

*War & Peace Cluster, Summit Program*  
*Physics Assignment 4*

1. What were the long term health effects on the people of Hiroshima and Nagasaki. You might want to distinguish between the years immediately years after the bomb was dropped, and the period decades later.
  - a. Three to four weeks after the explosions the radiation levels at the epicentres of the explosions were reported to be 15% above normal. Additional health problems as a result of this elevated radiation level would be expected.
  - b. There are estimated to be at least 280,000 survivors of the two explosions, as self-reported in a Japanese census in 1950. Of those approximately 7800 have died from cancer, slightly above the normal that would be expected from that population. It is estimated that about 420 can be attributed to radiation from the bombs, although the individuals cannot be identified. Incidents of some specific cancers (particularly leukemia) show a more marked increase.
  - c. Of approximately 76,000 infants born between 1948 and 1954, no significant rise in birth defects has been detected. However, statistical inference of an increase would only be possible if the natural rate of birth defects had been doubled. It is possible some birth defects were caused by the radiation, but not enough to detect.
  - d. As of 2007, there has been no evidence of increased cancer incidence or increased mortality from cancer or other diseases in the children of survivors
  - e. There is evidence of an increase both in the numbers and severity of eye cataracts.
  - f. There have been significant to severe psychological effects which can also lead to biological effects.

**Other non biological Effects**

In addition to the answer to the last question, but not directly related to it

- *Social effects*
  - Huge number of persons who were killed or injured so that their services in rehabilitation were not available
  - a panic flight of the population took place from both cities
  - 6500 children survivors who were orphaned
  - Hibakusha (survivors) and their children are victims of severe discrimination
- *Psychological*
  - Civic Paralysis. No significant reconstruction or repair work was accomplished at first because of the slow return of the population due to fear.
  - Sheer Terror. Persons who had become accustomed to mass air raids had grown to pay little heed to single planes or small groups of planes, but after the atomic bombings the appearance of a single plane caused more terror and disruption of normal life than the appearance of many hundreds of planes had ever been able to cause before. (This might well be considered to be a health effect, and included above.)
- *Environmental*
  - Hiroshima and Nagasaki are no longer radioactive (Radiation levels are at normal background level for the area)

**Some web resources**

*War & Peace Cluster, Summit Program*  
*Physics Assignment 4*

Avalon Project

Health effects at Hiroshima, Nagasaki

Questions about the Atomic-bomb Survivor Research Program

Radiation Effects — Hiroshima and Nagasaki (Health Physics Society)

[http://avalon.law.yale.edu/20th\\_century/mp24.asp](http://avalon.law.yale.edu/20th_century/mp24.asp)

[http://atomicbombmuseum.org/4\\_survivors.shtml](http://atomicbombmuseum.org/4_survivors.shtml)

<http://en.wikipedia.org/wiki/Hibakusha#Discrimination>

<http://eternalflames.ucsc.edu/exhibits/show/hibakusha/gwendolyn--fong>

<http://www.commondreams.org/headline/2010/08/04-1>

[http://www.rerf.or.jp/general/qa\\_e/qa12.html](http://www.rerf.or.jp/general/qa_e/qa12.html)