Methodology Note on the Human Life-Table Database (HLD)

by Vladimir M. Shkolnikov

With assistance from Evgeniy M. Andreev (Centre of Demography and Human Ecology, Moscow), Jacques Vallin and France Meslé (Institut national d'études démographiques, Paris), Carl Boe and John R. Wilmoth (University of California at Berkeley), Sigrid Gellers-Barkmann (Max Planck Institute for Demographic Research)

Introduction

Life tables describe the extent to which a generation of people (the life table cohort) dies off with age. Life tables are the most ancient and important tool in demography. They are widely used for descriptive and analytical purposes in demography, public health, epidemiology, population geography, biology and many other branches of science.

The Human Life-Table Database is a collection of population life tables for a multitude of countries and many years. Most of the HLD life tables are life tables for national populations, which have been officially published by national statistical offices. Some of the HLD life tables refer to certain regional or ethnic sub-populations within countries. Part of the HLD life tables are non-official life tables produced by researchers.

HLD includes the following types of data:

- complete life tables in text format;
- abridged life tables in text format;
- references to statistical publications and other data sources;
- scanned copies of the original life tables as they were published.

Three scientific institutions are jointly developing the HLD: the Max Planck Institute for Demographic Research (MPIDR) in Rostock, Germany, the Department of Demography at the University of California at Berkeley, USA and the Institut national d'études démographiques (INED) in Paris, France. The MPIDR is responsible for maintaining the database. A big set of life tables were collected for and given to the HLD by Dr. Väinö Kannisto, a former United Nations advisor on demographic and social statistics. Professor J.W.Vaupel, Founding Director of the MPIDR provided general guidance to the HLD project.

Method of calculation

A life table is a rectangular matrix, showing changes in a standard set of life table functions (columns) across ages (rows). The conventional set of life table functions includes: probability of death within elementary age interval $[x, x+1)$ ${}_1q_x$, probability of survival from birth to exact age x l_x, number of deaths within the elementary age interval $[x, x+1)$ ${}_1d_x$, central death rate for the age interval $[x,x+1)$ ${}_1M_x$, number of person-years lived within the elementary age interval $[x,x+1)$ ${}_1L_x$, number of person-years lived after the exact age x T_x, and life expectancy at exact age x e_x. The first three functions are frequency (or intensity) measures since they show frequencies of

events (deaths or survival). The last three functions are duration measures since they show amounts of lifetime and are measured in person-years.

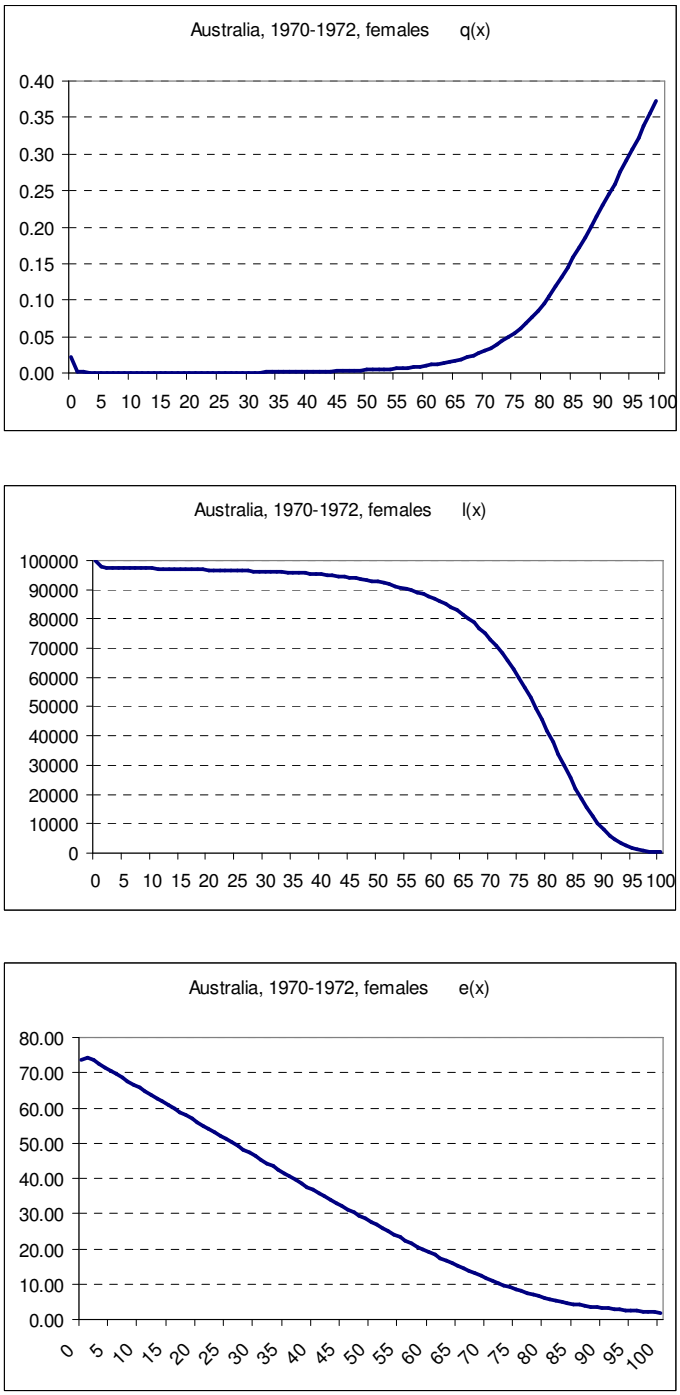


Figure 1. An example of life table functions: probability of death at age *x*, probability of survival to age *x* (from 100,000 at age 0), life expectancy at age *x* (in years).

Life tables differ with respect to the width of elementary age intervals. Complete life tables are based on one-year age intervals, while abridged life tables are based on wider age categories. Usually, these are age groups 0, 1-4, 5-9, 10-14, 20-24, ...

For a more detailed description of life tables and methods for their construction, see the textbooks by Preston, Heuveline, Guillot (2001), Keyfitz (1985) and Chiang (1984).

HLD mostly relies on published life tables. Life tables published in different countries and years represent a variety of methods for their calculation and presentation in print. They depend on both national and historical peculiarities and on the availability and quality of vital statistics.

The majority of the HLD life tables are *original, complete* life tables. Some users, however, might prefer abridged life tables as a shorter form of the complete ones. For this reason, the HLD presents also abridged life tables calculated from the complete ones.

Complete life tables are rarely available for developing countries and for the historical populations of today's developed countries. However, for some of them, there are abridged life tables. Therefore, the HLD includes *original, abridged* life tables.

Usually not all of the standard life table functions (columns) described above are shown in published life tables.

Almost all published life tables include the column of life expectancies e_x. It shows how many years an average individual at exact age *x* can expect to live after this age. In a *period life table,* life expectancy estimates correspond to age-specific intensities of death at age *x* and older ages observed in a given calendar year or during a short calendar period. In a *cohort life table,* life expectancy estimates correspond to age-specific intensities of death at age *x* and older ages observed for a birth cohort during a long calendar period.

Columns q_x and l_x are also published frequently. However, columns ${}_1d_x, {}_1M_x, {}_1L_x, T_x$ are omitted in many publications. Later on we will show that the absence of columns ${}_1T_x$ and ${}_1L_x$ causes certain difficulties for the computation of exact values of these functions.

The absence of life table parameters in publications is an important disadvantage since users might need some of the missing parameters. Therefore, the HLD provides to a user all of the standard life table columns.

There are different ways for the calculation of missing life table functions.

HLD provides six types of life tables computed from original, complete or abridged life tables by two methods. One method allows for the computation of missing life table functions from two original life table functions of frequency and duration. Life tables of types 1, 2, and 5 are computed by this method. Another method allows computing all life table functions from one original frequency function (life tables of types 3, 4, and 6).

Type 1: Complete life tables.

This type of the HLD life tables closely resembles to the original, published tables. The calculation procedure ensures that one frequency function (${}_1q_x$ or l_x) and one duration function ($T_x, {}_1L_x$ or e_x) of the original, published life table are preserved

without changes. It means that all values of life expectancy e_x of the type 1 life table are exactly or almost exactly as in the original.

In the type 1 life table, one of the original columns l_x, ${}_1q_x$ or ${}_1d_x$, dependent on their availability, is taken as a frequency function and one of the columns T_x, ${}_1L_x$ or e_x is taken as a duration function for further calculations.

Let us assume, first, that l_x and T_x are available from the original life table. Then all other life table functions can be computed in the following way

$${}_1d_x = l_x - l_{x+1}, {}_1q_x = {}_1d_x / l_x, {}_1L_x = T_x - T_{x+1}, e_x = T_x / l_x. \qquad (1)$$

If ${}_1q_x$ is available from the published table instead of l_x, then l_x can be calculated from ${}_1q_x$:

$$l_0 = 100000, l_1 = l_0 - l_0 \cdot {}_1q_0, l_2 = l_1 - l_1 \cdot {}_1q_1, ..., l_{x+1} = l_x - l_x \cdot {}_1q_x, ... \qquad (2)$$

If ${}_1d_x$ is available instead of l_x or ${}_1q_x$, then l_x and ${}_1q_x$ can be calculated from ${}_1d_x$:

$$l_0 = 100000, l_1 = l_0 - {}_1d_0, {}_1q_0 = {}_1d_0 / l_0, ... \qquad (3)$$

If ${}_1L_x$ is available instead of T_x, then T_x can be calculated from ${}_1L_x$:

$$T_x = \sum_{t \geq x} {}_1L_t \,. \qquad (4)$$

Finally, if T_x and ${}_1L_x$ are not published in the original source, then it is still possible to compute T_x from e_x as $T_x = l_x \cdot e_x$. However, the values of T_x and especially their first differences ${}_1L_x$ resulting from such calculation are relatively imprecise since the values of e_x in most publications are given only with one or two decimal positions after the point. Figure 2 shows a comparison of ${}_1L_x$, calculated from the original, published T_x, with ${}_1L_x$ calculated from $T_x = l_x \cdot e_x$. In the latter case, ${}_1L_x$ values experience random fluctuations. At ages of low mortality (from 5 to 15) it can even result in values of ${}_1L_x$ higher than 100000.

This is an inevitable disadvantage of the type 1 complete life table where T_x or ${}_1L_x$ are not available. In such cases, these columns can be computed only approximately. The problem is more severe for small populations. It diminishes in abridged life tables with wider age intervals containing more deaths.

For the highest age ω, the published values of the life expectancy e_ω and of the probability of death q_ω are used for computation of other functions. If the last age interval is open ended, then ${}_\infty q_\omega = 1$ otherwise ${}_1q_\omega \leq 1$.

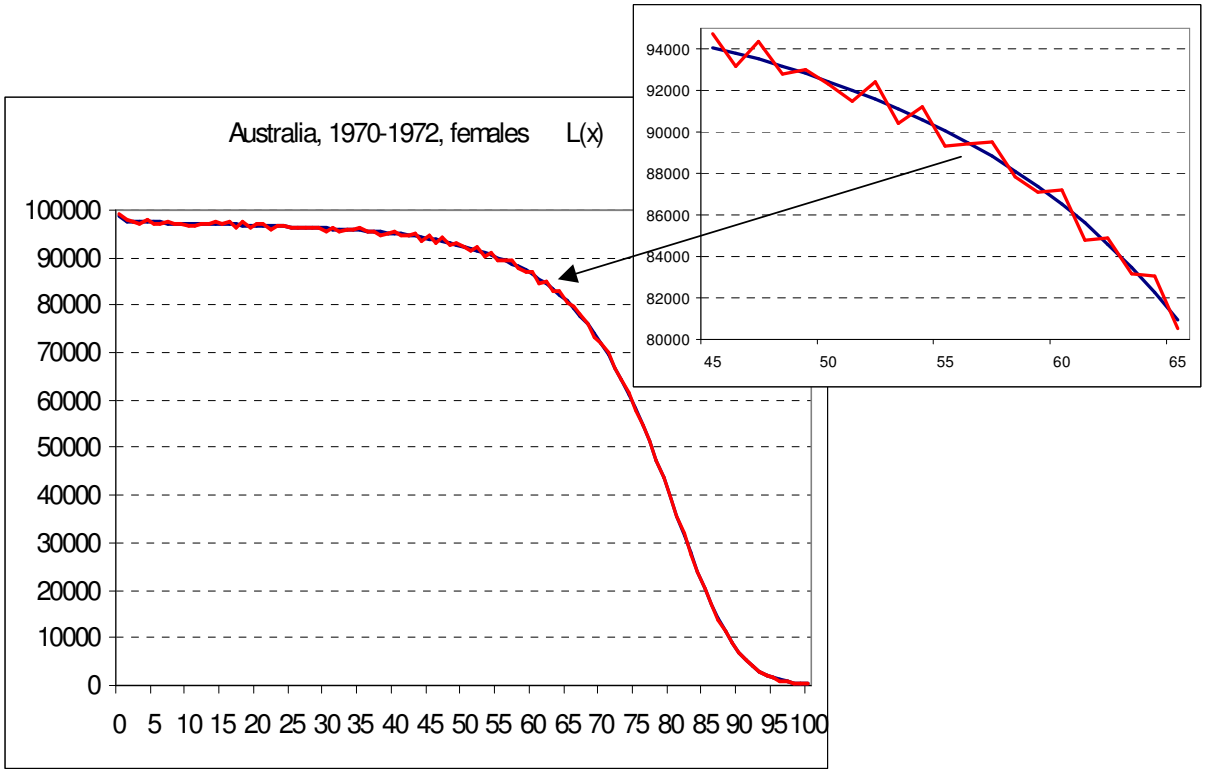


Figure 2. Comparison between $_1L_x$, calculated from the original, published T_x (blue curve) **with $_1L_x$ calculated from $T_x = l_x \cdot e_x$** (red curve).

Type 3: Recalculated complete life tables.

Complete life tables of type 1 include two original, published life table functions and preserve the original values of e_x. However, methods for the life table computation have been changing with time and have been different in different countries. This concerns two major parts of the life table construction: calculation of the probabilities of death from the raw data on deaths and population at risk and transition from the probabilities of death to the duration measures. The HLD does not deal with the first issue because it relies on the published values of $_1q_x$ (or l_x or $_1d_x$). However, the HLD has to address the second issue by providing "recalculated" life tables of type 3, which are computed from only one frequency measure $_1q_x$ (or l_x or $_1d_x$) in a completely uniform way for all countries and all years. This means that period- or country-specific peculiarities of methods, originally used for the computation, are eliminated and that the type 3 life tables are comparable in respect to countries and calendar years.

A disadvantage of this approach is that the calculated values of life expectancy e_x are slightly different from the published ones.

The procedure to compute ${}_1L_x$ from ${}_1q_x$ begins from the calculation of l_x according to formula (2). For the first year of life we apply a formula very similar to that used in the Coale-Demeny model life tables:

$$ {}_1L_0 = \begin{cases} 0.35 \cdot l_0 + 0.65 \cdot l_1, {}_1q_0 > 0.1 \\ (0.05 + 3 \cdot {}_1q_0) \cdot l_0 + (0.95 - 3 \cdot {}_1q_0) \cdot l_0, q_0 \le 0.1 \end{cases} \qquad (5) $$

For older ages, ${}_1L_x$ is computed by averaging neighboring values of l_x:

$$ {}_1L_x = \frac{1}{2} \cdot (l_x + l_{x+1}). $$

T_x is computed by applying (4) and $e_x = T_x / l_x$.

The simple method for the closing of the type 1 life tables can not be applied for closing the type 3 life tables because recalculated life tables are based on ${}_1q_x$ and the original value of e_ω can not be used.

First of all, we have to define which age is to be considered as the last age ω in the recalculated life table. Let age *X* be the last age, for which the value of ${}_1q_X$ is not missing. If ${}_1q_X = 1$, then the last age is defined as $\omega = X$ and ${}_\infty d_\omega = l_{X-1}$. If ${}_1q_X < 1$, then the last age is defined as $\omega = X + 1$ and ${}_\infty d_\omega = l_X$.

The last life expectancy at age ω is taken from the table of correspondence between e_ω and e_0 in appendix 1. In order to construct this table we used long series of life tables of France and Sweden from two data sources:

1) The Berkeley Mortality Database (http://demog.berkeley.edu/wilmoth/mortality) for the Swedish life tables in 1861-1995 and for the French life tables in 1899-1995.

2) Data files from the CD enclosed in the publication by Vallin and Meslé (2001) for the French life tables in 1806-1898.

Establishing the correspondence between e_ω and e_0 includes two steps:

1) For each interval of life expectancy at birth (<35, 35-39, 40-44,... , ≥80 for women and <35, 35-39, 40-44,... , ≥75 for men) the mean values of life expectancy at ages ω = 75, 76, ..., 107 are computed.

2) Some of these values experienced random fluctuations. These fluctuations were smoothed by the splines and the values of e_ω are extrapolated up to age $\omega = 120$ (see Appendix 1).

These model values are used in the type 3 life tables as the values of e_ω. Remaining duration functions are computed as ${}_\infty L_\omega = T_\omega = l_\omega \cdot e_\omega$.

Type 2: Abridged life tables computed from complete life tables

These abridged life tables are computed from the type 1 complete life tables. Their calculation is very simple.

For the elementary age interval [*x, x+n*), the functions of the abridged life table are

$${}_nd_x = l_x - l_{x+n}, {}_nq_x = {}_nd_x / l_x, {}_nL_x = T_x - T_{x+n}, e_x = T_x / l_x. \qquad (6)$$

Type 4: Abridged life tables computed from recalculated complete life tables

These abridged life tables are computed from the type 3 complete life tables. They are constructed by applying formula (6) to respective recalculated complete life tables.

Type 5: Abridged life tables

For some countries/time periods, complete life tables are unavailable, but abridged life tables exist. Type 5 of the HLD life tables is very close to the original, published abridged tables. The calculation procedure is similar to that for type 1 complete life tables. It ensures that one frequency function and one duration function of the original, published life table is preserved without changes in the type 1 table. Values of life expectancy e_x are exactly or almost exactly as those in the original tables.

In the type 5 life table, one of the original columns l_x, ${}_nq_x$ or ${}_nd_x$, dependent on their availability, is taken as a frequency measure. One of the columns T_x, ${}_nL_x$ or e_x is taken as a duration measure.

In an abridged life table, the length of the elementary age interval is *n*. After replacement of ${}_1q_x$ by ${}_nq_x$, ${}_1d_x$ by ${}_nd_x$ and ${}_1L_x$ by ${}_nL_x$, formulae (1)–(4) are used for the calculation.

Type 6: Recalculated abridged life tables

In life tables of type 6, all functions have to be calculated from ${}_nq_x$. Transition from ${}_nq_x$ to ${}_nL_x$ is central for this calculation.

Formula (5) yields ${}_1L_0$ for the first age group (age 0). For the second age group (1-4 years) another approximate relationship by Coale-Demeny (1983) is applied:

$${}_4L_1 = k_1 l_1 + (1 - k_1) l_4,$$

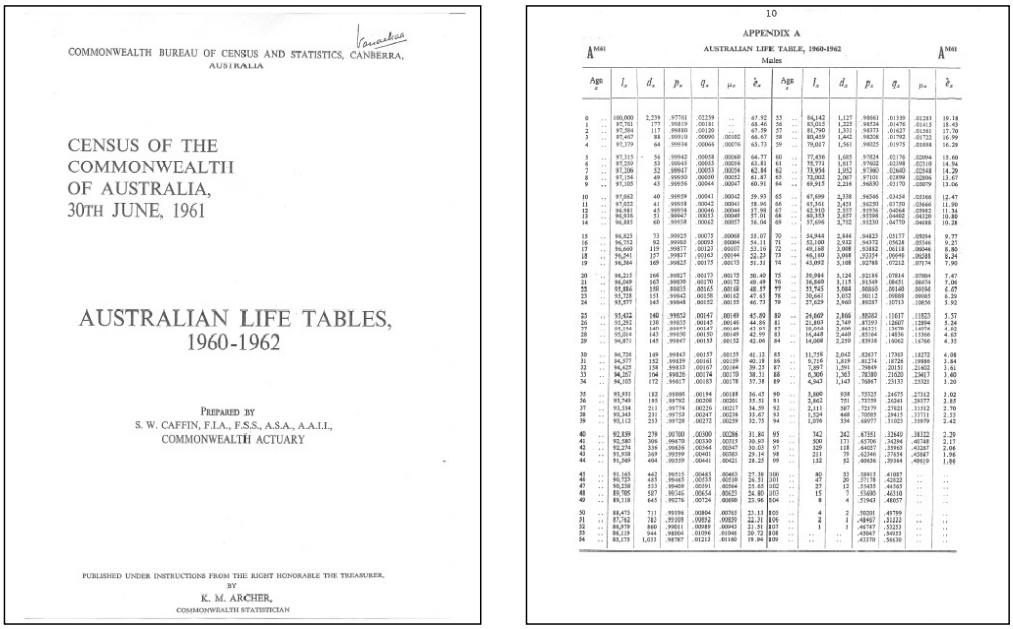
where k_1

	Males	Females
$q_0 \le 0.1$	$1.653 - 3.013 \cdot q_0$	$1.524 - 1.627 \cdot q_0$
$q_0 > 0.1$	1.352	1.361

For age groups 5-9, 10-14, …. ${}_5L_x = \frac{1}{2} \cdot (l_x + l_{x+5})$.

Formats for data presentation

Images of published life tables are on the web in portable document format (.pdf) as shown in Figure 3.



COMMONWEALTH BUREAU OF CENSUS AND STATISTICS, CANBERRA, AUSTRALIA

CENSUS OF THE COMMONWEALTH OF AUSTRALIA, 30TH JUNE, 1961

AUSTRALIAN LIFE TABLES, 1960-1962

PREPARED BY
S. W. CAFFIN, F.I.A., F.S.S., A.S.A., A.A.I.I.,
COMMONWEALTH ACTUARY

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APPENDIX A

AUSTRALIAN LIFE TABLE, 1960-1962

Males

Figure 3. Presentation of the published Australian life table for the period 1960-62 in PDF format.

The HLD life tables are given in a tabular form as text files with comma-separated values. The following columns are given in each table:

`Country`	United Nations standard 3-character country and area "ISO ALPHA-3 code" followed by 4 digits, which are used for the additional coding of ethnic groups or regions within a country (when needed)
`Year1`	Beginning of the calendar period
`Year2`	End of the calendar period
`TypeLT`	Type of HLD life table (see explanations in the section "Methods of calculation")
`Sex`	1-males 2-females
`Age`	Lower limit of age interval (age x)
`AgeInt`	Length of age interval. Usually has values of 1, 4 or 5. Value 99 is used for the age group ω in recalculated life tables of types 3, 4 or 6 with $q_\omega = 1$
`m(x)`	Central death rate at age x

`q(x)`	Probability of death at age *x*
`l(x)`	Number of survivors to age *x*
`d(x)`	Death number at age *x*
`L(x)`	Number of person-years lived at age *x*
`T(x)`	Number of person-years lived after age *x*
`e(x)`	Life expectancy at age *x*

The columns of the original, published life table, which are used to produce HLD life tables of types 1, 2, 5 and 6, are marked by an asterisk e.g. "`l(x)*`", "`e(x)*`".

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Chiang, C.L. 1984. *The Life Table and its Applications.* Malabar, Florida.

Coale, A.J. and Demeny, P. 1983. *Regional Model Life Tables and Stable Populations*. Second Edition. Academic Press, N.Y.-L.

Preston, S.H., Heuveline, P., and M.Guillot. 2001. *Demography. Measuring and Modelling Population Process.* Blackwell Publishers. Oxford, Malden, Massachusetts.

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APPENDIX 1

Correspondence between the levels of life expectancy at birth and the last life expectancy e_{ω}.

Males

Last age	Life expectancy at birth									
	-35	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75+
75	5.97	6.17	6.37	6.57	6.78	6.98	7.18	7.60	8.43	9.48
76	5.64	5.82	6.01	6.19	6.37	6.56	6.74	7.13	7.93	8.94
77	5.32	5.49	5.66	5.82	5.99	6.16	6.32	6.69	7.45	8.40
78	5.02	5.17	5.32	5.47	5.62	5.77	5.92	6.27	6.99	7.91
79	4.74	4.87	5.01	5.14	5.27	5.41	5.54	5.87	6.55	7.42
80	4.47	4.59	4.71	4.83	4.95	5.06	5.18	5.49	6.13	6.95
81	4.21	4.32	4.42	4.53	4.63	4.74	4.84	5.12	5.73	6.52
82	3.97	4.06	4.15	4.24	4.33	4.43	4.52	4.78	5.36	6.11
83	3.74	3.82	3.90	3.98	4.06	4.14	4.22	4.46	5.00	5.71
84	3.52	3.59	3.66	3.73	3.80	3.87	3.94	4.16	4.67	5.33
85	3.32	3.38	3.44	3.50	3.56	3.62	3.68	3.88	4.36	4.99
86	3.12	3.18	3.23	3.28	3.33	3.38	3.43	3.62	4.07	4.66
87	2.92	2.97	3.03	3.08	3.13	3.18	3.23	3.40	3.80	4.31
88	2.73	2.78	2.83	2.89	2.94	3.00	3.05	3.20	3.54	3.98
89	2.55	2.61	2.66	2.72	2.77	2.83	2.88	3.02	3.31	3.68
90	2.39	2.45	2.50	2.56	2.61	2.67	2.73	2.85	3.09	3.39
91	2.24	2.30	2.36	2.41	2.47	2.53	2.58	2.69	2.88	3.13
92	2.09	2.15	2.21	2.27	2.33	2.39	2.45	2.55	2.71	2.91
93	1.95	2.02	2.08	2.14	2.20	2.26	2.32	2.41	2.54	2.70
94	1.84	1.90	1.96	2.02	2.08	2.14	2.20	2.28	2.39	2.51
95	1.72	1.78	1.84	1.90	1.97	2.03	2.09	2.16	2.24	2.33
96	1.62	1.69	1.75	1.81	1.88	1.94	2.00	2.07	2.13	2.19
97	1.50	1.56	1.63	1.69	1.75	1.81	1.87	1.94	2.00	2.06
98	1.38	1.44	1.50	1.56	1.62	1.68	1.74	1.80	1.86	1.93
99	1.26	1.32	1.38	1.44	1.50	1.55	1.61	1.67	1.73	1.79
100	1.19	1.24	1.29	1.35	1.40	1.45	1.50	1.56	1.61	1.66
101	1.12	1.16	1.21	1.26	1.30	1.35	1.39	1.44	1.49	1.53
102	1.09	1.13	1.16	1.19	1.23	1.26	1.29	1.33	1.36	1.39
103	1.04	1.07	1.10	1.13	1.16	1.19	1.21	1.24	1.27	1.30
104	0.99	1.02	1.04	1.07	1.10	1.13	1.15	1.18	1.21	1.24
105	0.94	0.96	0.99	1.02	1.04	1.07	1.09	1.12	1.14	1.17
106	0.89	0.91	0.93	0.96	0.98	1.01	1.03	1.06	1.08	1.11
107	0.83	0.86	0.88	0.90	0.93	0.95	0.97	0.99	1.02	1.04
108	0.78	0.80	0.82	0.85	0.87	0.89	0.91	0.93	0.95	0.98

109	0.73	0.75	0.77	0.79	0.81	0.83	0.85	0.87	0.89	0.91
110	0.68	0.70	0.71	0.73	0.75	0.77	0.79	0.81	0.83	0.85
111	0.63	0.64	0.66	0.68	0.69	0.71	0.73	0.75	0.76	0.78
112	0.57	0.59	0.60	0.62	0.64	0.65	0.67	0.68	0.70	0.72
113	0.52	0.54	0.55	0.56	0.58	0.59	0.61	0.62	0.64	0.65
114	0.47	0.48	0.49	0.51	0.52	0.53	0.55	0.56	0.57	0.59
115	0.42	0.43	0.44	0.45	0.46	0.47	0.49	0.50	0.51	0.52
116	0.36	0.37	0.38	0.40	0.41	0.42	0.43	0.44	0.45	0.46
117	0.31	0.32	0.33	0.34	0.35	0.36	0.36	0.37	0.38	0.39
118	0.26	0.27	0.27	0.28	0.29	0.30	0.30	0.31	0.32	0.33
119	0.21	0.21	0.22	0.23	0.23	0.24	0.24	0.25	0.25	0.26
120	0.16	0.16	0.16	0.17	0.17	0.18	0.18	0.19	0.19	0.20

Females

Last age	Life expectancy at birth										
	-35	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80+
75	6.02	6.30	6.58	6.86	7.14	7.42	7.70	7.98	8.57	10.10	11.94
76	5.71	5.96	6.21	6.47	6.72	6.97	7.23	7.48	8.04	9.49	11.24
77	5.39	5.63	5.86	6.09	6.32	6.55	6.78	7.01	7.53	8.91	10.57
78	5.10	5.31	5.52	5.73	5.94	6.15	6.36	6.56	7.05	8.35	9.92
79	4.82	5.01	5.20	5.39	5.57	5.76	5.95	6.14	6.59	7.81	9.29
80	4.55	4.72	4.89	5.06	5.23	5.40	5.57	5.74	6.16	7.30	8.69
81	4.30	4.45	4.60	4.76	4.91	5.06	5.21	5.36	5.75	6.81	8.11
82	4.05	4.19	4.32	4.46	4.60	4.73	4.87	5.01	5.36	6.35	7.57
83	3.82	3.94	4.06	4.19	4.31	4.43	4.55	4.68	5.00	5.92	7.05
84	3.59	3.70	3.81	3.92	4.04	4.15	4.26	4.37	4.67	5.52	6.55
85	3.38	3.48	3.58	3.68	3.78	3.88	3.98	4.08	4.35	5.14	6.09
86	3.18	3.27	3.36	3.45	3.54	3.63	3.72	3.81	4.06	4.78	5.66
87	2.96	3.05	3.15	3.24	3.33	3.42	3.51	3.60	3.83	4.44	5.18
88	2.76	2.86	2.95	3.04	3.13	3.23	3.32	3.41	3.61	4.12	4.74
89	2.58	2.67	2.76	2.86	2.95	3.04	3.13	3.23	3.40	3.83	4.34
90	2.41	2.50	2.59	2.68	2.78	2.87	2.96	3.05	3.21	3.56	3.98
91	2.25	2.34	2.43	2.52	2.62	2.71	2.80	2.89	3.03	3.32	3.65
92	2.10	2.19	2.28	2.37	2.46	2.55	2.64	2.73	2.86	3.09	3.35
93	1.96	2.05	2.14	2.23	2.32	2.41	2.50	2.59	2.70	2.89	3.10
94	1.82	1.91	2.00	2.09	2.18	2.27	2.36	2.45	2.56	2.70	2.87
95	1.70	1.79	1.88	1.97	2.06	2.15	2.23	2.32	2.42	2.53	2.66
96	1.60	1.69	1.77	1.86	1.95	2.03	2.12	2.21	2.30	2.40	2.51
97	1.50	1.59	1.67	1.75	1.84	1.92	2.01	2.09	2.18	2.27	2.36
98	1.40	1.48	1.57	1.65	1.73	1.81	1.89	1.97	2.06	2.14	2.22
99	1.31	1.39	1.47	1.54	1.62	1.70	1.78	1.85	1.93	2.01	2.08
100	1.22	1.29	1.37	1.44	1.51	1.59	1.66	1.73	1.80	1.88	1.95
101	1.13	1.20	1.27	1.34	1.40	1.47	1.54	1.61	1.68	1.75	1.81

102	1.08	1.14	1.21	1.28	1.34	1.41	1.47	1.54	1.60	1.67	1.73
103	1.03	1.09	1.15	1.21	1.28	1.34	1.40	1.46	1.53	1.59	1.65
104	0.98	1.04	1.09	1.15	1.21	1.27	1.33	1.39	1.45	1.51	1.57
105	0.92	0.98	1.04	1.09	1.15	1.20	1.26	1.32	1.37	1.43	1.48
106	0.87	0.93	0.98	1.03	1.09	1.14	1.19	1.24	1.30	1.35	1.40
107	0.82	0.87	0.92	0.97	1.02	1.07	1.12	1.17	1.22	1.27	1.32
108	0.77	0.82	0.86	0.91	0.96	1.00	1.05	1.10	1.14	1.19	1.24
109	0.72	0.76	0.81	0.85	0.89	0.94	0.98	1.02	1.07	1.11	1.15
110	0.67	0.71	0.75	0.79	0.83	0.87	0.91	0.95	0.99	1.03	1.07
111	0.62	0.65	0.69	0.73	0.77	0.80	0.84	0.88	0.92	0.95	0.99
112	0.57	0.60	0.63	0.67	0.70	0.74	0.77	0.80	0.84	0.87	0.91
113	0.51	0.54	0.58	0.61	0.64	0.67	0.70	0.73	0.76	0.79	0.82
114	0.46	0.49	0.52	0.55	0.57	0.60	0.63	0.66	0.69	0.71	0.74
115	0.41	0.44	0.46	0.49	0.51	0.54	0.56	0.59	0.61	0.64	0.66
116	0.36	0.38	0.40	0.43	0.45	0.47	0.49	0.51	0.53	0.56	0.58
117	0.31	0.33	0.35	0.36	0.38	0.40	0.42	0.44	0.46	0.48	0.49
118	0.26	0.27	0.29	0.30	0.32	0.33	0.35	0.37	0.38	0.40	0.41
119	0.21	0.22	0.23	0.24	0.26	0.27	0.28	0.29	0.31	0.32	0.33
120	0.15	0.16	0.17	0.18	0.19	0.20	0.21	0.22	0.23	0.24	0.25

APPENDIX 2

Coding of country or area, region or regional sample, settlement category, race, ethnicity and religious group, and other subgroup.

The standard country and area "ISO ALPHA-3 code" can be found on the website of United Nations Statistics Division http://unstats.un.org/unsd/methods/m49/m49alpha.htm. The HLD also uses several codes for special areas or of former countries (Palestinian Authority, West Bank and Gaza Strip, Taiwan, former Czechoslovakia, former Yugoslavia, the former USSR, former Serbia and Montenegro). The list of all codes used nowadays is presented below.

Country

Albania	ALB
Argentina	ARG
Australia	AUS
Austria	AUT
Bahrain	BHR
Bangladesh	BGD
Barbados	BRB
Belgium	BEL
Botswana	BWA
Brazil	BRA
Bulgaria	BGR
Canada	CAN
Chile	CHL
China	CHN
Colombia	COL
Costa Rica	CRI
Cuba	CUB
Cyprus	CYP
Czech Republic	CZE
Denmark	DNK
Dominican Republic	DOM
Egypt	EGY
El Salvador	SLV
Estonia	EST
Fiji	FJI
Finland	FIN
France	FRA
French Guiana	GUF
Germany	DEU
Greece	GRC
Greenland	GRL

Grenada	GRD
Guyana	GUY
Honduras	HND
Hong Kong Special Administrative Region of China	HKG
Hungary	HUN
Iceland	ISL
India	IND
Iran (Islamic Republic of)	IRN
Iraq	IRQ
Ireland	IRL
Israel	ISR
Italy	ITA
Jamaica	JAM
Japan	JPN
Jordan	JOR
Kuwait	KWT
Lebanon	LBN
Lithuania	LTU
Luxembourg	LUX
Malta	MLT
Martinique	MTQ
Mauritius	MUS
Mexico	MEX
Mongolia	MNG
Netherlands	NLD
New Zealand	NZL
Norway	NOR
Oman	OMN
Palestinian Authority, West Bank and Gaza Strip	WEB
Panama	PAN
Peru	PER
Poland	POL
Portugal	PRT
Puerto Rico	PRI
Qatar	QAT
Republic of Korea	KOR
Reunion	REU
Romania	ROU
Russian Federation	RUS

Saudi Arabia	SAU
Senegal	SEN
Singapore	SGP
Slovakia	SVK
Slovenia	SVN
South Africa	ZAF
Spain	ESP
Sri Lanka	LKA
Sweden	SWE
Switzerland	CHE
Syrian Arab Republic	SYR
Taiwan	TWN
Thailand	THA
the former USSR	SUN
The former Yugoslav Republic of Macedonia	MKD
Togo	TGO
Trinidad and Tobago	TTO
United Arab Emirates	ARE
United Kingdom of Great Britain and Northern Ireland	GBR
United States of America	USA
Uruguay	URY
Venezuela (Bolivarian Republic of)	VEN
Yemen	YEM

Region or regional sample

Country or area name	Region or regional sample	Code
Australia	Australian Capital Territory	10
Australia	New South Wales	20
Australia	Northern Territory	30
Australia	Queensland	40
Australia	South Australia	50
Australia	Tasmania	60
Australia	Victoria	70
Australia	Western Australia	80
Austria	Burgenland	10
Austria	Kaernten	20
Austria	Niederoesterreich	30
Austria	Oberoesterreich	40
Austria	Salzburg	50
Austria	Steiermark	60
Austria	Tirol	70
Austria	Vorarlberg	80
Austria	Wien	90
Argentina	24 partidos del Gran Buenos Aires	10

Argentina	Buenos Aires	20
Argentina	Catamarca	30
Argentina	Chaco	40
Argentina	Chubut	50
Argentina	Cordoba	60
Argentina	Corrientes	70
Argentina	Cuidad de Buenos Aires	80
Argentina	Entre Rios	90
Argentina	Formosa	100
Argentina	Jujuy	110
Argentina	La Pampa	120
Argentina	La Rioja	130
Argentina	Mendoza	140
Argentina	Misiones	150
Argentina	Provincia del Neuquen	160
Argentina	Resto de Partidos de la Provincia de Buenos Aires	170
Argentina	Rio Negro	180
Argentina	Salta	190
Argentina	San Juan	200
Argentina	San Luis	210
Argentina	Santa Cruz	220
Argentina	Santa Fe	230
Argentina	Santiago del Estero	240
Argentina	Tierra del Fuego	250
Argentina	Tucuman	260
Bangladesh	Matlab DSS Area	10
Bangladesh	Teknaf DSS Area	20
Canada	Alberta	10
Canada	British Columbia	20
Canada	Manitoba	30
Canada	New Brunswick	40
Canada	Newfoundland Labrador	50
Canada	Nova Scotia	60
Canada	Ontario	70
Canada	Quebec	80
Canada	Saskatchewan	90
Canada	Prince Edward Island	100
Canada	Yukon Territory	110
Canada	Northwest Territories	120
Canada	Nunavut	130
Canada	Yukon, Northwest Territories and Nunavut	140
Chile	Aisen del General Carlos Ibanez del Campo	10
Chile	Atacama	20
Chile	Antofagasta	30
Chile	Araucania	40
Chile	Biobio	50
Chile	Coquimbo	60
Chile	Los Lagos	70
Chile	Libertador Bernardo O'Higgins	80
Chile	Magallanes y de la Antartica Chilena	90
Chile	Metropolitana de Santiago	100
Chile	Tarapaca	110

Chile	Valparaiso	120
China	Anhui	10
China	Beijing	20
China	Fujian	30
China	Gansu	40
China	Guangdong	50
China	Guangxi	60
China	Guizhou	70
China	Hebei	80
China	Hellongjiang	90
China	Henan	100
China	Hubei	110
China	Hunan	120
China	Jiangsu	130
China	Jiangxi	140
China	Jilin	150
China	Liaoning	160
China	Neimongol	170
China	Ningxia	180
China	Qinghai	190
China	Shaanxi	200
China	Shandong	210
China	Shanghai	220
China	Shanxi	230
China	Sichuan	240
China	Tianjin	250
China	Xinjiang	260
China	Yunnan	270
China	Zhejiang	280
Columbia	Antioquia	10
Columbia	Arauca	20
Columbia	Atlantico	30
Columbia	Bogota	40
Columbia	Bolivar	50
Columbia	Boyaca	60
Columbia	Caldas	70
Columbia	Caqueta	80
Columbia	Casanare	90
Columbia	Cauca	100
Columbia	Cesar	110
Columbia	Choco	120
Columbia	Cundinamarca	130
Columbia	Grupo Amazonia	140
Columbia	Hulia	150
Columbia	La Guajira	160
Columbia	Magdalena	170
Columbia	Meta	180
Columbia	Narino	190
Columbia	Norte de Santander	200
Columbia	Putumayo	210
Columbia	Quindio	220
Columbia	Risaralda	230

Columbia	San Andres	240
Columbia	Santander	245
Columbia	Sucre	250
Columbia	Tolima	260
Columbia	Valle del Cauca	270
Czech Republic	Jihocesky	10
Czech Republic	Jihomoravsky	20
Czech Republic	Karlovarsky	30
Czech Republic	Kralovehradecky	40
Czech Republic	Liberecky	50
Czech Republic	Moravskoslezsky	60
Czech Republic	Olomoucky	70
Czech Republic	Pardubicky	80
Czech Republic	Plzensky	90
Czech Republic	Praha	100
Czech Republic	Stredocesky	110
Czech Republic	Ustecky	120
Czech Republic	Vysocina	130
Czech Republic	Zlinsky	140
Germany	former Federal Republic	FRG
Germany	former Democratic Republic	GDR
India	Central	10
India	East	20
India	North	30
India	South	40
India	West	50
India	Sample Registration System	SR
Japan	Aichi	10
Japan	Akita	20
Japan	Aomori	30
Japan	Chiba	40
Japan	Ehime	50
Japan	Fukui	60
Japan	Fukuoka	70
Japan	Fukushima	80
Japan	Gifu	90
Japan	Gunma	100
Japan	Hiroshima	110
Japan	Hokkaido	120
Japan	Hyogo	130
Japan	Ibaraki	140
Japan	Ishikawa	150
Japan	Iwate	160
Japan	Kagawa	170
Japan	Kagoshima	180
Japan	Kanagawa	190
Japan	Kochi	200
Japan	Kumamoto	210
Japan	Kyoto	220
Japan	Mie	230
Japan	Miyagi	240
Japan	Miyazaki	250

Japan	Nagano	260
Japan	Nara	270
Japan	Niigata	280
Japan	Oita	290
Japan	Okayama	300
Japan	Okinawa	310
Japan	Osaka	320
Japan	Saga	330
Japan	Saitama	340
Japan	Shiga	350
Japan	Shimane	360
Japan	Shizuoka	370
Japan	Tochigi	380
Japan	Tokio	390
Japan	Tokushima	400
Japan	Tottori	410
Japan	Toyama	420
Japan	Wakayama	430
Japan	Yamagata	440
Japan	Yamaguchi	450
Japan	Yamanashi	460
Japan	Nagasaki	470
Mauritius	Island of Mauritius	10
Mauritius	Island of Rodrigues	20
Portugal	Alentejo	10
Portugal	Algarve	20
Portugal	Centro	30
Portugal	Continente	40
Portugal	Lisboa	50
Portugal	Norte	60
Portugal	Regiao Autonoma da Madeira	70
Portugal	Regiao Autonoma dos Acores	80
Slovenia	Vzhodna (East)	10
Slovenia	Zahodna (West)	20
Slovenia	Pomurska	30
Slovenia	Podravska	40
Slovenia	Koroska and Savinjska	50
Slovenia	Zasavska and Spodnjeposavska	60
Slovenia	Jugovzhodna Slovenija	70
Slovenia	Osrednjeslovenska	80
Slovenia	Gorenjska	90
Slovenia	Notranjsko-Kraska and Obalno-Kraska	100
Slovenia	Goriska	110
Spain	Alava	10
Spain	Albacete	20
Spain	Alicante	30
Spain	Almeria	40
Spain	Asturias	50
Spain	Avila	60
Spain	Badajoz	70
Spain	Balears	80
Spain	Barcelona	90

Spain	Burgos	100
Spain	Caceres	110
Spain	Cadiz	120
Spain	Cantabria	130
Spain	Coruna	135
Spain	Castellon	140
Spain	Ceuta	150
Spain	Ciudad Real	160
Spain	Cordoba	170
Spain	Coruna	180
Spain	Cuenca	190
Spain	Girona	200
Spain	Granada	210
Spain	Guadalajara	220
Spain	Guipuzcoa	230
Spain	Huelva	240
Spain	Huesca	250
Spain	Jaen	260
Spain	Leon	270
Spain	Lleida	280
Spain	Lugo	290
Spain	Madrid	300
Spain	Malaga	310
Spain	Melilla	320
Spain	Murcia	330
Spain	Navarra	340
Spain	Ourense	350
Spain	Palencia	360
Spain	Palmas	370
Spain	Pontevedra	380
Spain	Rioja	390
Spain	Salamanca	400
Spain	Santa Cruz de Tenerife	410
Spain	Segovia	420
Spain	Sevilla	430
Spain	Soria	440
Spain	Tarragona	450
Spain	Teruel	460
Spain	Toledo	470
Spain	Valencia/Valencia	480
Spain	Valladolid	490
Spain	Vizcaya	500
Spain	Zamora	510
Spain	Zaragoza	520
Sri Lanka	Ampara	10
Sri Lanka	Anuradhapura	20
Sri Lanka	Badulla	30
Sri Lanka	Batticaloa	40
Sri Lanka	Colombo	50
Sri Lanka	Galle	60
Sri Lanka	Gampaha	70
Sri Lanka	Hambantota	80

Sri Lanka	Kalutara	90
Sri Lanka	Kandy	100
Sri Lanka	Kegalle	110
Sri Lanka	Kurunegala	120
Sri Lanka	Matale	130
Sri Lanka	Matara	140
Sri Lanka	Moneragala	150
Sri Lanka	Northern Province	160
Sri Lanka	Nuwaran Eliya	170
Sri Lanka	Polonnaruwa	180
Sri Lanka	Puttalam	190
Sri Lanka	Ratnapura	200
Sri Lanka	Tricomalee	210
Taiwan	Fuchien	10
Taiwan	Fuchien Area	10
Taiwan	Kaohsiung	20
Taiwan	Province	30
Taiwan	Taipei	40
Taiwan, China	Fuchien	10
Taiwan, China	Kaohsiung	20
Taiwan, China	Province	30
Taiwan, China	Taipei	40
United Kingdom	England	ENG
United Kingdom	England and Wales	ENW
United Kingdom	England, Wales and Scotland	GBR
United Kingdom	Northern Ireland	NIR
United Kingdom	Scotland	SCO
United Kingdom	Wales	WLS
United Kingdom	Great Britain	GRB
Belgium	Region de Bruxelles-Capitale	10
Belgium	Region flamande	20

Settlement category

Settlement category	Code
Urban	S01
Rural	S02
Small cities	S03
Big cities	S04

Race, ethnicity and religion

Race, ethnicity and religion	Code
Arab	E010
Asian	E020
Black	E030
Coloured, Non White	E040
Jews	E050
Jews and Others	E060
Maori	E070
Non Jews	E080
Non-Maori	E090
Non White	E092

Others	E100
White	E110
Aboriginals and Torres Strait Population	E120

Socio-economic group

Socio-economic group		Code
South Africa	Low income	A010
South Africa	Very low income	A020
China	Farmers	A030