

Long – Term Monitoring of Health Inequalities

First Report on headline Indicators – September 2008

Scottish Government Health Analytical Services Division

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Acknowledgements

Thanks are due to the expert group for their advice and participation to a tight timescale and to colleagues at the Scottish Public Health Observatory for their advice on the calculation of different types of health inequalities measures. We are also very grateful to colleagues at the NHS Information Services Division (ISD) and the General Register Office for Scotland for providing the background data on the indicators (again to a relatively tight timescale) and to colleagues in the Office of the Chief Statistician for their advice on calculating the Income-Employment Index.

Introduction

In 2007, a Ministerial Task Force on Health Inequalities led by the Minister for Public Health was established to identify and prioritise practical actions to reduce the most significant and widening health inequalities in Scotland. The Task Force recognised the need to monitor progress in tackling health inequalities in the longer term as well as managing short- and medium-term progress.

A short life technical advisory group was set up in early 2008 to advise the Task Force on long-term monitoring of health inequalities (see Annex 1 for membership of this group). The remit of this group was to explore how best to measure health inequalities and which high level national indicators should be monitored over time. The group's advice was as follows:

Recommended headline indicators of inequalities in health outcomes

- Healthy Life Expectancy (at birth)
- Premature Mortality - from all causes, aged under 75 years
- Mental Wellbeing - adults aged 16 years and over
- Low birthweight

Recommended indicators of inequalities in morbidity and mortality from specific causes for specific age groups

- Coronary Heart Disease (first ever hospital admission for heart attack aged under 75 years; deaths aged 45-74 years)
- Cancer (incidence rate aged under 75 years; deaths aged 45-74 years)
- Alcohol (first ever hospital admission aged under 75 years; deaths aged 45-74 years)
- All-cause mortality aged 15-44 years (to capture large inequalities in mortality observed in this age group)

Details of the definitions and sources for these indicators are provided below. Note that the time periods for which data are available for these indicators vary.

Some of these indicators (healthy life expectancy, mental wellbeing, alcohol related hospital admissions and premature mortality from coronary heart disease in deprived areas) are also included in the National Performance Framework. Further information about these national indicators is available on the Scotland Performs website:

<http://www.scotland.gov.uk/About/scotPerforms>

The Task Force considered that the expert group's proposals would give a much better basis for Government reporting on long-term success in reducing health inequalities and therefore included in their report ("Equally Well"; published in June 2008), the following recommendations on long-term monitoring of health inequalities:

70. The Government should adopt the recommended new headline indicators and measures for reporting on long-term progress in reducing health inequalities in Scotland and driving action on the underlying causes of the most important inequalities.

71. The Government should publish in summer 2008 detailed proposals for the new high level indicators and measures of health inequalities, along with current levels and trends for each measure.

This is the first report on long-term monitoring of health inequalities, produced by the Scottish Government in response to these recommendations. Its aim is to present the detailed definitions for each of the proposed indicators of inequalities in health outcomes (as agreed by the Task Force), and to present current trends to set a baseline for long-term monitoring at Scotland level.

Equally Well also included the recommendation that information about medium-term outcomes be published:

72. The Government should arrange for a clear analysis of the medium-term outcome indicators critical to achieving reductions in the key health inequalities outcomes. This analysis should reflect the National Performance Framework and the new relationship between the Scottish Government and local authorities as embodied in the Single Outcome Agreement process, It should be published by autumn 2008, in order to guide community planning partnerships and their constituent organisations in their own planning and performance reporting.

The Health Inequalities Task Force will be reconvened in 2010 to assess progress in implementing the recommendations set out in Equally Well. This will be too soon to assess progress on the indicators included in this report, but information published to meet recommendation 72 on medium-term outcomes should assist in managing progress in the meantime.

Detailed Definitions for the recommended indicators of inequalities in health outcomes

▪ **Healthy Life Expectancy**

Source: ScotPHO (using raw deaths data from the General Register Office for Scotland; Scottish Household Survey data on self-assessed health for adults aged 16+ years [data for 2003/04 not available]; Census 2001 data for self-assessed health for those aged <16 years).

Definition: Healthy life expectancy (HLE) is defined as the number of years people can expect to live in good health. The discrepancy between healthy and total life expectancy (LE), therefore, indicates the length of time people can expect to spend in poor health. HLE is calculated through a combination of life expectancy and survey data on people's own assessments of their health. The method used to calculate the Life Expectancy estimates is based on Chiang (II) methodology; the HLE calculation is based on the Sullivan method. The uncertainty around estimates of HLE are larger than those around life expectancy because relatively small samples are involved in the age and sex specific breakdowns of survey data required to calculate HLE (for example: in the calculations to produce these estimates of HLE, there were 900 age/sex/decile breakdowns for self-assessed health data from the Scottish Household Survey; 53% of which had fewer than 100 respondents and 13% of which had fewer than 50 respondents).

▪ **Premature Mortality (from all causes, aged under 75 years)**

Source: General Register Office for Scotland.

Definition: European age-standardised rates of deaths from any cause amongst those aged under 75 years.

▪ **Mental Wellbeing (adults aged 16 years and over)**

Source: WEMWBS; Initial results available from the Well? Survey 2006; Future source will be the Scottish Health Survey (annually for 2008-2011).

Definition: Warwick-Edinburgh Mental Wellbeing Scale. This has been developed as a tool for measuring positive mental wellbeing at a population level. The scale comprises fourteen separate statements describing feelings related to mental wellbeing; respondents are asked to indicate how often they have felt such feelings over the last two weeks. Results are presented as average WEMWBS score for the population concerned.

▪ **Low birthweight**

Source: NHS Information Services Division (ISD) ; SMR02 maternity dataset.

Definition: The figures are presented as a percentage of all live, full term, singleton births (not including home births or births in non-NHS hospitals). Figures are for financial year (i.e. '2005' is for '2004/05'). Low birth birthweight is defined as < 2,500g - the standard World Health Organisation definition. Figures for the most recent year are provisional.

▪ **Coronary Heart Disease - first ever hospital admission for heart attack aged under 75 years**

Source: NHS Information Services Division (ISD) ; SMR1/01 records (all inpatient and daycase discharges) – all records were extracted from the SMR01 linked database as at 24th July 2007.

Definition: European age-standardised rates of first ever hospital admission for acute myocardial infarction (heart attack) amongst those aged under 75 years. The following World Health Organisation International Classification of Disease coding was used: ICD10 'I21-I22'; ICD9 '410'.

- **Coronary Heart Disease - deaths aged 45-74 years**

Source: NHS Information Services Division (ISD); using deaths data from General Register Office for Scotland.

Definition: European age-standardised rates death from coronary heart disease amongst those aged 45-74 years. The following World Health Organisation International Classification of Disease coding was used: ICD10 'I20-I25'; ICD9 '410-414'.

- **Cancer - incidence rate aged under 75 years**

Source: NHS Information Services Division (ISD); Scottish Cancer Registry.

Definition: European age-standardised rates of new cases of cancer amongst those aged under 75 years. Cancer defined as all malignant neoplasms excluding non-melanoma skin cancer. The following World Health Organisation International Classification of Disease coding was used: ICD10 'C00-C96' excluding 'C44' (the Scottish Cancer Registry does not use code 'C97').

- **Cancer - deaths aged 45-74 years**

Source: NHS Information Services Division (ISD); Scottish Cancer Registry.

Definition: European age-standardised rates of deaths from cancer amongst those aged under 45-74 years. Cancer defined as all malignant neoplasms excluding non-melanoma skin cancer. The following World Health Organisation International Classification of Disease coding was used: ICD10 (2000 onwards) 'C00-C97' excluding 'C44'.

- **Alcohol - first ever hospital admission aged under 75 years**

Source: NHS Information Services Division (ISD).

Definition: European age-standardised rates of first ever hospital admission for alcohol related conditions amongst those aged under 75 years. These rates include hospital discharges where alcohol-related problems are recorded as either primary or secondary reasons for admission to hospital and will cover first ever admission since 1981 (a patient may have had admissions prior to 1981 which would not be recorded in this database). Caution is necessary when interpreting these figures. The recording of alcohol misuse may vary from hospital to hospital. Where alcohol misuse is suspected but unconfirmed it may not be recorded by the hospital. The following World Health Organisation International Classification of Disease coding was used: ICD10 F10, R780, Y90, Y91, Z637, Z811, Z864, Z714, Z502, T506, Y573, T510, T519, X45, X65, Y15, O354, Q860, P043, Z721, Z133, G621, G721, K860, I426, K70, K292, G312 & E52; ICD9 291, 303, V11, 3050, 3575, 4255, 5353, 5710, 5711, 5712, 5713, 6555, 7607, 7903, 9773, 9800, E8600, E8609, E9473, E9773, E9800.

- **Alcohol - deaths aged 45-74 years**

Source: General Register Office for Scotland.

Definition: European age-standardised rates of death from alcohol related conditions amongst those aged 45-74 years. The definition of alcohol related deaths includes deaths where there was any mention of alcohol related conditions on the death certificate, rather than just as the main cause of death. The following World Health Organisation International Classification of Disease coding was used: ICD10 F10, G31.2, G62.1, I42.6, K29.2, K70, K73, K74.0, K74.1, K74.2, K74.6, K86.0, X45, X65, Y15; ICD9 291, 303, 305.0, 425.5, 571.0, 571.1, 571.2, 571.3, 571.4, 571.5, 571.8, 571.9, E860.

- **All-cause mortality aged 15-44 years**

Source: General Register Office for Scotland.

Definition: European age-standardised rates of deaths from any cause amongst those aged 15-44 years. Specific breakdowns for deaths from assault, drug related deaths and suicide are also provided, as the major causes of death for which there are large inequalities amongst young people. There may be some double counting in these breakdowns. The following World Health Organisation International Classification of Disease coding was used: Assault ICD10 'X85-Y09', 'Y87.1' ICD9 'E960-969'; Drug related ICD10 'F11-16', 'F19', 'X40-44', 'X60-64', 'X85', 'Y10-Y14'; Suicide (intentional self harm + undetermined intent) ICD10 'X60-84', 'Y87.0' ICD9 'E950-959', 'E980-989'.

Recommended measurement approaches to monitoring health inequalities

The expert group recognised that different types of measure give insight into different aspects of inequalities. The recommended approach therefore uses a combination of measures, with the aim of giving a fuller understanding of the inequalities concerned.

- Relative Index of Inequality (RII): *How steep is the inequalities gradient?* This measure describes the gradient of health observed across the deprivation scale, relative to the mean health of the whole population.
- Absolute gap: *How big is the gap?* This measure describes the absolute difference between the extremes of deprivation – the rate in the most deprived minus the rate in the least deprived group.
- Scale: *How big is the problem?* This measure describes the underlying scale of the problem, puts it into context and presents past trends at Scotland level.

Detailed descriptions of these measures are provided in Annex 3.

In the absence of individual level data on socio-economic circumstance, which the group identified as the ideal but acknowledged is not yet possible, an area based index based on income and employment has been used to define “deprivation”. Details about the reasons for this and the way that this index was calculated are provided in Annex 3.

The expert group also advised that these indicators and measures were recommended for long-term monitoring of health inequalities due to deprivation at Scotland level. Monitoring of health inequalities due to other factors (such as age, gender, ethnicity for example) would require different indicators and measures. Similarly, the group advised that these recommended indicators and measures would not necessarily be the most appropriate for long-term monitoring of health inequalities at a local level.

Summary of trends and current baselines for proposed indicators of inequalities in health outcomes

Healthy Life Expectancy (HLE) - at birth

- Between 1999/00 and 2005/06, HLE has increased by 2.4 years (4%) for males and 1.5 years (2%) for females.
- In 2005/06, HLE at Scotland level for males was 67.4 years (7.3 years less than total life expectancy) and HLE for females was 69.6 years (10.0 years less than total life expectancy).
- In 2005/6, HLE of those living in the most deprived decile was 19.8 years lower for males and 18.2 years lower for females than HLE of those living in the least deprived decile.
- Between 1999/00 and 2005/06, inequalities in HLE have been stable in both absolute and relative terms.

Premature Mortality - from all causes, aged under 75 years

- Between 1997 and 2006, deaths amongst those aged under 75 years have decreased by 18%.
- Despite these decreases, around 22,000 people aged under 75 still die each year.
- In 2006, under 75 deaths amongst those living in the most deprived decile were 3.6 times more likely than those living in the least deprived decile.
- Whilst inequalities have been stable in absolute terms between 1997 and 2006, improvements observed in deprived areas have not been as great as those observed elsewhere in Scotland resulting in a widening of inequalities in relative terms.

Mental Wellbeing - adults aged 16 years and over

- The data required for the calculation of the recommended inequalities measures are not yet available.
- Some data from the Well? 2006 survey are however available and show that those with low household income or who feel that it is difficult to manage on their household income have notably lower mental wellbeing scores than those with higher household income or who feel that it is easy to manage on their household income.

Low birthweight

- Between 1998 and 2005, the percentage of low birthweight babies has been relatively stable.
- Around 3,000 low birthweight babies are born each year (around 6% of total live, full term, singleton births in Scotland).
- In 2005, full term, singleton babies in the most deprived decile were 2.4 times more likely to have a low birthweight than those in the least deprived decile.
- Between 1998 and 2005, inequalities have widened slightly in absolute terms, but have been stable in relative terms.

Coronary Heart Disease - first ever hospital admission for heart attack aged under 75 years

- Between 1997 and 2006, rates of first hospital admission for heart attack amongst those aged under 75 years fell by 45% in Scotland as a whole.
- Despite these decreases, around 1,600 new cases are still admitted to hospital for heart attack each year.
- In 2006, adults aged under 75 years in the most deprived decile were 1.3 times more likely to be admitted to hospital for heart attack than those in the least deprived decile.

- Between 1997 and 2006, inequalities have narrowed in absolute terms and also in relative terms.

Coronary Heart Disease (CHD) - deaths aged 45-74 years

- Between 1997 and 2006, there has been a considerable decrease in CHD mortality amongst the population aged 45-74 years as a whole – rates fell by 45%.
- However, CHD remains one of Scotland's biggest causes of premature mortality, with around 3,500 deaths occurring in this age group each year.
- In 2006, adults in the most deprived decile were 3.8 times more likely to die from CHD aged 45-74 years than those in the least deprived decile.
- Whilst inequalities have narrowed in absolute terms between 1997 and 2006, improvements observed in deprived areas have not been as great as those observed elsewhere in Scotland resulting in a widening of inequalities in relative terms.

Cancer - incidence rate aged under 75 years

- Between 1996 and 2005, there has been a 8% decrease in rates of new cases of cancer amongst those aged under 75 years as a whole.
- Despite these decreases, around 18,000 new cases of cancer are still diagnosed each year.
- In 2006, adults aged under 75 years in the most deprived decile were 1.4 times more likely to be diagnosed with cancer than those in the least deprived decile.
- Between 1996 and 2005, inequalities have been stable in absolute terms and also in relative terms.

Cancer - deaths aged 45-74 years

- Between 1997 and 2006, there has been a 14% decrease in rates of death from cancer amongst those aged 45-74 years as a whole.
- Despite these decreases, around 7,500 people aged 45-74 years still die from cancer each year.
- In 2006, adults aged 45-74 years in the most deprived decile were 2.3 times more likely to be diagnosed with cancer than those in the least deprived decile.
- Whilst inequalities have been relatively stable in absolute terms between 1997 and 2006, improvements observed in deprived areas have not been as great as those observed elsewhere in Scotland resulting in a widening of inequalities in relative terms.

Alcohol - first ever hospital admission aged under 75 years

- Between 1997 and 2006, there has been a 17% increase in rates of new hospital admissions for alcohol related conditions amongst those aged under 75 years as a whole.
- Numbers have risen such that around 16,000 new cases aged under 75 years are now being admitted to hospital for alcohol related conditions each year.
- In 2006, adults aged under 75 years in the most deprived decile were 6.3 times more likely to be admitted to hospital (as a new case) with an alcohol related condition than those in the least deprived decile.
- Between 1997 and 2006, inequalities have been stable in absolute terms and also in relative terms.

Alcohol - deaths aged 45-74 years

- Between 1998 and 2006, there has been a 75% increase in rates of death from alcohol related conditions amongst those aged under 45-74 years as a whole.
- Numbers have risen such that around 2,500 people aged 45-74 years are now dying from alcohol related conditions each year.

- In 2006, adults aged 45-74 years in the most deprived decile were 12.3 times more likely to die from an alcohol related condition than those in the least deprived decile.
- Between 1998 and 2006, inequalities have increased in both absolute and relative terms.

All-cause mortality aged 15-44 years

- Between 1997 and 2006, rates of death have been stable amongst those aged under 15-44 years as a whole, but within this there has been variation for specific causes of death.
- In 2006, adults aged 15-44 years in the most deprived decile were 4.9 times more likely to die than those in the least deprived decile.
- Between 1997 and 2006, inequalities have increased in both absolute and relative terms.

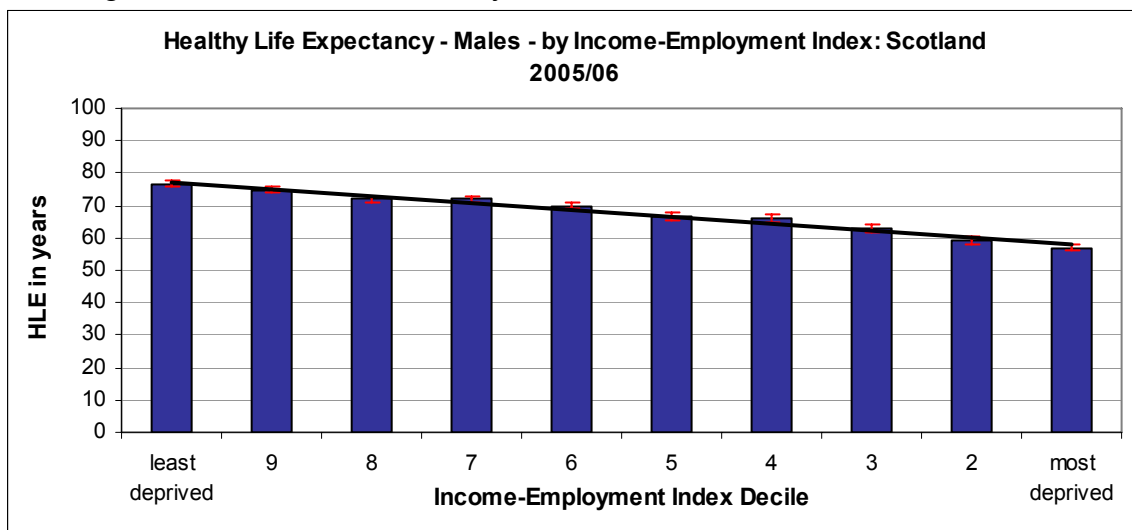
Detailed Results

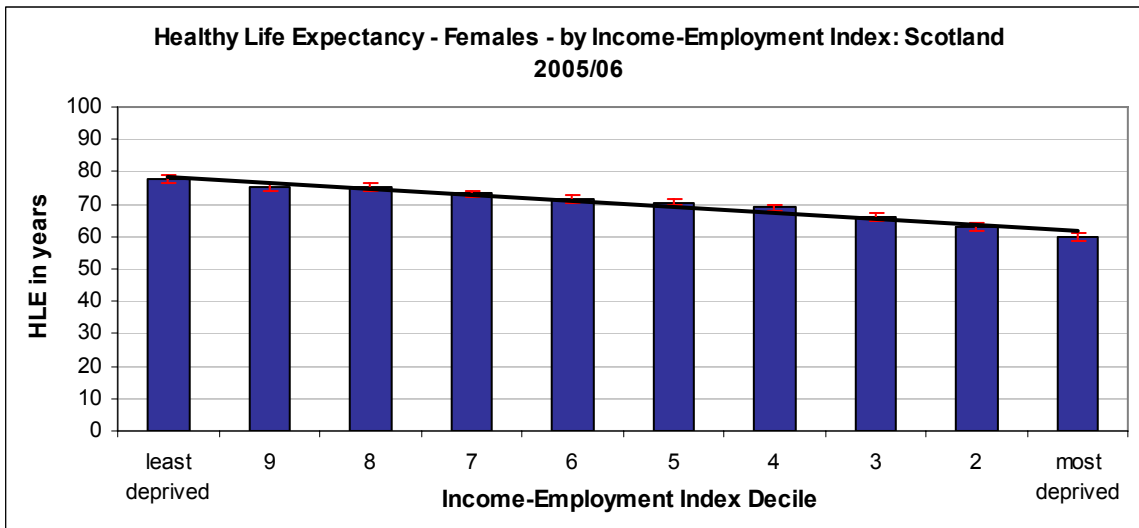
Healthy Life Expectancy (HLE) - at birth

Summary

Between 1999/00 and 2005/06, HLE has increased by 2.4 years (4%) for males and 1.5 years (2%) for females. Over the same period, the difference between HLE and total life expectancy (that is, the number of years that could be expected to be spent in poor health) has fallen by 0.5 years (7%) for males and 0.2 years (2%) for females. In 2005/06, HLE at Scotland level for males was 67.4 years (7.3 years less than total life expectancy) and HLE for females was 69.6 years (10.0 years less than total life expectancy). HLE in deprived areas is lower for both males and females than HLE in areas of low deprivation. In 2005/6, HLE of those living in the most deprived decile was 19.8 years lower for males and 18.2 years lower for females than HLE of those living in the least deprived decile. The difference between HLE and total life expectancy (expected years spent in poor health) is also notably greater in more deprived areas: for males - 10.1 years in poor health in the most deprived decile compared with 3.6 years in the least deprived decile; and for females - 14.9 years in poor health in the most deprived decile compared with 5.8 years in the least deprived decile. Between 1999/00 and 2005/06, increases in HLE have been observed across the population, with no discernible difference between deprivation groups. Inequalities have been stable in both absolute and relative terms (as demonstrated by the absolute range and RII respectively).

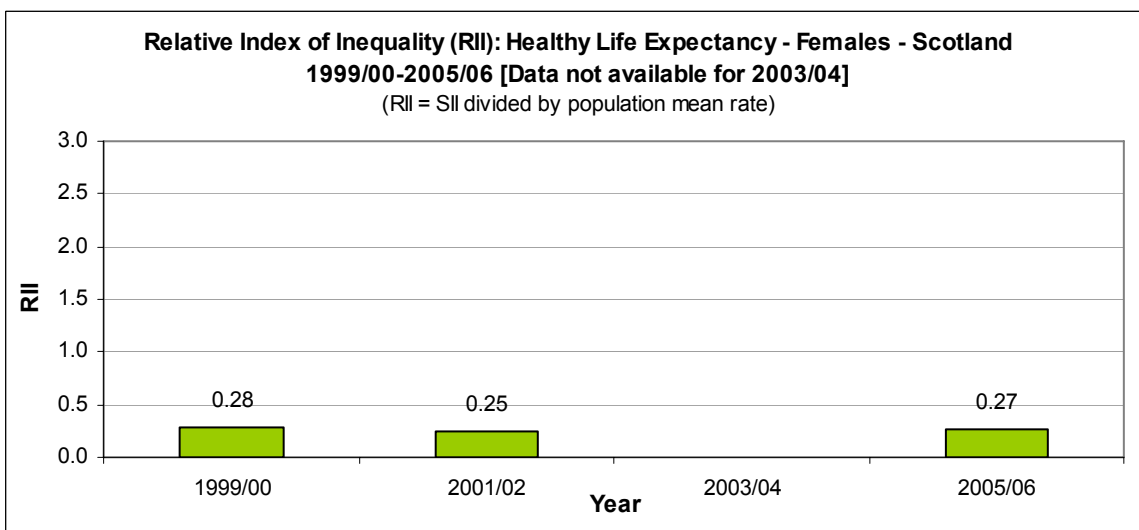
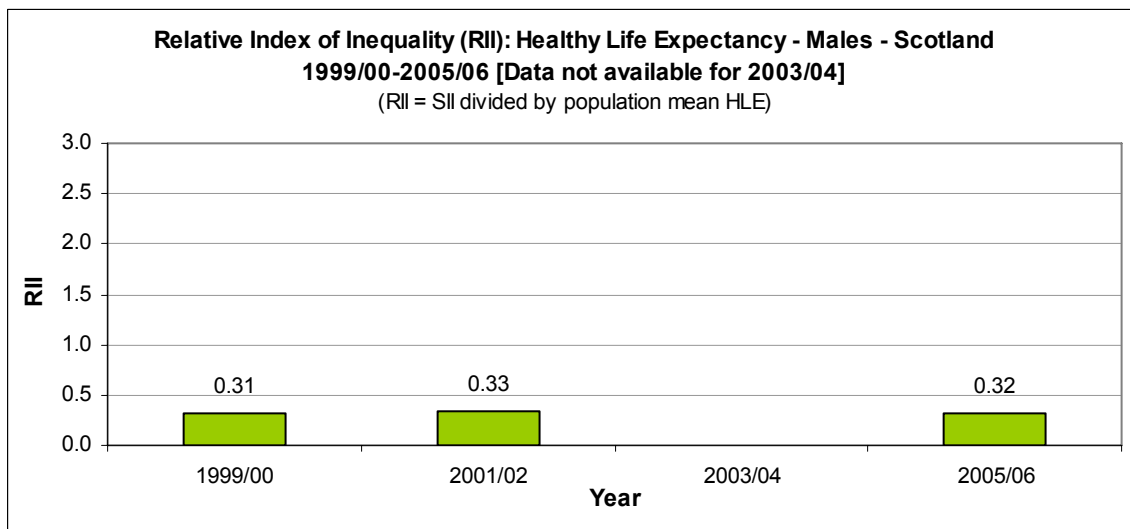
Inequalities gradient in the most recent year available:



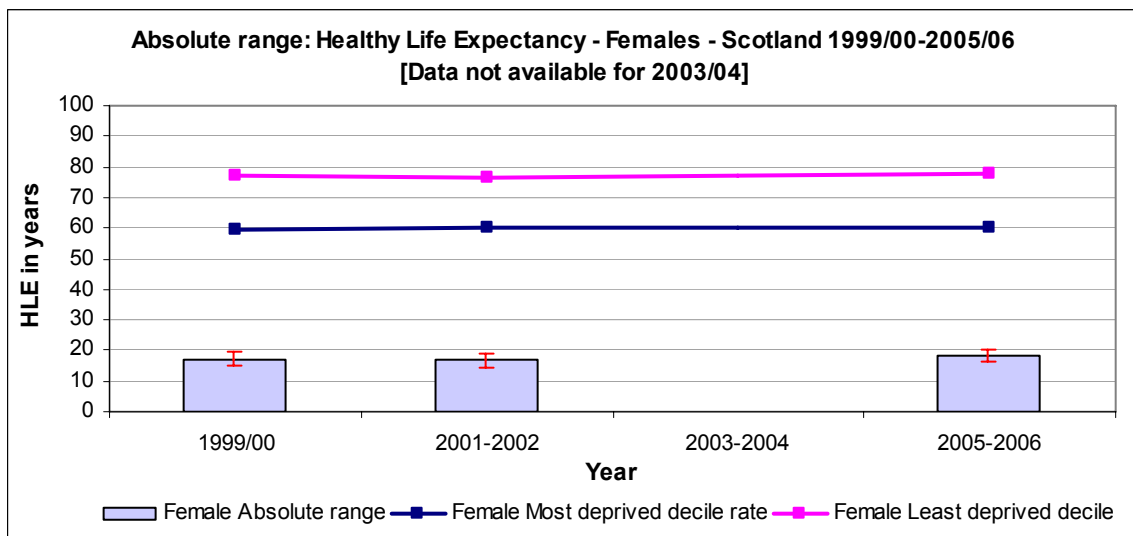
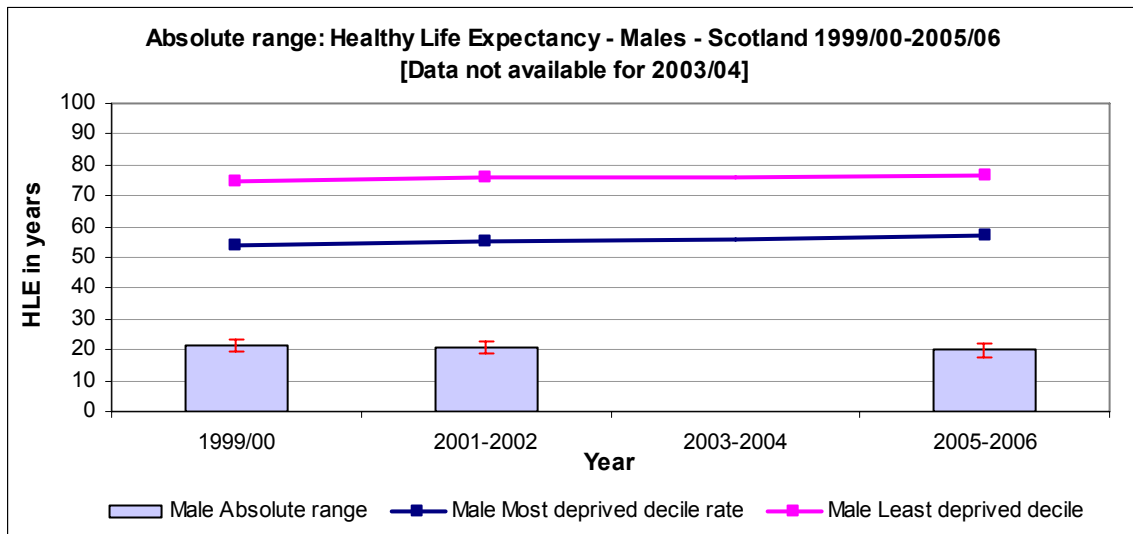


(Note: the red bars for each column indicate the uncertainties in each estimate of HLE).

Relative Index of Inequality (RII) over time



Absolute range over time



(Note: the red bars for each column indicate the uncertainties in each estimate of absolute difference in HLE).

Scale / context

	Male HLE in years	95%LL	95%UL	Male LE in years	95%LL	95%UL	Estimated years spent in poor health
1999/00							
Scotland	65.0	64.7	65.4	73.0	72.8	73.1	7.8
Most deprived decile	53.7	52.6	54.8	65.8	65.4	66.3	11.7
Least deprived decile	75.0	74.0	75.9	78.6	78.3	79.0	3.3
2001/02							
Scotland	65.9	65.6	66.2	73.4	73.3	73.5	7.4
Most deprived decile	55.0	53.9	56.1	65.8	65.4	66.3	10.4
Least deprived decile	75.7	74.8	76.6	79.5	79.1	79.9	3.4
2003/04							
Scotland				74.0	73.9	74.1	-
Most deprived decile				66.3	65.9	66.8	-
Least deprived decile				79.7	79.3	80.0	-
2005/06							
Scotland	67.4	67.1	67.7	74.8	74.7	74.9	7.3
Most deprived decile	57.0	55.9	58.1	67.5	67.1	67.9	10.1
Least deprived decile	76.8	75.8	77.8	80.7	80.4	81.1	3.6

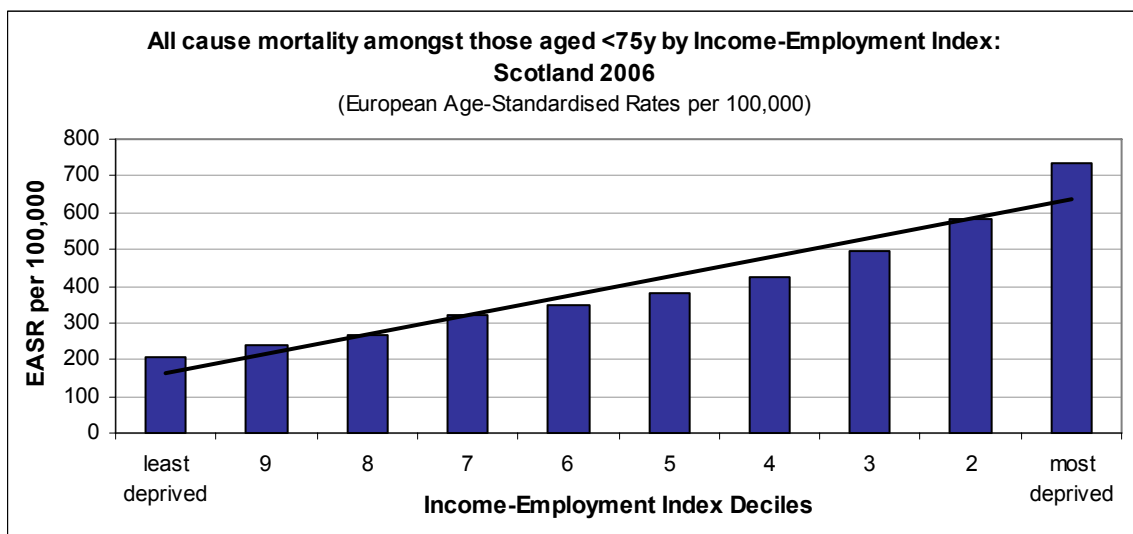
	Female HLE in years	95%LL	95%UL	Female LE in years	95%LL	95%UL	Estimated years spent in poor health
1999/00							
Scotland	68.2	67.8	68.5	78.4	78.3	78.5	10.2
Most deprived decile	59.8	58.6	61.0	74.2	73.9	74.6	14.1
Least deprived decile	77.1	76.1	78.1	81.8	81.5	82.1	4.4
2001/02							
Scotland	69.2	68.9	69.6	78.9	78.8	79.0	9.5
Most deprived decile	60.0	58.8	61.1	74.6	74.2	74.9	14.2
Least deprived decile	76.8	75.6	77.9	82.4	82.1	82.8	5.3
2003/04							
Scotland				79.1	79.0	79.2	-
Most deprived decile				74.8	74.4	75.2	-
Least deprived decile				83.0	82.6	83.3	-
2005/06							
Scotland	69.6	69.2	70.0	79.7	79.6	79.8	10.0
Most deprived decile	59.9	58.7	61.1	75.1	74.7	75.5	14.9
Least deprived decile	78.1	76.8	79.3	84.2	83.9	84.6	5.8

Premature Mortality - from all causes, aged under 75 years

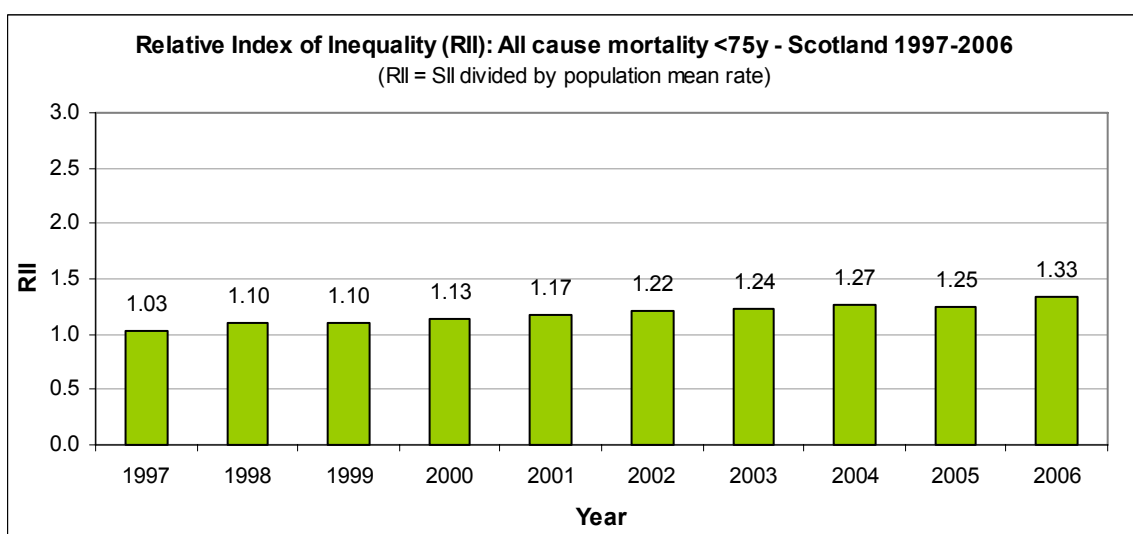
Summary

Between 1997 and 2006, deaths amongst those aged under 75 years have decreased by 18%. Despite these decreases, around 22,000 people aged under 75 still die each year. Deaths in this age group are more common in deprived areas than in areas of low deprivation. In 2006, under 75 deaths amongst those living in the most deprived decile were 3.6 times more likely than those living in the least deprived decile. Recent reductions in premature mortality have been observed across the population. Whilst inequalities have been stable in absolute terms (as demonstrated by the absolute range), improvements observed in deprived areas have not been as great as those observed elsewhere in Scotland resulting in a widening of inequalities in relative terms (as demonstrated by RII).

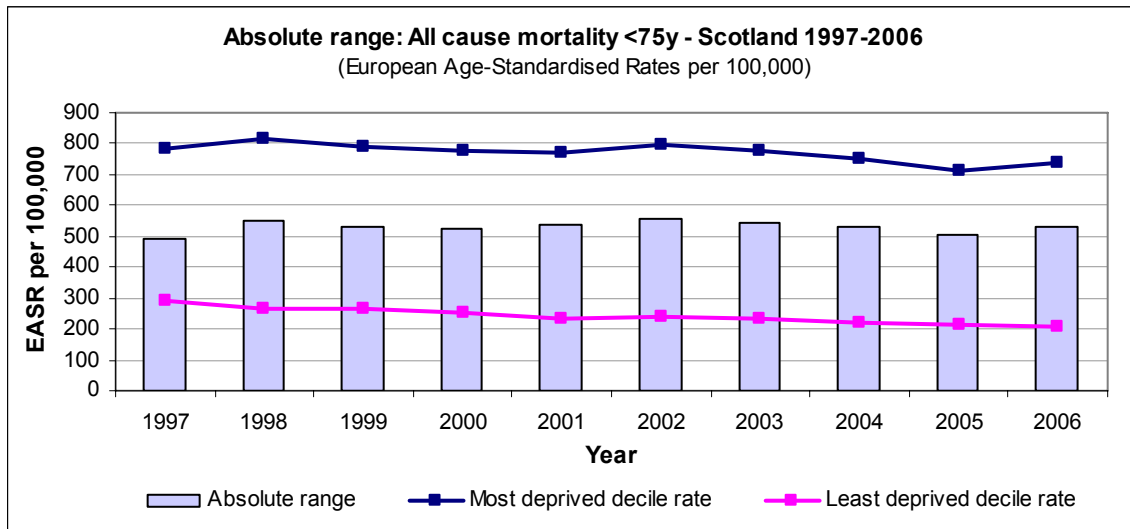
Inequalities gradient in the most recent year available:



Relative Index of Inequality (RII) over time



Absolute range over time



Scale / context

	Number of deaths	Target population size	Rate per 100,000 (EASR)*
1997	26,081	4,740,269	485.5
1998	25,857	4,729,975	479.8
1999	25,491	4,721,298	471.6
2000	24,593	4,708,667	454.1
2001	24,168	4,703,661	446.2
2002	24,219	4,690,508	443.8
2003	23,789	4,690,603	431.4
2004	22,896	4,706,922	411.6
2005	22,441	4,718,403	401.0
2006	22,237	4,734,676	395.8

*European age standardised rate

Mental Wellbeing - adults aged 16 years and over

Summary

The data required for the calculation of the recommended inequalities measures are not yet available. From mid 2009 onwards, these data will be available from the Scottish Health Survey. Some data from the Well? 2006 survey are however available and show that there was a clear difference in WEMWBS score according to actual household income and perceptions of how easy or difficult it is to manage on household income. A low WEMWBS score indicates relatively low mental wellbeing. Those with low household income or who feel that it is difficult to manage on their household income have notably lower WEMWBS scores than those with higher household income or who feel that it is easy to manage on their household income.

Scale / Context

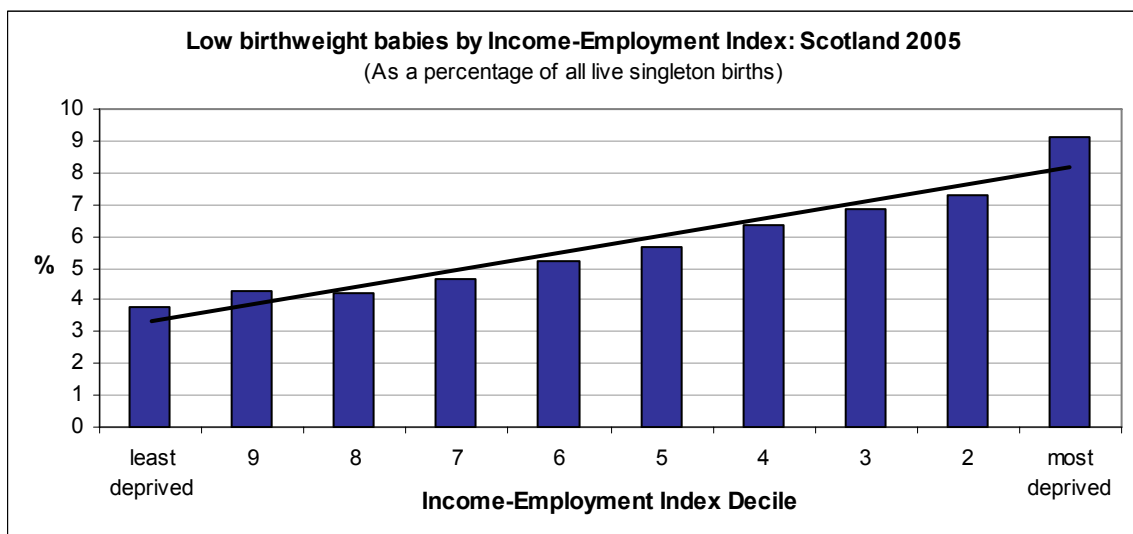
	Base sample size	WEMWBS score				
		Mean	Standard deviation	Median	Minm	Maxm
All respondents	973	51.05	8.54	52	14	70
Respondents with household income:						
Less than £5,200	71	46.82	9.11	47	18	70
Greater than £36,400	114	52.22	6.98	52.5	36	67
Respondents who say it is:						
Easy to manage on household income	630	52.48	8.07	53	20	70
Difficult to manage on household income	156	46.25	9.47	47	18	70

Low birthweight

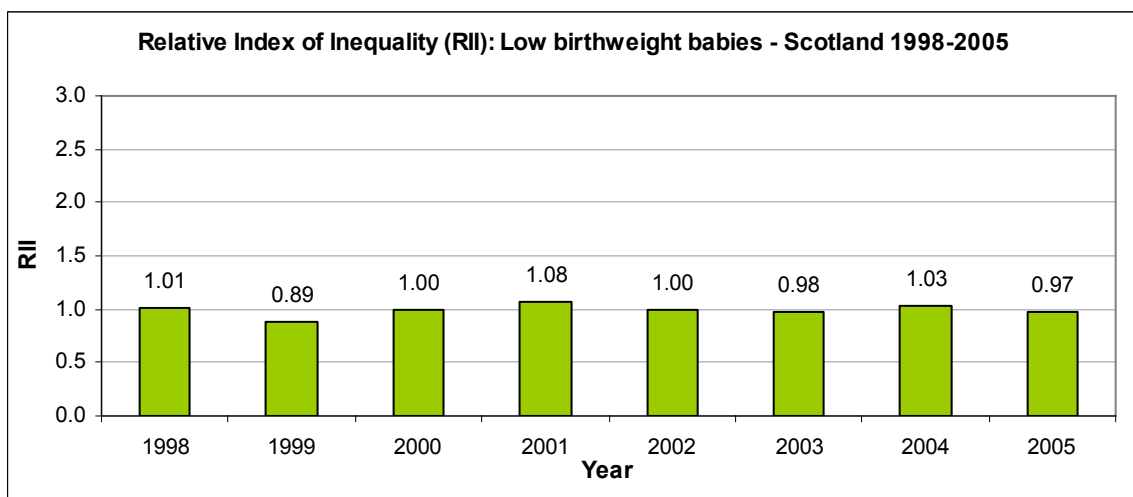
Summary

Between 1998 and 2005, the percentage of low birthweight babies has been relatively stable. Around 3,000 low birthweight babies are born each year (around 6% of total live, full term, singleton births in Scotland). Low birthweight babies are more common in deprived areas than in areas of low deprivation. In 2005, full term, singleton babies in the most deprived decile were 2.4 times more likely to have a low birthweight than those in the least deprived decile. Whilst rates of low birthweight babies have been stable over this period, rates in deprived areas have increased slightly. Inequalities have widened slightly in absolute terms (as demonstrated by the absolute range), but have been stable in relative terms (as demonstrated by the RII, which has been relatively stable).

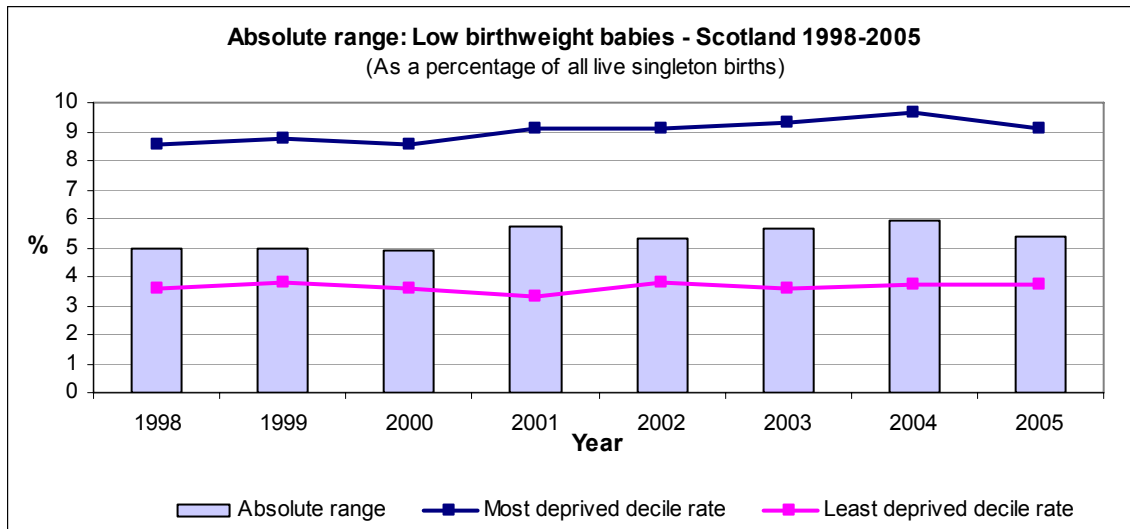
Inequalities gradient in the most recent year available:



Relative Index of Inequality (RII) over time



Absolute range over time



Scale / context

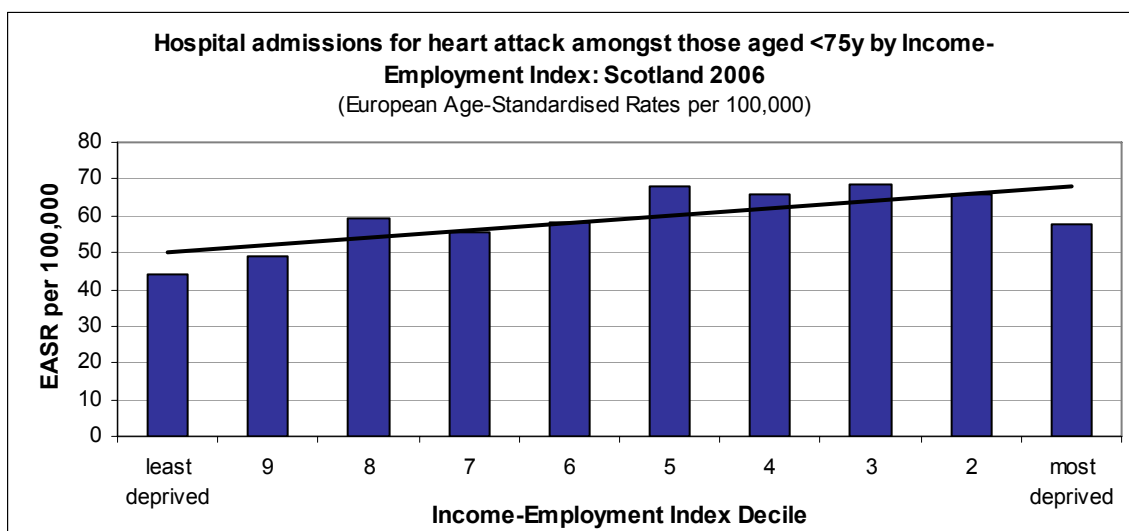
	Number of low BW babies	Target population size (live singleton births)	Percentage
1998	3,108	55,152	5.6
1999	3,098	52,726	5.9
2000	2,906	51,082	5.7
2001	2,848	49,752	5.7
2002	2,910	48,952	5.9
2003	3,026	50,071	6.0
2004	3,030	51,852	5.8
2005	3,056	51,372	5.9

Coronary Heart Disease - first ever hospital admission for heart attack aged under 75 years

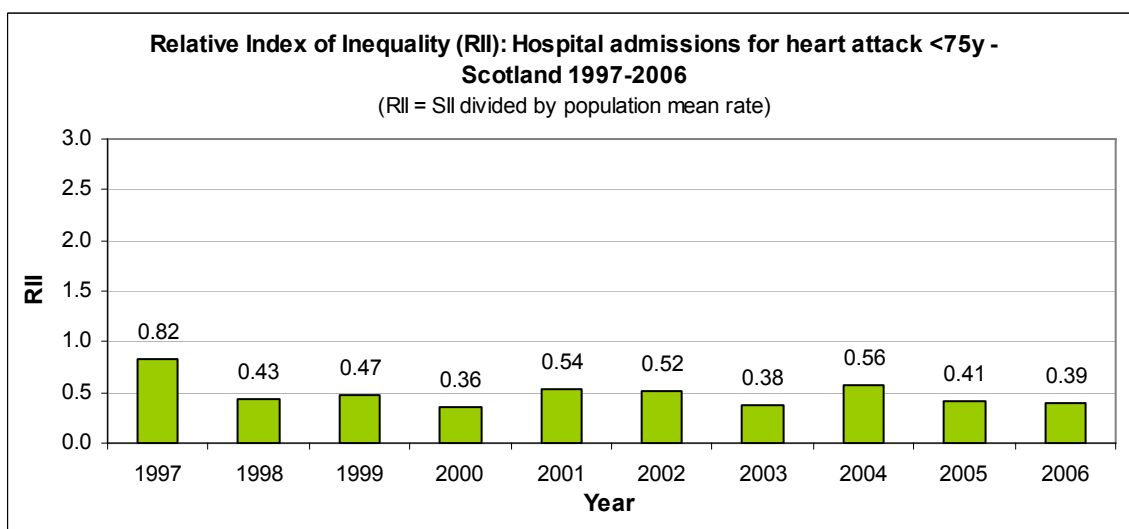
Summary

Between 1997 and 2006, there has been a considerable decrease in rates of first hospital admission for heart attack amongst those aged under 75 years as a whole – rates fell by 45% (but note that rates increased slightly between 2005 and 2006). Despite these decreases, around 1,600 new cases are still admitted to hospital for heart attack each year. Hospital admissions for heart attack amongst the under 75s are more common in deprived areas than in areas of low deprivation. In 2006, adults aged under 75 years in the most deprived decile were 1.3 times more likely to be admitted to hospital for heart attack than those in the least deprived decile. Reductions in admissions for heart attack amongst the under 75s have been observed across the population, but perhaps slightly more so in the more deprived areas. Inequalities have narrowed in absolute terms and also in relative terms (as demonstrated by the absolute range and RII respectively, which have both broadly decreased albeit with some fluctuation from one year to the next).

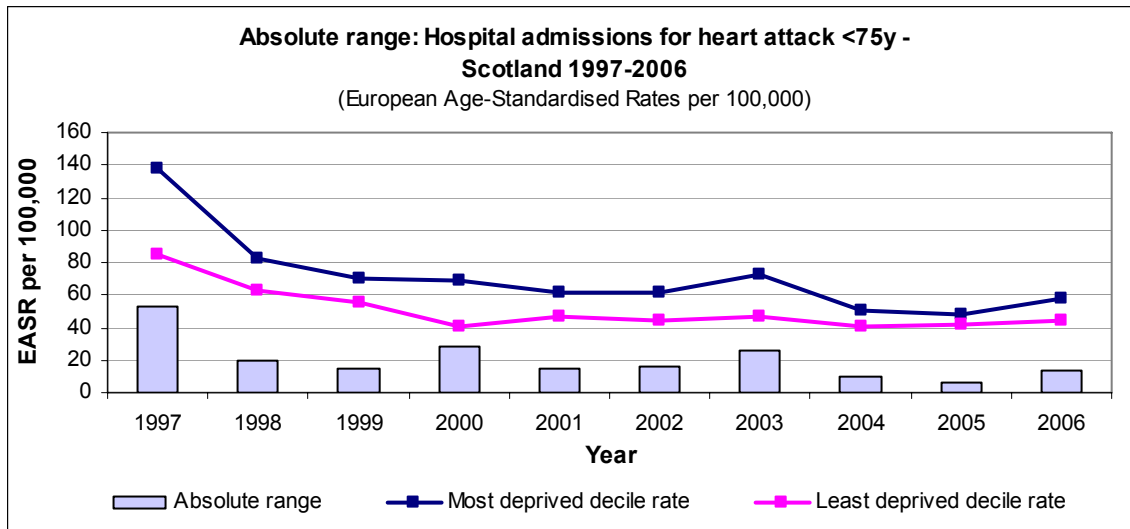
Inequalities gradient in the most recent year available:



Relative Index of Inequality (RII) over time



Absolute range over time



Scale / context

	Number of new cases	Target population size	Rate per 100,000 (EASR)*
1997	3,249	4,740,269	92.5
1998	2,321	4,729,975	66.2
1999	2,070	4,721,298	58.2
2000	1,979	4,708,667	62.1
2001	2,022	4,703,661	63.4
2002	1,927	4,690,508	53.7
2003	1,846	4,690,603	52.4
2004	1,807	4,706,922	50.0
2005	1,726	4,718,403	44.1
2006	1,589	4,734,676	51.0

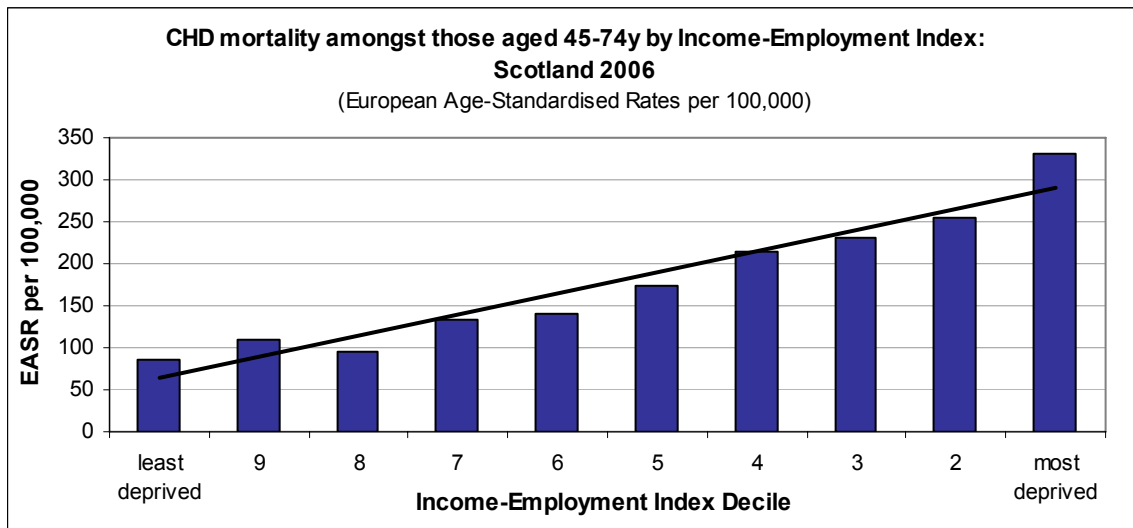
*European Age Standardised Rate

Coronary Heart Disease (CHD) - deaths aged 45-74 years

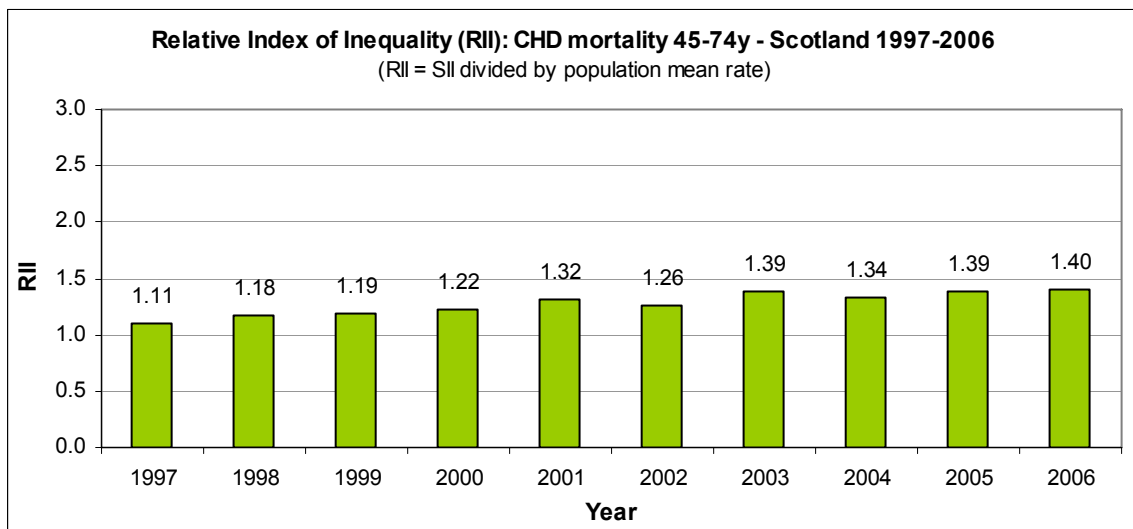
Summary

Between 1997 and 2006, there has been a considerable decrease in CHD mortality amongst the population aged 45-74 years as a whole – rates fell by 45%. However, CHD remains one of Scotland's biggest causes of premature mortality, with around 3,500 deaths occurring in this age group each year. Premature mortality from CHD is more prevalent in deprived areas than in areas of low deprivation. In 2006, adults in the most deprived decile were 3.8 times more likely to die from CHD aged 45-74 years than those in the least deprived decile. Recent reductions in CHD mortality have been observed across the population. Whilst inequalities have narrowed in absolute terms (as demonstrated by the absolute range), improvements observed in deprived areas have not been as great as those observed elsewhere in Scotland resulting in a widening of inequalities in relative terms (as demonstrated by the RII).

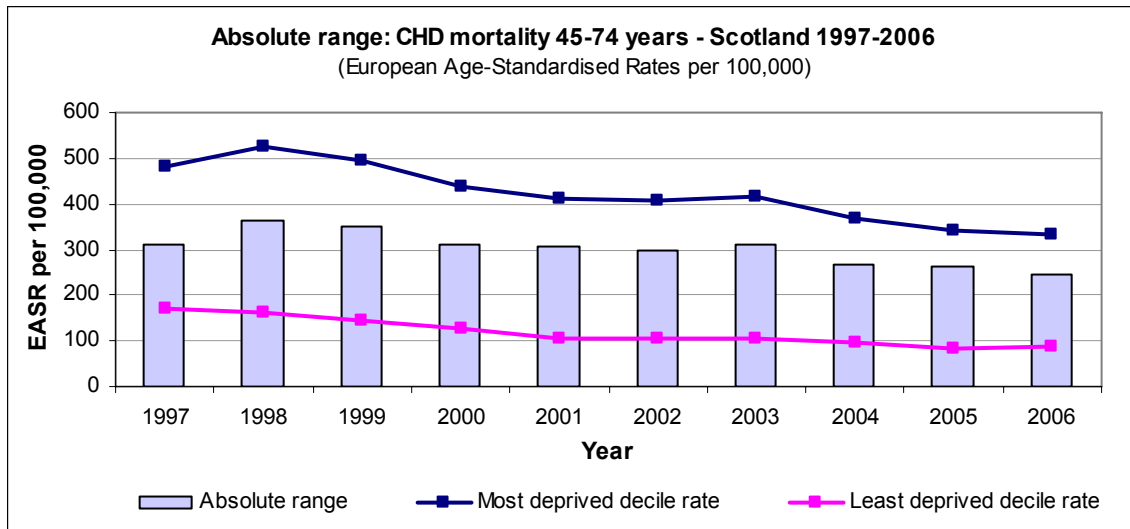
Inequalities gradient in the most recent year available:



Relative Index of Inequality (RII) over time



Absolute range over time



Scale / context

	Number of deaths	Target population size	Rate per 100,000 (EASR)*
1997	5,887	1,635,590	320.0
1998	5,676	1,646,711	306.1
1999	5,389	1,658,124	289.8
2000	4,858	1,670,660	261.1
2001	4,483	1,687,422	238.9
2002	4,309	1,703,819	227.9
2003	4,197	1,724,940	219.5
2004	3,840	1,750,293	198.8
2005	3,721	1,771,454	191.2
2006	3,394	1,793,423	174.5

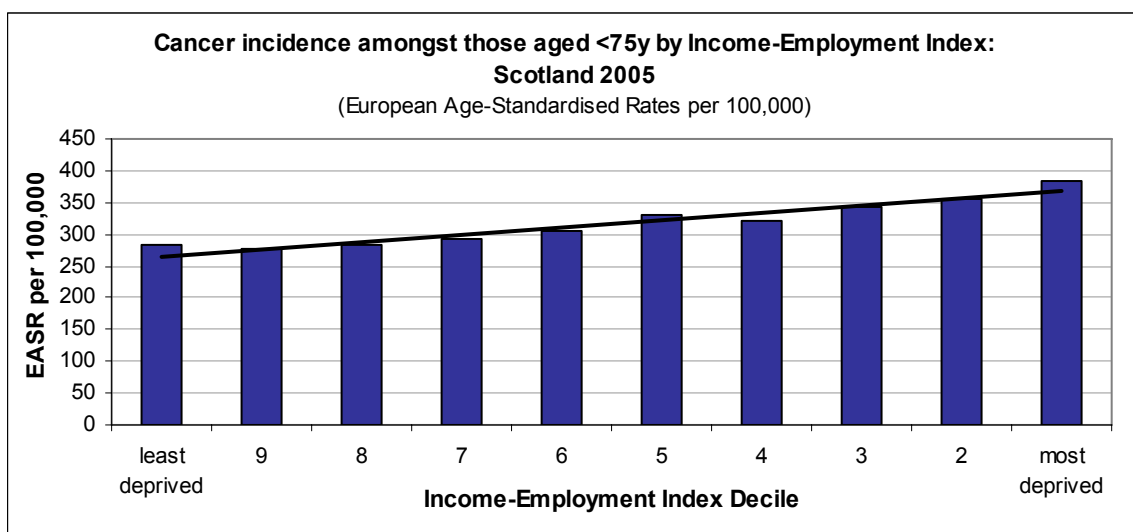
*European Age Standardised Rate

Cancer - incidence rate aged under 75 years

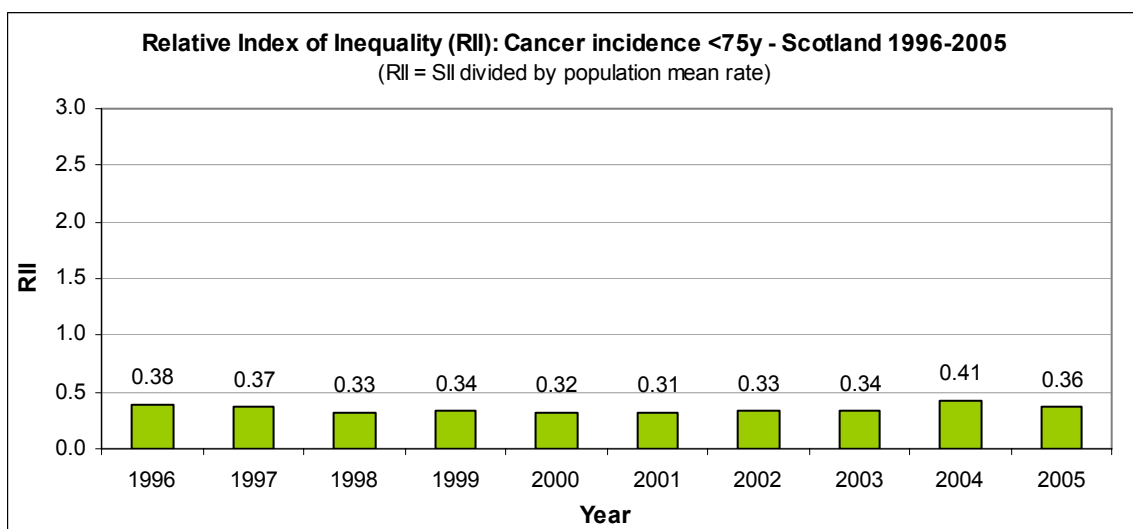
Summary

Between 1996 and 2005, there has been a 8% decrease in rates of new cases of cancer amongst those aged under 75 years as a whole. Despite these decreases, around 18,000 new cases of cancer are still diagnosed each year. Cancer diagnosis amongst the under 75s are more common in deprived areas than in areas of low deprivation. In 2006, adults aged under 75 years in the most deprived decile were 1.4 times more likely to be diagnosed with cancer than those in the least deprived decile. Reductions in new cases of cancer amongst the under 75s have been observed across the population, with little discernible difference by deprivation. Inequalities have been stable in absolute terms and also in relative terms (as demonstrated by the absolute range and RII respectively, which have both been stable, albeit with some fluctuation from one year to the next).

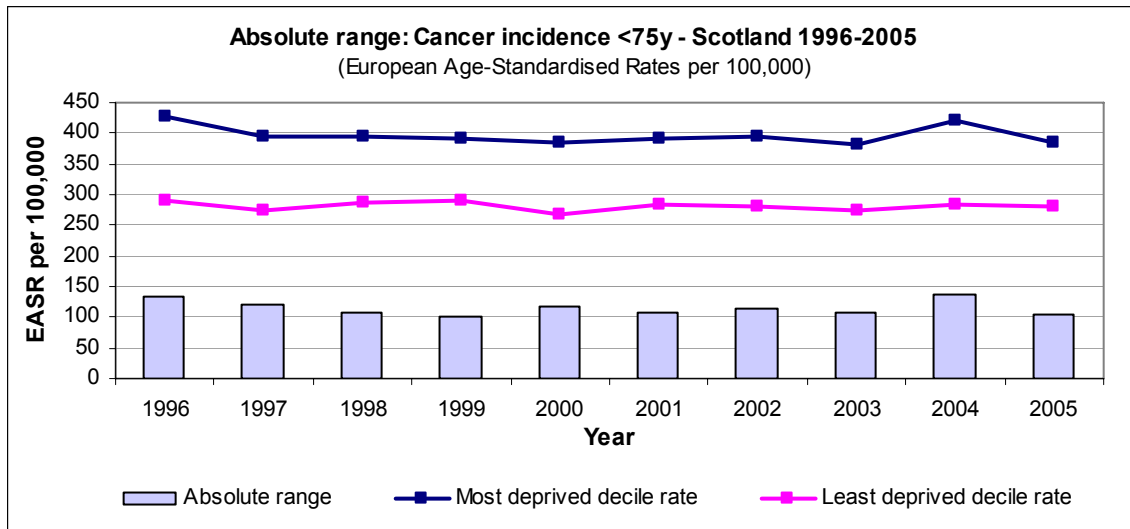
Inequalities gradient in the most recent year available:



Relative Index of Inequality (RII) over time



Absolute range over time



Scale / context

	Number of new cases	Target population size	Rate per 100,000 (EASR)*
1996	18,136	4,754,906	345.1
1997	17,160	4,740,269	326.7
1998	17,144	4,729,975	323.6
1999	16,915	4,721,298	318.4
2000	17,122	4,708,667	321.2
2001	17,097	4,703,661	318.8
2002	17,465	4,690,508	323.3
2003	17,453	4,690,603	319.2
2004	18,002	4,706,922	326.5
2005	17,639	4,718,403	316.6

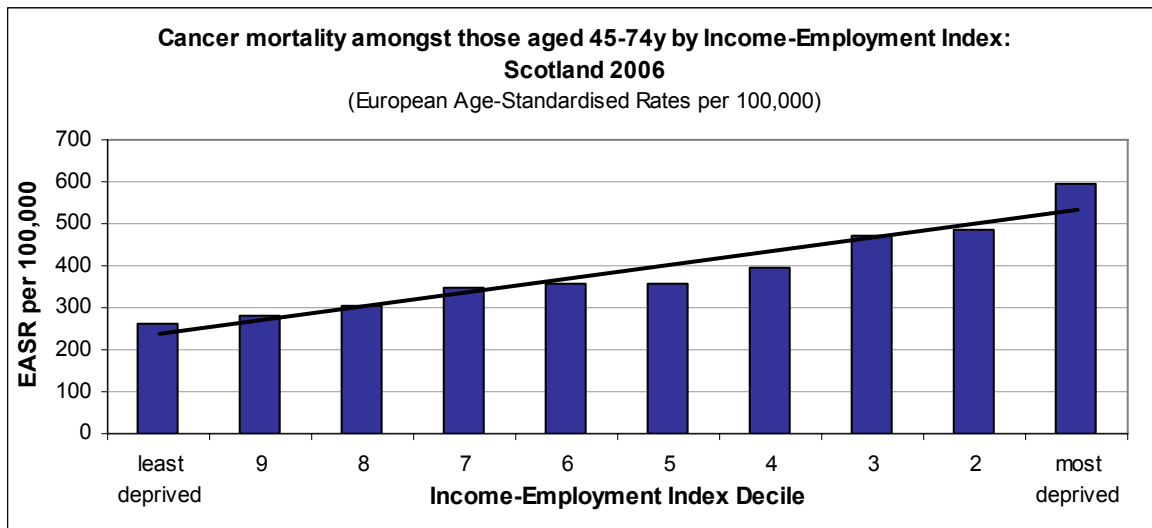
*European Age Standardised Rate

Cancer - deaths aged 45-74 years

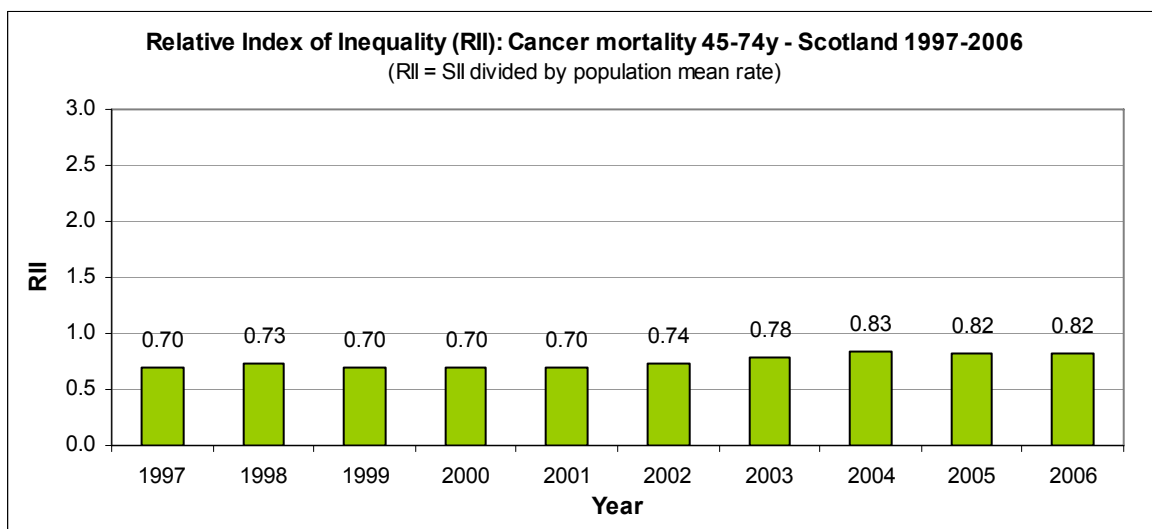
Summary

Between 1997 and 2006, there has been a 14% decrease in rates of death from cancer amongst those aged 45-74 years as a whole. Despite these decreases, around 7,500 people aged 45-74 years still die from cancer each year. Cancer deaths in this age group are more common in deprived areas than in areas of low deprivation. In 2006, adults aged 45-74 years in the most deprived decile were 2.3 times more likely to be diagnosed with cancer than those in the least deprived decile. Reductions in cancer deaths amongst those aged 45-74 years have been observed across the population. Whilst inequalities have been relatively stable in absolute terms (as demonstrated by the absolute range), improvements observed in deprived areas have not been as great as those observed elsewhere in Scotland resulting in a widening of inequalities in relative terms, as demonstrated by the Relative Index of Inequality (RII).

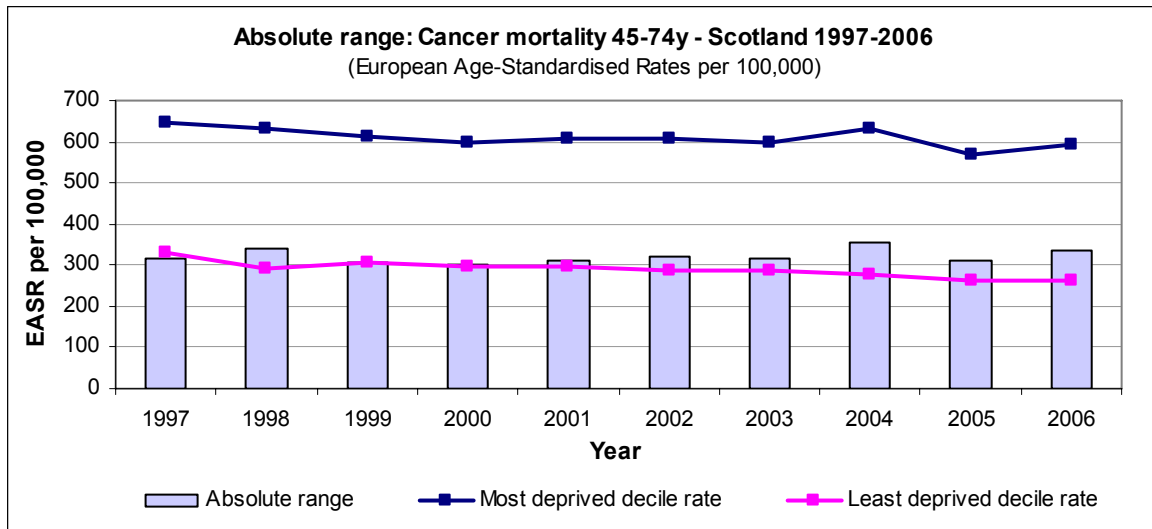
Inequalities gradient in the most recent year available:



Relative Index of Inequality (RII) over time



Absolute range over time



Scale / context

	Number of deaths	Target population size	Rate per 100,000 (EASR)*
1997	8,068	1,635,590	446.9
1998	7,995	1,646,711	440.0
1999	7,904	1,658,124	433.8
2000	7,776	1,670,660	422.8
2001	7,903	1,687,422	430.1
2002	7,850	1,703,819	422.4
2003	7,706	1,724,940	409.3
2004	7,678	1,750,293	402.0
2005	7,606	1,771,454	396.7
2006	7,486	1,793,423	386.6

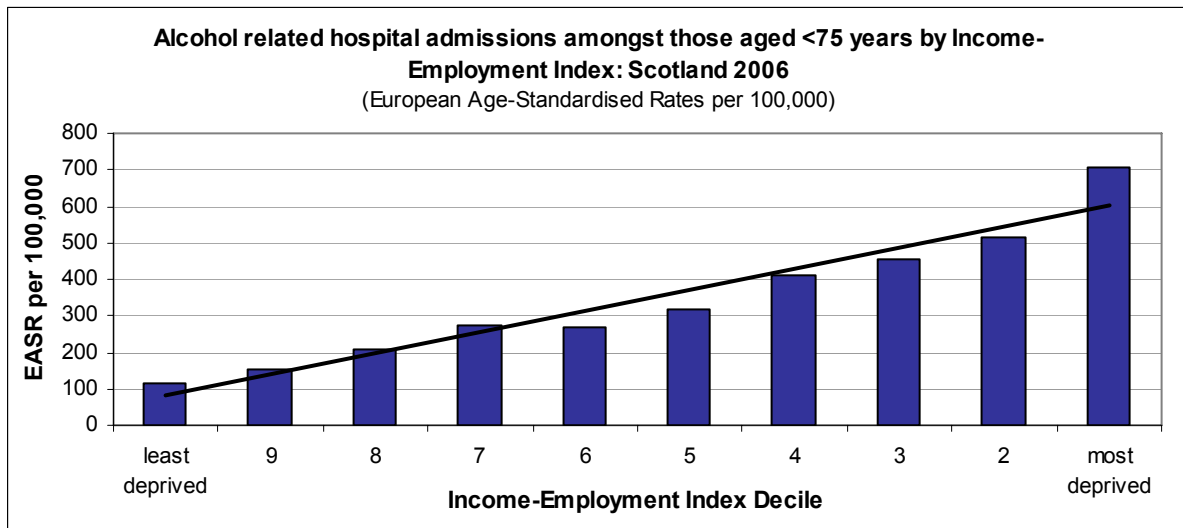
*European Age Standardised Rate

Alcohol - first ever hospital admission aged under 75 years

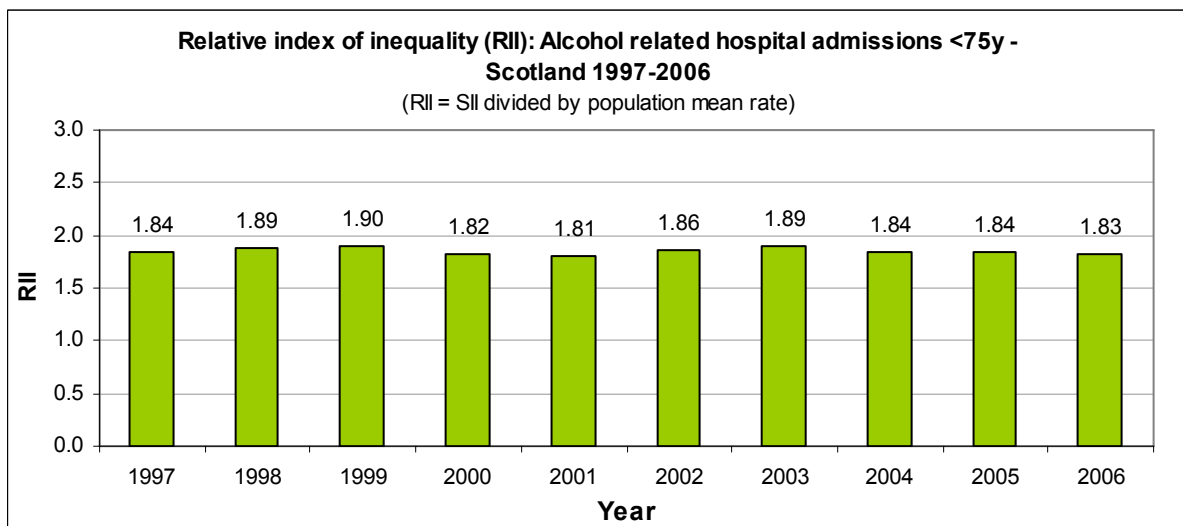
Summary

Between 1997 and 2006, there has been a 17% increase in rates of new hospital admissions for alcohol related conditions amongst those aged under 75 years as a whole. Numbers have risen such that around 16,000 new cases aged under 75 years are now being admitted to hospital for alcohol related conditions each year. Alcohol related admissions amongst those aged under 75 years are more common in deprived areas than in areas of low deprivation. In 2006, adults aged under 75 years in the most deprived decile were 6.3 times more likely to be admitted to hospital (as a new case) with an alcohol related condition than those in the least deprived decile. Increases in alcohol related admissions amongst those aged under 75 years have been observed across the population, with no discernible variation by deprivation. Inequalities have been stable in absolute terms and also in relative terms (as demonstrated by the absolute range and RII respectively, which have both been stable, albeit with some fluctuation from one year to the next).

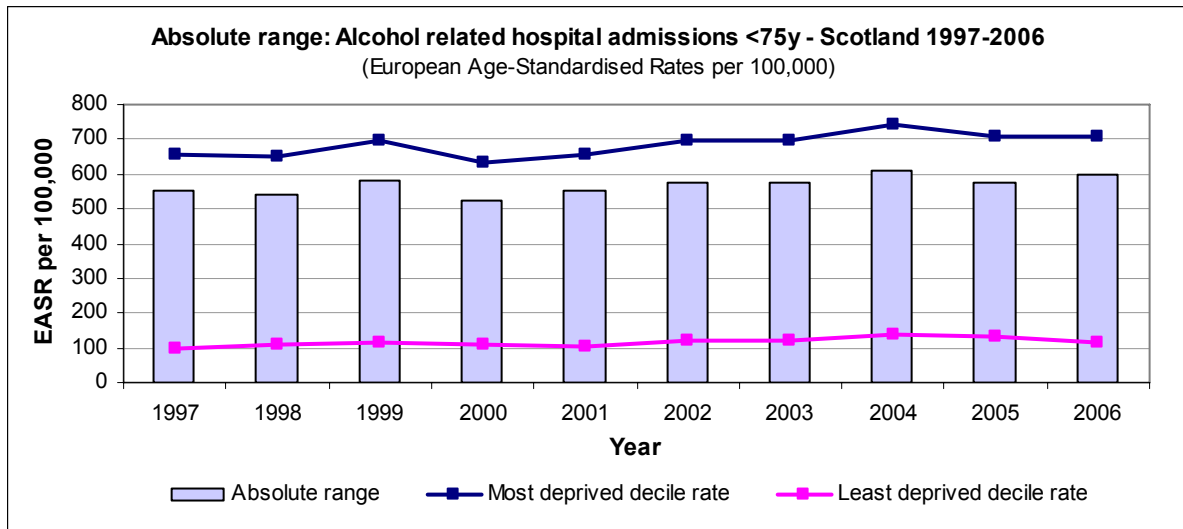
Inequalities gradient in the most recent year available:



Relative Index of Inequality (RII) over time



Absolute range over time



Scale / context

	Number of admissions	Target population size	Rate per 100,000 (EASR)*
1997	13,125	4,740,269	270.8
1998	13,697	4,729,975	281.6
1999	13,834	4,721,298	284.8
2000	13,686	4,708,667	281.9
2001	14,365	4,703,661	294.8
2002	14,729	4,690,508	301.7
2003	14,399	4,690,603	292.2
2004	15,897	4,706,922	319.3
2005	15,498	4,718,403	309.8
2006	15,850	4,734,676	316.2

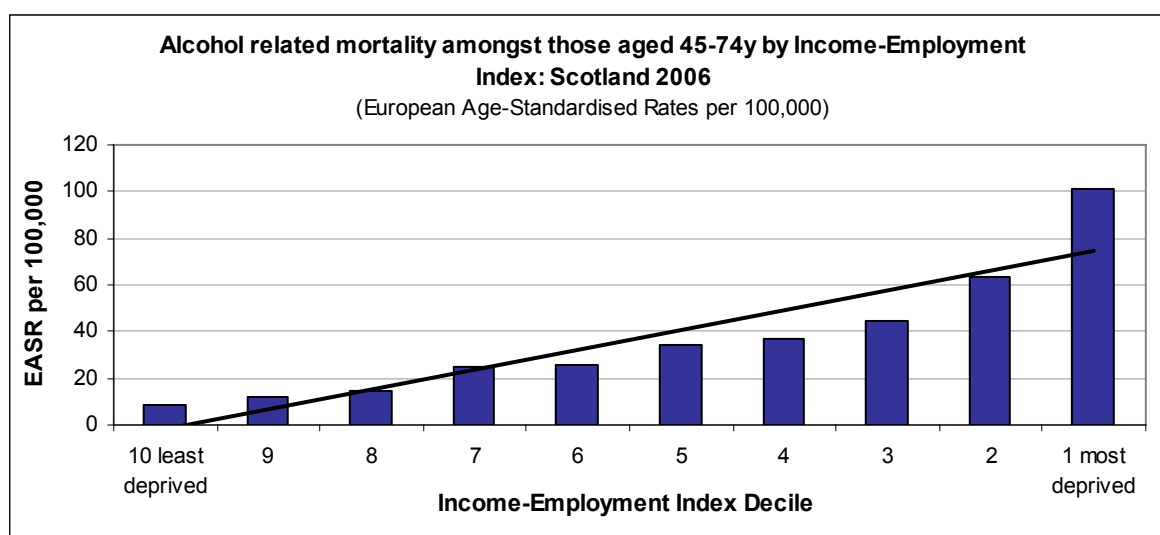
*European Age Standardised Rate

Alcohol - deaths aged 45-74 years

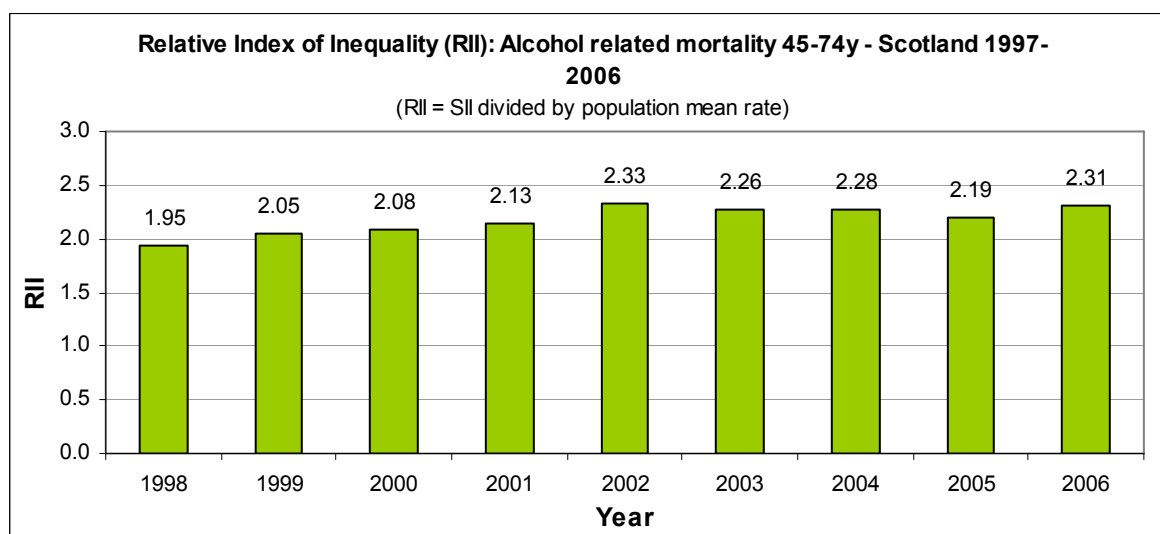
Summary

Between 1998 and 2006, there has been a 75% increase in rates of death from alcohol related conditions amongst those aged under 45-74 years as a whole. Numbers have risen such that around 2,500 people aged 45-74 years are now dying from alcohol related conditions each year. Alcohol related deaths amongst those aged 45-74 years are more common in deprived areas than in areas of low deprivation. In 2006, adults aged 45-74 years in the most deprived decile were 12.3 times more likely to die from an alcohol related condition than those in the least deprived decile. Increases in alcohol related deaths amongst those aged 45-64 years have been observed across the population, but particularly so in deprived areas. Inequalities have increased in both absolute and relative terms (as demonstrated by the absolute range and RII respectively, which have both broadly increased, albeit with some fluctuation from one year to the next).

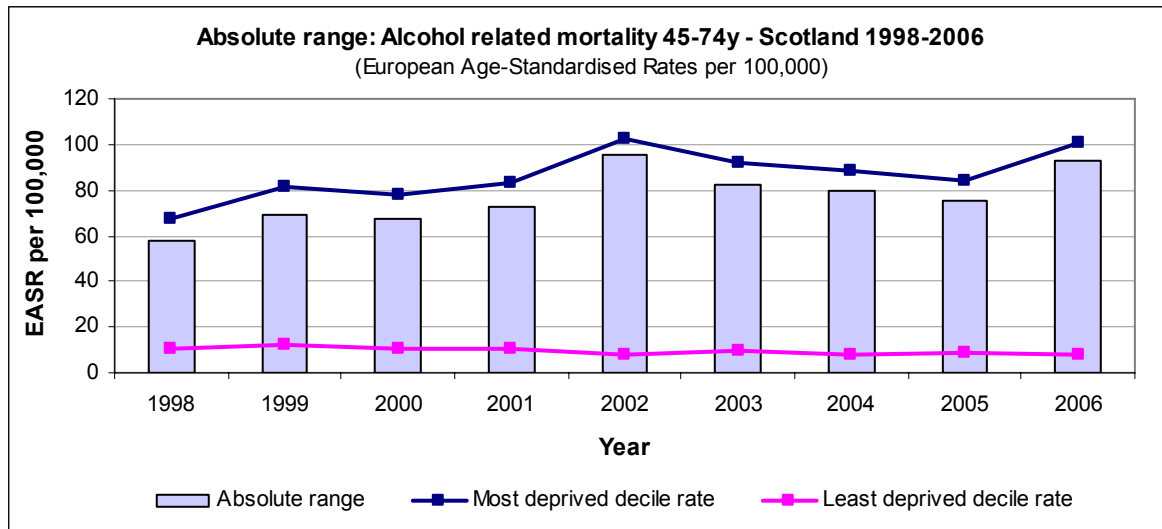
Inequalities gradient in the most recent year available:



Relative Index of Inequality (RII) over time



Absolute range over time



Scale / context

	Number of deaths	Target population size	Rate per 100,000 (EASR)*
1997	1,415	1,646,711	28.6
1998	1,508	1,658,124	30.1
1999	1,489	1,670,660	29.5
2000	1,565	1,687,422	30.8
2001	1,753	1,703,819	34.1
2002	1,749	1,724,940	33.5
2003	1,764	1,750,293	33.3
2004	1,790	1,771,454	33.4
2005	1,899	1,793,423	35.
2006	2,482	2,085,170	50.1

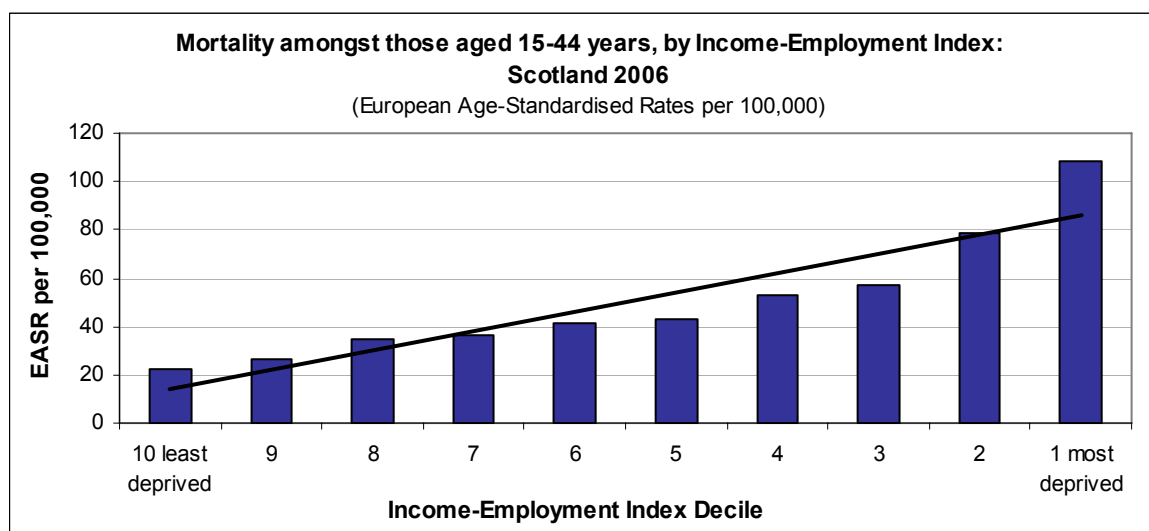
*European Age Standardised Rate

All-cause mortality aged 15-44 years

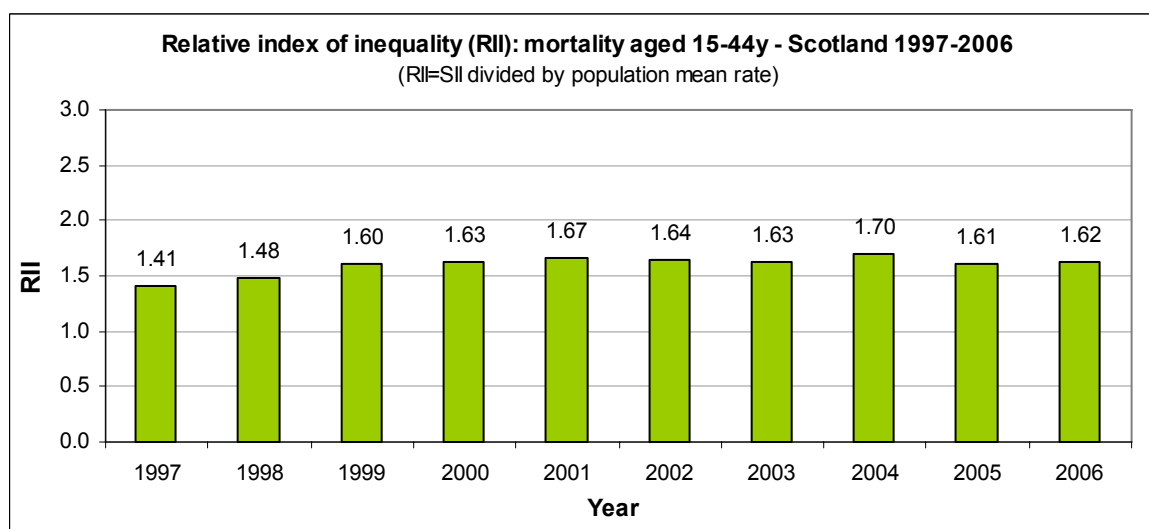
Summary

Between 1997 and 2006, rates of death have been stable amongst those aged under 15-44 years as a whole. Within this age group, rates of drug related deaths have increased by 75% over the same period (to around 400 deaths per year), rates of death from assault have decreased by 16% (to around 50 deaths per year) and rates of death from suicide have dropped by 11% (to around 450 deaths per year). Note however that the relatively small numbers involved mean that comparison of numbers for single years should be interpreted with caution as there will be natural fluctuation from one year to the next. Deaths amongst those aged 15-44 years are more common in deprived areas than in areas of low deprivation. In 2006, adults aged 15-44 years in the most deprived decile were 4.9 times more likely to die than those in the least deprived decile. Whilst the overall rate of death in this age group has remained stable over this period, rates have increased in deprived areas. Inequalities have therefore increased in both absolute and relative terms (as demonstrated by the absolute range and RII respectively, which have both broadly increased, albeit with some fluctuation from one year to the next).

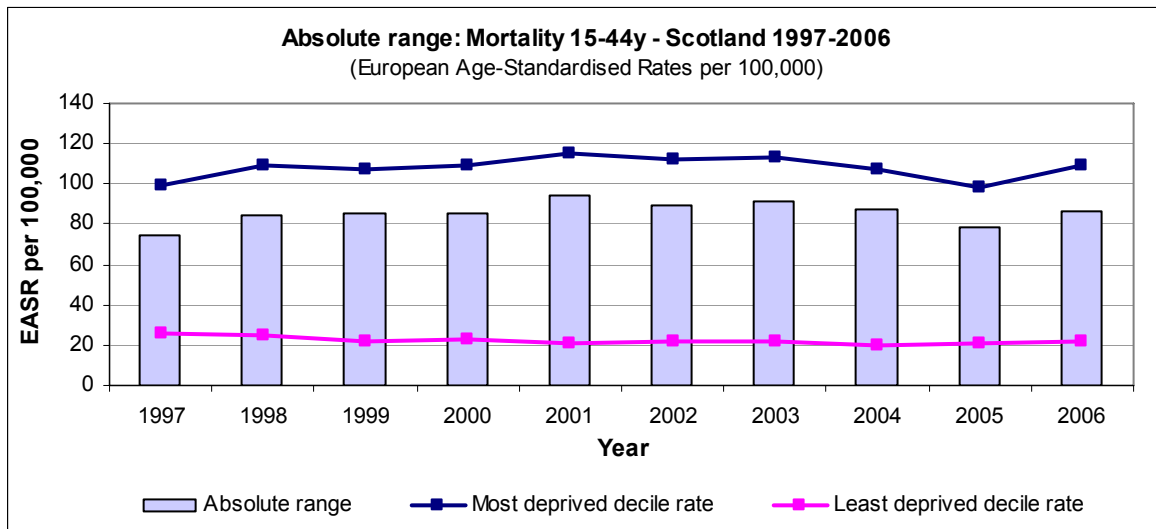
Inequalities gradient in the most recent year available:



Relative Index of Inequality (RII) over time



Absolute range over time



Scale / context

	Number of deaths	Target population size	Rate per 100,000 (EASR)*
1997	2,440	2,158,030	49.1
1998	2,507	2,142,787	50.5
1999	2,507	2,129,794	50.6
2000	2,501	2,118,568	50.2
2001	2,509	2,111,242	50.3
2002	2,566	2,096,447	51.8
2003	2,461	2,087,978	49.6
2004	2,409	2,084,722	48.5
2005	2,305	2,081,858	46.2
2006	2,482	2,085,170	50.1

	Deaths from assault		Drug related deaths		Suicides	
	Number	EASR* per 100,000	Number	EASR* per 100,000	Number	EASR* per 100,000
1997	65	3.1	227	10.8	526	24.2
1998	86	4.0	274	13.2	529	24.6
1999	60	2.9	268	12.8	541	25.5
2000	63	3.0	288	13.8	531	24.9
2001	76	3.6	345	17.0	539	25.6
2002	71	3.4	281	13.7	456	21.5
2003	78	3.8	311	15.4	475	22.1
2004	50	2.4	277	13.2	436	20.7
2005	83	4.0	351	17.0	435	20.6
2006	54	2.6	392	18.9	453	21.6

*European Age Standardised Rate

Recommendations for Future Work

The expert group on measuring health inequalities recommended that, rather than using area based measures of deprivation or socio-economic circumstances, linkage of individual records of health status with individual records of socio-economic status should be pursued. For example:

- Linkage to income records, such as: The inclusion of a question on income in the Census; Tax records from the Inland Revenue linked to mortality data (work on-going by Leyland et al); Investigation of the feasibility of linking Incapacity Benefit data with health datasets (work on-going by Glasgow University).
- Within survey linkage of individual income information with health variables such as self-assessed health, long-standing limiting illness, GHQ12 and in the future WEMWBS should be explored (using large scale national surveys such as Scottish Health Survey or Scottish Household Survey).

The Task Force reflected this in Equally Well with the following recommendation:

76. The Government, with relevant advice from experts, should work towards better information to describe health inequalities based on socio-economic status, for example looking at low income of individuals, not just average income of people living in a small area.

The expert group also recommended that:

- The age group used to define 'premature mortality' should be reviewed.
- The inequalities analyses should all include confidence intervals so that the statistical significance of changes over time can be accurately assessed.
- The use of statistical process control methods to present results should be investigated.

These recommendations will be taken into consideration in the preparation of future versions of this report.

Annex 1: Short Life Technical Advisory Group on Monitoring Health Inequalities

Chair

- Jill Vickerman
Scottish Government; Head of Health Analytical Services Division

Group Membership

- Marion Bain
NHS Information Services Division; Medical Director
- Kay Barton
Scottish Government; Deputy Director: Health Improvement Strategy
- Neil Craig
NHS Health Scotland; Senior Public Health Advisor
- David Gordon
NHS Health Scotland / ScotPHO; Head of Public Health Observatory
- Professor Alastair Leyland
Medical Research Council; Social & Public Health Sciences Unit
- Gordon McLaren
NHS Fife; Public Health Consultant
- Rosalia Munoz-Arroyo
NHS Information Services Division / ScotPHO; Senior Information Analyst
- Emma Stevens
Scottish Government; Statistician; Health Analytical Services Division
- Diane Stockton
NHS Information Services Division / ScotPHO; Programme Principal
- Professor Matt Sutton
Aberdeen University
- Bruce Whyte
Glasgow Centre for Population Health; Public Health Programme Manager

Annex 2 : Technical Notes

A2.1 Measurement of Inequalities

Different measures can give information about different aspects of inequalities. Some measures concentrate on the extremes of deprivation, whilst others include inequalities across the scale – taking into account the whole population. Absolute and relative measures can give quite different interpretations of inequalities. In addition to this, measures based on rates alone will not give insight into the scale of the problem.

Information about different measures of inequality and their calculation was based on work done by the Scottish Public Health Observatory, available at:

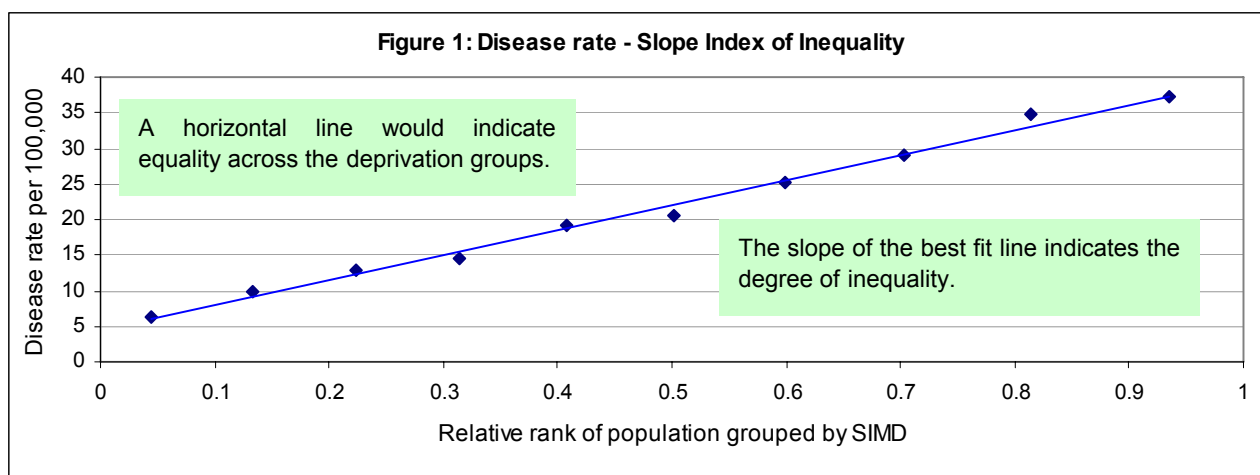
http://www.scotpho.org.uk/home/Publications/scotphoreports/pub_measuringinequalities.asp

The approach recommended by the expert group and adopted in this report uses a combination of measures, with the aim of giving a fuller understanding of the inequalities concerned.

▪ **Relative Index of Inequalities (RII):** *How steep is the inequalities gradient?*

The RII describes the gradient of health observed across the deprivation scale, relative to the mean health of the whole population.

The RII is the slope index of inequality (SII) divided by the population mean rate. The SII is defined as the slope of the “best fit” regression line showing the relationship between the health status of a particular group and that group's relative rank on the deprivation scale. An equal rate across the deprivation categories would give a horizontal line with a slope of zero (SII=0) and would indicate that there are no inequalities. The larger the absolute value of SII, the bigger the inequalities observed (see Figure 1).



The SII and RII have the advantage that they are based on data about the whole population, rather than just the extremes, and so take into account inequalities across the scale. They do however require that there is a reasonably linear relationship between the health indicator and deprivation. Another disadvantage is that the SII and RII are not intuitive and are relatively difficult to interpret and explain to a non-statistical audience.

▪ **Absolute range:** *How big is the gap?*

This measure describes the absolute difference between the extremes of deprivation – the rate in the most deprived minus the rate in the least deprived group.

This measure has the advantage that it is intuitive and straightforward to explain. It has the disadvantage that because it focuses only on the extremes of deprivation, it does not take account of patterns of inequalities observed across the intermediate groups.

- **Scale:** *How big is the problem?*

The aim of this measure is to give insight into the underlying scale of the problem and to put it in context, for example by presenting numbers involved and past trends at Scotland level.

A2.2 Income-Employment Index

The Short Life Technical Advisory Group also addressed the precise way in which deprivation should be defined for this work. The group agreed that the ideal would be to use individually linked records of health and socio-economic indicators, but acknowledged that these are not yet available. The preferred interim approach was to use the latest available versions of the Scottish Index of Multiple Deprivation (SIMD) income and employment domains. The reasoning behind this being that income / poverty / employment are felt to be the best indicators of deprivation for health inequalities analysis and because the possibility of being able to update these domains on a regular, perhaps annual basis, is being investigated.

In order to combine the SIMD income and employment domains, each domain was exponentially transformed to reduce averaging effects. Exponential transformation gives greater weighting to the most deprived ranking, so combining a datazone ranked most deprived with a datazone ranked least deprived would give a combined ranking skewed towards the deprived end of the scale. This is the method used to create the SIMD.

The income and employment domains have been given equal weighting when combined in the Income-Employment Index.

In line with the recommendations of the Short Life Technical Advisory Group, the Income-Employment Index deciles are population based. Datazone based deciles are produced by ranking the 6,505 datazones in Scotland according to their deprivation score and then dividing them into deciles based on number of datazones (so that those datazones ranked from 1 to 651 are in decile 1 and so on). Population basing the deciles uses the same approach but also takes into account the population sizes involved. The 6,505 datazones are ranked according to their deprivation score alongside a cumulative total of datazone populations. The cut-off for decile 1 is the point at which 10% of the population has been included, rounded to the nearest whole datazone. Population basing the deciles ensures that they contain equally sized populations, which is the best proxy to individual level indicators of deprivation available when using an area based measure. Equally sized populations in the deciles are also important for the types of inequalities analyses presented in this report.