Radiation Effects Research Foundation Life Span Study Solid Cancer Incidence Data Sets. 1958 to 1998 follow-up.

March 23, 2007

These two files described in this documentation contain the data for the 1958 through 1998 follow-up that was used in the analyses of the solid cancer incidence in the Life Span Study of atomic bomb survivors. Results of these analyses are described in the paper D. L. Preston, E. Ron, S. Tokuoka, S. Funamoto, N. Nishi, M. Soda, K. Mabuchi and K. Kodama, Solid Cancer Incidence in Atomic Bomb Survivors: 1958 – 98. *Radiat. Res.* **167** (2007). Earlier versions of these datasets were used for some analyses for the U.S. National Academy of Science BEIR-VII report (National Academy of Sciences Committee on the Biological Effects of Radiation, *Health Risks From Exposure to Low Levels of Ionizing Radiation: BEIR VII Phase 2* National Academies Press, Washington, DC, 2005) and soon-to-be published reports from UNSCEAR and the ICRP.

In preparing these data for release, we found that the stratification on whether or not a survivor's total shielded kerma estimate was under or over 4 Gy was not done correctly in the earlier versions of this dataset. Since the earlier analyses did not make use of this factor, this error has no effect on the number of cases or person years and virtually no effect on risk estimates, we are releasing only the corrected person year tables. Releasing the corrected datasets will allow interested users to properly stratify on (or omit) the high kerma group if they desire to do so.

This release consists of two datasets (person-year) tables. In the primary dataset (*lssinc07.csv*), person-years and cases were stratified on city, gender, attained age, age at exposure, calendar time, total weighted DS02 colon dose estimate, ground distance, and (as noted above) whether or not an individual's unweighted total shielded kerma was above 4 Gy and includes counts of cases in all of the cancer groups used in the 2007 LSS incidence report. The second dataset (*lssinc07ahs.csv*) includes an additional stratification on whether or not an individual is a member of the Adult Health Study (clinical) cohort and includes case counts for thyroid and skin cancers. Details of the file contents are given below.

The files are comma-separated-value files with one record per strata. The first record in each file contains variable names. These file can easily be read into statistical packages such as SAS, Stata, or Epicure. Because of the numbers of records some versions of Excel may not be able to read all of the records in these files.

The release also includes the following Epicure command and log files that read the data and fit many of the models described in the RERF report.

File name	Content
Epicure script files	
inc07solmod.amf	Solid cancer ERR and EAR models
inc07sitemods.amf	Site-specific ERR and EAR models
inc07sitemodsahs.amf	Site-specific models with AHS effects
Epicure log (output) text and pdf files	
inc07solmod.log / .pdf	Solid cancer ERR and EAR models
inc07sitemods.log / .pdf	Site-specific ERR and EAR models
inc07sitemodesahs.log / .pdf	Site-specific models with AHS effects

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) in Hiroshima, Japan. RERF is a private foundation funded equally by the Japanese Ministry of Health, Labour, and Welfare and the U.S. Department of Energy through the U.S. National Academy of Sciences. The data include information obtained from the Hiroshima City, Hiroshima Prefecture, Nagasaki City, and Nagasaki Prefecture Tumor Registries and the Hiroshima and Nagasaki Tissue Registries. 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 manuscripts which make use of these data to:

> Archives Unit
> Library and Archives Section
> Information Technology Department
> Radiation Effects Research Foundation
> 5-2 Hijiyama Koen
> Minami-ku
> Hiroshima, 732-0815
> JAPAN

These data are available from the RERF home page (http://www.rerf.or.jp).

LSS solid cancer incidence 1958-1998 person-year table without AHS stratification

File name : *lssinc07.csv*

Format : ASCII text, comma-separated-values with variable names in row 1

File size : 26,807 records (including one variable name header record)

Basic description : Data on 18,645 cancers among 111,952 people with 2,939,361 migration-adjusted person years of follow-up (includes people with unknown dose)

Name	Description and codes
city	City 1 : Hiroshima 2 : Nagasaki
sex	Sex 1 : Male 2 : Female
un4gy	Under 4Gy of Shielded Kerma Total (G+N) indicator 0 : Under 4Gy 1 : Over 4Gy
distcat	Distance categories 1 : 0-3000m 2 : 3000-10000m 3 : NIC
agxcat	Age at exposure categories 1 : 0 – 5 years old 2 : 5 – 10 3 : 10 – 15 4 : 15 – 20 5 : 20 – 25 6 : 25 – 30 7 : 30 – 35 8 : 35 – 40 9 : 40 – 45 10 : 45 – 50 11 : 50 – 55 12 : 55 – 60 13 : 60 – 65 14 : 65 – 70 15 : 70 +
agecat	Attained age categories 1 : 0 – 5 years old 2 : 5 – 10 3 : 10 – 15 4 : 15 – 20 5 : 20 – 25 6 : 25 – 30 7 : 30 – 35 8 : 35 – 40 9 : 40 – 45 10 : 45 – 50 11 : 50 – 55 12 : 55 – 60 13 : 60 – 65 14 : 65 – 70 15 : 70 – 75 16 : 75 – 80 17 : 80 – 85 18 : 85 +

dcat	DS02 weighted colon dose category Adjusted-truncated RBE10 weighted does (i.e. gamma + 10 * neutron) 1: dose unknown 2 : 0 – 5 mGy 3 : 5 – 20 4 : 20 – 40 5 : 40 – 60 6 : 60 – 80 7 : 80 – 100 8 : 100 – 125 9 : 125 – 150 10 : 150 – 175 11 : 175 – 200 12 : 200 – 250 13 : 250 – 300 14 : 300 – 500 15 : 500 – 750 16 : 750 – 1000 17 : 1000 – 1250 18 : 1250 – 1500 19 : 1500 – 1750 20 : 1750 – 2000 21 : 2000 – 2500 22 : 2500 – 3000 23 : 3000+
time	Calendar time 1 : 1958/1/1 – 1960/12/31 2 : 1961/1/1 – 1965/12/31 3 : 1966/1/1 – 1970/12/31 4 : 1971/1/1 – 1975/12/31 5 : 1976/1/1 – 1980/12/31 6 : 1981/1/1 – 1985/12/31 7 : 1986/1/1 – 1987/12/31 8 : 1988/1/1 – 1990/12/31 9 : 1991/1/1 – 1995/12/31 10 : 1996/1/1 – 1998/12/31
subjects	The number of subjects of first at risk
upyr	Unadjusted person years at risk
pyr	Adjusted person years at risk
gdist	Person-year weighted mean Ground Distance in meters
agex	Person-year weighted mean Age at exposure in years
age	Person-year weighted mean Attained age in years
year	Person-year weighted mean year

Case Counts		
	Organ or Organ Group	**ICD-O-2 codes***
solid	All solid cancer	
oralca	Cancer of the oral cavity	C00-C14 / 3
lip	Lip cancer	C00 / 3
tongue	Tongue cancer	C01,C02 / 3
saliv	Salivary major glands cancer	C07,C08 / 3
mouth	Mouth cancer	C03-C06 / 3
pharynx	Pharynx cancer	C09-C14 / 3
digestca	Cancer of the digestive system	C15-C26,C42.2,C48 / 3
esoph	Esophageal cancer	C15 / 3
stomach	Stomach cancer	C16 / 3
smallint	Small intestine cancer	C17 / 3
colon	Colon cancer	C18 / 3
rectum	Rectum cancer	C19-C21 / 3
liver	Liver cancer	C22 / 3
gallbldr	Cancer of gallbladder, etc	C23,C24 / 3
pancr	Pancreatic cancer	C25 / 3
othdig	Other cancers of the digestive system	C26,C422,C48 / 3
respca	Cancer of respiratory system	C30-C34, C37-C39 / 3
nasal	Cancer of nasal cavity, etc	C30,C31 / 3
larynx	Larynx cancer	C32 / 3
lung	Lung cancer	C33,C34 / 3
othres	Other cancers of the respiratory system	C37-C39 / 3
thymus	Thymus cancer	C379 / 3
skinbone	Cancer of bone, connective tissue and skin	C40,C41,C44,C47,C49 / 3
bone	Bone cancer	C40,C41 / 3
connect	Connective tissue cancer	C47,C49 / 3
melanoma	Cutaneous melanoma	C44 / 3 M8270 – 8279
nmskin	Non-melanoma skin cancer	C44 / 3 except M8270 – 8279
skbasal	Basal cell carcinoma	C44 / 3 M8090- 8099
sksquam	Squamous cell carcinoma	C44 / 3 M8070 – 8079
bowens	Bowen's disease	C44 / 2 M8081
breast	Breast cancer	C50 / 3
femgenca	Female genital organ cancer	C51-C58 / 3
uterus	All uterine cancer	C53-C54, C559 / 3
utrnos	Uterine cancer, NOS	C559 / 3
cervix	Cervical cancer	C53 / 3
corpus	Cancer of the uterine corpus	C54 / 3
ovary	Ovarian cancer, etc	C56,C57(0,1,2,3,4,8) / 3

- ICD-O version 2 codes given as *topography* / *behavior* M*morphology*

Case Counts		
	Organ or Organ Group	**ICD-O-2 codes***
othfem	Other female genital cancer	C51,C52,C57(7,8,9),C58 / 3
malgenca	Male genital organ cancers	C60,C63 / 3
prost	Prostate cancer	C61 / 3
testis	Testis cancer	C62 / 3
othmale	Other male genital cancer	C60,C63 / 3
urinca	Cancer of urinary system	C64-C68 / 3
bladder	Urinary bladder cancer	C67 / 3
kidney	Kidney cancer	C649 / 3
renal	Renal pelvis & ureter cancer	C659,C669 / 3
othurin	Other urinary system cancer	C68 / 3
cnsca	Cancer of Central nervous system (includes benign tumors)	C70-C72 / (2, 3)
thyroid	Thyroid cancer	C739 / 3
othsol	Other solid cancer	C42(0,1,3,4), C69,C74-C76, C77,C809 / 3
msother	Sites used in the *other sites* group in the paper. This includes all sites no explicitly included in other analyses presented in the report	

* ICD-O version 2 codes given as *topography* / *behavior* M*morphology*

Histology groups		
		ICD-O-2 morphology codes
adeno	Adenocarcinomas	8140-8381, 8290-8420, 8430, 8440-8490, 8500-8543
squam	Squamous cell carcinoma	8050-8082
othepi	Other epithelial cancers	8010-8045, 8090-8110, 8120-8130, 8550, 8560-8580, 8590-8671, 8680-8790
sarcoma	Sarcoma	8800-8804, 8810-8833, 8840-8841,8850-8881, 8890-8920, 8930-8933, 8940, 8950-8951, 8963, 8980-8991,9020-9040, 9120-9161, 9170-9175, 9180-9241, 9250-9251, 9260-9262, 9580-9581
othnonepi	Other non-epithelial cancers	9050-9055, 9060-9091, 9100-9104, 9110, 9270-9840, 9350-9370, 9380-9481, 9490-9523, 9530-9539, 9540-9570
histnos	Histology not otherwise specified	8000-8005

Doses (person-year weighted adjusted-truncated DS02 doses)*	
cola02w10	Colon dose (mGy)
cola02g	Colon gamma (mGy)
cola02n	Colon neutron (mGy)
mara02w10	Bone marrow dose (mGy
mara02g	Bone marrow gamma (mGy)
mara02n	Bone marrow neutron (mGy)
braa02w10	Brain dose (mGy)
brea02w10	Breast dose (mGy)
liva02g	Liver gamma (mGy)
liva02n	Liver neutron (mGy)
liva02w10	Liver dose (mGy)
luna02w10	Lung dose (mGy)
ovaa02w10	Ovary dose (mGy)
pana02w10	Pancreas dose (mGy)
skea02w10	Skeleton dose(mGy)
skia02w10	Skin dose (mGy)
stoa02w10	Stomach dose (mGy)
tesa02w10	Testis dose (mGy)
thya02w10	Thyroid dose (mGy)
blaa02w10	Bladder dose (mGy)
utea02w10	Uterus dose (mGy)
trunc02	Truncation factor
adjust02	Adjustment factor

* weighted doses were computed as gamma + 10 * neutron

LSS solid cancer incidence 1958-1998 person-year table with AHS stratification

File name : *lssinc07ahs.csv*

Format : ASCII text, comma-separated-values with variable names in row 1

File size : 44,371 records (including one variable name header record)

Basic description : Data on 18,645 cancers among 111,952 people with 2,939,361 migration-adjusted person years of follow-up (includes people with unknown dose)

Name	Description and codes
city	City 1 : Hiroshima 2 : Nagasaki
sex	Sex 1 : Male 2 : Female
ahs	AHS indicator 1: Not AHS 2 : AHS
un4gy	Under 4Gy of Shielded Kerma Total (G+N) indicator 0 : Under 4Gy 1 : Over 4Gy
distcat	Distance categories 1 : 0-3000m 2 : 3000-10000m 3 : NIC
agxcat	Age at exposure categories 1 : 0 – 5 years old 2 : 5 – 10 3 : 10 – 15 4 : 15 – 20 5 : 20 – 25 6 : 25 – 30 7 : 30 – 35 8 : 35 – 40 9 : 40 – 45 10 : 45 – 50 11 : 50 – 55 12 : 55 – 60 13 : 60 – 65 14 : 65 – 70 15 : 70 +
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bowens	Bowen's disease	C44 / 2 M8081
thyroid	Thyroid cancer	C739 / 3

* ICD-O version 2 codes given as *topography* / *behavior* M*morphology*

Doses (person-year weighted adjusted-truncated DS02 doses)*	
cola02w10	Colon dose (mGy) (RBE10 weighted dose (i.e. gamma + 10*neutron))
cola02g	Colon gamma (mGy)
cola02n	Colon neutron (mGy)
skia02w10	Skin dose (mGy)
thya02w10	Thyroid dose (mGy)
trunc02	Truncation factor
adjust02	Adjustment factor

* weighted doses were computed as gamma + 10 * neutron