Hiroshima Prefectural Government
- The City of Hiroshima
Accumulated expertise in treating A-bomb survivors as well as research on the effect of A-bomb radiation as the site of tragedy of the first atomic bombing in human history.

To contribute to overseas and promote international cooperation.
HICARE Projects

Training Project

Dispatch of Experts

Symposiums

Publishing Works
1. Trainee’s Application Requirements

- Applications made by international organizations, foreign governments or medical associations via public organizations in Japan.
- Physicians or medical experts engaged in medical care/health management of the radiation-exposed.

2. Some Examples of Training Course

Radiation dosimetry
Assessment of biological effects of radiation
Diagnosis of radiation disorders

- Training period is from 1 week to 3 months.
Accomplishments

Number of Trainees Accepted
(As of March, 2012 since 1991)

15 countries, 356 people
Dispatch of Medical Experts

- **Number**
  200 medical experts to 16 countries

- **Programs**
  Trainings on Radiation Medicine
  in Brazil (2007) and in USA (2009, 2012)
  Laboratory Trainings
  in Kazakhstan and Belarus
  Attending International Meetings
  RENPAN conference
  Chernobyl conference
  IAEA international conference
Dispatched experts to domestic radiation disasters

Tokai village accident in 1999
Fukushima NPP accident in 2011

March 11, 2011
Mega Earthquake Hits East Japan
Support Projects for Fukushima

Dispatch of radiologists

6 radiologists from Mar 16 to 22 for radiation screening of the refugees

Recommendation

“Proposal Regarding Radiation Exposure” to the Prime Minister of Japan” (June 14, 2011)

Others

Medical supports, advice to the government, etc. by HICARE members
Lecture on significance and necessity of international cooperation in health care for the radiation-exposed
Publishing Monographs


Revised edition in 2012

English version and the digest version will be published in the near future.
Future Issues

- Educate Global Specialists
- Specialists in the field of Radiation Medicine
- Human resource to succeed Hiroshima’s accumulated knowledge and skill.

- Expand Counterpart of Collaboration

Build a World-wide Network
August 6, 2010

IAEA and HICARE signed the Memorandum of Agreement in Hiroshima on collaborative programs in research and medical treatment of the radiation-exposed people
Epidemiological Studies at ABCC/RERF

1945 '47 '48 1975 2000

Atomic Bomb Casualty Commission (ABCC)
Established by the U.S.

Radiation Effects Research Foundation (RERF)
Funded equally by US-Japan
Life Span Study/Adult Health Study

A-bomb survivors 284,000

1950 census

residents in Hiroshima and Nagasaki

reference population

27,000 + 93,000 = 120,000

LSS

20,000

AHS

5,000

15,000

20,000
ABCC/RERF Epidemiological Studies

A-bombings

National Census

1945
1950
1960
1990
2000
2010

ABCC 1947

1947

1958

RERF 1975

Life Span Study (LSS)

Adult Health Study (AHS)

In-Utero Study (mortality · health)

Membership recruiting

F1 study

26th examinations
Dose Response of Solid Cancer
(LSS, Mortality, 1950-2002)

Colon Dose (Gy)

ERR

LQ

L

0.47

0.0

0.5

1.0

1.5

2.0

2.5

3.0

Colon Dose (Gy)
国際連合原子放射線影響科学委員会（UNSCEAR）
国際放射線防護委員会（ICRP）年次報告書
電離放射線の生物学的影響に関する諮問委員会（BEIR）
It is the greatest regret in human history that the last world war broke out and resulted in the use of atomic bombs on civilians.

However, humankind should highly appraise the fact that long–lasting radiation effect research in Nagasaki and Hiroshima has become a symbol of the everlasting hopes of the A–bomb survivors and people of Japan for world peace and abolition of nuclear weapons.

Such achievements would not have been possible without cooperation from the A–bomb survivors.
The End