Setting Levels of Ambition for the NHS Outcomes Framework

A technical annex to support *Developing our NHS care objectives: A consultation on the draft mandate to the NHS Commissioning Board.*

Chapter 3: Preventing people from dying prematurely

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Setting Levels of Ambition for the NHS Outcomes Framework

Chapter 3: Preventing people from dying prematurely

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Assessment of trends and possible improvements – Domain 1: Preventing People from dying prematurely

Introduction

3.1 This chapter sets out our proposals for calculating a level of ambition for domain 1: Preventing people from dying prematurely. The proposed methodology is summarised in the executive summary and explained in detail in chapter 2.

3.2 In this chapter, we review available data for each indicator. A 'notes' section highlights some aspects which may merit further consideration. The chapter illustrates a range of factors that may affect outcomes (we use the term 'drivers' to describe these). In some cases, we refer to findings from academic literature. Such citations are not intended to be a guide to clinical practice and should not be taken as official endorsement by the Department of Health.

3.3 We produce 'current practice projections' where data are available. The purpose of these projections is explained in the executive summary and in Chapter 2. They are not forecasts of performance – rather they represent benchmarks for assessing the likely NHS contribution to improving outcomes. After producing a projection, we then consider what scope there is for the NHS to improve outcomes measured by individual indicators within available resources.

3.4 Finally, sections 3 a and b provide examples of how these areas of possible improvement could be aggregated and used to inform a level of ambition that is set for each domain. It is important to note that this section is a partial assessment at this stage. It illustrates how we might set levels of ambition. We intend to quantify what might be possible to achieve at a national level. It would then be for the NHS Commissioning Board to decide how to meet that level of ambition.

3.5 Our partial assessment is based on building up a picture of what might be possible based on considering individual indicators. Our aim is to have a level of ambition that represents the goal of the domain as a whole – therefore we are clear that we may need to make some additional broader assumptions.

3.6 As indicated earlier in the document, this material is an analytical work in progress. It is being published in the interests of transparency, to outline our proposals, and to invite comments. Levels of ambition will be included in the final mandate.

(1) Domain 1: Overview and Metric of Incremental Progress

3.7 Domain 1, preventing people from dying prematurely, comprises two overarching indicators: “1a. Potential Years of Life Lost (PYLL) from causes considered amenable to health care” and “1b. Life expectancy at 75”, and seven improvement areas.

3.8 The improvement areas are of two sorts:

- Complementary Indicators. Neonatal mortality up to the age of 28 days is not included in the overarching indicator because cause of death is not classified by ICD-10 code for deaths up to 28 days after live birth. Therefore, it is not possible to measure separately those neonatal deaths that are considered amenable. Yet deaths up to 28 days and stillbirths, indicator 1.6.ii (Neonatal mortality and stillbirths), are increasingly amenable to healthcare, and therefore complement indicator 1a. Indicator 1.6.i (Infant mortality), a joint indicator with public health, is included to register the important contribution of the NHS to care of all infants up to one year old

- Sub-indicators. The first four improvement areas relate to particular diseases (Under 75 mortality rates from 1.1 cardiovascular disease, 1.2 respiratory disease, 1.3 liver disease, 1.4.i-vii five-year survival from colorectal, breast and lung cancer and under 75 mortality rate from cancer), which account for large portions of the disease burden amenable to health care. Progress in these outcomes therefore provides a useful initial analysis of what accounts for progress in the overarching indicators. In this case, the reason for inclusion of separate indicators is concern that poor outcomes for this group may reflect inequity. Note, however, that the exclusion of a condition from indicator 1a does not mean that there are no deaths for people with that condition that are amenable to NHS intervention. Where there is such amenability, to that extent these indicators are also complementary to the overarching indicators. Amenable outcomes under indicator 1.5, Excess under 75 mortality rate in adults with serious mental illness, and under the placeholder indicator 1.7 (which will measure excess mortality for people with Learning Disabilities), are also largely captured in overarching indicator 1a.

3.9 Together, the overarching indicators and the improvement indicators provide a picture of the NHS’s contribution to preventing people from dying prematurely.

3.10 The challenge is to construct a single aggregate metric of incremental progress in this Domain to allow a level of ambition to be formulated. To this end we must identify all outcome areas to which the NHS contributes improvement. To avoid duplication, sub-indicators should be included only to the extent that they exceed in scope the overarching and complementary indicators. Hence, to set levels of ambition for Domain 1, we require an approach that takes into account NHS contributions to progress in the following areas:

- 1a. All changes included. This also includes Life Year gains from improvements in outcomes captured by indicators 1.1, 1.2 and 1.4.i-vi, and by 1.5 and 1.7.
- 1b. All changes included.
- 1.3. All changes included: liver disease is not counted as amenable under the ONS definition (used for indicator 1a); nevertheless, some element of mortality is susceptible to improvement. This reflects incremental gains for those conditions whose deaths are only rarely amenable, and also the contribution that the NHS can make by encouraging healthy behaviours and uptake of screening options with contemporaneous impact, complementing public health services.
- 1.4.vii. All changes for cancers not considered amenable, i.e. excluding those captured by 1a.
- 1.6.i. All changes included EXCEPT those already captured by 1a (causes amenable for those aged 29 days and over). This includes Life Year gains from outcomes captured by 1.6.ii except stillbirths, which are excluded from Domain aggregation. (Stillbirths are regarded as too sensitive to coding changes and to shifts in practice in termination of pregnancy for use as a reliable indicator of NHS care. Monitoring of the trend is necessary to aid interpretation of changes in the neonatal mortality indicator.)

3.11 For each of these areas, the gain from improved outcomes can be characterised as a gain in

- Cohort life expectancy at birth

3.12 In each case, a common metric of incremental gain attributable to the NHS is available:

- Life years

3.13 Specifically:

- 1a. A reduction in the number of deaths from causes amenable to health care gives an extension of life to each beneficiary.
- 1b. An increase of life expectancy of those aged 75 attributable to improved NHS services can be assessed as a gain in life years by considering the gain for each year-group separately.
- 1.6.i. Reduced infant mortality gives additional life years to infants who would otherwise die. Multiplying the numbers of additional survivors by their life expectancy on survival gives the increase in life years.

- Other indicators: reduced mortality in other outcome areas that is not picked up in the above indicators would contribute life years according to the life expectancy of those whose death is avoided.

Projection methodology for Domain 1

3.14 For this Domain, where sufficient data was available, Age-Period-Cohort (APC) models have been used to forecast mortality. For a number of indicators, projections have been carried out using an Age Period Cohort technique. The methodology used is explained here and referenced at the appropriate places.

3.15 These models separate out three influences upon the mortality of each age group in a given period: the age of the group, the date at which the mortality takes place, and the birth period in which the group was born. The three influences capture distinct determinants of outcomes: respectively:

- age: the natural increased fragility associated with age,
- period: the impact of contemporaneous determinants of outcome – in particular the quality of healthcare services,
- cohort, the cumulative impact upon outcomes of life health behaviours and experiences, which vary systematically with birth period.

3.16 To the extent that modelling robustly distinguishes these effects, projections based upon the quality of current NHS care is simplified.

3.17 Although the models are applied to all ages, the projected mortality rates for the younger age groups are calculated using the average of the last three data points, i.e. the last 15 years.

3.18 Age-specific mortality rates are provided in 5 year age bands, so the models are structured around cohorts of 5 years. Hence the projected rates are also for 5 year periods: 2011-2015 and 2016-2020. Annual figures are presented by assuming a linear progression in rates, with the projected figures being reached in the middle of each period (2013 and 2018).

3.19 It is not possible to estimate APC models directly due to the linear dependence between age, period and cohort. Numerous solutions to this problem have been proposed, one of which is the Intrinsic Estimator. The Intrinsic Estimator uniquely determines coefficients without requiring a user-imposed constraint on their values, and is both unbiased and efficient[1] . The STATA apc_ie package was used to estimate all the results published here.

[1] "Trends in U.S adult chronic disease mortality, 1960-1999: Age, period and cohort variations" Yang Yang, Demography, vol.45 no.2 (May 2008)

3.20 Whilst having estimates of the age and cohort variables improves the robustness of projections, it is still necessary to estimate future period effects as well as the value for new cohorts. Additional cohort coefficients are projected based on recent trends. The choice of predicted cohort coefficients is however of little importance, as they only affect the youngest age groups where mortality rates are low.

3.21 Although numerous factors have a contemporaneous effect on the outcomes monitored, it is reasonable to assume that the quality of treatment is of major importance. In the absence of alternative explanations, we therefore presume that period effects are determined by the NHS, and so our Current Practice Projection uses a period effect that is kept constant at the current level. Population figures are taken directly from the ONS mid-year population forecasts.

3.22 The robustness of this methodology will be tested further during the consultation period. This will involve an examination of the Intrinsic Estimator through comparisons with alternatives such as Constrained Generalized Linear Estimators. The use of natural splines will be looked into as a solution to potentially over fitting the data. We can also explore truncating the data and estimating the omitted period. Further work will also be done into determining the optimal methodology for projecting period and cohort effects. For the former, it may be possible to model the period effects themselves against possible NHS and external contemporaneous drivers of outcome. We will also consider further whether the current practice projections collectively capture the impacts of relevant drivers including obesity, alcohol and smoking.

(2) Domain 1: Indicator Trends, Explanations, Projections and Scope for Improvement

3.23 This section sets out for each indicator or set of indicators:

a) Recent Trends and Explanations

b) Current Practice Projections

c) Scope for Improvement by Indicator

3.24 The analysis is predicated upon consideration of the influence of drivers of outcome. On the basis of our understanding of the relative contribution of different factors to these outcomes, current-practice projections for each indicator can be made on the assumption that the quality of the NHS contribution to outcomes is maintained at the same level as in the base-year, 2012-13 (see discussion in Chapter 2, section ii).

Indicator 1a: Potential Years Of Life Lost (PYLL) From Causes Considered Amenable To Healthcare

Outcome sought	***Reduced PYLL from causes amenable to health care***
Indicator definition	***European age-standardised rate of Potential Years of Life Lost (PYLL) per 100,000 population, from causes considered amenable to health care.***

3.25 The following analyses use the definition of amenable mortality and associated data that were published by the ONS on 15th May 2012.

3.26 The list of amenable causes and respective relevant age groups is set out in the following table.

ICD–10 codes	Condition group and cause	Ages included
Infections		
A15–A19, B90	Tuberculosis	0–74
A38–A41, A46, A48.1, B50–B54, G00, G03, J02, L03	Selected invasive bacterial and protozoal infections	0–74
B17.1, B18.2	Hepatitis C	0-74
B20-B24	HIV/AIDS	All
Neoplasms		
C18–C21	Malignant neoplasm of colon and rectum	0–74
C43	Malignant melanoma of skin	0–74
C50	Malignant neoplasm of breast	0–74
C53	Malignant neoplasm of cervix uteri	0–74
C67	Malignant neoplasm of bladder	0–74
C73	Malignant neoplasm of thyroid gland	0–74
C81	Hodgkin's disease	0–74
C91, C92.0	Leukaemia	0–44
D10–D36	Benign neoplasms	0–74
Nutritional, endocrine and metabolic		
E10–E14	Diabetes mellitus	0–49
Neurological disorders		
G40–G41	Epilepsy and status epilepticus	0–74
Cardiovascular diseases (CVD)		
I01–I09	Rheumatic and other valvular heart disease	0–74
I10–I15	Hypertensive diseases	0–74
I20–I25	Ischaemic heart disease	0–74
I60–I69	Cerebrovascular diseases	0–74
Respiratory diseases		
J09–J11	Influenza (including swine flu)	0–74
J12–J18	Pneumonia	0–74
J45– J46	Asthma	0–74

Digestive disorders		
K25–K28	Gastric and duodenal ulcer	0–74
K35–K38, K40–K46, K80–K83, K85,K86.1-K86.9, K91.5	Acute abdomen, appendicitis, intestinal obstruction, cholecystitis / lithiasis, pancreatitis, hernia	0–74
Genitourinary disorders		
N00–N07, N17–N19, N25-N27	Nephritis and nephrosis	0–74
N13, N20–N21, N35, N40, N99.1	Obstructive uropathy & prostatic hyperplasia	0–74
Maternal & infant		
P00–P96, A33	Complications of perinatal period	All
Q00–Q99	Congenital malformations, deformations and chromosomal anomalies	0–74
Injuries		
Y60–Y69, Y83–Y84	Misadventures to patients during surgical and medical care	All

3.27 For the majority of conditions this indicator cover deaths up to the age of 74. The selection of an upper age limit of 74 years should not be taken to imply that some deaths in people aged 75 years and over could also not be amenable to health care. For example, deaths from misadventures to patients during surgical and medical care should be avoidable at all ages.

3.28 The reason for using an upper age limit is that with deaths at older ages the specific cause of death is often becomes more difficult to identify. As age increases, the number of conditions mentioned on the death certificate as contributing to the death generally increases. It is therefore more difficult to be confident that the recorded underlying cause of death was the determining factor leading to death at that time, or that the death was avoidable in the light of surrounding circumstances.

Calculation of PYLL rate

3.29 The proposed methodology for calculating the PYLL rate uses the average age-specific period life expectancy (LE) for each five-year age band for the relevant year as the age to which a person in that age band who died from one of the ‘amenable’ causes might be expected to live in the presence of timely and effective health care. The age-specific period LE is different for each year. The table below shows for each age band the 2010 average age-specific period life expectancies that were used in the calculation of the 2010 PYLL rates:

Age band	Males	Females	Age band	Males	Females
0	**78.8**	**82.7**	35-39	**43.0**	**46.5**
1-4	**76.7**	**80.5**	40-44	**38.3**	**41.7**
5-9	**72.2**	**76.1**	45-49	**33.7**	**36.9**
10-14	**67.3**	**71.1**	50-54	**29.1**	**32.3**
15-19	**62.3**	**66.1**	55-59	**24.8**	**27.8**
20-24	**57.4**	**61.2**	60-64	**20.7**	**23.4**
25-29	**52.6**	**56.3**	65-69	**16.8**	**19.2**
30-34	**47.8**	**51.4**	70-74	**13.2**	**15.2**

Source: Office for National Statistics

3.30 Thus a male who died in 2010 at age 22 from a cause considered to be amenable to health care in people of that age would be said to have lost 57.4 years of life. The total number of years of life lost is summed for each age band and the result is expressed as a European age-standardised rate per 100,000 population.

Note:

- This method uses the population's current period life table for each age group and for each relevant year as a weight for current mortality rates, therefore as long as life expectancies increase PYLL will increase due to this alone, even if age-specific mortality rates and the age distribution of deaths remain the same.

- Alternatives, such as the relevant UN model life table West at a high level, similarly use a residual LE at specific ages, but provide a stable reference point over time. Such alternatives may provide insight into changes in the PYLL data, and may provide a useful basis for international comparison. However, they do not give an accurate assessment of the increasing loss occasioned by amenable deaths at a given age as background life expectancies increase.

- The use of current period life expectancies may also provide a better model of the outcome that would result from constant quality of care if morbidity is determined by distance from death rather than age, as has been hypothesised (the so-called expansion or compression of morbidity is discussed by Kenneth Howse in "Review of longevity trends to 2025 and beyond"[2].

Context

3.31 Mortality from all causes in the under 75s made up around 53% of all mortality for males and 47% of all mortality for females in 2010. Using the new ONS definition of 'amenable', mortality from amenable causes made up 34% and 35% of all cause mortality in the under 75 age group for males and females respectively.

[2] Review of longevity trends to 2025 and beyond, Kenneth Howse, The Oxford Institute of Ageing, University of Oxford (January 2009)
http://www.beyondcurrenthorizons.org.uk/review-of-longevity-trends-to-2025-and-beyond/

(a) Indicator 1a: Recent Trends and Explanations

3.32 This section reviews data relevant to indicator 1a outcomes, lists the questions that recent data for individual indicators raise, and provides more or less tentative explanations, particularly distinguishing NHS and non-NHS determinants of outcomes.

Current position

Table 1a.a - Potential Years of Life Lost to people under 75 from amenable conditions (EAS PYLL rate per 100,000 population), 2010

	PYLL rates							
Condition	**Males**		**Females**		**Males**		**Females**	
Heart Disease								
All amenable	1,441.7	*59%*	604.5	*32%*				
Ischaemic heart disease					1,104.3	*77%*	344.1	*57%*
Stroke					277.3	*19%*	221.2	*37%*
Other amenable CVD					60.1	*4%*	39.2	*6%*
Cancer								
All amenable	404.9	*16%*	814.9	*42%*				
Colorectal					246.9	*61%*	168.8	*21%*
Breast					-	-	473.1	*58%*
Other amenable					158.0	*39%*	173.0	*21%*
Respiratory								
All amenable	172.7	*7%*	148.6	*8%*				
Pneumonia					146.9	*85%*	112.1	*75%*
Other amenable respiratory					25.8	*15%*	36.5	*25%*
Infant	143.4	*6%*	138.9	*7%*				
Digestive disorders	91.9	*4%*	58.5	*3%*				
Infections	87.6	*4%*	67.1	*3%*				
Epilepsy and status epilepticus	59.2	*2%*	43.6	*2%*				
Genitourinary disorders	24.5	*1%*	18.6	*1%*				
Diabetes	24.4	*1%*	15.8	*1%*				
Injuries	9.1	*0%*	7.5	*0%*				
Cancer and CVD	1,846.6	*75%*	1,419.5	*74%*				
Other amenable causes	612.8	*25%*	498.4	*26%*				
All amenable causes	**2,459.4**	***100%***	**1,917.9**	***100%***				

Source: Office for National Statistics, DH

3.33 In 2010, PYLL from amenable cancers and cardiovascular conditions made up 75% (males) and 74% (females) of all amenable PYLL. For males the largest contributor was cardiovascular conditions (59%, of which 77% was due to ischaemic heart disease), followed by cancer (16%). For females the largest contributor was cancer (42%, of which 58% was due to breast cancer), followed by cardiovascular conditions (32%).

3.34 The PYLL rate for males for all amenable conditions was 2,459.4 years of life lost per 100,000 population, 1.3 times higher than for females (1,917.9) (Table1a.a).

3.35 Similar patterns can be seen in standardised mortality rates for amenable conditions (Table 1a.b). In 2010 the European age-standardised mortality rate for amenable cancers and cardiovascular conditions made up 81% and 80% respectively of the mortality rate for all amenable conditions, for males and females respectively. For males the largest contributor was cardiovascular conditions (64%, of which 77% was due to ischaemic heart disease), followed by cancer (17%). For females the largest contributor was cancer (42%, of which 58% was due to breast cancer), followed by cardiovascular conditions (37%).

3.36 The standardised mortality rate for males was 113.2 deaths per 100,000 population, 1.5 times higher than that for females (74.7).

Table 1a.b - Under 75 mortality rate from amenable conditions, (EAS rate per 100,000 population), 2010

	Mortality rates							
Condition	**Males**		**Females**		**Males**		**Females**	
Heart Disease								
All amenable	72.0	*64%*	28.0	*37%*				
Ischaemic heart disease					55.1	*77%*	16.3	*58%*
Stroke					13.9	*19%*	9.9	*35%*
Other amenable CVD					2.9	*4%*	1.8	*6%*
Cancer								
All amenable	19.7	*17%*	31.4	*42%*				
Colorectal					12.7	*64%*	7.3	*23%*
Breast					-	-	18.3	*58%*
Other amenable					7.0	*36%*	5.8	*19%*
Respiratory								
All amenable	7.6	*7%*	5.7	*8%*				
Pneumonia					6.9	*90%*	4.6	*81%*
Other amenable respiratory					0.7	*10%*	1.0	*19%*
Infant	2.7	*2%*	2.4	*3%*				
Digestive disorders	4.2	*4%*	2.5	*3%*				
Infections	3.1	*3%*	2.1	*3%*				
Epilepsy and status epilepticus	1.6	*1%*	1.1	*1%*				
Genitourinary disorders	1.2	*1%*	0.8	*1%*				
Diabetes	0.6	*1%*	0.4	*0%*				
Injuries	0.5	*0%*	0.4	*1%*				
Cancer and CVD	91.67	*81%*	59.40	*80%*				
Other amenable causes	21.50	*19%*	15.31	*20%*				
All amenable causes	**113.2**	***100%***	**74.7**	***100%***				

3.37 The difference in percentages shown in the two tables above is due to the difference in average age at death for different conditions. For example, deaths from amenable cancer and CVD conditions made up about 75% of all amenable PYLL in 2010, but about 80% of all amenable mortality. This is because on average deaths from these diseases occur at older ages than deaths from the other amenable conditions.

3.38 To some extent this difference is due to the cause in question causing death at younger ages (e.g. infant conditions, particularly conditions arising in the perinatal period), but in some cases it is because the definition of amenable mortality only includes deaths in certain age groups. For example, deaths from leukaemia over the age of 44 and deaths from diabetes over the age of 49 are not considered amenable and are therefore not included in the calculation of PYLL and mortality rates.

3.39 Calculating PYLL per death (or PYLL rate divided by mortality rate) shows up the amenable causes from which people die at younger ages - the higher the average PYLL per death, the younger the age at which people die (Table 1a.c):

Table 1a.c - Crude ratio PYLL rate per mortality rate from amenable conditions, 2010

	Average PYLL per death			
Condition	**Males**	**Females**	**Males**	**Females**
Heart Disease				
All amenable	20.0	21.6		
Ischaemic Heart Disease			20.0	21.2
Stroke			19.9	22.3
Other amenable CVD			20.6	21.7
Cancer				
All amenable	20.5	25.9		
Colorectal			19.4	23.0
Breast				25.9
Other amenable			22.5	29.7
Respiratory				
All amenable	22.7	26.2		
Pneumonia			21.4	24.3
Other amenable respiratory			35.2	34.8
Infant	53.2	57.4		
Digestive disorders	21.9	23.5		
Infections	28.5	31.5		
Epilepsy and status epilepticus	36.2	41.1		
Genitourinary disorders	20.7	23.4		
Diabetes	40.3	44.0		
Injuries	17.6	18.6		
Cancer and CVD	20.1	23.9		
Other amenable causes	28.5	32.6		
All amenable causes	**21.7**	**25.7**		

3.40 The following table (Table 1a.d) shows how amenable deaths are distributed by broad amenable condition in different age bands, for males and females.

3.41 Nearly three quarters of deaths in the 0-4 age band are due to infancy-related causes (complications of the perinatal period or congenital malformations, deformations and chromosomal anomalies). With increasing age, these become less important and amenable cancer and CVD conditions become more predominant in male deaths. CVD conditions are the largest cause of male death from the age of 30 until 74. For females, the largest cause of death between the ages of 20 and 64 is cancer (including breast cancer); while from 65 to 74 heart disease takes over as the largest cause, causing more than half of amenable female deaths in the 70-74 age group. Amenable respiratory conditions are one of the largest causes of female death in the 10-14 age group, but this is on the basis of a very small number of deaths (9 in 2010).

Table 1a.d - Percentage of all amenable male and female deaths from each condition, by age band, 2010

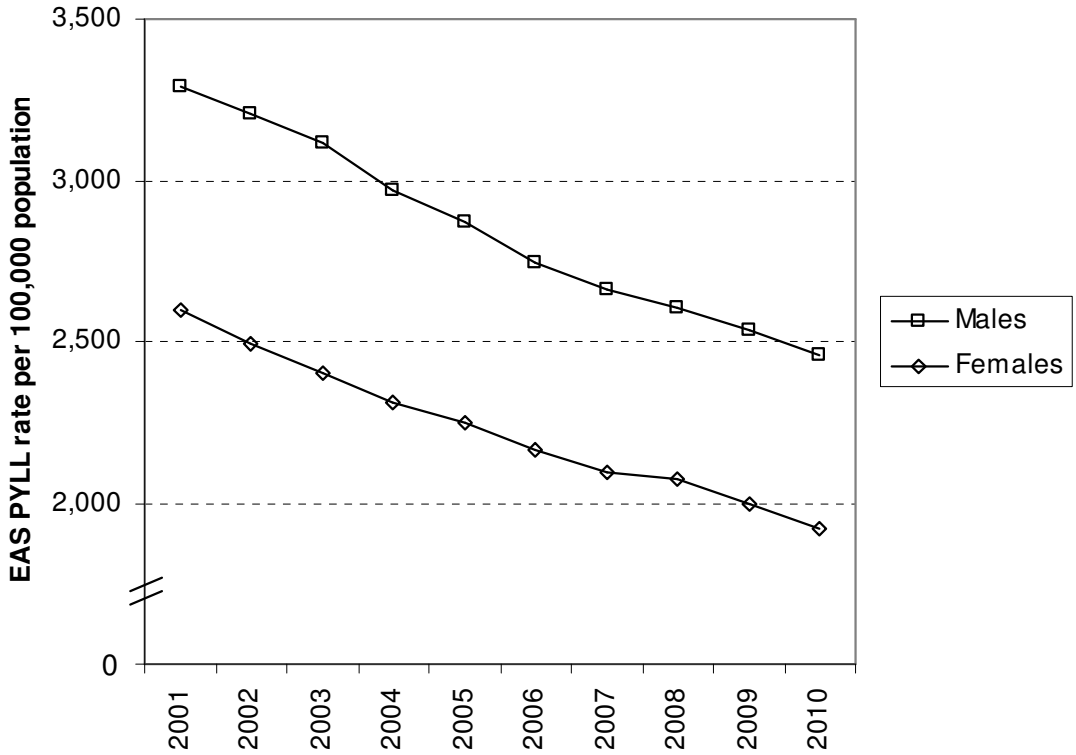
Male	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75+	All relevant ages
CVD	2.0%	5.4%	9.1%	13.4%	13.1%	22.3%	32.7%	44.5%	54.2%	61.9%	67.4%	66.6%	66.8%	67.3%	66.9%		64.2%
Cancer	3.5%	8.1%	20.5%	22.0%	12.3%	25.5%	19.7%	15.9%	13.4%	13.5%	14.8%	17.4%	18.4%	19.3%	18.5%		17.7%
Respiratory	9.2%	8.1%	18.2%	8.5%	15.4%	11.2%	9.4%	10.0%	7.6%	7.4%	5.2%	6.1%	6.0%	6.2%	7.3%		6.7%
Infant	72.3 %	32.4%	25.0%	22.0%	17.7%	14.4%	5.9%	3.6%	2.3%	1.8%	1.9%	1.4%	0.8%	0.5%	0.3%		2.0%
Digestive disorders	1.2%	8.1%	0.0%	2.4%	4.6%	2.1%	5.9%	4.2%	5.1%	3.6%	4.4%	3.9%	4.0%	3.4%	3.4%		3.7%
Infections	9.2%	13.5%	9.1%	6.1%	9.2%	3.7%	7.1%	7.7%	7.0%	4.5%	3.7%	2.4%	2.0%	1.8%	1.7%	7.0%	2.6%
Epilepsy and status epilepticus	1.4%	13.5%	15.9%	19.5%	16.9%	14.4%	11.4%	8.1%	5.4%	3.2%	1.4%	1.1%	0.6%	0.4%	0.3%		1.3%
Genitourinary disorders	0.9%	2.7%	2.3%	0.0%	1.5%	0.0%	1.6%	0.8%	0.9%	0.6%	1.0%	0.9%	1.0%	1.0%	1.3%		1.1%
Diabetes	0.0%	2.7%	0.0%	6.1%	7.7%	6.4%	5.5%	4.4%	3.9%	3.2%							0.5%
Injuries	0.3%	5.4%	0.0%	0.0%	1.5%	0.0%	0.8%	0.8%	0.2%	0.2%	0.2%	0.2%	0.4%	0.2%	0.2%	93.0%	0.3%
All amenable causes	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Number of deaths from all amenable causes	347	37	44	82	130	188	254	521	976	1,571	2,304	3,318	5,422	6,675	9,246	100	31,115
Female	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40-44**	**45-49**	**50-54**	**55-59**	**60-64**	**65-69**	**70-74**	**75+**	**All relevant ages**
Cancer	4.4%	13.6%	21.2%	17.9%	21.1%	35.6%	48.3%	53.2%	57.5%	54.3%	52.8%	50.4%	48.1%	38.5%	30.6%		41.4%
CVD	2.7%	4.5%	0.0%	5.1%	13.3%	11.6%	17.8%	16.2%	18.5%	26.4%	30.4%	33.6%	35.6%	45.2%	52.6%		39.2%
Respiratory	7.7%	20.5%	27.3%	14.1%	10.0%	12.3%	7.0%	7.5%	8.1%	6.4%	6.8%	6.9%	7.2%	7.3%	8.3%		7.6%
Infant	73.4 %	45.5%	27.3%	17.9%	16.7%	10.3%	5.2%	4.7%	3.1%	2.3%	1.9%	1.6%	1.4%	0.7%	0.4%		2.6%
Digestive disorders	0.3%	0.0%	6.1%	3.8%	4.4%	4.1%	1.7%	2.2%	2.1%	2.6%	3.7%	3.1%	3.4%	3.5%	4.0%		3.4%
Infections	8.1%	6.8%	6.1%	16.7%	11.1%	10.3%	4.8%	5.5%	3.9%	2.6%	1.9%	2.6%	2.2%	2.6%	2.2%	0.9%	2.8%
Epilepsy and status epilepticus	2.7%	6.8%	12.1%	20.5%	17.8%	9.6%	7.0%	6.3%	3.0%	2.4%	1.3%	1.0%	0.8%	0.5%	0.2%		1.2%
Genitourinary disorders	0.7%	2.3%	0.0%	0.0%	1.1%	2.7%	0.0%	0.8%	0.9%	0.9%	0.6%	0.7%	1.0%	1.3%	1.4%		1.1%
Diabetes	0.0%	0.0%	0.0%	3.8%	4.4%	2.7%	7.4%	3.0%	2.5%	2.0%							0.4%
Injuries	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.9%	0.6%	0.3%	0.2%	0.6%	0.1%	0.3%	0.4%	0.3%	99.1%	0.3%
All amenable causes	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Number of deaths from all amenable causes	297	44	33	78	90	146	230	494	868	1,250	1,711	2,184	3,398	4,292	6,448	117	21,563

Where a condition covers at least 20% of the deaths in an age band, it is shown in red.
Source: Office for National Statistics, DH

Recent Trends

3.42 The trend in PYLL for amenable causes has been steadily downwards in the 9 years from 2001 to 2010 – the average annual decline was similar for males (3.2%) and females (3.3%). Between 2009 and 2010 the decline was 3.1% for males and 4.0% for females (Figure 1a.a, Table 1a.e).

Figure 1a.a – European Age-Standardised PYLL rate for all amenable causes, 2001-2010



Source: Office for National Statistics, DH

3.43 This decline has been largely driven by the downward trend in deaths from amenable CVD and cancer conditions in the period. PYLL for amenable CVD conditions made up 59% of all amenable PYLL in 2010 in males, who saw a 4.4% average annual decline in PYLL for these conditions between 2001 and 2010. Females saw an even larger average annual decline in PYLL for amenable heart conditions – 6.0%, although these conditions made up only 32% of all amenable PYLL for females in 2010.

3.44 The other main driver of the decline in amenable PYLL over the period is for amenable cancers – for females these made up 42% of amenable PYLL in 2010 and declined on average by 1.9% between 2001 and 2010. For men amenable cancers made up 16% of all amenable PYLL and there was a smaller average annual decline over the period (0.8%).

Table 1a.e - European Age-Standardised PYLL rate for all amenable causes, 2001 to 2010, change 2009-2010 and average annual change 2001-2010

	Males	Females
2001	3,287.4	2,600.9
2002	3,204.8	2,492.3
2003	3,114.0	2,404.9
2004	2,968.6	2,309.6
2005	2,870.1	2,246.9
2006	2,742.3	2,164.0
2007	2,661.7	2,096.7
2008	2,602.6	2,071.3
2009	2,537.3	1,997.4
2010	2,459.4	1,917.9
Change 2009-10	*-3.1%*	*-4.0%*
Change 2001-10	*-3.2%*	*-3.3%*

Source: Office for National Statistics, DH

3.45 Diabetes was the only amenable cause to see an average annual increase in PYLL over the period for both males (0.9%) and females (0.3%), possibly reflecting earlier onset of diabetes. Between 2001 and 2010 males also saw a 1.3% increase in PYLL for 'Other amenable CVD' (hypertension and chronic rheumatic heart disease) and a 0.1% increase in injuries (Table 1a.f).

3.46 Males have also seen increases in PYLL rate between 2009 and 2010 for two major amenable conditions – stroke (3.0% increase) and colorectal cancer (3.8% increase). These conditions contributed 11% and 10% respectively of all male amenable PYLL in 2010. The male under 75 mortality rate for stroke only increased by 1% in the same period, suggesting that the age at death is not keeping up with the increasing age-specific life expectancies used as weights in the PYLL calculation.

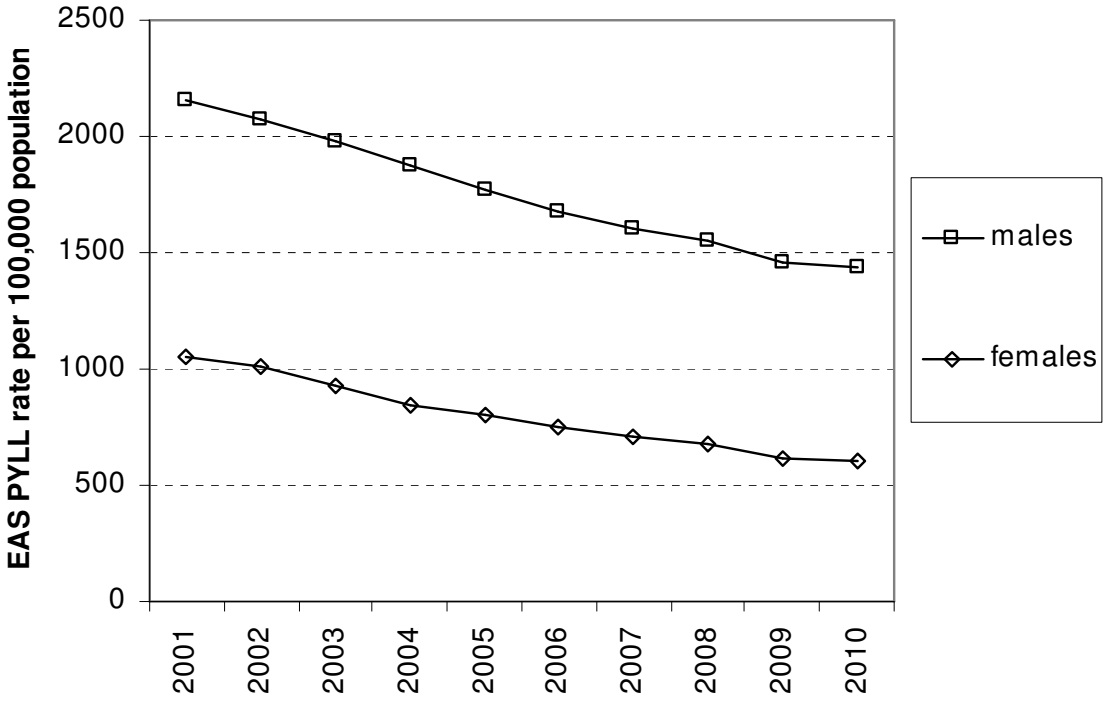
3.47 Jumps in PYLL data for conditions contributing a small share of PYLL, such as genitourinary disorders and diabetes, are likely to be due to random year-on-year fluctuations around a continuing trend.

Table 1a.f - European Age-Standardised PYLL rate for all amenable causes, 2010, change 2009-2010 and average annual change 2001-2010, by amenable condition

	Change 2009-10		Average annual change 2001-10		PYLL rate 2010	
Condition	**Males**	**Females**	**Males**	**Females**	**Males**	**Females**
Heart Disease						
All amenable CVD	*-1.4%*	*-1.8%*	*-4.4%*	*-6.0%*	1,441.7	604.5
Ischaemic heart disease	*-2.5%*	*-1.0%*	*-4.7%*	*-6.8%*	1,104.3	344.1
Stroke	*3.0%*	*-2.8%*	*-4.0%*	*-5.1%*	277.3	221.2
Other amenable CVD	*0.4%*	*-3.1%*	*1.3%*	*-3.0%*	60.1	39.2
Cancer						
All amenable	*0.1%*	*-5.0%*	*-0.6%*	*-1.9%*	404.9	814.9
Breast	-	*-6.6%*	-	*-2.4%*	-	473.1
Colorectal	*3.8%*	*-4.2%*	*-0.6%*	*-0.9%*	246.9	168.8
Other amenable	*-5.3%*	*-1.3%*	*-0.8%*	*-1.4%*	158.0	173.0
Respiratory						
All amenable	*-13.4%*	*-7.5%*	*-1.5%*	*-1.3%*	172.7	148.6
Pneumonia	*-11.9%*	*-7.6%*	*-1.4%*	*-1.5%*	146.9	112.1
Other amenable respiratory	*-21.0%*	*-7.0%*	*-2.1%*	*-0.6%*	25.8	36.5
Infant	*-12.7%*	*-1.6%*	*-1.1%*	*-1.1%*	143.4	138.9
Digestive disorders	*4.3%*	*-0.2%*	*-0.4%*	*-1.7%*	91.9	58.5
Infections	*-13.7%*	*-16.2%*	*-3.0%*	*-2.7%*	87.6	67.1
Epilepsy and status epilepticus	*-5.6%*	*1.5%*	*-1.8%*	*-2.0%*	59.2	43.6
Genitourinary disorders	*4.6%*	*7.9%*	*-3.2%*	*-4.6%*	24.5	18.6
Diabetes	*9.9%*	*11.9%*	*0.9%*	*0.3%*	24.4	15.8
Injuries	*-2.6%*	*-18.4%*	*0.1%*	*-3.3%*	9.1	7.5
Cancer and CVD	*-1.1%*	*-3.7%*	*-3.7%*	*-3.8%*	1,846.6	1,419.5
Other amenable	*-8.7%*	*-4.9%*	*-1.5%*	*-1.7%*	612.8	498.4
All amenable causes	***-3.1%***	***-4.0%***	***-3.2%***	***-3.3%***	**2,459.4**	**1,917.9**

Breakdown by condition

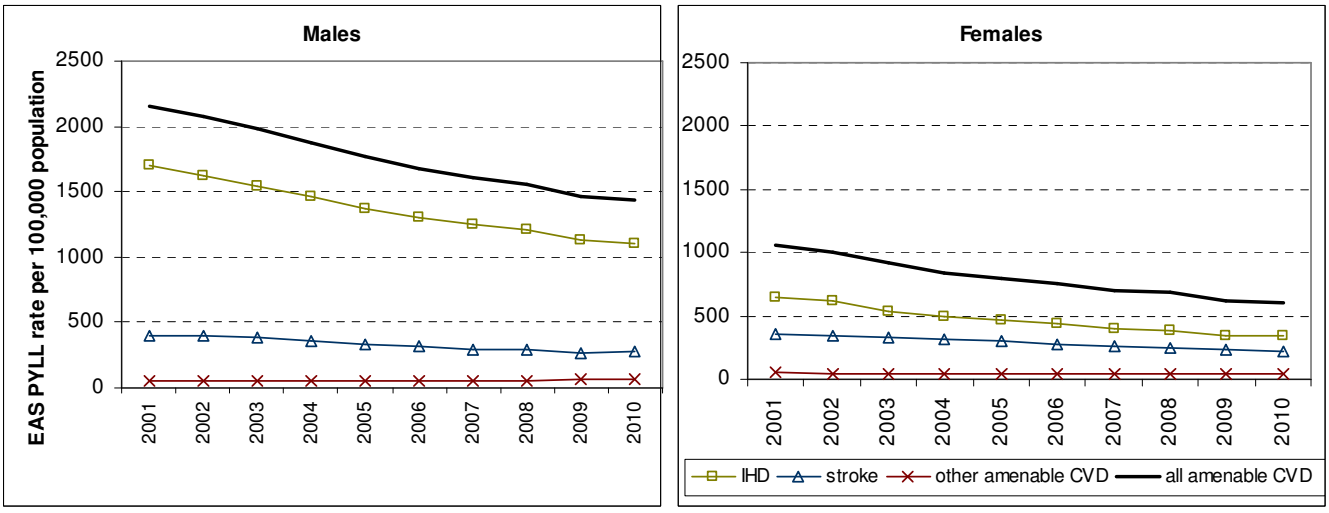
Figure 1a.b – Trend in PYLL for amenable CVD conditions, 2001 to 2010



Source: Office for National Statistics, DH

3.48 The difference in PYLL rate between men and women is driven by differences in ischaemic heart disease; PYLL rates for stroke and other amenable CVD conditions are similar for men and women.

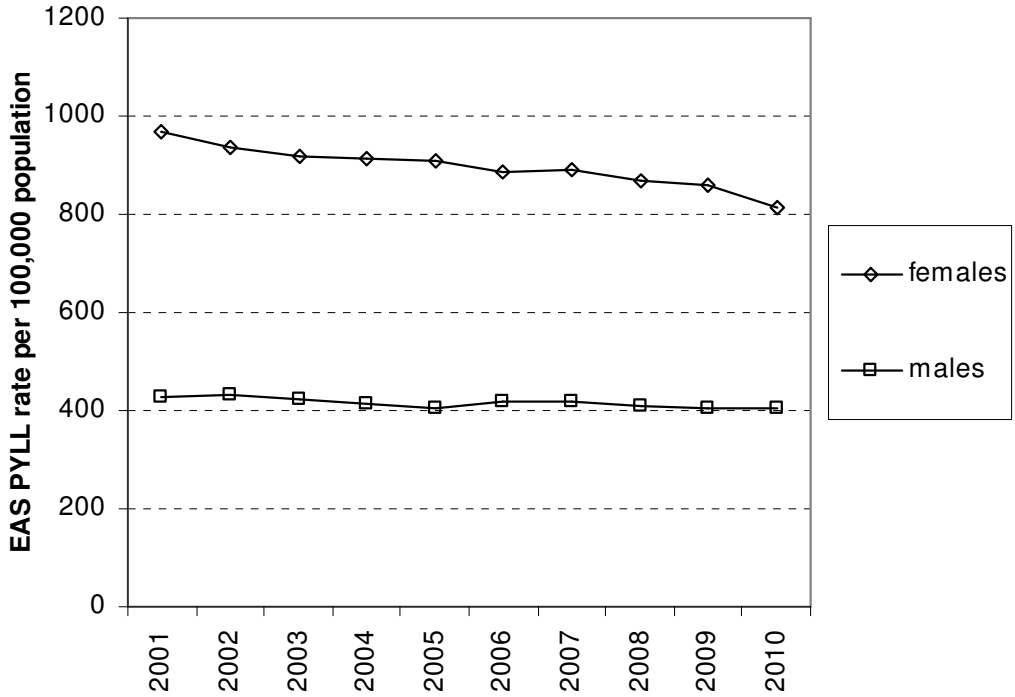
Figure 1a.c – Trend in PYLL by amenable CVD condition, 2001 to 2010, males and females



Source: Office for National Statistics, DH

3.49 See indicator 1.1 for further information on mortality from CVD in those under age 75.

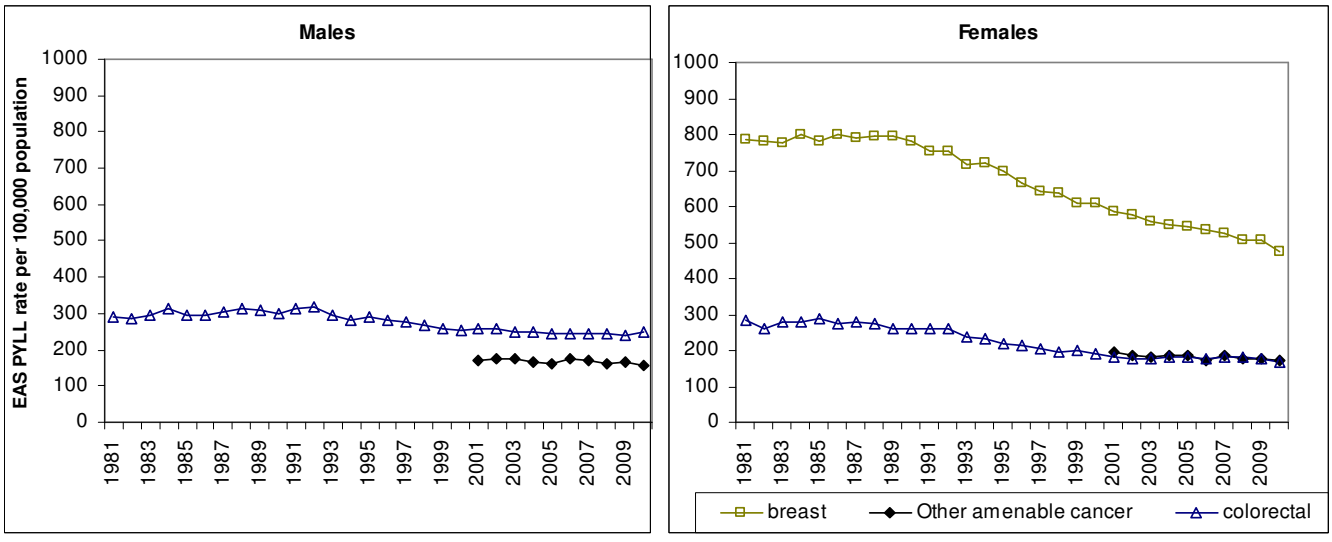
Figure 1a.d – Trend in PYLL for amenable cancers, 2001 to 2010



Source: Office for National Statistics, DH

3.50 The difference in PYLL rate for amenable cancers between men and women is driven by differences in the type of cancer included - for women it includes breast cancer and cervical cancer (included in 'other amenable cancer'). The PYLL rate for colorectal cancer was very similar for males and females in 1981, but has decreased faster for females than for males. This is due partly to under 75 mortality rates from colorectal cancer decreasing faster for females (2.4% decrease) than for males (1.5% decrease), and partly to the fact that LE for females has increased at a slower rate than for males.

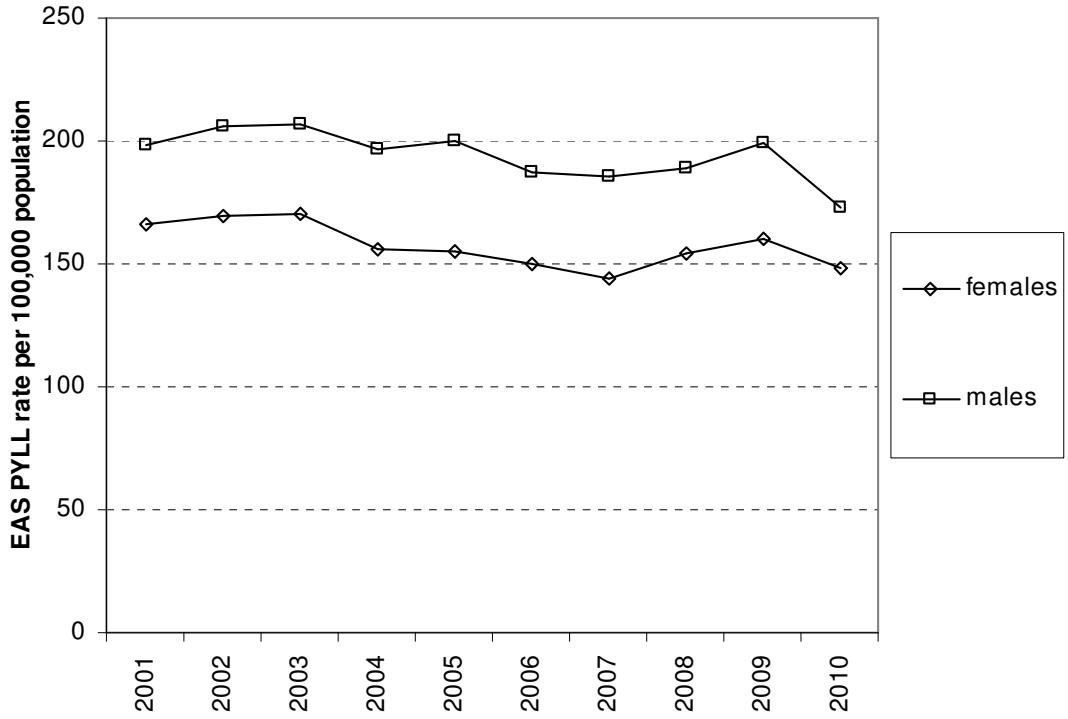
Figure 1a.e – Trend in PYLL by amenable cancer, 1981 to 2010, males and females



Source: Office for National Statistics, DH

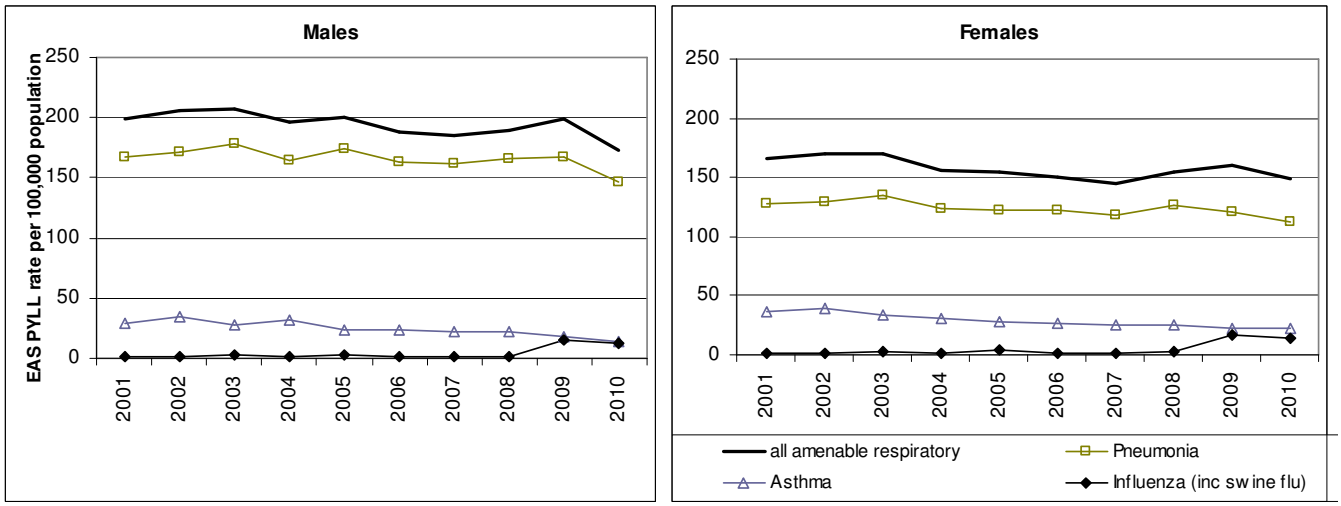
3.51 See indicator 1.4.vii for further information on mortality from cancer in those aged under 75, and the reasons for the sustained declines in breast and colorectal cancer mortality.

Figure 1a.f – Trend in PYLL for amenable respiratory conditions, 2001 to 2010



Source: Office for National Statistics, DH

Figure 1a.g – Trend in PYLL by amenable respiratory condition, 2001 to 2010, males and females



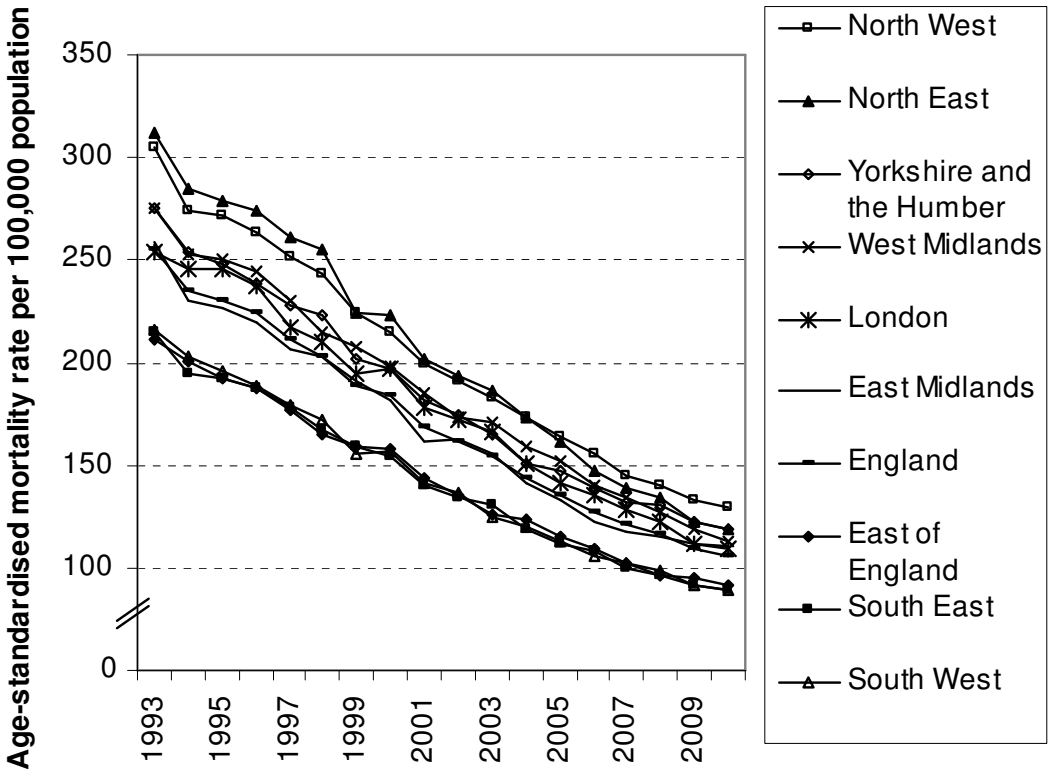
Source: Office for National Statistics, DH

3.52 The difference in PYLL rate between men and women is driven by differences in pneumonia; PYLL rates for asthma and influenza are similar for men and women.

3.53 The peak in mortality from pneumonia and other respiratory diseases in 2003 is thought to be due to extremely hot and dry weather conditions, which led to elevated concentrations of the pollutants ozone and PM10 in the UK and Europe. This does not seem to have had an impact on deaths from asthma, however.

Breakdown by region

Figure 1a.h – Trends in age-standardised mortality rates from amenable causes, English government office region, 1993 to 2010, males



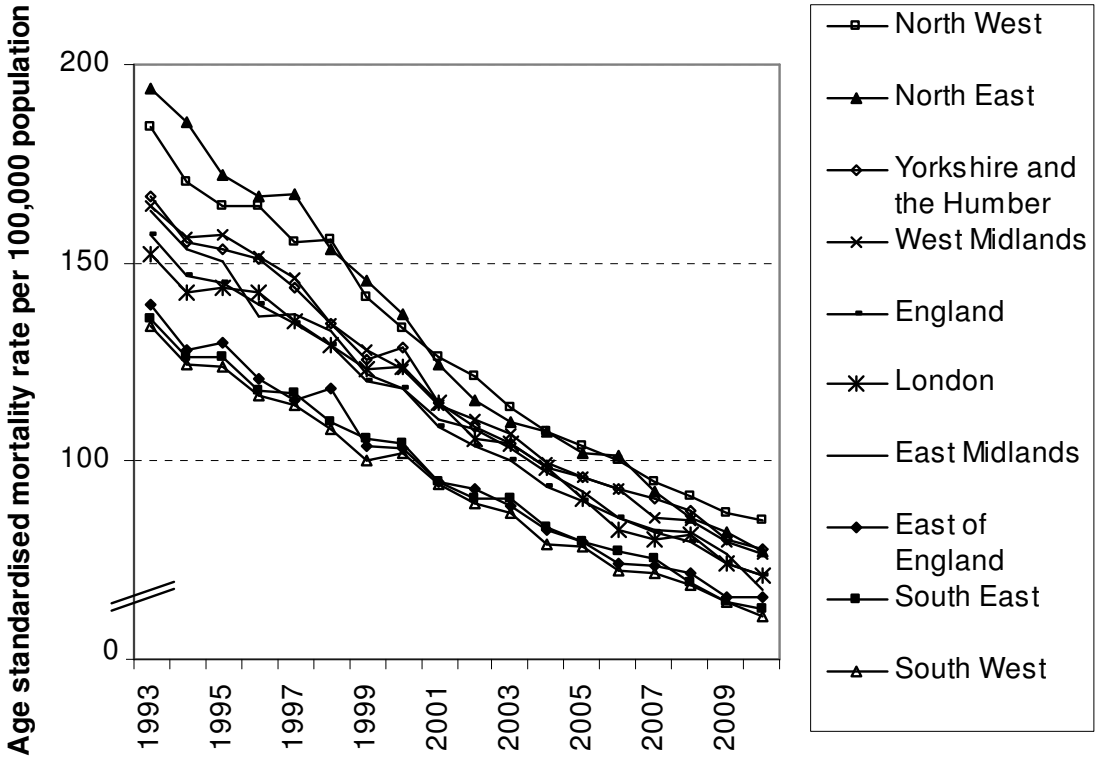
Source: NHS Information Centre

3.54 Trends in PYLL from the set of amenable causes defined by ONS are not available yet by region, however the NHS Information Centre for Health and Social Care publishes regional data on mortality from a slightly different, but largely overlapping, set of amenable causes. For comparison, the European age-standardised mortality rate from amenable causes in the new ONS definition is 7% higher for males and 5% higher for females than the Information Centre (NCHOD) definition: https://indicators.ic.nhs.uk/download/NCHOD/Specification/Spec_03D_171DRT0074_10_V1.pdf

3.55 These data show a clear north-south divide for both males and females, with the North West region having the highest and the South West the lowest mortality rate. London's outcomes are similar to those of the East and West Midlands.

3.56 Mortality from amenable causes has decreased in all regions of England over the period 1993 to 2010 (Figures 1a.h and 1a.i, Table 1a.g). The decrease has slowed in recent years, particularly for males – for England as a whole it decreased by 2.9% for males and 4.0% for females between 2009 and 2010, while the average annual decrease since 2001 was 5.0% and 4.6% respectively. The North East, London and the West Midlands have shown the largest decreases for males while the East Midlands, London and the North East have shown the largest decreases for females in this period.

Figure 1a.i – Trends in age-standardised mortality rates from amenable causes, English government office region, 1993 to 2010, females



Source: NHS Information Centre

3.57 The average annual decreases in amenable mortality rates for males and females over the period 1993 to 2010 for the nine regions in England are shown in Table 1a.g below:

3.58 While the absolute gap between the regions with the highest and the lowest PYLL rate has closed over the period from 1993 to 2010, the relative gap has remained similar for males – the highest rate in 1993 (North East) was 47.8% higher than the lowest (East of England), and the highest rate in 2010 (North West) was 45.5% higher than the lowest (South West). For females the relative gap has closed more - the highest rate in 1993 (North East) was 44.7% higher than the lowest (South West), and the highest rate in 2010 (North West) was 39.0% higher than the lowest (South West).

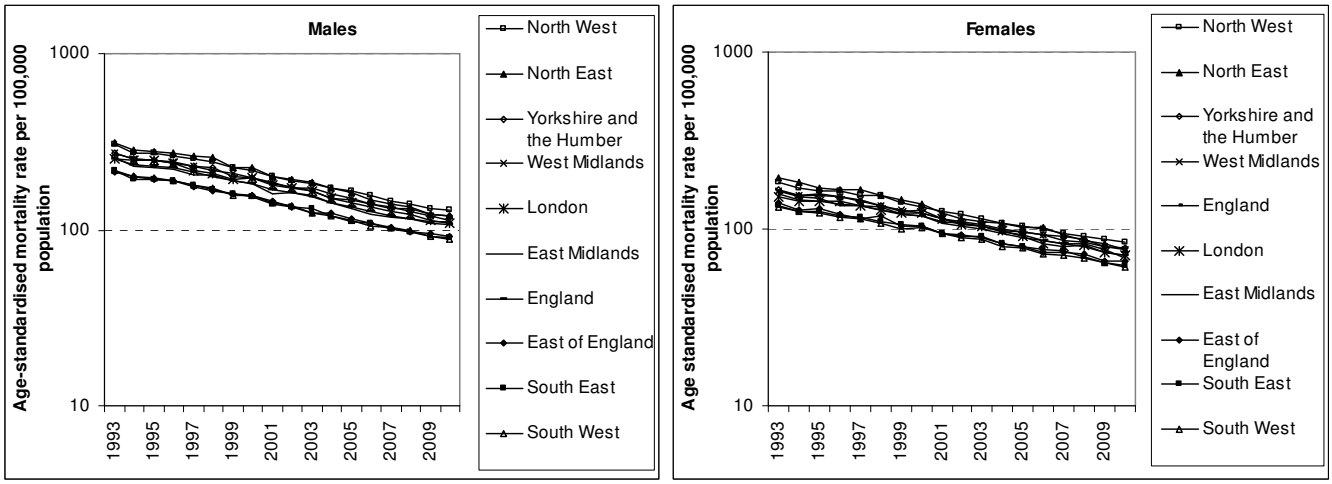
Table 1a.g – Average annual decrease by region (percentage)

Table 1a.g Average annual decrease by region (percentage)						
	Males			Females		
	1993 to 2010	**2001 to 2010**	**2009 to 2010**	**1993 to 2010**	**2001 to 2010**	**2009 to 2010**
England	**5.0%**	**5.0%**	**2.9%**	**4.6%**	**4.6%**	**4.0%**
North East	5.5%	5.7%	3.1%	5.3%	5.2%	5.8%
North West	4.9%	4.7%	2.4%	4.4%	4.3%	2.4%
Yorkshire and the Humber	4.8%	4.6%	3.1%	4.4%	4.3%	2.9%
East Midlands	4.9%	4.1%	1.2%	5.0%	5.3%	11.7%
West Midlands	5.1%	5.3%	5.0%	4.4%	4.3%	4.2%
East	4.8%	5.0%	3.8%	4.3%	3.9%	-0.1%
London	4.8%	5.3%	2.8%	4.4%	5.2%	4.4%
South East	5.0%	4.9%	2.5%	4.5%	4.5%	3.7%
South West	5.1%	5.0%	2.7%	4.5%	4.7%	5.0%

Source: NHS Information Centre, DH

3.59 This can be seen in charts using a logarithmic scale (Figure 1a.j), which show more clearly comparisons of change over time (lines with the same rate of change over time are parallel):

Figure 1a.j – Trends in age-standardised mortality rates from amenable causes, English government office region, 1993 to 2010, males and females (logarithmic scale)



Source: NHS Information Centre, DH

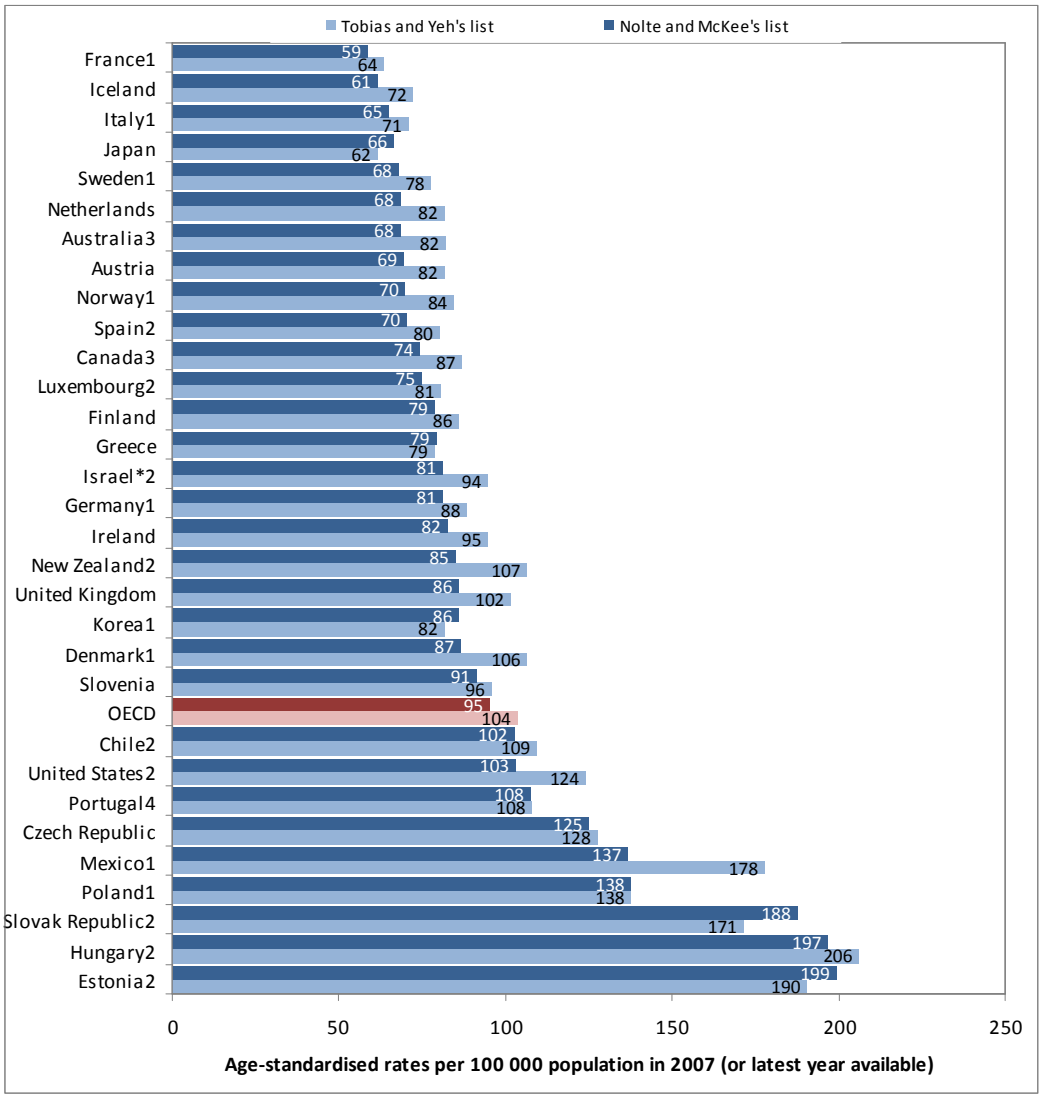
Breakdown by deprivation

3.60 Trends in PYLL from the set of amenable causes defined by ONS are not available yet by deprivation, but see deprivation breakdowns for the cancer, CVD and respiratory under 75 mortality rates (indicators 1.4.vii, 1.1 and 1.2), which are the key drivers of the amenable PYLL rate.

International position

3.61 There is no available international comparison of PYLL from amenable causes as such, although the OECD Health Status database has an internationally comparable PYLL indicator as a summary measure of premature mortality (with an age cut-off of 70) from selected causes, including some major amenable CVD and cancer conditions[3].

Figure 1a.k – Amenable mortality in 31 OECD countries, 2007 or latest available year

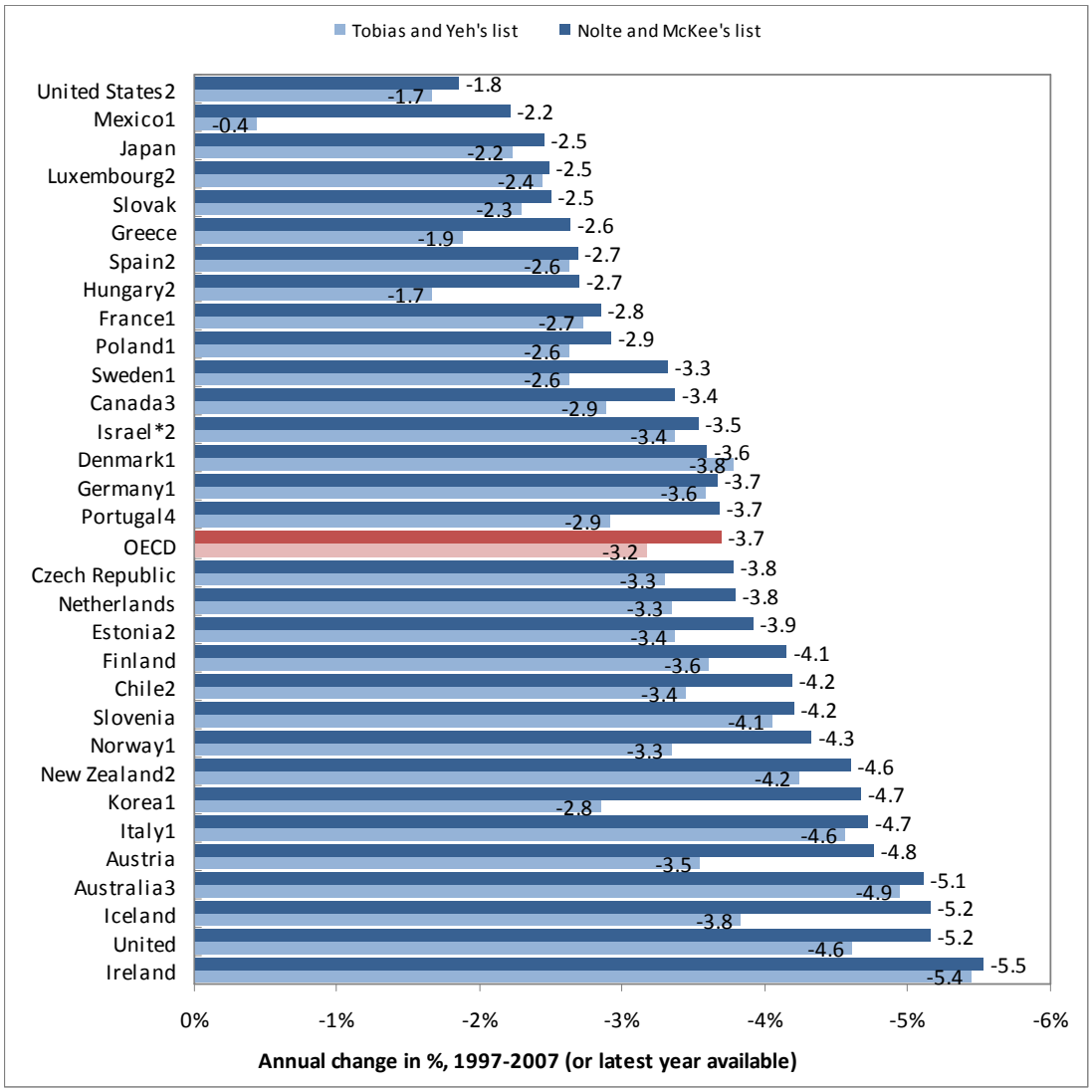


Source: Mortality Database 2010, OECD calculations

[3] OECD Health Status database: http://stats.oecd.org/index.aspx?DataSetCode=HEALTH_STAT#

3.62 An international comparison was made by the OECD of mortality rates from amenable causes in 2011[4]. This compares the UK and 30 other OECD countries, including all the other EU-15 countries apart from Belgium. This shows that, compared to the other thirteen EU-15 countries, in 2007 the UK had the third or fourth highest amenable mortality rate, using the Tobias & Yeh (2009) and Nolte & McKee (2008) definitions[5] respectively (Figure 1a.k). However, it also showed that the UK's amenable mortality rate decreased on average between 1997 and 2007 by between 4.6% and 5.2% per year, faster than every other country in the study apart from Ireland. This compared with an average decrease of between 3.2% and 3.7% for all countries in the study (Figure 1a.l). The Nolte and McKee definition is very similar to the one used by the Information Centre (NCHOD), which informed the regional comparisons above.

Figure 1a.l – Annual change in amenable mortality, 1997 to 2007 or latest available year



Source: Mortality Database 2010, OECD calculations

[4] Gay, J. G. *et al.* (2011), "Mortality Amenable to Health Care in 31 OECD Countries: Estimates and Methodological Issues", *OECD Health Working Papers*, No. 55, OECD Publishing.
[5] Tobias & Yeh (2009); Nolte & McKee (2008), cited in Gay et al (2011)

Notes:

- What is responsible for the sustained downtrend in PYLL notwithstanding increases in life expectancy?
- Why is it that the markedly accelerating improvement in London's life expectancy at 75 between 1993 and 2010 (see indicator 1b) is not accompanied by such a large improvement in PYLL from amenable causes in London over the same period? Conversely, why do we not see the deterioration in the relative position of the South West in life expectancy at 75 reflected in the amenable mortality rate in the South West? (Can this tell us something about the extent to which lifestyle factors, rather than the NHS, impact on life expectancy at 75, or is it to do with differences in care in London and/or the South West for the over and under 75s, or changes in demographic make-up in these regions?)

Drivers of this indicator

3.63 This indicator covers a very large number of conditions for which there are many NHS, public health, social care and other external drivers. However, as amenable CVD, cancer, respiratory and liver conditions cover more than 82% of all the amenable PYLL featured here, the most important drivers will be picked up in the reports on the under 75 mortality indicators for these conditions, indicators 1.1, 1.2, 1.3 and 1.4.vii. Clearly the NHS drivers of these conditions will be more important for the amenable causes of death for these conditions.

3.64 For many of these conditions, it is very plausible that cohort effects are in play. Age-period-cohort analyses have been undertaken where there is sufficient historic data, to attempt to disentangle such effects from genuine period effects – it being more likely that the latter reflect changes in the quality of NHS care.

(b) Indicator 1a: Current Practice Projections

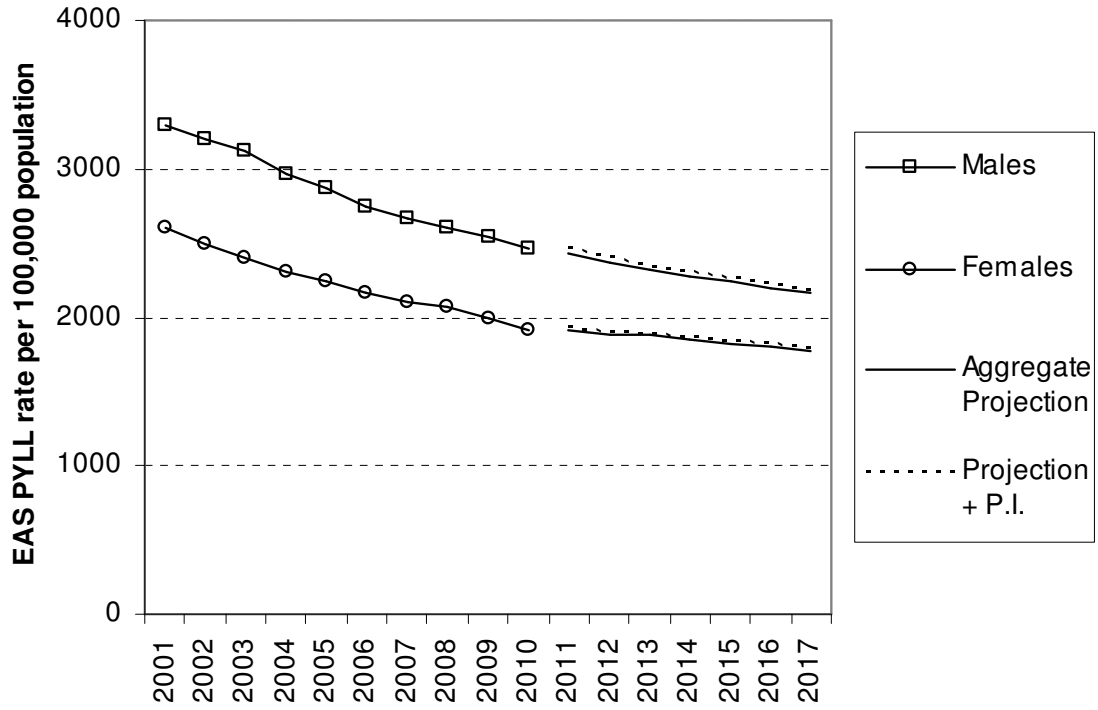
3.65 This section projects forward outcomes for indicator 1a, based upon the explanatory model that best accounts for recent developments, within the resource envelope, and assuming that the quality of NHS service is just maintained notwithstanding resource constraints.

3.66 The projection for PYLL from all amenable causes is an aggregation of projections of PYLL from each condition or group of conditions, which are in some cases aggregations of smaller groups of conditions. (Note that in each case there is an underlying tendency for PYLL to rise consequential to the projected rise in life expectancy: thus sustained downtrends must reflect an outweighing of this tendency by sustained improvements in factors driving better outcomes.)

3.67 Current practice projections for each condition or group of conditions are set out below. An upper bound for the projection (a tolerance interval) was formed in the following way:

- A best fitting regression line (second order polynomial) was fitted to the historical trend values from 2001 to 2010 for PYLL for all amenable conditions.
- One standard deviation of the residuals – the difference between observed values and predicted values from the regression – was calculated and added to the projected values to create an upper Projection Interval (P.I.).

Figure 1a.m – EAS PYLL rate per 100,000 population for all amenable conditions, with projection to 2017



Source: Office for National Statistics, DH

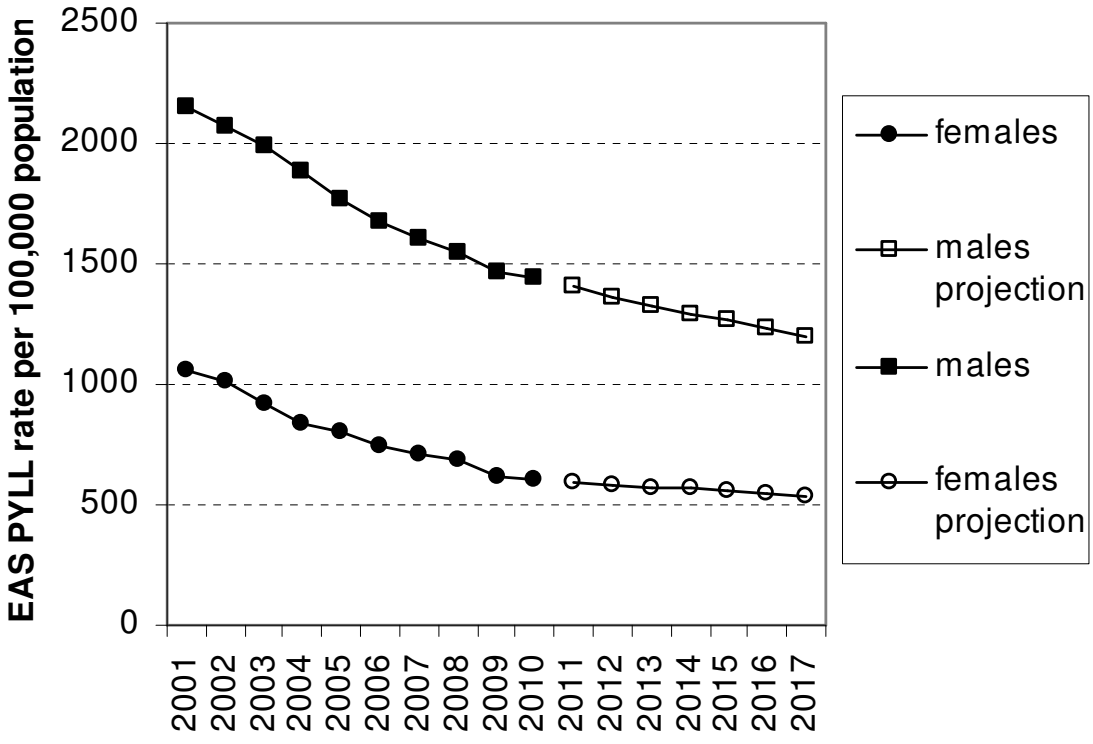
Table 1a.h - EAS PYLL rate per 100,000 population for all amenable conditions, with projection to 2017

	Males			Females		
	Observed	Aggregate Projection	Projection plus P.I.	Observed	Aggregate Projection	Projection plus P.I.
2001	3,287.4			2,600.9		
2002	3,204.8			2,492.3		
2003	3,114.0			2,404.9		
2004	2,968.6			2,309.6		
2005	2,870.1			2,246.9		
2006	2,742.3			2,164.0		
2007	2,661.7			2,096.7		
2008	2,602.6			2,071.3		
2009	2,537.3			1,997.4		
2010	2,459.4			1,917.9		
2011		2,435.0	2,455.2		1,912.7	1,926.3
2012		2,373.5	2,393.7		1,889.6	1,903.2
2013		2,317.1	2,337.3		1,875.0	1,888.6
2014		2,280.5	2,300.7		1,850.7	1,864.4
2015		2,242.1	2,262.3		1,826.4	1,840.0
2016		2,203.1	2,223.3		1,800.7	1,814.3
2017		2,162.9	2,183.1		1,774.8	1,788.4

Source: Office for National Statistics

Amenable cardiovascular disease

Figure 1a.n– EAS PYLL rate per 100,000 population for all amenable CVD conditions (IHD, stroke and other), with projection to 2017



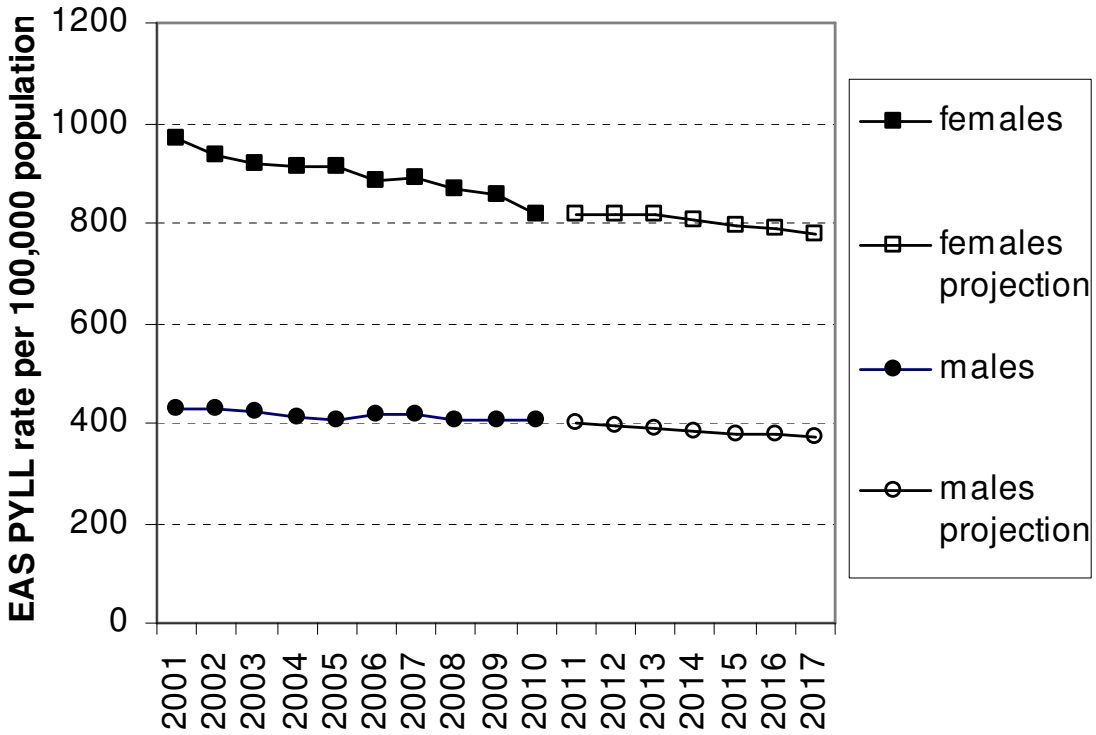
Source: Office for National Statistics, DH

3.68 The projections in Figure 1a.n were obtained using the same methodology as the CVD under 75 mortality indicator projection (indicator 1.1):

- The projected age-specific crude rates and the relevant weights for the years 2011 to 2017 were then used to calculate the projected PYLL rate for IHD and stroke and other amenable CVD.
- These projections were added together to form the projection for all amenable CVD PYLL.

Amenable cancers

Figure 1a.o - EAS PYLL rate per 100,000 population for all amenable cancers (breast, colorectal and other), with projection to 2017



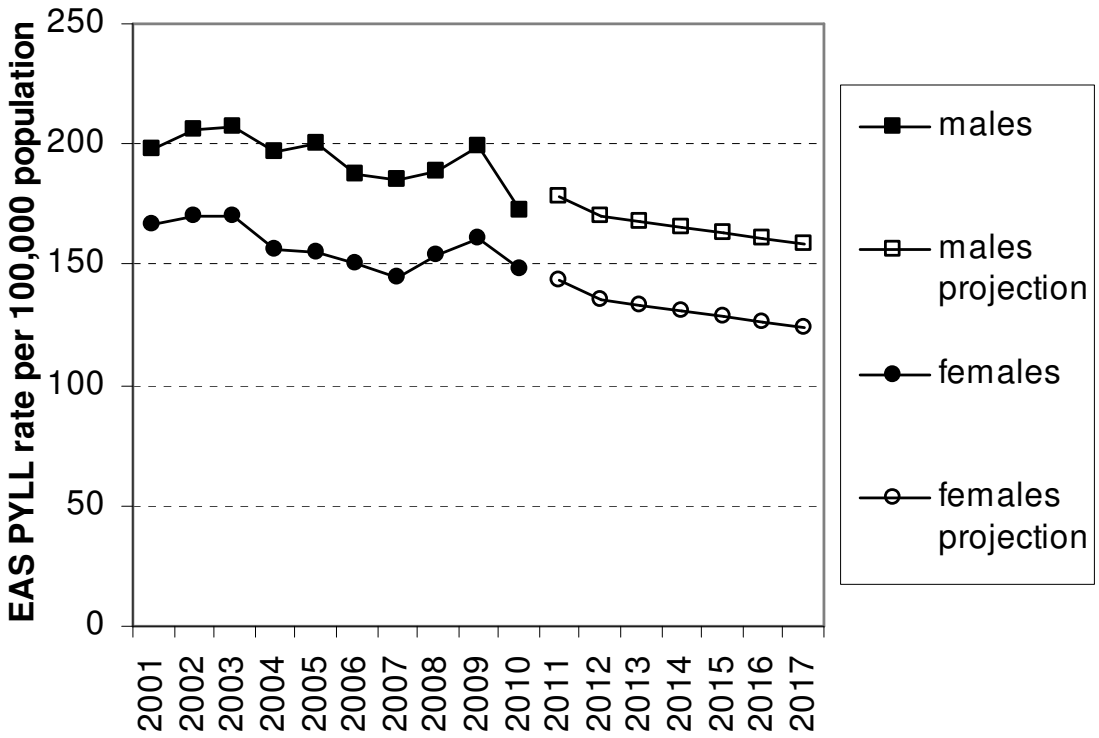
Source: Office for National Statistics, DH

3.69 The projections in Figure 1a.o were obtained using the same methodology as the cancer under 75 mortality indicator projection (indicator 1.4.vii):

- The projected age-specific crude rates and the relevant weights for the years 2011 to 2017 were used to calculate the projected PYLL rate for individual amenable cancers. These projections were added together to form the projection for all amenable cancer PYLL.

Amenable respiratory disease

Figure 1a.p - EAS PYLL rate per 100,000 population for all amenable respiratory disease (pneumonia, asthma and influenza), with projection to 2017

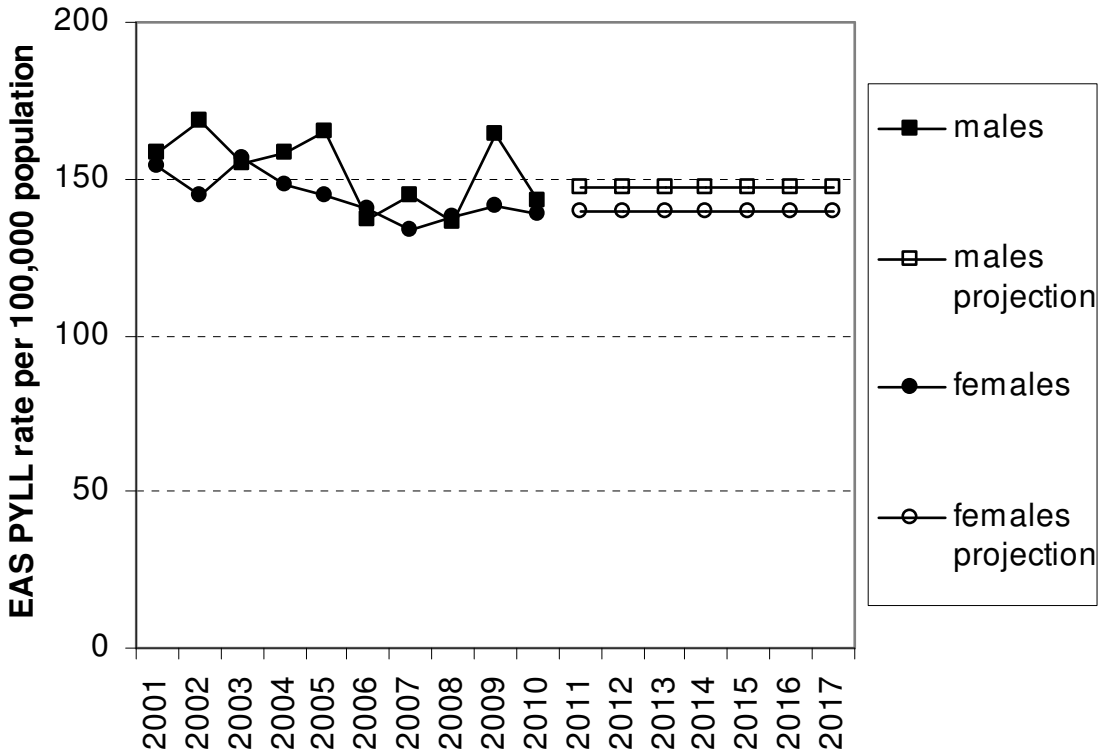


Source: Office for National Statistics, DH

3.70 The projection in Figure 1a.p was obtained using similar methodology to the respiratory disease under 75 mortality indicator projection (indicator 1.2).

Amenable infancy-related disorders (congenital malformations and complications of the perinatal period)

Figure 1a.q - EAS PYLL rate per 100,000 population for amenable infancy related disorders (congenital malformations and conditions arising in the perinatal period), with projection to 2017



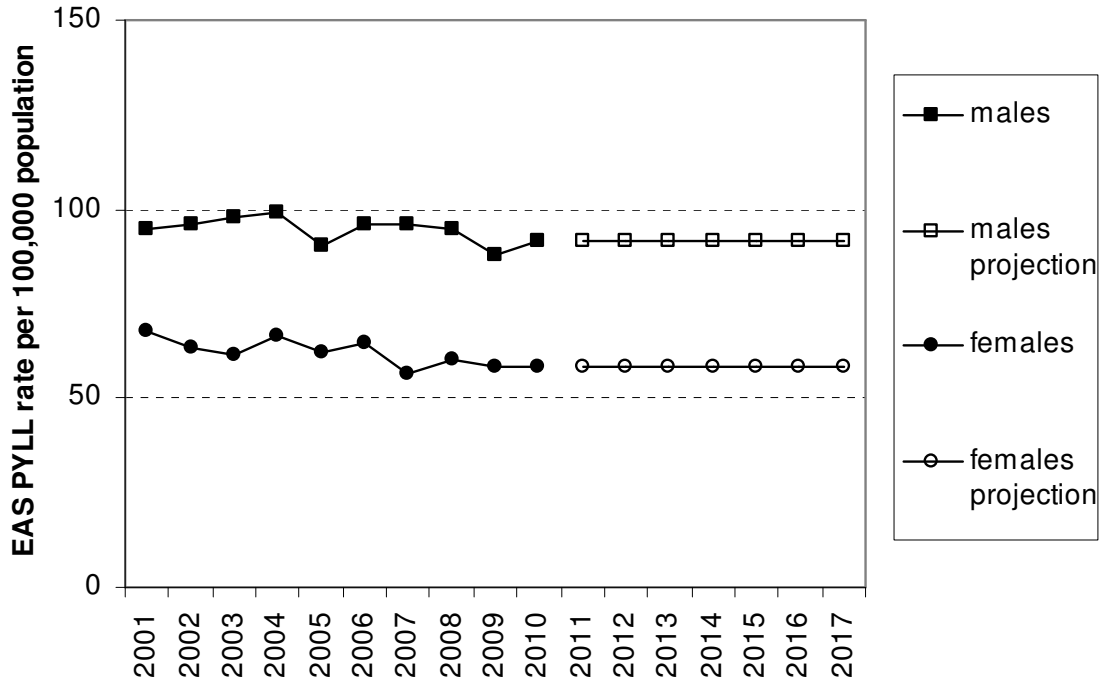
Source: Office for National Statistics, DH

3.71 The projection displayed in Figure 1a.q was arrived at as follows:

- As there is no clear trend in the data, and in the absence of known factors that would shift outcomes, the horizontal trend was continued on the basis of an exponentially smoothed 2010 data points[6].

Amenable digestive disorders

Figure 1a.r - EAS PYLL rate per 100,000 population for amenable digestive disorders (Acute abdomen, appendicitis, intestinal obstruction, cholecystitis / lithiasis, pancreatitis, hernia, gastric and duodenal ulcer) with projection to 2017



Source: Office for National Statistics, DH

3.72 The projection displayed in Figure 1a.r was arrived at as follows:

- As there is no clear trend in the data, and in the absence of known factors that would shift outcomes, the horizontal trend was continued on the basis of an exponentially smoothed 2010 data points.

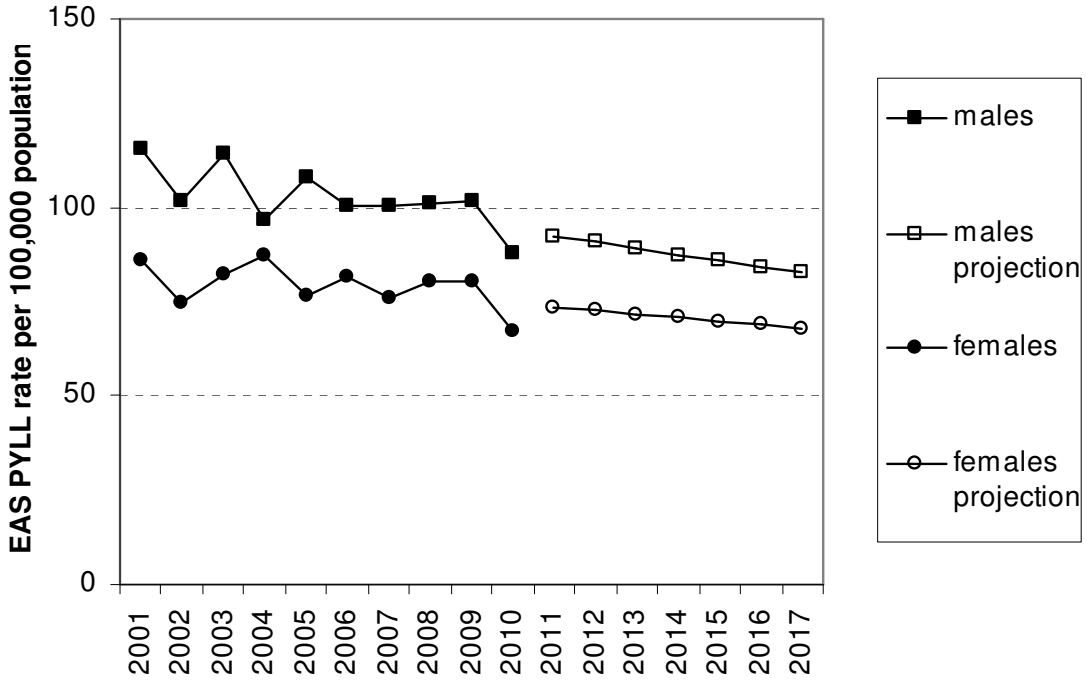
[6] **Exponential smoothing** is a technique that can be applied to time series data to reduce random fluctuations in order to facilitate making forecasts. Using this process more recent past observations can be assigned higher weights, unlike the simple moving average where past observations are weighted equally.

Amenable infections

3.73 The projection displayed in Figure 1a.s was arrived at by the following methodology:

- The downward trend observed for amenable infections was extended using linear regression.
- The majority of deaths from amenable infections are caused by 'Selected invasive bacterial and protozoal infections' (64% of amenable infections in 2010). Of this group, the majority are caused by 'Other septicaemia' (ICD-10 code A41), which includes septicaemia due to MRSA, but the proportion due to MRSA is not known as most are coded as 'Septicaemia, unspecified' For trends in MRSA infections, see indicator 5.2.ii in Domain 5.
- The remainder of deaths in this category are due to HIV/AIDS, Hepatitis C and Tuberculosis.
- The upward trend in HIV/AIDS is expected to continue.
- The linear trend in Hepatitis C PYLL is expected to continue for the next 5 years at least, based on factors external to the NHS or treatment options available within existing resources, as these will take longer than 5 years to have an impact on end-stage liver disease.
- The downward trend in TB is expected to continue.

Figure 1a.s - EAS PYLL rate per 100,000 population for amenable infections (TB, HIV, Hepatitis C, selected other infections) with projection to 2017



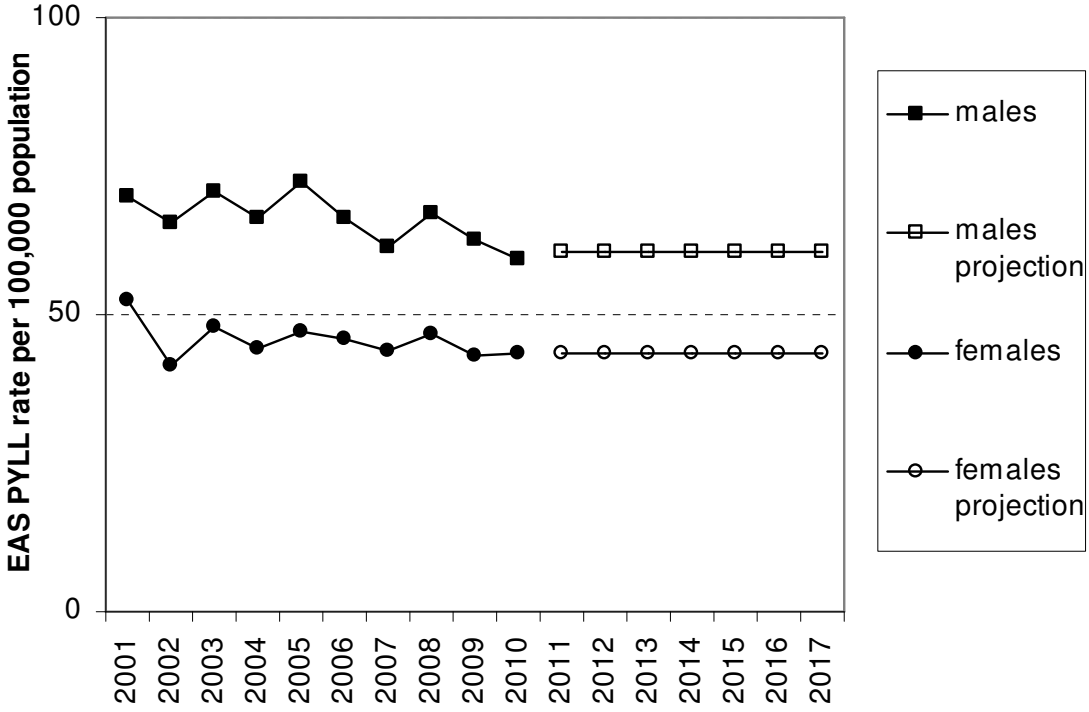
Source: Office for National Statistics, DH

Epilepsy

3.74 The projection displayed in Figure 1a.t was arrived at as follows:

- As there is no clear trend in the data, and in the absence of known external factors that would shift outcomes, the horizontal trend was continued on the basis of the exponentially smoothed 2010 data points.

Figure 1a.t - EAS PYLL rate per 100,000 population for epilepsy and status epilepticus, with projection to 2017



Source: Office for National Statistics, DH

Amenable genitourinary disorders

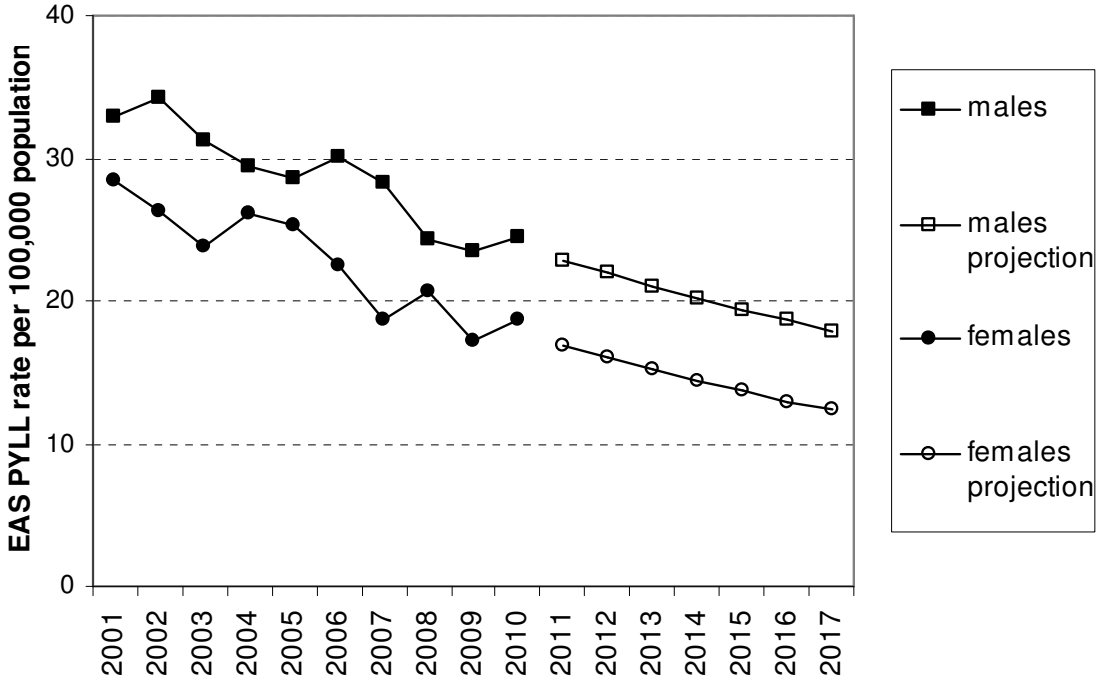
3.75 The projection displayed in Figure 1a.u was arrived at as follows:

- The downward trend observed for genitourinary disorders was extended using exponential regression, as the rate is likely to level off as it gets nearer to zero.

- Factors responsible for the downtrend are: fewer people presenting with end-stage kidney disease because of increased awareness and earlier diagnosis of the disease, earlier referrals, good linkage between primary and secondary care and good management of blood pressure and diabetes. If these continue we will

continue to see significant reductions in the rate, although the slope will flatten off if issues of obesity and consequent diabetes are not addressed.

Figure 1a.u - EAS PYLL rate per 100,000 population for amenable genitourinary disorders (Nephritis and nephrosis, Obstructive uropathy & prostatic hyperplasia), with projection to 2017



Source: Office for National Statistics, DH

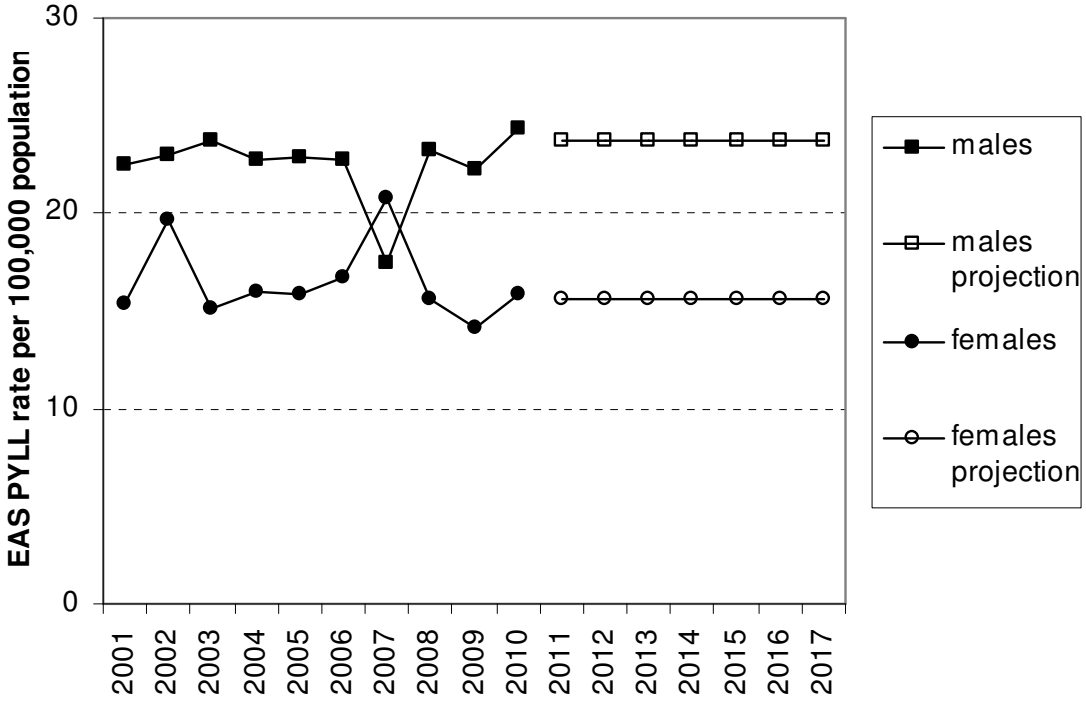
Diabetes mellitus

3.76 The projection displayed in Figure 1a.v was arrived at as follows:

- The codes used to identify these deaths (ICD-10 E10-E14) cover almost exclusively diabetic emergencies (very high blood glucose, very low blood glucose) predominantly among people with Type 1 diabetes.
- There is evidence that the incidence of Type 1 diabetes is increasing, but as this is an auto-immune disease influencing incidence is currently outside the scope of the NHS.
- These diabetes-specific deaths will not be amenable to the public health interventions that have been linked with decreases in cardiovascular deaths.
- Despite these factors poor outcomes can be mitigated firstly through education and support to ensure that the patient manages their condition in a way that prevents diabetic emergencies occurring and secondly, if a diabetic emergency does occur timely emergency health care should prevent death.

- As there is no clear trend in the data the horizontal trend was continued on the basis of the exponentially smoothed 2010 data points.

Figure 1a.v - EAS PYLL rate per 100,000 population for diabetes mellitus, with projection to 2017



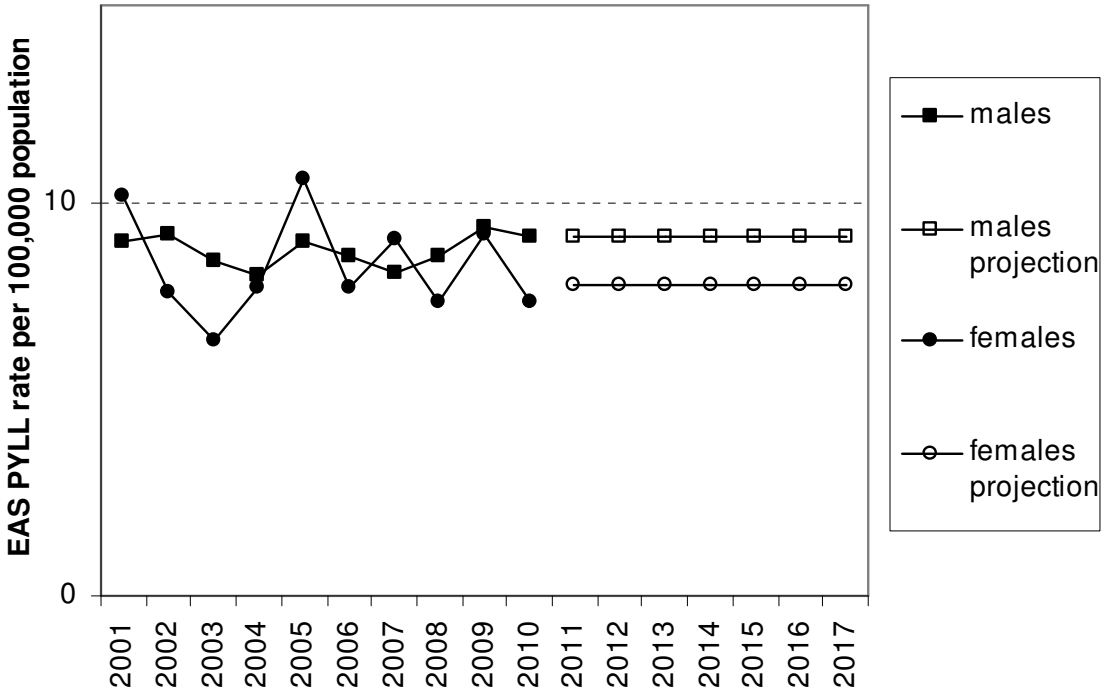
Source: Office for National Statistics, DH

Amenable Injuries

3.77 The projection displayed in Figure 1a.w was arrived at as follows:

- As there is no clear trend in the data, and in the absence of known external factors that would shift outcomes, the horizontal trend was continued on the basis of the exponentially smoothed 2010 data points.

Figure 1a.w - EAS PYLL rate per 100,000 population for amenable injuries, with projection to 2017



Source: Office for National Statistics, DH

(c) Indicator 1a: Scope for Improvement

3.78 This overarching indicator covers many clinical areas, notably cardiovascular disease, cancer and respiratory and liver disease, the 'amenable' aspects of which alone account for more than 82% of all amenable PYLL. Details of scope for improvement in these areas are covered by the four under 75 mortality indicators - 1.1 (CVD), 1.2 (respiratory disease), 1.3 (liver disease) and 1.4.vii (cancer).

References

ONS definition of avoidable mortality and associated data:
http://www.ons.gov.uk/ons/rel/subnational-health4/avoidable-mortality-in-england-and-wales/2010/stb-avoidable-mortality.html

ONS Period and Cohort Life Expectancy tables, 2010-based:
http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-227587

ONS mortality data:
http://www.ons.gov.uk/ons/publications/all-releases.html?definition=tcm%3A77-27475

Mortality from amenable causes - Information Centre for Health and Social Care Compendium of Population Health Indicators (formerly NCHOD):

https://indicators.ic.nhs.uk/webview/velocity?v=2&mode=documentation&submode=ddi&study=http%3A%2F%2F172.16.9.26%3A80%2Fobj%2FfStudy%2FP00364

Gay, J. G. et al. (2011), “Mortality Amenable to Health Care in 31 OECD Countries: Estimates and Methodological Issues”, OECD Health Working Papers, No. 55, OECD Publishing:

http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ECO/WKP%282012%2934&docLanguage=En

Howse, K. (2009) Review of longevity trends to 2025 and beyond, The Oxford Institute of Ageing, University of Oxford

http://www.beyondcurrenthorizons.org.uk/review-of-longevity-trends-to-2025-and-beyond/

1b – Life Expectancy at 75 i: males ii: females

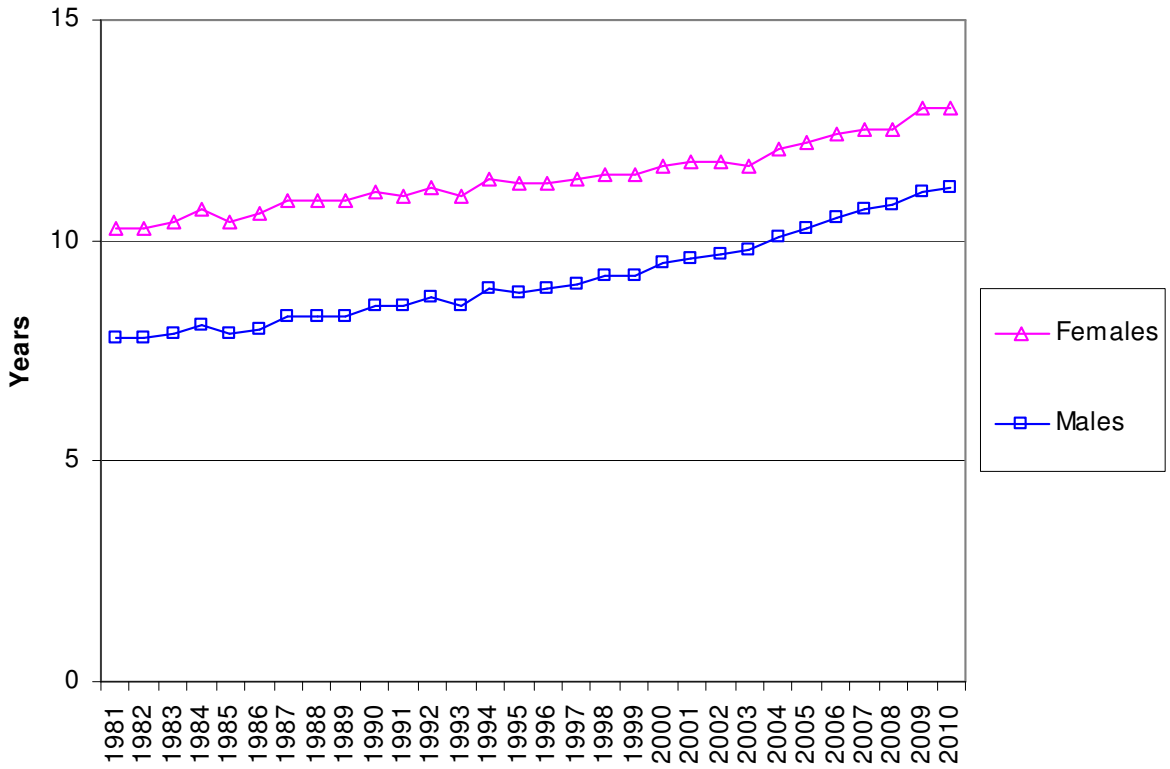
Outcome sought	**Increased life expectancy at 75, for males and females**
Indicator definition	**Period life expectancy at age 75 for males and females, in years**

(a) Indicator 1b: Recent Trends and Explanations

3.79 Life expectancy at 75 for males increased by 0.9% between 2009 and 2010, from 11.1 to 11.2 years. In 2000 it was 9.5 years, giving an average annual increase of 1.7% over the 10 years to 2010. This compares to a smaller average annual increase of 1.1% over the 10 years to 2000.

3.80 For females there was no increase between 2009 and 2010 – life expectancy at 75 remained at 13 years. It was 11.7 years in 2000, giving an average annual increase of 1.1% over the 10 years to 2010. This compares to a smaller average annual increase of 0.5% over the 10 years to 2000.

Fig 1b.a – Life Expectancy at 75, England



Source: NHS information Centre

Table 1b.a Life Expectancy at 75, males and females (years)

	Males	Females	difference
1990	8.5	11.1	2.6
1991	8.5	11.0	2.5
1992	8.7	11.2	2.5
1993	8.5	11.0	2.5
1994	8.9	11.4	2.5
1995	8.8	11.3	2.5
1996	8.9	11.3	2.4
1997	9.0	11.4	2.4
1998	9.2	11.5	2.3
1999	9.2	11.5	2.3
2000	9.5	11.7	2.2
2001	9.6	11.8	2.2
2002	9.7	11.8	2.1
2003	9.8	11.7	1.9
2004	10.1	12.1	2.0
2005	10.3	12.2	1.9
2006	10.5	12.4	1.9
2007	10.7	12.5	1.8
2008	10.8	12.5	1.7
2009	11.1	13.0	1.9
2010	11.2	13.0	1.8

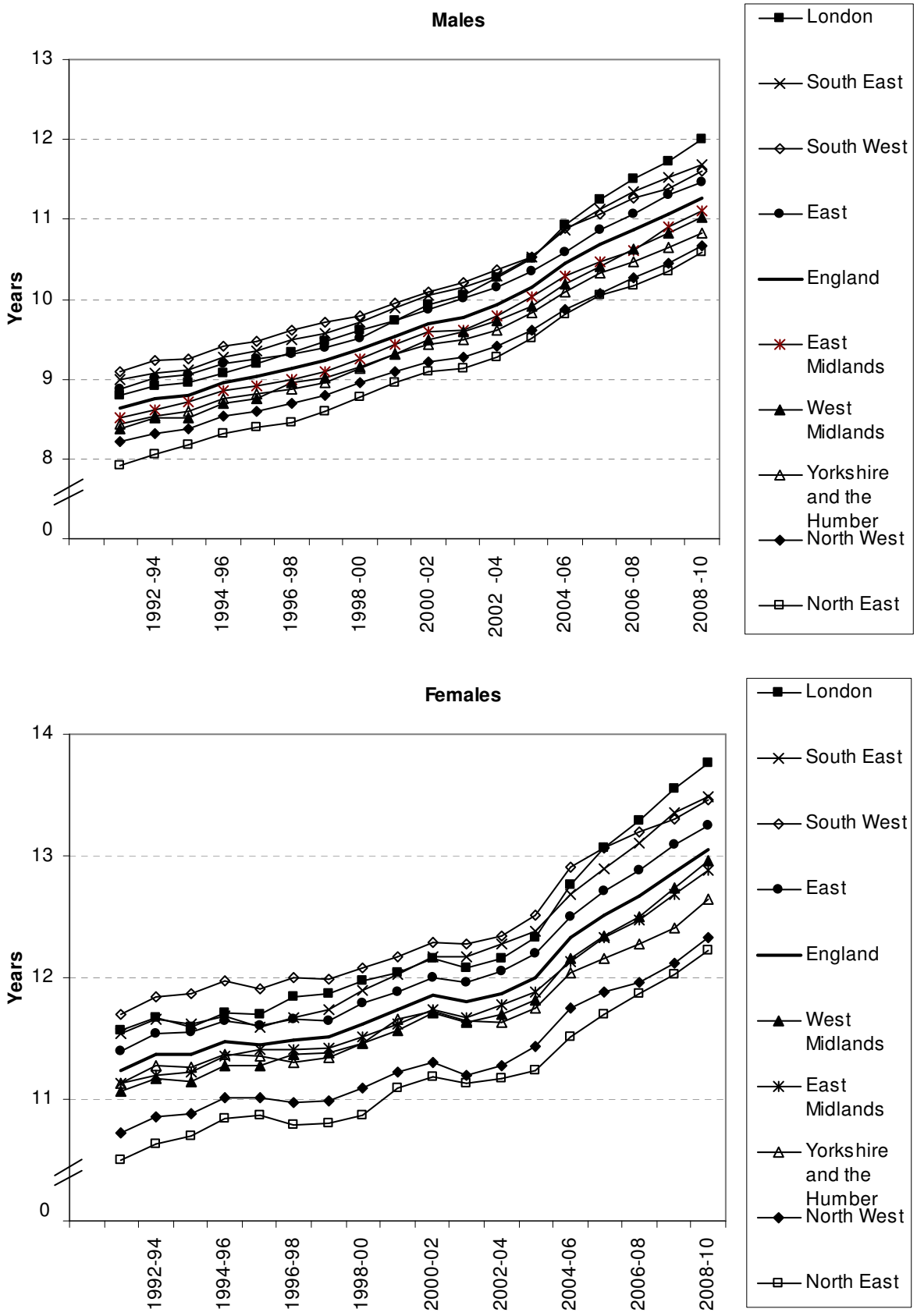
Source: NHS information Centre

Breakdown by region

3.81 For both males and females there is a clear north-south divide in Life Expectancy at 75, with London having the highest and the North East the lowest in the three-year period 2008-2010. The difference between these two regions in years is 1.4 for males and 1.5 for females.

3.82 Life Expectancy at 75 has increased in all regions of England over the period 1991-1993 to 2008-2010. This increase has been particularly notable since 2002-04, and in the London region. The South West region, which had the highest LE at 75 for both males and females for many years until the mid-2000s, has seen the smallest average annual increase over the period.

Fig 1b.b – Life Expectancy at 75, England and regions, males and females



Source: NHS Information Centre

3.83 The average annual increases in Life Expectancy at 75 for males and females between 1998-2000 and 2008-2010 for the nine regions in England were:

Table 1b.b Average annual increase by region (percentage)

	Males			Females		
	1991-93 to 2008-10	**1998-2000 to 2008-10**	**2002-04 to 2008-10**	**1991-93 to 2008-10**	**1998-2000 to 2008-10**	**2002-04 to 2008-10**
England	***1.6%***	***1.9%***	***2.1%***	***0.9%***	***1.2%***	***1.6%***
North East	*1.7%*	*1.9%*	*2.2%*	*0.9%*	*1.2%*	*1.5%*
North West	*1.5%*	*1.8%*	*2.1%*	*0.8%*	*1.1%*	*1.5%*
Yorkshire and the Humber	*1.5%*	*1.7%*	*2.0%*	*0.8%*	*1.0%*	*1.4%*
East Midlands	*1.6%*	*1.8%*	*2.1%*	*0.9%*	*1.1%*	*1.5%*
West Midlands	*1.6%*	*1.9%*	*2.1%*	*0.9%*	*1.2%*	*1.7%*
East	*1.5%*	*1.9%*	*2.1%*	*0.9%*	*1.2%*	*1.6%*
London	*1.8%*	*2.3%*	*2.6%*	*1.0%*	*1.4%*	*2.1%*
South East	*1.5%*	*1.9%*	*2.2%*	*0.9%*	*1.3%*	*1.6%*
South West	*1.4%*	*1.7%*	*1.9%*	*0.8%*	*1.1%*	*1.4%*

Source: NHS information Centre

Table 1b.c Life Expectancy at 75, males and females by region (years)

	1991 -93	1992 -94	1993 -95	1994 -96	1995 -97	1996 -98	1997 -99	1998 -00	1999 -01	2000 -02	2001 -03	2002 -04	2003 -05	2004 -06	2005 -07	2006 -08	2007 -09	2008 -10
MALES																		
England	**8.6**	**8.8**	**8.8**	**9.0**	**9.0**	**9.1**	**9.2**	**9.4**	**9.5**	**9.7**	**9.8**	**9.9**	**10.1**	**10.4**	**10.7**	**10.9**	**11.1**	**11.3**
North East	7.9	8.1	8.2	8.3	8.4	8.5	8.6	8.8	9.0	9.1	9.1	9.3	9.5	9.8	10.1	10.2	10.4	10.6
North West	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	9.1	9.2	9.3	9.4	9.6	9.9	10.1	10.3	10.4	10.7
Yorkshire and the Humber	8.4	8.5	8.6	8.8	8.8	8.9	9.0	9.1	9.3	9.4	9.5	9.6	9.8	10.1	10.3	10.5	10.6	10.8
East Midlands	8.5	8.6	8.7	8.9	8.9	9.0	9.1	9.3	9.4	9.6	9.6	9.8	10.0	10.3	10.5	10.6	10.9	11.1
West Midlands	8.4	8.5	8.5	8.7	8.8	9.0	9.0	9.1	9.3	9.5	9.6	9.7	9.9	10.2	10.4	10.6	10.8	11.0
East	8.9	9.0	9.0	9.2	9.3	9.3	9.4	9.5	9.7	9.9	10.0	10.1	10.4	10.6	10.9	11.1	11.3	11.5
London	8.8	8.9	8.9	9.1	9.2	9.3	9.5	9.6	9.7	9.9	10.0	10.3	10.5	10.9	11.2	11.5	11.7	12.0
South East	9.0	9.1	9.1	9.3	9.4	9.5	9.6	9.7	9.9	10.1	10.1	10.3	10.5	10.9	11.1	11.3	11.5	11.7
South West	9.1	9.2	9.3	9.4	9.5	9.6	9.7	9.8	9.9	10.1	10.2	10.4	10.5	10.9	11.1	11.3	11.4	11.6
FEMALES																		
England	**11.2**	**11.4**	**11.4**	**11.5**	**11.4**	**11.5**	**11.5**	**11.6**	**11.7**	**11.9**	**11.8**	**11.9**	**12.0**	**12.3**	**12.5**	**12.7**	**12.9**	**13.1**
North East	10.5	10.6	10.7	10.8	10.9	10.8	10.8	10.9	11.1	11.2	11.1	11.2	11.2	11.5	11.7	11.9	12.0	12.2
North West	10.7	10.8	10.9	11.0	11.0	11.0	11.0	11.1	11.2	11.3	11.2	11.3	11.4	11.7	11.9	12.0	12.1	12.3
Yorkshire and the Humber	11.1	11.3	11.3	11.4	11.4	11.3	11.3	11.5	11.7	11.7	11.6	11.6	11.7	12.0	12.2	12.3	12.4	12.6
East Midlands	11.1	11.2	11.2	11.4	11.4	11.4	11.4	11.5	11.6	11.7	11.7	11.8	11.9	12.1	12.3	12.5	12.7	12.9
West Midlands	11.1	11.2	11.2	11.3	11.3	11.4	11.4	11.5	11.6	11.7	11.6	11.7	11.8	12.2	12.3	12.5	12.7	13.0
East	11.4	11.5	11.6	11.6	11.6	11.7	11.6	11.8	11.9	12.0	12.0	12.0	12.2	12.5	12.7	12.9	13.1	13.3
London	11.6	11.7	11.6	11.7	11.7	11.8	11.9	12.0	12.0	12.2	12.1	12.2	12.3	12.8	13.1	13.3	13.6	13.8
South East	11.5	11.7	11.6	11.7	11.6	11.7	11.7	11.9	12.0	12.2	12.2	12.3	12.4	12.7	12.9	13.1	13.4	13.5
South West	11.7	11.8	11.9	12.0	11.9	12.0	12.0	12.1	12.2	12.3	12.3	12.3	12.5	12.9	13.1	13.2	13.3	13.5

Source: NHS Information Centre

Breakdown by Local Area

3.84 Of the 10 local areas in England that have seen the highest increase in male LE at 75 in the 10 years from 1998-2000 to 2008-10, five are in Inner London. Kensington and Chelsea and Westminster show high increases for both males and females.

Table 1b.d Local areas with the highest average annual increase in LE at 75 between 1998-2000 and 2008-2010, males and females

Males	Average annual increase (%)	Females	Average annual increase (%)
Westminster	*4.5%*	Kensington and Chelsea	*4.1%*
Kensington and Chelsea	*4.5%*	Bracknell Forest	*2.9%*
Hammersmith and Fulham	*3.7%*	East Cambridgeshire	*2.5%*
Crawley, W Sussex	*3.4%*	Rushmoor	*2.4%*
High Peak, Derbyshire	*3.4%*	Hart	*2.4%*
Slough UA	*3.4%*	Brentwood	*2.4%*
Hackney	*3.3%*	Westminster	*2.3%*
Tamworth, Staffordshire	*3.1%*	Chiltern	*2.2%*
Tower Hamlets	*3.1%*	Brighton and Hove	*2.2%*
Melton	*3.0%*	Hertsmere	*2.1%*
London	***2.3%***	**London**	***1.4%***
England	***1.9%***	**England**	***1.2%***

Source: NHS Information Centre

Breakdown by deprivation

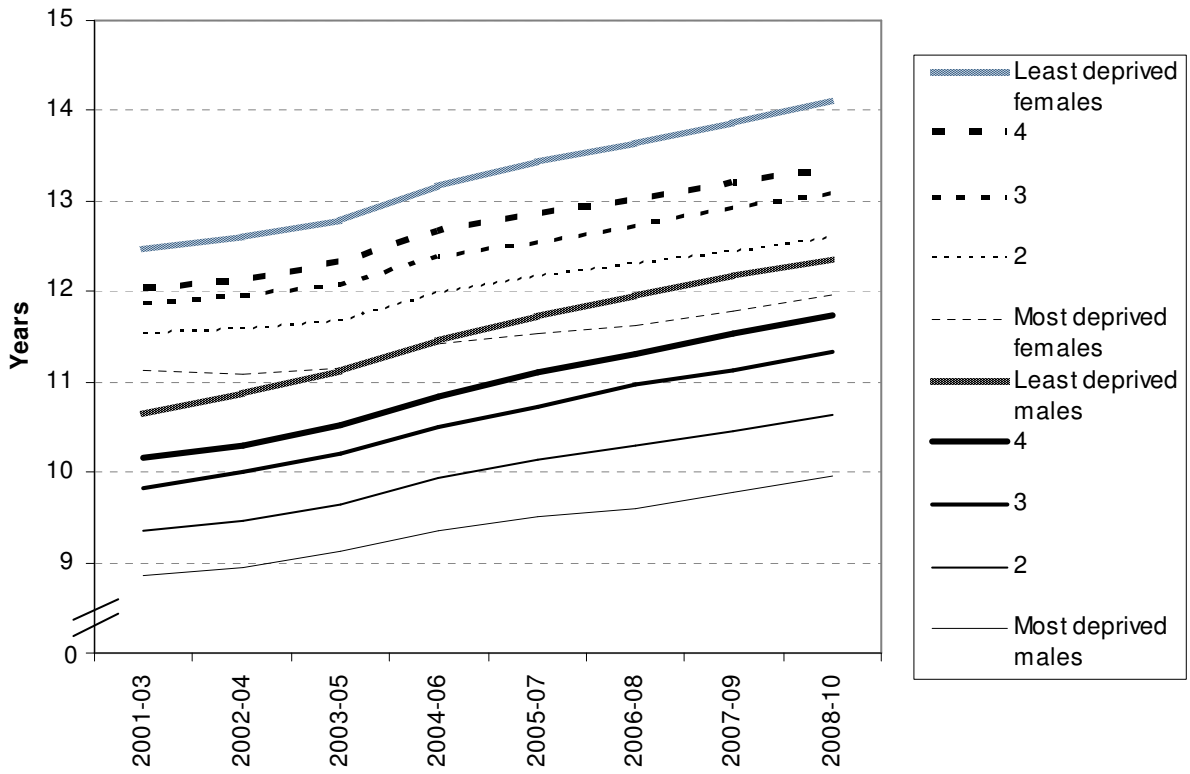
3.85 For both males and females there is a clear deprivation gradient in Life Expectancy at 75. Although on average LE at 75 for males is lower than for females, males aged 75 in the least deprived areas can now expect to live longer than females aged 75 in the most deprived areas.

Table 1b.e Life Expectancy at 75, males and females, by deprivation quintile

IMD Quintile	2001-03	2002-04	2003-05	2004-06	2005-07	2006-08	2007-09	2008-10
Most deprived males	8.9	8.9	9.1	9.4	9.5	9.6	9.8	10.0
2	9.3	9.5	9.6	9.9	10.1	10.3	10.4	10.6
3	9.8	10.0	10.2	10.5	10.7	11.0	11.1	11.3
4	10.2	10.3	10.5	10.8	11.1	11.3	11.5	11.7
Least deprived males	10.6	10.8	11.1	11.4	11.7	11.9	12.2	12.3
Most deprived females	11.1	11.1	11.2	11.4	11.5	11.6	11.8	12.0
2	11.5	11.6	11.7	12.0	12.2	12.3	12.4	12.6
3	11.9	12.0	12.1	12.4	12.5	12.7	12.9	13.1
4	12.0	12.1	12.3	12.7	12.9	13.0	13.2	13.4
Least deprived females	12.5	12.6	12.8	13.2	13.4	13.6	13.9	14.1

Source: NHS Information Centre, Office for National Statistics

Fig 1b.c – Life Expectancy at 75, males and females, by deprivation quintile



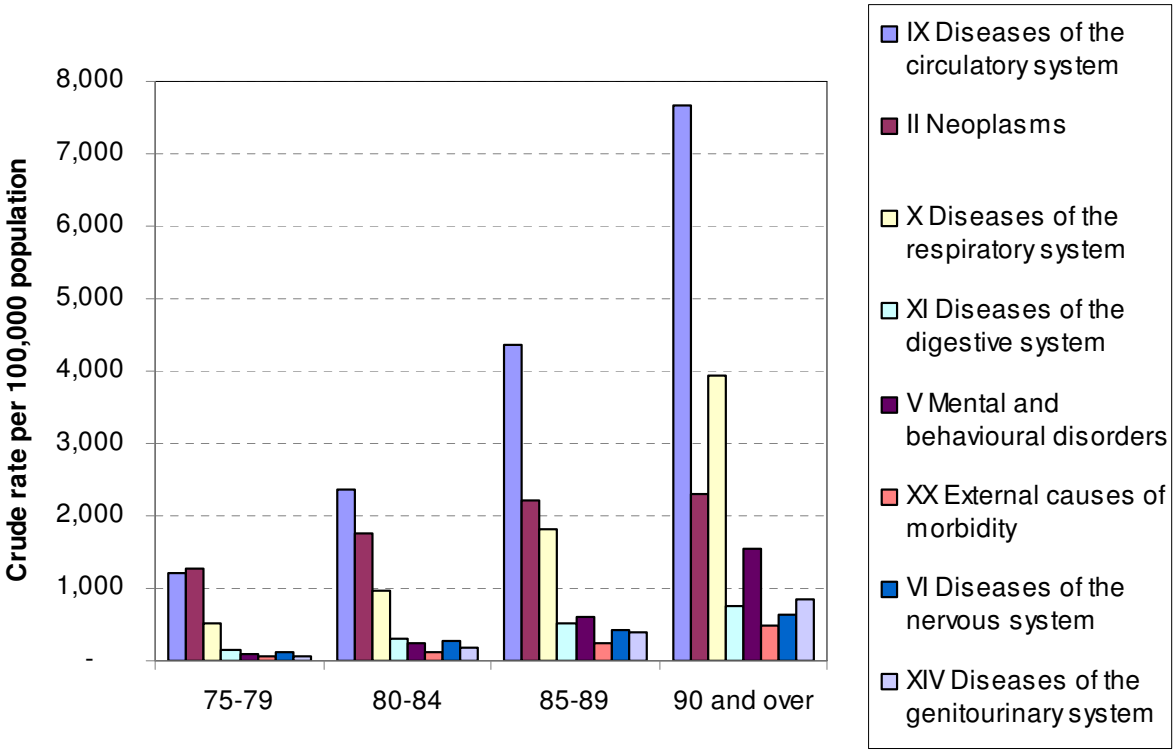
Source: NHS information Centre

3.86 The Slope Index of Deprivation can be used to represent the gap in life expectancy at 75 between the best-off and the worst-off deprivation quintiles. The Slope Index (i.e. the 'modelled gap' between the most and least deprived quintiles) for Life Expectancy at 75 was 2.8 years for males and 2.5 years for females in 2008-10. The Index has increased for both males and females since 2001-03, from 2.1 years and 1.6 years respectively.

Breakdown by condition

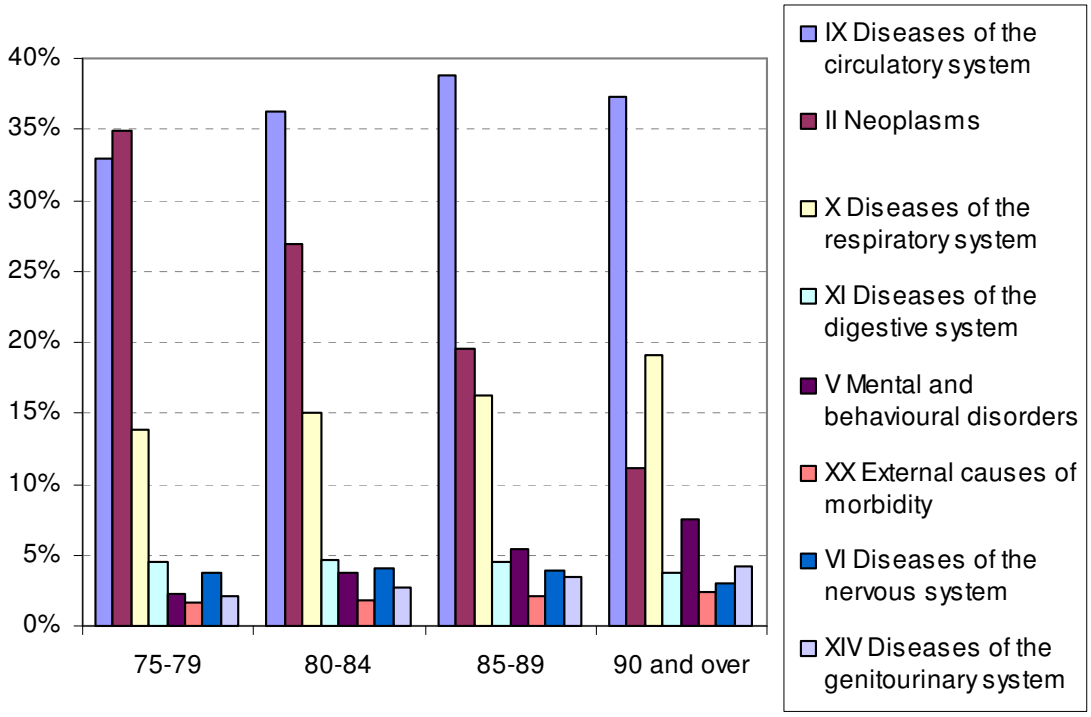
3.87 Coding of the underlying cause of death in the elderly can be difficult due to the presence of multiple co-morbidities, so assignment of ICD-10 codes is likely to become less accurate as age at death increases. Bearing this in mind, according to ICD-10 codes assigned by physicians registering deaths in the 75+ age group, the three most common causes of death are diseases of the circulatory system, cancer and diseases of the respiratory system.

Fig 1b.d – Crude mortality rate per 100,000 relevant population, by top ICD10 chapters, 2009



Source: Office for National Statistics

Fig 1b.e – Percentage of all deaths in age group, by ICD10 chapters, 2009



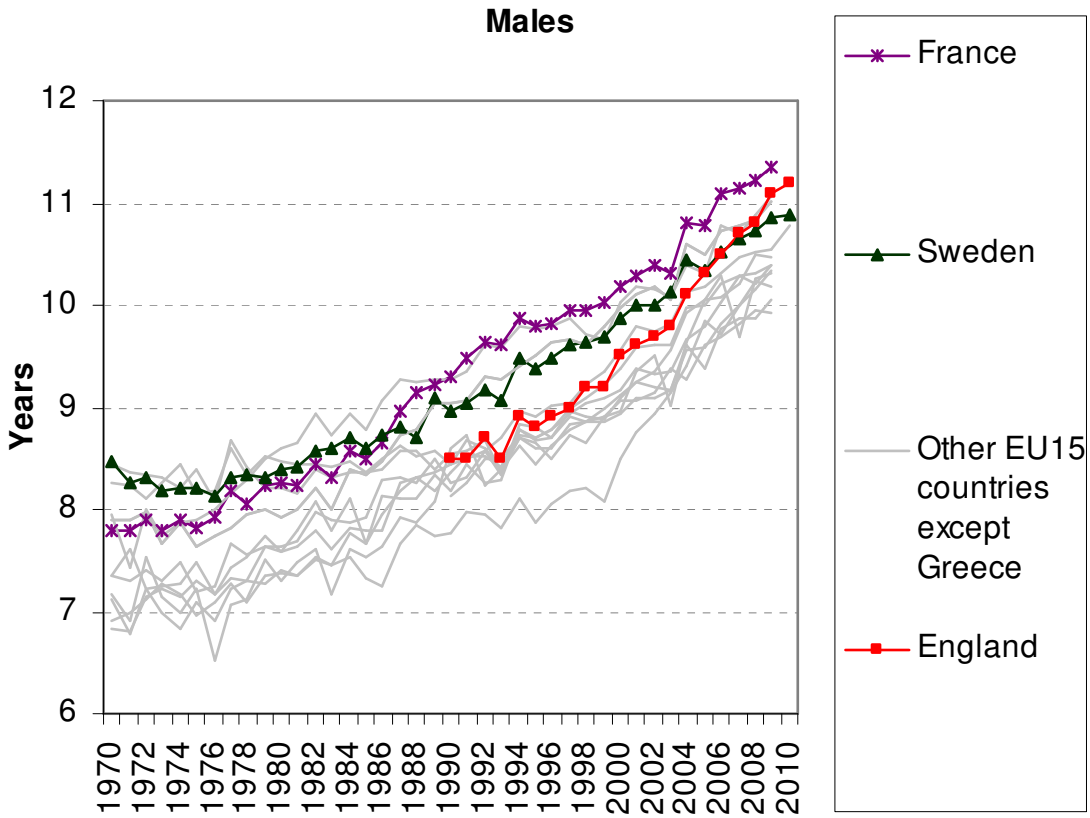
Source: Office for National Statistics

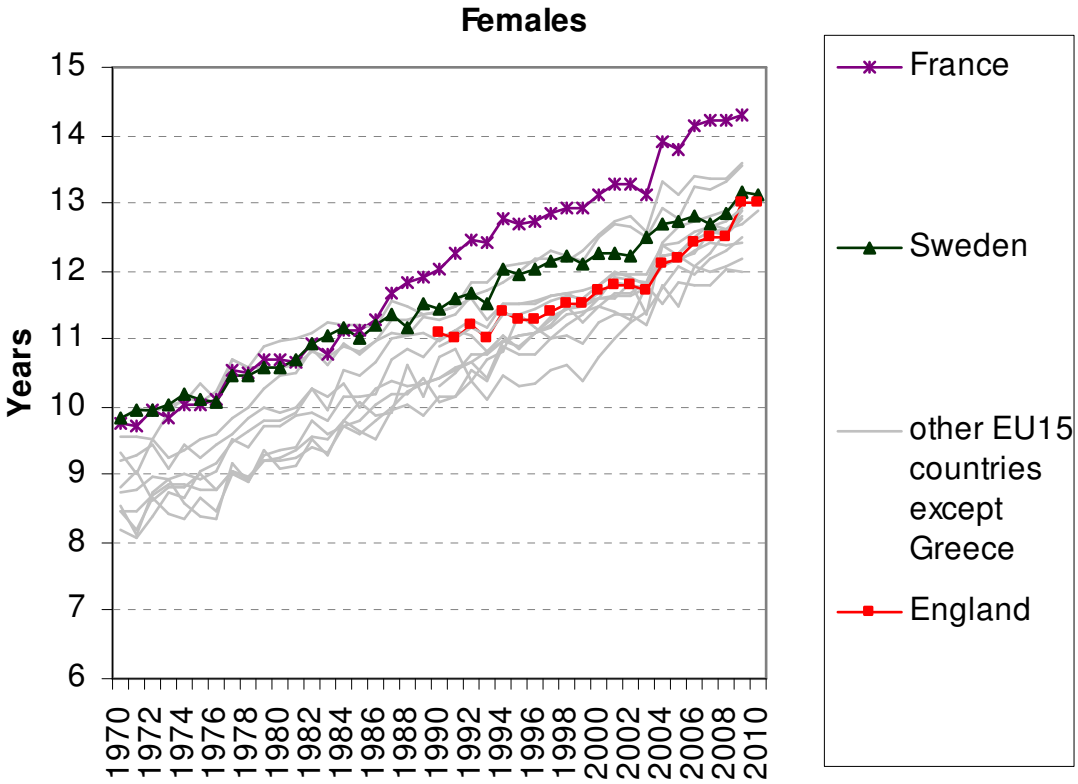
International position

3.88 England's male life expectancy at 75 increased by an average of 1.9% per year over the 10 years to 2009, faster than that of France (1.3%) and Sweden (1.1%) and the crude EU-15 average (1.4%). In 2009 it was 11.1 years, close to that of the best EU-15 country, France (11.4 years). 2009 data are the latest available for such international comparisons.

3.89 For females the increase was slower at an average of 1.2% per year over the 10 years to 2009, but still faster than Sweden (0.8%), France and the crude EU-15 average (both 1.0%). In 2009 female life expectancy at 75 was 13.0 years, lower than Sweden (13.2), considerably lower than France (14.3) but higher than the crude EU-15 average (12.9).

Fig 1b.f – Life Expectancy at 75, England and EU-15 countries except Greece, males and females





Source: Office for National Statistics (England) and Human Mortality Database. University of California, Berkeley (USA), and Max Planck Institute for Demographic Research (Germany). Available at www.mortality.org (data downloaded on 20.3.2012).

Notes:

- What is driving the accelerating rise in life expectancy over the last decade?
- What accounts for the sustained narrowing in life expectancy between men and women? (Life expectancy at 75 has been consistently higher for females than for males during the reporting period. Historical data from ONS1 shows that the difference peaked at 2.6 years in 1987, since when it has reduced steadily, to 1.8 years in 2010.)
- What accounts for the improvement in relative performance of London, and the slowing down of improvement in the South-West?
- What accounts for the increasing inequality of outcomes?

Key drivers of this indicator.

3.90 The key driver of the increase in life expectancy at 75 is declining mortality in the major killers of people aged 75 and over, in particular cardiovascular disease and cancer.

Health Care contribution

3.91 Extending life (at age 75 and over) through improved diagnosis and treatment, in particular by improving early diagnosis of long term conditions such as ischaemic heart disease, stroke, cancer, chronic obstructive pulmonary disease, liver disease and dementia. Improved care planning and treatment for those diagnosed with long-term conditions and investigation and treatment of patients presenting with acute symptoms (e.g. of heart attack, stroke, hip fracture, pneumonia or with cancer symptoms) are also important.

Public health and social care contribution

3.92 **Limiting tobacco use:** Smoking is the single largest cause of preventable deaths in the UK, accounting for approximately one in six of all adult deaths in England in 1998-2002 (Health Development Agency, 2004)[7] . Smoking is widely regarded as the largest single determinant of the substantial variations in mortality that are found (i) between men and women (see e.g. Pampel, 2003) [8], (ii) between different socioeconomic groups (see e.g. Law and Morris, 1998)[9] , and (iii) between different geographical areas (see e.g. Mackenbach et al, 2008)[10] . In many countries the spread of smoking in cohorts born at the beginning of the 20th century acted as a substantial drag on the mortality declines that might have been expected from post-war improvements in living standards and health care (Janssen et al, 2007)[11] . As the smoking epidemic recedes, we should therefore similarly expect an acceleration of mortality declines in places where the proportion of smokers in cohorts reaching later life continues to fall. There are good reasons, therefore, to think that the continuing decline in smoking prevalence is likely to be one of the main drivers of gains in life expectancy in the developed world over the next 50 years.

3.93 Limiting salt and alcohol consumption, tackling obesity, encouraging fruit and vegetable consumption, high fibre diets and good early life nutrition.

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[7] Health Development Agency (2004) *The smoking epidemic in England*. London: Health Development Agency.

[8] Pampel, F. (2003) Declining sex differences in mortality from lung cancer in high-income nations. *Demography*, 40 (1), pp.45-65.

[9] Law, M.R. and Morris, J.K. (1998) Why is mortality higher in poorer areas and in more northern areas of England and Wales? *Journal of Epidemiology and Community Health,* 52 (6), pp.344-352.

[10] Mackenbach, J.P. et al and European Union Working Group on Socioeconomic Inequalities in Health (2008) Socioeconomic inequalities in health in 22 European countries. *The New England Journal of Medicine,* 358 (23), pp.2468-2481

[11] Janssen, F., Kunst, A. and Mackenbach, J. (2007) Variations in the pace of old-age mortality decline in seven European countries, 1950-1999: the role of smoking and the factors earlier in life. *European Journal of Population,* 23 (2), pp.171-188.

3.94 Nutrition in utero and in early childhood has a substantial and long-lasting impact on health via their influence on the formation of essential physical structures in the developing organism (Barker, 1995)[12] . Essentially we are getting taller and there is a demonstrable link between adult height and mortality risk (see e.g. Langenberg et al, 2005) [13]. The fact that there is no evidence of any deceleration in this particular trend, certainly in Europe, suggests furthermore that we should expect no weakening in the force of this source of mortality reductions (Fogel and Costa, 1997)[14] .

3.95 Other areas include promoting physical activity, screening programmes, prevention, early identification and management of risk factors, including:

3.96 >cholesterol, blood pressure, diabetes, chronic kidney disease, hepatitis B, hepatitis C, Transient Ischemic Attack interventions, vaccination rates, quality of social care in hospital and that supports timely discharge, quality of care received whilst living at home or in residential care e.g. recognition of the symptoms of stroke, medication compliance, teenage pregnancy, mitigation of social isolation, appropriate use of Non-Steriodal Anti-Inflammatory Drugs (NSAIDS), statins, Hormone Replacement Therapy, oral contraceptives

Other external drivers:

3.97 Socioeconomic differences in mortality risk, education (better educated individuals are more in control of their lives, which means that they are more in control of the various factors in the social and material environment which influence their own health status (Cutler et al, 2006)), fuel poverty alleviation, environmental factors (e.g. air quality), occupational risk (e.g. carcinogens), genetic factors, cohort effect, prevalence of co-morbidities, underlying prevalence of long-term conditions.

(b) Indicator 1b: Current Practice Projections
Methodology used for projections of Life Expectancy at 75

3.98 The Office of National Statistics (ONS) makes two-yearly population projections based on the estimated population at the middle of the latest year for which data are available, and a set of demographic assumptions about future fertility, mortality and migration based on analysis of trends and expert advice. The mortality assumptions used for these population projections feed into two-yearly projections of life expectancy, on a period and cohort basis, by single year of age from birth to 95 and for fifty years ahead of the projection base year, for the UK and its constituent countries.

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[12] Barker DJP (1995) Fetal origins of coronary heart disease. *BMJ* 311:171-174

[13] Langenberg, C. et al (2005) Adult socioeconomic position and the association between height and coronary heart disease mortality: findings from 33 years of follow-up in the Whitehall Study. *American J Public Health*, 94, pp.6 n28-632

[14] Fogel, R.W. and Costa, D.L. (1997) A theory of technophysio evolution, with some implications for forecasting population health care costs, and pension costs. *Demography*, 34, pp.49-66

3.99 Further information on the 2010 based period and cohort life expectancy figures for 1981-2060 based on calendar year mortality rates can be found at:

www.ons.gov.uk/ons/rel/lifetables/period-and-cohort-life-expectancy-tables/2010-based/index.html

http://www.ons.gov.uk/ons/guide-method/user-guidance/health-and-life-events/guide-to--life-expectancy-in-the-united-kingdom.pdf

3.100 Mortality assumptions used for the projections can be found at:

http://ons.gov.uk/ons/rel/npp/national-population-projections/2010-based-projections/rep-2010-based-npp-mortality-assumptions.html

3.96 The period and cohort projections for the UK and constituent countries can be found at:

http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-227587

3.97 Details of methodology and notation can be found at:

http://www.ons.gov.uk/ons/rel/lifetables/interim-life-tables/2008-2010/rft-ilt-eng-2008-10.xls

3.101 Possible explanations for the contraction in the male female gap are:

- The change in smoking patterns - relatively higher numbers of men than women have now given up smoking and mortality rates for males at older ages have shown large rates of improvement in recent years. For example, the over 75 mortality rate for lung cancer in males was 4.6 times higher than for females in 1987. This difference had reduced to 1.8 times higher by 2010.
- The significant fall in deaths from CVD (which is the biggest killer of the over 75s – see figure 1b.e) over the period will have had more impact on Life Expectancy at 75 in males than females as the CVD mortality rate is 1.3 times higher in males than in females at this age.

Principal mortality assumptions used for the projections

3.102 The mortality rates for the first year of the projection, mid-2010 to mid-2011, are based on the best estimates that could be made in the autumn of 2011 of the numbers of deaths at each age in 2010-11. Assumed improvements in mortality rates after 2010-11 are based on trends in mortality rates before 2010.

3.103 This work will be complemented (over the consultation period) with age period cohort projections based upon all cause mortality data which might enable a more precise estimate of outcomes for the next ten years. Preliminary work (not shown, but using the approach set out in the Domain 1 Overview section above) suggests a rather more optimistic outlook for life expectancy over the next ten years than that set out below from the ONS long term projections (notwithstanding the 1924-39 cohort effect employed therein) – as there is a strong positive cohort effect for those reaching seventy five over this period.

3.104 The assumptions used in the 2010-based ONS projections are that annual rates of improvement will converge to 1.2% for most ages in 2035 (the 25th year of the 2010-based projections), and remain constant at 1.2% a year thereafter. However, those born after 1924 and before 1939 have exhibited greater rates of improvement over the last 25 years than those born on either side. There is currently no evidence that these differentials are declining. Similar cohort effects seen in other countries suggest that these differentials may persist well into the oldest ages. As a result, it is assumed that these cohorts will continue to experience higher rates of improvement after 2035 with the assumed rate of improvement in 2035 and beyond rising from 1.2% a year for those born in 1924 to a peak of 2.5% a year for those born in 1931 and 1932 and then declining back to 1.2% a year for those born in 1939 and later. For those born before 1924, rates of improvement are assumed to be lower than 1.2% in 2035. These are the same assumptions for the rates of mortality improvement in the target year as those used in the 2008-based projections (where the target year was 2033) for those born before 1940; for those born in 1940 and later the proposed improvement rates in the target year are higher than assumed in the 2008-based projections.

3.105 Over the 40-year period 1969-2009, the average annualised rate of improvement in mortality rates in the UK has been approximately 1.8% for males and a little over 1.4% for females. These rates of improvement are derived from aggregate mortality rates for ages 0 to 99 calculated using the 2001 population estimates for the UK as the standard population. The rate of improvement over the latter half of this period was higher than over the first half, particularly for males. This appears to be partly due to differential trends in smoking behaviour between males and females. Relatively higher numbers of men have now given up smoking and mortality rates for males at older ages have shown large rates of improvement in recent years.

3.106 The average annual rate of improvement over the whole of the 20th century was around 1.2% for both males and females, although the improvement rates vary by age. There is considerable debate as to whether the impact of future technical, medical and environmental changes will have a greater or lesser effect on improvements in mortality in the future than they had over the 20th century.

3.107 The transition from current rates of mortality improvement by age and gender, derived from recent trends, to the assumed rates of 1.2% to 2.5% in 2035 is not assumed to take place linearly, but more rapidly at first for males and less rapidly for females. There is growing evidence of generational effects for those born after 1940. Thus, in these projections, convergence to the assumed rate of improvement in 2035 has been done by cohort for all those born before 1960. For those born in 1960 and later, for whom there is little evidence of generational effects, the changes in the rates of improvement to the target rate are projected by calendar year.

3.108 The same future rates of improvements have been assumed for all countries of the UK except for some differences (generally, slightly smaller improvements) in the period to 2035 at some ages for males and females in Scotland, as has been done in recent past projections.

3.109 In 2035, period expectation of life at birth for the UK is around 0.1 years lower than in previous projections for males and 0.2 years lower for females compared to the previous projections. These differences are mainly due to the age-specific mortality rates for 2010 being assumed to be higher and the rates of mortality improvement between 2010 and 2011 assumed to be lower at many ages below 90 compared to those projected for the same period in the 2008-based projections. Over the early years of the projections these counterbalance the assumption of higher rates of mortality improvement at most ages in 2035

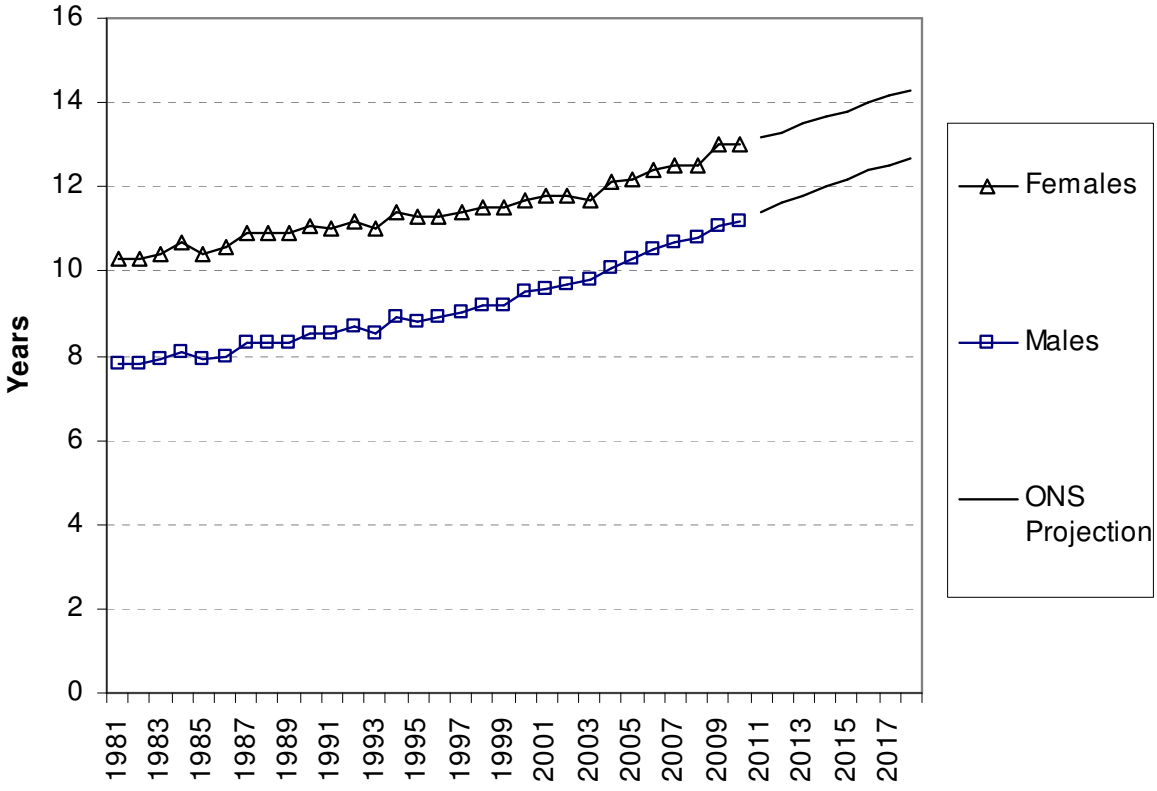
3.110 ONS produces three main life expectancy variant projections (high, low and principal). The three projections show the variation in expectation of life figures if different rates of mortality improvements are applied. The target rate assumptions are as follows:

- High variant: 2.4% annual improvement at 2035, For those born between 1925 and 1938 rates of annual improvement in 2035 will rise to a peak of 3.7% a year for those born in 1931 and 1932 and then decline back to 2.4% a year for those born in 1939 or later.

- Principal projection: 1.2% annual improvement at 2035. For those born between 1925 and 1938 rates of annual improvement in 2035 will rise to a peak of 2.5% a year for those born in 1931 and 1932 and then decline back to 1.2% a year for those born in 1939 or later.

- Low variant: 0% annual improvement at 2035. For those born between 1925 and 1938 rates of annual improvement in and after 2035 will rise to a peak of 1.3% a year for those born in 1931 and 1932 and then decline back to 0% a year for those born in 1939 or later.

Figure 1b.g – Period expectation of life at 75, England, 1981-2018: ONS principal projection, males and females



Source: Office for National Statistics

Table 1b.f – Period expectation of life at 75, England, 1981-2018: ONS principal projection, male and female

	Males		Females	
	Value	ONS Projection	Value	ONS Projection
1981	7.8		10.3	
1982	7.8		10.3	
1983	7.9		10.4	
1984	8.1		10.7	
1985	7.9		10.4	
1986	8.0		10.6	
1987	8.3		10.9	
1988	8.3		10.9	
1989	8.3		10.9	
1990	8.5		11.1	
1991	8.5		11.0	
1992	8.7		11.2	
1993	8.5		11.0	
1994	8.9		11.4	
1995	8.8		11.3	
1996	8.9		11.3	
1997	9.0		11.4	
1998	9.2		11.5	
1999	9.2		11.5	
2000	9.5		11.7	
2001	9.6		11.8	
2002	9.7		11.8	
2003	9.8		11.7	
2004	10.1		12.1	
2005	10.3		12.2	
2006	10.5		12.4	
2007	10.7		12.5	
2008	10.8		12.5	
2009	11.1		13.0	
2010	11.2		13.0	
2011		11.4		13.2
2012		11.6		13.3
2013		11.8		13.5
2014		12.0		13.7
2015		12.2		13.8
2016		12.4		14.0
2017		12.5		14.2
2018		12.7		14.3

Source: Office for National Statistics

(c) Indicator 1b: Scope for Improvement

3.111 Scope for improved cancer mortality for the over 75s is included in discussion of indicator 1.4.vii (cancer mortality for under 75s).

3.112 It may be possible to derive specific period effects (using age period cohort modelling mentioned above) to derive the NHS contribution to the recent improvement in life expectancy at 75 – which might form the basis of assessment of the scope for improvement.

References:

1. ONS Period and cohort life expectancy tables, 2010-based:

http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-227587

2. Howse, K. (2009) Review of longevity trends to 2025 and beyond, The Oxford Institute of Ageing, University of Oxford

http://www.beyondcurrenthorizons.org.uk/review-of-longevity-trends-to-2025-and-beyond/