

Cohort Estimates of Life Expectancy at Age 65

April 2011

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Background

1. Expectation of life calculates the average age at which someone will die. Conventionally it's calculated from birth, but can be calculated from any given age. For pensioners the measure often given most prominence is expectation of life at age 65 i.e. how many years the pensioner could, on average, expect to survive after retirement.

Methodology

2. The calculation of expectancy of life is based on age and gender specific mortality rates. The mortality rate measures the probability of a person of a given age and sex dying during any particular 12 month period (which can, but doesn't have to, be a calendar year). For example the probability of a 65 year old man, living in the United Kingdom in 2002, dying before age 66 was 1.7%, where these figures are published by the Government Actuary's Department and latterly the Office for National Statistics in the Interim Life Tables.
3. There are two methods by which expectation of life can be calculated:
 - a) The period method - Period life expectancies are worked out using the pattern of age-specific mortality rates for a given period (either a single year, or a run of years), with no allowance for any later actual or projected changes in mortality. For example period life expectancy at age 65 in 2010 would be worked out using the mortality rate for age 65 in 2010, for age 66 in 2010, for age 67 in 2010, and so on.
 - b) The cohort method - Cohort life expectancies are worked out using age-specific mortality rates which allow for known or projected changes in mortality in later years. For example cohort life expectancy at age 65 in 2010 would be worked out using the mortality rate for age 65 in 2010, for age 66 in 2011, for age 67 in 2012, and so on.

Discussion of methodologies

4. The period life expectancy estimate is a useful measure of the mortality experienced in a given year, or run of years and, for past years, provides an objective means of comparison of the trends in mortality over time, both between areas of a country and with other countries. Period life expectancy provides a useful indicator of mortality levels for past years, whereas cohort life expectancies, even for past years, may require projected mortality rates for their calculation.

5. Period life expectancy answers the question “For a group of people aged x in a given year, how long would we expect them to live, on average, if they experienced the age-specific mortality rates above age x of the period in question over the course of their remaining lives?”
6. Cohort life expectancy answers the question “For a group of people aged x in a given year, how long would we expect them to live, on average, if they experienced the actual or projected future age-specific mortality rates not just from the given year but from the series of future years in which they will actually reach each succeeding age if they survive?”
7. If mortality rates at age x and above are projected to decrease in future years, the cohort life expectancy at age x will be greater than the period life expectancy at age x .

Usage of alternate measures

8. In the Pensions Commission report *Pensions: Challenges and Choices. The First Report of the Pensions Commission* they utilised the cohort measure of life expectancy and “...recommend that official publications as much as possible use the cohort approach when describing current and future trends in longevity”, though they also stated that “To some extent the choice is expedient and reflects the nature of the data available”. Government accepted this recommendation and has generally used the cohort measure of expectation of life in publications since.

Conclusions

9. Whichever method of measurement (period or cohort) is used there has been a large and sustained improvement in expectation of life at all ages in the last century, and this is forecast to continue into the next century. There is no single “best” method of estimation; the use of period or cohort life expectancies depends partly on the purpose for which they are being used. It should also be remembered that cohort life expectancies will tend to be more subjective than period life expectancies even for past years, since, except for the oldest ages, they are likely to require projected mortality rates for their calculation.

Results

10. Expectation of life at age 65 has shown improvements, though not as rapidly as expectation of life at birth. This is mainly because the life expectancy of a 65 year old only depends on the mortality rates beyond 65, whereas survival from birth is based on mortality rates at every age. Reductions in infant mortality therefore only have an effect on expectation of life at birth not at age 65.

11. In 1951 a 65 year old man could expect to live to around 77.1 i.e. 12.1 further years of life and a 65 year woman to around 80.5 and by 2011 these figures were 84.7 for a 65 year old man and 87.5 for a 65 year old woman, (estimates are on a cohort basis for England and Wales).

12. The Government Actuary's Department/Office for National Statistics are forecasting continued improvements in life expectancy; Table 1 below shows that by 2051 a 65 year old man might expect to live to around 90.4 and a 65 year old woman to 92.9 (estimates are on a cohort basis for England and Wales).

Table 1: Projected cohort expectations of life (years), at age 65, Males and Females – England and Wales 1951 to 2058

Year	Male Cohort Life Expectancy at age 65	Female Cohort Life Expectancy at age 65
1951	12.1	15.5
1952	12.1	15.5
1953	12.1	15.6
1954	12.2	15.7
1955	12.1	15.7
1956	12.2	15.8
1957	12.2	15.9
1958	12.2	15.9
1959	12.2	16.0
1960	12.2	16.1
1961	12.2	16.3
1962	12.2	16.3
1963	12.3	16.4

Cohort estimates of life expectancy at age 65 – April 2011

Year	Male Cohort Life Expectancy at age 65	Female Cohort Life Expectancy at age 65
1964	12.3	16.6
1965	12.2	16.6
1966	12.3	16.7
1967	12.5	16.9
1968	12.6	17.0
1969	12.7	17.1
1970	12.8	17.2
1971	12.9	17.3
1972	13.0	17.4
1973	13.1	17.5
1974	13.2	17.6
1975	13.3	17.6
1976	13.5	17.7
1977	13.6	17.8
1978	13.8	17.9
1979	13.9	17.9
1980	14.0	18.0
1981	14.1	18.1
1982	14.3	18.2
1983	14.5	18.4
1984	15.1	18.9
1985	14.7	18.5
1986	15.0	18.7
1987	15.2	18.9
1988	15.5	19.0
1989	15.6	19.2
1990	15.9	19.4
1991	16.1	19.6
1992	16.5	19.8
1993	16.8	20.0

Cohort estimates of life expectancy at age 65 – April 2011

Year	Male Cohort Life Expectancy at age 65	Female Cohort Life Expectancy at age 65
1994	17.1	20.3
1995	17.5	20.6
1996	17.8	20.9
1997	18.2	21.2
1998	18.6	21.6
1999	18.9	21.9
2000	19.3	22.2
2001	19.7	22.5
2002	20.0	22.8
2003	20.2	23.0
2004	20.5	23.2
2005	20.7	23.4
2006	20.9	23.5
2007	21.0	23.7
2008	21.2	23.8
2009	21.3	23.9
2010	21.4	24.0
2011	21.6	24.1
2012	21.7	24.2
2013	21.8	24.4
2014	22.0	24.5
2015	22.1	24.6
2016	22.2	24.7
2017	22.3	24.8
2018	22.4	24.9
2019	22.5	25.0
2020	22.6	25.1
2021	22.7	25.2
2022	22.8	25.3
2023	22.9	25.4

Cohort estimates of life expectancy at age 65 – April 2011

Year	Male Cohort Life Expectancy at age 65	Female Cohort Life Expectancy at age 65
2024	23.0	25.5
2025	23.0	25.6
2026	23.1	25.7
2027	23.2	25.7
2028	23.3	25.8
2029	23.4	25.9
2030	23.5	26.0
2031	23.6	26.1
2032	23.7	26.2
2033	23.8	26.3
2034	23.9	26.4
2035	24.0	26.4
2036	24.1	26.5
2037	24.1	26.6
2038	24.2	26.7
2039	24.3	26.8
2040	24.4	26.9
2041	24.5	27.0
2042	24.6	27.1
2043	24.7	27.1
2044	24.8	27.2
2045	24.9	27.3
2046	25.0	27.4
2047	25.1	27.5
2048	25.2	27.6
2049	25.3	27.7
2050	25.3	27.8
2051	25.4	27.9
2052	25.5	27.9
2053	25.6	28.0

Year	Male Cohort Life Expectancy at age 65	Female Cohort Life Expectancy at age 65
2054	25.7	28.1
2055	25.8	28.2
2056	25.9	28.3
2057	26.0	28.4
2058	26.1	28.5

Source: Government Actuary's Department/Office for National Statistics.

Notes

- Estimates are based on a database of historical mortality rates for England and Wales by age, gender and calendar year which have been used, together GAD/ONS projections, for estimating historic and future life expectancies for England and Wales.
- For years before 1961 these mortality rates are only estimated since there are no population estimates available to calculate actual rates.
- Projection at age 65 is total life expectancy, e.g. in 1951 a 65 year old man could expect to survive another 12.1 years on a cohort basis

13. Table 2 below shows cohort life expectancy, at age 65, for a man in the United Kingdom based on various sets of demographic estimates. As discussed in paragraph 9 above cohort life expectancy estimates requires the use of projected mortality rates for their calculation and hence they are updated with each new set of demographic data. Table 2 shows that with each successive set of demographic data the projections of life expectancy have increased. For example, the 1983 based projections estimated that a 65 year old man in 2011 would have another 15.1 years of life, but the 2008 based projections suggest this has become 21.4 years.

Table 2: Projected cohort expectations of life (years), at age 65, Males – United Kingdom 1951 to 2058

	Latest (2008 based)	2006 based	2004 based	2002 based	1992 based	1983 based
1951	12.2	-	-	-	-	-
1952	12.0	-	-	-	-	-
1953	12.1	-	-	-	-	-
1954	12.1	-	-	-	-	-
1955	12.1	-	-	-	-	-
1956	12.2	-	-	-	-	-

Cohort estimates of life expectancy at age 65 – April 2011

	Latest (2008 based)	2006 based	2004 based	2002 based	1992 based	1983 based
1957	12.1	-	-	-	-	-
1958	12.1	-	-	-	-	-
1959	12.1	-	-	-	-	-
1960	12.2	-	-	-	-	-
1961	12.2	-	-	-	-	-
1962	12.2	-	-	-	-	-
1963	12.2	-	-	-	-	-
1964	12.2	-	-	-	-	-
1965	12.2	-	-	-	-	-
1966	12.2	-	-	-	-	-
1967	12.4	-	-	-	-	-
1968	12.5	-	-	-	-	-
1969	12.6	-	-	-	-	-
1970	12.7	-	-	-	-	-
1971	12.8	-	-	-	-	-
1972	12.9	-	-	-	-	-
1973	13.0	-	-	-	-	-
1974	13.1	-	-	-	-	-
1975	13.3	-	-	-	-	-
1976	13.4	-	-	-	-	-
1977	13.5	-	-	-	-	-
1978	13.7	-	-	-	-	-
1979	13.8	-	-	-	-	-
1980	13.9	-	-	-	-	-
1981	14.0	-	-	-	-	-
1982	14.2	-	-	-	-	-
1983	14.4	-	-	-	-	13.6
1984	15.0	-	-	-	-	13.7
1985	14.6	-	-	-	-	13.8

Cohort estimates of life expectancy at age 65 – April 2011

	Latest (2008 based)	2006 based	2004 based	2002 based	1992 based	1983 based
1986	14.9	-	-	-	-	13.8
1987	15.1	-	-	-	-	13.9
1988	15.3	-	-	-	-	13.9
1989	15.5	-	-	-	-	14.0
1990	15.8	-	-	-	-	14.0
1991	16.0	-	-	-	-	14.1
1992	16.3	-	-	-	15.7	14.2
1993	16.6	-	-	-	15.9	14.2
1994	17.0	-	-	-	16.1	14.3
1995	17.3	-	-	-	16.2	14.3
1996	17.7	-	-	-	16.3	14.4
1997	18.0	-	-	-	16.4	14.5
1998	18.4	-	-	-	16.6	14.5
1999	18.8	-	-	-	16.7	14.6
2000	19.1	-	-	-	16.8	14.6
2001	19.5	-	-	-	16.9	14.7
2002	19.8	-	-	18.5	16.9	14.7
2003	20.0	-	-	18.7	17	14.8
2004	20.3	-	19.2	18.9	17.1	14.8
2005	20.5	-	19.4	19	17.2	14.9
2006	20.7	20.6	19.5	19.1	17.2	14.9
2007	20.9	20.7	19.7	19.2	17.3	15
2008	21.0	20.8	19.8	19.3	17.4	15
2009	21.1	21.0	19.9	19.4	17.4	15
2010	21.3	21.1	20.0	19.5	17.5	15.1
2011	21.4	21.2	20.1	19.6	17.6	15.1
2012	21.6	21.3	20.2	19.7	17.6	15.1
2013	21.7	21.5	20.3	19.7	17.6	15.2
2014	21.8	21.6	20.4	19.8	17.7	15.2

Cohort estimates of life expectancy at age 65 – April 2011

	Latest (2008 based)	2006 based	2004 based	2002 based	1992 based	1983 based
2015	21.9	21.7	20.5	19.9	17.7	15.2
2016	22.1	21.8	20.6	20	17.8	15.2
2017	22.2	21.9	20.7	20.1	17.8	15.2
2018	22.2	22.0	20.8	20.1	17.8	15.3
2019	22.3	22.1	20.8	20.2	17.9	15.3
2020	22.4	22.2	20.9	20.3	17.9	15.3
2021	22.5	22.3	21.0	20.3	17.9	15.3
2022	22.6	22.4	21.1	20.4	18	15.3
2023	22.7	22.5	21.2	20.5	18	15.3
2024	22.8	22.5	21.3	20.5	18	15.3
2025	22.9	22.6	21.3	20.6	18	15.3
2026	23.0	22.7	21.4	20.6	18	15.3
2027	23.1	22.8	21.5	20.7	18	15.3
2028	23.2	22.9	21.6	20.8	18	15.3
2029	23.3	23.0	21.7	20.8	18	15.3
2030	23.4	23.1	21.8	20.9	18	15.3
2031	23.4	23.2	21.9	20.9	18	15.3
2032	23.5	23.3	22.0	21	18	15.3
2033	23.6	23.4	22.1	21	18	15.3
2034	23.7	23.5	22.1	21.1	18	15.3
2035	23.8	23.6	22.2	21.1	18	15.3
2036	23.9	23.7	22.3	21.2	18	15.3
2037	24.0	23.7	22.4	21.2	18	15.3
2038	24.1	23.8	22.5	21.3	18	15.3
2039	24.2	23.9	22.6	21.3	18	15.3
2040	24.3	24.0	22.7	21.3	18	15.3
2041	24.4	24.1	22.8	21.4	18	15.3
2042	24.5	24.2	22.9	21.4	18	15.3
2043	24.6	24.3	22.9	21.4	18	15.3

Cohort estimates of life expectancy at age 65 – April 2011

	Latest (2008 based)	2006 based	2004 based	2002 based	1992 based	1983 based
2044	24.6	24.4	23.0	21.5	18	15.3
2045	24.7	24.5	23.1	21.5	18	15.3
2046	24.8	24.6	23.2	21.5	18	15.3
2047	24.9	24.7	23.3	21.6	18	15.3
2048	25.0	24.8	23.4	21.6	18	15.3
2049	25.1	24.9	23.5	21.6	18	15.3
2050	25.2	25.0	23.6	21.7	18	15.3
2051	25.3	25.1	23.7	-	-	-
2052	25.4	25.2	23.8	-	-	-
2053	25.5	25.3	23.8	-	-	-
2054	25.6	25.3	23.9	-	-	-
2055	25.7	25.4	-	-	-	-
2056	25.8	25.5	-	-	-	-
2057	25.9	-	-	-	-	-
2058	26.0	-	-	-	-	-

Source: Government Actuary's Department/Office for National Statistics.

Notes

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- For years before 1961 these mortality rates are only estimated since there are no population estimates available to calculate actual rates.
- Projection at age 65 is total life expectancy, e.g. in 1951 a 65 year old man could expect to survive another 12.2 years on a cohort basis

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