

DS02 Risk Estimation: Solid Cancer and Leukemia Mortality Data

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This documentation describes data and supplementary files that are distributed by RERF in conjunction with the publication of a paper evaluating the changes in cancer risk estimates due to the new dosimetry DS02: Preston et. al. *Radiation Research* **162**, 377-389 (2004). The data, providing both DS86 and DS02 dose estimates, are for all solid cancers as a group, leukemia, all cancers, and all liquid cancers.

The files included with this data release are:

DS02can.dat	Comma delimited text file with a single header line that contains the variable names
DS02can.amf	Epicure (AMFIT) command script to read the data file, compute various auxiliary variables and fit some of the basic models used in the paper
DS02can.log	Log file produced by DS02can.amf

The data set is a detailed tabulation of person years, case counts, and summary data constructed from data on individual survivors including NIC and dose unknown. The dataset is based on 120,200 of the 120,321 LSS cohort members. Follow-up data are not available for the remaining 121 cohort members. The cohort for analysis includes 86,611 survivors. Data on individual survivors are stratified by city, sex, age at exposure, dose, attained age and calendar time, and several other factors. The first four of these stratification factors categorize people, while the last two categorize the cohort experience over time. The dose variable used for stratification is DS02 weighted colon "survivor" dose computed as the gamma survivor dose estimate plus 10 times the neutron survivor dose estimate. "Survivor" doses incorporate an adjustment of the basic DS02 dose estimates to reduce bias in risk estimates that arises from random errors in individual dose estimates. This adjustment uses the same adjustment factors as for DS86 (revisions of this for DS02 are not yet available).

The first ten variables tabulated below index the cross-classification used to define the tables. The next five variables include cell-specific numbers of person years, a count of subjects entering the study, and cell-specific mean values for age at exposure, attained age, and year. The next five variables give disease death counts. The remaining variables are survivor exposure and dose variables for both DS02 and DS86.

For each cell in the stratified table, the numbers of deaths due to various causes divided by the person years provide very imprecise estimates of death rates. To be useful these must be averaged or

smoothed in some manner, in particular smoothing by use of the rate models such as used in the paper. The summary and dose variables in the table cells can be used as class-marks (scores) for purposes of statistical modeling. Persons contribute to multiple cells of the table, and the summary and dose variables are weighted means, weighted by the time each person contributes to the cell.

These data are provided to the public free of charge, but any use of them in written or oral form must explicitly acknowledge RERF as the source. If these data are used as the basis for analyses in any publication including working papers or technical reports, a statement of acknowledgment must be included in the manuscript. This statement should read:

This report makes use of data obtained from the Radiation Effects Research Foundation (RERF), Hiroshima and Nagasaki, Japan. RERF is a private, non-profit foundation funded by the Japanese Ministry of Health, Labour and Welfare (MHLW) and the U.S. Department of Energy (DOE), the latter through the National Academy of Sciences. The conclusions in this report are those of the authors and do not necessarily reflect the scientific judgment of RERF or its funding agencies.

Please send a copy of any reprints that make use of these data to:

Archives Unit
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By accepting these data, the user agrees to the above terms.

Detailed documentation follows:

Name	Categorizations	Definitions and Labeling Codes
city	City	1 – Hiroshima 2 – Nagasaki
sex	Sex	1 – male 2 – female
un4gy	Under 4 Gy shielded kerma	0 – over 4 Gy 1 – under 4 Gy

nfact	Nagasaki factory worker	0 – not this class 1 – factory worker
gdcat	Ground distance category	1: < 3km 2: 3-10 km 3: NIC
agxcat	Age at exposure category	1: 0 - 4 2: 5 - 9 3: 10 – 14 4: 15 – 19 5: 20 – 24 6: 25 – 29 7: 30 – 34 8: 35 – 39
agecat	Attained age category	9: 40 – 44 10: 45 – 49 11: 50 – 54 12: 55 – 59 13: 60 – 64 14: 65 – 69 15: 70 +
dcat	Weighted DS02 survivor colon dose categories (Sv)	2: 5 - 9 3: 10 – 14 4: 15 – 19 5: 20 – 24 6: 25 – 29 7: 30 – 34 8: 35 – 39 9: 40 – 44
has86	Has DS86 estimate	10: 45 – 49 11: 50 – 54 12: 55 – 59 13: 60 – 64 14: 65 – 69 15: 70 – 74 16: 75 – 79 17: 80 – 84 18: 85+
time	Calendar time period	1: Dose unknown 2: 0 - 0.005 3: 0.005 – 0.02 4: 0.02 - 0.04 5: 0.04 - 0.06 6: 0.06 - 0.08 7: 0.08 - 0.10 8: 0.10 - 0.125 9: 0.125 – 0.15 10: 0.15 - 0.175 11: 0.175 – 0.20 12: 0.20 - 0.25 13: 0.25 – 0.30 14: 0.30 – 0.50 15: 0.50 – 0.75 16: 0.75 – 1.00 17: 1.00 – 1.25 18: 1.25 – 1.50 19: 1.50 – 1.75 20: 1.75 – 2.00 21: 2.00 – 2.50 22: 2.50 – 3.00 23: 3.00+
pyr	Person years	0: does not have 1: does have
subjects	Subjects first at risk	1: 1950 (Oct.) - 1952 2: 1953 – 1955 3: 1956 – 1960 4: 1961 – 1965 5: 1966 – 1970 6: 1971 – 1975 7: 1976 – 1980
agex	Age at exposure	8: 1981 - 1985 9: 1986 - 1990 10: 1991 - 1995 11: 1996 - 1997 12: 1998 - 2000

Name	Summary Variable	Description
pyr	Person years	PY at risk for the cell
subjects	Subjects first at risk	Number of subjects, nonzero only in 1 st time category
agex	Age at exposure	PY-weighted average in years

age	Attained age	PY-weighted average in years
year	Year	PY-weighted calendar time

Name	Death Counts	9th Revision ICD Codes
death	All deaths	
cancer	All cancer	140-208
solid	All solid cancer	140-199
liquid	All hematopoietic cancer	200-208
Leuk	Leukemia	204-208

Name	Exposure and Dose Variables	Detail -- All doses are PY-weighted
gdist	Ground distance	Ground distance (only useful for proximal survivors)
skr02t	Shielded kerma DS02	Unweighted total DS02 kerma truncated at 4 Gy
skr02g	Shielded gamma kerma DS02	Gamma part of truncated DS02 kerma
skr02n	Shielded neutron kerma DS02	Neutron part of truncated DS02 kerma
skr86t	Shielded kerma DS86	Unweighted total DS86 kerma truncated at 4 Gy
skr86g	Shielded gamma kerma DS86	Gamma part of truncated DS86 kerma
skr86n	Shielded neutron kerma DS86	Neutron part of truncated DS86 kerma
cola02w10	DS02 weighted colon dose	weighted DS02 survivor (adjusted) colon dose (Sv)
cola02g	DS02 gamma colon dose	gamma DS02 survivor (adjusted) colon dose (Gy)
cola02n	DS02 neutron colon dose	neutron DS02 survivor (adjusted) colon dose (Gy)
cola86w10	DS86 weighted colon dose	weighted DS86 survivor (adjusted) colon dose (Sv)
cola86g	DS86 gamma colon dose	gamma DS86 survivor (adjusted) colon dose (Gy)
cola86n	DS86 neutron colon dose	neutron DS86 survivor (adjusted) colon dose (Gy)
mara02w10	DS02 weighted marrow dose	weighted DS02 survivor (adjusted) marrow dose (Sv)
mara02g	DS02 gamma marrow dose	gamma DS02 survivor (adjusted) marrow dose (Gy)
mara02n	DS02 neutron marrow dose	neutron DS02 survivor (adjusted) marrow dose (Gy)
mara86w10	DS86 weighted marrow dose	weighted DS86 survivor (adjusted) marrow dose (Sv)
mara86g	DS86 gamma marrow dose	gamma DS86 survivor (adjusted) marrow dose (Gy)
mara86n	DS86 neutron marrow dose	neutron DS86 survivor (adjusted) marrow dose (Gy)
trunc02	DS02 truncation factor	ratio of 4 to untruncated dose DS02
trunc86	DS86 truncation factor	ratio of 4 to untruncated dose DS86
adjust02	DS02 dose adjustment factor	survivor adjustment factor DS02
adjust86	DS86 dose adjustment factor	survivor adjustment factor DS86