Long-term Monitoring of Health Inequalities: Headline Indicators

October 2012

CONTENTS

Introduction

This publication updates the headline indicators from the Long-Term Monitoring of Health Inequalities[1] report. This is the fifth annual update of these data.

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 indicators should be monitored over time. The group's recommended indicators were:

Headline indicators of inequalities in health outcomes
- Healthy Life Expectancy at birth
- Premature Mortality from all causes aged under 75 years
- Mental Wellbeing of adults aged 16 years and over
- Low birthweight

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

Details of the definitions and sources for these indicators are provided in Annex 2. Note that the time periods for which data are available for these indicators vary.

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.

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[1] The first Long-Term Monitoring of Health Inequalities report (published 2008) is available here: http://scotland.gov.uk/Publications/2008/09/25154901/0

- 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 or 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.

The report of the Ministerial Task Force, *Equally Well*[2] (published in June 2008), recommended that these indicators and measures should be adopted and a report published. The first report was published in September 2008 and updates were published in September 2009, October 2010 and October 2011. This report represents the fifth of a series of annual publications.

Recommendations from the Technical Advisory Group, June 2012
In June 2012 there was a further meeting of the technical advisory group to review methodology and the range of published indicators. The meeting focussed on two main areas. The first of these was a proposal that the assumption of a linear relationship between deprivation and each indicator be tested, and possibly replaced by a non-linear model if appropriate[3]. The second issue surrounded whether the existing range of indicators was appropriate[4].

On the issue of applying a non-linear spline model to the measurement of relative deprivation, it was agreed that no changes would be made to the methodology. While the alternative had some technical merits it was felt to be too complex for this report; and its lack of consistency over time had drawbacks for long-term monitoring.

On the range of reported indicators, it was agreed that the low birthweight indicator should be supplemented by an additional indicator of appropriate weight for gestational age (including high birthweight babies). This will be included in the 2013 annual report when data are available for this indicator. It was also agreed that mortality rates from each of the three most common types of cancer should be investigated separately to total cancer mortality. This is because there may be distinct patterns of inequality for different cancer types. This matter will be investigated over the coming year and, if appropriate, new indicators may be introduced in the 2013 report.

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[2] Equally well (2008), http://scotland.gov.uk/Publications/2008/06/25104032/0
[3] What is the shape of the dose-response relationship between markers of socioeconomic status and health status indicators: https://www.scphrp.ac.uk/node/193
[4] Best Practice Guidelines for Monitoring Socioeconomic Inequalities in Health Status: Lessons from Scotland: https://www.scphrp.ac.uk/node/244

Results

Summary of Trends

- **Healthy life expectancy at birth:** A new methodology means change over time cannot be measured, but there continues to be inequalities in both relative and absolute terms.

- **Premature Mortality (all causes, under 75 years):** since 2006, inequalities have been stable in relative terms, and have fallen in absolute terms.

- **Mental Wellbeing (WEMWBS):** inequalities are increasing in absolute terms but remain stable in relative terms.

- **Low birthweight:** inequalities are narrowing in both absolute and relative terms.

- **Hospital admissions for heart attack (under 75 years):** over time inequalities have fluctuated in both absolute and relative terms, but with no clear long-term trend

- **Coronary Heart Disease (CHD) deaths (45-74 years):** inequalities are narrowing in absolute terms and, following a long-term increase, have begun to stabilise in relative terms.

- **Cancer incidence (under 75 years):** over the long term, inequalities are stable in both absolute and relative terms.

- **Cancer deaths (45-74 years):** over the long term there has been a slight increase in relative inequality, although this has been more stable since 2004. Absolute inequalities have fluctuated over time with no clear trend.

- **Alcohol – first hospital admission (under 75 years):** the level of absolute inequality has fallen since 2007, while relative inequality has remained stable over the same period.

- **Alcohol – deaths (45-74 years):** inequalities have reduced since a peak in 2006 in both relative and absolute terms, but remain higher than in 1998.

- **All-cause mortality (15-44 years):** inequalities have grown in relative terms over the long term, but have stabilised in recent years. Absolute inequality shows no clear trend over the time.

Healthy Life Expectancy (HLE) - at birth

Summary

- A new methodology means change over time cannot be measured, but there continues to be inequalities in both relative and absolute terms.
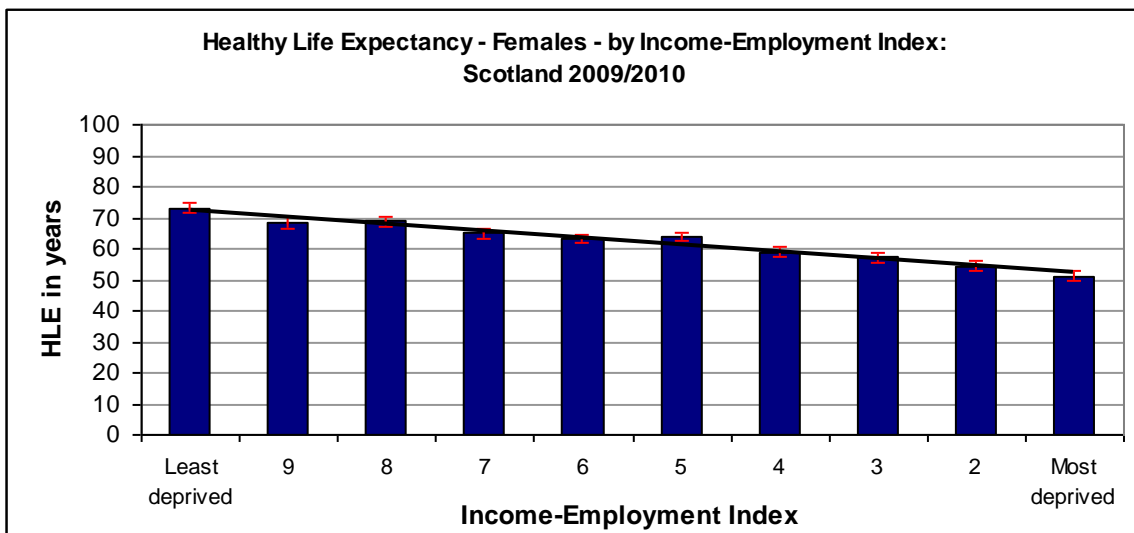
The Healthy Life Expectancy (HLE) indicator is based on two years of data to ensure large enough sample sizes. The results presented below for 2009/10 are replicated from the report published in October 2011, and will be updated next year with results for 2011/12.

Between 1999/2000 and 2007/2008, HLE increased by 3 years (4.5%) for males and 2.3 years (3.4%) for females. In 2009 the format of the self-assessed health question (on which the healthy life expectancy data is based) was changed to align with the European Union. This has led to a major discontinuity in the series. For both men and women, the markedly lower estimate of HLE at birth for Scotland for 2009 (8 years below the 2008 estimates for men and women) cannot be considered as part of the same series as earlier years, but represents the first point in a new time trend for future years. A technical paper by the Scottish Public Health Observatory (ScotPHO) has more information on this change[5]

In 2009/2010, HLE at Scotland level for males was 59.9 years (16.3 years less than life expectancy) and HLE for females was 62.1 years (18.6 years less than life expectancy). HLE in deprived areas is lower for both males and females than HLE in areas of low deprivation. In 2009/2010, HLE of those living in the most deprived decile was 22.5 years lower for males and 22.1 years lower for females than HLE of those living in the least deprived decile. The difference between HLE and life expectancy (expected years spent in 'not good' health) is also notably greater in more deprived areas: for males - 21.3 years in 'not good' health in the most deprived decile compared with 12.1 years in the least deprived decile; and for females – 24.9 years in 'not good' health in the most deprived decile compared with 11.6 years in the least deprived decile.

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[5]Technical paper available at: http://www.scotpho.org.uk/population-dynamics/healthy-life-expectancy/references

Inequalities gradient in the most recent year available

Healthy Life Expectancy - Males - by Income-Employment Index: Scotland 2009/2010

Healthy Life Expectancy - Females - by Income-Employment Index: Scotland 2009/2010

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

Relative Index of Inequality (RII) over time

Relative Index of Inequality (RII): Healthy Life Expectancy - Males
Scotland 1999/2000-2009/2010
(RII = SII divided by population mean HLE)

Relative Index of Inequality (RII): Healthy Life Expectancy - Females
Scotland 1999/2000-2009/2010
(RII = SII divided by population mean rate)
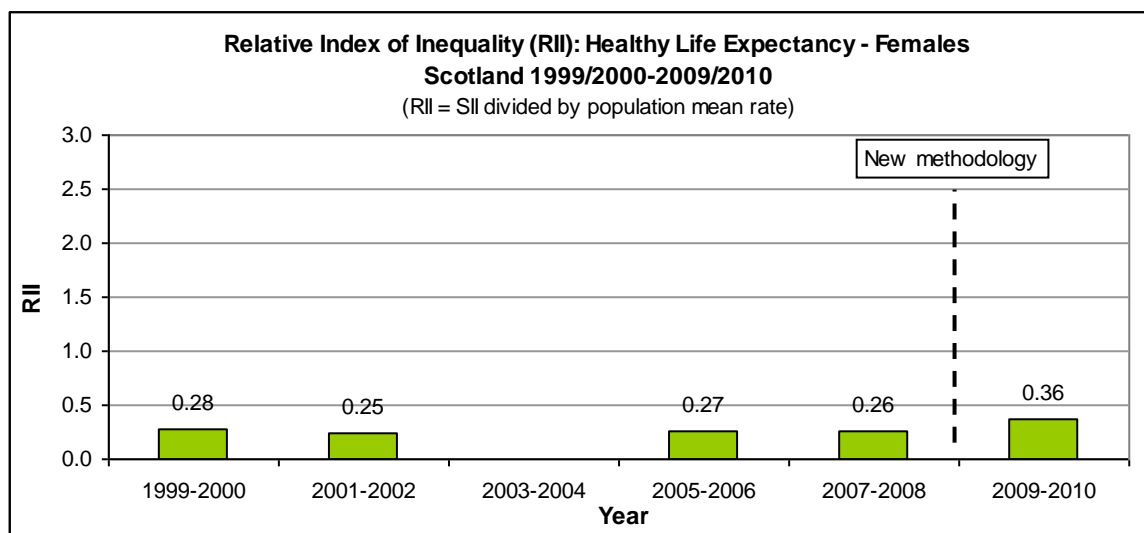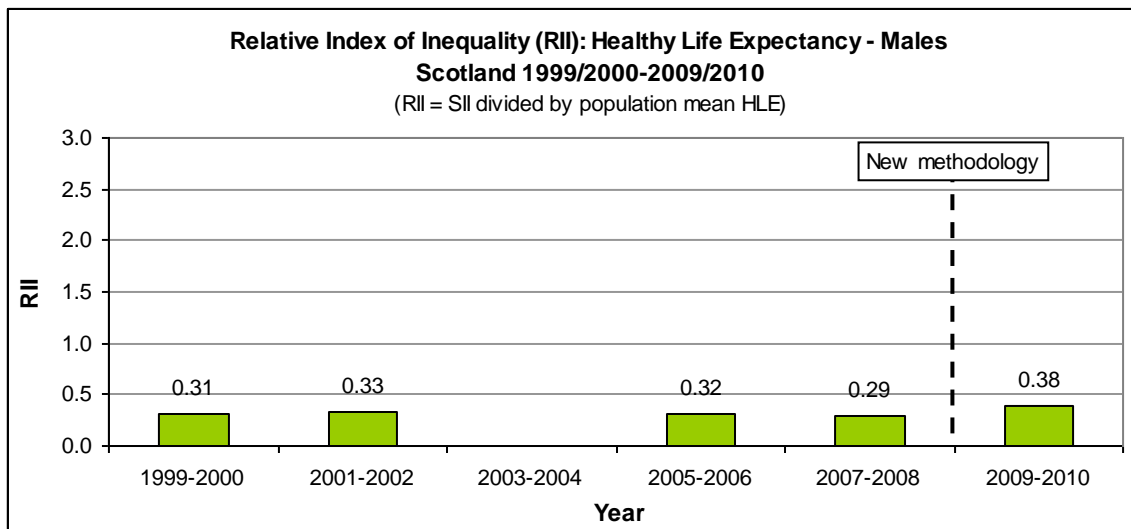
Data not available for 2003/2004

Absolute range over time

Absolute range: Healthy Life Expectancy - Males
Scotland 1999/2000 to 2009/2010

Absolute range: Healthy Life Expectancy - Females
Scotland 1999/2000 to 2009/2010
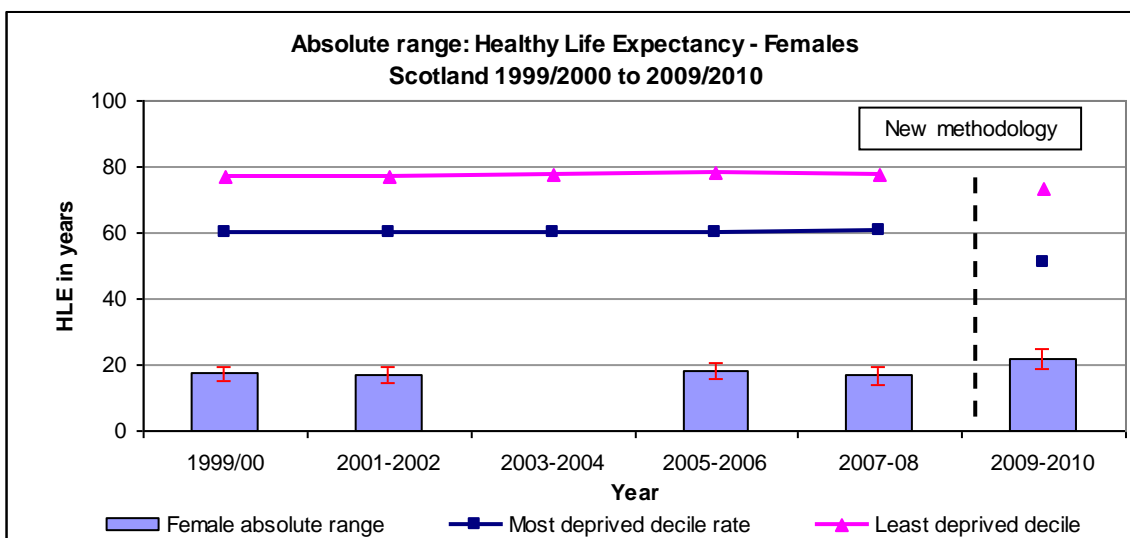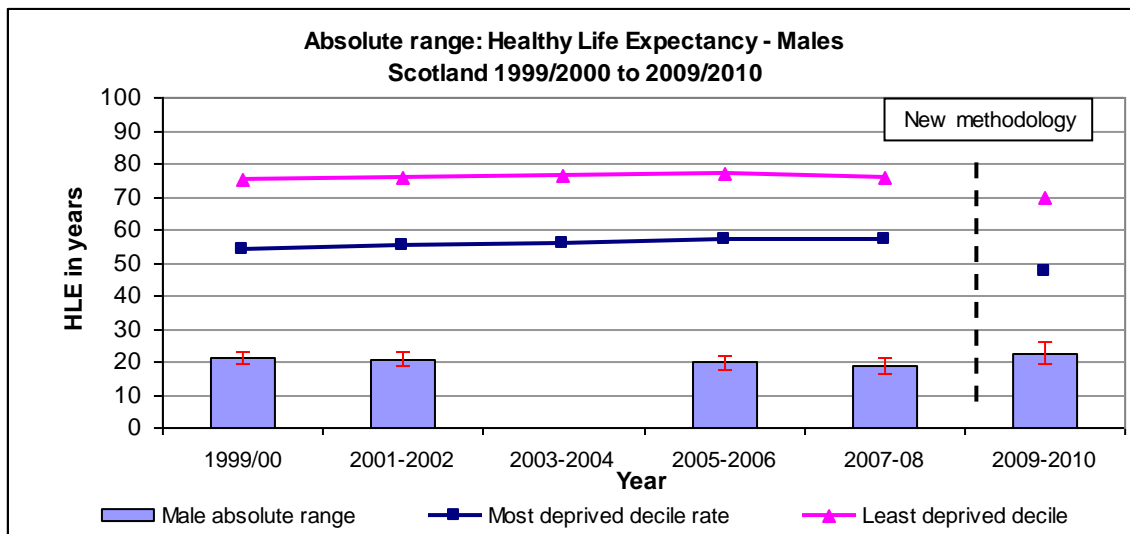
Data not available for 2003/2004.
The red bars for each column indicate the uncertainties in each estimate of absolute difference in HLE.

Scale / context

New Methodology (5 point scale of self-assessed health), 2009/2010

	Male HLE in years	95%LL	95%UL	Male LE in years	95%LL	95%UL	Estimated years spent in not good health[1]
2009/2010							
Scotland	59.9	59.4	60.4	76.1	76.0	76.2	16.2
Most deprived decile	47.4	45.8	49.0	68.7	68.3	69.1	21.3
Least deprived decile	69.9	68.2	71.6	82.0	81.6	82.3	12.1

	Female HLE in years	95%LL	95%UL	Female LE in years	95%LL	95%UL	Estimated years spent in not good health[1]
2009/2010							
Scotland	62.1	*61.6*	*62.6*	80.6	*80.5*	*80.8*	18.6
Most deprived decile	51.1	*49.6*	*52.6*	76.1	*75.7*	*76.5*	24.9
Least deprived decile	73.2	*71.7*	*74.7*	84.8	*84.5*	*85.1*	11.6

1. From 2009 Self-assessed health was measured on a five-point scale (Very good, Good, Fair, Bad, Very bad). For summary purposes the final three categories (Fair, Bad, Very Bad) are collectively referred to as 'Not good health'. This is different to the category of 'Poor health' in the subsequent two tables.

Previous Methodology (3-point scale of self-assessed health), 1999/2000 to 2007/2008

	Male HLE in years	95%LL	95%UL	Male LE in years	95%LL	95%UL	Estimated years spent in poor health[1]
1999/2000							
Scotland	65.0	*64.7*	*65.4*	73.0	*72.8*	*73.1*	7.9
Most deprived decile	53.7	*52.6*	*54.8*	65.8	*65.4*	*66.3*	12.1
Least deprived decile	75.0	*74.0*	*75.9*	78.6	*78.3*	*79.0*	3.7
2001/2002							
Scotland	65.9	*65.6*	*66.2*	73.4	*73.3*	*73.5*	7.5
Most deprived decile	55.0	*53.9*	*56.1*	65.8	*65.4*	*66.3*	10.8
Least deprived decile	75.7	*74.8*	*76.6*	79.5	*79.1*	*79.9*	3.8
2003/2004							
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*	-
2005/2006							
Scotland	67.4	*67.1*	*67.7*	74.8	*74.7*	*74.9*	7.4
Most deprived decile	57.0	*55.9*	*58.1*	67.5	*67.1*	*67.9*	10.5
Least deprived decile	76.8	*75.8*	*77.8*	80.7	*80.4*	*81.1*	3.9
2007/2008 – revised[2]							
Scotland	68.0	*67.6*	*68.3*	75.1	*75.0*	*75.2*	7.1
Most deprived decile	56.9	*55.7*	*58.1*	67.6	*67.2*	*68.0*	10.6
Least deprived decile	75.8	*74.7*	*76.9*	80.9	*80.6*	*81.3*	5.1

	Female HLE in years	95%LL	95%UL	Female LE in years	95%LL	95%UL	Estimated years spent in poor health[1]
1999/2000							
Scotland	68.2	67.8	68.5	78.4	78.3	78.5	10.3
Most deprived decile	59.8	58.6	61.0	74.2	73.9	74.6	14.4
Least deprived decile	77.1	76.1	78.1	81.8	81.5	82.1	4.7
2001/2002							
Scotland	69.2	68.9	69.6	78.9	78.8	79.0	9.6
Most deprived decile	60.0	58.8	61.1	74.6	74.2	74.9	14.6
Least deprived decile	76.8	75.6	77.9	82.4	82.1	82.8	5.7
2003/2004							
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	-
2005/2006							
Scotland	69.6	69.2	70.0	79.7	79.6	79.8	10.1
Most deprived decile	59.9	58.7	61.1	75.1	74.7	75.5	15.2
Least deprived decile	78.1	76.8	79.3	84.2	83.9	84.6	6.2
2007/2008							
Scotland	70.5	70.1	70.9	80.0	79.8	80.1	9.5
Most deprived decile	60.9	59.5	62.2	75.5	75.2	75.9	14.7
Least deprived decile	77.6	76.3	78.8	84.3	84.0	84.6	6.7

1. Prior to 2009 Self-assessed health was measured on a three-point scale (Good, Fairly good, Not good). For summary purposes 'Not good' responses were counted as 'Poor health'. This is not comparable to the category of 'Not good health' used from 2009 onwards.
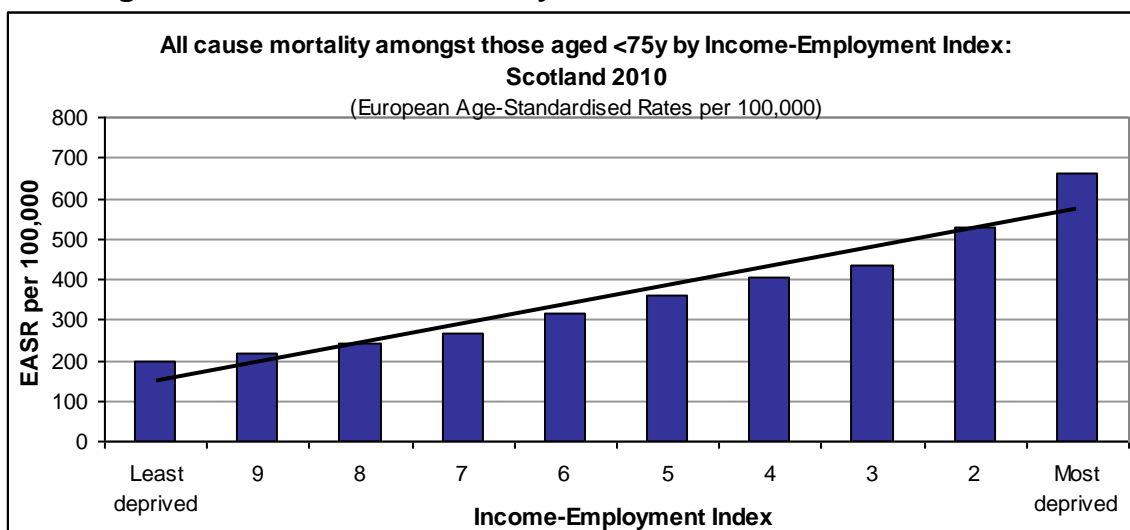
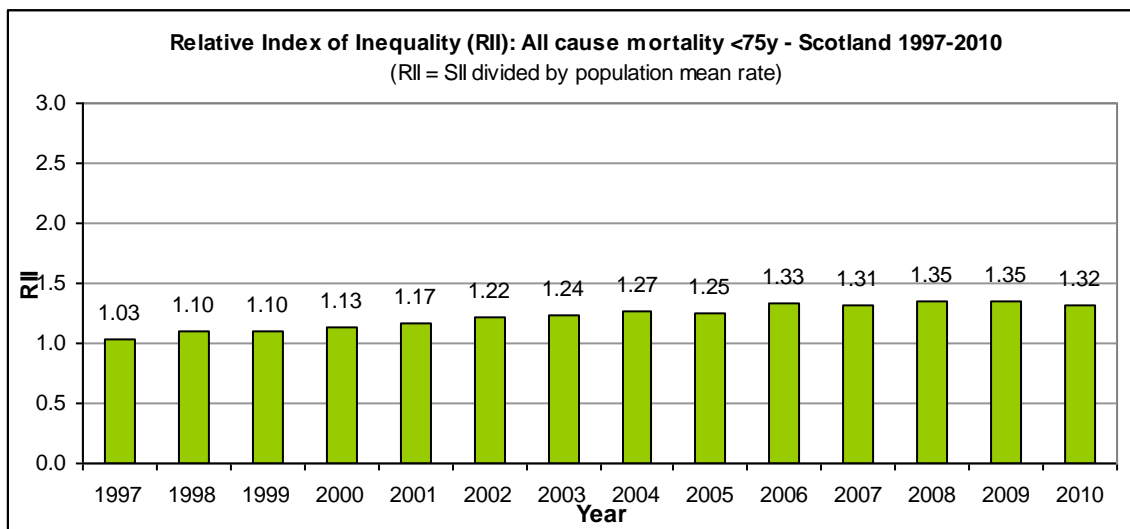## Premature Mortality - from all causes, aged under 75 years

Summary

- Since 2006, inequalities have been stable in relative terms, and have fallen in absolute terms

Between 1997 and 2010, deaths amongst those aged under 75 years have decreased by 26.4%. Despite these decreases, around 21,000 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 2010, premature deaths amongst those living in the most deprived decile were 3.4 times more likely than those living in the least deprived decile. Reductions in premature mortality have been observed across the population in most years since 1997. Between 1997 and 2006 these improvements occurred at a slower rate in the most deprived areas than elsewhere in Scotland, which resulted in a widening of inequalities in relative terms. However, in the years since 2006 the level of relative inequalities has stabilised. Over the long-term the level of absolute equality has remained broadly stable, although there have been some reductions in recent years.
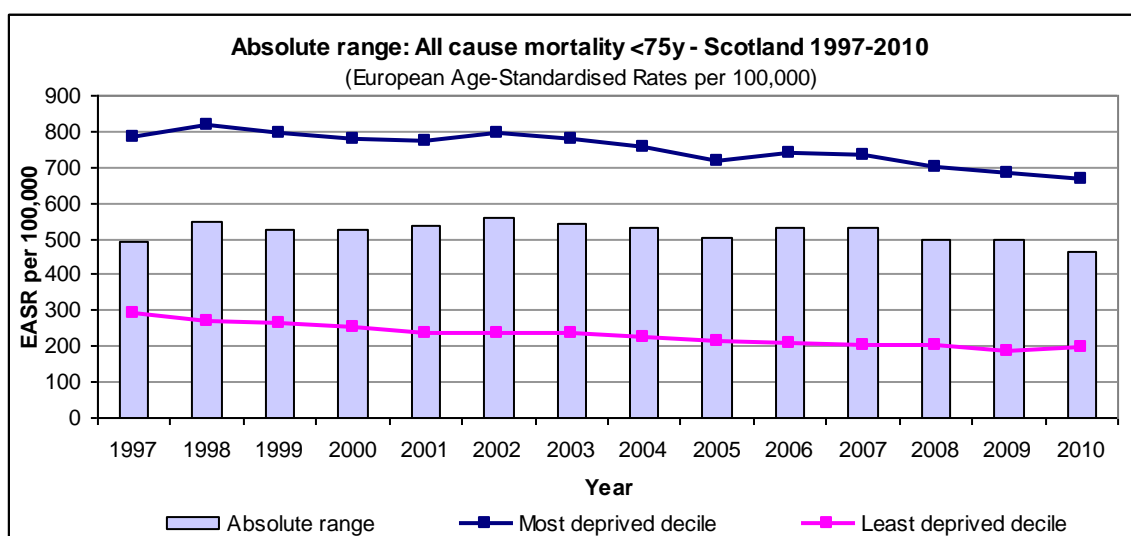
Inequalities gradient in the most recent year available

Relative Index of Inequality (RII) over time

Absolute range over time

Absolute range: All cause mortality <75y - Scotland 1997-2010
(European Age-Standardised Rates per 100,000)

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
2007	22,359	4,755,963	393.4
2008	22,005	4,775,321	382.8
2009[1]	21,229	4,795,479	364.8
2010	20,997	4,816,465	357.2

1. Correction notice. A clerical error was identified in the previous publication of the target population for 2009. This did not reflect an error in the underlying data and no statistical results have been affected.

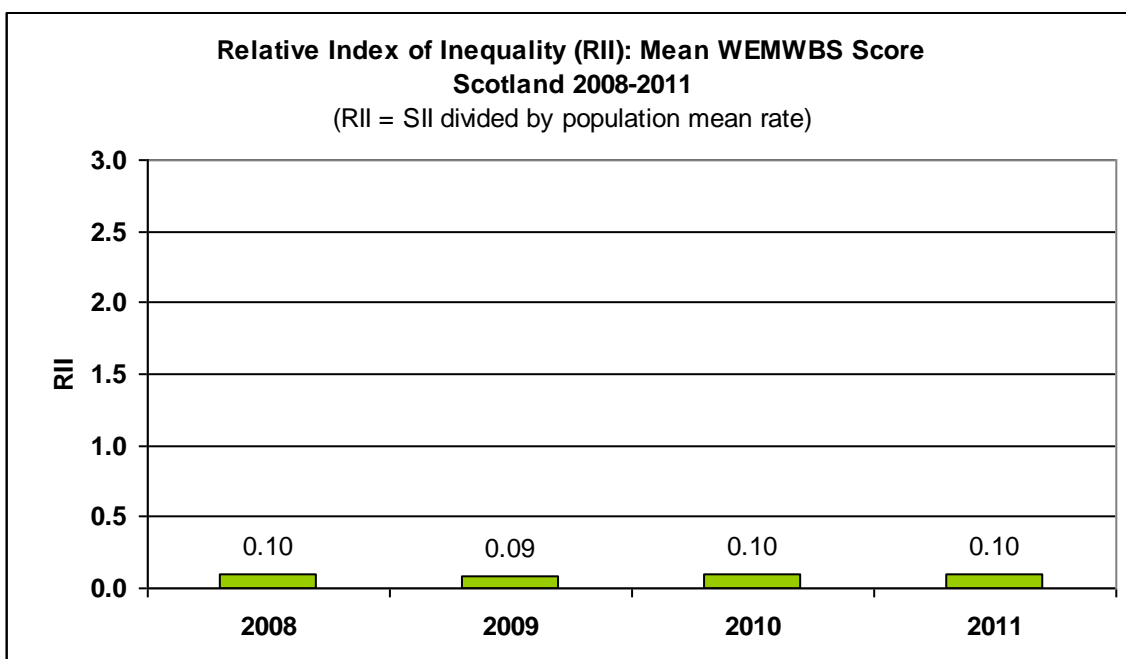## Mental Wellbeing (WEMWBS) - adults aged 16 years and over

Summary

- Inequalities are increasing in absolute terms but remain stable in relative terms.

There is a clear difference in mean WEMWBS scores in terms of deprivation. Those in the most deprived decile reported a lower mean score (indicating lower mental wellbeing) than those in the highest decile. The absolute level of inequality has increased slightly in the last two years, from a difference of 3.8 in mean WEMWBS scores in 2009 to 5.0 in 2011. Relative inequality has remained stable over the last four years.

Inequalities gradient in the most recent year available

Mean WEMWBS Score (16+ years) by Income-Employment Index: Scotland 2011

Relative Index of Inequality (RII) over time

Relative Index of Inequality (RII): Mean WEMWBS Score Scotland 2008-2011 (RII = SII divided by population mean rate)

Absolute range over time

Absolute range: Mean WEMWBS Score Scotland 2008-2011
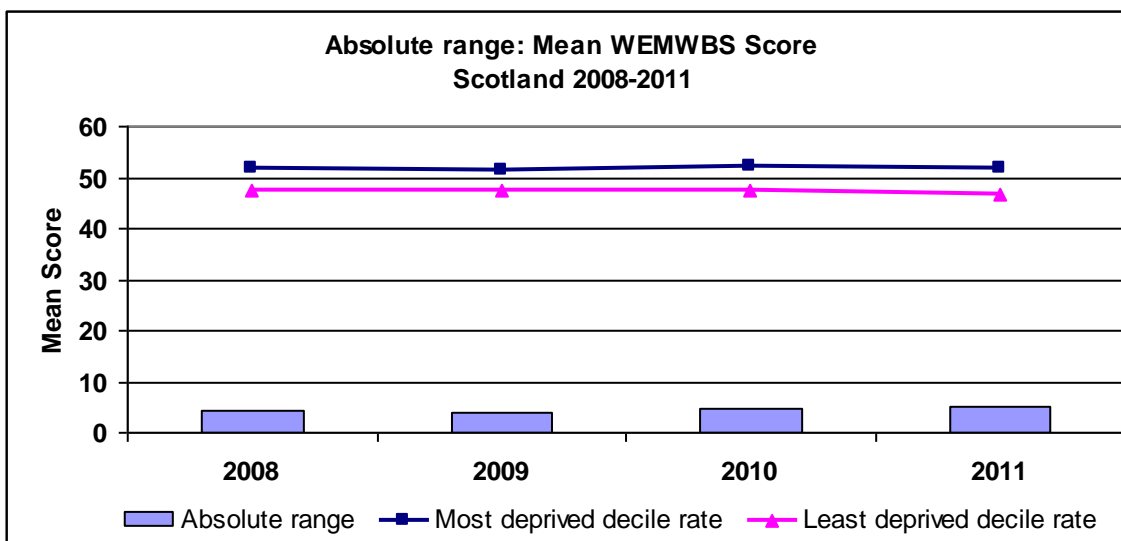
Scale / context

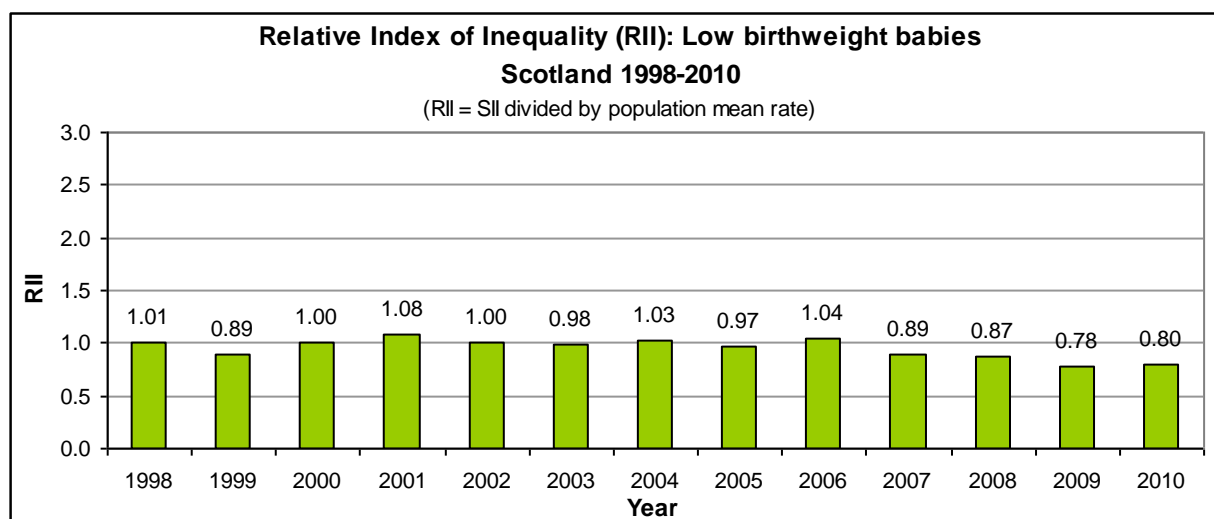| Income-Employment Index Decile	Mean WEMWBS Score 2008	Mean WEMWBS Score 2009	Mean WEMWBS Score 2010	Mean WEMWBS Score 2011
most deprived	47.4	47.5	47.5	46.7
2	47.7	47.7	47.9	48.2
3	48.9	49.0	48.4	48.8
4	49.6	49.3	49.6	50.4
5	49.9	49.2	50.1	49.9
6	50.5	50.1	50.7	50.1
7	51.0	50.6	50.4	51.1
8	51.3	50.7	51.3	51.0
9	51.6	51.6	52.0	51.3
least deprived	51.7	51.3	52.0	51.7
Total	50.0	49.8	49.9	49.9

Low Birthweight

Summary

- Inequalities are narrowing in both absolute and relative terms

Around 3,000 low birthweight babies (less than 2.5 kg) are born each year, accounting for 5-6% of total live, full-term, singleton births in Scotland. Low birthweight babies are more common in deprived areas than in areas of low deprivation (6.8% in the most deprived areas, compared to 3.5% in the least deprived, in 2010). Inequalities were broadly stable between 1998 and 2006, but since then have narrowed in both relative and absolute terms. This has been due to a falling percentage of low birthweight babies in the most deprived areas in recent years, while the proportion in the least deprived areas has remained fairly stable.
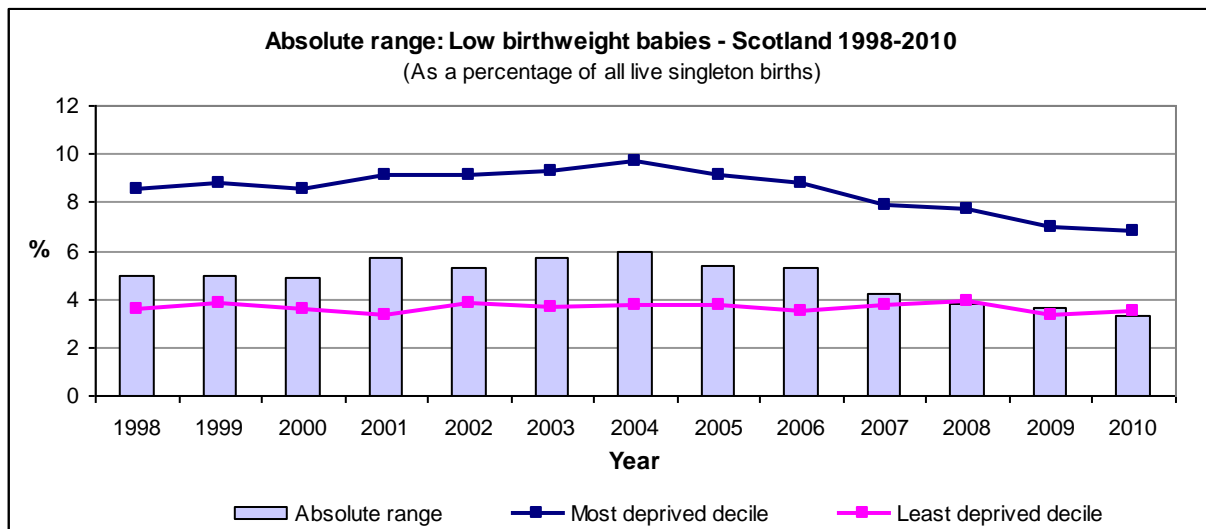
Inequalities gradient in the most recent year available
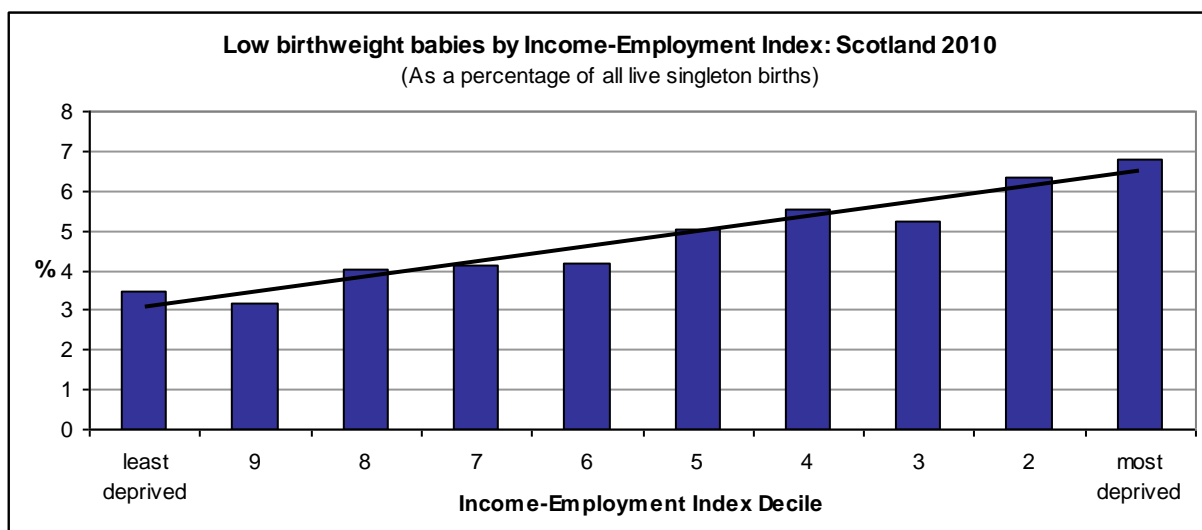
Relative Index of Inequality (RII) over time

Absolute range over time

Absolute range: Low birthweight babies - Scotland 1998-2010
(As a percentage of all live singleton births)

Legend: Absolute range | Most deprived decile | Least deprived decile

Scale / context

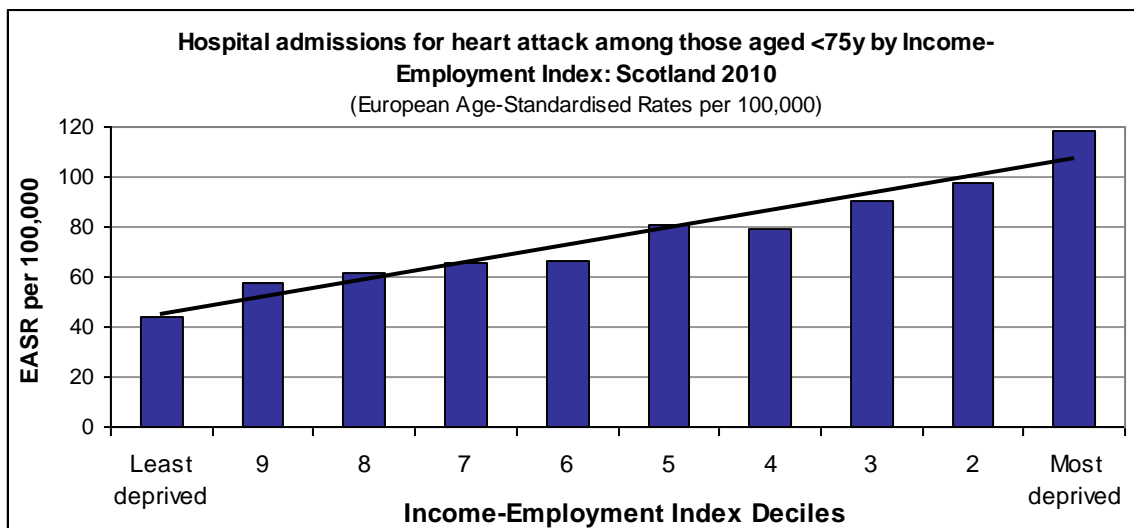|	Number of low BW babies	Target population size (live singleton births)	Percentage
1998	3,108	55,152	5.6
1999	3,098	52,726	5.9
2000	2,906	51,082	5.7
2001	2,848	49,752	5.7
2002	2,910	48,952	5.9
2003	3,026	50,071	6.0
2004	3,030	51,852	5.8
2005	3,056	51,372	5.9
2006	2,928	52,286	5.6
2007	3,095	55,086	5.6
2008	3,134	56,738	5.5
2009	2,896	55,797	5.2
2010	2,756	55,153	5.0

Coronary Heart Disease - first ever hospital admission for heart attack aged under 75 years
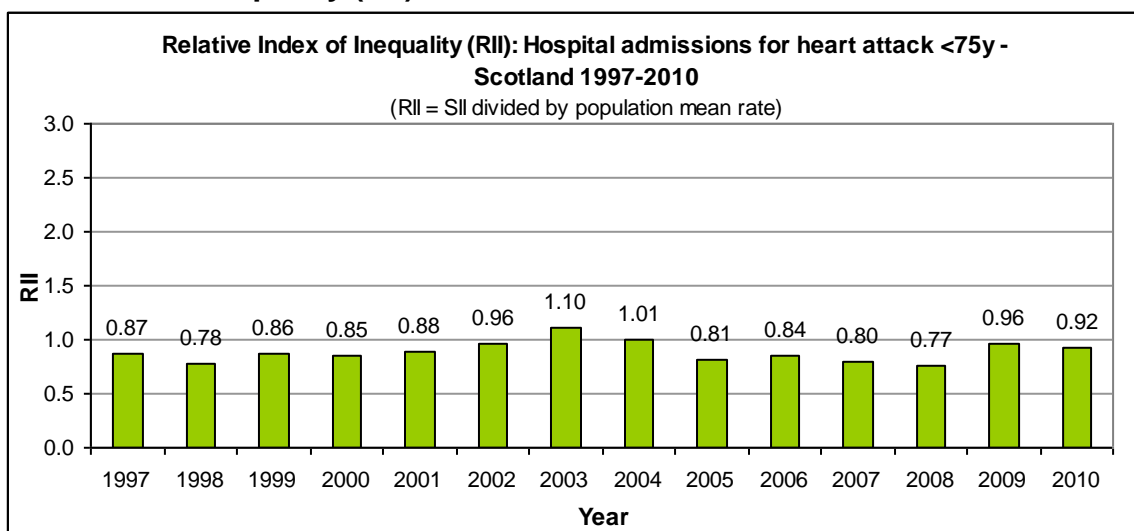
Summary
- Over time inequalities have fluctuated in both absolute and relative terms, but with no clear long-term trend

Nearly 4,400 new cases of heart attack (aged under 75 years) were admitted to hospital in 2010. Since 1997 the rate of admissions has fallen by 32%; however the recent trend has been increasing again after admissions reached their lowest level in 2007. The admissions rate is more than two and half times higher in the most deprived areas than in the least deprived areas (118.6 compared to 44.3 cases per 100,000 population, in 2010). The recent increase in admissions rates in the most deprived areas has resulted in an increase in inequalities in both relative and absolute terms since 2008, after both measures fell between 2003 and 2008. Over the longer-term there is little evidence of any clear downward trend in inequalities.

Inequalities gradient in the most recent year available

Hospital admissions for heart attack among those aged <75y by Income-Employment Index: Scotland 2010
(European Age-Standardised Rates per 100,000)

Relative Index of Inequality (RII) over time

Relative Index of Inequality (RII): Hospital admissions for heart attack <75y - Scotland 1997-2010
(RII = SII divided by population mean rate)

Absolute range over time

Absolute range: Hospital admissions for heart attack <75y
Scotland 1997-2010
(European Age-Standardised Rates per 100,000)
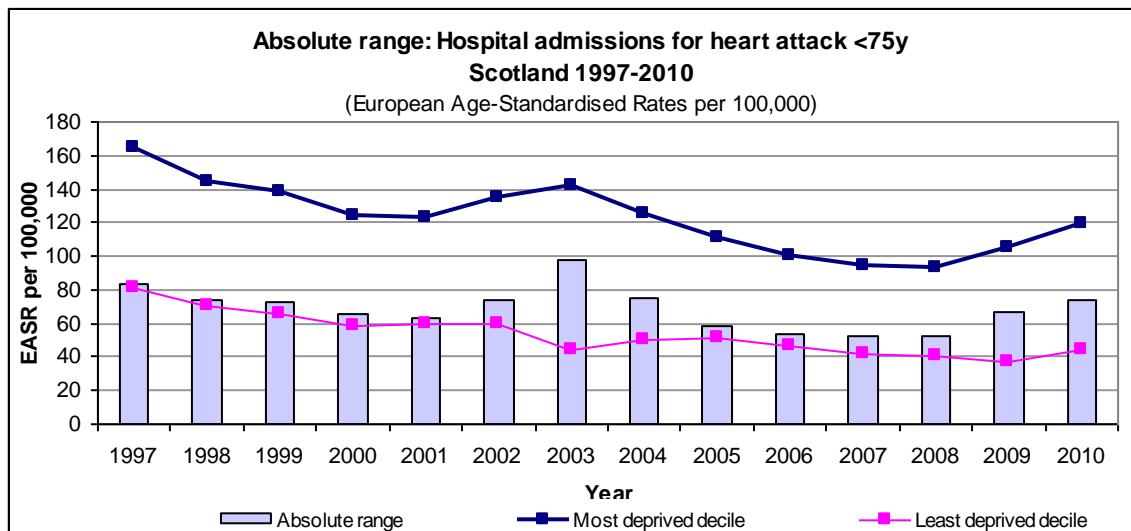
Scale / context

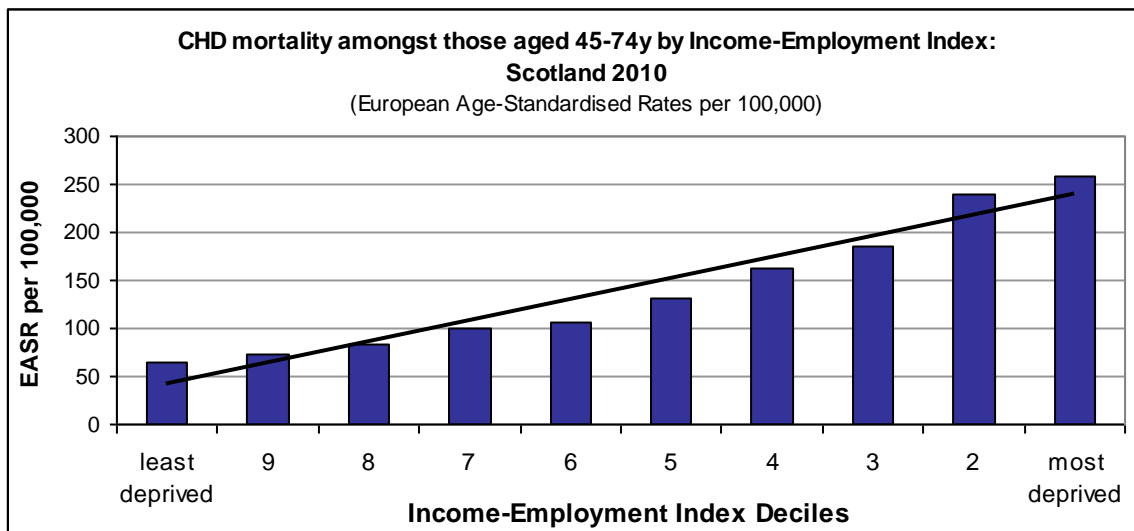|	Number of new cases	Target population size	Rate per 100,000 (EASR)
1997	5,765	4,740,269	110.9
1998	5,676	4,729,975	108.3
1999	5,102	4,721,298	97.0
2000	4,812	4,708,667	90.7
2001	4,776	4,703,661	89.6
2002	4,833	4,690,508	89.6
2003	4,569	4,690,603	84.0
2004	4,413	4,706,922	80.5
2005	4,054	4,718,403	73.2
2006	3,817	4,734,676	68.6
2007	3,624	4,755,963	64.5
2008	3,733	4,775,321	65.8
2009	3,857	4,795,479	67.1
2010	4,368	4,816,465	75.3

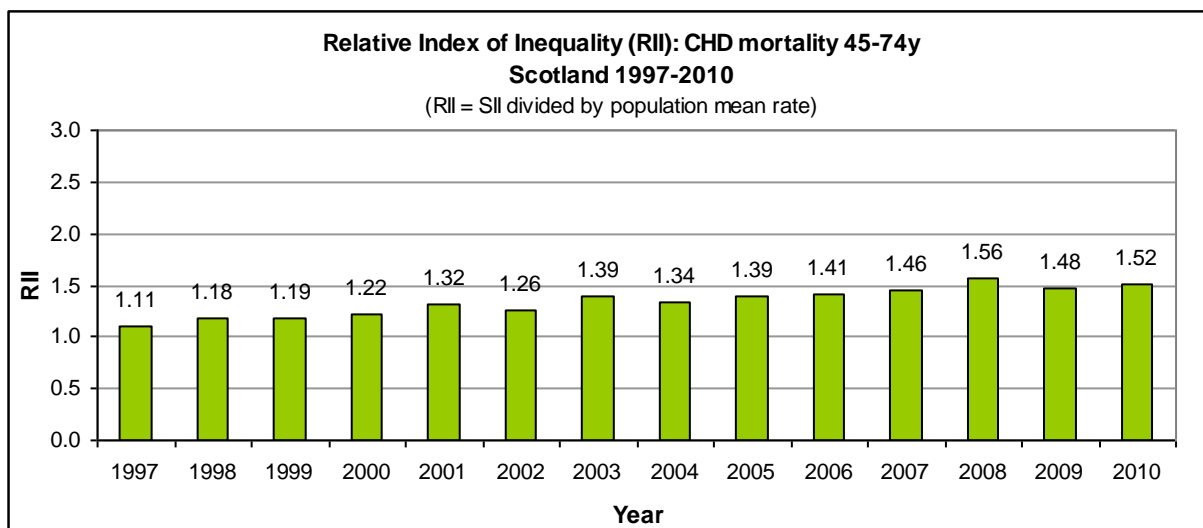## Coronary Heart Disease (CHD) - deaths aged 45-74 years

Summary

- Inequalities are narrowing in absolute terms and, following a long-term increase, have begun to stabilise in relative terms

Between 1997 and 2010, there has been a considerable decrease in CHD mortality amongst the population aged 45-74 years as a whole – rates fell by 57%. However, CHD remains one of Scotland's biggest causes of premature mortality, with around 2,800 deaths occurring in this age group. Premature mortality from CHD is around four times more common in the most deprived areas than the least deprived areas (258 deaths per 100,000 population compared to 64 per 100,000, in 2010). The level of inequality in absolute terms has fallen consistently over time. However, between 1997 and 2007 the death rate fell more quickly in the least deprived areas than in the most deprived areas, resulting in a widening of relative inequality. This trend has stabilised since 2007 as greater improvements have been seen in the most deprived areas.
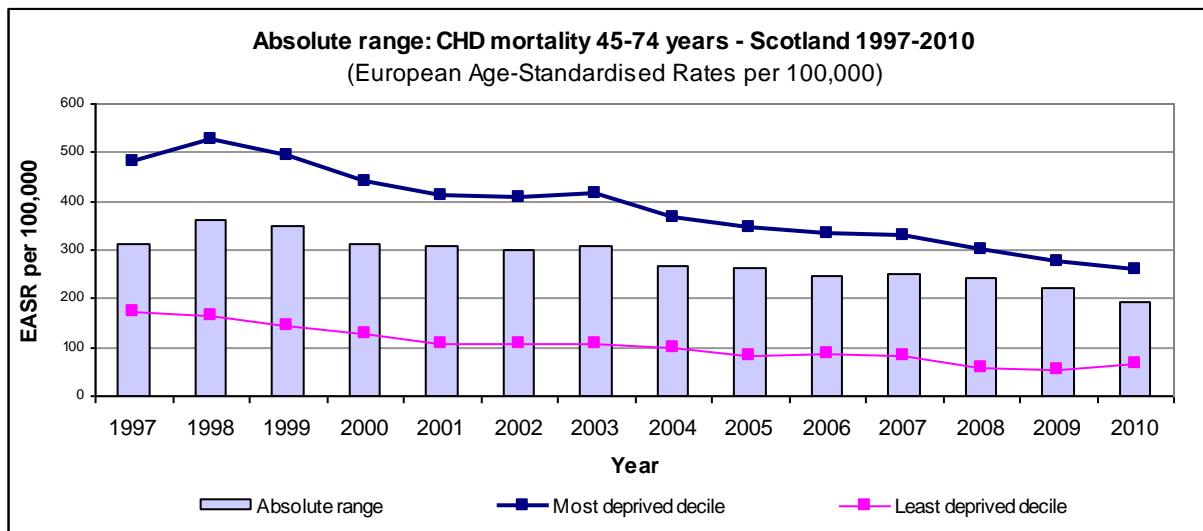
Inequalities gradient in the most recent year available

Relative Index of Inequality (RII) over time

Absolute range over time

Absolute range: CHD mortality 45-74 years - Scotland 1997-2010
(European Age-Standardised Rates per 100,000)

Scale / context

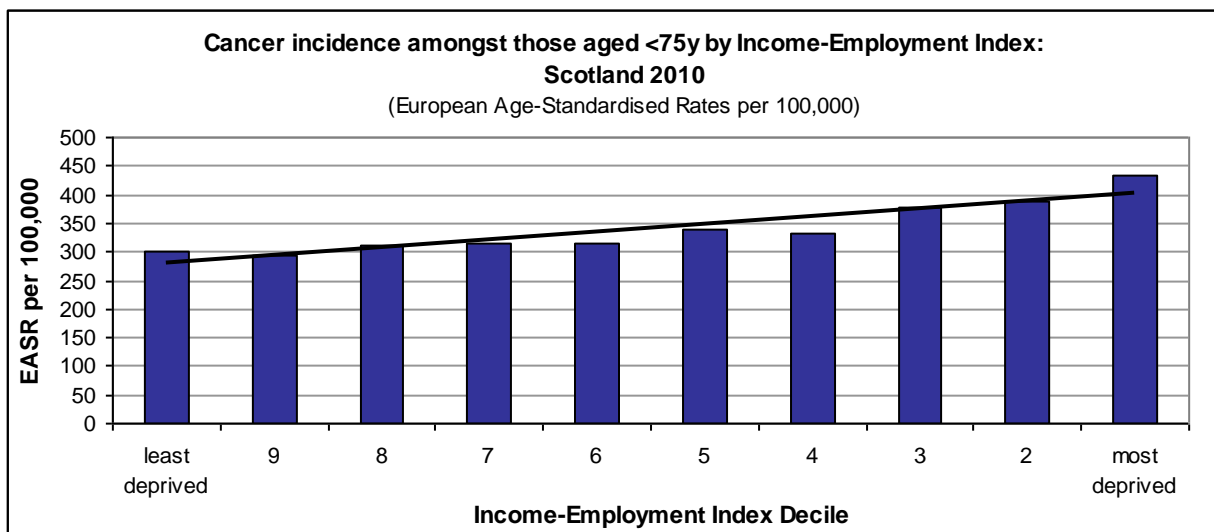|	Number of deaths	Target population size	Rate per 100,000 (EASR)
1997	5,887	1,635,590	320.0
1998	5,675	1,646,711	306.1
1999	5,389	1,658,124	289.8
2000	4,858	1,670,660	261.1
2001	4,483	1,687,422	238.9
2002	4,310	1,703,819	227.9
2003	4,197	1,724,940	219.5
2004	3,840	1,750,293	198.8
2005	3,721	1,771,454	191.2
2006	3,393	1,793,423	174.4
2007	3,374	1,818,202	171.4
2008	3,155	1,843,609	157.9
2009	2,855	1,869,363	141.3
2010	2,811	1,893,493	137.5

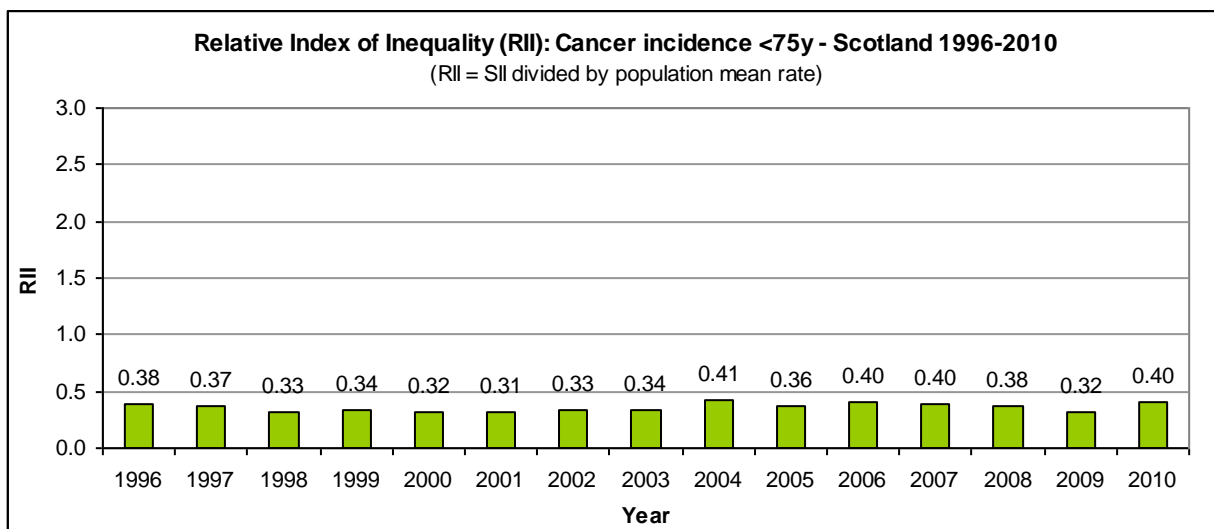## Cancer - incidence rate aged under 75 years

Summary

- Over the long term, inequalities are stable in both absolute and relative terms

There were more than 19,800 new cases of cancer diagnosed in 2010. The incidence rate remained broadly stable between 1997 and 2007, but has increased slightly in recent years. The incidence of cancer is more common in deprived areas than in less deprived areas of Scotland (432 cases per 100,000 population, compared to 301 per 100,000, in 2010). While there have been short-term fluctuations in both the relative and absolute levels of inequality, there is no clear long-term trend.

Inequalities gradient in the most recent year available

Cancer incidence amongst those aged <75y by Income-Employment Index: Scotland 2010
(European Age-Standardised Rates per 100,000)

Relative Index of Inequality (RII) over time

Relative Index of Inequality (RII): Cancer incidence <75y - Scotland 1996-2010
(RII = SII divided by population mean rate)

Absolute range over time

Absolute range: Cancer incidence <75y - Scotland 1996-2010
(European Age-Standardised Rates per 100,000)

Legend: Absolute range | Most deprived decile rate | Least deprived decile rate
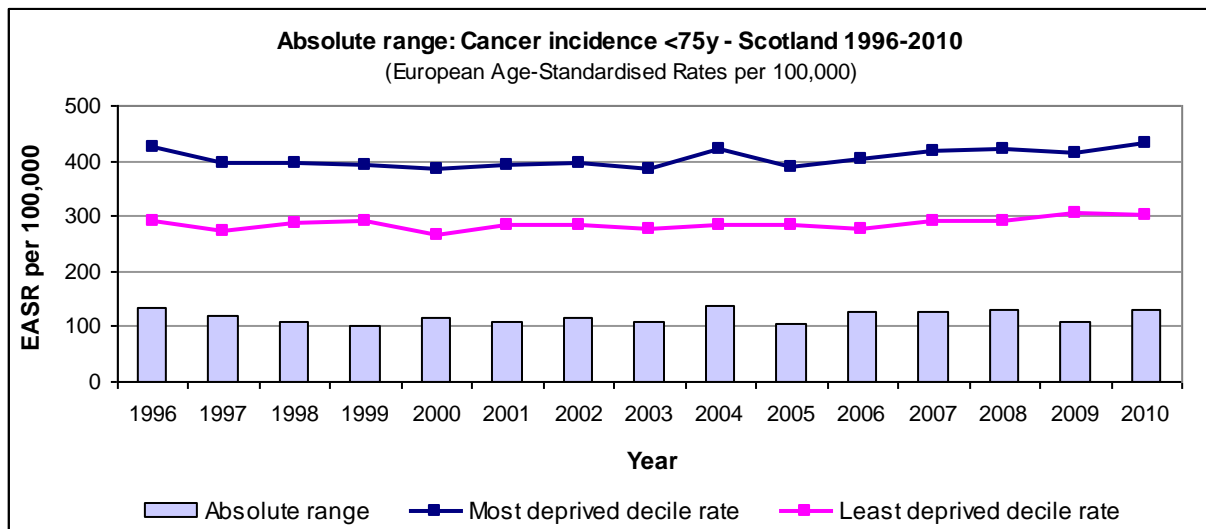
Scale / context

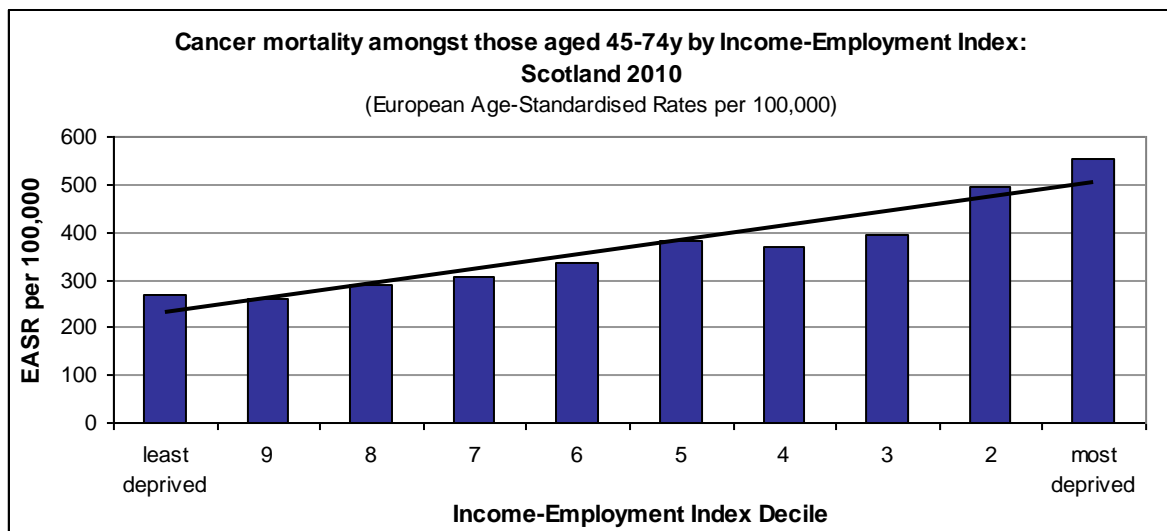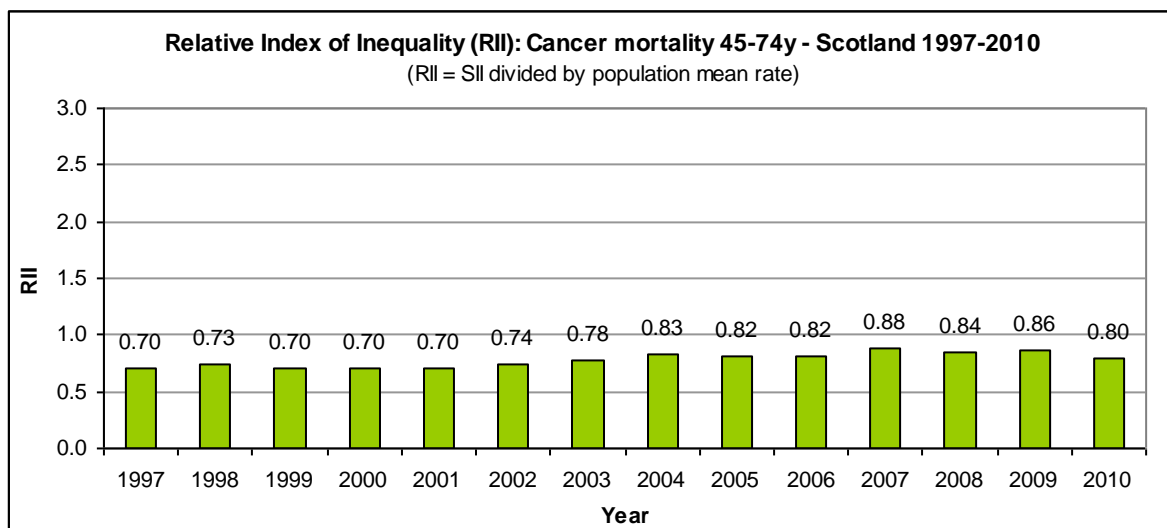|	Number of new cases	Target population size	Rate per 100,000 (EASR)
1996	18,136	4,754,906	345.1
1997	17,160	4,740,269	326.7
1998	17,144	4,729,975	323.6
1999	16,915	4,721,298	318.4
2000	17,122	4,708,667	321.2
2001	17,097	4,703,661	318.8
2002	17,465	4,690,508	323.3
2003	17,453	4,690,603	319.2
2004	18,002	4,706,922	326.5
2005	17,800	4,718,403	319.3
2006	17,873	4,734,676	318.5
2007	18,683	4,755,963	329.9
2008	19,342	4,775,321	337.1
2009	19,708	4,795,479	339.2
2010	19,855	4,816,465	338.5

Cancer - deaths aged 45-74 years

Summary

- Over the long term there has been a slight increase in relative inequality, although this has been more stable since 2004. Absolute inequalities have fluctuated over time with no clear trend.

Between 1997 and 2010, there was a 19.1% decrease in the death rate from cancer amongst those aged 45-74 years (around 7,400 deaths in 2010). People aged 45-74 living in the most deprived areas are more than twice as likely to die of cancer than those in the least deprived areas (555 per 100,000 population compared to 267 per 100,000, in 2010). Over the long-term the death rate in the most deprived areas has reduced by a similar amount as in the least deprived areas, meaning that absolute inequality has remained broadly stable (as demonstrated by the absolute range). Relative inequality has increased slightly over the long-term, but has been more stable since 2004 (indicated by the overall increase in RII).

Inequalities gradient in the most recent year available

Cancer mortality amongst those aged 45-74y by Income-Employment Index: Scotland 2010
(European Age-Standardised Rates per 100,000)

Relative Index of Inequality (RII) over time

Relative Index of Inequality (RII): Cancer mortality 45-74y - Scotland 1997-2010
(RII = SII divided by population mean rate)

Absolute range over time

Absolute range: Cancer mortality 45-74y - Scotland 1997-2010
(European Age-Standardised Rates per 100,000)

Legend: Absolute range — Most deprived decile rate — Least deprived decile rate
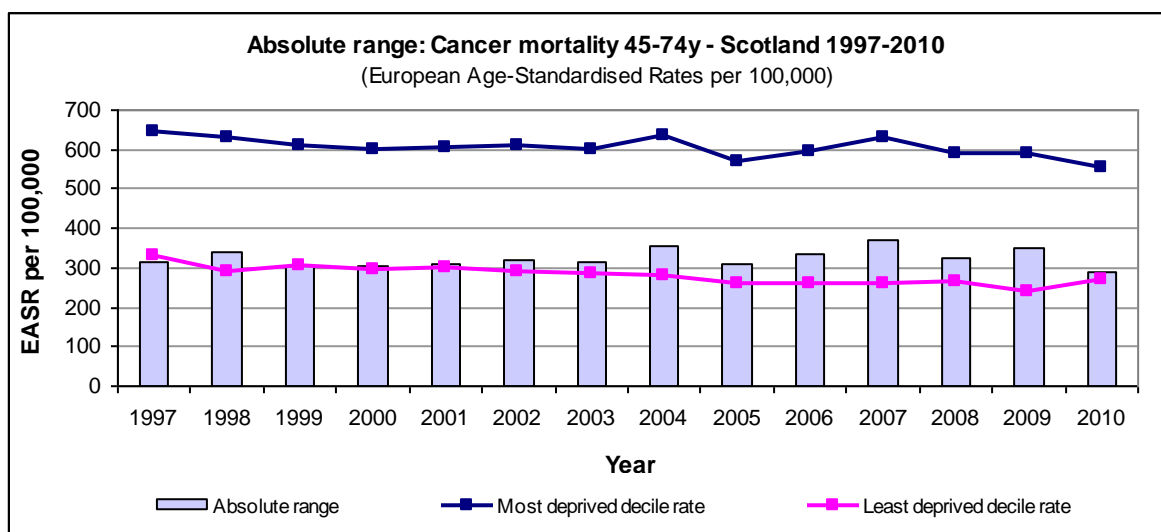
Scale / context

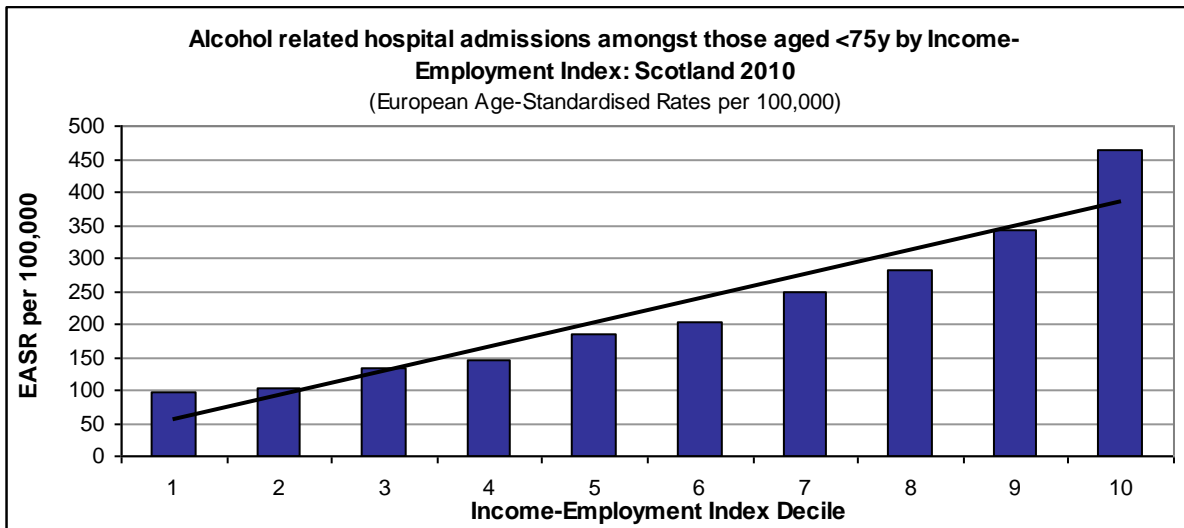|	Number of deaths	Target population size	Rate per 100,000 (EASR)
1997	8,068	1,635,590	446.9
1998	7,995	1,646,711	440.0
1999	7,904	1,658,124	433.8
2000	7,776	1,670,660	422.8
2001	7,903	1,687,422	430.1
2002	7,850	1,703,819	422.4
2003	7,706	1,724,940	409.3
2004	7,678	1,750,293	402.0
2005	7,606	1,771,454	396.7
2006	7,486	1,793,423	386.6
2007	7,569	1,818,202	385.4
2008	7,536	1,843,609	378.0
2009	7,481	1,869,363	370.3
2010	7,394	1,893,493	361.8

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

Summary

- The level of absolute inequality has fallen since 2007, while relative inequality has remained stable over the same period.

Between 2007[6] and 2010 rates of new hospital admissions for alcohol-related conditions among those aged under 75 years fell by 20% to around 11,200 new cases in 2010. These types of admissions are more common in deprived areas – 464 per 100,000 population compared to 96 per 100,000 population in areas of low deprivation. Relative inequality has remained broadly stable over time. There has been a decrease in absolute inequality since 2007, mainly caused by a decrease in the admission rate in the most deprived decile from 583 per 100,000 population (in 2007) to 464 per 100,000 population (in 2010).

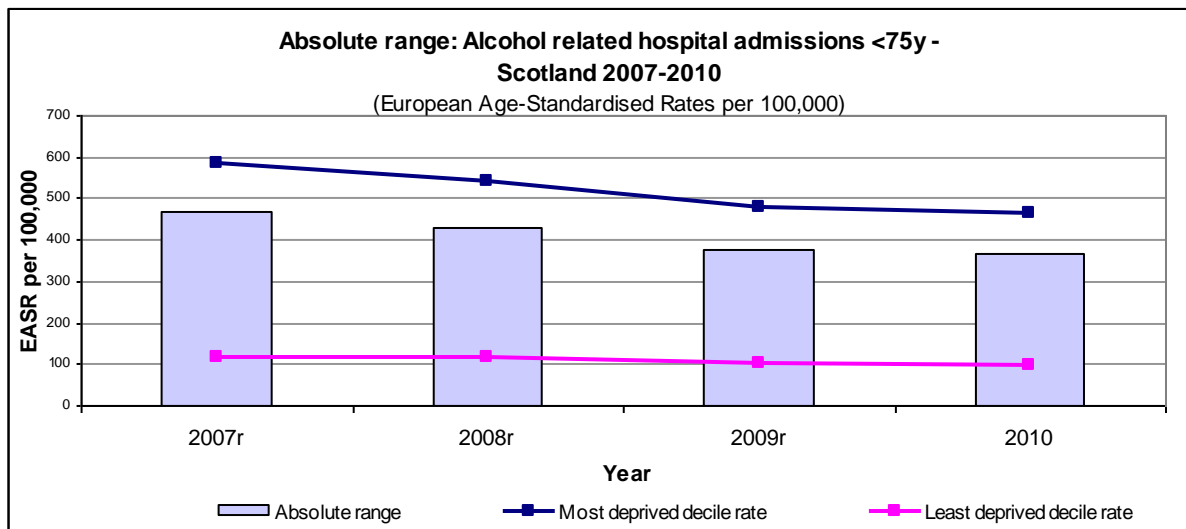### Inequalities gradient in the most recent year available

Alcohol related hospital admissions amongst those aged <75y by Income-Employment Index: Scotland 2010
(European Age-Standardised Rates per 100,000)

Relative Index of Inequality (RII) over time

Relative Index of Inequality (RII): Alcohol related hospital admissions <75y - Scotland 2007-2010
(RII = SII divided by population mean rate)

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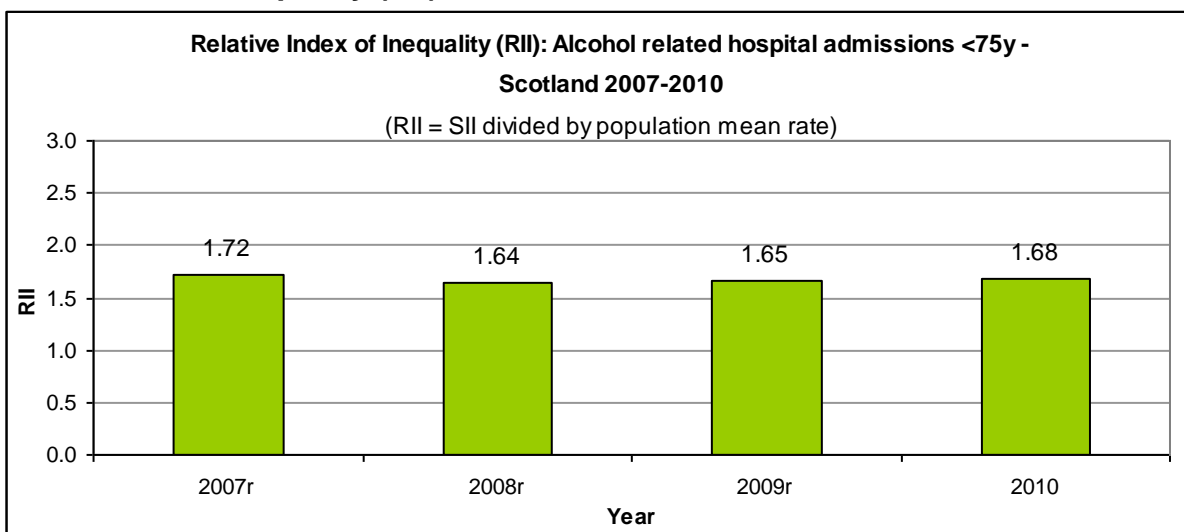
[6] There has been an update to the methodology used to produce data for this indicator. Results for 1997-2006, on a consistent basis to the latest figures, are undergoing further quality assurance and will be published with the next update

Absolute range over time

Absolute range: Alcohol related hospital admissions <75y - Scotland 2007-2010
(European Age-Standardised Rates per 100,000)

Scale / Context

	Number of new cases	Target population size	Rate per 100,000 (EASR)
2007[1]	13,633	4,755,963	271.9
2008[1]	13,145	4,775,321	260.5
2009[1]	11,832	4,795,479	232.9
2010	11,175	4,816,465	218.6

1. The 2007-2009 data have been revised since the publication of the October 2011 report. Data for 1997-2006 are undergoing quality assurance following a methodology improvement and will be published on the next update.
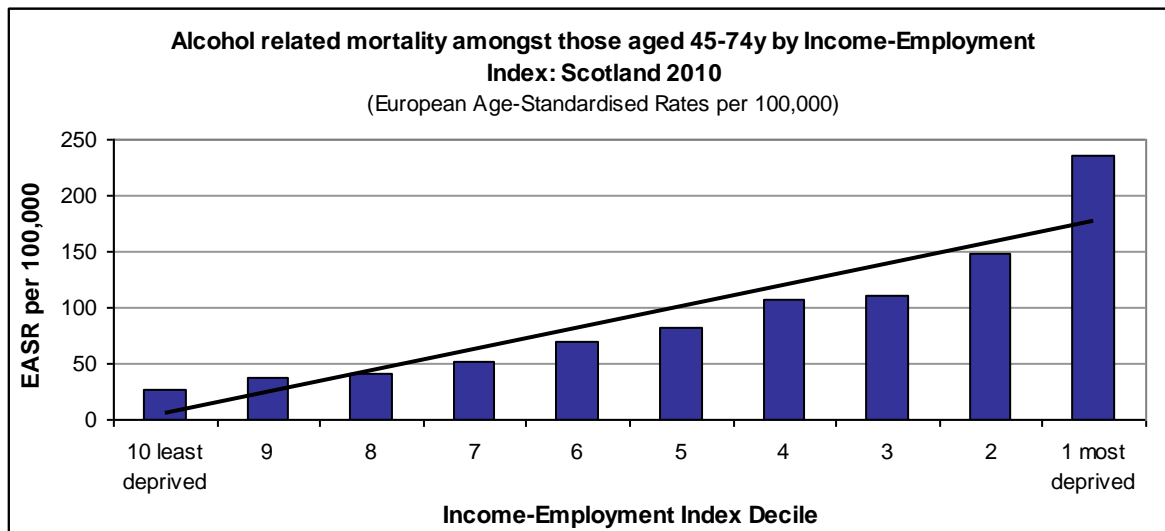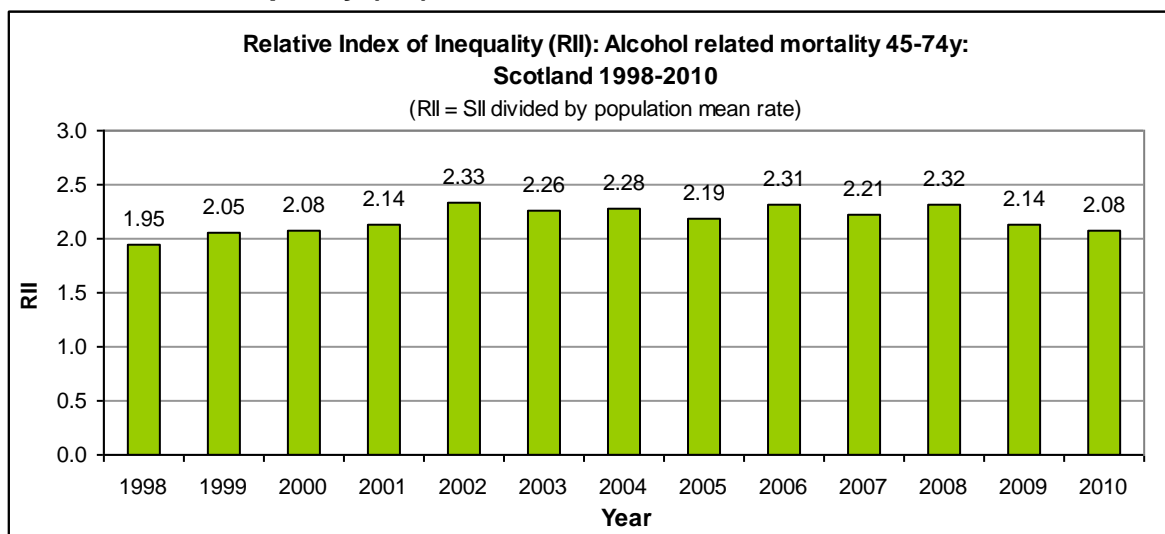
Alcohol - deaths aged 45-74 years

Summary

● Inequalities have reduced since a peak in 2006 in both relative and absolute terms, but remain higher than in 1998.

Between 1998 and 2006, there was a 24% increase in the rate of alcohol-related deaths among those aged 45-74 years. Since the peak in 2006 the rate of alcohol-related deaths has fallen again to a similar level, and in 2010 was only 2% higher than in 1998 (nearly 1,700 deaths in 2010). The overall death rate in this age group was 87.3 per 100,000 population, but with the rate in the most deprived areas nearly 10 times higher than in areas of low deprivation (236 per 100,000 compared to 27 per 100,000). The longer term pattern in alcohol related deaths has been driven by variations in the most deprived areas, while the death rate in the least deprived areas has remained stable. This resulted in a widening of inequalities in both relative and absolute terms between 1997 and 2006. However, inequalities have begun to fall again, in line with the overall pattern in deaths.

Inequalities gradient in the most recent year available

Alcohol related mortality amongst those aged 45-74y by Income-Employment Index: Scotland 2010
(European Age-Standardised Rates per 100,000)

Relative Index of Inequality (RII) over time

Relative Index of Inequality (RII): Alcohol related mortality 45-74y: Scotland 1998-2010
(RII = SII divided by population mean rate)

Absolute range over time

Absolute range: Alcohol related mortality 45-74y - Scotland 1998-2010
(European Age-Standardised Rates per 100,000)
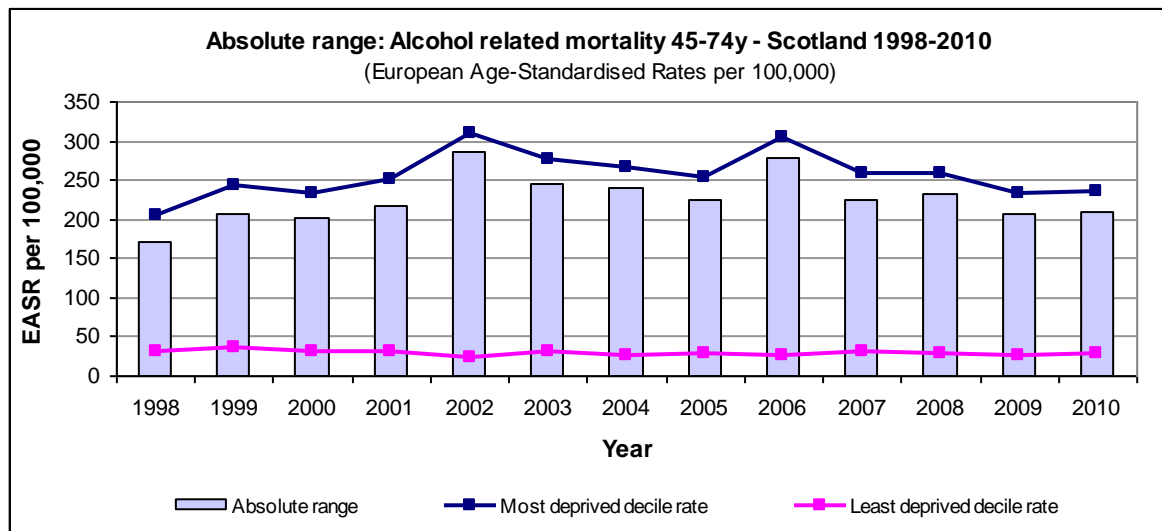
Scale / context

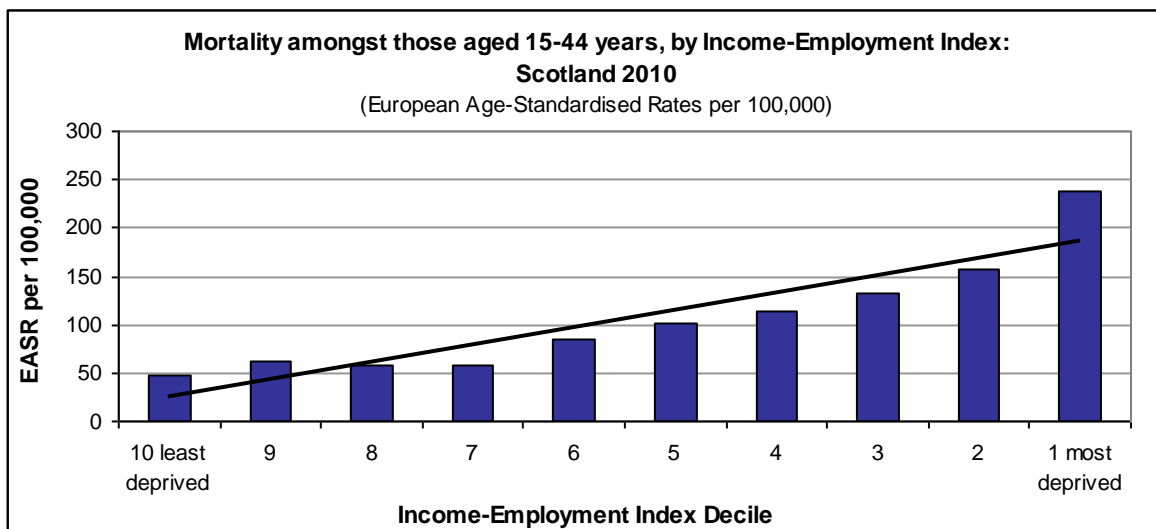|	Number of deaths	Target population size	Rate per 100,000 (EASR)
1998	1,415	1,646,711	85.6
1999	1,508	1,658,124	90.9
2000	1,489	1,670,660	89.1
2001	1,565	1,687,422	92.7
2002	1,753	1,703,819	102.9
2003	1,749	1,724,940	101.4
2004	1,764	1,750,293	100.8
2005	1,790	1,771,454	101.0
2006	1,899	1,793,423	105.9
2007	1,801	1,818,202	98.7
2008	1,782	1,843,609	95.9
2009	1,611	1,869,363	85.2
2010	1,674	1,893,493	87.3

All-cause mortality aged 15-44 years

Summary

- Inequalities have grown in relative terms over the long term, but have stabilised in recent years. Absolute inequality shows no clear trend over time.
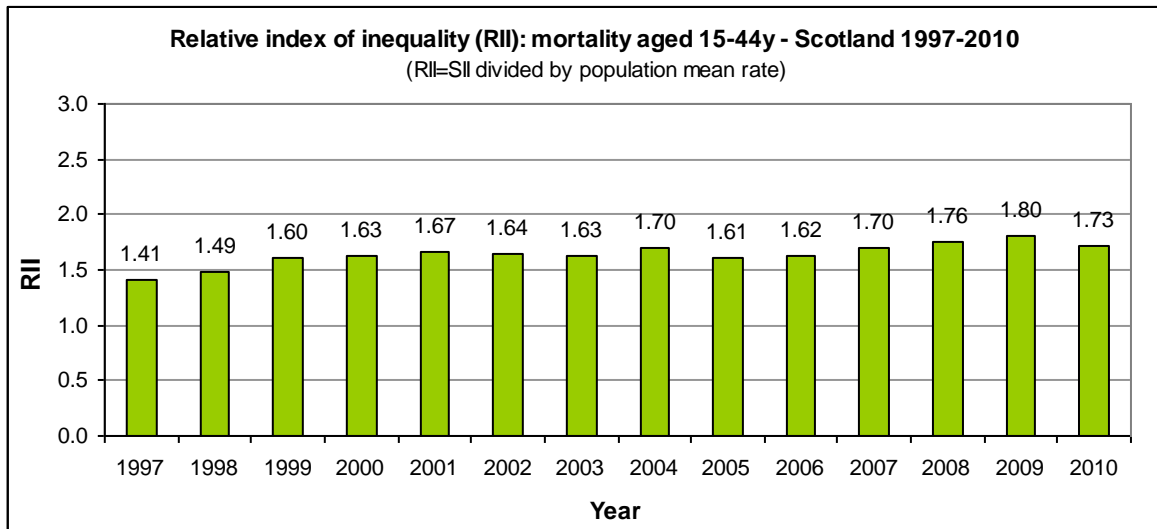
Between 1997 and 2010, the rate of death amongst those aged 15-44 years has remained broadly stable (between 106 per 100,000 population and 118 per 100,000 population). Within this age group, rates of drug related deaths have doubled over the same period (to around 19 per 100,000), rates of death from assault have remained stable (around 3 per 100,000) and rates of death from suicide have fallen by 14% (to around 20 per 100,000). However, note 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 (238 per 100,000 population compared to 47 per 100,000, in 2010). While there have been some short terms fluctuations in both the relative and absolute level of inequalities, the rates of both have remained broadly stable since 1999.
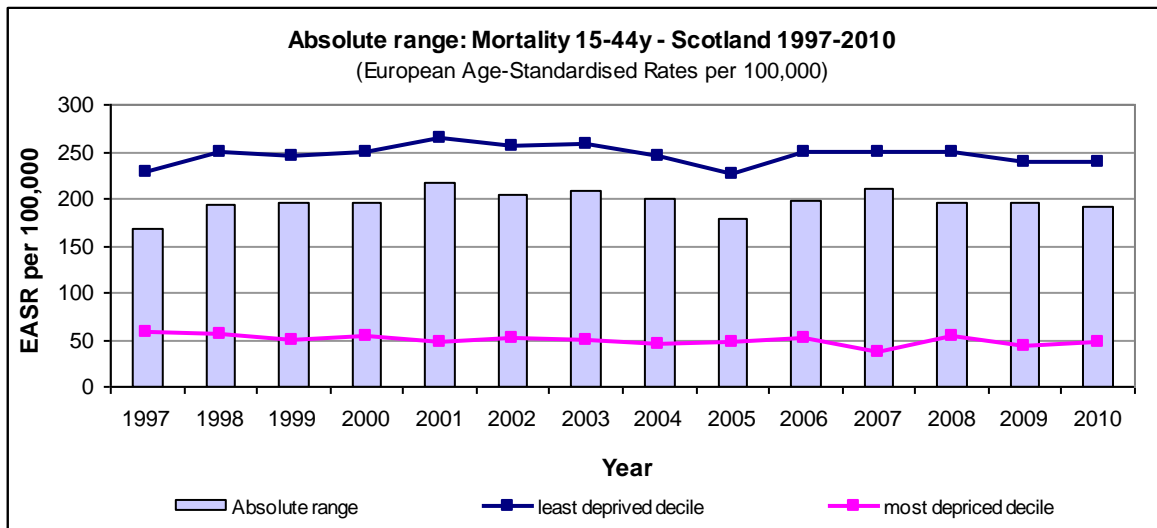
Inequalities gradient in the most recent year available

Mortality amongst those aged 15-44 years, by Income-Employment Index: Scotland 2010
(European Age-Standardised Rates per 100,000)

Relative Index of Inequality (RII) over time

Relative index of inequality (RII): mortality aged 15-44y - Scotland 1997-2010
(RII=SII divided by population mean rate)

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
RII	1.41	1.49	1.60	1.63	1.67	1.64	1.63	1.70	1.61	1.62	1.70	1.76	1.80	1.73

Absolute range over time

Absolute range: Mortality 15-44y - Scotland 1997-2010
(European Age-Standardised Rates per 100,000)

Legend: Absolute range | least deprived decile | most depriced decile

Scale / context

	Number of all-causes deaths	Target population size	Rate per 100,000 (EASR)
1997	2,436	2,158,030	112.0
1998	2,498	2,142,787	115.1
1999	2,507	2,129,794	115.6
2000	2,501	2,118,568	114.8
2001	2,509	2,111,242	114.9
2002	2,566	2,096,447	118.5
2003	2,461	2,087,978	113.3
2004	2,409	2,084,722	110.9
2005	2,305	2,081,858	105.5
2006	2,482	2,085,170	114.5
2007	2,461	2,086,427	114.2
2008	2,443	2,081,506	114.5
2009	2,389	2,075,639	112.0
2010	2,229	2,071,351	105.8

	Deaths from assault		Drug related deaths		Suicides	
	Number	**EASR per 100,000**	**Number**	**EASR per 100,000**	**Number**	**EASR per 100,000**
1997	56	2.6	196	9.1	518	23.7
1998	65	3.1	227	10.8	526	24.2
1999	86	4.0	274	13.2	529	24.6
2000	60	2.9	268	12.8	541	25.5
2001	63	3.0	288	13.8	531	24.9
2002	76	3.6	345	17.0	539	25.6
2003	71	3.4	281	13.7	456	21.5
2004	78	3.8	311	15.4	475	22.1
2005	50	2.4	277	13.2	436	20.7
2006	83	4.0	351	17.0	435	20.6
2007	54	2.6	392	18.9	453	21.6
2008	53	2.6	477	23.1	480	23.1
2009	47	2.3	436	21.0	432	20.6
2010	54	2.6	384	18.6	423	20.3

Annex 1: Expert Working Group Membership

Short Life Technical Advisory Group on Monitoring Health Inequalities

Chair
o   Jill Vickerman
    Scottish Government; Head of Health Analytical Services Division

Group Membership
o   Marion Bain
    NHS Information Services Division; Medical Director

o   Kay Barton
    Scottish Government; Deputy Director: Health Improvement Strategy

o   Neil Craig
    NHS Health Scotland; Senior Public Health Advisor

o   David Gordon
    NHS Health Scotland / ScotPHO; Head of Public Health Observatory

o   Professor Alastair Leyland
    Medical Research Council; Social & Public Health Sciences Unit

o   Gordon McLaren
    NHS Fife; Public Health Consultant

o   Rosalia Munoz-Arroyo
    NHS Information Services Division / ScotPHO; Senior Information Analyst

o   Emma Stevens
    Scottish Government; Statistician; Health Analytical Services Division

o   Diane Stockton
    NHS Information Services Division / ScotPHO; Programme Principal

o   Professor Matt Sutton
    Aberdeen University

o   Bruce Whyte
    Glasgow Centre for Population Health; Public Health Programme Manager

Annex 2: Indicator Definitions & Sources

- **Healthy Life Expectancy**

<u>Source</u>: ScotPHO (using raw deaths data from the National Register of 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).

<u>Definition</u>: 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 calculated 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.

<u>Change to methodology</u>: In 2009 the format of the self-assessed health question (on which the life expectancy data is based) was changed to align with the European Union. The options for response changed from a three-point scale (Good, Fairly good, Not good) to a five point scale (Very good, Good, Fair, Bad, Very bad). Under the three-point scale 'Good' and 'Fairly good' were categorised as 'healthy'. Under the five point scale only 'Very good' and 'Good' are categorised as 'healthy'. This has led to a major discontinuity in the series. For both men and women, there is a markedly lower estimate of HLE at birth for 2009 than previous years. These 2009 figures cannot be considered as part of the same series as earlier years, but represents the first point in a new time trend for future years.

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

<u>Source</u>: National Records of Scotland.

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

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

<u>Source</u>: Scottish Health Survey (2008-2011).

<u>Definition</u>: Warwick-Edinburgh Mental Wellbeing Scale (WEMWBS). 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**

<u>Source</u>: NHS Information Services Division (ISD) ; SMR02 maternity dataset.

<u>Definition</u>: 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**

<u>Source</u>: NHS Information Services Division (ISD) ; SMR1/01 records (all inpatient and daycase discharges) – all records were extracted from the SMR01 linked database as at 28th July 2012.

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 National Records of 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'. Because of the dynamic nature of the linked database, previous years' data are sometimes updated in subsequent publications.

- **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 hospitals 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). These figures exclude private hospitals, mental illness hospitals, psychiatric units and maternity hospitals and includes Scottish residents only. 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 revised World Health Organisation International Classification of Disease coding was used: ICD10: F10, K70, X45, X65, Y15, Y90, Y91, E244, E512, G312, G621, G721, I426, K292, K860, O354, P043, Q860, T510, T511, T519, Y573, R780, Z502, Z714, Z721. See:
http://www.alcoholinformation.isdscotland.org/alcohol_misuse/3986.html

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

Source: National Records of 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: National Records of 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'.

Annex 3 : 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).

Figure 1: Disease rate - Slope Index of Inequality

A horizontal line would indicate equality across the deprivation groups.

The slope of the best fit line indicates the degree of inequality.

(Y-axis: Disease rate per 100,000, from 0 to 40; X-axis: Relative rank of population grouped by SIMD, from 0 to 1)
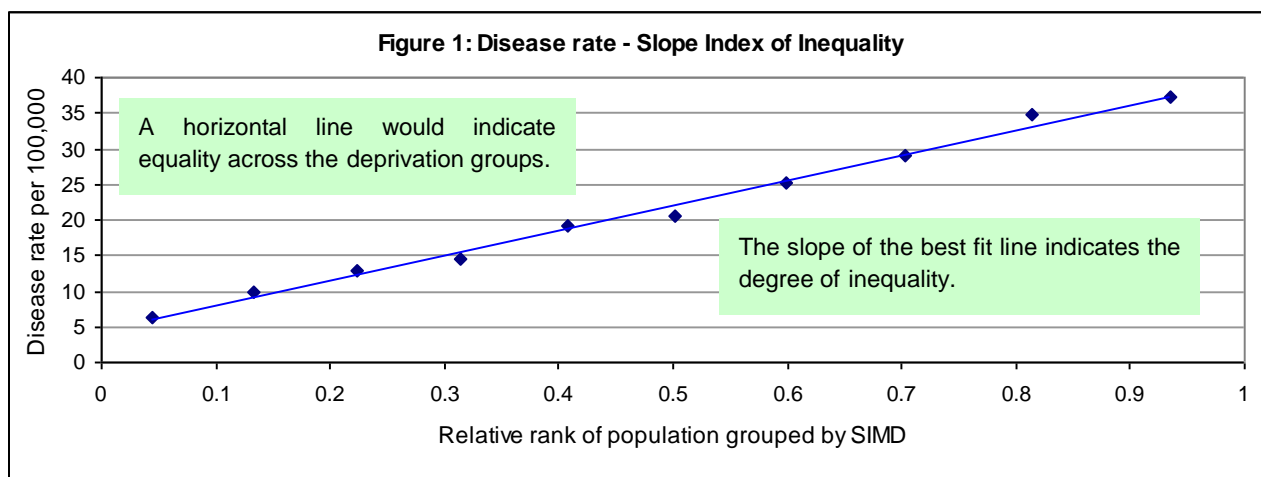
The SII and RII have the advantage that they are based on data about the whole population, rather than just the extremes, and so take into account inequalities across the scale. They do however require that there is a reasonably linear relationship between the health indicator and deprivation. Another disadvantage is that the SII and RII are not intuitive and are relatively difficult to interpret and explain to a non-statistical audience.

Following discussion with colleagues from the Scottish Collaboration for Public Health Research and Policy (SCPHRP), we investigated the alcohol related indicators to assess

possible non-linearity using a 'knot and spline' based approach[7]. While there was evidence of non-linearity in some years, the technical expert group concluded that it was minor and that it did not invalidate the calculation of RII using the linear method. The group concluded that the linear methodology should be retained due to the complexity of non-linear methods, and the need of consistent reporting and general understanding.

- **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.

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[7] See Sergeant JC, Firth D. Relative index of inequality: definition, estimation, and inference. Biostatistics 2006;7:213-24 for further details

A2.3 Notes to tables
P = Provisional
RII = Relative index of inequality
EASR = European age – standardised rate
WEMWBS = Warwick-Edinburgh mental wellbeing scale
ICD = International classification of disease
BW = Birth weight

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