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Population mortality and projections

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Population mortality and projections

- Historical data
- Mortality projection methodology
- Assumptions
- Results from 2004-based population projections
- Comparison with CMI tables
- Mortality by social class

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Period expectation of life at birth, E&W

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Period expectation of life at age 65, E&W

Male mortality by major cause, England & Wales, 1911-2002

Age standardised mortality rates for selected broad disease groups
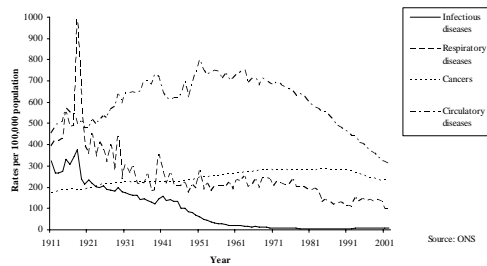
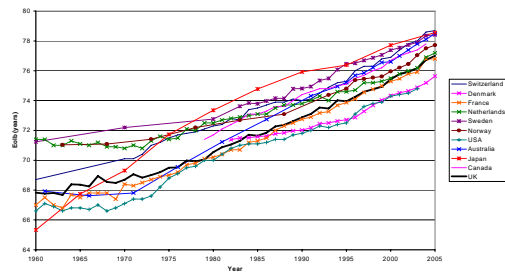## Period expectations of life at birth in 2005

Country	Males	Females
UK	77.0	81.2
The Netherlands	77.2	81.6
Germany (2004)	76.2	81.8
Norway	77.7	82.5
Sweden	78.4	82.8
France	76.8	83.8
Switzerland	78.7	83.9
USA (2004)	75.2	80.4
Canada (2004)	77.8	82.6
Australia	78.5	83.3
Japan	78.6	85.5

Period EolB: Males – selected countries

Period EolB: Females – selected countries

Female – Male Period EolB; selected countries

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UK Population Mortality Projections

- Estimate current rates of mortality improvement by age and gender
- Set rates of mortality improvement for some future year (the target year)
- Make assumptions on method and speed of convergence from current improvement rates to target rates and how improvement rates change after target year

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## Projected smoothed percentage changes in death rates between 2003 and 2004 by age
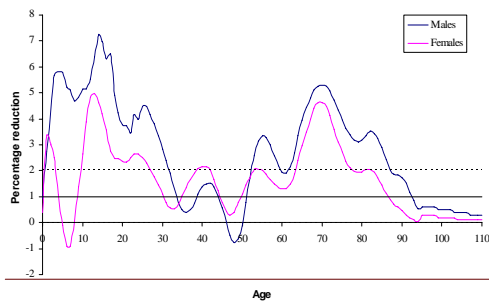
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UK Population Mortality Projections

- Target year is 25th year of projection (ie 2029 for 2004-based projections)
- Improvements in 2029 assumed to be 1% pa for all ages for both males and females
- Convergence not linear; more rapidly at first for males, less rapidly for females
- For those born before 1960, convergence assumed along cohort
- After 2029 rates of improvement assumed to remain constant at 1% pa
- Variants – HLE target rate 2%, LLE target rate 0%
- Applies to UK and constituent countries

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Annual improvement in smoothed mortality rates, Males, UK

Improvement in smoothed mortality rates
Males, UK (cohort 45+)

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Annual improvement in smoothed mortality rates, Females, UK


Improvement in smoothed mortality rates
Females, UK (cohort 45+)

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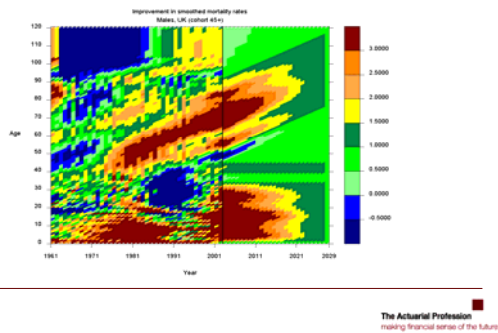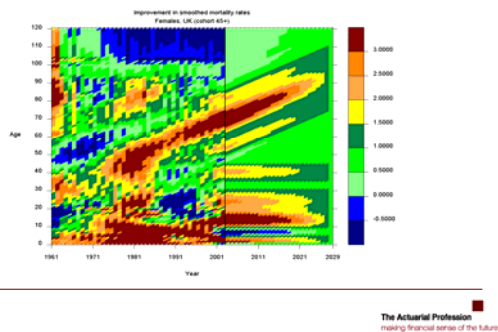
Actual and assumed overall annual rates of mortality improvement

|	Males		Females	
	Past (Actual)	Future (assumed)	Past (Actual)	Future (assumed)
Last/next 22 years	2.0%	1.9%	1.3%	1.8%
Last/next 42 years	1.5%	1.5%	1.3%	1.4%
Last/next 72 years	1.2%	1.3%	1.2%	1.3%

Note: Analysis relates to England & Wales. Historic estimates are based on comparison of 2002-04 Interim Life Tables with English Life Tables for 1930-32, 1960-62 and 1980-82
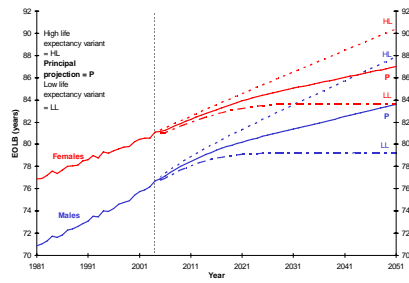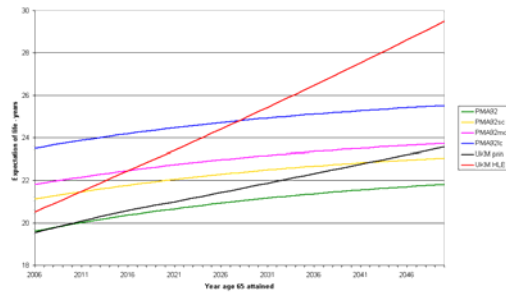
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Period expectation of life at birth, UK

Period expectation of life at age 65, UK
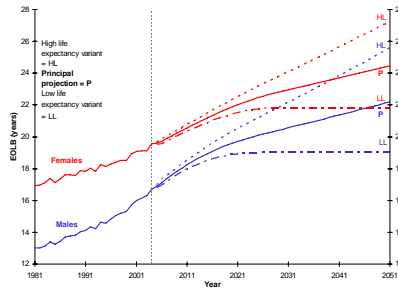
Cohort expectations of life at age 65, males

Comparison of '92' tables and 2004-based pop projections – cohort eol65 UK males

	C=2007	C=2017	C=2027	C=2047
PMA92	19.70	20.42	20.99	21.74
PMA92sc	21.20	21.84	22.33	22.99
PMA92mc	21.88	22.52	23.01	23.67
PMA92lc	23.58	24.25	24.76	25.44
UKM principal	19.66	20.67	21.52	23.30
UKM HLE	20.72	22.66	24.61	28.83

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Mortality improvement factors - males

	2004-based pop projections			PA92mc			PA92lc		
	Assumed percentage reduction in q_x rates between 2007 and								
Age	2017	2027	2047	2017	2027	2047	2017	2027	2047
50	7%	15%	31%	26%	43%	63%	26%	43%	63%
60	13%	21%	35%	26%	43%	63%	26%	43%	63%
70	19%	28%	41%	17%	29%	43%	18%	30%	44%
80	25%	34%	46%	17%	24%	34%	28%	35%	43%
90	18%	29%	41%	14%	19%	24%	28%	40%	44%

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Variations in life expectancy

- Between local authorities and smaller areas
- Social class component of variation
  - Between countries in the UK
  - Between regions
- Social class trends in life expectancy

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Life expectancy of males in local authorities in England, 2003-5

Highest

Kensington and Chelsea	82.2
East Dorset	80.9
Hart	80.2
Uttlesford	80.0

Lowest

Comhairle nan Eilean Siar	72.1
Inverclyde	71.1
West Dunbartonshire	71.0
Glasgow City	69.9

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Life expectancy of males in Camden wards

Highest

Belsize	80.4
Swiss Cottage	79.3
Frognal and Fitzjohns	79.0
Hampstead Town	78.8

Lowest

King's Cross	71.5
Holborn and Covent Garden	70.4
St Pancras and Somers Town	70.2
Kilburn	69.8

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Age standardised death rates for Social Classes I and V, by country, 1991-3

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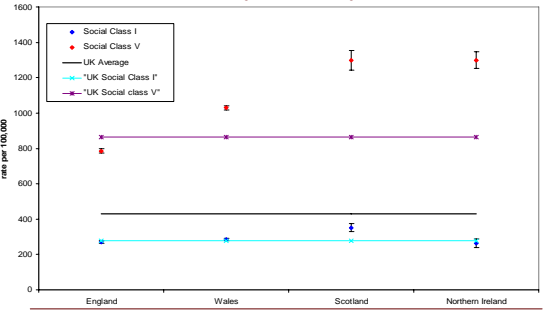
Age standardised death rates for Social Classes I and V, by region of England, 1991-3
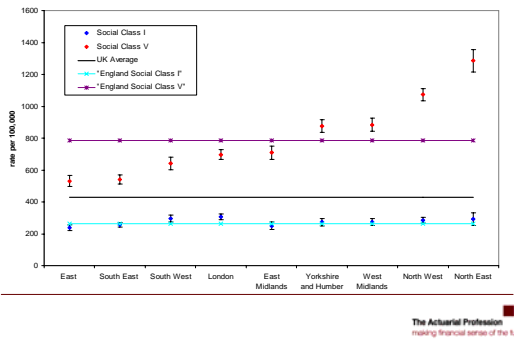
Data on social class trends

- ONS Longitudinal Study (LS) - an approximate 1 per cent sample of the population of England and Wales
- Links census data from 1971 onwards with birth and death registrations, immigration and emigration records, and other life events
- All LS members who entered the study between 1971 and 1991, and were traced in the NHS Central Register, were included in the original analysis
- New analysis uses records up to the end of 2001 – data available on National Statistics website at http://www.statistics.gov.uk/StatBase/Product.asp?vlnk=8460&Pos=1&ColRank=1&Rank=272

Data & Methods: the population at risk

- Exclusions:
  - never traced in the NHS Central Register
  - present at less than two censuses and lost to follow-up
  - exited the study then found at later census
- Censoring:
  - Lost to follow-up in 2001 adjusted for estimated unobserved LS embarkation rates (LS and International Passenger Survey)

Methods: assignment of social class

▪ Social class was usually assigned to each LS member at their entry to the study and held constant throughout

Source of Social Class for Different Types of LS Entrant

| Type of LS entrant	Source of Social Class (in priority order)					
Census adult	Own (Census)	Spouse's (Census)				
Census child	Father's (Census)	Mother's (Census)				
Immigrant	Own (Census)	Spouse's (Census)				
New birth	Father's (Census)	Mother's (Census)	Father's (Birth record)	Mother's (Birth record)	Father's (Death record)	Mother's (Death record)

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Trends in male period life expectancy at birth by social class, 1972-2001
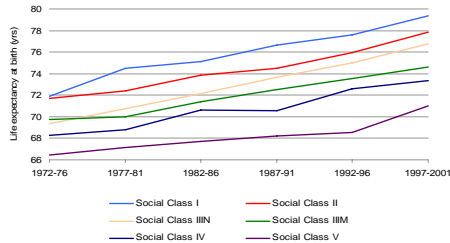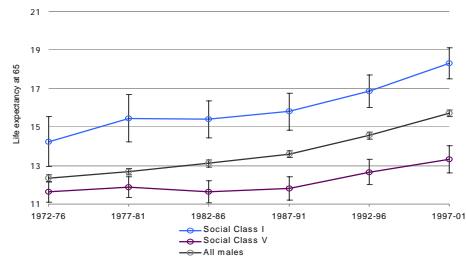

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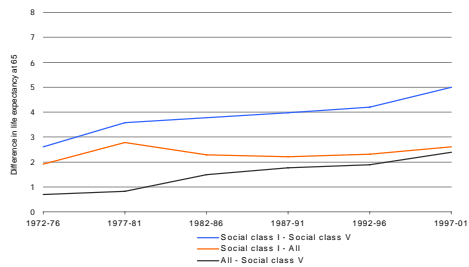## Trends in male period life expectancy at age 65 by social class, 1972-2001
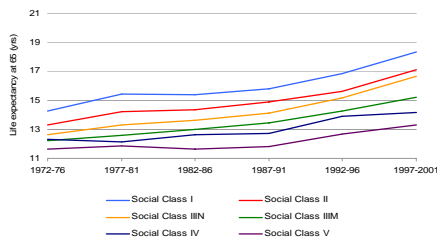
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Trends in male period life expectancy at age 65 Social classes I and V, 1972-2001
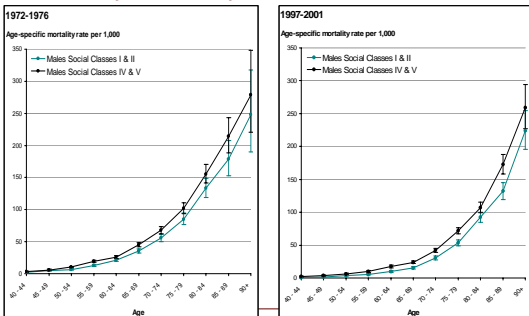

Legend:
- Social Class I
- Social Class V
- All males

Social class differences in male period life expectancy at age 65, 1972-2001

Legend:
- Social class I - Social class V
- Social class I - All
- All - Social class V

Mortality rates by social class

1972-1976

Age-specific mortality rate per 1,000

- Males Social Classes I & II
- Males Social Classes IV & V

1997-2001

Age-specific mortality rate per 1,000

- Males Social Classes I & II
- Males Social Classes IV & V

Source: ONS Longitudinal Study

Mortality rates - social class II

Males Social Class II

Age-specific mortality rate per 1,000

1972-76
1977-81
1982-86
1987-91
1992-96
1997-01

Males Social Class II

Age-specific mortality rate per 1,000

1972-76
1997-01
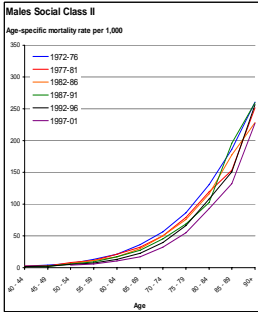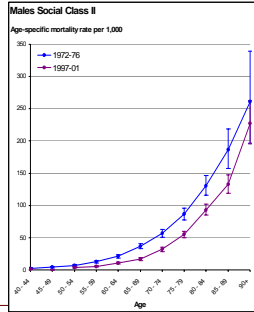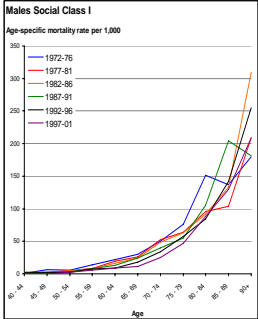
Source: ONS Longitudinal Study

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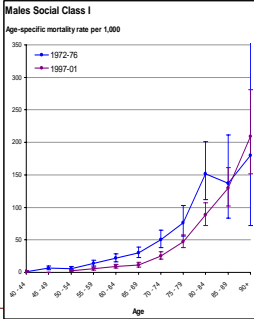
Mortality rates - social class I

Males Social Class I

Age-specific mortality rate per 1,000

1972-76
1977-81
1982-86
1987-91
1992-96
1997-01

Males Social Class I

Age-specific mortality rate per 1,000

1972-76
1997-01

Source: ONS Longitudinal Study

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Male 'cohort' mortality – social class I & II

Male 'cohort' mortality rates - social class I & II

1950-54
1945-49
1940-44
1935-39
1930-34
1925-29
1920-24
1915-19
1910-14
1905-09
1900-04
1895-99

Source: ONS Longitudinal Study

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Male 'cohort' mortality – social class I & II

Male 'cohort' mortality rates - social class I & II

Legend:
- 1950-54
- 1945-49
- 1940-44
- 1935-39
- 1930-34
- 1925-29
- 1920-24
- 1915-19
- 1910-14
- 1905-09

Y-axis: Mortality rate per 1,000
X-axis: Age (40 - 44, 45 - 49, 50 - 54, 55 - 59, 60 - 64, 65 - 69, 70 - 74, 75 - 79, 80 - 84, 85 - 89)

Source: ONS Longitudinal Study

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Key findings

- Life expectancy has increased for males of all ages and all social classes since the 1970s.

- There is a gradient in life expectancy with social class I living the longest and social class V the least.

- Since the late 1970s, there has been an increase in the difference in life expectancy at age 65 between males in social classes I and V.

- The rate of increase in life expectancy is rising faster for males in social class I than those in social class V.

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