

**Risk of prostate cancer incidence
among atomic bomb survivors:
1958–2009**

Epidemiological studies (research on frequency and distribution of disease in a fixed population) into radiation effects on prostate cancer risk have been inconsistent to date.

In this latest analysis of the RERF Life Span Study (LSS)*, the follow-up period was extended by 11 years (through 2009) since the last such report for the period 1958–1998, with the aim of further investigating prostate cancer incidence among males of the LSS population of atomic bomb survivors.

The number of prostate cancer cases in the study population was found to have doubled during the extended follow-up through 2009. More than half the cases were diagnosed among those who were younger than 20 years of age at the time of the bombings, and who were at or near the ages of typical prostate cancer onset during the extended follow-up period.

In the analysis of radiation dose response using advanced statistical techniques, a statistically significant linear dose response was observed (meaning, prostate cancer rates increased in proportion to increased radiation dose), with excess relative risk** per gray*** of radiation being 0.6 (excess of 0.6 times the background rate). An estimated 5% of the observed cases were attributed to radiation exposure. This is the first RERF paper reporting an observable association between radiation and prostate cancer. At the same time, the analysis suggested that radiation risk of prostate cancer decreased with increasing age at exposure.

The doubling of cases with the extended follow-up mentioned above is assumed to be, in part, the result of more comprehensive screening for prostate cancer in recent years in Japan. However, further research is considered necessary to clarify the study's findings.

* Life Span Study (LSS):

The main purpose of this study is to investigate the long-term effects of atomic bomb

radiation on the cause of death and cancer incidence. At the time of the 1950 national population census in Japan, about 94,000 atomic bomb survivors were selected from among those who were confirmed to be in Hiroshima and/or Nagasaki at the time of the atomic bombings and about 27,000 who were not in city at the time. This study has tracked about 120,000 subjects.

** Excess relative risk:

Excess relative risk is the rate of health risk increase or decrease in an exposed group compared with a control group. An excess relative risk of 0 means that radiation exposure, for example, did not affect risk. An excess relative risk of 1 in the exposed group would indicate a rate of disease that is double the rate in the unexposed, or control, group.

*** Gray (Gy):

Gray (1 gray = 1,000 milligray) is a unit of radiation that represents the amount of radiation dose absorbed by a substance when it is exposed to radiation. The average dose for RERF's LSS participants is around 140–200 milligray (0.14–0.2 Gy). As reference, the average annual amount of radiation we are all exposed to in our daily lives, include medically, is estimated to be around 2–6 milligray (0.002–0.006 Gy).

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RERF's objective with this brief outline is to succinctly explain our research for the lay public. Much of the technical content of the original paper has been omitted. For further details about the study, please refer to the full paper published by the journal.