

# The Atomic Bombings of Hiroshima and Nagasaki

## Estimated Casualties

There has been great difficulty in estimating the total casualties in the Japanese cities as a result of the atomic bombing. The extensive destruction of civil installations (hospitals, fire and police department, and government agencies), the state of utter confusion immediately following the explosion, as well as the uncertainty regarding the actual population before the bombing, contribute to the difficulty of making estimates of casualties. The Japanese periodic censuses are not complete. Finally, the great fires that raged in each city totally consumed many bodies.

The number of total casualties has been estimated at various times since the bombings with wide discrepancies. The Manhattan Engineer District's best available figures are:

TABLE A: Estimates of Casualties

	<b>Hiroshima</b>	<b>Nagasaki</b>
Pre-raid population	255,000	195,000
Dead	66,000	39,000
Injured	69,000	25,000
<b>Total Casualties</b>	<b>135,000</b>	<b>64,000</b>

The relation of total casualties to distance from X, the center of damage and point directly under the air-burst explosion of the bomb, is of great importance in evaluating the casualty-producing effect of the bombs. This relationship for the total population of Nagasaki is shown in the table below, based on the first-obtained casualty figures of the District:

TABLE B: Relation of Total Casualties to Distance from X

<b>Distance from X, feet</b>	<b>Killed</b>	<b>Injured</b>	<b>Missing</b>	<b>Total Casualties</b>	<b>Killed per square mile</b>
0 - 1,640	7,505	960	1,127	9,592	24,700
1,640 - 3,300	3,688	1,478	1,799	6,965	4,040
3,300 - 4,900	8,678	17,137	3,597	29,412	5,710
4,900 - 6,550	221	11,958	28	12,207	125
6,550 - 9,850	112	9,460	17	9,589	20

No figure for total pre-raid population at these different distances were available. Such figures would be necessary in order to compute percent mortality. A calculation made by the British Mission to Japan and based on a preliminary analysis of the study of the Joint Medical-Atomic Bomb Investigating Commission gives the following calculated values for per cent mortality at increasing distances from X:

TABLE C: Percent Mortality at Various Distances

<b>Distance from X, in feet</b>	<b>Percent Mortality</b>
0 - 1000	93.0%
1000 - 2000	92.0
2000 - 3000	86.0
3000 - 4000	69.0
4000 - 5000	49.0
5000 - 6000	31.5
6000 - 7000	12.5
7000 - 8000	1.3
8000 - 9000	0.5
9000 - 10,000	0.0

It seems almost certain from the various reports that the greatest total number of deaths were those occurring immediately after the bombing. The causes of many of the deaths can only be surmised, and of course many persons near the center of explosion suffered fatal injuries from more than one of the bomb's effects. The proper order of importance for possible causes of death is: burns, mechanical injury, and gamma radiation. Early estimates by the Japanese are shown in D below:

TABLE D: Cause of Immediate Deaths

**Hiroshima**

<b>Cause of Death</b>	<b>Percent of Total</b>
Burns	60%
Falling debris	30
Other	10

**Nagasaki**

<b>Cause of Death</b>	<b>Percent of Total</b>
Burns	95%
Falling debris	9
Flying glass	7
Other	7

Source: [www.atomicarchives.com](http://www.atomicarchives.com) (National Science Foundation at [http://www.atomicarchive.com/Docs/MED/med\\_chp10.shtml](http://www.atomicarchive.com/Docs/MED/med_chp10.shtml)).