

# Low Potentiality of Health Damage by the Fukushima Accident – from the survey of the atomic bomb survivors in Hiroshima and Nagasaki

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The medical research of survivors from the atomic bombs in Hiroshima and Nagasaki has been used by governments to plan policies on national health care or radiation restrictions. This research surveys 280,000 people over 50 years. There is no similar case to this large scale medical research on radiation exposure.

With references to Emeritus Professor of Oxford University, Wade Allison's "Radiation and Reason" [1], and a research article of Radiation Effects Research Foundation (Hiroshima: RERF) [2], I will introduce the fact that health hazards are hardly observed among atomic bomb survivors who were exposed to low-dose radiation.

## Backgrounds of Research

From the research by RERF, we can grasp facts as follows. When the atomic bombs were dropped, the numbers of total population of Hiroshima and Nagasaki were 429,000 people. Due to its heat and radiation, more than 103,000 were killed instantly. Although there are lack of right information after the explosion, there are medical records of 283,000 survivors since 1950.

From the record, from 1950 to 2000, 7.9% of the total population at the time of atomic bombs droppings, died from cancer, and among them, 0.4% is estimated to have died from cancer caused by radiation. This ratio is less than what was previously assumed. RERF also estimated the approximate amount of exposure of each 87,000 persons. They are estimated from behavioral data and health examination of each person.

RERF also predicted numbers of leukemia and cancer by using LNT hypothesis and medical data of Japanese who were not exposed. LNT hypothesis (linear no threshold: LNT)) means that radiation is harmful, even a small dose, and the degree of susceptibility to cancer is proportional to the amount of radiation exposed.

## The Results of the Survey

Figure 1 and 2 shows number of deaths of the atomic bomb survivors by leukemia and cancer, from 1950 until 2000. The death by leukemia for people who were exposed to over 200 millisievert (mSv), and by cancer over 100mSv is more than it had been expected. We cannot observe health hazard under 100mSv.

Policies makers and health care professionals take these results as important references that show small possibility of health hazards by low-dose exposure, and the threshold is about 100mSv.

There is no report that the public exposure is over 100mSv by the Fukushima nuclear power plants accident. We can estimate that the potential for health damage caused by this accident is very small from the experience of Atomic bombs survivors.

## References:

[1] Wade Allison, 'Radiation and Reason', 2010

[2] Dale L. Preston, et al. 'Effect of Recent Changes in Atomic Bomb Survivor Dosimetry on Cancer Mortality Risk Estimates' RADIATION

**(Figure 1) The number of people who died from leukemia among atomic bomb survivors from 1950 to 2000**

| Range of Exposure (mSv) | Survivors | Death (Actual) | (Predicted) |
|-------------------------|-----------|----------------|-------------|
| Less than 5             | 37403     | 92             | 84.9        |
| 5-100                   | 30387     | 69             | 72.1        |
| 100-200                 | 5841      | 14             | 14.5        |
| 200-500                 | 6304      | 27             | 15.6        |
| 500-1000                | 3963      | 20             | 9.5         |
| 1000-2000               | 1972      | 39             | 4.9         |
| Over 2000               | 737       | 25             | 1.6         |
| Total                   | 86955     | 296            | 203         |

From Allison and RERF

**(Figure 2) The number of people who died from cancer among atomic bomb survivors from 1950 to 2000**

| Range of Exposure (mSv) | Survivors | Death (Actual) | (Predicted) |
|-------------------------|-----------|----------------|-------------|
| Less than 5             | 38507     | 4270           | 4282        |
| 5-100                   | 29960     | 3387           | 3313        |
| 100-200                 | 5949      | 732            | 691         |
| 200-500                 | 6380      | 815            | 736         |
| 500-1000                | 3426      | 483            | 378         |
| 1000-2000               | 1764      | 326            | 191         |
| Over 2000               | 625       | 114            | 56          |
| Total                   | 86611     | 10127          | 9647        |

From Allison and RERF