

1000 Communities

Social inequalities across Scotland over the past ten years





improvement service

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E.1 *1000 Communities* focuses on patterns of inequalities and deprivation levels across Scotland over the past ten years. The impact of policies and public service delivery do not necessarily benefit communities equally across society. To explore this, three cohorts were selected comprising the most deprived, central, and least deprived neighbourhoods in Scotland. These cohorts were then profiled between 2002 and 2012 using a selected set of indicators. For further evaluation the variance of each indicator was also studied individually and compared over this period.

E.2 Overall, in terms of multiple deprivation, there was limited change for the three cohorts selected within *1000 Communities* between 2002 and 2012. Over 80% of these neighbourhoods remain in their original 15% of SIMD[1] rankings. This lack of mobility is highly emphasised in the most and least deprived cohorts, with >90 and >95% of neighbourhoods respectively remaining in their original 15% of SIMD rankings.

E.3 The strongest improvements across cohorts were experienced in educational attainment and SIMD crime rates. Educational attainment increased for all three cohorts and the Scottish average, and SIMD crime rates steadily decreased between 2004 and 2010/11. Averages for emergency hospital admissions, however, were less positive. By 2012, admission rates had increased and the aim of reducing unplanned hospital admissions (as proposed in *Delivery for Health*, 2005) had not yet been accomplished. The percentages of population claiming Jobseekers Allowance also increased significantly between 2007 and 2012, and by 2011 the proportion of income deprived population in the most deprived cohort was still over 2.5 times higher than the Scottish average. Results from the analyses into variation across Scotland highlighted similar patterns. Disregarding SIMD crime rates, variation among indicators have all either grown or remain largely as they were in 2002.

E.4 The disparities in multiple indicators reflect the persistence and perpetuation of inequalities throughout Scotland. These results call into question the effectiveness of policies emplaced to reduce inequalities in Scotland, as well as the ability of public services to meet demands equally across society. A truly universal service should be designed and implemented to this end. This may mean different approaches in different areas, and more effective use of targeting resources. Importantly, “universal” provision does not equate to standard provision in all areas. While we do not suggest that public services are a cause of inequality, due to the attendant implications of inequality discussed here (and elsewhere) it remains firmly in the interest of public services to address it. It is notable that public service policy is becoming increasingly focussed on prevention, equality, and improving outcomes for all.

E.5 Within the regression models tested in this study, income deprivation and unemployment rates continuously had the highest impacts (although all indicators of deprivation correlated significantly with one another). This suggests that income- and employment-related factors influence other domains of inequality. In this respect, successful economic development could potentially improve wellbeing across many aspects in life, hence reducing pressure on other public services such as health care, policing, social services and so on. Successful economic development itself is

1 Scottish Index of Multiple Deprivation

therefore a form of prevention for a whole range of services, and perhaps needs to be recognised as such.

E.6 The Scottish Government has committed to 'tackle the significant inequalities' in Scotland by 2017 (Scottish Government, 2010a in EHRC and OPM, 2010), creating reliable and sustainable income and employment in the most disadvantaged areas in Scotland has the potential to achieve substantial benefits, across a variety of sectors. These policies and programmes would have financial costs, but money will be spent in these areas – whether in health care, social work, unemployment benefits or crime prevention. Targeted spending on employment and sustainable income could help save in the long-term.

1. Introduction

1000 Communities focuses on patterns of inequalities and deprivation levels across Scotland over the past ten years. Since devolution there have been numerous policies introduced to tackle inequalities in Scotland. The National Health Service and the Scottish Government have repeatedly reported their aim to reduce negative health outcomes for people from disadvantaged backgrounds (Delivery for Health, 2005; Better Health, Better Care, 2007; Equally Well, 2008), and the Scottish education system was remodelled to ensure education is accessible to all (Education Scotland).

This report seeks to explore and understand the impact of these policies and public service provision within geographic areas experiencing different levels of deprivation. Services delivered across Scotland do not necessarily benefit communities equally across society: to explore this, three cohorts were selected comprising the 330 most deprived neighbourhoods, 330 central neighbourhoods, and 330 least deprived neighbourhoods in Scotland. These cohorts were then profiled using selected indicators from 2002 to 2012 (depending on availability). For further evaluation, the variance of each indicator was also studied individually: for each year the 10% highest and 10% lowest averages[2] were calculated and compared over this period. Unlike the cohort study, this does not necessarily profile the same areas over the whole period, but does indicate the overall spread of variation for each indicator and year, individually.

These processes measure levels of inequality but this report aims to go beyond this and address why high levels of inequality could be—and indeed, are—problematic for society. Inequality in itself solely illustrates that there is no standard outcome across Scotland. It is the extent of such inequality and its systematic and multiple nature, however, that could be described as unjust and problematic. Further analyses were conducted to consider detectable relationships between different domains of deprivation: learning and educational attainment; income levels and benefit dependency; health, and crime. High degrees of association highlight the fact that neighbourhoods experiencing one form of deprivation are also likely to be disadvantaged in several other respects. For example, areas experiencing higher rates of income deprivation are also subject to more hospital admissions, lower educational attainment, and higher crime rates.

There is also a growing body of literature that considers the link between levels of income inequality and national outcomes. There is evidence to suggest that developed countries with lower levels of income inequality tend to perform better in domains such as health, education and crime, than developed countries with higher levels of income inequality. This is an example of how inequality in itself could be problematic for society and is further addressed in this report. Correspondingly, high levels of disadvantage and deprivation have further consequences on public services and welfare expenditure. In light of this, high levels of deprivation could be problematic for society, irrespective of any question of justice. This study is concerned with the implications of inequality arising from deprivation, as opposed to other dimensions such as gender, ethnicity, age, disability or religion. This does not suggest that women, ethnic minority groups, or people with disabilities, for example, are not disproportionately affected: this would require further analyses and is beyond the remit of this paper.

2 Arithmetic means

2. Methods

This study uses publicly available data sets from the Scottish Neighbourhood Statistics (SNS) and the Scottish Index of Multiple Deprivation (SIMD) websites. As a neighbourhood study, all datasets used in the analysis are expressed on a neighbourhood (data zone) level. Data zones are statistical geographies that represent areas of approximately 500 to 1000 people with the size ranging from 1.2 hectares to 115,963.2 hectares depending on the population density. There are 6505 data zones across the whole of Scotland and the boundaries have been created to respect physical borders, natural communities and—where possible—to include households with similar social characteristics.

Data zones are Scotland's smallest statistical geography available in the public domain. They were selected for this study because more aggregated geographies potentially mask inequalities between smaller areas. For example, the average S4 tariff score in the City of Edinburgh in 2011/12 was 192. Between multi-member wards in Edinburgh these scores ranged from 150 to 249. Among data zones, however, the equivalent range was between 16 and 378. Data zone level data, therefore, provide a clearer indication of distribution and inequity than larger, aggregated geographies.

There are three main stages to this study:

1. *1000 Communities*: Profiles 990 data zones from 2002 to 2012.
2. *Variation across Scotland*: Calculates averages for the 10% highest and 10% lowest[3] neighbourhoods for each indicator and year separately from 2002 to 2012.
3. *Relationships between Outcomes*: Detailed inferential analyses into the statistical relationships between inequalities in Scotland, on a neighbourhood level.

1000 Communities

1000 communities consists of 990 neighbourhoods (data zones) selected from the SIMD rank 2004. SIMD ranks every data zone in Scotland from the most to the least deprived, with 1 being the most deprived, 6505 being the least deprived[4]. These 990 data zones comprise three individual cohorts, or sub-groups: the 330 highest (least deprived), 330 central, and 330 lowest (most deprived) rankings from SIMD 2004. Each data zone represents 500 to 1000 people, thus each of the three cohorts encompasses between 165,000 and 330,000 individuals (approximately 5% of the Scottish population). Further details and maps of each cohort are available in the following section (Relative Change: SIMD 2004 to SIMD 2012) and in the appendix: Mapping 1000 Communities.

Once determined, these three cohorts were profiled for a number of selected indicators, such as average S4 and S5 tariff scores, emergency hospital admission rates, levels of income and employment deprivation, and SIMD crime rates, from 2002 to 2012 (depending upon available data). Profiling cohorts in this manner provides insight into changes between and within specific areas, over a selected period. This helps identify and evaluate changes in inequalities between neighbourhoods that 10 years ago had relatively extreme levels of deprivation.

3 Approximately 650 data zones

4 For more information see the SIMD website: http://www.scotland.gov.uk/Topics/Statistics/SIMD

The variation between neighbourhoods within and between cohorts is regularly demonstrated and analysed in this report using a combination of box plots and statistical calculations, such as the standard deviation, interquartile range, and coefficient of variation. Information on how to read a box plot and calculate variation is available in the appended sections on Box Plots and Measures of variation.

Variation across Scotland

For each of the selected indicators, variation across the whole of Scotland was also evaluated. The 10% highest and 10% lowest neighbourhoods were recorded over the past ten years. These neighbourhoods were selected individually for each indicator and year, therefore, unlike the cohort study, these are not necessarily the same areas profiled over this period. Rather, these figures demonstrate the spread of variation across neighbourhoods in Scotland for each indicator, individually, over the past ten years. This illustrates whether individual indicators have become more or less evenly distributed across Scotland. Unlike the cohort study, this measure does not necessarily relate to deprivation levels but solely to the indicator in question.

Relationships between outcomes

Inferential analyses were carried out to examine the relationships between inequalities across Scotland. This section primarily focuses upon correlation and regression analyses, to interpret how multiple forms of deprivation influence one another. These relationships are explored for all neighbourhoods across Scotland, but also separately for the most and least deprived cohorts from *1000 communities*. The models focus upon the indicators used within this study but also explore other variables in order to verify additional research hypotheses. Understanding the relationships between outcomes helps identify the multiple nature of deprivation and ascertain how improvements could be made to break such relationships and improve equity across Scotland.

2.1 Rural Representation

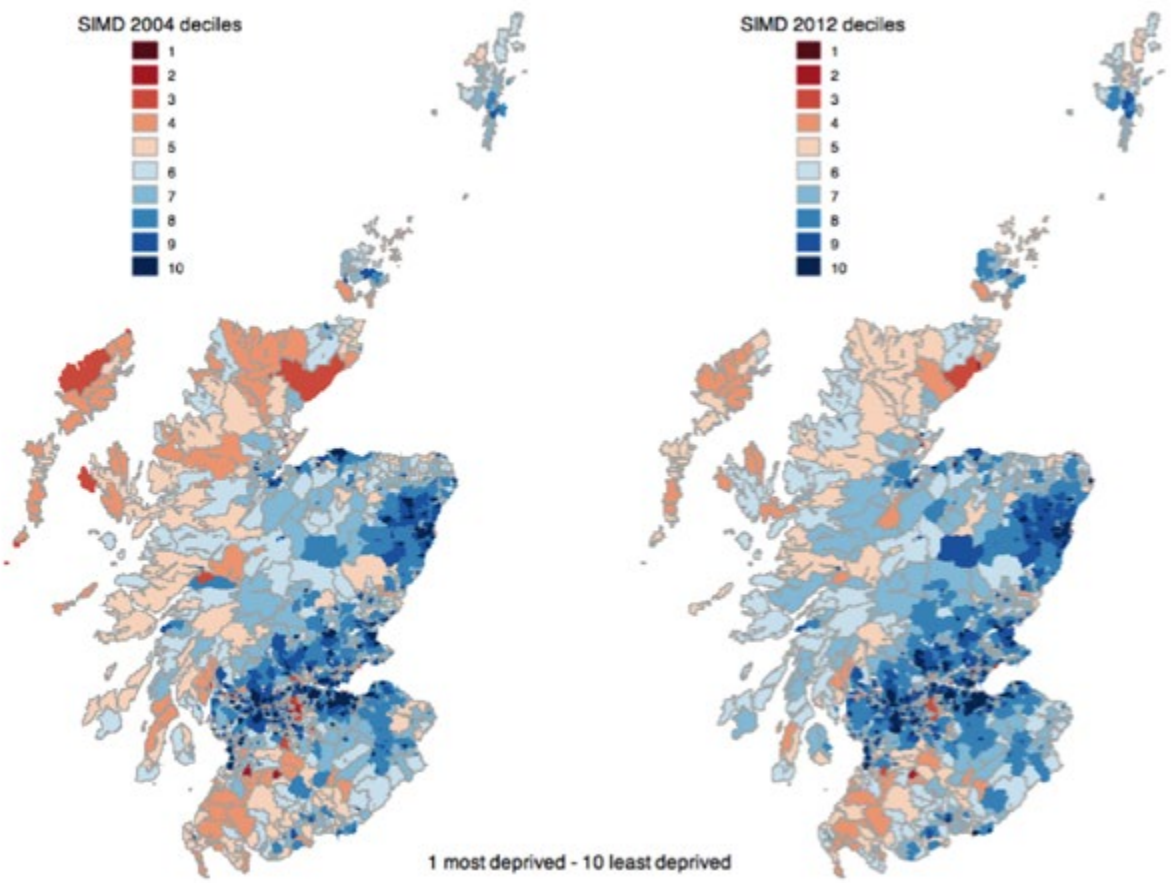
As mentioned, the analyses in this study are on a data zone level. Data zones can potentially hide division within their boundaries. Although this issue applies to all data zones, the potential for it to arise in rural areas is greater because they represent relatively larger geographic areas. Data zone boundaries range up to 115,963.2 hectares: one rural data zone can, therefore, represent several villages and potentially mask division between areas and households. Inequality between rural data zones may not appear as dramatic as among urban data zones, which can result in weaker correlations between indicators in rural areas. Caution should thus be taken in such analysis.

Furthermore, the economic indicators used within this study are generic and do not account for differences such as living costs. Levels of income deprivation, for example, are measured from a combination of benefits related to income, such as income support, Jobseekers Allowance (JSA), and tax credits. This measure does not, therefore, reflect any differences in costs across the country. A report from Highlands and Islands Enterprise (HIE) in 2013 concluded that households in remote rural areas in Scotland require significantly higher incomes to attain the same minimum living standard as elsewhere in the UK. This was linked to travel costs, heating, and the higher cost of goods. This highlights that the context and reality of income deprivation differs across Scotland.

3. Relative Change: SIMD 2004 to SIMD 2012

To assess the relative change in terms of multiple deprivation, cohort ranking positions in SIMD 2012 were compared to 2004. Although SIMD records a relative rank for all data zones across the whole of Scotland, it does not measure absolute deprivation. This section, therefore, evaluates changes in relation to other neighbourhoods.

Map 3-1 SIMD 2004 and 2012 deciles, Scotland



Map 3-1 displays data zones across Scotland divided by SIMD deciles. Neighbourhoods in decile 1 are coloured dark red and represent the 10% most deprived data zones in Scotland, according to SIMD. The areas coloured dark blue, on the other hand, represent the 10% least deprived data zones on the SIMD rank. The two maps display SIMD 2004 and 2012 respectively, on this scale there are a few noticeable differences between several rural areas. A number of rural data zones moved into neighbouring SIMD deciles between 2004 and 2012 but this movement was relatively marginal. More detailed maps, displaying urban areas, are available in the appendix: Map Comparisons, SIMD 2004 and 2012.

3.1 Least Deprived Cohort

The box plots in Figure 3-1 display movement in SIMD rankings between SIMD 2004 and SIMD 2012 for data zones within the least deprived cohort.

Figure 3-1 Movement of least deprived cohort SIMD 2004 to SIMD 2012

This cohort consists of the 330 data zones highest on the SIMD 2004 rank, therefore in 2004 all data zones ranged from 6176 to 6505. By 2012, 200 (61%) of these data zones remained in the 330 least deprived (highest) ranks, 287 (87%) were still in the top 10% while only 14 dropped below the top (least deprived) 15%. As displayed in Figure 3 1, over 75% of these data zones ranked above 6000 in SIMD 2012 and only outliers fell below 5500. Therefore, despite some movement in ranking levels, very few neighbourhoods fell significantly. The 14 data zones that fell below the top 15% of rankings are displayed in the table below.

Table 3-1 Data zones from the least deprived cohort no longer in the top 15% rankings (SIMD 2012)

Data zones no longer in the top 15% (SIMD 2012)	Intermediate Geography Name	SIMD 2004	SIMD 2012
S01000307	Aberdeenshire - Newtonhill	6404	5384
S01000389	Aberdeenshire - Newmachar and Fintray	6380	5290
S01000403	Aberdeenshire - Inverurie North	6235	5419
S01000414	Aberdeenshire - Ythanside	6278	5470
S01000427	Aberdeenshire - Ellon East	6176	5397
S01001451	East Dunbartonshire - Kessington East	6275	5440

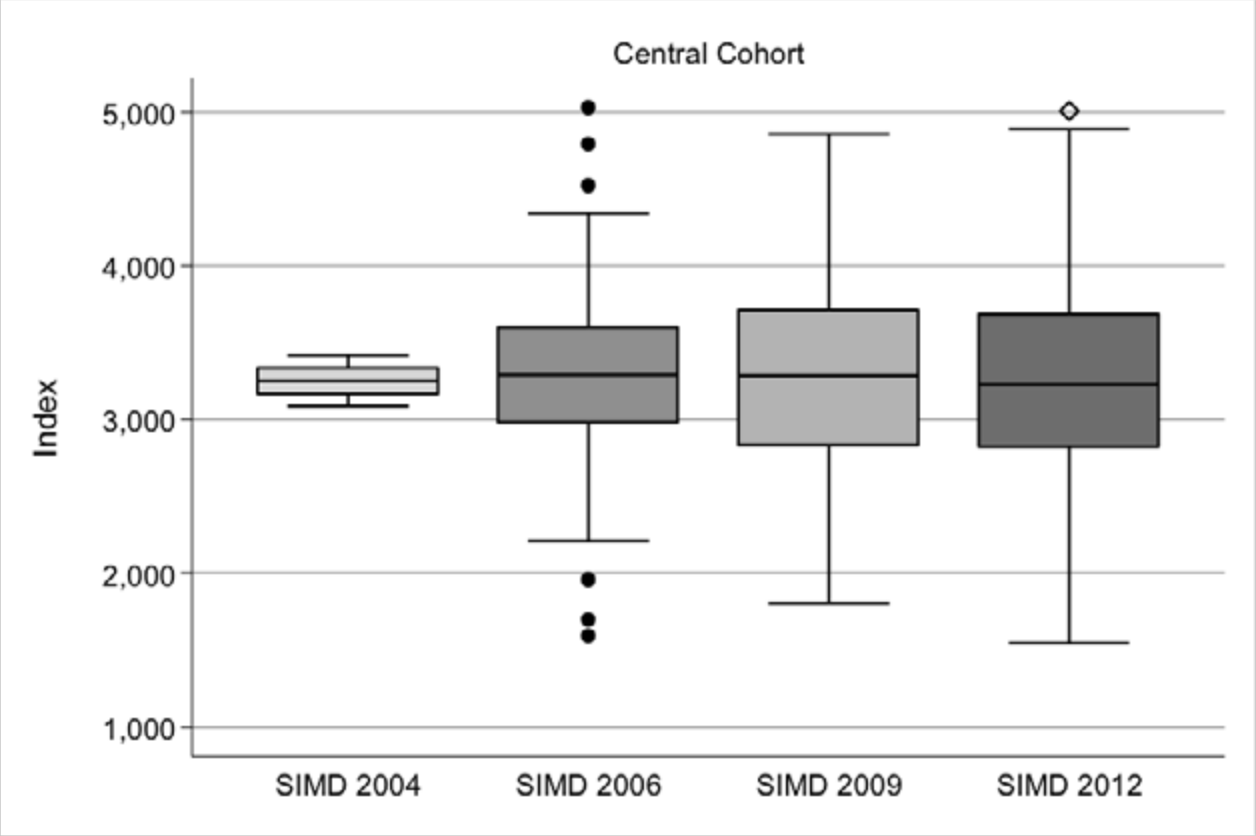
Data zones no longer in the top 15% (SIMD 2012)	Intermediate Geography Name	SIMD 2004	SIMD 2012
S01001940	Edinburgh, City of - Blackford	6237	5445
S01002018	Edinburgh, City of - Forrester Park and Broomhall	6286	5027
S01002449	Falkirk - Head of Muir and Dennyloanhead	6238	5070
S01004109	Inverclyde - Gourock East, Greenock West and Lyle Road	6388	5375
S01004285	Moray - IZ Eight	6382	4917
S01004988	Perth & Kinross - Glenfarg, Dunning and Rhynd	6211	5361
S01005415	Scottish Borders - Kelso South	6186	4848
S01006357	West Lothian - Kirkton	6214	4700

All data zones within this cohort remain in the top 30% of ranks.

3.2 Central Cohort

The box plots in Figure 3 2 display the movement in SIMD ranking for the central cohort.

Figure 3-2 Movement of central cohort SIMD 2004 to SIMD 2012



The central cohort consists of the 330 middle rankings in SIMD 2004, ranging from 3088 to 3417. In 2012, 59 data zones (approximately 18%) remained in the central 330 bracket, 134 data zones (approximately 41%) had fallen, while 137 (approximately 42%) had risen. 56% were still in the central 15% (2765 – 3740). The following table displays the six data zones that dropped into the lowest 30% of rankings.

Table 3-2 Data zones from central cohort now in bottom 30% rankings (SIMD 2012)

Data zones in the bottom 30% (SIMD 2012)	Intermediate Geography Name	SIMD 2004	SIMD 2012
S01004092	Inverclyde - Greenock West and Central	3110	1549
S01005427	Scottish Borders - Galashiels South	3117	1596
S01000687	Angus - Montrose North	3251	1903
S01002592	Fife - Rosyth Central	3371	1914
S01000958	Dumfries & Galloway - Gretna and Eastriggs	3373	1919
S01006089	Stirling - Bannockburn	3310	1926

Two data zones, one in Inverclyde and one in the Scottish Borders, fell into the bottom 25% of rankings, falling from 3110 to 1549, and 3117 to 1596 respectively.

The following table (3-3) displays the 8 neighbourhoods that rose into the 30% highest rankings in SIMD 2012.

Table 3-3 - Data zones from central cohort now in top 30% rankings (SIMD 2012)

Data zones in the top 30% (SIMD 2012)	Intermediate Geography Name	SIMD 2004	SIMD 2012
S01003504	Glasgow City - Kelvingrove and University	3293	4558
S01004763	North Lanarkshire - Cliftonville South	3261	4609
S01002040	Edinburgh, City of - Polwarth	3333	4620
S01002084	Edinburgh, City of - Dalry and Fountainbridge	3230	4624
S01003506	Glasgow City - Firhill	3411	4679
S01005418	Scottish Borders - Melrose and Tweedbank area	3207	4719

Data zones in the top 30% (SIMD 2012)	Intermediate Geography Name	SIMD 2004	SIMD 2012
S01001733	East Renfrewshire - West Arthurlie and North Neilston	3381	4888
S01005490	Scottish Borders - Berwickshire East	3158	5005

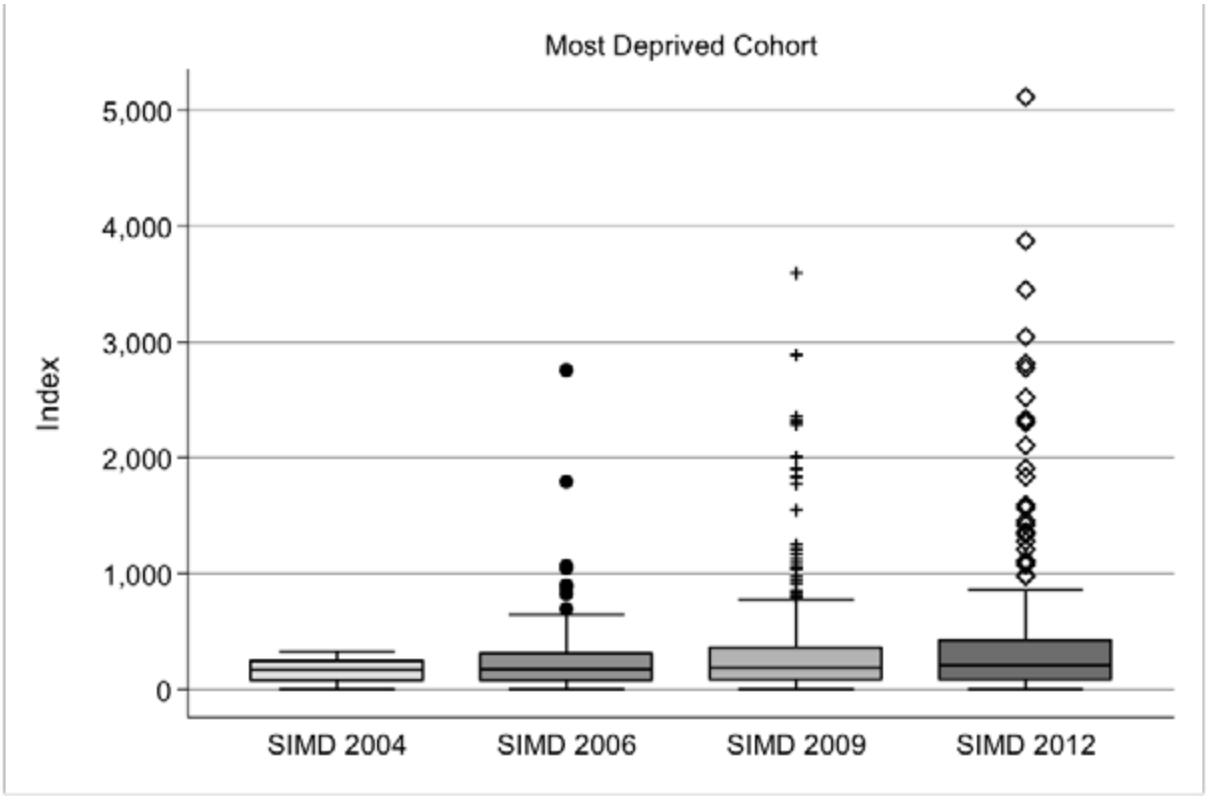
Two data zones, one in East Renfrewshire and one in the Scottish Borders, moved into the top 25% of ranks; rising from 3381 to 4888, and 3158 to 5005.

Out of the three cohorts, this central group experienced the most change between 2004 and 2012; however, the data zones moved in both directions equally. For the 40% improved, 40% also fell, by relatively equal distances.

3.3 Most Deprived Cohort

The box plots in Figure 3-3 display movement in rankings for data zones in the most deprived cohort between SIMD 2004 and SIMD 2012.

Figure 3-3 Movement of most deprived cohort SIMD 2004 to SIMD 2012



This cohort consists of SIMD 2004's 330 lowest rankings, ranging from 1 to 330. By 2012, 220 (67%) remained in the lowest 330 rankings. 284 (86%) were still in the lowest 10% of data zones and 304 (92%) in the lowest 15%. Therefore, only 8% of data zones moved out of the lowest 15% (above rank 976). These are displayed in Table 3-4 below.

Table 3-4 Data zones from most deprived cohort no longer in bottom 15% rankings (SIMD 2012)

Data zones no longer in bottom 15% (SIMD 2012)	Intermediate Geography Name	SIMD 2004 -SIMD 2012	Changes in geographical area
S01001141	Dundee City – Hilltown	231 - 2102	Hilltown regeneration: tower blocks demolished in 2011, Population 803 (2011), 493 (2013)
S01002296	Edinburgh – Muirhouse	162 - 2305	Demolishment of Muirhouse Crescent 2011, Muirhouse and Pennywell Gardens regeneration (population reduced from 689 in 2004 to 211 in 2011 and 11 in 2013)
S01003031	Glasgow City - Glenwood South	92 - 3870	Flats Demolished (zero population in 2011)
S01003058	Glasgow City - Darnley West	314 - 1364	Close to S01003097 (Crookston South), Original housing schemes in South Nitshill were largely demolished. Now replaced with private housing. Population increased from 781 in 2004 to 1198 in 2011 and 1341 in 2013.
S01003060	Glasgow City - Glenwood North	123 - 1205	Large increase in population between 2001 and 2004 (689 to 1024), population of 1220 in 2011 and 1006 in 2013. New housing.
S01003097	Glasgow City - Crookston South	209 - 2296	Redevelopment 2001-2007, Sanctuary. Population reduced to 300 in 2013.
S01003118	Glasgow City - Pollokshaws	143 - 1420	GHA and Glasgow City Council working together to regenerate Pollokshaws (formally Shawbridge) – hope to attract new families to the area, £11m development. Two tower blocks demolished, Shawbridge, 2009. Population reduced from 1032 in 2004 to 756 in 2011 and 325 in 2013.

Data zones no longer in bottom 15% (SIMD 2012)	Intermediate Geography Name	SIMD 2004 -SIMD 2012	Changes in geographical area
S01003126	Glasgow City - Pollokshaws	136 - 1834	Tower blocks demolished along Riverbank street, Population declined from 1011 in 2004 to 400 in 2011 and 300 in 2013. Part of Pollokshaws regeneration.
S01003178	Glasgow City - Mosspark	289 - 1273	Tenement demolition in Corkerhill 2004, replaced with private housing. Population increased from 797 in 2004 to 1131 in 2011
S01003201	Glasgow City - Dalmarnock	21 - 1334	Millerfield Flats demolished, 2007. Population declined from 769 in 2004 to 467 in 2011 and 234 in 2013. Clyde Gateway Urban regeneration .
S01003285	Glasgow City - Gorbals and Hutchesontown	197 - 1591	Gorbals Regeneration Project. The old tower blocks were replaced with brand new homes (£13m investment). Population reduced to 361 in 2013.
S01003319	Glasgow City – Craigton	32 - 5108	Broomloan Court flats demolished 2007 (zero population in 2011)
S01003324	Glasgow City - Ibrox East and Cessnock	205 - 1562	3 tower blocks demolished, Ibrox terrace and Ibroxholm Oval, 2011. Population reduced from 852 in 2004 to 606 in 2011 and 455 in 2013.
S01003350	Glasgow City - Penilee	296 - 1105	New build mixed tenure development, 30 units, funded by Council, handed to GHA in 2006. Data zone includes part of Bellway private homes development, 2006
S01003382	Glasgow City – Anderston	307 - 2773	On-going Anderston SSHA (part of the Clyde bank redevelopment) Rise in population (to 1527 in 2011 and 1844 in 2013)
S01003422	Glasgow City - Dennistoun North and Alexandra Parade	261 - 1077	
S01003445	Glasgow City - Roystonhill, Blochairn, and Provanmill	208 - 985	Large scale demolition/ refurbishment 1990s

Data zones no longer in bottom 15% (SIMD 2012)	Intermediate Geography Name	SIMD 2004 -SIMD 2012	Changes in geographical area
S01003447	Glasgow City - City Centre East	253 - 2513	Community regeneration, St. Mungo Avenue. Heavily populated, 2125 in 2011 and 2345 in 2013.
S01003463	Glasgow City - Sighthill	321 - 1351	Close to Fountainwell, demolition, zero population in 2013
S01003491	Glasgow City – Sighthill	118 - 3043	Fountainwell tower blocks demolished. Population reduced to 296 in 2011 and 82 in 2013.
S01003502	Glasgow City - Garthamlock, Auchinlea and Gartloch	294 - 1456	Large growth in population, increased from 603 in 2004 to 1496 in 2011 and 2103 in 2013.
S01003505	Glasgow City – Sighthill	156 - 3453	Fountainwell tower blocks demolished. Zero population in 2011
S01003533	Glasgow City – Petershill	96 - 2814	Part of Red Road demolition, Population reduced from 900 in 2004 to 643 in 2011 and zero population in 2013.
S01003548	Glasgow City – Barmulloch	37 - 2332	Part of Red Road, Population reduced from 456 in 2004 to 247 in 2011 and 61 in 2013
S01003625	Glasgow City - Wyndford	104 - 1906	Population reduced to 361 in 2013.
S01003714	Glasgow City - Drumchapel North	309 - 1112	New housing in the North West of Drumchapel – substantial private investment. Population reduced from 846 in 2004 to 670 in 2011 and 616 in 2013.

Out of the 26 neighbourhoods no longer within the bottom 15% of SIMD rankings, 24 are in Glasgow City, one in Dundee, and one in Edinburgh. The four data zones ranked above 3000 in SIMD 2012 are areas where tower blocks have been demolished; three of these data zones had a population of zero in 2011 (the other significantly reduced); these figures could therefore be misleading if this is not recognised.

All areas to increase above 2000 in the rank experienced demolishment or regeneration/ housing development, or both. One neighbourhood within Anderston increased from rank 307 to 2773: this area has been undergoing substantial regeneration as part of the Clyde Bank Waterfront Project. Phase 1 was completed in 2011 providing 104 new flats for social renting, Phase 2 was finished in December 2012 (further 72 units) and Phase 3 was due for

completion in February 2015 (109 units), with a total cost of £50 million for all phases.

By 2011, three data zones had no population and population levels for several others were considerably reduced (see examples in Table 3-4). This is evidence of population migration, and indicates that changes in neighbourhood outcomes may not necessarily reflect changes for individuals or households. For the majority of data zones, however, changes in ranking were relatively modest between SIMD 2004 and SIMD 2012. Although this represents neighbourhoods, there is ample evidence from academic research that reveals the low horizontal and vertical social mobility for people across deprived areas (for example Nunn et al., 2007). It would be naïve, therefore, to assume that trends occurring within the majority of Scotland's most deprived neighbourhoods represent completely new populations in 10 years.

Although there has been some movement in SIMD rankings for all three cohorts, the vast majority of data zones have not moved substantially. The central cohort experienced the most change, with neighbourhoods both improving and falling equally. This highlights the persistence of relative deprivation, especially within areas experiencing the highest and lowest levels. The majority of these areas remain largely as they were in relation to one another in SIMD 2004, with over 60% of the most and least deprived cohorts remaining in the bottom 330 and the top 330 ranks, and over 90% remaining in the top and bottom 15% (note that this is a rank of relativity; this does not reflect possible changes in real terms for these neighbourhoods).

4. Educational Attainment

One of the Scottish Government's (2007) five strategic objectives is for a smarter Scotland: "expand opportunities for Scots to succeed from nurture through to life; long learning ensuring higher and more widely shared experiences". Nonetheless, within Scotland there remains a substantial divide within educational achievements between children from affluent and disadvantaged communities. This was raised in debates in 2012 over the low level of students from disadvantaged communities in Scotland's leading Universities (The Guardian, 2012). There are still large numbers of Scottish children leaving school without sufficient qualifications for higher education (ESRC, 2013). Moreover, results from the Programme for International Student Assessment (PISA) indicate that mathematical performance within Scottish schools is more divided by socioeconomic status than it is within schools across the rest of the UK and the majority of similar European countries (more details are available in the appendix: PISA results). This highlights that pupils attending the same schools in Scotland perform very differently in mathematics according to their socioeconomic background.

This is not a new occurrence and inequity in educational attainment by socioeconomic background has regularly been reported within political and academic debate. Over the past ten years there have been numerous policies introduced and substantial alterations implemented to improve Scotland's education system: the curriculum for excellence, 2004; early years intervention, with "more choices, more chances" (2006); Additional support for learning Act 2004 (amended 2009), placing duty on education authorities to identify and meet pupils needs; Getting it Right for Every Child (GIRFEC) and Community Learning and Development. Within higher education the graduate endowment tax was also abolished. Table 4 1 lists some of the key policies introduced in education in Scotland since 2002.

Table 4-1 List of key education policies in Scotland

Name	Year	Description	Organisation
Assessment is for Learning (AifL)	2002	Strategy to improve children's educational attainment through formative assessment. The strategy was designed to streamline assessment and ensure pupils, parents and teachers receive informative feedback on pupils' learning & development needs	Scottish Executive
Determined to Succeed (DtS)	2003	National strategy for enterprise education to improve employability and work-related skills in Scottish schools.	Scottish Executive

Name	Year	Description	Organisation
Closing the Opportunity Gap	2003-2006	Scottish Budget for 2003-2006. Commitment to give young people the best possible start in life including efforts to ensure that Scotland's health, education and care services focus resources on children and families who need the most support. Intention to tackle social injustice and inequality.	Scottish Executive
Closing the Opportunity Gap Programme (CtOG)	2004	3 basic aims: • to prevent poverty • to provide routes out of poverty • to sustain poverty-free live • Objectives: • to increase the chances of sustained employment for vulnerable and disadvantaged groups • to improve the confidence and skills of the most disadvantaged children and young people • to reduce vulnerability of low income families to financial exclusion and multiple debts • to regenerate the most disadvantaged neighbourhoods • to increase the rate of improvement of the health status of people living in the most deprived communities • to improve access to high quality services for the most disadvantaged groups and individuals in rural communities	Scottish Government
Curriculum for Excellence	2004	A new school curriculum framework to enable young people to become "successful learners, confident individuals, responsible citizens and effective contributors." The curriculum focuses on the knowledge, skills and attributes needed for learning, life and work. It was designed to be flexible and less prescriptive than previous curriculum advice to enable teachers and other staff to meet the needs of all children and young people in Scotland.	Scottish Executive

Name	Year	Description	Organisation
Community Learning & Development (CLD)	2004	Guidance for Community Planning Partnerships to set a long term framework for the development of CLD. CLD is a way of working and supporting communities to increase the skills, confidence, networks and resources they need to tackle problems and grasp opportunities. 3 national priorities: • achievement through learning for young people • achievement through learning for adults • achievement through building community capacity	Scottish Executive
More Choices, More Chances	2006	A strategy to reduce the proportion of young people not in education, employment or training in Scotland (NEET).	Scottish Executive
Parental Involvement Act	2006	The right for parents to be involved in their child's learning. Local Authorities are responsible for encouraging parents to participate through both representation in schools and learning at home.	Scottish Executive
Early Years and Early Intervention	2008	A joint policy statement regarding the commitment to break the cycle between health, education and employment opportunities through prevention and early intervention. This includes prioritising resources across local government, the health service and the entire public sector to identify and manage the risks early in life that lead to inequality.	Scottish Government & COSLA
Getting it Right for Every Child (GIRFEC)	2008 (updated guide 2012)	An approach for all organisations working with children and young people to put the child or young person, and their family, at the centre. This includes working together to support families and their wellbeing, and where appropriate, to take early action at the first signs of any difficulty.	Scottish Government

Name	Year	Description	Organisation
Child Poverty Strategy for Scotland	2011	Main aims of this strategy include: • maximising household resources among low income families to reduce income poverty and material deprivation • improving children's wellbeing and life chances by breaking cycles of poverty, inequality and deprivation. Three key principles: • Early intervention and prevention • Building on the assets of individuals and communities • Ensuring that children and family needs are at the centre in both design and delivery	Scottish Government
Child Poverty Strategy for Scotland (revised)	2014	Promotes targeting efforts to close the attainment gap between children from disadvantaged and advantaged households. This is seen as key to improving children's life chances and tackling poverty.	Scottish Government
Children and Young People's Bill	2013	Encourages Local Authorities to target the early years and work across agencies to improve the life chances of children in poverty. The Bill increases the number of nursery hours for every child from 450 hours to 600 hours.	

The following section studies the changes in educational inequality over the past ten years, focussing on pupil performance within publicly funded secondary school education. Due to availability, Average tariff scores for pupils at the end of secondary four and five are profiled from 2002/3 to 2012/13. Tariff scores are allocated to pupils in relation to their SQA results and are used by UCAS to establish entry into higher education: the higher the score, the higher the educational attainment. Although these scores are valuable measures for academic attainment they fail to capture wider achievement or vocational success among young people in Scotland. These measures are commonly used to assess attainment but in reality they fail to represent or measure broader learning that Curriculum for Excellence and GIRFEC were originally designed to support. Academic achievement alone does not necessarily reflect success, just as poor academic achievement may not represent failure. It should, therefore, be recognised that the following two indicators measure changes in levels of academic attainment and not broader educational success.

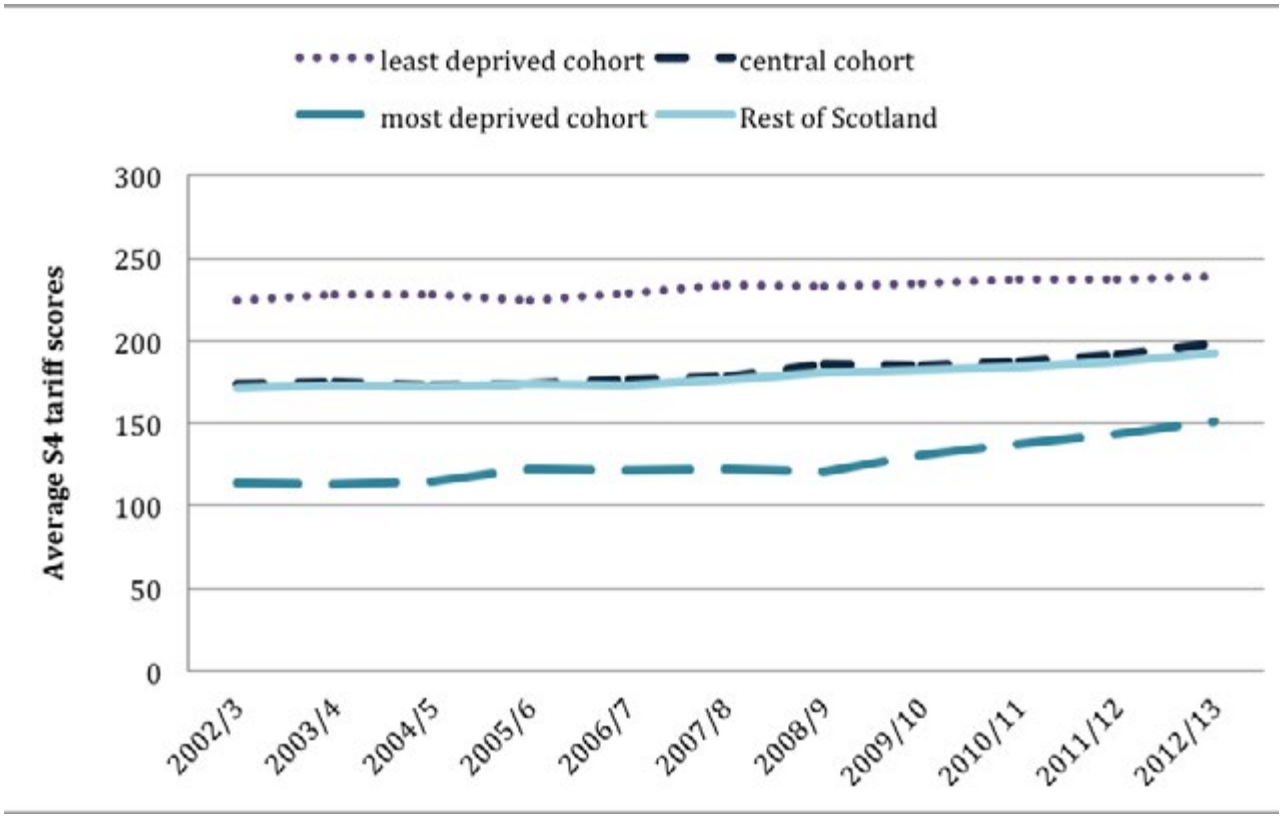
4.1 Average S4 Tariff Scores

Average S4 tariff scores refer to the average (mean) tariff score achieved by pupils within a selected area by the end of fourth year of secondary school. Secondary 4 is the last year of compulsory education in Scotland and is, therefore, the final year representing all pupils who attend state schools. In 2012/13 there were 64,023 pupils on the S4 roll in Scotland: 2644 in the least deprived cohort, 3387 in the central cohort and 4039 in the most deprived cohort. Average S4 tariff scores across data zones in Scotland range up to 389 with a Scottish average of 193.

4.1.1 1000 Communities

Average S4 tariff scores were calculated for all three cohorts within *1000 Communities*, and the rest of Scotland, from 2002/3 to 2012/13. These scores are displayed in Figure 4-1 below.

Figure 4-1 Average S4 tariff scores, 1000 communities



* null values have been removed for all data zones that have no S4 pupils.

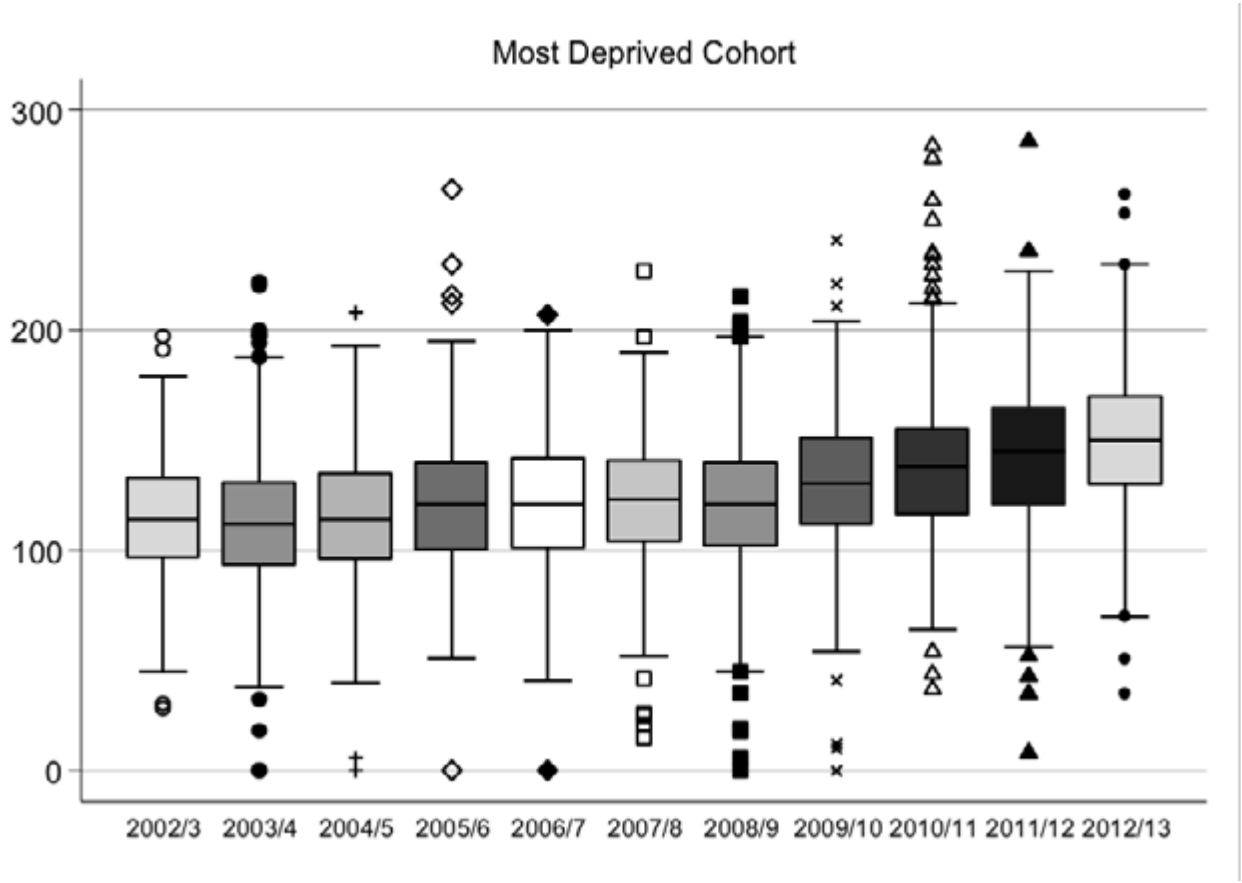
Average scores generally improved for all three cohorts, especially for the most deprived group (32% increase – see Table 4 2 below). This not only shows an improvement overall, but the gap between the most and least deprived cohorts also decreased from a 110 point difference in 2002/3 to 88 in 2012/13, this is a decrease of approximately 20%. This decrease in dispersion between cohorts indicates that these areas are not as divided in average S4 attainment as they were in 2002.

Table 4-2 Average S4 tariff scores, 2002/3 to 2011/12, 1000 Communities

Average S4 tariff scores	02/ 03	03/ 04	04/ 05	05/ 06	06/ 07	07/ 08	08/ 09	09/ 10	10/ 11	11/ 12	12/ 13	Change (n, %)	
Least deprived cohort	224	227	227	224	229	234	232	235	237	237	239	15	7%
Central cohort	174	174	173	174	176	178	185	184	187	191	198	24	14%
Most deprived cohort	114	113	115	122	121	122	121	131	138	144	151	37	32%
Rest of Scotland	171	173	172	174	173	177	180	182	184	188	192	21	12%

The box plots in Figure 4-2 display the range in average S4 tariff scores for the most deprived cohort from 2002/3 to 2012/13. These plots indicate any changes in dispersion between data zones in the most deprived cohort across this period.

Figure 4-2 Most deprived cohort average S4 tariff scores, boxplots



The range of scores attained by neighbourhoods in the most deprived cohort increased marginally between 2002 and 2012, this is reflected by a slight increase in standard deviation. The coefficient of variation (CV) in 2012/13, however, was lower than the equivalent in 2002/3. Therefore, after normalising the distribution to the mean, variation did not increase for the most deprived cohort. This suggests that between 2002/3 and

2012/13 average S4 tariff scores improved for the majority of neighbourhoods in the most deprived cohort. In 2012/13, 50% of neighbourhoods scored between 130 and 170, giving an interquartile range (IQR) of 40. In 2002 the IQR was 36 but ranged between 97 and 133. Although the range of scores increased between 2002 and 2012, in relative terms variation reduced slightly over this period. Therefore, data zones within the most deprived cohort have higher average S4 tariff scores than they did in 2002 as well as less variation between them.

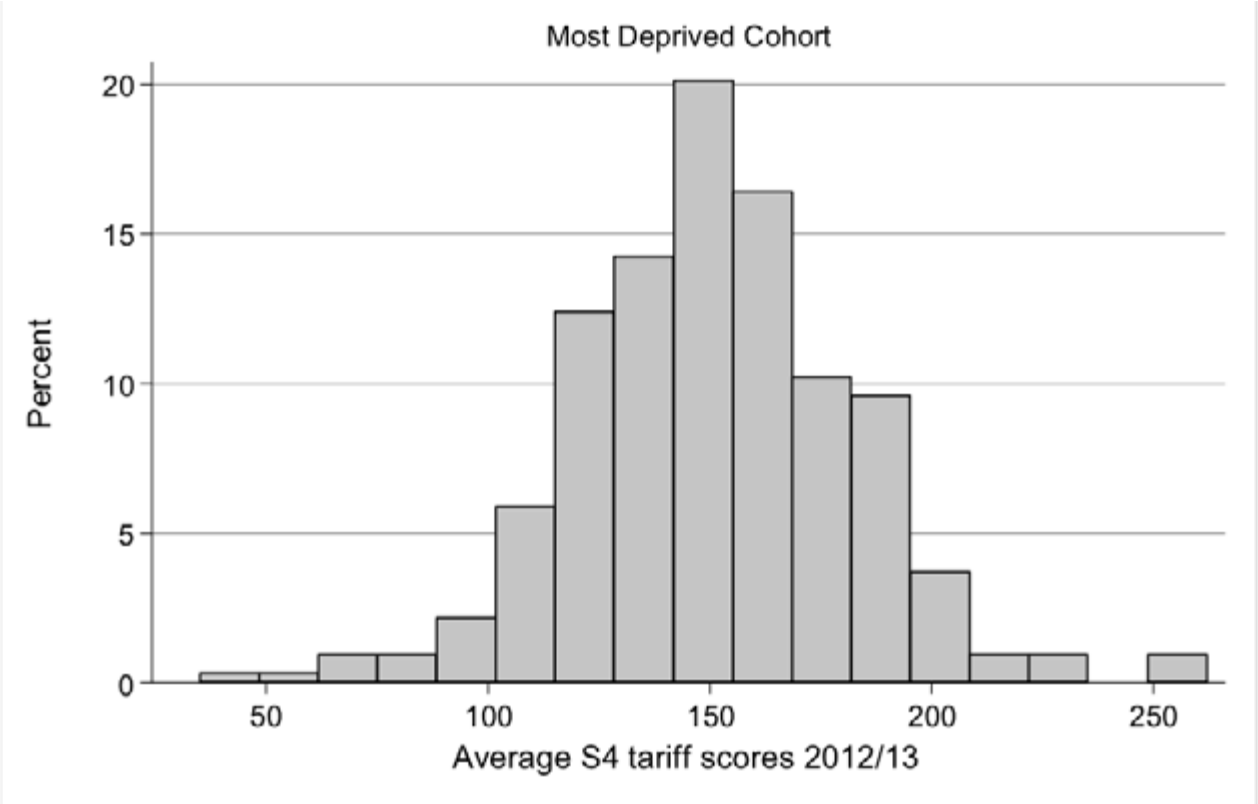
Table 4-3 Summary statistics most deprived cohort

Average S4 tariff scores, Most Deprived Cohort										
Year	Min	Max	Median	Mean	St.Dev.	CV	25%	75%	IQR	Skewness
2002/3	28	197	114	114	27.7	0.24	97	133	36	-0.148
2003/4	0	222	112	113	31.4	0.28	93	131	38	0.056
2004/5	0	208	114	115	30.93	0.27	96	135	39	-0.127
2005/6	0	264	121	122	31.6	0.26	100	140	40	0.394
2006/7	0	207	121	121	31.8	0.26	101	142	41	-0.128
2007/8	15	227	123	122	31.3	0.26	104	141	37	-0.341
2008/9	0	215	121	121	32.2	0.27	102	140	38	-0.307
2009/10	0	241	131	131	33.5	0.26	112	151	39	-0.239
2010/11	37	284	138	138	34.7	0.25	116	155	39	0.68
2011/12	8	286	145	144	35.1	0.24	121	165	44	-0.129
2012/13	35	262	150	151	31.7	0.21	130	170	40	0.075

The maximum score achieved within the most deprived cohort increased significantly between 2002 and 2012, from 197 to 262. As displayed in the box plot in Figure 4-2 and the histogram in Figure 4-3 this is an outlier and the majority of neighbourhoods in this cohort scored well below the national average of 193.

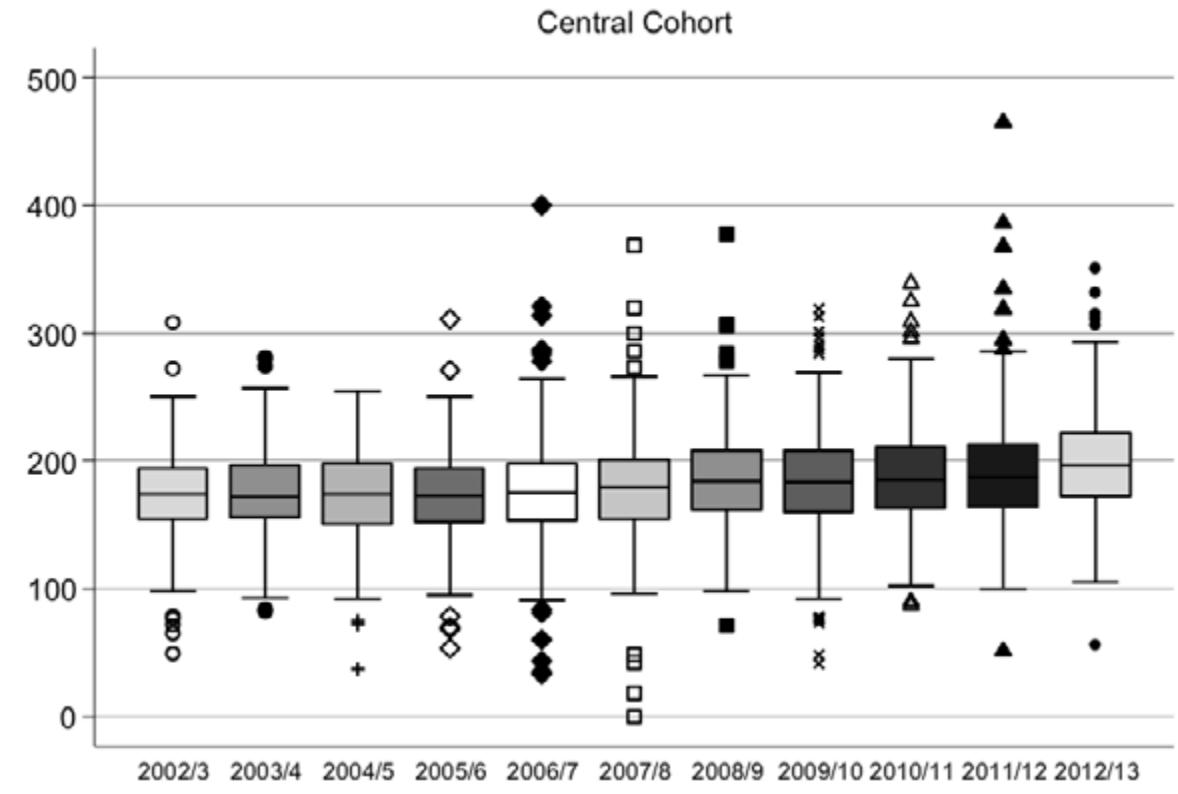
Overall, despite improvements across the most deprived cohort, average S4 tariff scores for the majority of data zones in this cohort remain considerably lower than the national average.

Figure 4-3 Histogram, Average S4 tariff scores, 2012/13, most deprived cohort



The box plots in Figure 4-4 display the range in average S4 tariff scores for the central cohort from 2002/3 to 2012/13.

Figure 4-4 Central cohort average S4 tariff scores, boxplots

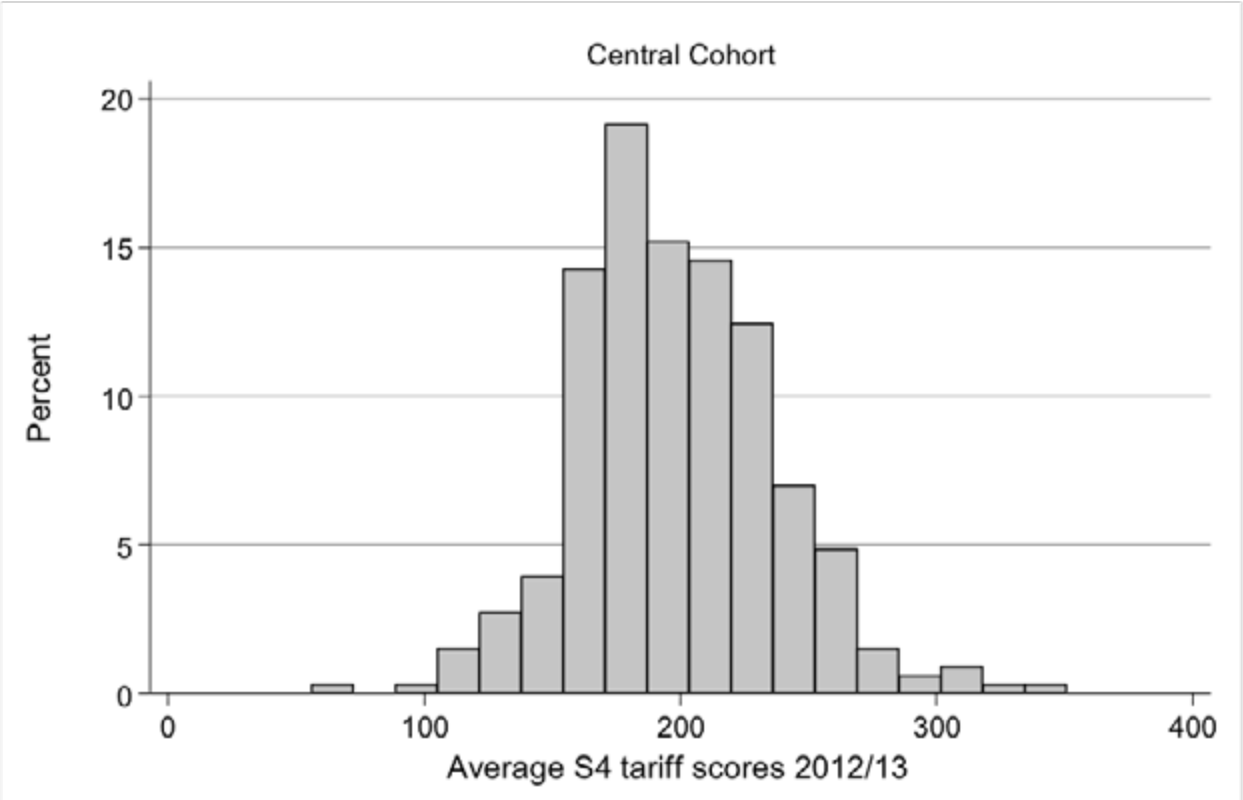


The variation in scores attained by neighbourhoods in the central cohort increased between 2002 and 2012, this is reflected by increases in the standard deviation, the CV and the IQR. In 2012/13 50% of neighbourhoods scored between 172 and 222, giving an IQR of 50. In 2002 the IQR was 40 with a range between 154 and 194. By 2012/13 average S4 tariff scores had improved for the majority of neighbourhoods in the central cohort but variation between neighbourhoods also increased.

Table 4-4 Summary statistics, average S4 tariff scores, central cohort

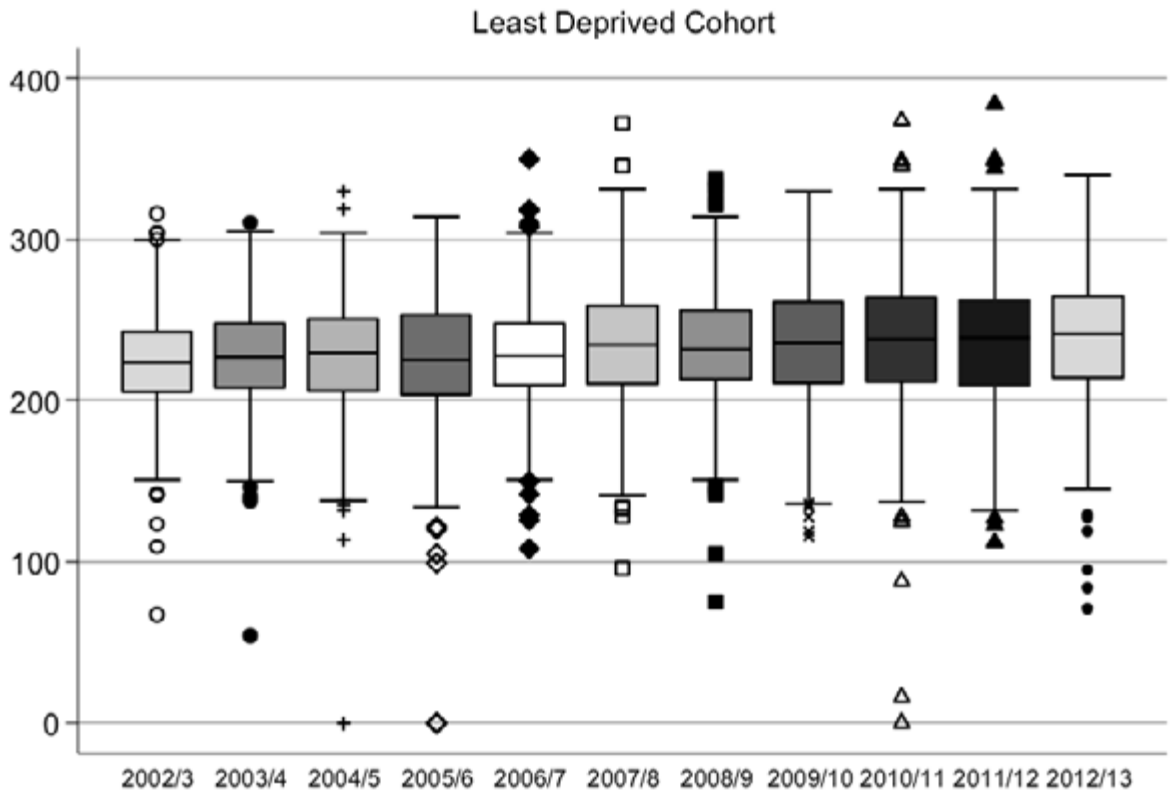
Average S4 tariff scores, Central Cohort										
Year	Min	Max	Median	Mean	St.Dev.	CV	25%	75%	IQR	Skewness
2002/3	49	308	174	174	33.7	0.19	154	194	40	-0.129
2003/4	82	281	172	174	33.5	0.19	155	197	42	0.145
2004/5	37	255	174	173	34.3	0.20	150	198	48	-0.327
2005/6	53	311	173	174	34.6	0.20	152	194	42	-0.017
2006/7	33	400	175	176	42.1	0.24	153	198	45	0.392
2007/8	0	369	179	178	40.7	0.23	154	201	47	0.04
2008/9	71	378	184	185	37.6	0.20	162	208	46	0.707
2009/10	41	319	183.5	184	41	0.22	160	208	48	-0.061
2010/11	87	339	185	187	38.7	0.21	163	211	48	0.393
2011/12	51	465	187	191	43.7	0.23	164	213	49	1.388
2012/13	56	351	197	198	39	0.20	172	222	50	0.375

Figure 4-5 Histogram, Average S4 tariff scores, 2012/13, central cohort



The histogram in Figure 4-5 displays the distribution of average S4 tariff scores in 2012/13 between neighbourhoods in the central cohort. The majority of neighbourhoods scored between 160 and 230. Both upper and lower quartile limits increased between 2002/3 and 2012/13. This indicates that average S4 tariff scores improved right across this cohort. The box plots in Figure 4-6 display average S4 tariff scores for neighbourhoods in the least deprived cohort.

Figure 4-6 Least deprived cohort average S4 tariff scores, boxplots



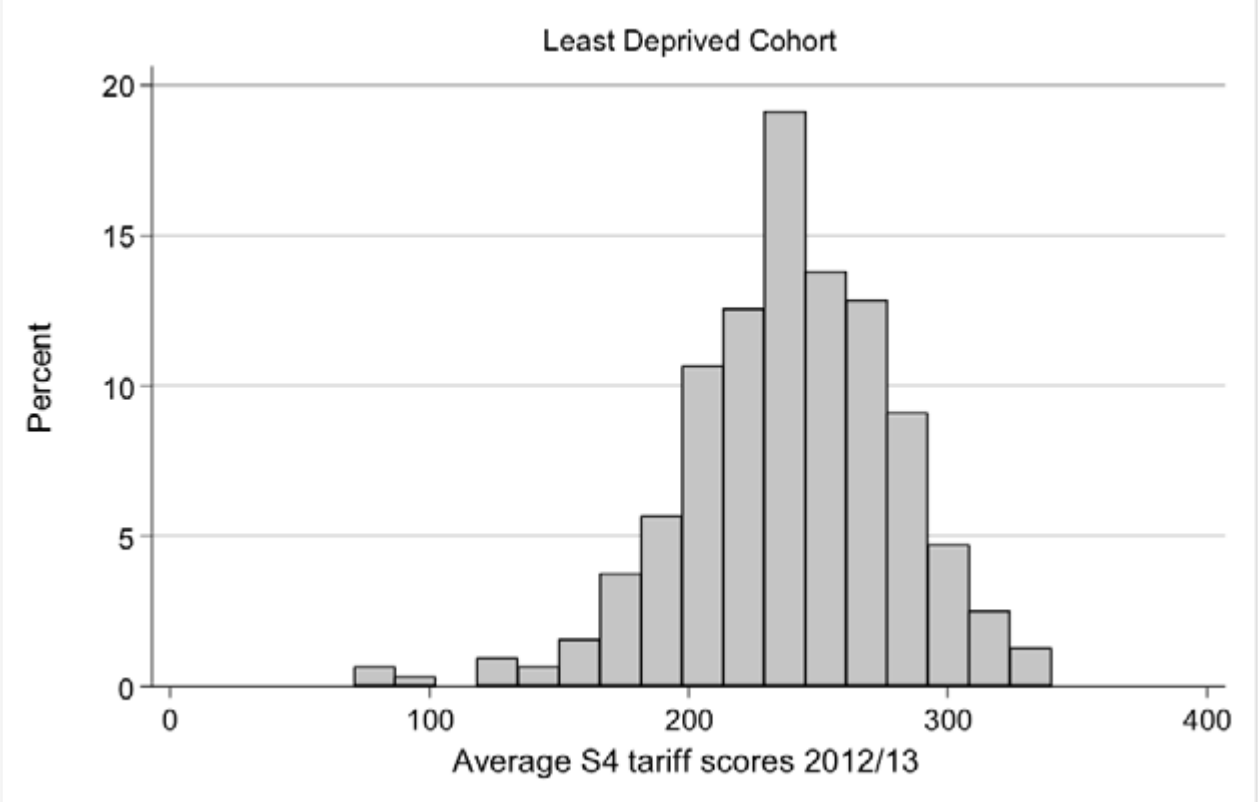
The variation in scores attained by neighbourhoods in the least deprived cohort increased between 2002 and 2012, this is reflected by increases in the standard deviation, the CV and the IQR. In 2012/13 50% of neighbourhoods scored between 214 and 265, giving an IQR of 51. In 2002 the IQR was 38 with a range between 205 and 243. This indicates that between 2002/3 and 2012/13 average S4 tariff scores improved for the majority of neighbourhoods in the least deprived cohort but variation between neighbourhoods also increased.

Table 4-5 Summary statistics, average S4 tariff scores, least deprived cohort

Average S4 tariff scores, Least Deprived Cohort										
Year	Min	Max	Median	Mean	St.Dev.	CV	25%	75%	IQR	Skewness
2002/3	67	316	224	224	31.5	0.14	205	243	38	-0.384
2003/4	54	310	227	227	32.1	0.14	208	248	40	-0.499
2004/5	0	330	230	227	37.3	0.16	206	251	45	-0.877
2005/6	0	314	225	224	43.2	0.19	204	253	49	-1.413
2006/7	108	350	228	229	34.2	0.15	209	248	39	-0.138

Average S4 tariff scores, Least Deprived Cohort										
Year	Min	Max	Median	Mean	St.Dev.	CV	25%	75%	IQR	Skewness
2007/8	96	372	235	234	39.3	0.17	210	259	49	-0.056
2008/9	75	338	232	232	37.2	0.16	213	256	43	-0.303
2009/10	116	330	236	235	37.5	0.16	211	261	50	-0.239
2010/11	0	374	238	237	43.1	0.18	212	264	52	-0.94
2011/12	112	384	239	237	40.4	0.17	209	262	53	-0.025
2012/13	71	340	241	239	41.4	0.17	214	265	51	-0.559

Figure 4-7 Histogram, average S4 tariff scores, 2012/13, least deprived cohort



The histogram in Figure 4-7 displays the distribution of average S4 tariff scores in 2012/13 for the least deprived cohort. The majority of neighbourhoods in this cohort scored well above the Scottish average of 193.

Overall, variation increased within the central and least deprived cohorts between 2002 and 2012. This suggests less consistency and wider levels of attainment between data zones in these cohorts, than previously. The coefficients of variation for the most deprived and central cohorts in 2012/13 (0.21 and 0.20 respectively) were higher than the equivalent for the least deprived cohort (0.17). Average S4 tariff scores within the least deprived cohort were, therefore, more consistent between neighbourhoods than within the most deprived and central cohorts.

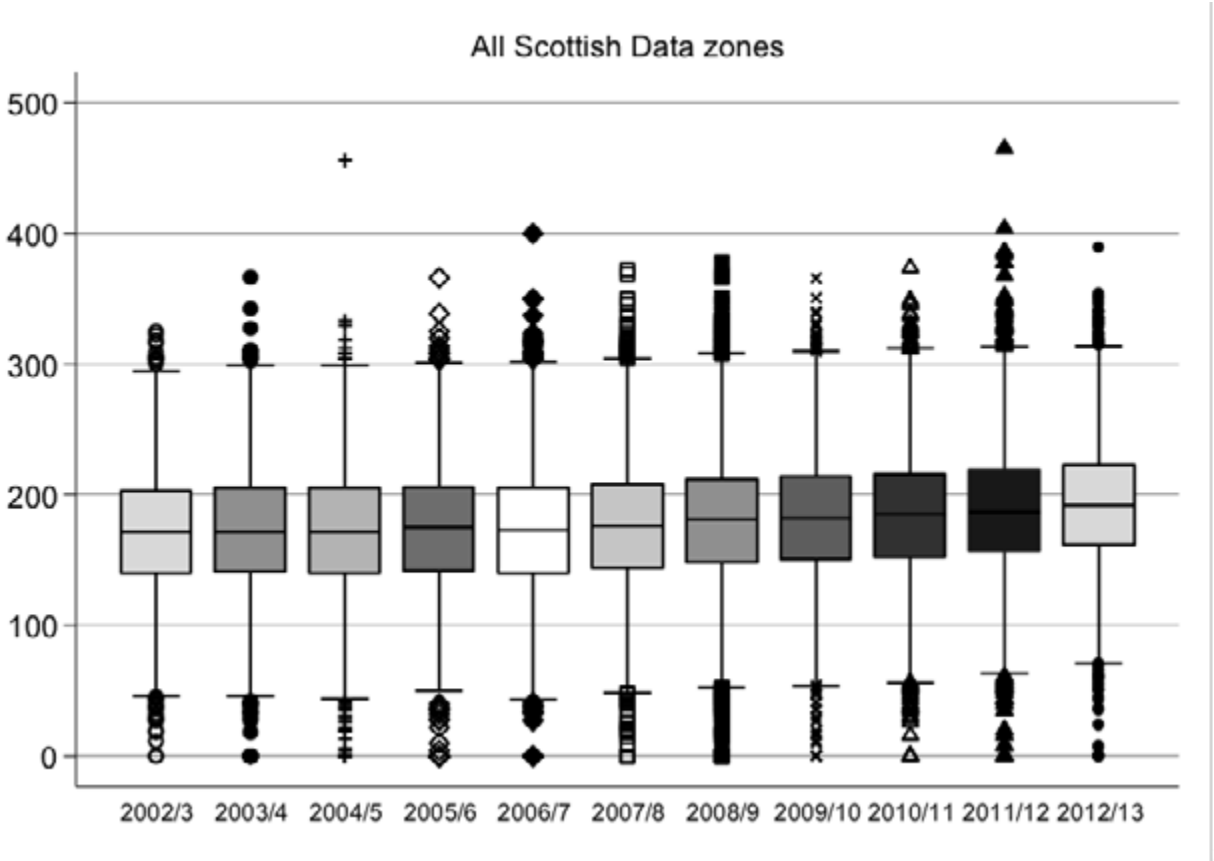
Despite variation *within* cohorts, this division is not as extreme as between the most and

least deprived cohorts. In 2012/13, the IQR within cohorts ranged from 40 to 51. The difference between average (mean) scores for the most and least deprived cohorts, however, was 88 points (41 points between the least deprived and central cohort and a further 47 points between the central and most deprived cohort). Although the cohort study indicates positive progress considering that inequity in average S4 tariff scores reduced to some extent, the cohorts average scores remain greatly divided: these cohorts were the most, central, and least deprived in 2004 but by 2012/13 their average S4 tariff scores were still divided by over 40 points between each cohort.

4.1.2 Variation in Scotland

Variation between cohorts reduced to some extent between 2002/3 and 2012/13 because average S4 tariff scores improved most substantially in the most deprived cohort. Further analyses were carried out to consider the overall variation of S4 attainment across Scotland over this same period.

Figure 4-8 Average S4 tariff scores, Scotland



The box plots in Figure 4 8 display the distribution of average S4 tariff scores across all data zones in Scotland from 2002/2003 to 2012/2013. There was a gradual increase in tariff scores across this period but variation remains largely as it was in 2002/2003.

The average S4 tariff scores for the 10% highest and 10% lowest achieving areas in Scotland were selected and compared separately for every year between 2002/3 and 2012/13 (therefore, these are not necessarily the same neighbourhoods profiled over this period). Unlike the cohort study in section 4.2.1 this does not associate deprivation levels but measures variance in educational attainment independently. This analysis reflects the general gap in S4 achievements for Scotland overall. These scores are displayed in Table 4 6 below.

Table 4-6 Average S4 tariff scores for 10% highest and 10% lowest achieving areas

Average S4 tariff scores	02/ 03	03/ 04	04/ 05	05/ 06	06/ 07	07/ 08	08/ 09	09/ 10	10/ 11	11/ 12	12/ 13	Change (n, %)	
10% highest achieving data zones	245	250	252	251	254	261	260	263	266	271	274	29	12%
10% lowest achieving data zones	93	93	91	94	95	97	97	103	105	109	113	20	21.5%
Scottish Average	168	170	170	172	171	175	180	182	184	188	193	25	15%

4.2 Average S5 Tariff Scores

Average S5 tariff scores refer to the average (mean) tariff score achieved by pupils by the end of fifth year in secondary school. In 2012/13 there were 54,347 pupils on the S5 roll, this was a reduction of 8544 pupils (approximately 14%) from the S4 roll in 2011/12 (62,891)[5]. The following analyses mirror the previous study of S4 attainment for comparison and further evaluation. Average S5 tariff scores range from 0 to 764 across data zones in Scotland, with a Scottish average of 356.

4.2.1 1000 Communities

S5 results illustrate a similar pattern to the results in S4. The line chart in Figure 4 9 displays average S5 tariff scores for each cohort and the Scottish average from 2004/5 to 2012/13.

Similar to the S4 results, average S5 tariff scores improved for all three cohorts and the rest of Scotland, especially for the most deprived group (27% increase – see Table 4 7 below). Furthermore, the gap between the most and least deprived cohorts decreased by nearly 13% over this period, illustrating less division between cohorts than in 2004/5.

5 The least deprived cohort had 2543 pupils on the S5 roll in 2012/13, this was a reduction of 120 pupils (4.5%) from the S4 roll in 2011/12 (2663). The central cohort had 2746 pupils on the S5 roll in 2012/13, a reduction of 437 pupils (14%) from the S4 roll in 2011/12 (3183). The most deprived cohort had 3096 pupils on the S5 roll in 2012/13, this was a reduction of 479 pupils (13%) from the S4 roll in 2011/12 (3575).

Figure 4-9 Average S5 tariff scores, 1000 communities

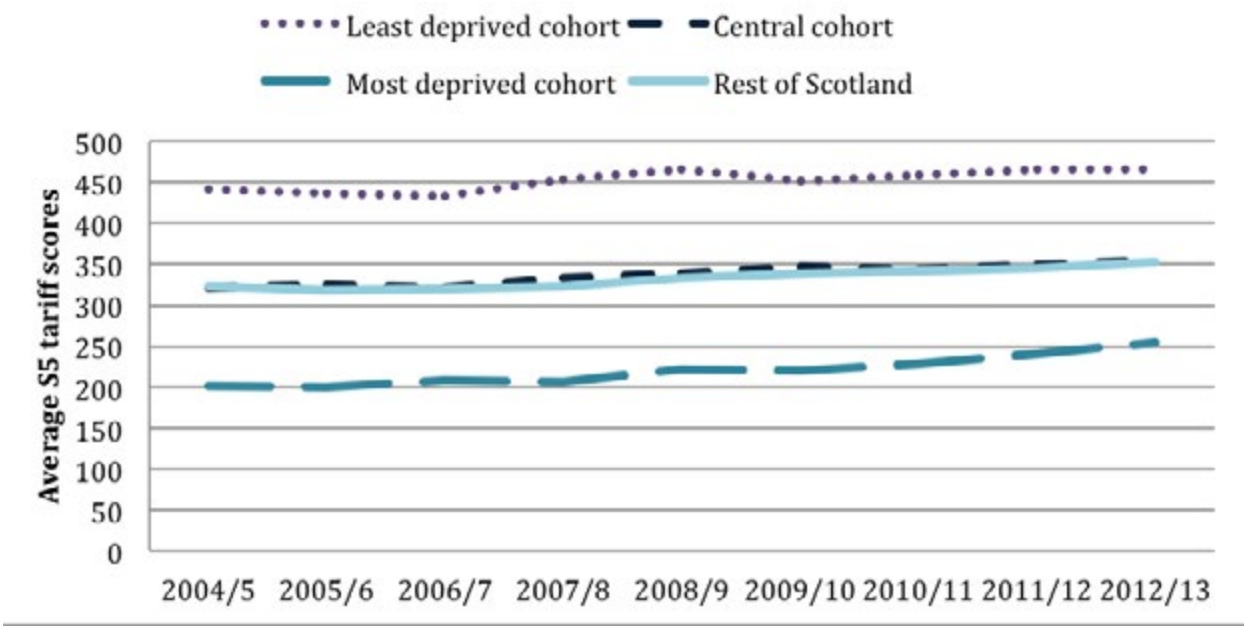


Table 4-7 Average S5 tariff scores, 2004/5 to 2012/13, 1000 communities

Average S5 tariff scores	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	Change (n, %)	
Least dep. cohort	442	438	434	453	465	451	460	467	465	23	5.2%
Central cohort	322	325	321	333	338	347	343	348	353	31	9.6%
Most dep. cohort	201	200	208	207	221	220	229	240	255	54	26.9%
Rest of Scotland	323	318	320	323	334	338	343	346	352	29	9%

The box plots in Figure 4 10 display the range of S5 tariff scores in 2004/5, 2006/7, 2008/9 2010/11 and 2012/13 for the least, central and most deprived cohorts.

Variation within the least deprived cohort increased slightly between 2004/5 and 2012/13. Median scores for all three cohorts also increased over this period. Table 4 8, Table 4 9, and Table 4 10 display summary statistics for the most, central and least deprived cohorts respectively. These data provide further detail about the distribution of average S5 tariff scores within these cohorts.

Figure 4-10 Average S5 tariff scores, boxplots

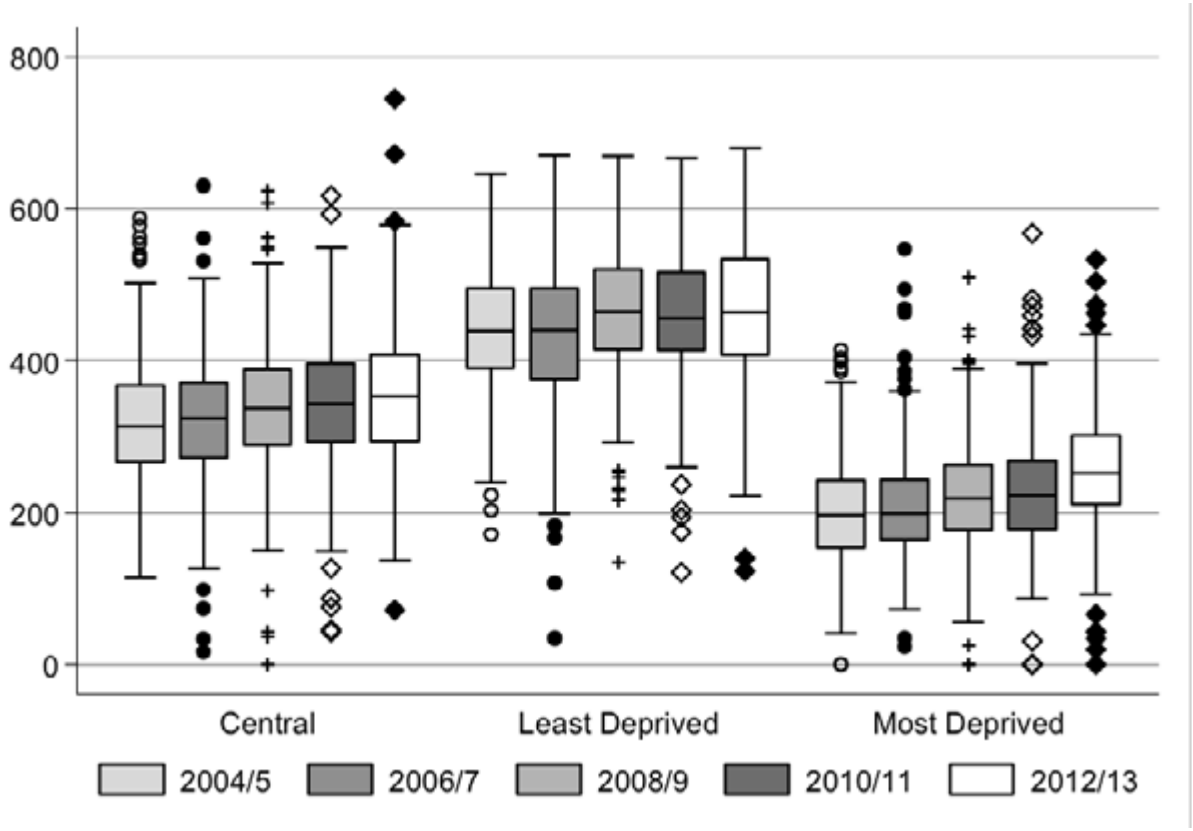


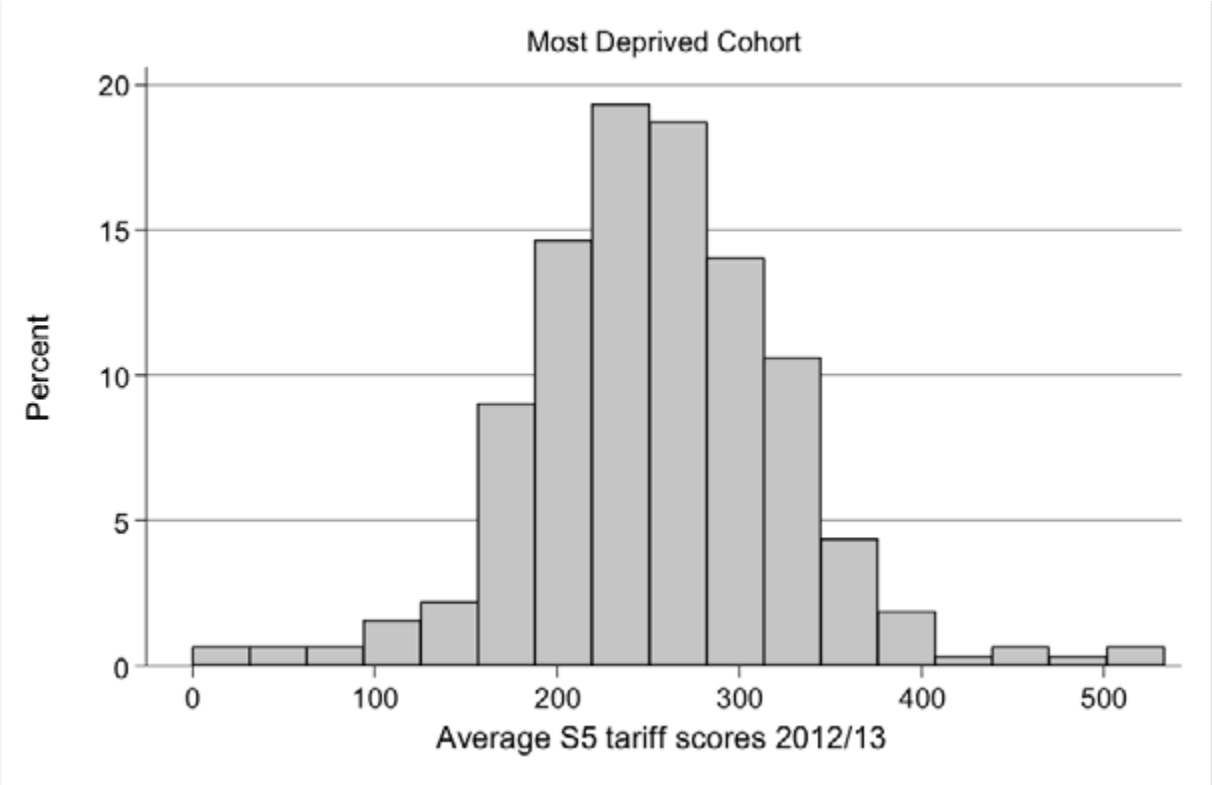
Table 4-8 Summary statistics, average S5 tariff scores, most deprived cohort

Average S5 tariff scores, Most Deprived Cohort										
Year	Min	Max	Median	Mean	St.Dev.	CV	25%	75%	IQR	Skewness
2004/5	0	414	197	201	70.8	0.35	153	242	89	0.341
2005/6	0	443	196.5	200	68	0.34	156	244	88	0.068
2006/7	22	546	199	208	67.6	0.33	164	243	79	1.136
2007/8	16	478	202	207	73.4	0.35	157	253	96	0.442
2008/9	0	510	219.5	221	73.6	0.33	177	263	86	0.194
2009/10	0	585	217	220	78.7	0.36	179	265	86	0.292
2010/11	0	568	223	229	78.5	0.34	178	269	91	0.575
2011/12	22	608	241	240	77.8	0.32	192	283	91	0.77
2012/13	0	533	252	255	72.7	0.29	211	302	91	0.083

Between 2004/5 and 2012/13 the maximum score within the most deprived cohort increased from 414 to 533. Values for the upper and lower quartile limits also increased considerably over this period, indicating that average S5 tariff scores improved at both the upper and lower end of the distribution in the most deprived cohort. In 2004/5, 50% of neighbourhoods in the most deprived cohort scored between 153 and 242, giving an IQR of 89. By 2012/13 the IQR was 91 but ranged between 211 and 302. This reflects a relatively similar degree of mid-range variation between 2004/5 and 2012/13. The coefficient of variation (CV), on the

other hand, decreased from 0.35 in 2004/5 to 0.29 in 2012/13. Variation in relation to the mean, therefore, decreased to some extent across this period. This indicates less variation between data zones in the most deprived cohort in 2012/13 than in 2004/5.

Figure 4-11 Histogram, average S5 tariff scores, 2012/13, most deprived cohort



The histogram in Figure 4-11 displays the distribution of average S5 tariff scores in 2012/13 for the most deprived cohort. The majority of neighbourhoods scored between 200 and 300. These scores have improved since 2004/5 but are still well below the Scottish average of 356.

Table 4-9 displays summary statistics for the central cohort. Maximum scores also improved within this cohort, increasing from 587 in 2004/5 to 745 in 2012/13. In 2004/5, 50% of neighbourhoods in the central cohort scored between 266 and 367, giving an IQR of 101. By 2012/13 the IQR increased to 115, ranging between 293 and 408. This indicates that average S5 tariff scores increased for the majority of neighbourhoods in the central cohort between 2004/5 and 2012/13. Although the IQR increased over this period, the CV remained relatively stable. Therefore, although the range (both mid-range and standard deviation) of scores increased slightly between 2004/5 and 2012/13, after normalising for the increase in mean, variation has not increased.

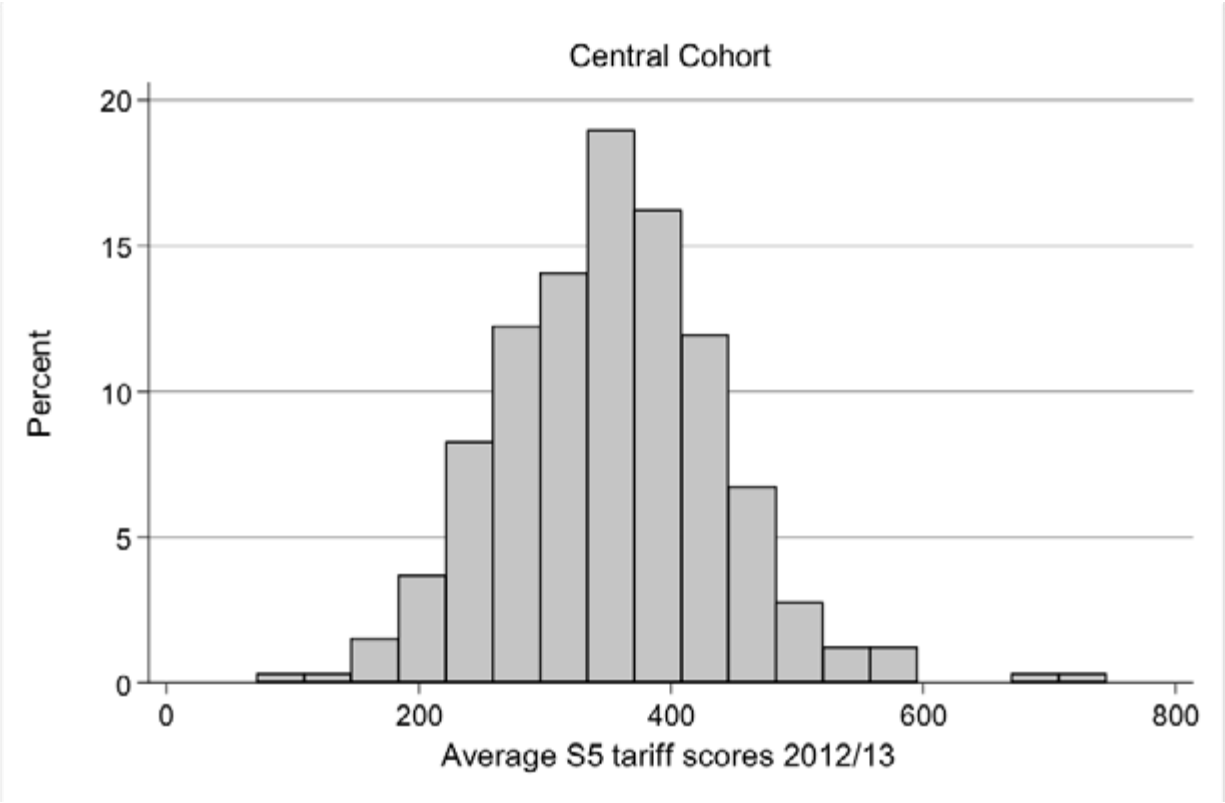
Table 4-9 Summary statistics, average S5 tariff scores, central cohort

Average S5 tariff scores, Central Cohort										
Year	Min	Max	Median	Mean	St.Dev.	CV	25%	75%	IQR	Skewness
2004/5	115	587	314	322	81.4	0.25	266	367	101	0.402
2005/6	0	664	324	325	83.4	0.26	271	373	102	-0.035

Average S5 tariff scores, Central Cohort										
Year	Min	Max	Median	Mean	St.Dev.	CV	25%	75%	IQR	Skewness
2006/7	16	630	324	321	83.5	0.26	272	371	99	-0.128
2007/8	11	616	333.5	333	84.5	0.25	285	382	97	-0.011
2008/9	0	624	337.5	338	85.3	0.25	288	389	101	-0.242
2009/10	99	731	345	347	86.8	0.25	292	400.5	108.5	0.417
2010/11	43	617	343	343	87.8	0.26	292	396	104	-0.194
2011/12	118	644	351	348	79.8	0.23	297	404	107	0.12
2012/13	72	745	353	353	87.6	0.25	293	408	115	0.368

The histogram in Figure 4 12 displays the distribution of average S5 tariff scores in 2012/13 for the central cohort.

Figure 4-12 Histogram, average S5 tariff scores, 2011/12, Central cohort



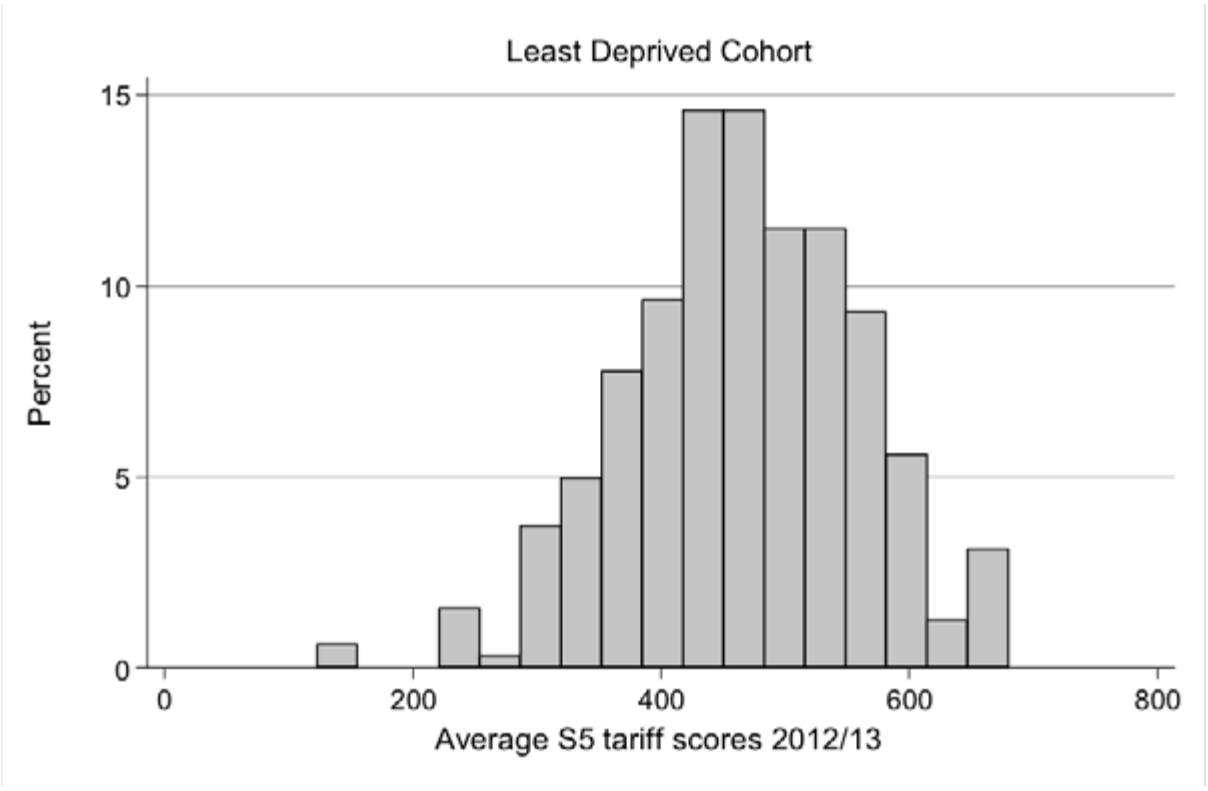
Despite approximately 19% of neighbourhoods scoring between 335 and 365 points, the majority of neighbourhoods in the central cohort scored between 290 and 410 in 2012/13. Table 4-10 displays summary statistics for the least deprived cohort.

Table 4-10 Summary statistics, average S5 tariff scores, least deprived cohort

Average S5 tariff scores, Least Deprived Cohort										
Year	Min	Max	Median	Mean	St.Dev.	CV	25%	75%	IQR	Skewness
2004/5	171	646	439	442	80.4	0.18	390	495	105	-0.101
2005/6	158	696	440	438	87.7	0.20	381	499	118	-0.168
2006/7	35	670	440	434	94.3	0.22	376	495	119	-0.48
2007/8	195	708	456	453	80.4	0.18	398	509	111	-0.143
2008/9	135	669	464	465	84.8	0.18	415	520	105	-0.278
2009/10	150	672	454	451	89.5	0.20	404	506	102	-0.411
2010/11	121	667	456	460	84.8	0.18	414	517	103	-0.484
2011/12	0	706	467	467	94.8	0.20	412	532	120	-0.619
2012/13	123	680	463	465	93.8	0.20	408	534	126	-0.296

In 2012/13 50% of neighbourhoods in the least deprived cohort scored between 408 and 534, giving an interquartile range of 126. This is an increase from the IQR in 2004/5 (105), which ranged between 390 and 495. This, alongside increases in the standard deviation and CV, suggests that variation of scores between neighbourhoods in the least deprived cohort has increased since 2004/5 (but is very similar to the equivalent in 2006/7).

Figure 4-13 Histogram, average S5 tariff scores, 2012/13, least deprived cohort



In 2012/13 the majority of neighbourhoods in the least deprived cohort scored between 410 and 540. The distribution of scores is displayed in the histogram in Figure 4 13. The vast majority of neighbourhoods within the least deprived cohort scored well above the national

average of 356.

Overall, average S5 tariff scores increased between 2004/5 and 2012/13 for the majority of data zones within all three cohorts. Averages as well as upper and lower quartile limits increased throughout, indicating improvement in both higher and lower scores within each cohort.

Variation after normalising for the mean (coefficient of variation: CV) increased slightly for the least deprived cohort, remains the same for the central cohort and decreased for the most deprived cohort. Despite this reduction, in 2012/13 the CV for average S5 tariff scores was highest for the most deprived cohort (0.29). This CV is also notably higher than the equivalent for S4 scores (0.21). Within the most deprived cohort there is, therefore, less consistency between neighbourhoods regarding S5 attainment than S4 attainment. There is also wider dispersion between scores in the most deprived cohort than either the least deprived or central cohorts.

Despite variation between neighbourhoods within cohorts, the scale of variation is not as extreme as *between* cohorts. In 2012/13 IQRs for average S5 tariff scores varied between 126 in the least deprived cohort and 91 in the most deprived cohort. The difference between the average (mean) scores in the least and most deprived cohorts, however, was 210 points (approximately 100 points between each cohort).

Overall, S5 tariff scores increased across and within all three cohorts. Similar to S4 results, the reduction in division between cohorts is positive progress for these specific areas. Nonetheless, although these cohorts are not as divided in S5 attainment as they were in 2004/5, 8 years later there was still a considerable gap in achievement, not only between the most and least deprived cohorts but between all three cohorts. In 2012/13, 25% of data zones in the central cohort achieved average scores of 408 or above. In contrast, 75% of data zones in the least deprived cohort scored above this same score.

4.2.2 Variation across Scotland

1000 Communities profiles selected cohorts from 2004/5 to 2012/13. This does not, however, reflect the overall distribution of scores across the whole of Scotland. The box plots in Figure 4-14 display the distribution of average S5 tariff scores across all data zones in Scotland.

Scores generally increased between 2004/5 and 2012/13 at both the top and bottom end of the distribution. The 10% highest scores and 10% lowest scores both increased by 32 points over this period. The gap between top and bottom deciles, therefore, remains as it was in 2004/5. These averages are displayed in Table 4-11 below.

Figure 4-14 Distribution of average S5 tariff scores, all data zones in Scotland

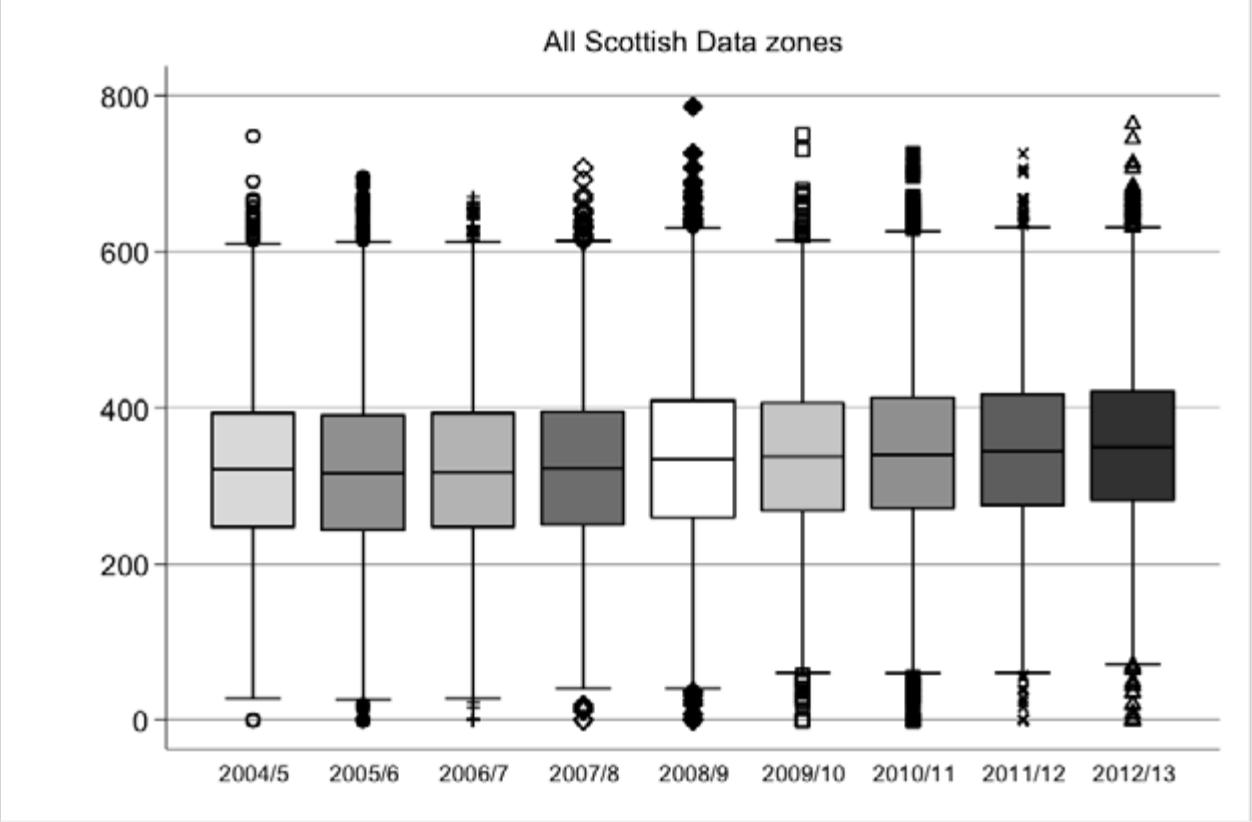


Table 4 11 Average S5 tariff scores, 10% highest and 10% lowest achieving areas

Average S5 tariff scores	04/ 05	05/ 06	06/ 07	07/ 08	08/ 09	09/ 10	10/ 11	11/ 12	12/ 13	Change (n, %)	
10% highest achieving data zones	508	506	504	513	524	522	527	534	540	32	6.3%
10% lowest achieving data zones	148	141	144	150	155	161	168	171	180	32	21.6%
Scottish average	325	321	324	327	338	344	348	350	356	31	9.5%

Overall, average S5 tariff scores increased between 2004/5 and 2012/13 for the majority of areas in Scotland, consequently leaving variation in scores largely as it was in 2004/5. As previously stated, this measures levels of academic attainment and not wider educational success.

4.3 School Attendance

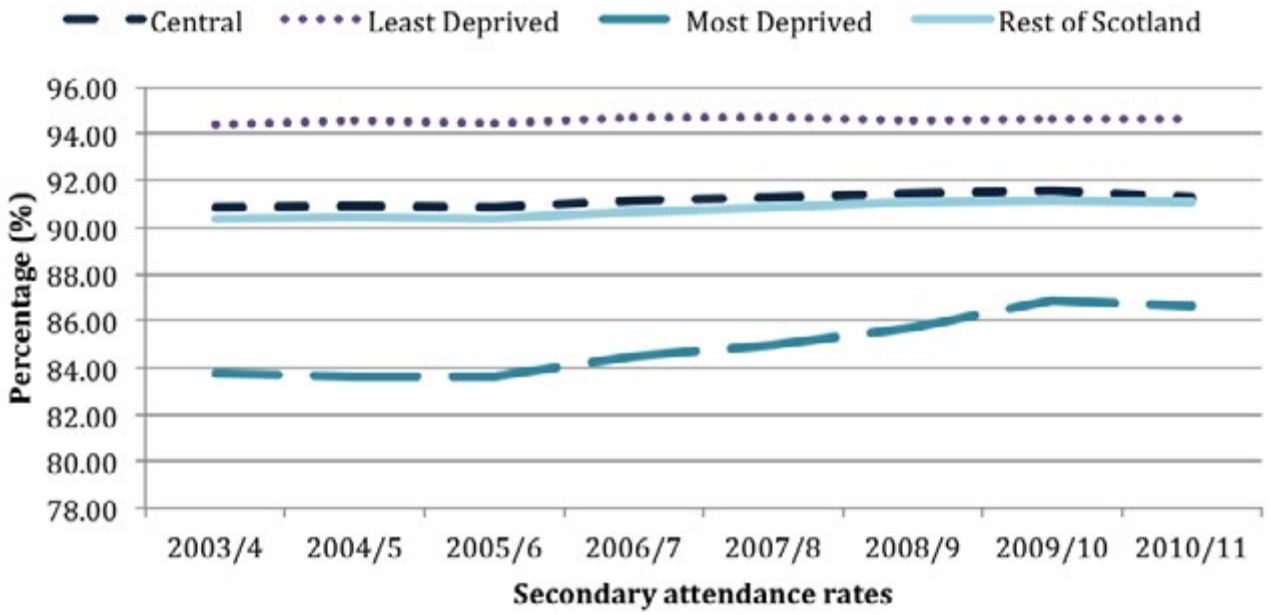
As established above, pupils living in the most deprived cohort tend to attain lower academic results in education than the central and least deprived cohorts. However, further analysis

indicates these pupils are also more likely to have a lower attendance. Percentages for primary and secondary attendance are presented in the following section to illustrate the difference between the three cohorts. Lower percentages of attendance indicate higher levels of absence, including both authorised absence such as sickness without educational provision or authorised holidays, and unauthorised absence such as truancy and unauthorised holidays. In 2012/13 attendance across Scotland was 93.6% with 6.4% absences; 4.5% authorised, and 1.8% unauthorised. Disaggregated data is not yet available for 2012/13. In 2010/11 the Scottish average attendance was 93.1% with 6.8% absences; 4.9% authorised, and 1.9% unauthorised.

4.3.1 Secondary Attendance

The following attendance percentages refer to publicly funded secondary schools in Scotland.

Figure 4-15 Secondary attendance



As displayed in Figure 4-15 and Table 4-12 the average attendance in the most deprived cohort in 2010/11 was approximately 87%. This is 8 percentage points lower than the average for the least deprived cohort (95%). In reality this illustrates that across data zones in the most deprived cohort the average pupil is absent from school for approximately 5 weeks out of a 38-week school year. In contrast, the average pupil in the least deprived cohort is absent for approximately 2 weeks out of a 38-week school year.

Table 4-12 Secondary attendance (%)

Secondary attendance (%)		2010/11	2009/10	2008/9	2007/8	2006/7	2005/6	2004/5	2003/4
Least deprived cohort	Mean	94.63	94.62	94.54	94.68	94.70	94.47	94.56	94.37
	SD	1.57	1.56	1.61	1.54	1.37	1.94	1.96	2.00
	Min	87.44	88.24	86.33	86.71	89.03	75.75	75.75	77.14
	Max	98.38	97.68	100	99.52	100	99.06	99.06	98.9

Secondary attendance (%)		2010/11	2009/10	2008/9	2007/8	2006/7	2005/6	2004/5	2003/4
Central cohort	Mean	91.29	91.58	91.47	91.26	91.12	90.87	90.91	90.84
	SD	2.28	2.03	2.29	2.73	2.81	2.82	2.75	2.41
	Min	82.72	85.89	80.09	74.78	75.55	73.97	73.97	79.73
	Max	96.94	96.43	95.92	97.07	98.61	95.99	95.99	96.05
Most deprived cohort	Mean	86.63	86.86	85.69	84.98	84.47	83.63	83.63	83.76
	SD	3.72	3.24	3.48	4.13	3.69	3.78	3.79	3.96
	Min	67.17	71.43	73.32	59.11	72.79	68.41	68.41	68.26
	Max	96.47	95.18	93.81	93.36	92.23	92.78	92.78	92.7
Rest of Scotland	Mean	91.06	91.14	91.07	90.84	90.66	90.38	90.42	90.36
	SD	3.23	3.24	3.50	3.65	3.81	3.88	3.90	3.69
	Min	73	64.65	50.69	57.11	58.1	46.36	46.36	67.02
	Max	99.09	100	100	100	99.54	100	100	100

This alone highlights a stark difference between attendances in areas experiencing different levels of deprivation. Even more striking, however, the lowest attendance in the most deprived cohort in 2010/11 was 67%, demonstrating that, within this data zone, pupils missed on average approximately one third of their education. The Average S4 tariff score for this data zone in 2010/11[6] was also 44% below the Scottish average.[7]

Pupils living in the central cohort attended secondary school approximately 91% of the 2010/11 school year. This equates to 34.7 weeks out of the 38-week year. Between 2003/4 and 2010/11 secondary attendance rates within all three cohorts increased. This indicates significant improvement but average attendance in 2010/11 remained greatly divided between cohorts. Distribution within and between cohorts in 2010/11 is displayed in the box plots in Figure 4-16 below.

Notably, there is considerably wider distribution of attendance percentages within the most deprived cohort than either the central or least deprived cohorts. Further analyses were conducted to consider the association between secondary attendance, educational attainment and income deprivation; the results are available on page 130 of this report.

4.3.2 Primary Attendance

Percentages for primary attendance do not follow the same trend as secondary attendance. As displayed in Figure 4-17 and Table 4-13, between 2003/4 and 2010/11, primary attendance decreased for all three cohorts and the rest of Scotland.

6 Average S4 tariff score: 103

7 Scottish Average, 2010/11: 184

Figure 4-16 Secondary attendance (%), box plots

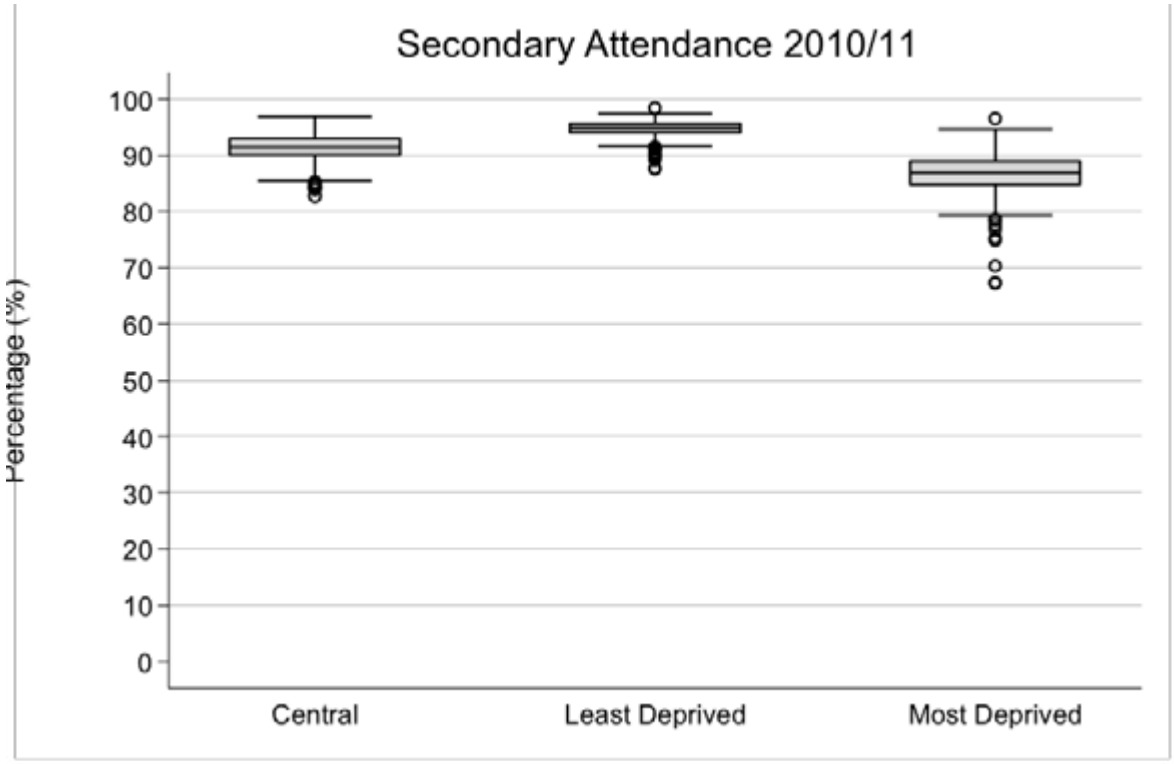
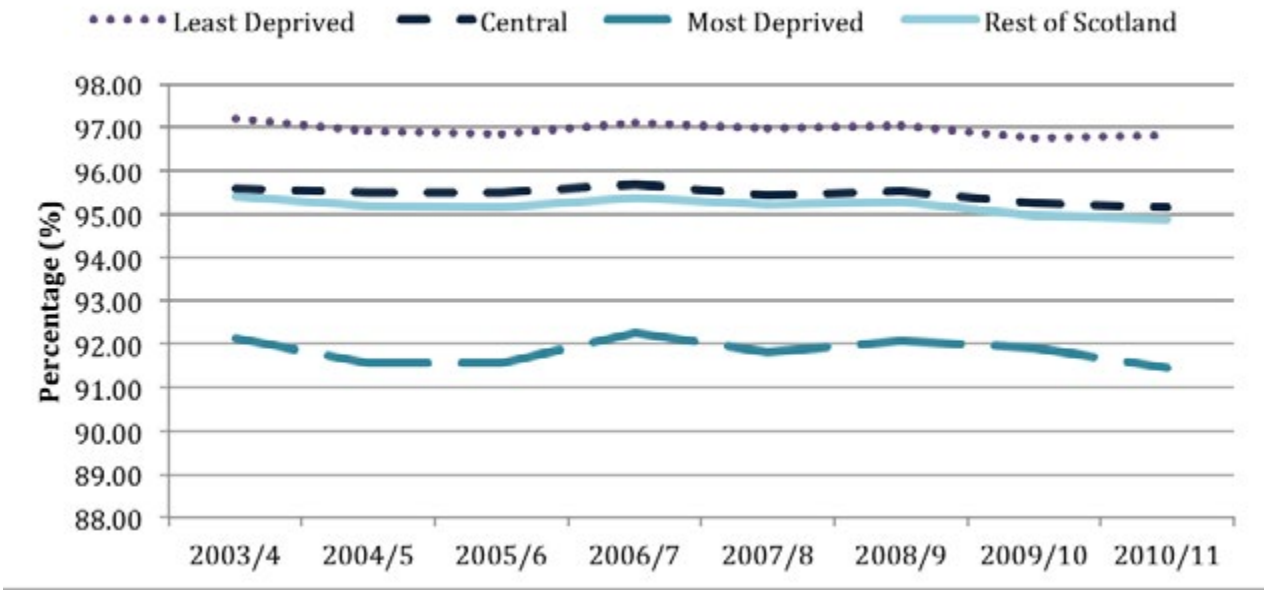


Figure 4-17 Primary attendance (%)



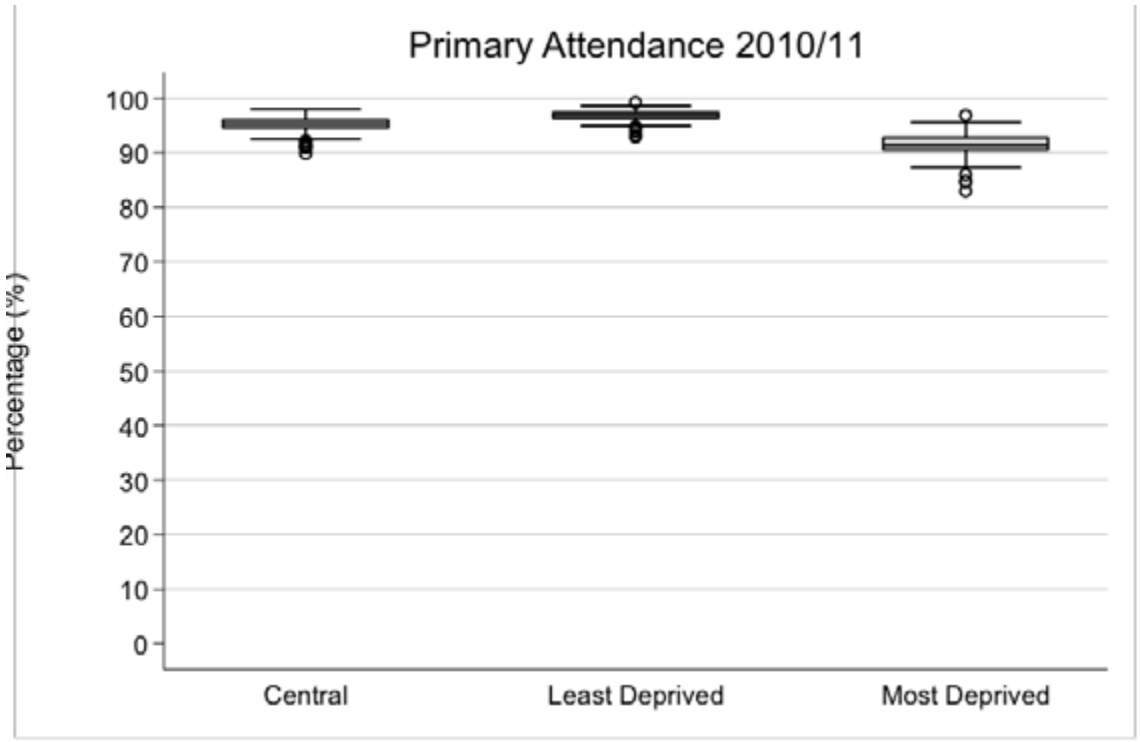
Although there remains a sizeable gap between primary attendances between cohorts, these percentages are all higher than their secondary equivalent. In 2010/11 the average primary school pupil in the central cohort attended school for 95.14% of the school year, approximately 4 percentage points higher than the equivalent attendance in secondary schools. This equates to approximately 2 weeks out of a 38-week school year.

Table 4-13 Primary attendance (%)

Primary attendance (%)		2003/4	2004/5	2005/6	2006/7	2007/8	2008/9	2009/10	2010/11
Least deprived cohort	Mean	97.19	96.93	96.86	97.10	96.99	97.04	96.76	96.83
	SD	0.78	0.78	0.78	0.76	0.74	0.74	0.90	0.89
	Min	92.28	93.89	94.1	93.37	93.48	94.51	92.38	92.98
	Max	99.38	98.41	98.41	99.49	98.49	99.01	98.84	99.2
Central cohort	Mean	95.60	95.51	95.49	95.69	95.43	95.54	95.24	95.14
	SD	1.17	1.14	1.13	1.16	1.28	1.27	1.28	1.24
	Min	88.69	90.37	90.37	89.13	87.77	88.63	89.11	89.92
	Max	98.61	98.61	98.61	99.38	98.06	98.03	97.9	97.98
Most deprived cohort	Mean	92.12	91.57	91.57	92.24	91.83	92.08	91.90	91.45
	SD	1.64	1.65	1.65	1.61	1.70	1.65	1.73	1.88
	Min	83.72	82.38	82.38	84.91	85.67	86.29	84.56	82.88
	Max	95.25	95.53	95.53	97.31	95.44	96.16	96.1	96.82
Rest of Scotland	Mean	95.41	95.19	95.16	95.38	95.22	95.27	94.98	94.88
	SD	1.77	1.62	1.62	1.63	1.64	1.65	1.62	1.73
	Min	55.88	80.73	80.73	80.77	82.65	85.41	84.67	82.62
	Max	99.96	100	100	99.52	100	98.54	99.08	98.66

The box plots in Figure 4-18 display the distribution of primary attendance within and between cohorts in 2010/11. Similar to the secondary attendance results, attendance between data zones in the most deprived cohort varies most substantially. In 2010/11 the average level of attendance within one of the data zones in the most deprived cohort was below 83%, whereas another data zone within the same cohort showed an attendance level of nearly 97%.

Figure 4-18 Primary attendance box plots



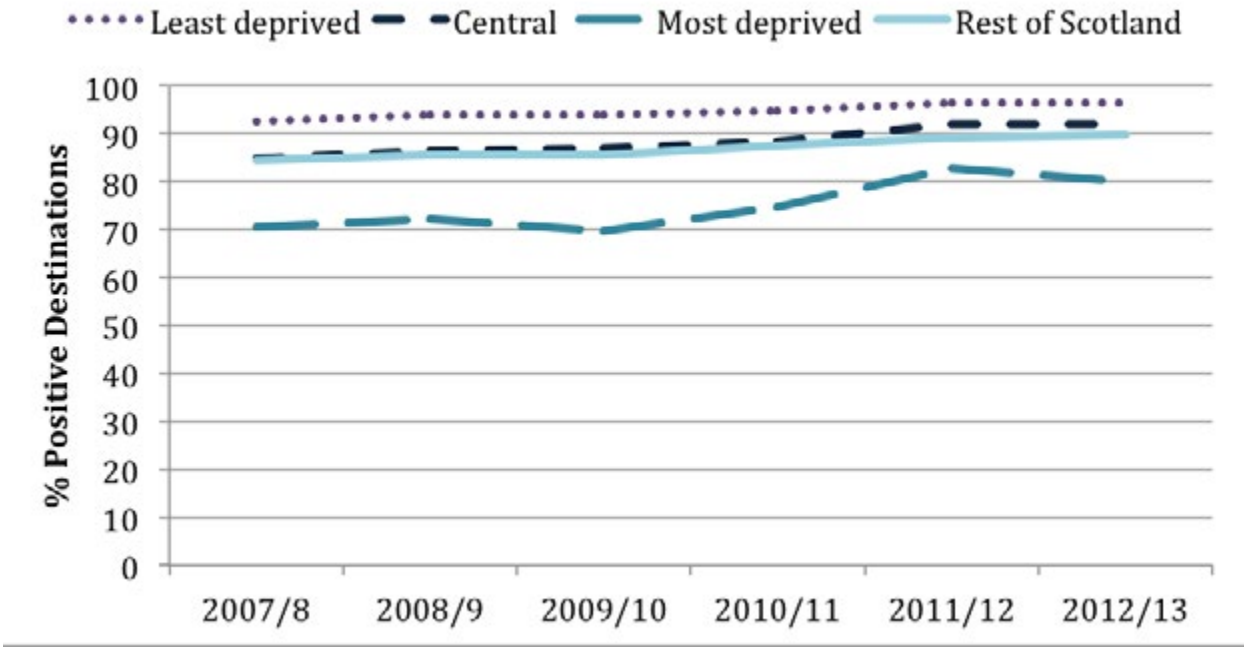
The significance of such results is discussed in greater detail later in this report. It is clear nevertheless that, on average, both primary and secondary school pupils living in the most deprived cohort attend less school per year than in either the central or least deprived cohorts.

4.4 Follow up Destinations

Average tariff scores measure pupils' academic attainment within school education but fail to capture achievement beyond this. The following chart displays the percentage of leavers from publicly funded secondary schools in positive follow-up destinations. These positive destinations include higher education, further education, training, employment, voluntary work and from 2010/11 onwards, activity agreements.

4.4.1 1000 Communities

Figure 4-19 Percentage of leavers in positive follow up destination, 1000 communities



Positive destinations increased for all three cohorts and the rest of Scotland between 2007/8 and 2011/12. These average percentages are displayed in Table 4-14 below.

Table 4-14 Average percentage of pupils in positive follow-up destination

	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13	Change (n, %)	
Least deprived	92.6	93.9	94.0	94.7	96.6	96.5	3.9	4.2%
Central	84.9	86.6	87.0	88.4	92	92	7.1	8.4%
Most deprived	70.7	72.3	69.7	74.8	82.8	80.1	9.4	13.3%

	2007/8	2008/9	2009/10	2010/11	2011/12	2012/13	Change (n, %)	
Rest of Scotland	84.5	85.5	85.5	87.5	89.3	89.9	5.4	6%

Positive destinations generally improved for all three cohorts. Furthermore, the gap between the most and least deprived cohort decreased by 25%. The percentage for the most deprived cohort increased most significantly in 2010/11 and 2011/12.

As indicated above, this indicator proposes a notably encompassing definition for "positive destination". While this is useful as a general measure, it should be recognised that these percentages include all levels and variation within broad categories, including for example those who may be described as under-employed or on zero-hour contracts.

4.5 Educational Attainment: Summary and Discussion

Generally across Scotland, educational attainment increased in fourth and fifth year of secondary school. Average tariff scores improved for both the highest and lowest achieving areas in Scotland. The gap between the most and least deprived cohorts also decreased significantly for both S4 and S5 tariff scores. Scores between these cohorts remain divided but this is positive progress for these areas. The variation across the country however, remains substantial – the gap between S4 attainment of the 10% highest and 10% lowest achieving neighbourhoods continued to rise.

In 2006, David Raffe from the University of Edinburgh warned that although inequalities in compulsory education in Scotland had narrowed slightly, the increased importance of post-compulsory education risked offsetting any real benefit of this. Raffe (2006) argued that opportunities were becoming more dependent on attainment in upper secondary and further education. A recent publication from The Social Mobility and Child Poverty Commission (2014) on educational trajectories revealed that disadvantaged pupils who were high performers at age 11 are much less likely to go on to study at an elite university than the equivalent high performing pupils from more advantaged backgrounds. Slight improvements in attainment do not necessarily promote improved life chances and do not guarantee that more pupils from disadvantaged backgrounds will move on to further or higher education (British Educational Research Association (BERA), 2010; Raffe, 2006). Raising attainment in schools, alone, may not be enough to reduce inequality in opportunity and future outcomes.

Clifton and Cook (2012) argue that in order to improve social mobility among socioeconomic classes and improve equity in post-16 education, the youth labour market and unreliable, low-quality jobs also need addressed. Although school education may reduce the impact of social disadvantage in children's progress, there are many factors that are not within the education system's control (BERA, 2010). This does not suggest, however, that universal education is not important for children's development and future lives (BERA, 2010). Despite some evidence indicating otherwise, education is still a powerful determinant of life chances (Raffe, 2006; Scottish Government 2008; EHRC and OPM 2010; Clifton and Cook, 2012). Basic skills and higher education qualifications are both important predictors of future occupational success (Raffe, 2006; Scottish Government, 2008) and there are disproportionally more pupils not in education, employment or training (NEET) from less qualified backgrounds (Raffe, 2006). Increased inequity in educational attainment can lead to

further exclusion through increased inequality in access and progression within employment (EHRC and OPM 2010). This stresses the value in achieving an educational service where pupils' needs are met, irrespective of their background or academic level. Education may be provided across Scotland but the results of such are not universal across society. This is indicated not only by exam results but also by difference in school attendance levels and post-school destinations.

4.5.1 Explanations for inequality in education

The majority of explanations for educational inequality focus on material, aspirational, cultural, and social aspects of home life, as well as emphasis on teachers, schools and the educational system (Raffe, 2006). Low-achieving pupils often come from poorer families living in areas of urban deprivation with higher levels of ill-health, poor housing and unemployment (BERA 2010). BERA (2010) cites factors such as these, as well as neighbourhood dynamics, as impacting on educational achievement. Educational outcomes rely not only on the delivery of teaching but also on the attitudes and behaviour of the pupils, their families and communities (Bovaird and Loeffler, 2013). For example, if pupils do not want to learn, the ability of the school to teach and the amount they will learn will be limited (Bovaird and Loeffler, 2013).

Relative contributions are difficult to quantify, but there is an increasing recognition of the multiple nature of disadvantage, and the extent to which different aspects of deprivation reinforce one another (Raffe, 2006). Social disadvantage and inequality in education involves a wide range of sectors and partnerships: educational institutions, professionals and community groups as well as young people and their parents (Raffe, 2006).

Previous research has argued that the UK has relatively low levels of social mobility – children from poorer backgrounds struggle to gain access to university, enter professional jobs and earn decent wages (BERA 2010; Clifton and Cook 2012). This is deep-rooted and gaps in educational performance can serve to entrench wider inequalities in the labour market, housing market and social structure (Clifton and Cook 2012). This highlights the importance of breaking the relationship between socioeconomic indicators and educational attainment. This relationship between educational attainment and income is further explored in section 9.2 of this report. PISA consistently reports that high performance and equity in education achievement are not mutually exclusive – "one does not have to be sacrificed to achieve the other" (Clifton and Cook 2012; PISA 2012 results).

4.5.2 Income inequality and educational attainment

A study by Wilkinson and Pickett published in 2009 argues that levels of income inequality have a significant impact on social problems within society, including low educational attainment. Within their publication, *The Spirit Level*, Wilkinson and Pickett highlight that among developed countries, those with lower levels of income inequality tend to achieve higher in education, have lower rates of crime and have better health.

With this in mind, a series of analyses were performed to consider the link between levels of income inequality and national outcomes. These analyses are explored in section 7 of this report. The results indicate a correlation between income inequality and PISA 2009 scores in mathematics, and the top share of performers in mathematics in PISA 2012, on a national level across Europe. As mentioned previously, socio-mobility within the UK is relatively low and the UK has one of the highest levels of income inequality, pre-tax, in the developed

world (Wilkinson and Pickett, 2009). Although these do not prove a causal link between income inequality and educational attainment levels, they do highlight that European countries with lower levels of income inequality generally performed better in mathematics in 2009 and 2012.

PISA results indicate that how countries spend their limited resources matter as much as, if not more than, the amount they are spending on education (PISA 2012). The results show that once a certain level of spending is reached, more resources no longer predict higher achievement. Expenditure of up to about USD 50,000 per student from the age of 6 to 15 is positively related to higher mean performance but also to disparities in performance between students of different socio-economic status. This finding highlights the importance for countries to adopt effective policies on equity (PISA 2012).

4.5.3 Concluding remarks

Inequity in education may be one of the easiest domains to regard as unjust and problematic for society: an education system that fails to meet the needs of all pupils has consequences for these pupils in later life opportunities and outcomes. It is unacceptable that a child living in one of Scotland's most deprived areas has less chance of success than a child living in any other area in Scotland. Although there will always be variation in educational attainment, the systematic association between education and income needs addressed. The relationships between educational attainment and other life outcomes are explored on page 129 of this report. There may be an array of contributing attributes, such as cultural differences, but this does not make these results any less significant. Despite improvements, it could be argued that Scotland's education system is meeting the needs and demands of certain parts of society more effectively than others.

The very notion that, in some areas of Scotland, pupils are absent from school for a relatively large proportion of their education suggests a failure to engage with and provide for these pupils. As discussed in previous literature, this may involve more than engagement with the pupil but also with families and surrounding communities. This requires two-way communication not only to enable educational professionals to illustrate the importance and value of education but also to allow pupils, families, and communities to address what they feel education should offer. A universal education service must provide for all pupils across society: pupils from all backgrounds, of all levels, and all abilities. A standard education system, on the other hand, does not necessarily achieve this.

Corresponding to this, a more holistic measure of educational success may be considered to acknowledge wider educational achievement, such as vocational success. This aligns with the notion put forward above, but also the values in recent educational provision, such as Curriculum for Excellence and GIRFEC.

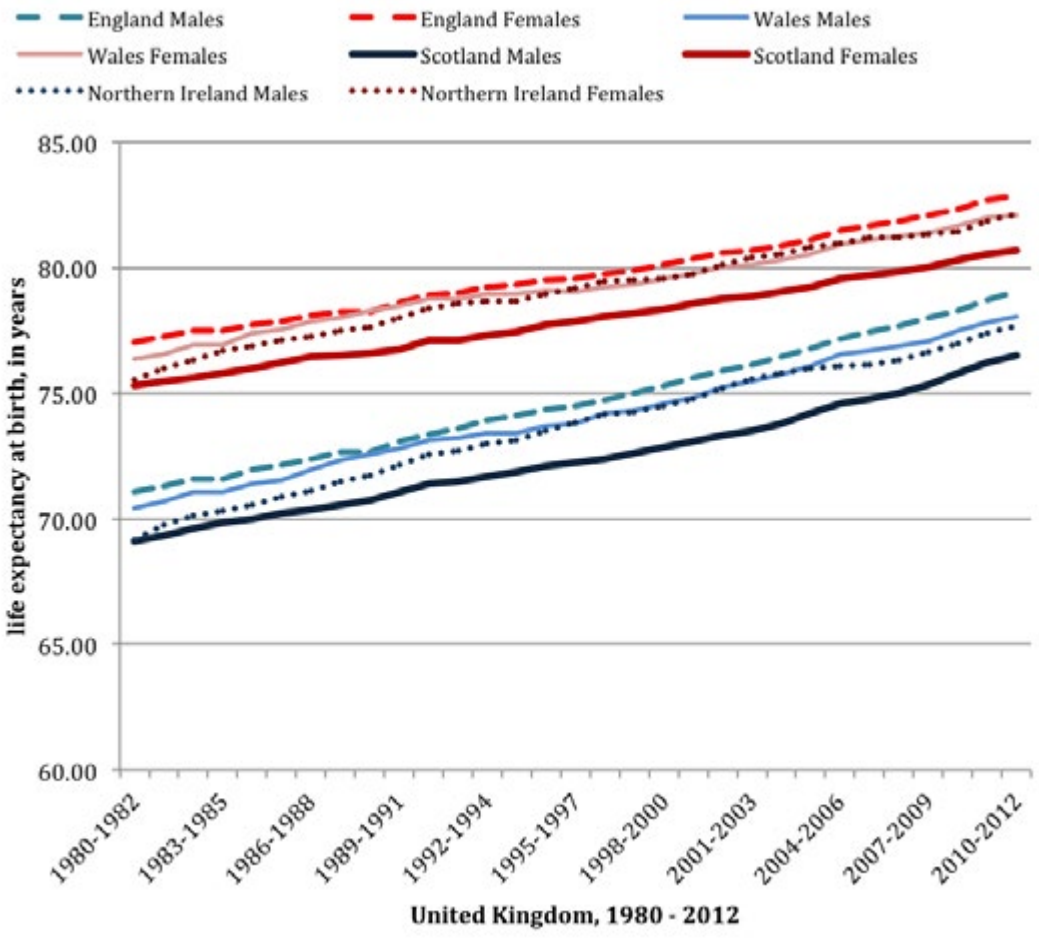
5. Health

Despite improvements in health across Europe, inequalities continue to persist between and within countries (World Health Organisation, 2013). People with lower income, lower occupational class, or lower education level tend to have a higher risk of health problems and lower life expectancy, with health improvements often benefitting higher socioeconomic classes at a faster rate than those in lower socioeconomic classes (Mackenbach, 2006). These inequalities are evident in all European countries and are markedly persistent over time (Mackenbach, 2006; WHO 2013; Marmot 2005; JRF 2011).

Scotland is no exception to these inequalities. In recent years Scotland was labelled the 'sick man of Europe' (ScotPHO, 2013), largely influenced by high mortality rates in comparison to similar European countries (ScotPHO, 2012; Whyte and Ajetunmobi, 2012).

Although recent life expectancy[8] figures reveal that Scottish people are living longer than they ever have before, this improvement was slower than in England, Wales and Northern Ireland. Scotland has the lowest average life expectancy in the United Kingdom (See Figure 5-1) with males and females in England living an average of 2.5 and 2 years more than in Scotland.

Figure 5-1 United Kingdom, life expectancy at birth, 1980 - 2012 (source: Office of National Statistics)



8 Life expectancy at birth predicts the average number of years an individual is expected to live from when they are born. This is calculated based on the mortality of those living in the area, country or region at that given time (National Records for Scotland, 2011).

Scotland's average life expectancy of 78 is also significantly lower than similar European countries (more details are available in the appendix: Life expectancy, Europe). In 2005, the National Framework Advisory Group reported a need to address the general health across Scotland and work towards "preventative, anticipatory care rather than reactive management". Focussing on prevention could lead to better health overall but also greater efficiency in monetary terms. Within Scotland, as among other European countries, there is substantial disparity in health between affluent and deprived communities. The annual report of the chief medical officer for Scotland 2011 focussed specifically on the problem of health inequalities in Scotland stating: *"why should a child born today, and live in the poorest areas of Scotland, be faced with living 10 or 12 years less, and struggling with considerably more ill health than a child who will live in an affluent area?"*.

The issue of health inequalities was raised in many reports over the past decade with several national strategies to improve health and tackle inequalities. Examples of these are listed in Table 5-1 below.

Table 5-1 Recent policies, frameworks and action plans for improving health inequalities in Scotland

Name	Year	Description	Organisation
Improving Health in Scotland: the challenge	2003	Identified two main challenges: to improve the health of all the people in Scotland; and to narrow the gap in health in Scotland.	Scottish Executive
Delivering for Health	2005	Programme of action for NHS Scotland to change the balance in health care away from episodic hospital admissions towards greater health and wellbeing.	NHS Scotland Scottish Executive
Keep Well	2006	The Keep Well vision is ´to increase the rate of health improvement in deprived communities by enhancing primary care services to deliver anticipatory care´.	NHS Scotland
Better Health, Better Care	2007	An action plan to "help people to sustain and improve their health, especially in disadvantaged communities, ensuring better, local and faster access to health care"	NHS Scotland, Scottish Government
Equally Well	2008	Includes recommendations from the Ministerial Taskforce on tackling the causes of health inequalities.	Ministerial Taskforce on health inequalities, Scottish Government
The Road to Recovery: a new approach to tackling Scotland's drug problem	2008	New national drugs strategy with priorities and action plan for prevention, support and recovery from drug use.	Scottish Government

Name	Year	Description	Organisation
Better Cancer Care: an action plan	2008	An action plan to support those affected by cancer. The Scottish Cancer Taskforce was set up to oversee the delivery plan to reduce the number of people developing cancer (for example via early screenings) and extra support for people with cancer.	NHS Scotland, Scottish Government
Achieving Our Potential: a framework to tackle poverty and income inequality in Scotland	2008	A new approach for tackling poverty in Scotland with support for those who cannot find work and reducing the barriers to employment. A national target was set to improve the proportion of income received by the 30% poorest households in Scotland by 2017.	Scottish Government
Early Years Framework	2008	A national framework aimed to maximise opportunities for children by a good start in life to provide a strong platform for future success. This includes addressing the needs for children whose lives are constrained by poverty, poor health, poor attainment and unemployment.	Scottish Government, COSLA
Changing Scotland's Relationship with Alcohol: a framework for action	2009	This action plan aims to alter Scotland's relationship with alcohol. These include legislative measures to achieve shorter-term goals as well as plans to encourage a cultural change towards longer-term goals.	Scottish Government
Alcohol and Drug Partnerships		There are 30 Alcohol and Drug Partnerships in Scotland with the aim to deliver effective local strategies to reduce harm from alcohol and drugs. In 2009 a joint framework was launched by the Scottish Government, CoSLA and the NHS to clarify the roles, responsibilities and accountability of all bodies involved in tackling alcohol and drugs problems.	Community Planning Partnerships
Towards a mentally flourishing Scotland	2009	This improvement plan includes 36 commitments to be delivered up to 2015 covering mental health improvement, prevention, care services and recovery.	Scottish Government

Name	Year	Description	Organisation
Recipe for Success: Scotland's National Food and Drink Policy	2009	Out of the 7 key themes within this framework, 2 include: • making food both accessible and affordable for all; and • ensuring people understand more about the food they eat (this was revised to 'ensuring young people understand food and drink'.)	Scottish Government
Preventing overweight and obesity in Scotland: a route map towards healthy weight	2010	Scotland's obesity strategy includes actions for central government, local councils and NHS to take to prevent and manage obesity in Scotland. The Scottish Government established a Joint Obesity Ministerial Group to oversee the implementation of the strategy and report on progress.	Scottish Government
Diabetes Action Plan 2010: quality care for diabetes in Scotland	2010	Variety of actions towards prevention of diabetes, treatment and supporting people to self-manage their condition.	Scottish Government
Child Poverty Strategy for Scotland	2011	A strategy to maximise household resources and improve children's wellbeing and life chances. This includes expenditure to move to early intervention and prevention.	Scottish Government
Health and Social Care Integration	2011	Scottish Government's plan to integrate adult health and social care with the aim to improve quality and consistency of care for older people. In accordance with this Community Health Partnerships are being replaced with Health and Social Care Partnerships. These new partnerships are joint responsibility of the NHS and Local Authority but will also include working with the third and independent sectors.	Scottish Government

"We need to *reduce our reliance on episodic, acute care* in hospitals for treating illness, increasingly through emergency admissions. Instead, we need to move towards a system which emphasizes a wider effort on improving health and wellbeing, through *preventive* medicine, through support for self-care, and through greater *targeting of resources on those at greatest risk*, with a more proactive approach in the form of anticipatory care services. Our aim is to improve the health of the people of Scotland, and to *close the gap* in life expectancy…By strengthening local services;

with more support for self-care; more intensive case management for individuals with serious long term conditions; and with more capacity for local diagnosis and treatment, it is possible to *reduce the rising trend of unscheduled hospital admissions*" (Delivering for Health, 2005)

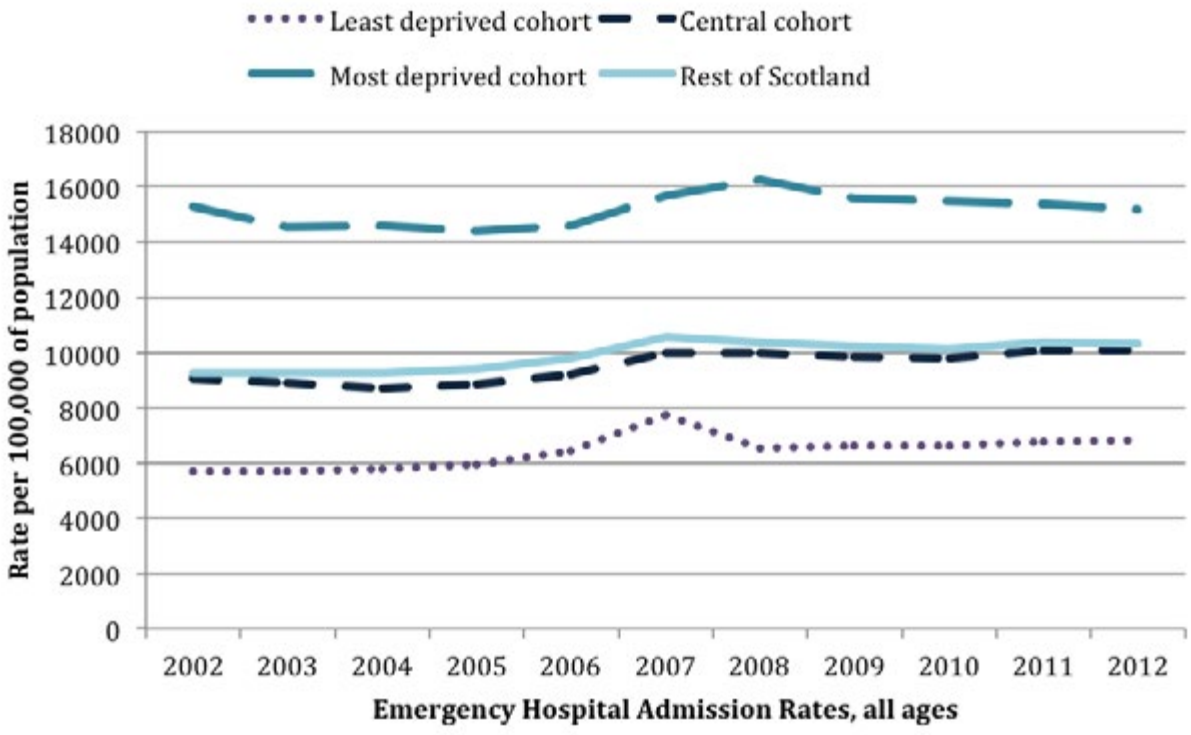
Delivering for Health (2005), as quoted above, stated an ambition to reduce the number of unscheduled hospital admissions and move towards a preventative health care system with more locally accessible services. Emergency admissions to hospital are expensive and use resources that could otherwise be targeted more effectively. Rising rates of emergency admissions do not represent a move to preventative health care. The following research considers hospital admissions over the past ten years, comparing differences between areas experiencing high and low levels of deprivation.

5.1 Emergency hospital admission rates, all ages,

Emergency hospital admission refers to patients who are admitted to any non-psychiatric/ non-obstetric hospital in an emergency. This includes inpatients and day-cases only, and does not include people who enter Accident and Emergency but are not admitted to a hospital bed (ISD[9]). The following charts present the number of emergency hospital admissions per 100,000 of population. Across data zones in Scotland these rates vary between 778 and 34,012 per 100,000 people with a Scottish average of 10,194.

5.1.1 1000 Communities

Figure 5-2 Emergency hospital admission rates per 100,000, all ages



*null values removed

9 For more information on emergency hospital admissions please see the 'hospital care' webpage on the ISD website: http://www.isdscotland.org/Health-Topics/Hospital-Care/Inpatient-and-Day-Case-Activity/.

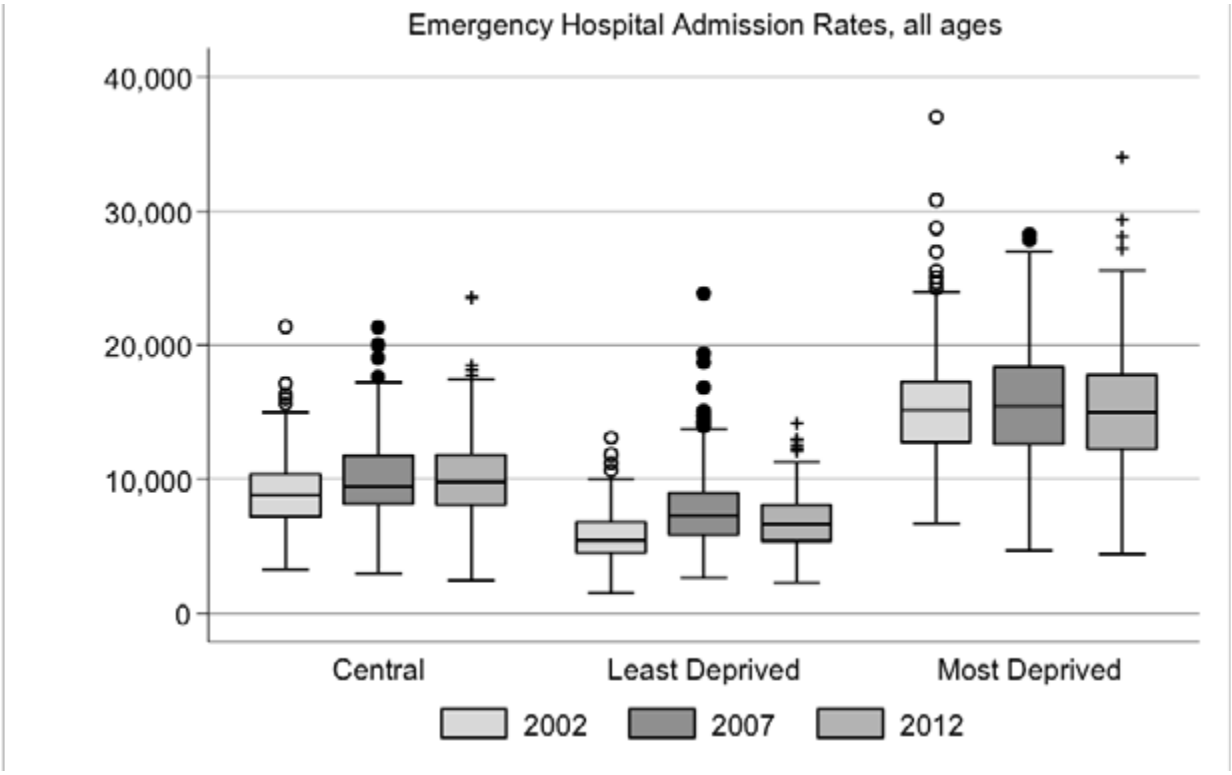
Figure 5-2 displays average emergency hospital admission rates per 100,000 people (all ages) from 2002 to 2012. These rates increased within the least and central cohorts but, after some fluctuation, in 2012 the rate for the most deprived cohort was relatively similar to that in 2002 (see Table 5 2 below).

Table 5-2 Emergency hospital admission rates, per 100,000 population

Year	Least deprived cohort	Central cohort	Most deprived cohort	Rest of Scotland
2002	5717	9064	15288	9244
2003	5718	8918	14573	9239
2004	5782	8721	14604	9255
2005	5958	8877	14414	9382
2006	6433	9206	14626	9778
2007	7760	9980	15697	10553
2008	6529	9986	16276	10354
2009	6652	9833	15579	10251
2010	6637	9811	15501	10143
2011	6773	10071	15362	10395
2012	6838	10094	15213	10346
Change	*1121*	*1030*	*-75*	*1102*
Change %	*19.61%*	*11.36%*	*-0.50%*	*11.92%*

This reduced the gap between cohorts by 12% over this ten-year period. The box plots in Figure 5-3 display the distribution of emergency hospital admission rates in 2002, 2007 and 2012 for each of the three cohorts.

Figure 5-3 Box plots, emergency hospital admission rates



Variation increased in the most deprived cohort between 2002 and 2012 but remained relatively stable in the least deprived and central cohorts. Table 5-3 displays summary statistics for emergency hospital admission rates (all ages) in the most deprived cohort.

Table 5-3 Summary statistics, emergency hospital admission rates (all ages), most deprived cohort

Emergency Hospital Admission rates (all ages), Most deprived cohort										
Year	Min	Max	Median	Mean	St.Dev.	CV	25%	75%	IQR	Skewness
2002	6700	37001	15120	15288	3796.5	0.25	12748	17246	4498	1.098
2003	5543	30160	14167	14573	3753.7	0.26	11940	16571	4631	0.706
2004	5645	28331	14245.5	14604	3727.4	0.26	11893	16958	5065	0.531
2005	455	27731	14008.5	14414	3902.7	0.27	11765	16762	4997	0.435
2006	4893	29905	14372	14626	3888.3	0.27	11702	17330	5628	0.415
2007	4651	28230	15430	15697	4222.8	0.27	12530	18387	5857	0.364
2008	4545	32231	15930	16276	4443.4	0.27	13288	19167	5879	0.475
2009	1887	30164	15343	15579	4527.2	0.29	12594	18484	5890	0.145
2010	5308	36080	15183	15501	4545.2	0.29	12512	18324	5812	0.473
2011	2628	32422	15052	15362	4657.9	0.30	12187	18203	6016	0.403
2012	4444	34012	15009	15213	4177.9	0.27	12181	17763	5582	0.552

Variation in admission rates widened between 2002 and 2012. This is reflected by increases in the standard deviation, the CV and the IQR. By 2012, 50% of neighbourhoods in the most deprived cohort had between 12,181 and 17,763 people per 100,000 population admitted to hospital in an emergency, giving an IQR of 5582. In 2002 the IQR was 4498 ranging between 12,748 and 17,246. Both limits for the upper and lower quartile moved between 2002 and 2012, therefore, variation widened in both directions over this period. Within some neighbourhoods in the most deprived cohort, emergency admission rates decreased between 2002 and 2012, but for others this rate increased. Distribution between neighbourhoods in the most deprived cohort in 2012 is also displayed in the histogram in Figure 5-4.

In 2012 the majority of neighbourhoods in the most deprived cohort (over 75%) had a rate well above the Scottish average of 10,194. Table 5-4 displays summary statistics for emergency hospital admission rates in the central cohort.

Figure 5-4 Histogram, emergency hospital admission rates (all ages), most deprived cohort

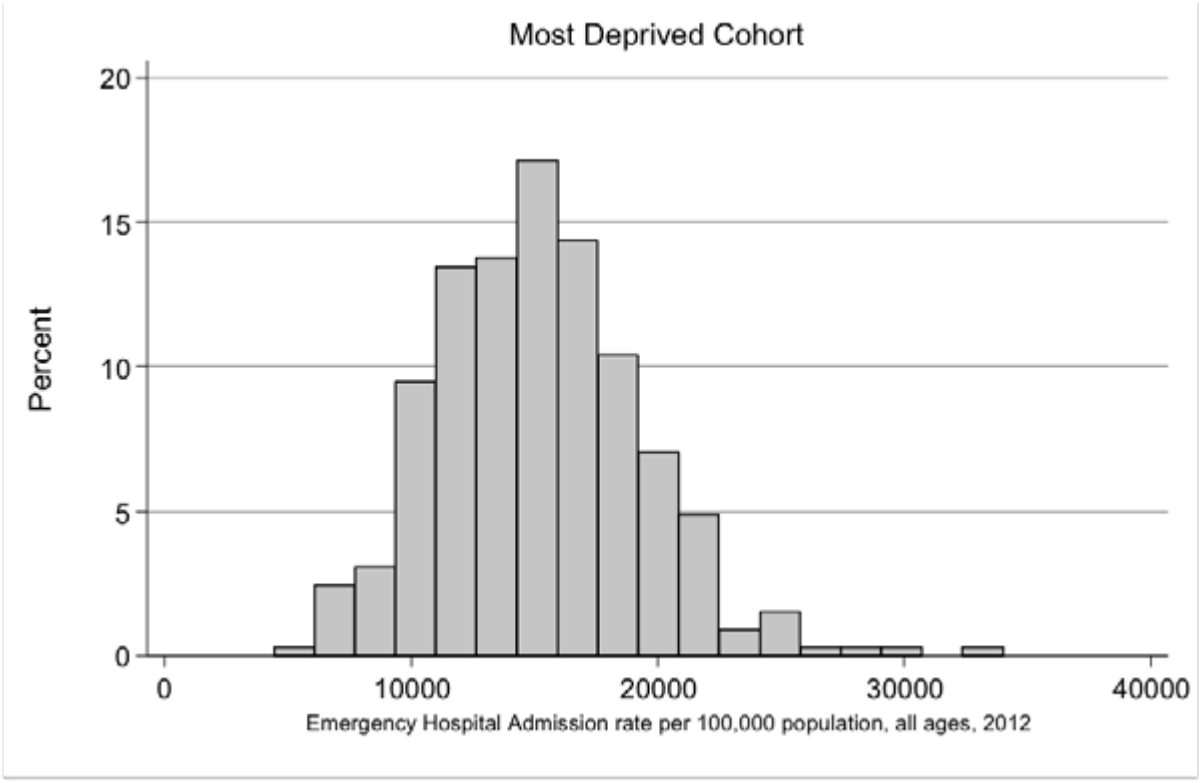
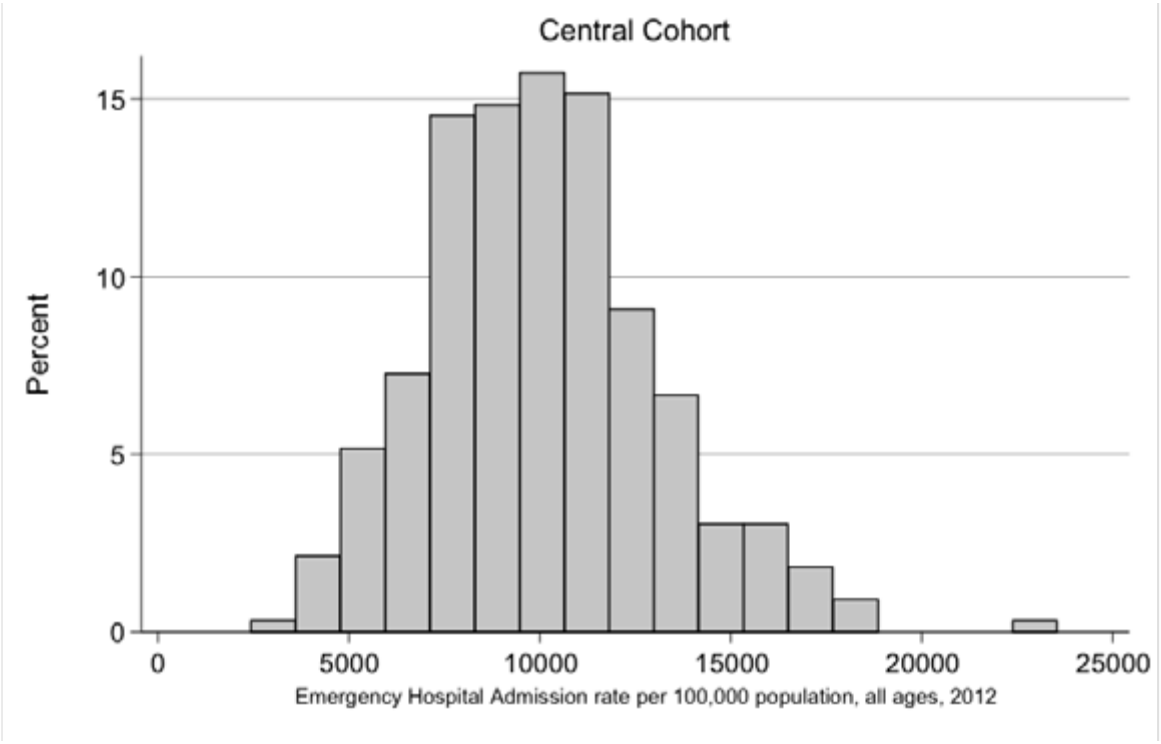


Table 5-4 Summary statistics, emergency hospital admission rates (all ages), central cohort

Emergency Hospital Admission Rates (all ages), Central Cohort										
Year	Min	Max	Median	Mean	St.Dev.	CV	25%	75%	IQR	Skewness
2002	3279	21373	8800	9064	2594.4	0.29	7200	10364	3164	0.704
2003	2110	21728	8416.5	8918	2862.9	0.32	6909	10436	3527	0.822
2004	2240	18519	8150.5	8721	2679.4	0.31	6928	10363	3435	0.712
2005	3015	18028	8532.5	8877	2612.9	0.29	7022	10278	3256	0.68
2006	2965	18531	8872.5	9206	2848.2	0.31	7299	11083	3784	0.465
2007	2930	21341	9454	9980	2884	0.29	8077	11777	3700	0.783
2008	3767	18672	9722.5	9986	2778.9	0.28	8083	11602	3519	0.552
2009	2724	19830	9554.5	9833	2810.1	0.29	7914	11396	3482	0.593
2010	3507	20425	9398	9811	3119.3	0.32	7627	11675	4048	0.678
2011	2808	19475	9948.5	10071	2921.6	0.29	7981	11975	3994	0.296
2012	2433	23558	9815	10094	3008.8	0.30	8004	11821	3817	0.579

Although both the interquartile range (IQR) and standard deviation increased slightly between 2002 and 2012, in relative terms variation did not increase within the central cohort; the coefficient of variation (CV) remained relatively stable over this period.

Figure 5-5 Histogram, emergency hospital admission rates (all ages), central cohort



In 2012 over 15% of neighbourhoods in the central cohort had an emergency hospital admission rate of approximately 10,000 per 100,000 people, with the majority between 8000 and 12,000. Table 5-5 displays summary statistics for emergency hospital admission rates in the least deprived cohort.

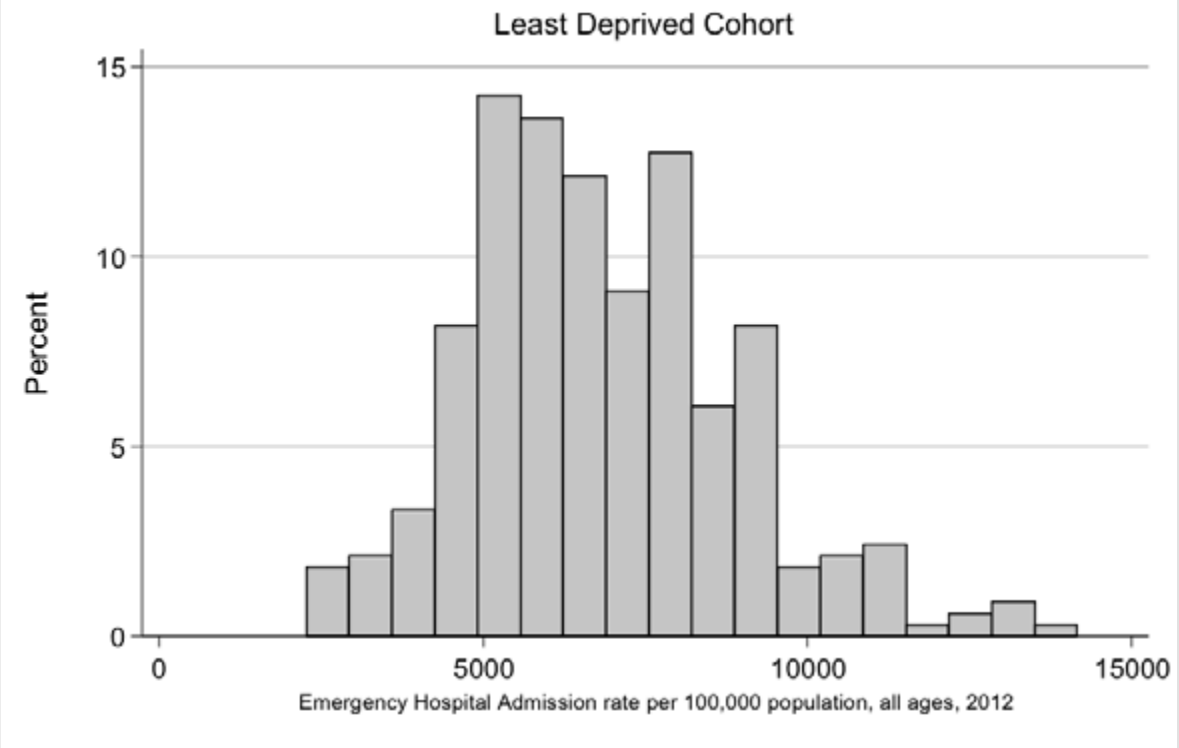
Table 5-5 Summary statistics, emergency hospital admission rates (all ages), least deprived cohort

Emergency Hospital Admission Rates (all ages), Least Deprived Cohort										
Year	Min	Max	Median	Mean	St.Dev.	CV	25%	75%	IQR	Skewness
2002	1491	13038	5459	5717	1779.5	0.31	4494	6833	2339	0.606
2003	1399	12589	5452.5	5718	1921.1	0.34	4367	6796	2429	0.822
2004	1378	12543	5472.5	5782	1771.3	0.31	4586	6752	2166	0.894
2005	2156	15567	5515.5	5958	2044.1	0.34	4528	7097	2569	1.102
2006	2557	18141	6123.5	6433	1997.2	0.31	5044	7376	2332	1.244
2007	2642	23795	7311	7760	2939.8	0.38	5819	9001	3182	1.324
2008	1641	14570	6343.5	6529	1996.9	0.31	5140	7622	2482	0.817
2009	1416	14211	6366.5	6652	2159.6	0.32	5161	7740	2579	0.762
2010	1367	13536	6316.5	6637	2143.2	0.32	5102	7683	2581	0.667
2011	1706	14444	6556.5	6773	2233	0.33	5006	8225	3219	0.606
2012	2270	14172	6640.5	6838	2060.9	0.30	5379	8082	2703	0.547

Similar with the central cohort, although the distribution of rates increased between 2002

and 2012, as indicated by the standard deviation and IQR, in relation to the mean variation did not increase. By 2012, 50% of neighbourhoods in this cohort had an emergency hospital admission rate between 5379 and 8082.

Figure 5-6 Histogram, emergency hospital admission rates (all ages), least deprived cohort



In 2012 the vast majority of neighbourhoods in this cohort had a lower emergency hospital admission rate than the Scottish average (10,194 per 100,000 people).

In relative terms, in 2012 the central and least deprived cohorts had very similar levels of variation between neighbourhoods (CV = 0.3). This was slightly higher than the equivalent for the most deprived cohort (CV = 0.27), which reduced from 0.3 in 2011. Although within all three cohorts there is a degree of variation for emergency hospital admission rates, this dispersal is not as dramatic as between the most and least deprived cohorts. In 2012 IQRs were between 5582 in the most deprived cohort and 2703 in the least deprived cohort. Between the most and least deprived cohort, however, average admission rates differed by 8375 points.

5.1.2 Variation across Scotland

The following section profiles variation in emergency hospital admission rates across the whole of Scotland from 2002 to 2012.

Figure 5-7 displays the distribution of emergency hospital admission rates across all data zones in Scotland from 2002 to 2012. Variation increased across this period at both the upper and lower end of the distribution.

Figure 5-7 Distribution of emergency hospital admission rates, all ages, all data zones in Scotland

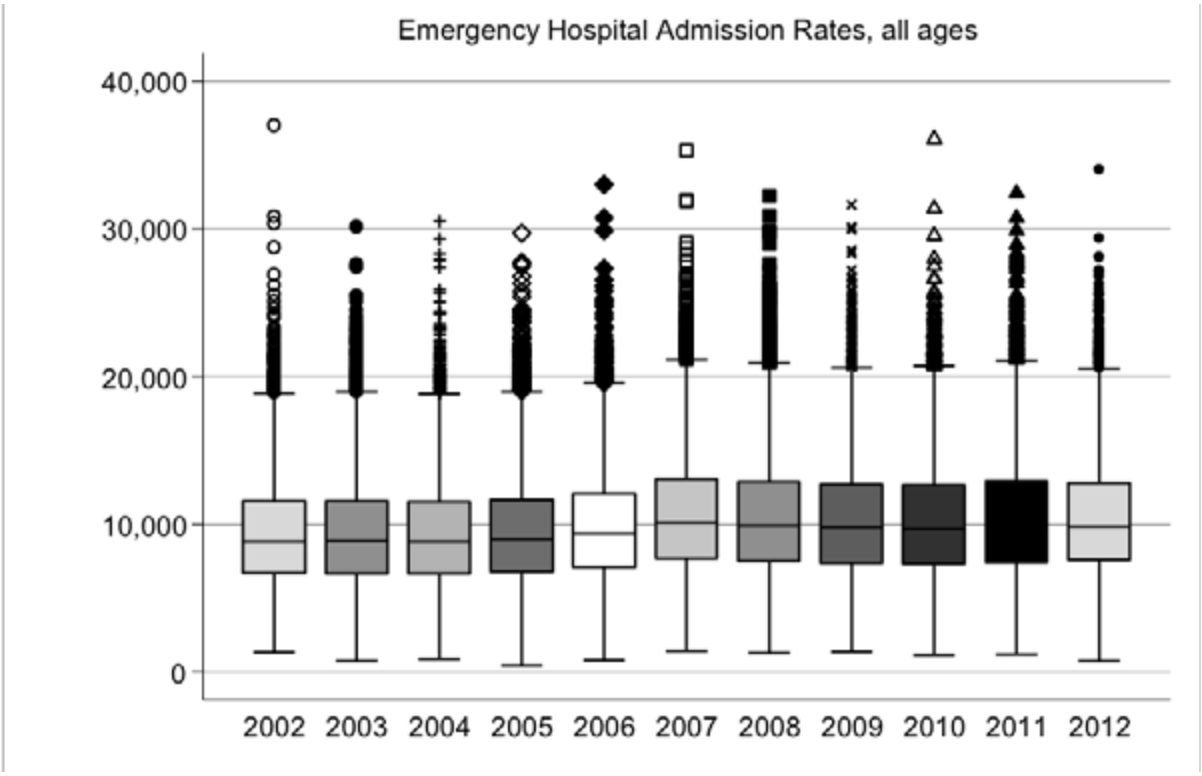


Table 5-6 displays the emergency hospital admission rates for the areas with the 10% highest rates, the 10% lowest rates and Scotland overall. These neighbourhoods were selected separately for every year, thus are not necessarily the same neighbourhoods profiled over this period.

Table 5-6 Emergency hospital admission rates, all ages, areas with 10% highest and 10% lowest rates

Emergency Hospital Admission rates, all ages	10% highest rates	10% lowest rates	Scotland
2002	16735	4154	9351
2003	16691	4009	9262
2004	16786	4104	9261
2005	16735	4186	9347
2006	17300	4483	9723
2007	18688	4837	10517
2008	18333	4717	10293
2009	18248	4599	10150
2010	18221	4579	10024
2011	18694	4609	10232
2012	18025	4873	10194
Change (n)	*1290*	*719*	*843*
Change %	*7.71%*	*17.31%*	*9.02%*

Average rates rose for both the 10% highest and 10% lowest areas, and the Scottish

average, between 2002 and 2012 (see Table 5 3). Although emergency hospital admissions collectively increased over this period, variation between the top and bottom deciles also increased by nearly 5%.

Overall, between 2002 and 2012 emergency hospital admission rates increased across Scotland. Despite some fluctuation, in 2012 the rate for the most deprived cohort was relatively similar to the equivalent in 2002. This resulted in a 12% decrease in the variation between cohorts. Distribution across data zones in Scotland, however, continued to widen. The relevance of this is discussed later in this report.

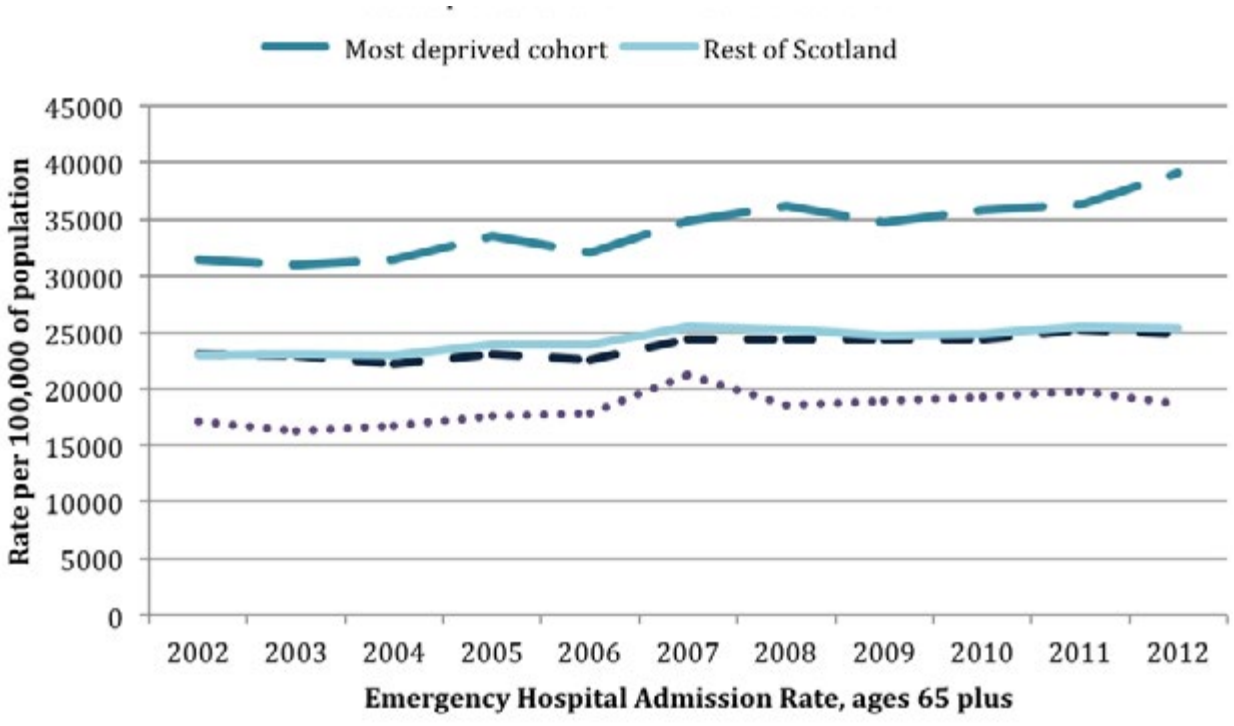
5.2 Emergency Hospital Admission Rates, Ages 65 Plus

The following section displays emergency hospital admission rates for people aged 65 years and over. Across data zones in Scotland rates range from 1,724 to 85,714 per 100,000 population with a Scottish average of 25,493.

5.2.1 1000 Communities

Figure 5-8 displays average emergency hospital admission rates per 100,000 people aged 65 and over, for all three cohorts and the rest of Scotland.

Figure 5-8 Emergency hospital admission rates per 100,000, ages 65+



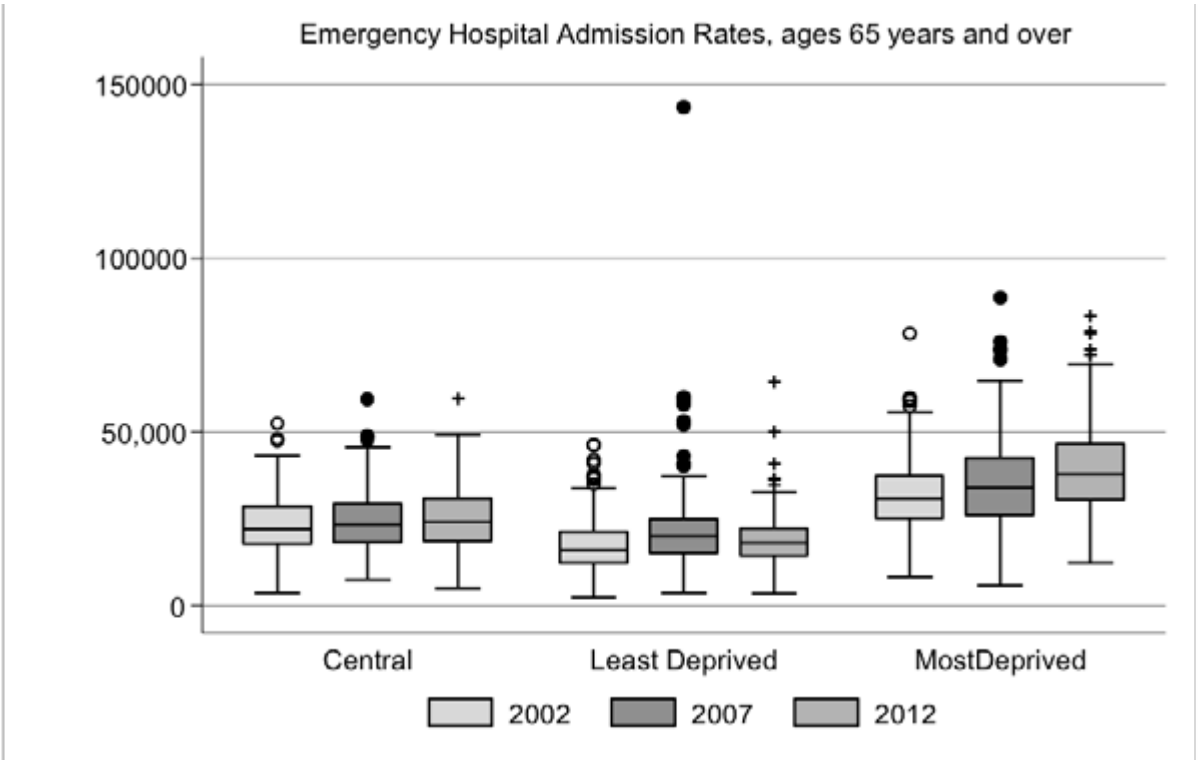
*null values have been removed

Emergency hospital admission rates for people aged 65 years and over also increased over this period. This increase was most dramatic in the most deprived cohort (nearly 25% – see Table 5-7 below), which increased the gap between the most and least deprived cohorts by approximately 43%. In 2012 the most deprived cohort had an emergency hospital admission rate over double that of the least deprived cohort.

Table 5-7 Emergency hospital admission rates, per 100,000 population 65 years and over

Year	Least deprived cohort	Central cohort	Most deprived cohort	Rest of Scotland
2002	17070	22996	31402	22962
2003	16280	22910	30907	23003
2004	16766	22203	31430	22983
2005	17624	23094	33526	23847
2006	17865	22586	32040	23931
2007	21230	24364	34834	25538
2008	18555	24438	36182	25246
2009	18905	24334	34738	24726
2010	19244	24410	35852	24925
2011	19774	25201	36274	25473
2012	18632	24932	39097	25383
Change (n)	*1562*	*1936*	*7695*	*2421*
Change %	*9.15%*	*8.42%*	*24.50%*	*10.54%*

Figure 5-9 Emergency hospital admission rates, per 100,000 population 65 years and over, box plots



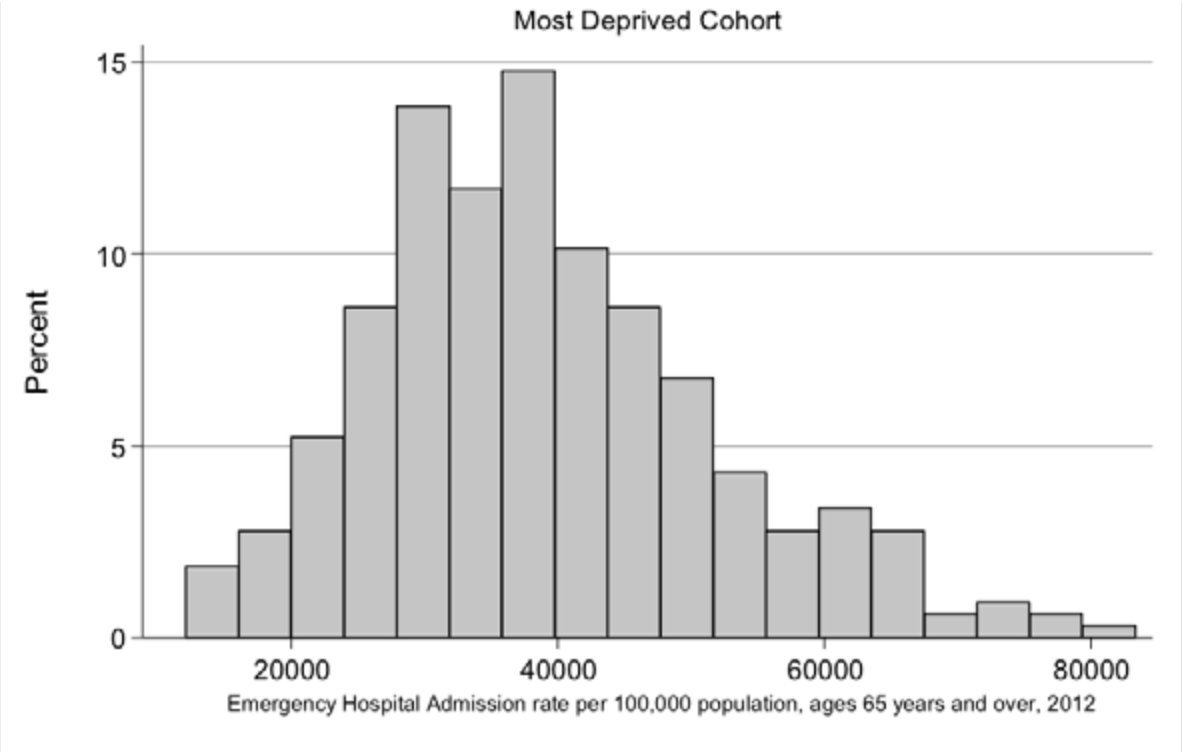
The box plots in Figure 5-9 display the distribution of emergency hospital admission rates (ages 65 plus) in 2002, 2007 and 2012. Variation increased slightly between 2002 and 2012 within the most deprived and central cohorts.

Table 5-8 Summary statistics, emergency hospital admission rates (65 plus), most deprived cohort

Emergency Hospital Admission Rates (65plus), Most Deprived Cohort										
Year	Min	Max	Median	Mean	St.Dev.	CV	25%	75%	IQR	Skewness
2002	8197	78261	30922.5	31402	9973.4	0.32	25000	37398	12398	0.49
2003	5556	74725	30435	30907	9938.2	0.32	24444	37037	12593	0.498
2004	3226	100000	29908	31430	11378.2	0.36	24194	37500	13306	1.143
2005	3448	120513	32203	33526	12699.1	0.38	25743	39053	13310	1.46
2006	6250	87805	30732	32040	12040.7	0.38	24194	38938	14744	0.849
2007	5785	88571	33846	34834	12681.4	0.36	26087	42424	16337	0.625
2008	4000	91892	36134	36182	13002.7	0.36	28161	43678	15517	0.567
2009	4545	93333	34286	34738	13001.3	0.37	27098	43056	15958	0.457
2010	3922	96296	35673	35852	13541.3	0.38	26984	44444	17460	0.522
2011	1408	118644	34783	36274	14886	0.41	26446	45390	18944	1.094
2012	12121	83333	37838	39097	12902.9	0.33	30303	46552	16249	0.652

The standard deviation, CV and IQR all increased between 2002 and 2012 within the most deprived cohort. In 2002, 50% of neighbourhoods in the most deprived cohort had between 25,000 and 37,398 emergency admissions to hospital per 100,000 people aged 65 and over, giving an IQR of 12,398. In 2012, the IQR increased to 16,249 ranging between 30,303 and 46,552. Therefore, not only has variation increased but emergency hospital admission rates increased for the majority of neighbourhoods in the most deprived cohort over this period.

Figure 5-10 Histogram, emergency hospital admission rates (65 plus), most deprived cohort



The histogram in Figure 5-10 displays the distribution of emergency hospital admission rates (ages 65 plus) in 2012 for the most deprived cohort. In 2012 the majority of neighbourhoods in the most deprived cohort experienced rates considerably higher than the Scottish average of 25,493.

Table 5-9 Summary statistics, emergency hospital admission rates (65 plus), central cohort

Emergency Hospital Admission Rate (65 plus) per 100,000 people, Central Cohort										
Year	Min	Max	Median	Mean	St.Dev.	CV	25%	75%	IQR	Skewness
2002	3659	52326	21918	22996	8073.6	0.35	17526	28571	11045	0.4772
2003	4938	49565	21680	22910	8561.0	0.37	17143	28205	11062	0.630
2004	5714	52000	21277	22203	8130.7	0.37	16824.5	26834.5	10010	0.727
2005	4930	53030	21765	23094	8730.1	0.38	16981	28289	11308	0.771
2006	2941	58000	21606.5	22586	8683.3	0.38	16667	27820	11153	0.755
2007	7477	59375	23213	24364	8725.4	0.36	17949	29412	11463	0.699
2008	6140	53719	23550	24438	8207.9	0.34	18333	29787	11454	0.527
2009	6957	56000	23249.5	24334	8865.9	0.36	18182	29102	10920	0.827
2010	6369	56552	22802	24410	9580.5	0.39	17593	30457	12864	0.776
2011	4225	58750	23812	25201	9091.3	0.36	18898	31111	12213	0.72
2012	4959	59649	24131.5	24932	9032.1	0.36	18301	30851	12550	0.400

Variation between neighbourhoods in the central cohort also increased slightly between 2002 and 2012. The standard deviation for emergency hospital admission rates (ages 65 plus) increased from 8073.6 to 9032.1 and the IQR increased from 11045 to 12550. The limit for both the lower and upper quartile increased over this period, suggesting an increase in emergency hospital admission rates (ages 65 plus) for the majority of neighbourhoods in the central cohort.

The histogram in Figure 5-11 displays the distribution of emergency hospital admission rates (aged 65 years) for the central cohort in 2012. The majority of neighbourhoods in this cohort experienced rates of between 18,000 and 31,000.

Figure 5-11 Histogram, emergency hospital admission rates (65 plus), central cohort

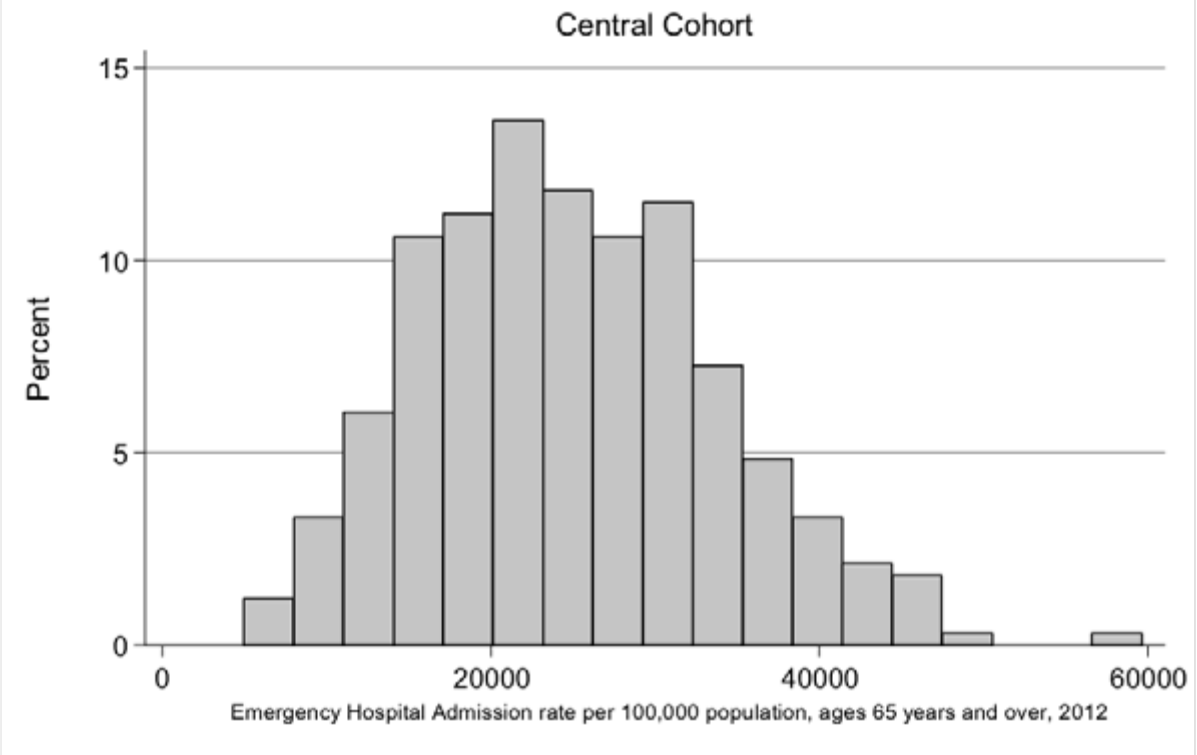
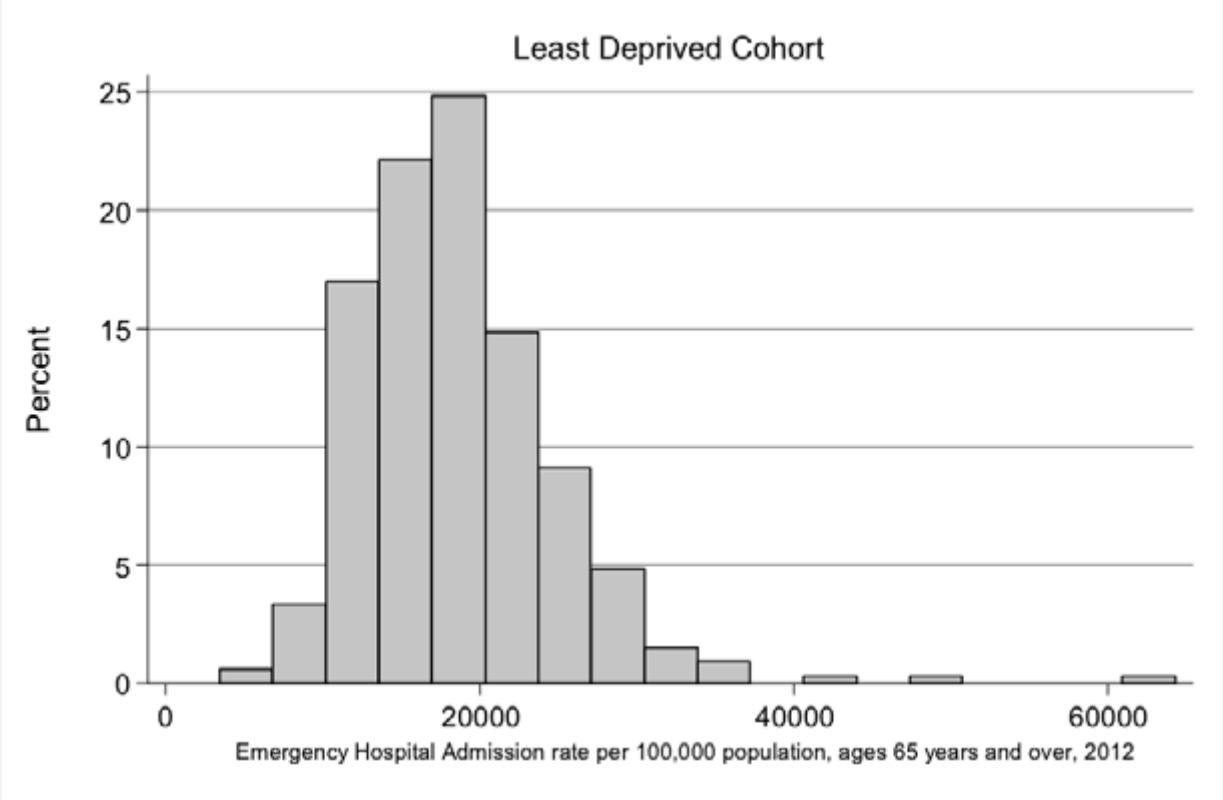


Table 5-10 Summary statistics, emergency hospital admission rates (65 plus), least deprived cohort

Emergency Hospital Admission Rates per 100,000 people aged 65 plus, Least Deprived Cohort										
Year	Min	Max	Median	Mean	St.Dev.	CV	25%	75%	IQR	Skewness
2002	2273	46154	15909	17070	7132.6	0.42	12195	21127	8932	0.999
2003	3125	39394	15556	16280	6411.8	0.39	12000	20161	8161	0.57
2004	4000	44000	16495	16766	6530.5	0.39	12144.5	20054.5	7910	0.792
2005	2083	52000	16573.5	17624	7132.6	0.40	12750	21455	8705	1.287
2006	1852	102105	17055	17865	7994.1	0.45	13433	21176	7743	3.743
2007	3704	143617	20000	21230	11221.3	0.53	15152	24865	9713	4.53
2008	5660	52688	17895	18555	6678.8	0.36	14205	22000	7795	1.07
2009	3571	75862	17857	18905	7402.1	0.39	14054	22619	8565	1.866
2010	2222	72414	18286	19244	7336.7	0.38	14286	23288	9002	1.627
2011	2857	45588	19108	19774	6956.3	0.35	14865	24000	9135	0.652
2012	3448	64286	17919.5	18632	6438	0.35	14286	22069	7783	1.8

Variation among data zones in the least deprived cohort, however, decreased between 2002 and 2012. This is reflected by decreases in the standard deviation, the interquartile range and the coefficient of variation.

Figure 5-12 Histogram, emergency hospital admission rates (65 plus), least deprived cohort



The histogram in Figure 5-12 displays the distribution of emergency hospital admission rates (aged 65 years and over) within the least deprived cohort in 2012. Although some neighbourhoods had relatively high rates, the majority were below the Scottish average of 25,493 per 100,000 people aged 65 years and over.

The central and least deprived cohorts had very similar coefficients of variation in 2012: 0.36 and 0.35 respectively. This was higher than the equivalent for the most deprived cohort (0.33), which had reduced from 0.41 in 2011.

5.2.2 Variation across Scotland

Unlike the cohort study, the following analysis considers the scale of variation in emergency hospital admissions (ages 65 plus) across all data zones in Scotland. The box plots in Figure 5-13 display the distribution of rates from 2002 to 2012.

Disregarding outliers, the distribution of emergency hospital admission rates for populations aged 65 and over became slightly more dispersed between 2002 and 2012.

Table 5-11 displays the average rates for the areas with the 10% highest and 10% lowest rates, ages 65 years and over. These areas are selected separately every year, therefore, these are not necessarily the same areas profiled over this period. This profiles the overall variation of emergency hospital admission rates across the whole of Scotland between 2002 and 2012.

Figure 5-13 Distribution of emergency hospital admission rate, 65 and over

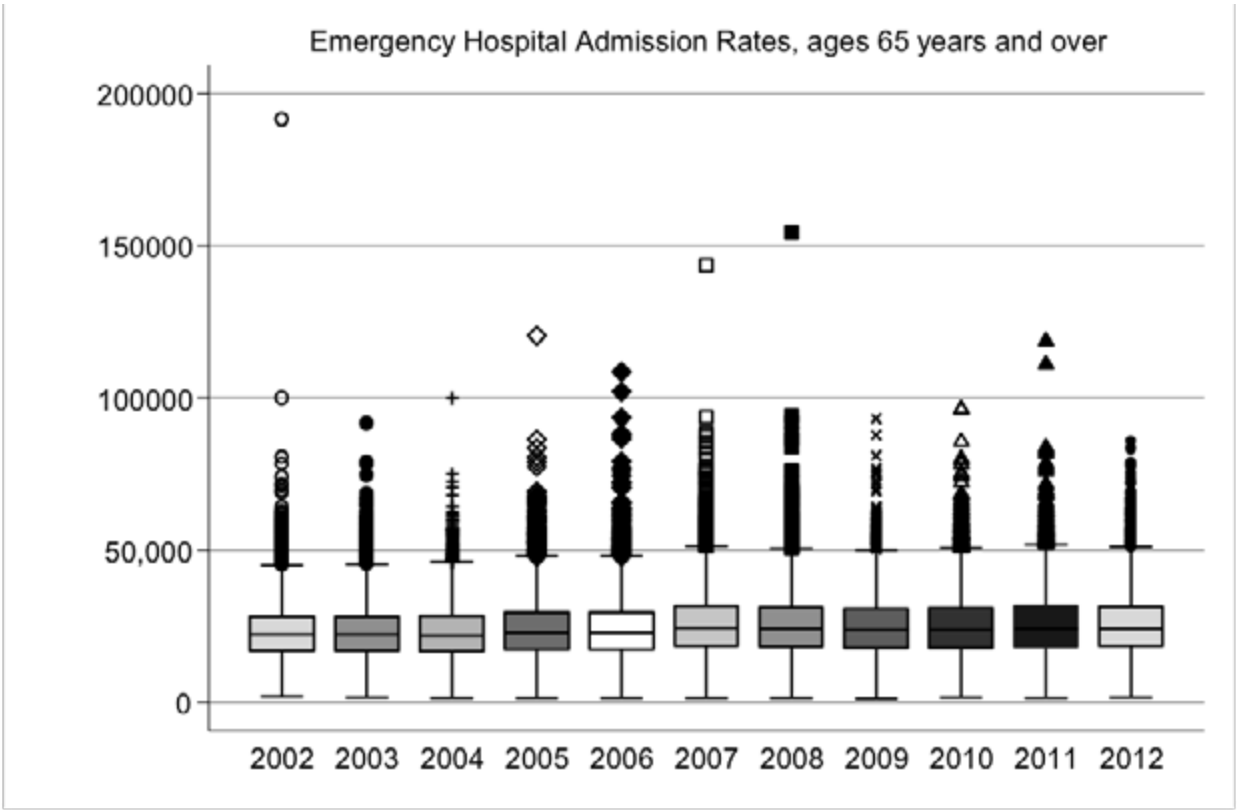


Table 5-11 Averages, emergency hospital admission rates, ages 65 plus

Emergency Hospital Admission Rates per 100,000, Ages 65 plus	10% lowest rates	10% highest rates	Scottish average
2002	9518	41645	23368
2003	9224	41171	23418
2004	9172	41800	23336
2005	9429	43917	24337
2006	9529	43614	24237
2007	10275	47426	26024
2008	10468	46193	25691
2009	10202	45171	25142
2010	10155	46271	25320
2011	10552	47540	25763
2012	11326	46674	25493
Change (n)	*1808*	*5029*	*2125*
Change (%)	*19.00%*	*12.08%*	*9.09%*

The 10% highest and 10% lowest rates, and the Scottish average, all increased between 2002 and 2012, increasing the gap between the highest and lowest deciles by 10%. In 2012, the 10% highest rates were over four times the 10% lowest rates. This does not reflect the relationship with deprivation levels (as the cohort study does) but emphasises the immense scale of disparity across Scotland, with some neighbourhoods experiencing extremely high

rates of emergency admissions among their older population.

Overall across Scotland, emergency hospital admission rates increased between 2002 and 2012. These increases were most significant around 2007 and 2008. Rates for populations aged 65 years and over increased for all three cohorts and the top and bottom deciles over this period. Dispersion between average rates also increased between the most and least deprived cohorts as well as across Scotland overall.

5.3 Planned Hospital Admission Rates

The following section considers rates for elective (planned) hospital admissions to non-psychiatric/non-obstetric hospitals. These rates include inpatients and day-cases only (ISD[10]).

5.3.1 1000 Communities

Figure 5-14 Planned hospital admission rates, 1000 Communities

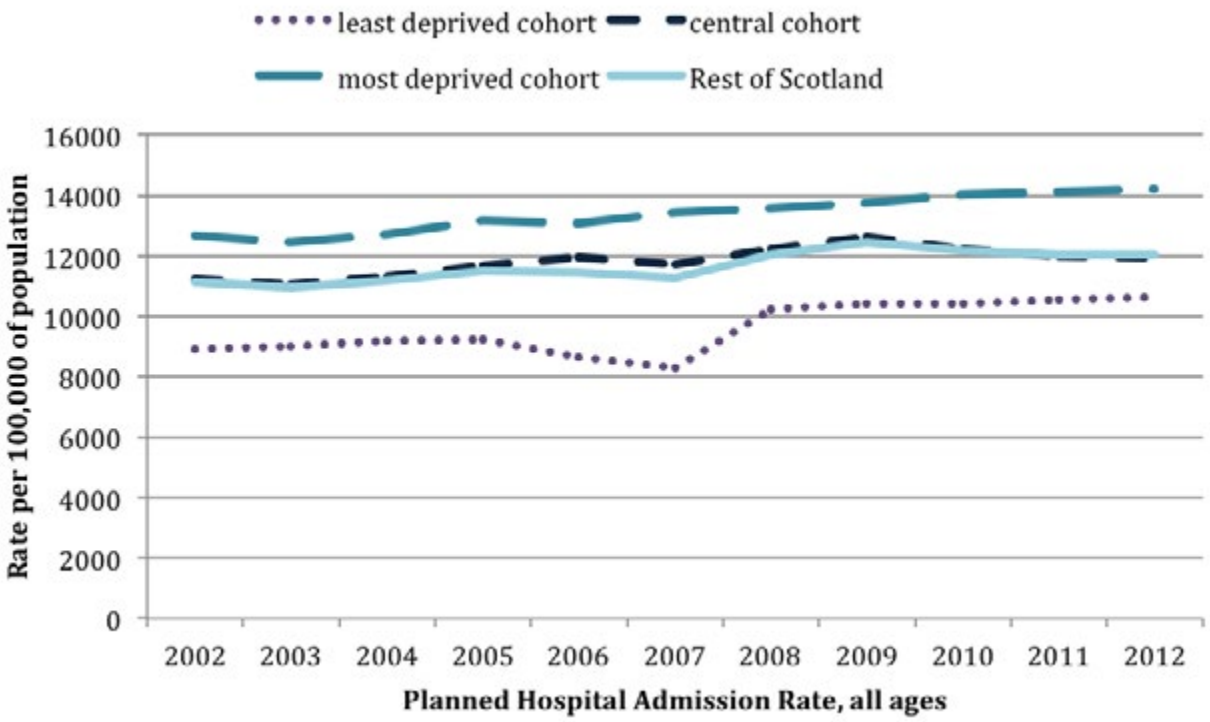


Figure 5-14 displays planned hospital admission rates from 2002 to 2012 for all three cohorts within 1000 Communities, and the rest of Scotland. Planned admission rates increased for all cohorts between 2002 and 2012, nonetheless, the gap between the most and least deprived groups decreased by approximately 5%.

10 For more information on this indicator please see the 'hospital care' webpage on the ISD website: http://www.isdscotland.org/Health-Topics/Hospital-Care/Inpatient-and-Day-Case-Activity/.

Table 5-12 Planned hospital admission rate per 100,000 population

Year	Least deprived cohort	Central cohort	Most deprived cohort	Rest of Scotland
2002	8919	11212	12676	11133
2003	9030	11031	12447	10953
2004	9197	11312	12703	11193
2005	9228	11694	13155	11484
2006	8641	11928	13073	11467
2007	8285	11727	13418	11249
2008	10210	12214	13553	12028
2009	10417	12603	13758	12437
2010	10399	12195	14005	12149
2011	10557	11983	14101	12039
2012	10617	11924	14203	12032
Change (n)	*1698*	*712*	*1527*	*899*
Change (%)	*19.04%*	*6.35%*	*12.05%*	*8.08%*

It is apparent that average rates for planned admissions are considerably closer than those for emergency hospital admissions. In 2012, the planned admission rate for the most deprived cohort was approximately 34% higher than that of the least deprived cohort. The emergency hospital admission rate (all ages), on the other hand, was over double the equivalent for the least deprived cohort.

Figure 5-15 Hospital admission rates; emergency and planned

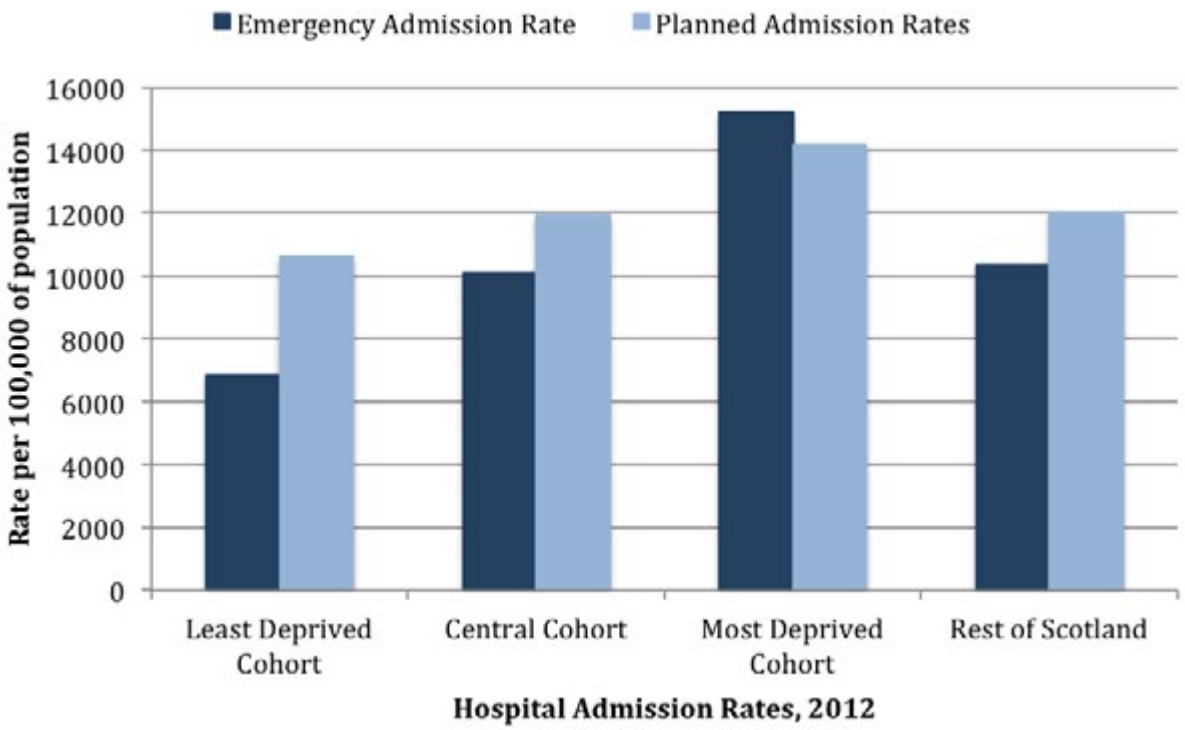


Figure 5-15 compares emergency hospital admission rates to planned admission

rates for all three cohorts and the Scottish average. The most deprived cohort is the only group that has a higher rate of emergency admissions than planned admissions. This indicates that people living within the most deprived cohort are more likely to be admitted to hospital in an emergency than planned in advance. Correspondingly, the opposite occurs within the least deprived cohort, people are much more likely to be admitted to hospital via planned appointments than in an emergency. Although this is likely influenced by differences in health, it may also illustrate how people living in different areas use health care services. In speculation, attending A&E and being admitted to hospital in an emergency may offer a more convenient and direct service for some people, rather than arranging an appointment with a GP in advance.

5.4 Life Expectancy

Although hospital admission rates are likely to be influenced by health on some degree, they do not indicate health or wellbeing themselves. As reflected, there is reason to suggest that people living in different socio-economic areas in Scotland use health care services differently. Further analyses were, therefore, conducted to consider life expectancy in different geographical areas in Scotland.

To do this, average life expectancy was calculated for each of the three cohorts in 1000 Communities. Life expectancy data are only available on an intermediate zone level. Intermediate geography zones are larger than data zones and tend to be used to release data that are not suitable for release on a data zone level. Each intermediate zone represents approximately 2,500 to 6,000 people. These calculations are, therefore, not derived from data zones themselves but the intermediate geographies they belong to. As these figures are estimates, the 95% confidence intervals are provided in the tables below.

Figure 5-16 Male life expectancy at birth, in years (source: National Records of Scotland[11])

Cohort	Average Male Life Expectancy at Birth, in years, 2005-2009	MLE Upper 95% CI	MLE Lower 95% CI	Average Male Life Expectancy at Birth, in years, 2003-2007	MLE Upper 95% CI	MLE Lower 95% CI
Most Deprived	68.6	71.4	65.8	67.8	70.6	64.9
Central	75.8	78.6	73	75.4	78.3	72.5
Least Deprived	79.2	81.6	76.7	79.1	81.7	76.5
Rest of Scotland	75	77.8	72.3	74.7	77.5	71.9

According to life expectancy rates between 2005 and 2009, Males living in areas within the most deprived cohort could expect to live, on average, between 66 and 71 years. This compares to between 73 and 79 years in the central cohort, and 77 and 82 years in the least

11 http://www.gro-scotland.gov.uk/files2/stats/life-expectancy-areas-in-scotland/2010-2012/le-methodology-paper-april-2014.pdf

deprived cohort. Male life expectancy in the most deprived cohort is significantly lower than life expectancy in both the central and least deprived cohorts, as confidence intervals do not overlap. According to these figures, males in the least deprived cohort could expect to live on average over 10 years more than males living in the most deprived cohort.

Figure 5-17 Female life expectancy at birth, in years (source: National Records of Scotland)

Cohort	Average Female Life Expectancy at birth, 2005-2009	FLE Upper 95% CI	FLE Lower 95% CI	Average Female Life Expectancy at birth, 2003-2007	FLE Upper 95% CI	FLE Lower 95% CI
Most Deprived	75.8	78.4	73.2	75.5	78.2	72.9
Central	80.1	82.6	77.6	80.2	82.8	77.7
Least Deprived	82.3	85.1	80.7	83.1	85.4	80.8
Rest of Scotland	79.8	82.2	77.4	75.5	78.2	72.8

Correspondingly, between 2005 and 2009, females living in the most deprived cohort could expect to live for between 73 and 78 years. This compares to between 77 and 83 years in the central cohort, and between 81 and 85 years in the least deprived cohort. Although there is not a statistically significant difference between each cohort, there is between the most and least deprived cohorts[12].

This demonstrates the difference in health between people living in different parts of society in Scotland; both male and female life expectancy rates in the most deprived cohort are significantly lower than life expectancy in the least deprived cohort. There is much discussion in academic and white paper reports regarding health inequalities and their causes. Scotland has low life expectancy in comparison to other similar European countries but within Scotland health also varies considerably, emphasised by both life expectancy and healthy life expectancy rates.

Further inferential analyses were conducted to consider the association between emergency hospital admission rates, life expectancy and income deprivation. The results are displayed in section 9 of this report but they indicate a stronger association between emergency admission rates and levels of income deprivation than between emergency hospital admission rates and life expectancy. This coincides with the previous statement that although emergency hospital admissions relate to health, there are patterns in health care use that are unexplained by differences in wellbeing.

5.5 Hospital Admissions: Summary and Discussion

Overall, between 2002 and 2012 emergency and planned hospital admission rates increased across Scotland. Rates among populations of all ages increased in the central and least deprived cohorts, reducing dispersion between the most and least deprived cohort by

12 Confidence intervals do not overlap

approximately 12%. Despite this reduction, rates among neighbourhoods in the most deprived cohort remained high in 2012. Among populations aged 65 years and over, all three cohorts experienced an increase in admission rates. Furthermore, rates in most deprived areas grew faster than elsewhere across the country. For this population, variation between cohorts and variation between the highest and lowest rates across Scotland both increased. The rise in emergency hospital admission rates across Scotland reflects that the aims presented in *Delivering for Health* 2005 were not yet achieved by 2012. Unplanned admissions to hospital continued to increase. The clustering of emergency hospital admission rates in Scotland's most deprived areas suggest that to have the greatest impact in reducing unplanned admissions to hospital these areas need targeted. As mentioned previously, inequality can be problematic for society, the high prevalence of unplanned hospital admissions within areas in Scotland are problematic in themselves, being an inefficient use of NHS resource. Reducing these rates may require addressing health itself, as has been the target in many national reports such as *Equally Well*, as well as addressing how people use NHS resources and what methods could be implemented to encourage people to use other means of care, especially within Scotland's more deprived neighbourhoods.

Considering health in Scotland, average life expectancy is low in comparison to similar European countries and, within Scotland, life expectancy varies considerably according to deprivation levels. There is a growing body of literature that considers health inequalities within and between countries in Europe. Despite the value of national health care, health inequalities are influenced by many varying factors across society and not simply the standard of health care services and provision.

5.5.1 Health inequalities

Health inequalities between socioeconomic groups are well documented among National and European White Paper reports and academic literature. Following the Commission on Social Determinants of Health (CSDH) more is recognised of the impact social aspects have on both health and disease (WHO 2013). The final report of the CSDH (2008) outlined that health inequalities were determined by the conditions in which people were born, grew up, lived, worked and aged, as well as inequalities in power, money and resources (WHO, 2013). Factors such as where we live, the surrounding environment, genetics, income, education and relationships with friends and family all impact health, whereas commonly considered factors such as access and use of health care services often have less of an influence (WHO, 2012, 2013). This is highlighted within many reports, with the recurring observation that although access to universal healthcare is very important for public health, the many social determinants of health inequalities necessitate cross-sector participation (Mackenbach 2006; WHO, 2013).

Health 2020 is a European policy framework that aims to focus on health distribution across and within societies in Europe (WHO, 2013). Current literature and policy reports tend to agree that to achieve a reduction in health inequalities the root causes of such inequality must be tackled (Mackenbach 2006; WHO, 2013).

Reducing health inequalities requires government sectors to act together on the social, environmental, and behavioural determinants of health (Kickbusch and Behrendt, 2013; WHO, 2013). Health ministers should ensure universal access to high-quality health care but also emphasise that health is an outcome of policies across all sectors (WHO, 2013), whilst considering economic constraints, demographic changes and unhealthy lifestyles (Kickbusch

and Behrendt, 2013). Tackling health inequalities requires more than individual health programmes but a response from a wide range of actors (Mackenbach, 2006; Kickbusch and Gleicher, 2012; Kickbusch and Behrendt, 2013). Health care systems alone do not have the capacity, or the necessary provisions, to solve problems influenced by all structures in society (Huynen et al., 2005, in Kickbusch and Behrendt, 2013).

Individualised health messages may be useful in some circumstances but are unlikely to be proficient in reducing health inequalities (Mackenbach, 2006). People in lower socioeconomic groups often know the health risks associated with a given activity or behaviour, such as smoking. To ultimately change behaviour the determinants of this behaviour should be addressed at both an individual level (for example financial problems, or stress) and a group level (such as social norms, labour market, geographical barriers etc.) level (Mackenbach 2006). Burns (2013) agrees that simply addressing peoples' behaviour ignores the underlying circumstances that lead to risky behaviours in the first place and argues for an asset-based approach to help improve wellbeing within communities.

The World Health Organisation (2012) further attributes the persistence of health inequity to increasing disparity in living conditions and decreasing social mobility and social cohesion. The economic crisis has augmented this trend, with wide disparities socially and economically within and between countries in Europe (WHO, 2012). This coincides with the notion that increased levels of income inequality could potentially lead to wider negative outcomes, such as in health.

6. Economic Wellbeing and Benefit Dependency in Scotland

Further analyses indicate that economic and welfare dependency indicators, such as income deprivation and percentage of population claiming Jobseekers Allowance (JSA), are strongly correlated with other inequalities (see section 9 of this report). This relationship between income level and life outcomes has been recognised in previous policy reports: *"It is unacceptable that, in Scotland, the wealth of a child's family should determine their chance of enjoying the kind of positive future that should be their right"* (Scottish Government Achieving Our Potential 2008). Within this framework a national target was set to increase the proportion of income received by the poorest 30% of households by 2017. The 'Fairer Scotland Fund' was set up and distributed around Community Planning Partnerships between 2008 and 2011, costing £435 million. Between 2007 and 2011 a further £87 million was spent on Scottish Urban Regeneration Companies to help stimulate growth. The 'Wider Role Fund' was established in 2000 to provide funding for landlords in most disadvantaged areas to improve employability[13]. 'More choices, more chances' 2006 aimed to reduce the levels of young adults who are not in education, employment or training (NEET). Workforce Plus Employability Framework 2006 focused upon the importance of moving people from welfare to work, stating that employers have a role in this by providing opportunities for the 'undiscovered workforce'.

This focus upon 'employability' of young people has continued in recent years: 16+ *Learning Choices*, 2010, and *Opportunities for All*, 2012. *Opportunities for All* guarantees every 16- to 19-year old in Scotland a place in education or training. There was a £30 million investment for 2012, 2013 and 2014 in employability projects for young people, aimed at reducing the high levels of youth unemployment. £9 million of this fund was allocated to six councils with the highest youth unemployment rates to help provide job opportunities for young people in these areas. £15 million was also invested for small to moderate businesses to provide jobs for young people who have been out of work for at least three months.

The following section provides unemployment and income deprivation levels for 1000 communities and Scotland overall since 2002.

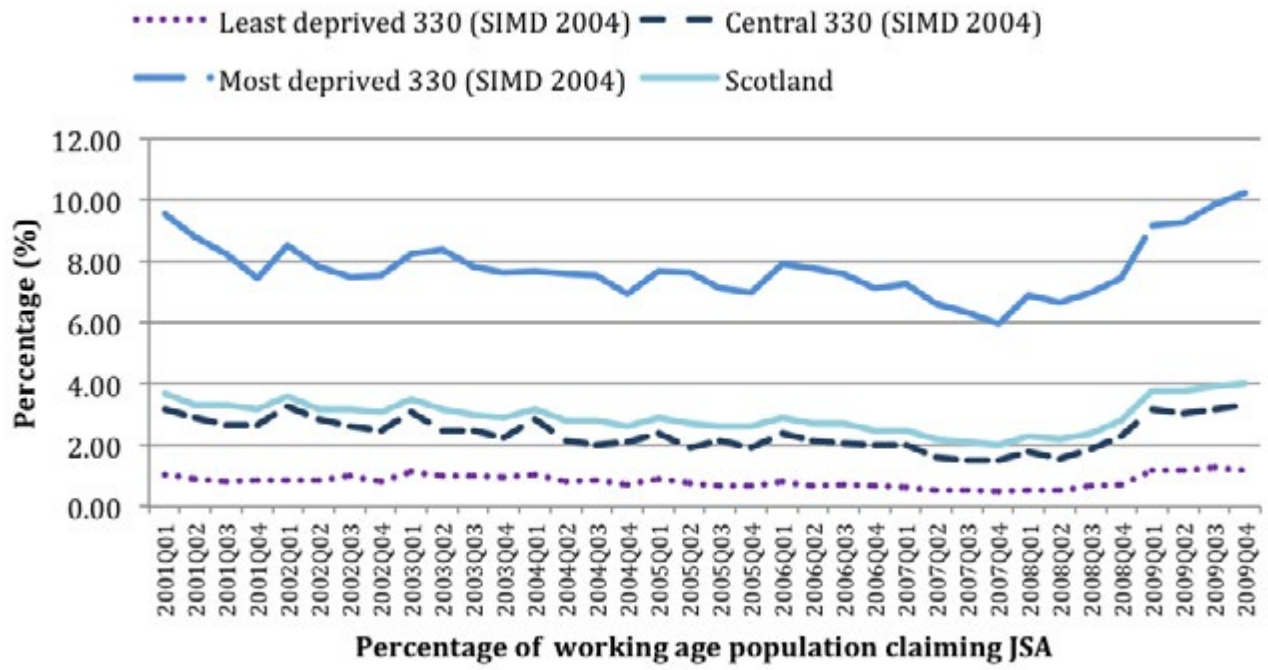
6.1 Jobseekers Allowance Claimants

1000 Communities

The following chart displays the percentage of working age population claiming Jobseekers Allowance (JSA) for all three cohorts and the Scottish Average. A new indicator was created in 2010: changing criteria from 'working age' population to ages 16 to 64.

13 http://www.scotland.gov.uk/Topics/People/Equality/18507/EQIASearch/WiderRoleRSL

Figure 6-1 Percentage of working age population claiming JSA



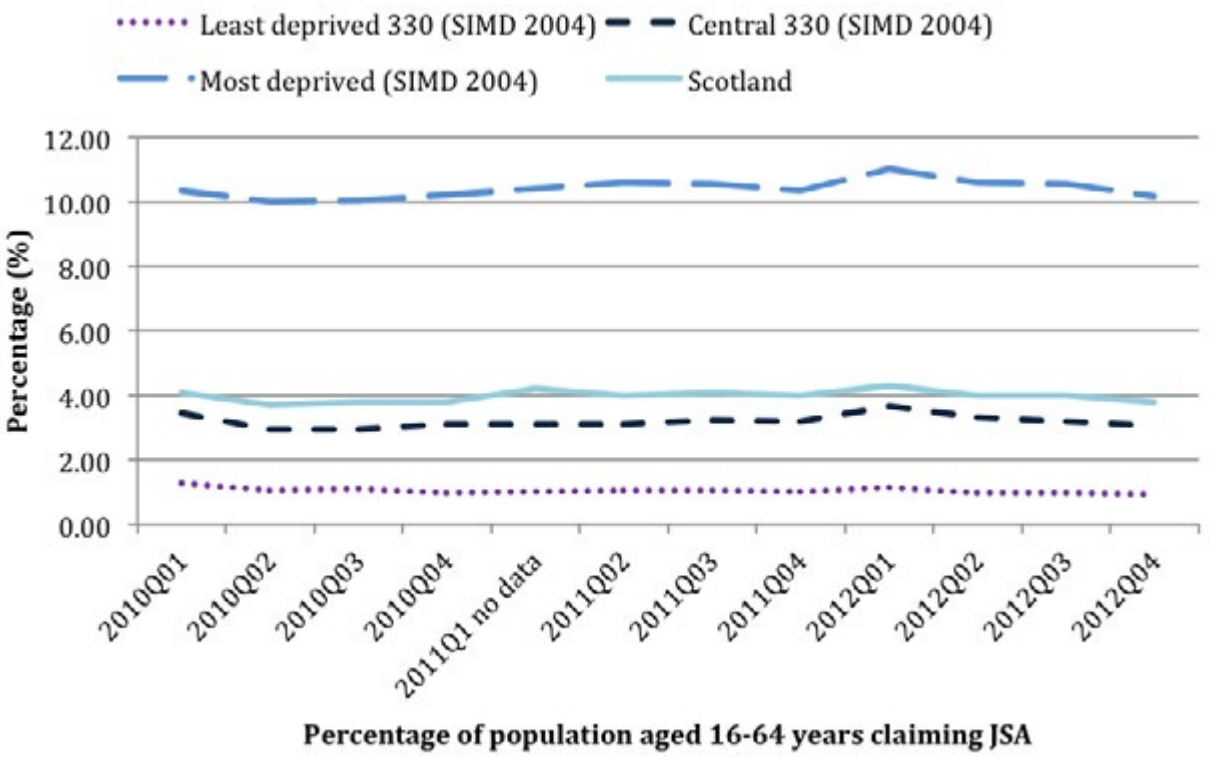
*null values from three unpopulated data zones removed

The table below shows selected percentages from Figure 6-1 above.

Table 6-1 Selected figures, percentage of working age population claiming Jobseekers Allowance, 2001 to 2009

% people claiming JSA	2001Q01	2004Q1	2007Q04	2009Q04	Difference 2001Q1 to 2009Q4	Difference as %
Least deprived cohort	1.03	1.05	0.47	1.19	0.16	15.5%
Central cohort	3.19	2.86	1.51	3.3	0.11	3.4%
Most deprived cohort	9.57	7.67	5.96	10.24	0.67	7%
Scotland	3.7	3.2	2	4	0.3	8.1%

Figure 6-2 Percentage of population aged 16-64 claiming JSA



*null values from three unpopulated data zones removed

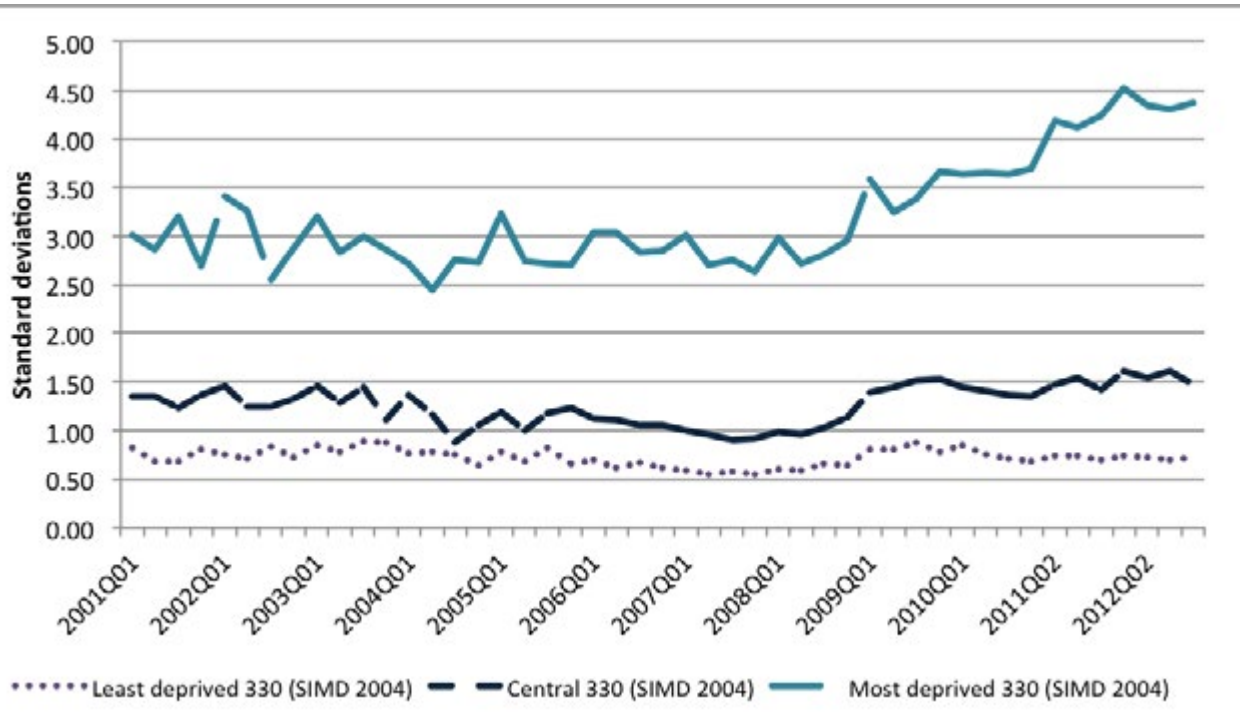
Table 6-2 Selected figures, percentage of population aged 16-64 claiming JSA, 2010 to 2012

% people claiming JSA	2010 Q01 new indicator	2012 Q4 new indicator	Difference 2010 Q1 to 2012 Q4	Difference as %
Least deprived cohort	1.26	0.93	0.33	-26.2%
Central cohort	3.44	3.08	-0.36	-10.5%
Most deprived cohort	10.35	10.18	-0.17	-1.6%
Scotland	4.1	3.8	-0.3	-7.3%

Claimant figures for all three cohorts and the Scottish average increased between 2001 and the end of 2009. Claimant levels fell up to the end of 2007 before increasing sharply in 2008 and 2009; this is not a surprise considering the onset of the economic recession.

Table 6-2 displays the difference in levels of claimant rates since 2001. Although the least deprived cohort increased the most in terms of percentages up to 2009 (15%), their rate has fallen considerably since. The gap between the most and least deprived cohorts increased by nearly 6% between 2001 and 2009, and a further 2% between 2009 and 2012. The percentage of JSA claimants for the most deprived cohort is over 10 times higher than the percentage for the least deprived cohort, and over 2.6 times the Scottish average.

Figure 6-3 Standard Deviation - Percentage of population claiming JSA



*Precise figures for the chart above are displayed in Summary tables available at the end of this document.

Figure 6-3 displays the standard deviation figures for Jobseeker claimant levels between 2001 and 2012. Variation from the mean increased most dramatically for the most deprived cohort; the standard deviation increased from 3.02 in 2001Q01 to 4.38 in 2012Q04, and coefficient of variation increased from 0.31 to 0.43. This indicates growing dispersal and irregularity, possibly a result of the insecure job market with many people fluctuating in and out of work.

Variation across Scotland

Table 6-3 Percentages of working age population claiming JSA, areas with the 10% highest and lowest claimants

	2001 Q01	2009 Q04	2010 Q1 (new indicator)	2012 Q04
10% highest claims	10.16	10.9	11.17	11.58
10% lowest claims	0.37	0.55	0.68	0.44
Scottish average	3.7	4	4.1	3.8

Table 6-3 indicates percentages of working age population claiming JSA from areas with the 10% highest and 10% lowest levels of claimants. These areas are selected separately every year. Claimant percentages increased for both groups, and the variation continued to rise over this period (by nearly 14%). In 2012Q04 the 10% highest rates were over 26 times higher than the 10% lowest rates.

6.2 Employment Deprivation

Employment deprivation refers to the proportion of working age population who are out of work or unable to work. This is based on the SIMD[14] employment domain, generated from a combination of benefits such as Jobseekers Allowance, Incapacity Benefit, Employment and Support Allowance (ESA), and Severe Disability Allowance.

Figure 6-4 Percentage of population who are employment deprived, 1000 communities

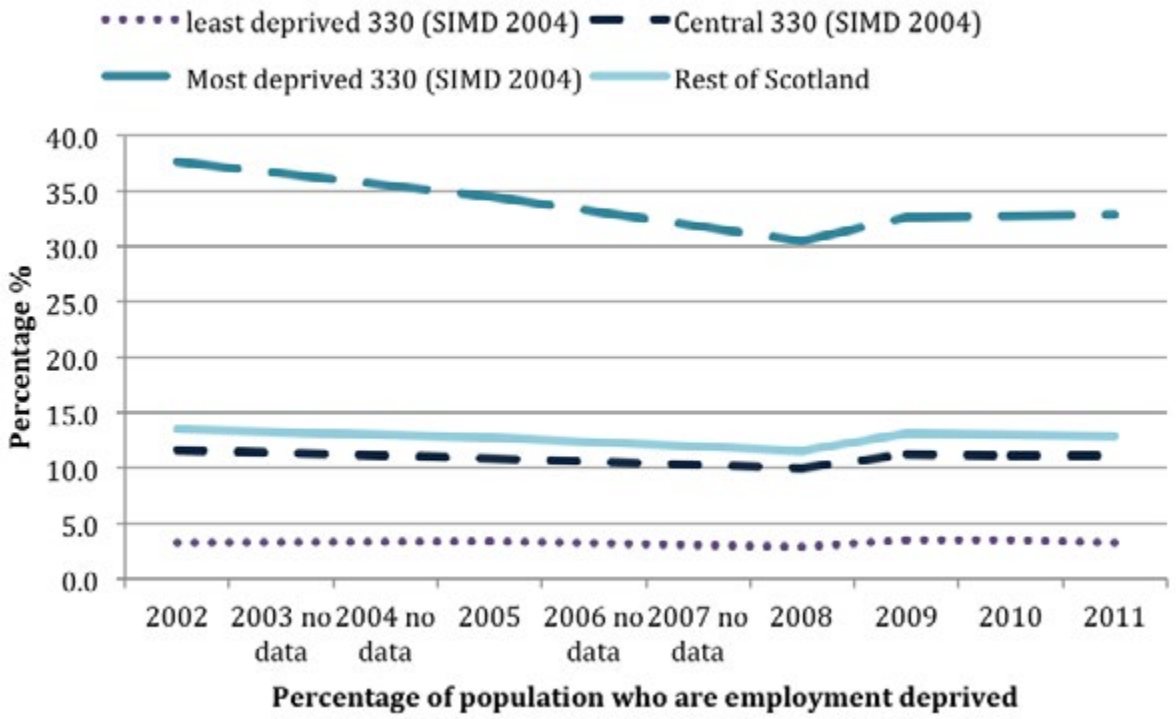


Figure 6-4 displays the percentage of population who are employment deprived for all three cohorts and the rest of Scotland. All groups decreased up to 2008, experienced a relatively sharp rise in 2009 before levelling off (See Table 6 4 for percentage differences).

Table 6-4 Percentage of population who are employment deprived

Percentage of population who are employment deprived	2002	2005	2008	2009	2010	2011	Change (n)	Change (%)
Least deprived cohort	3.3	3.4	2.9	3.5	3.5	3.3	0.0	0
Central cohort	11.6	10.9	10.0	11.2	11.1	11.1	-0.5	-4.3%
Most deprived cohort	37.7	34.5	30.5	32.7	32.7	32.9	-4.8	-12.7%
Scotland	13.5	12.8	11.6	13.1	13.0	12.9	-0.6	-4%

14 Website: http://simd.scotland.gov.uk/publication-2012/simd-2012-results/domain-results/employment-domain/.

6.3 Levels of Income Deprivation

Income deprivation refers to the level of population who are classified as income deprived. This is based on the SIMD income domain generated from a combination of benefits related to income, such as income support, JSA and tax credits[15].

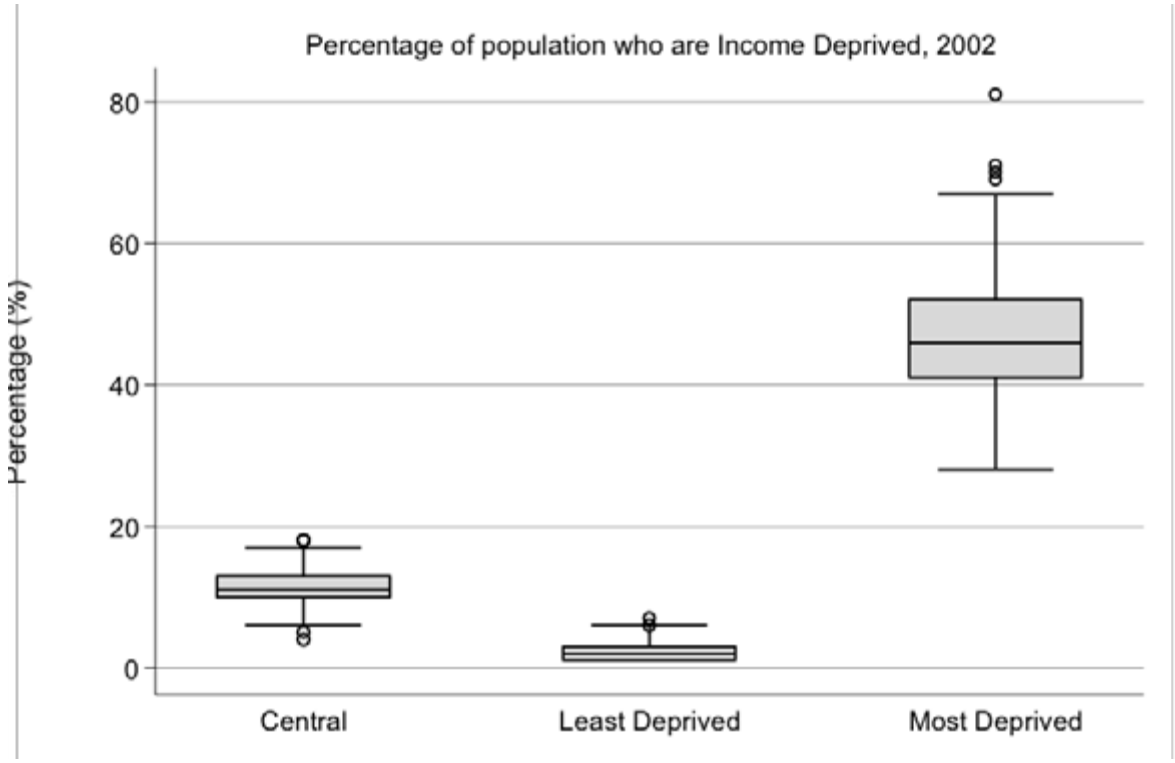
The most recent iteration of data available is from 2011 (SIMD 2012); however, increases of the threshold for tax credits consequently mean this iteration is not directly comparable to previous years. In 2011 fewer people were identified as being income deprived, because fewer people now qualify for tax credits.

The SIMD income domain 2006 is also not directly comparable to SIMD 2004 or SIMD 2009, because this iteration does not include tax credits. As this could be misleading or lead to erroneous interpretation, no time series has been provided for income deprivation. Nonetheless, this indicator is very useful for measuring relativity between cohorts and the national average. This indicator is calculated on claimant rates as opposed to eligibility, therefore those who are out of work or on low incomes but not claiming financial support are not represented in the datasets.

In 2011 proportions of income deprived populations within Scottish data zones ranged from 0 to 65%. The following box plots display the percentage of population who were income deprived in 2002 for each of the three cohorts in *1000 Communities*.

Within the most deprived cohort in 2002 income deprivation levels ranged from 28% to 81%. The central cohort ranged from 4% to 18%, and the least deprived cohort from 1% to 7%. The summary statistics for each cohort are displayed in Table 6-5 below.

Figure 6-5 Percentage of population who are income deprived, 2002



15 For more details see SIMD website: http://simd.scotland.gov.uk/publication-2012/simd-2012-results/domain-results/income-domain/.

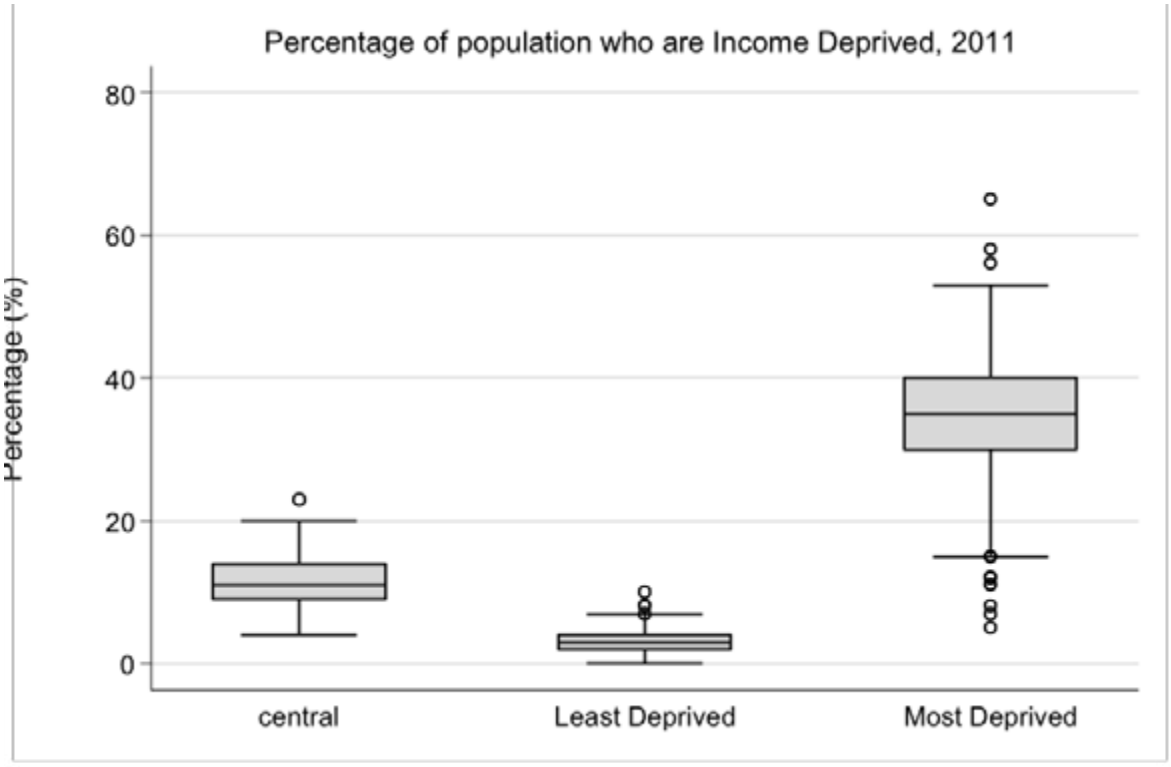
Table 6 5 Summary statistics, percentage of population who are income deprived, 2002

Percentage of population who are income deprived, 2002										
Cohort	Min	Max	Median	Mean	St.Dev.	CV	25%	75%	IQR	Skewness
Most Deprived	47	28	81	46	8.3	0.18	41	52	11	0.554
Central	11.5	4	18	11	2.5	0.22	10	13	3	0.023
Least Deprived	2.2	1	7	2	1.03	0.47	1	3	2	0.965
Scottish Average	15									

In 2002 the average percentage of income deprivation for the most deprived cohorts was over 4 times higher than the Scottish average, and over 20 times higher than the least deprived cohort average.

These same calculations were taken for the 2011 figures. These percentages cannot be directly compared to the 2002 results but measuring relative change between cohorts is still applicable.

Figure 6-6 percentage of population who are income deprived, 2011



By 2011 the spread of income deprivation levels for the most deprived cohort had further increased, ranging from 5% to 65%. Variation also increased for the central and least deprived cohort, the central ranging from 4% to 23% and the least deprived from 0% to 10%. Summary statistics for all three cohorts are displayed in Table 6-6 below.

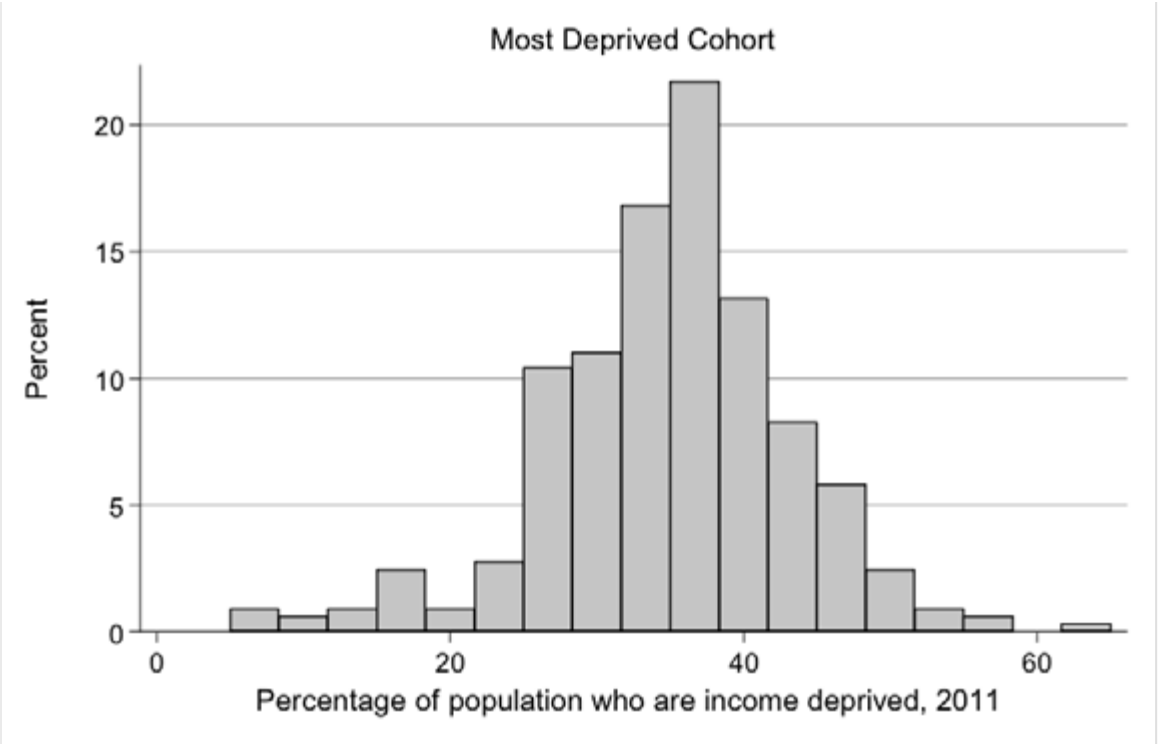
Table 6-6 Summary statistics, percentage of population who are income deprived, 2011

Percentage of population who are income deprived, 2011										
Cohort	Mean	Min	Max	Median	St.Dev.	CV	25%	75%	IQR	Skewness
Most Deprived	34.8	5	65	35	8.5	0.24	30	40	10	-0.41
Central	11.5	4	23	11	3.6	0.31	9	14	5	0.29
Least Deprived	2.7	0	10	3	1.4	0.52	2	4	2	1.145
Scottish Average	13									

In 2011 the percentage of population who were income deprived in the most deprived cohort was approximately 2.7 times higher than the Scottish average and approximately 13 times the percentage for the least deprived cohort. Division between these cohorts, therefore, remains substantial but has decreased on some level between 2002 and 2011. This is also reflected by a very slight reduction in the coefficient of variation between cohorts: CV reduced from 1.17 in 2002 to 1.02 in 2011.

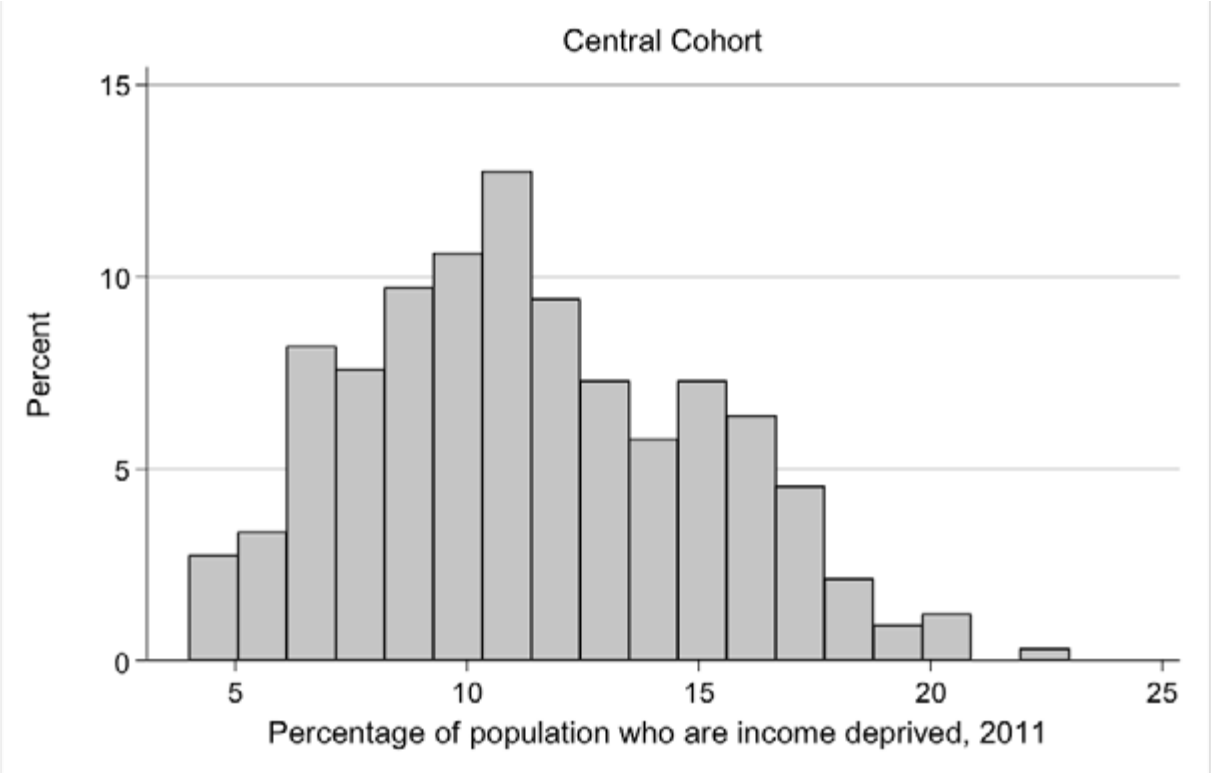
The histograms in Figure 6-7, Figure 6-8, and Figure 6-9 display the distribution of income deprivation levels in 2011 for the most deprived, central and least deprived cohort respectively.

Figure 6-7 Histogram, % income deprivation 2011, most deprived cohort



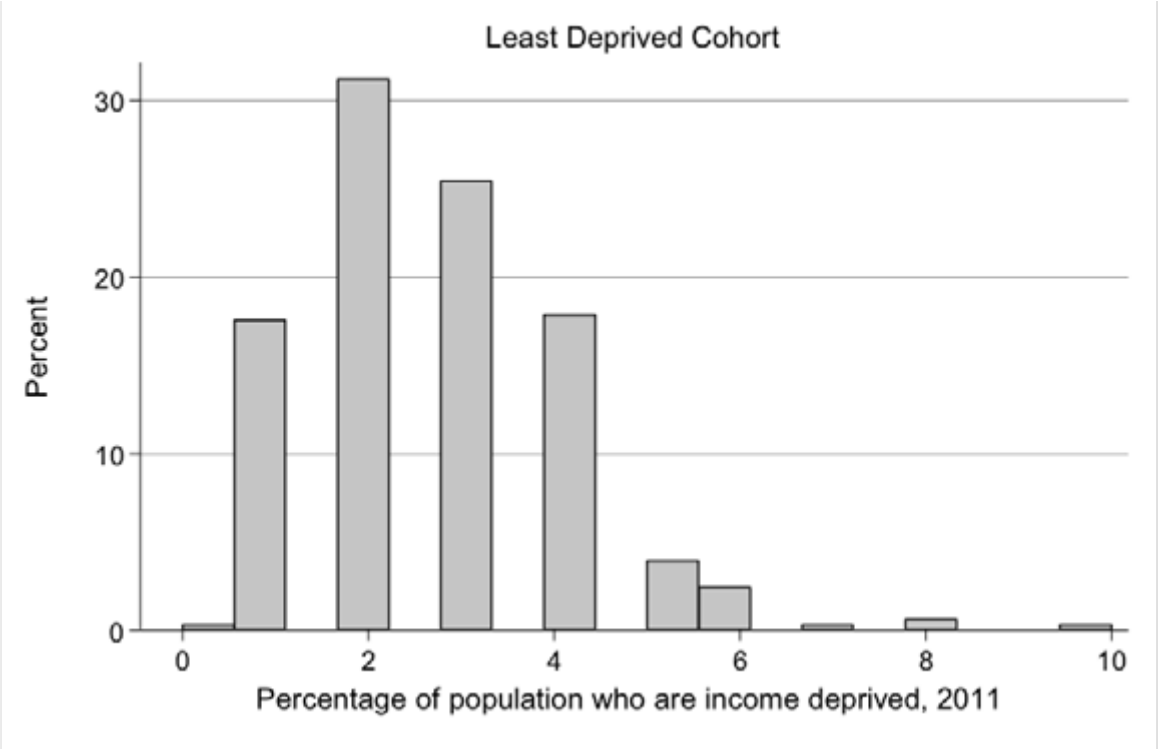
For the most deprived cohort in 2011, within the majority of neighbourhoods between 30% and 40% of population experienced income deprivation.

Figure 6-8 Histogram, % income deprivation 2011, central cohort



For the central cohort, within the majority of neighbourhoods approximately 9% to 14% of population were income deprived.

Figure 6-9 Histogram, % income deprivation 2011, least deprived cohort



For the least deprived cohort, within the majority of neighbourhoods between 2% and 4% of population experienced income deprivation.

6.3.1 Do the majority of income-deprived people live in deprived areas?

Out of the 126,450 income deprived people that in 2011 lived within data zones selected for 1000 Communities, 70.6% (89,310 people) lived within the most deprived cohort, 23.6% (29,785 people) lived in the central cohort, and 6% (7,355 people) lived in the least deprived cohort. Between cohorts there are, therefore, considerably more people who are income deprived living in the most deprived cohort than in either the central or least deprived cohorts.

Table 6-7 ncome deprivation, 2012

Cohort	Number of people who are income deprived, SIMD 2012	Percentage out of total number of people who are income deprived in 1000 Communities
Most Deprived	89,310	70.6%
Central	29,785	23.6%
Least Deprived	7,355	6%
Total – 1000 Communities	126,450	

Across all 6505 data zones in Scotland 700,475 people were classed as income deprived in 2011. Among these people, nearly a quarter (23.9%) lived within the 10% most deprived data zones in Scotland and over half (55.4%) lived within the 30% most deprived data zones in Scotland (SIMD 2012). Under a quarter (23.6%) of income-deprived people lived within the 50% least deprived data zones, the upper half of the SIMD 2012 rank.

Table 6-8 Number of people who are income deprived

SIMD 2012 Deciles	Number of people who are income deprived, SIMD 2012	Total		Percentage of total number of income deprived people across all data zones
1 – 10% Most Deprived (MD)	167,280	MD 10%*	-	23.9%
2	123,460	MD 20%	290,740	41.5%
3	97,165	MD 30%	387,905	55.4%
4	81,285	MD 40%	469,190	70%
5	65,825	MD 50%	535,015	76.4%
6	52,925	LD 50%**	165,460	23.6%
7	41,965	LD 40%	112,535	16.1%
8	32,640	LD 30%	70,570	10.1%
9	23,365	LD 20%	37,930	5.4%
10 – 10% Least Deprived (LD)	14,565	LD 10%	-	2.1%
Total	**700,475**			

* MD = Most Deprived (SIMD 2013) ** LD = Least Deprived (SIMD 2012)

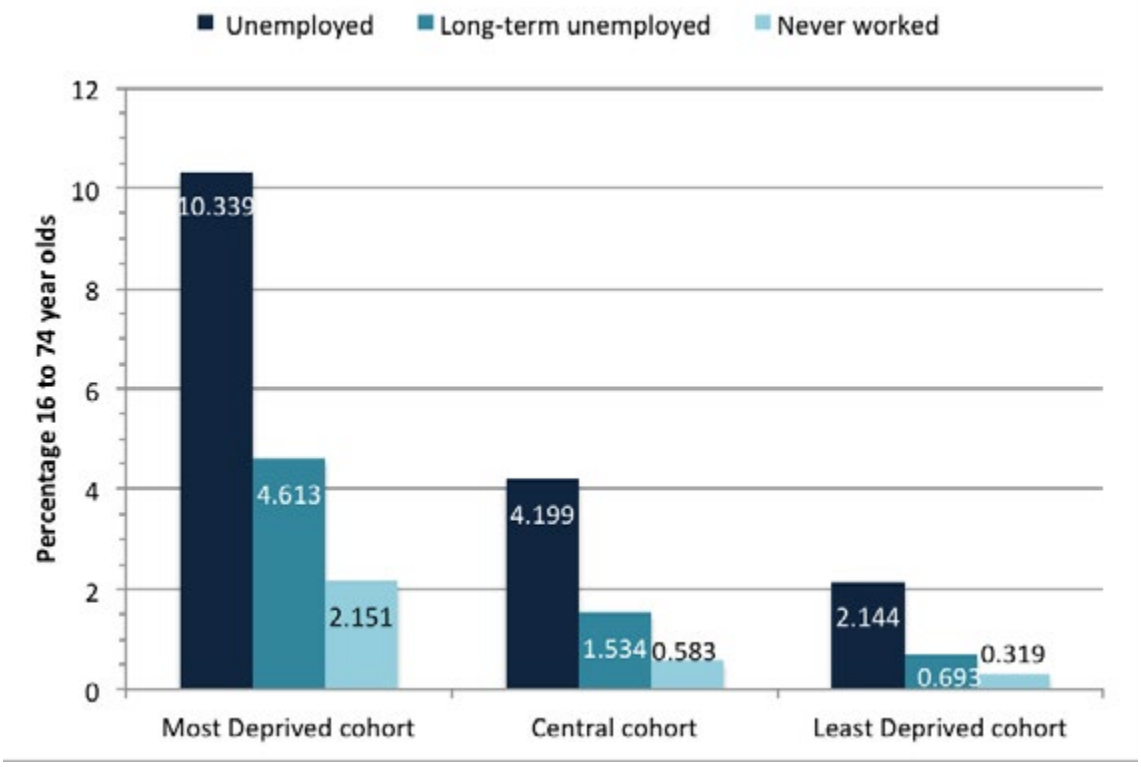
Therefore, although there are people who are income deprived that live in areas that are not regarded as deprived in Scotland, the majority do live in areas with relatively high levels of multiple deprivation. Over 75% of income-deprived people in 2011 lived in areas that ranked in the bottom half of SIMD 2012.

6.4 Scottish Census 2011: Unemployment Figures

The Scottish Census 2011 data further amplifies the disparity still existing between cohorts.

Figure 6-10 displays the proportion of economically active people who are unemployed, long-term unemployed, and who have never worked, for all three cohorts. Economically active implies that these individuals are able or looking for work as opposed to individuals who are economically inactive due to conditions such as sickness or disability, home care commitments or retirement. Within the most deprived cohort over 10% of economically active 16- to 74-year olds are unemployed, nearly 5% long-term unemployed and over 2% have never worked. Within the least deprived cohort just over 2% are unemployed, under 0.7% are long-term unemployed and 0.3% have never worked. The proportion of economically active people who are unemployed, long-term unemployed or who have never worked in the least deprived cohort are all 80-85% lower than in the most deprived cohort.

Figure 6-10 Percentage of economically active 16 to 74 year olds who are unemployed, source: Scottish Census 2011



6.5 Economic Wellbeing and Benefit Dependency: Summary

Although since 2002 there has been a slight drop in the disparity of income deprivation between the most and least deprived cohorts, unemployment rates remain segregated; this

is represented in the Census 2011 data, as well as in the percentage of population claiming JSA. It is recognised that these indicators were profiled over a period of economic recession. The JSA time series in Figure 6-1 illustrates the results of this. Although there were increases for all three cohorts in 2008, the sharpest increase over this period was experienced by the most deprived cohort. By the end of 2012, proportions of jobseeker claimants were over 10 times higher in the most deprived cohort than the least deprived cohort, perhaps illustrating the instability of lower end jobs.

The proportion of people who are income deprived includes those who are working and claiming tax credits, intimating that employment does not always guarantee income stability. Studies conducted for the European Commission (2010) highlight the growing concern of in-work poverty within modern western society. This needs addressed alongside and as well as unemployment itself (European Commission 2010).

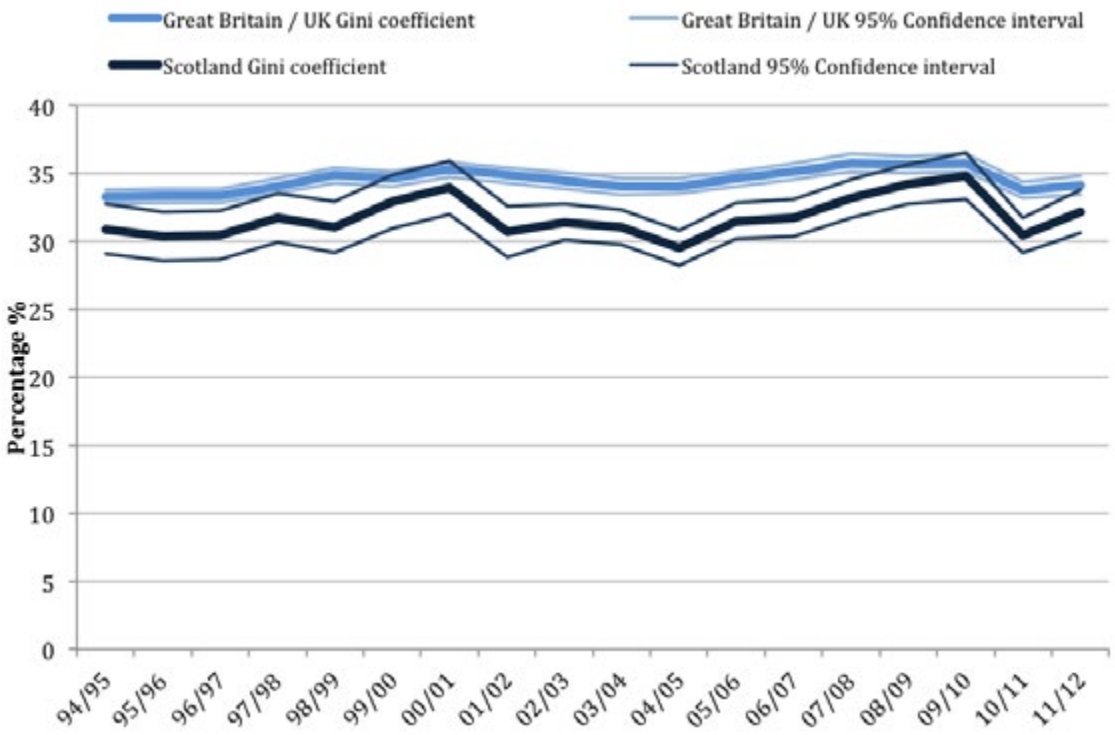
7. Income Inequality

As introduced previously in this report, since the publication of '*The Spirit Level*' by Wilkinson and Pickett (2009) there has been increased publicity concerning levels of income inequality. Wilkinson and Pickett (2009) argue that high levels of income inequality within economically developed countries increases health and social problems, not only among less advantaged populations but right across society.

The following analyses consider levels of income inequality in Scotland, the UK and across Europe. The Gini coefficient measures dispersal of income within economies by calculating the extent income distributed among individuals or households deviates from a perfectly equal distribution (The World Bank[16], 2013). The higher the Gini coefficient is, the higher the level of income inequality in that economy. A Gini coefficient of 0 represents perfect income equality while 100% expresses maximum inequality (for instance whereby one household has all the income in that economy) (EASYPol, 2006). The Gini coefficient is therefore based on income ratios and reflects relative income as opposed to actual income levels. For instance, if an economy grows or falls but the impact is shared equally across all households then the Gini coefficient will remain the same[17].

Figure 7-1 displays Gini coefficients for the UK and Scotland from 1994 to 2011. This Gini coefficient is provided by the Scottish Government and is calculated on equivalised household income after taxes and benefits but before housing costs. Total household income is equivalised to respect differences in household size and composition. The figures from 1994/95 to 2001/02 are calculated for Great Britain rather than the UK.

Figure 7-1 GINI coefficients UK and Scotland, 1994 to 2011 (source: DWP Resources Survey, Scottish Government)



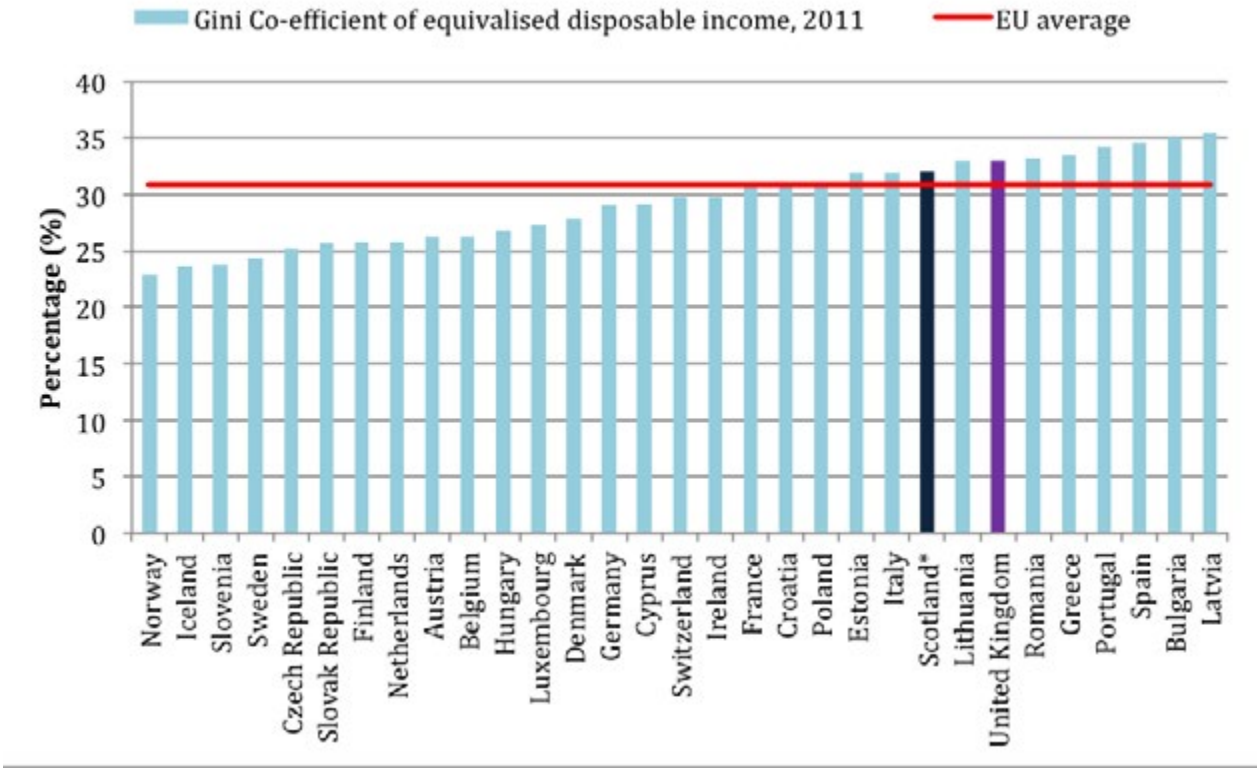
16 http://data.worldbank.org/indicator/SI.POV.GINI

17 http://www.scotland.gov.uk/Publications/2007/07/18083820/4

The line graph in Figure 7-1 illustrates that since 1994/5 Scotland has generally had a more equal distribution of income than the United Kingdom overall. This gap narrowed in 2004/5, 2009/10 and 2011/12. Although Scotland's Gini coefficient of 32 was lower than the United Kingdom's it remains higher than the EU average.

Figure 7-2 displays Gini coefficients of equivalised disposable income for a selection of countries in Europe. Disposable income includes all income from work (including employment and self-employment earnings), private income from investment and property, transfers between households and all social transfers received in cash including old-age pensions (Eurostat, 2012[18]).

Figure 7-2 GINI coefficient of equivalised disposable income, 2011 (source: SILC, Eurostat & Scottish Government)



*Scotland's Gini coefficient sourced from Scottish Government not Eurostat

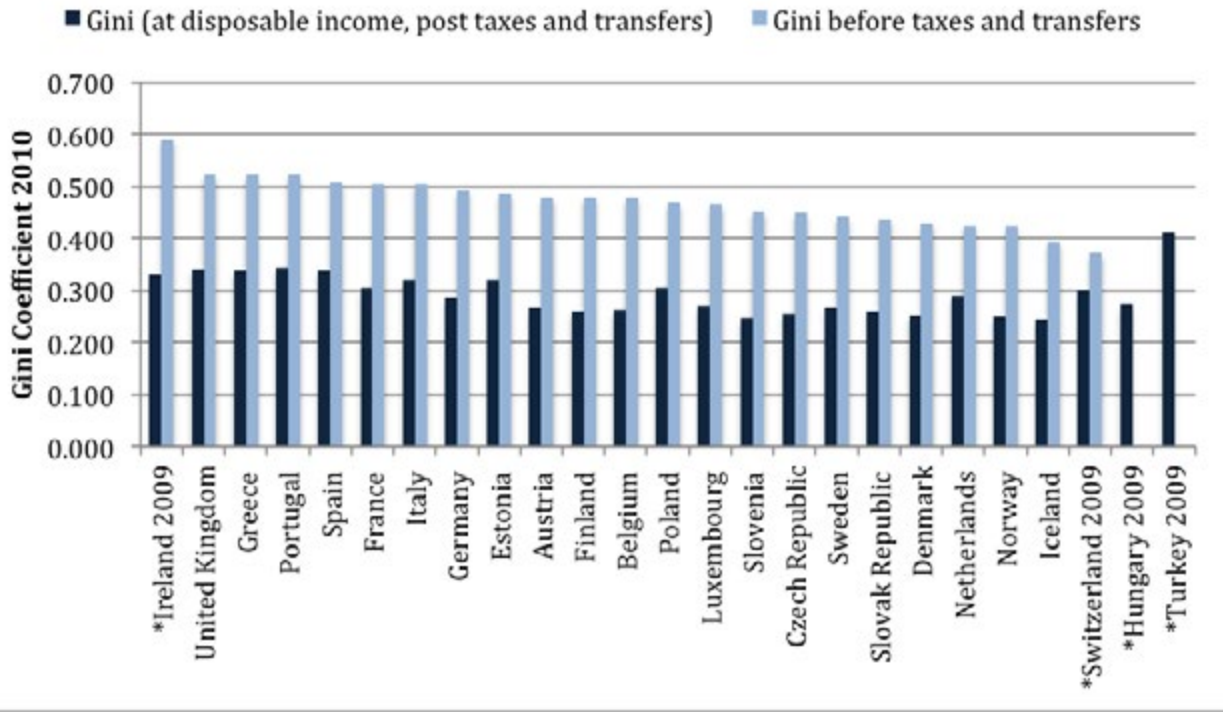
Out of the 31 countries selected in Figure 7-2, the UK has the seventh highest Gini coefficient, is over 2 points higher than the EU average and is over 10 points higher than Norway's Gini coefficient.

7.1 Gini Coefficient Pre- and Post-taxes and Transfers

The Gini coefficients presented above are calculated on disposable income post taxes and transfers. The bar chart in Figure 7-3 displays Gini coefficients for both before and after taxes and transfers for European members of the OECD. This, therefore, indicates levels of income inequality before and after the implementation of redistribution policies by the state.

18 http://epp.eurostat.ec.europa.eu/cache/ITY_SDDS/EN/ilc_esms.htm

Figure 7-3 Gini coefficient before and post taxes and transfers, OECD European countries, 2010 (source: OECD)



*Figures for Ireland, Switzerland, Hungary and Turkey are from 2009 not 2010

Out of the European OECD countries presented in Figure 7-3, the UK has the second highest Gini coefficient before taxes and transfers and the third highest Gini coefficient post taxes and transfers. The differences between Gini coefficients before and after tax and transfers are shown in Table 7-1.

The UK's Gini coefficient drops by 0.182 points after government redistribution. In comparison to other European members of the OECD this is relatively central, with Switzerland's Gini coefficient dropping by 0.074 and Ireland's dropping 0.26 points. This reflects absolute difference; in relative terms the UK's Gini coefficient drops by 35% after redistribution in taxes and transfers. In relative terms, out of the 23 European OECD countries with available data, the UK had the 6th lowest percentage decrease between Gini coefficients before and post taxes and transfers in 2010. Gini coefficients for Finland, Slovenia and Belgium all dropped by over 45% after redistribution. Although Switzerland's only dropped by 20%, Switzerland had a considerably lower Gini coefficient before taxes and transfers and their Gini coefficient post redistribution policies remains lower than the UK's (0.298 compared to 0.341 in the UK).

This highlights the vast level of income inequality in the United Kingdom both before and after taxes and transfers. Although redistribution in taxes and transfers reduces the Gini coefficient by 35%, the very high level of income inequality in income distribution before taxes and transfers means that this Gini coefficient remains high in European standards.

Table 7-1 Summary tables gini coefficients before and after taxes and transfers

OECD: European Countries	Gini post taxes and transfers, 2010	Gini before taxes and transfers, 2010	Difference between Gini before and post taxes and transfers, 2010	Difference as a % of Gini before taxes and transfers
*Ireland 2009	0.331	0.591	0.260	44%
United Kingdom	0.341	0.523	0.182	35%
Greece	0.337	0.522	0.185	35%
Portugal	0.344	0.522	0.178	34%
Spain	0.338	0.507	0.169	33%
France	0.303	0.505	0.202	40%
Italy	0.319	0.503	0.184	37%
Germany	0.286	0.492	0.206	42%
Estonia	0.319	0.487	0.168	34%
Austria	0.267	0.479	0.212	44%
Finland	0.260	0.479	0.219	46%
Belgium	0.262	0.478	0.216	45%
Poland	0.305	0.468	0.163	35%
Luxembourg	0.270	0.464	0.194	42%
Slovenia	0.246	0.453	0.207	46%
Czech Republic	0.256	0.449	0.193	43%
Sweden	0.269	0.441	0.172	39%
Slovak Republic	0.261	0.437	0.176	40%
Denmark	0.252	0.429	0.177	41%
Netherlands	0.288	0.424	0.136	32%
Norway	0.249	0.423	0.174	41%
Iceland	0.244	0.393	0.149	38%
*Switzerland 2009	0.298	0.372	0.074	20%
*Hungary 2009	0.272	No data		
*Turkey 2009	0.411	No data		

7.2 At-risk-of-poverty-rate

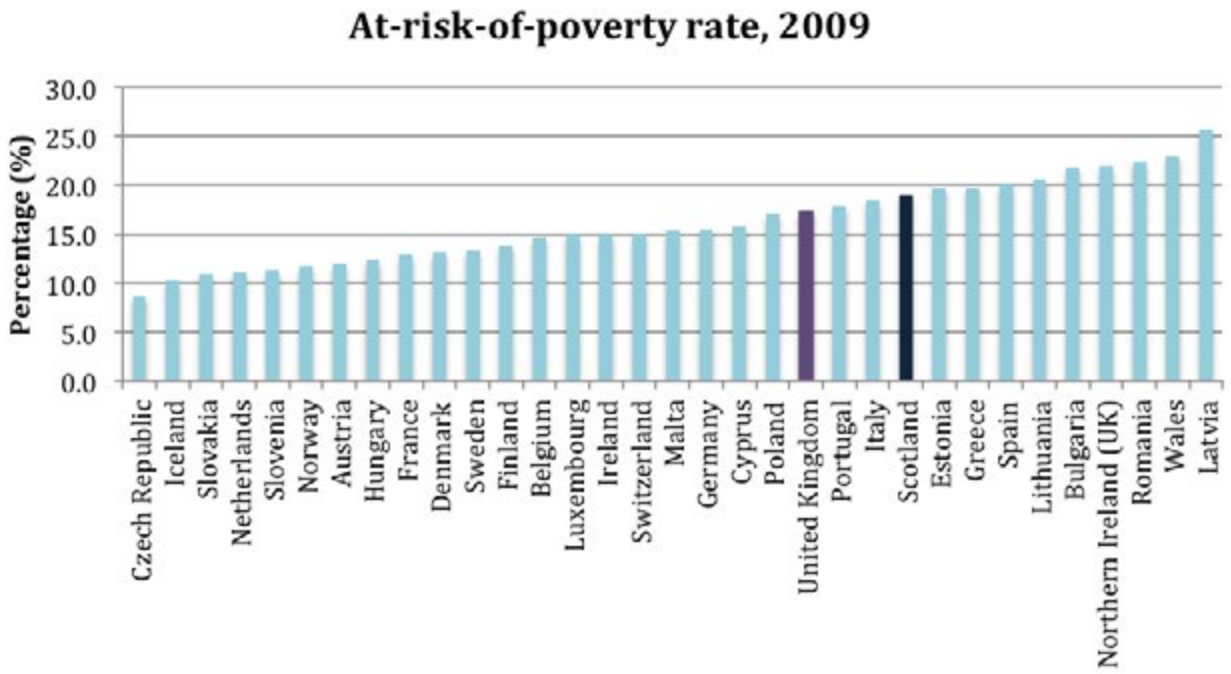
The at-risk-of-poverty rate is the proportion of people with an equivalised disposable income[19] (after social transfers[20]) below the at-risk-of-poverty threshold, which is 60% of the national median equivalised disposable income (after social transfers).

This indicator, therefore, measures low income in comparison to other residents in that country, but does not necessarily represent a low standard of living (Eurostat).

19 Equivalised income is calculated by dividing the total household income by its size determined after applying the following weights: 1.0 to the first adult, 0.5 to each other household members aged 14 or over and 0.3 to each household member aged less than 14 years old.

20 After taxation and benefits applied

Figure 7-4 At-risk-of-poverty rate, 2009 (source: Eurostat)



*figures for Scotland are estimates

In 2011, 16.9% of the European population was calculated to be at-risk-of-poverty. This average conceals considerable variations between countries – as also illustrated in the 2009 results in Figure 7-4 above. In 2009, the UK population considered at-risk-of-poverty was approximately 17.3% and estimated 19% in Scotland. This indicates in 2009 just under a fifth of Scotland's population were estimated at-risk-of-poverty in comparison to the equivalised disposable income of other residents in Scotland.

Both Gini coefficients and at-risk-of-poverty rates suggest that the UK and Scotland have higher income inequality than the EU average. Although Scotland has a lower Gini coefficient to the UK overall, it's at-risk-of-poverty rate was estimated higher than that of the UK in 2009.

As mentioned previously, several authors highlight the dangers and social impact of high levels of income inequality (Wilkinson and Pickett, 2009; Stiglitz in Fiscal Commission Working Group, 2013). Professor Joseph Stiglitz argues that unequal countries do not perform as well as and are less stable than countries with greater equality (Fiscal Commission Working Group, 2013). Stiglitz states that high concentrations of income can restrict economies in the future by limiting the contribution of citizens, whilst also increase restriction on government investment in infrastructure, education and technology. Underperformance in the labour market can further constrain full economic potential (Fiscal Commission Working Group, 2013).

Wilkinson and Pickett (2009) opened debate as to whether income inequality itself is a causal factor of social problems. *The Spirit Level* highlights a relationship between income inequality and health and social problems among countries above a particular income threshold. Therein, Wilkinson and Pickett (2009) created an index of health and social problems, establishing no correlation with average income in wealthy countries, but a strong correlation with income inequality. This suggests, therefore, that within wealthy countries the level of income inequality itself has a negative association with social outcomes, not only for those in lower socioeconomic classes, but across society.

There are several disputes concerning *The Spirit Level*: Snowden (2010) argues that it relies too heavily on countries that should be regarded as outliers – stating, for example, that without the USA's unusually high murder rate there is no correlation between inequality and homicide rates. Snowden also contends that economic growth does benefit populations even at a very high level of development. Nonetheless, several other studies carried out for the European Commission (2010) comment on the weaknesses of 'trickle-down' effects in society, stating that there is no evidence that redistributive policies adversely affect growth or that growth leads to lower levels of inequality.

A report published by the International Monetary Fund (IMF) (2014) into redistribution, inequality and growth reveals that the average redistribution in society has no significant impact on economic growth[21] in the medium to long term but that income inequality has a negative effect. Redistribution, therefore, has the potential to support economic growth by reducing inequality. Although very large-scale redistribution may have a negative impact on growth duration, this is counter-balanced by the positive effect of increasing equality. There is, therefore, very little evidence for the negative impact of fiscal redistribution at a macroeconomic level. Redistribution, generally, associates with a reduction in inequality, and in return leads to higher and more durable growth.

7.3 Correlations Between Income Inequality and Life Outcome Indicators

This section displays a series of scatterplots to examine an association between Gini coefficients and life outcomes between countries in Europe. Most of the selected countries are members of the European Union but also include Norway, Switzerland and Iceland. Within individual scatterplots several EU countries may be missing due to unavailable data.

Figure 7-5 presents PISA 2009 scores in mathematics for a selection of countries within Europe. These scores have been sorted according to their level of income inequality (Gini coefficient, 2011). Despite some variation there is a statistically significant moderate to strong relationship between PISA 2009 maths scores and Gini coefficients (Spearman's rank correlation coefficient: -0.63, $p<0.01$). This relationship is still moderate when outliers below 470[22] and above 520[23] are removed from the data set (Spearman rank correlation coefficient: -0.53 $p<0.01$). Linear regression analysis indicated Gini coefficients explain 27% of variance in PISA 2009 maths scores for the whole data set ($R^2 = 0.266$, $F(1, 28) = 11.51$, $p<0.01$) and 18% with the outliers removed ($R^2 = 0.18$, $F(1, 21) = 5.883$, $p<0.05$).

The share of top performers in mathematics (PISA 2012) also had a statistically significant correlation with Gini coefficients between the selected countries (Spearman rank correlation coefficient: -0.4 $p<0.05$)[24].

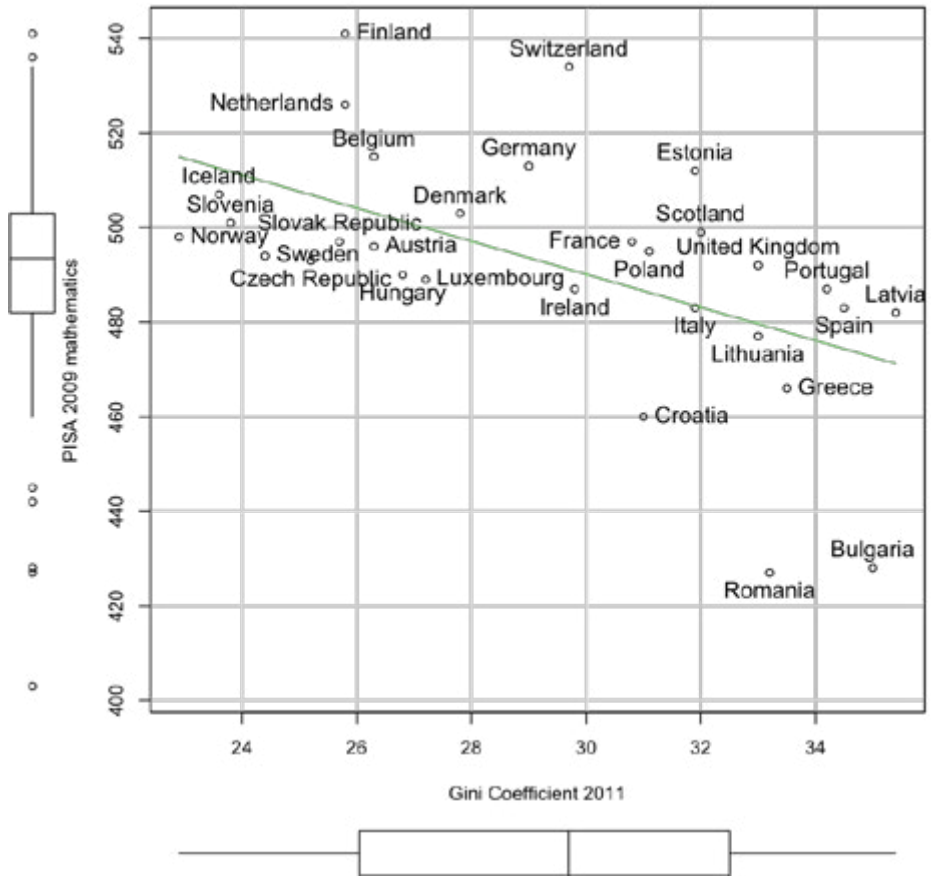
21 Unless redistribution already exceeds a particular level.

22 Bulgaria, Romania, Cyprus and Greece

23 Finland, Switzerland and the Netherlands

24 no outliers present

Figure 7-5 PISA 2009 Maths Scores by Gini coefficients



There were further statistically significant relationships between Gini coefficients and PISA 2009 reading scores[25], and PISA 2009[26] and 2012[27] science scores, however these relationships relied heavily on individual outlying countries. If these outliers were removed from the datasets these relationships were no longer statistically significant.

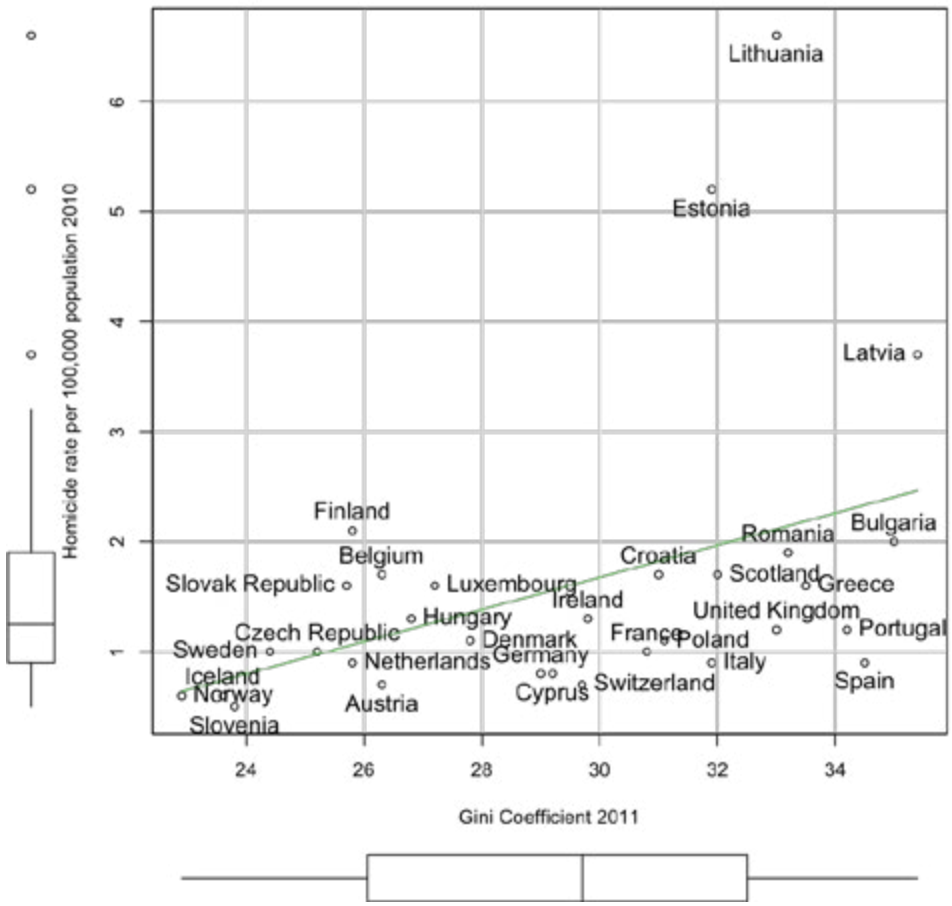
Figure 7-6 displays homicide rates per 100,000 population for selected countries within Europe sorted by Gini coefficients. Despite variation there is a statistically significant relationship between homicide rates and Gini coefficients within the countries presented in Figure 7-6 (Spearman rank correlation coefficient: 0.51 *p<0.01*). After removing Latvia, Estonia and Lithuania from the data set as outliers there is still a statistically significant relationship (Spearman rank correlation coefficient: 0.42 *p<0.05*). Linear bivariate regression suggests that Gini coefficients explain 14% of variance for homicide rates between the European countries presented in Figure 7 6 ($R^2 = 0.143$, $F(1,29) = 6.12$), $p<0.05$).

25 rho = -0.37 (*p<0.05*)

26 rho = -0.37 (*p<0.05*)

27 rho = -0.13 (*p<0.05*)

Figure 7-6 Homicide rate per 100,000 population by Gini coefficients



The scatterplots and correlations displayed within this section illustrate a relationship between Gini coefficients and a variety of life outcome indicators. Within the regression analyses, Gini coefficients explained at most 27% of variance for any of the indicators; therefore there are clearly other influences on life outcomes between these countries. Income inequality does, nonetheless, have a significant association and therefore cannot be dismissed. This does not prove a causal relationship but the results do illustrate that among the selected European countries, those with higher income inequality are overall more likely to have lower attainment in mathematics scores (PISA 2009) and higher homicide rates than European countries with lower income inequality. This could of course be due to the attributes of the countries selected, for example swayed by the relatively high levels of equality and outcomes within Nordic countries and the inequality and relatively poor outcomes in countries such as Romania and Bulgaria. These countries do influence the results but the question is whether income inequality itself in some part influences these attributes.

8. Crime

Crime prevention strategies have expanded since their emergence in the early 1980s to incorporate the notion of community safety. Community safety strategies focus beyond the traditional notion of crime prevention[28], incorporating social and economic change in order to tackle root causes of crime and disorder (Community Safety Partnerships Ltd (CSP), 2010). This encompasses organisations across a variety of sectors, with partnership working a fundamental component to community safety development and delivery (Lea, 2007; Cunneen, 2012). Today, despite no statutory obligation, all Scottish Local Authorities have functioning CSPs comprising a range of organisations such as the local authority, police, fire and rescue, NHS, alcohol and drug partnerships and a range of third sector organisations. These partnerships collaborate with the aim of creating safer, more inclusive and healthier communities with lower levels of antisocial behaviour (ASB) and fear of crime (Scottish Government).

There have been several studies taken forward by the Scottish government to review the connection between neighbourhoods, housing and crime (Scottish Government, 2010). Community regeneration programmes have often tried to tackle this relationship (ibid.). Several policies over the past ten years have focussed upon reducing crime rates: '10 year violence reduction plan', 2007, with the Violence Reduction Unit, 2008; Reducing Reoffending Programme by securing safe accommodation, supporting community integration and reducing the use of short-term prison sentences; 'Promoting Positive Outcomes', 2009, tackling anti-social behaviour; Community Safety Partnerships (CSPs). A list of some of the key policies and practices in crime reduction and community safety in Scotland is available in Table 8-1 below.

Table 8-1 List of policies towards crime reduction and community safety, Scotland

Name	Year	Description	Organisation
Community Safety Partnerships		Despite no statutory obligation, all Local Authorities in Scotland maintain a Community Safety Partnership. These partnerships work to reduce antisocial behaviour and fear of crime within communities.	
Community Safety Unit		The CSU is within the Police and Community Safety Directorate and is focussed on both crime and improving communities. 4 key priorities: • Provide leadership • Improve the evidence base • Deliver better outcomes for communities • Support the sector	

28 Traditional crime prevention strategies focused purely on physical measures to prevent crime occurring, e.g. installing streetlights, locks, etc.

Name	Year	Description	Organisation
Promoting Positive Outcomes	2009	This framework for tackling antisocial behaviour emphasises the importance of prevention and early and effective intervention. It promotes the need to address the causes of antisocial behaviour including drink, drugs and deprivation. 4 key features: prevention, integration, engagement and communications.	Scottish Government & COSLA
Violence Reduction Unit	2006	"Violence is preventable – not inevitable" The Violence Reduction Unit was established by Strathclyde Police in 2005 to develop a strategy for the sustainable reduction of violence in Strathclyde. This remit was then extended across Scotland by the Scottish Executive in 2006.	Scottish Executive
Reducing Reoffending Programme	2009 (second phase 2012)	This programme includes four key projects: • Young people who offend • Pre-disposal • Effective community disposals • Community re-integration The programme aims to reduce the use of short prison sentences with more focus on community penalties, diversion programmes and improving the link between rehabilitation and communities.	Scottish Government
Reducing Reoffending Change Fund	2012 – 2015	£10m to provide mentoring schemes for offenders	Scottish Government
Strengthening Community Engagement and Resilience		Policy to work with people in local areas, so that they feel involved in the decisions that affect them. Work towards this includes: • Establishing single police and fire rescue services with a designated senior officer for every area • Policing plans for every council ward tailored to local needs and priorities • The cashback for communities programme (see below) • Ready Scotland website to provide advice for citizens	Scottish Government

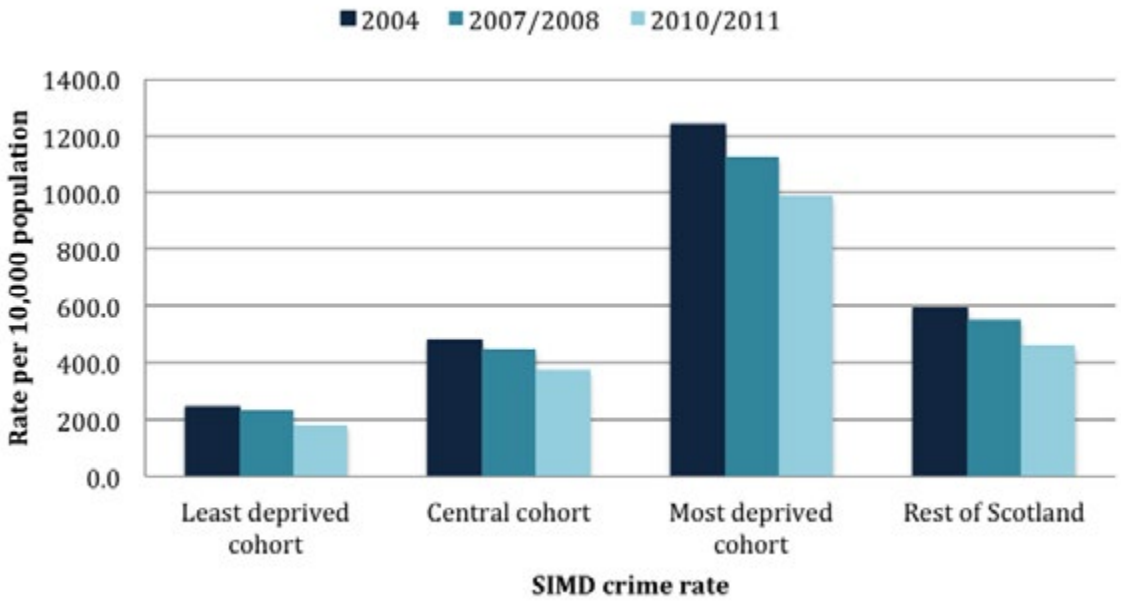
Name	Year	Description	Organisation
Cashback for Communities scheme	2007	This project uses funds recovered from criminal activity to provide grants of up to £2000 to support local youth groups provide opportunities for Scotland's young people. The scheme is largely, but not exclusively, for young people who are at risk of turning to crime and anti-social behaviour.	Scottish Government

The following section provides SIMD crime rates from 2004 to 2010/11. This SIMD crime rate comprises of crimes reported by the police only. Crimes concentrated in retail centres or directed at businesses as opposed to neighbourhoods, such as shoplifting or non-domestic break-ins, are not included in these figures, neither are crimes that are nontrivial to locate, such as fraud and speeding offences. The SIMD website holds more information on the SIMD crime domain's inclusions and exclusion: http://simd.scotland.gov.uk/publication-2012/technical-notes/domains-and-indicators/crime-domain/.

Across data zones in Scotland SIMD crime rates vary between 33 reported crimes per 10,000 population to 15,916 per 10,000 population. The following analyses compare SIMD crime rates in 2004, 2007/8 and 2010/11.

8.1.1 1000 Communities

Figure 8-1 SIMD crime rate per 10,000 population



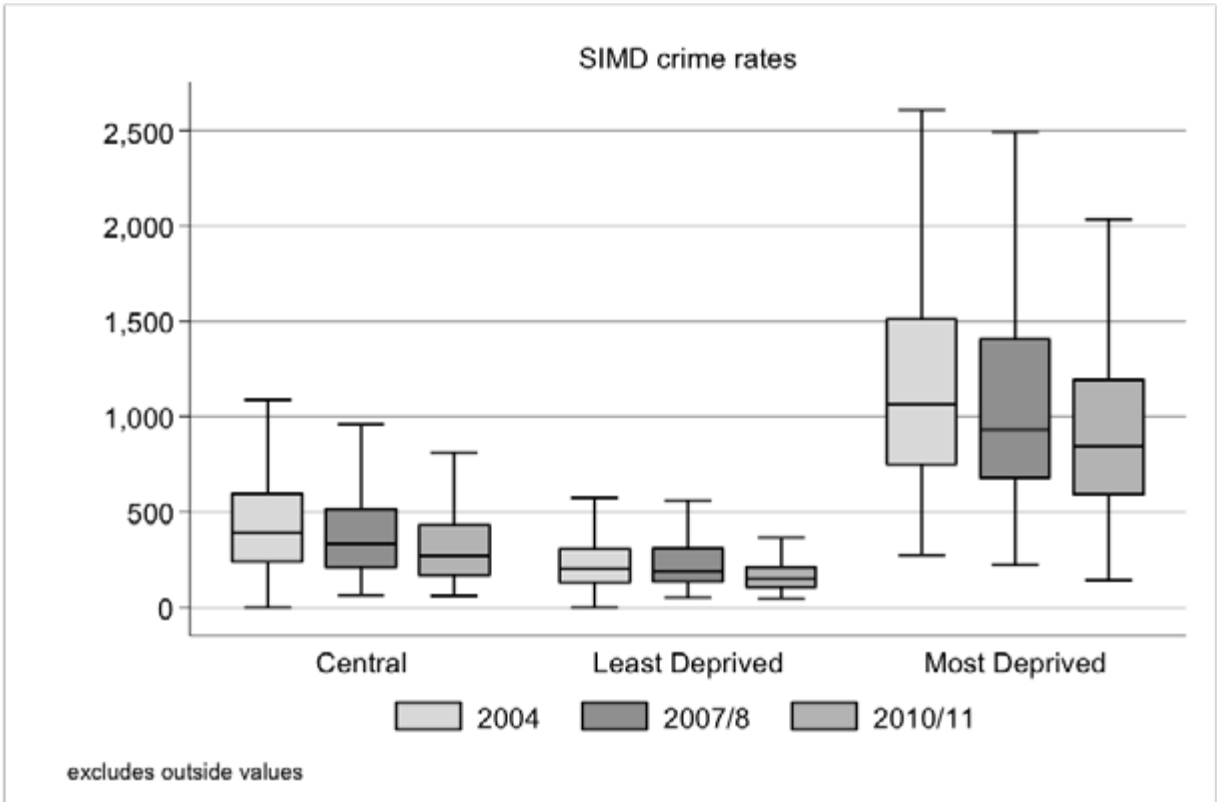
The bar chart in Figure 8-1 displays average SIMD crime rates for the most, central and least deprived cohorts in 1000 Communities. Crime rates within all three cohorts and across the rest of Scotland have decreased by over 20% since 2004 (see Table 8-2 below).

Table 8-2 SIMD crime rates per 10,000 population

	2004	2007/2008	2010/2011	Change (n)	Change (%)
Least deprived cohort	245.5	231.7	179.7	-65.8	-26.8%
Central cohort	481.2	450.0	373.7	-107.5	-22.3%
Most deprived cohort	1239.4	1126.6	987.0	-252.4	-20.4%
Rest of Scotland	594.4	554.0	460.7	-133.7	-22.5%

This highlights a significant decrease in reported crime rates among all deprivation levels across Scotland.

Figure 8-2 SIMD crime rates, boxplots



The box plots in Figure 8-2 display that not only have averages decreased between 2004 and 2010/11 but variation surrounding these averages within the most and least deprived cohorts has also decreased.

Table 8-3 Summary statistics, SIMD crime rates

SIMD Crime Rates											
Cohort	Year	Min	Max	Median	Mean	St.Dev.	CV	25%	75%	IQR	Skewness
Most Deprived	2004	276	12337	1065.5	1239.4	899.6	0.73	751	1512	761	6.384
	2007/8	222	9846	931.5	1126.6	787.8	0.70	677.5	1406	728.5	5.322
	2010/11	143	6943	845	987	657.8	0.67	592	1195	603	3.534

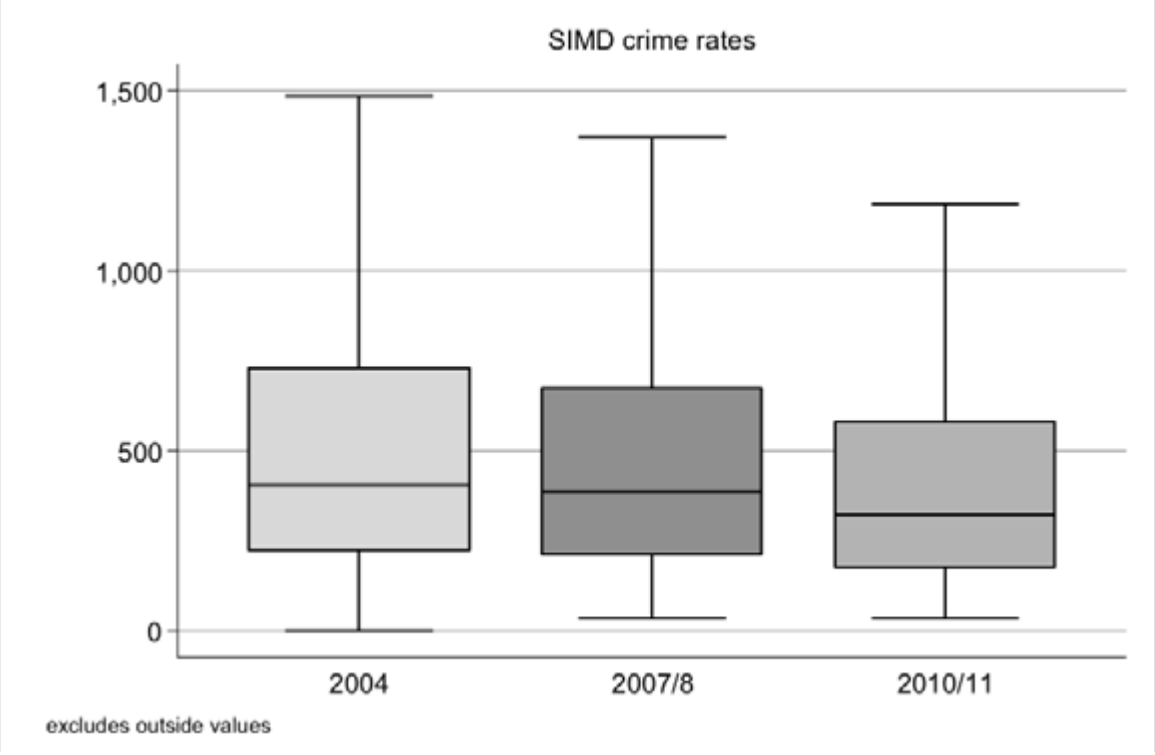
SIMD Crime Rates											
Cohort	Year	Min	Max	Median	Mean	St.Dev.	CV	25%	75%	IQR	Skewness
Central	2004	0	6335	391	481.2	483.9	1.01	241	597	356	6.662
	2007/8	66	6157	336	450	494.1	1.10	211	515	304	6.419
	2010/11	62	7529	271	373.7	492.2	1.32	168	434	266	10.4
Least Deprived	2004	0	1511	202	245.5	175.6	0.72	127	307	180	2.364
	2007/8	49	1048	190	231.7	144.5	0.62	133	311	178	1.869
	2010/11	46	1294	153	179.7	122.7	0.68	107	212	105	4.014

Table 8-3 shows summary statistics for the averages displayed in Table 8-2. IQRs decreased for all three cohorts, indicating less dispersion for the 50% central rates than in 2004. The standard deviations for the most and least deprived cohorts also decreased over this period, indicating that variation between all neighbourhoods in these cohorts decreased over time. The central cohort, on the other hand, has a very high level of variation that further increased between 2004 and 2010. SIMD crime rates, therefore, vary substantially between neighbourhoods in the central cohort.

8.1.2 Variation across Scotland

The following chart displays variation in SIMD crime rates across the whole of Scotland for 2004, 2007/8 and 2010/11.

Figure 8-3 - SIMD crime rate, per 10,000 of population, data zones across the whole of Scotland



Recorded crime rates decreased considerably across Scotland between 2004 and 2010/11. Variation between data zones also decreased over this period but rates between top and bottom deciles remained greatly divided in 2010/11 (see Table 8-4 below).

Table 8-4 SIMD recorded crime rate

SIMD recorded crime rate per 10,000 population	2004	2007/08	2010/11	Difference 2004 to 2010/2011	Difference as %
10% highest crime rate	1886	1740	1486	-400	-21.2%
10% lowest crime rate	87	94	83	-4	-4.5%
Scottish average	571	538	453	-118	-20.7%

Therefore, despite substantial concentration of crime rates, variation in Scotland and variation between cohorts has reduced. Across Scotland the difference between the 10% highest and lowest rates reduced by 22% between 2004 and 2010/11, and the gap between the least and most deprived cohorts in 1000 Communities reduced by nearly 19%. This is positive progress towards more equal distribution in Scotland but, as clearly demonstrated by the bar charts in Figure 8-1 and Figure 8-2, concentration of crime rates remains substantial. The highest 10% of crime rates in 2010/11 were still over 3 times higher than the Scottish average and nearly 18 times higher than the 10% lowest crime rates (1486 recorded crime rates per 10,000 population compared to just 83). Furthermore, within the cohort study, in 2010/11 the SIMD recorded crime rate in the most deprived cohort was still over double the Scottish average and 5.5 times the rate in the least deprived cohort.

Therefore, despite progress in crime reduction, crime remains highly concentrated in Scotland's most deprived neighbourhoods. Breaking this trend requires targeting the main underlying causes of such activity.

8.2 Social Influences and Crime

Recent community safety strategies aim to address the social influences on crime and disorder. These social determinants, as discussed within previous literature, include factors such as poverty, social exclusion, wage and income inequality, cultural and family background and education (Poverty.org, 2011; Buonanno, 2003). Poverty.org—a website for research for social and economic development worldwide — stresses the distinctive association between poverty and crime on a pure geographical level: where there are high poverty rates, there are also high crime rates.

Other researchers have attempted to find direct relationships between independent factors and crime, for example Hooghe et al. (2011) identified a strong positive relationship between unemployment figures and crime rates in Belgium. Unemployment figures yielded a stronger impact than that of income levels; Hooghe et al. (2011) suggest this may be due to the fact that those without a job are less mobile, and hence more vulnerable to be victimized within their own community.

8.2.1 Inequality and crime

There have been recent debates as to whether greater income inequality itself has a detrimental impact on crime rates. As introduced by Wilkinson and Pickett (2009), significant relationships have been identified between levels of income inequality and crime rates among developed countries. However, explanations for this relationship vary: Runciman's relative deprivation theory suggests that higher levels of income inequality increase feelings

of dispossession and unfairness which leads to higher crime, while Wilson and Daly argue that crime rates are largely influenced by status competition (Refrancos et al., 2013). They suggest that people on low incomes are most affected by income distribution; therefore high inequality can lead to increases in risky behaviour (such as crime) because low-risk prospects offer little return. Further explanations include socioeconomic position, social status, disrespect, social support, anxiety, trust, and community cohesion (Refrancos et al., 2013). Arguably these factors influence social interactions and behaviours, and ultimately lower inhibitions to commit crime (Refrancos et al., 2013).

Further studies proposed by Wilkinson and Pickett alongside Refrancos and Power (2013) review the relationship between income inequality and crime rates over time. The results indicate that property crime, as well as specific measures of violent crime (such as homicide and robbery), are associated with income inequality over time. Refrancos et al. (2013) call for continuing research in this area and suggest it be considered when designing and implementing crime reduction strategies.

9. Relationships Between Inequalities

The following analyses consider the pattern of inequalities between neighbourhoods across Scotland, addressing how different variables relate to one another. Correlation analysis[29] was used to determine if different domains of inequality, for example levels of income deprivation, educational attainment, hospital admissions and crime rates, have significant connections to one another. All variables used within this study had statistically significant correlations[30], indicating that they are all associated on some level. These correlation coefficients are presented in Table 9-1 below. A coefficient of 1 indicates a perfect relationship while a coefficient below 0.1 is negligible (for more details see section 11.8 Correlation Analysis appended to this report).

Table 9-1 Spearman Rank Correlation Coefficient

Spearman rho	Income Deprivation 2011	Employment Deprivation 2011	JSA 2011	S4 Tariff 2011/12	S5 Tariff 2011/12	SIMD crime 2010/11	Emergency admissions all age 2011	Emergency admissions 65 plus 2011
Employment Deprivation, 2011	0.96*	…						
JSA 2011 S4 Tariff 2011/12	0.92	0.93	…					
	-0.6	-0.59	-0.56	…				
S5 Tariff 2011/12	-0.61	-0.6	-0.56	-0.53	…			
SIMD Crime 2010/11	0.68	0.68	0.69	-0.48	-0.43	…		
Emergency Admissions, all age, 2011	0.71	0.69	0.61	-0.37	-0.38	0.48	…	
Emergency Admissions, 65 plus, 2011	0.51	0.45	0.41	-0.24	-0.26	0.36	0.73	…
Percentage leavers in positive destination, 2011/12	-0.32	-0.31	-0.31	0.27	0.33	-0.23	-0.19	-0.14

* Both income deprivation and employment deprivation are calculated based on a variety of benefits, including JSA. Income Deprivation, Economic Deprivation and JSA indicators are, therefore, derived from some of the same data.

Some indicators correlate stronger than others, for example there is a strong positive relationship between SIMD crime rates and income and employment related indicators (0.68) while there is a weak negative association between the percentage of school leavers in positive destinations and emergency hospital admission rates (-0.19). Negative associations indicate that as one variable increases the other decreases.

29 Spearman rank correlation coefficient

30 $p<0.01$

This analysis identifies association between variables but it does not control for other contributing factors. For example, the relationship between emergency hospital admissions and attainment can be largely accounted for by levels of income deprivation as opposed to a direct link between educational attainment and hospital admissions. The following section focuses on linear bivariate and multiple regression analyses between variables across neighbourhoods in Scotland. This process evaluates the relationships and influences different inequality indicators have upon each other on a neighbourhood level. The higher the coefficient of determination (R^2) is, the stronger the influence upon the dependent variable.

9.1 Health Inequalities

All the variables listed in Table 9-2 correlate with rates of emergency hospital admissions to some extent. The strongest correlation coefficient identified was between emergency hospital admission rates and levels of income deprivation.

Table 9-2 Spearman rho, emergency hospital admission rates per 100,000 people

	Emergency Hospital Admission rates, all ages, 2011	Emergency Hospital Admission rates, ages 65 plus, 2011
% Pensionable Population, 2011	0.28	N/A
% Population aged 75 years and over	0.37	0.18
% Population aged 80 years and over	0.34	0.18
% Population aged 85 years and over	0.28	0.15
Hospital admissions due to alcohol ratio, 2007-10	0.62	0.46
Hospital admissions due to drugs ratio, 2007-10	0.46	0.31
% Income Deprivation, 2011	0.71	0.51
% Council tax band A-C, 2011	0.59	0.4
% Social rented housing, 2001	0.65	0.45
% Low birth weight, 2010-12	0.16	0.12
% First time mothers aged 19 years and below, 2009-11	0.37	0.21
% First time mothers aged 35 years and over, 2009-11	-0.31	-0.18
Urban Rural Classification, 2011-12	-0.12	-0.23

Further analyses were required to control for association of variation between the variables listed above. Multiple regression analyses were performed to detect the explanation of

variance between emergency hospital admission rates and selected variables, whilst also controlling for other factors.

Combined, the five independent variables in the model (the percentage of pensionable aged population; ratio of hospital admissions due to alcohol; the percentage of council tax bands A-C; the percentage of social rented households, and percentage of population who are income deprived), explain approximately 62.5% of variance in emergency hospital admission rates across data zones in Scotland ($R^2 = 0.625$, $F (6, 6498) = 1804.9$, $p = 0.00$). This relationship relies strongest on levels of income deprivation ("$\beta = 0.461, p = 0.00$"), proportion of pensionable aged population ("$\beta = 0.383, p = 0.00$") and the ratio of hospital admissions due to alcohol ("$\beta = 0.218, p = 0.00$"). All five variables were significant in the model, therefore indicating that each variable associates with emergency hospital admission rates to some degree, independently from the other variables in the model. The proportion of council tax bands A-C and the proportion of social rented households — though significant — had only a marginal impact, reflecting their close reliance on levels of income deprivation. Calculating the same model with percentage of population aged 75 years instead of percentage of pensionable age had very little impact on the result.

These variables have less influence on emergency hospital admission rates for populations aged 65 years and over. Combined, variables explain approximately 27% of the variance across data zones in Scotland. Correspondingly this model relies strongest on levels of income deprivation ("$\beta = 0.39, p = 0.00$"), followed by the percentage of population who are aged 80 years and over ("$\beta = 0.16, p = 0.00$") and hospital admissions due to alcohol ratios ("$\beta = 0.16, p = 0.00$"). Percentage of social rented housing is not significant in the model, indicating that it does not associate with emergency hospital admission rates for older populations independently from the other variables in the model. Percentage of council tax bands A-C and hospital admissions due to drug misuse ratios, though significant, also have very little impact. This is largely because council tax bands correlate strongly with income deprivation levels, as do the ratios of hospital admissions due to drug misuse with ratios of hospital admissions due to alcohol.

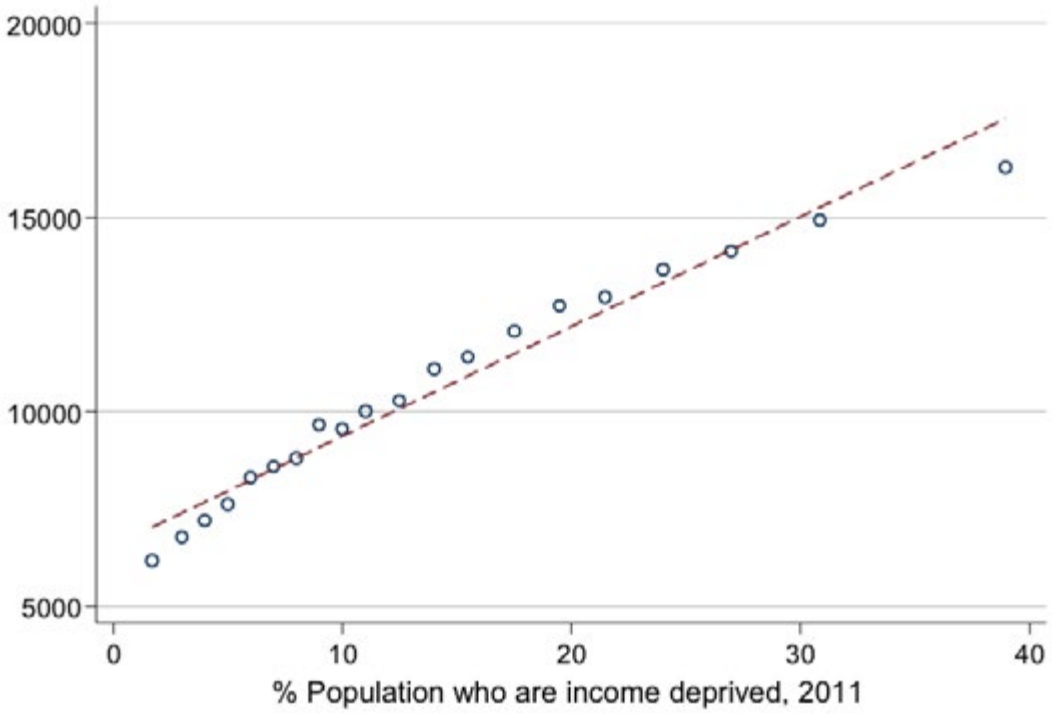
9.1.1 Health inequalities, age and income

As indicated in the models above, regression analyses with population demographics and income deprivation suggest that across Scotland as a whole, the level of income deprivation in a neighbourhood has a higher influence on emergency hospital admission rates than age demographics.

The scatterplot in Figure 9-1 displays emergency hospital admission rates by levels of income deprivation across data zones in Scotland. The data zones have been binned into 20 groups to illustrate the association more clearly.

The percentage of population who are income deprived explains over 45% of variance for emergency hospital admission rates (all ages) for data zones across the whole of Scotland ($R^2 = 0.459$, $F (1, 6499) = 5525.13$, $p = 0.00$). By including the percentage of pensionable aged population into the model, a further 14% of variance is explained ($R^2 = 0.597$, $F (2, 6498) = 4810.43$, $p = 0.00$), both levels of income deprivation ("$\beta = 0.717, p = 0.00$)" and the percentage of population who are pensionable age ("$\beta = 0.373, p = 0.00$)" significantly predict emergency hospital rates but the relationship with income deprivation is stronger.

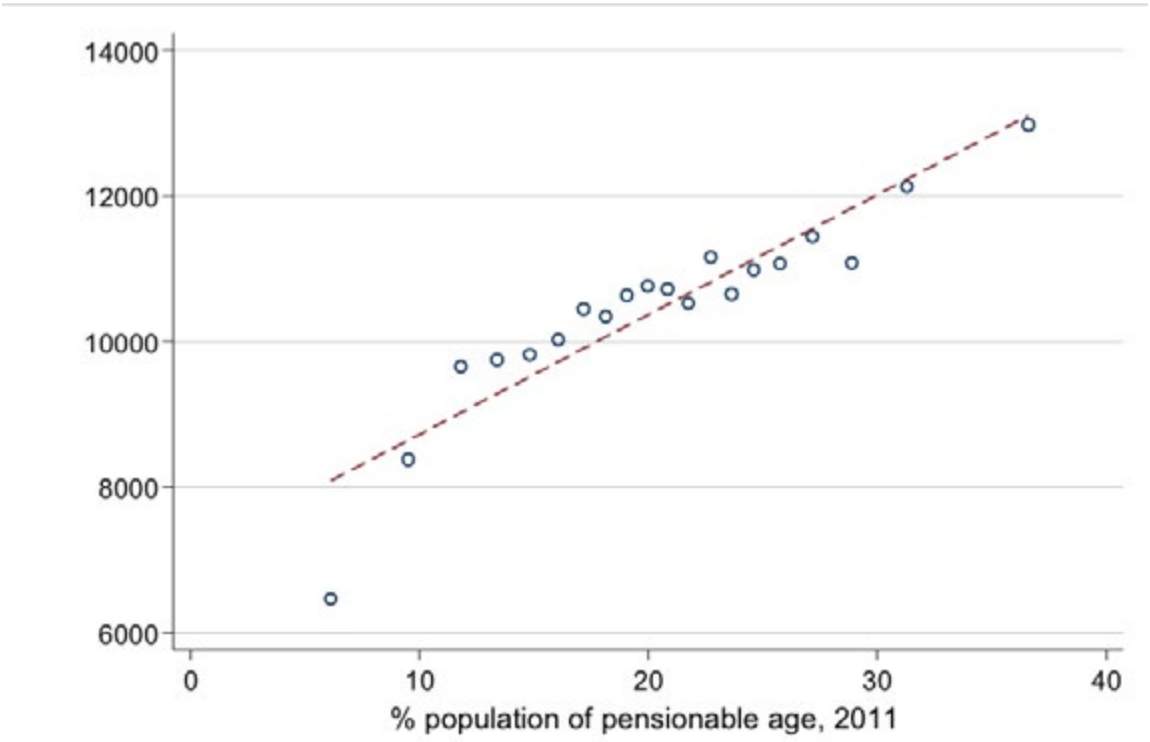
Figure 9-1 Emergency hospital admission rates by income deprivation, Scottish data zones



Within more extreme cases these relationships become stronger. Regression analysis for the least and most deprived cohorts within this study (660 data zones) indicates that income deprivation alone explains nearly 70% of variance for emergency hospital admissions, all ages, (R^2 = 0.67, F (1, 656) = 1321.87, p = 0.00). By including the percentage of pensionable population an extra 10% of variance can be explained (R^2 = 0.76) but again this relies more heavily on levels of income deprivation ("β = 0.91,p = 0.00) " as opposed to percentage of pensionable population ("β = 0.32,p = 0.00)" .

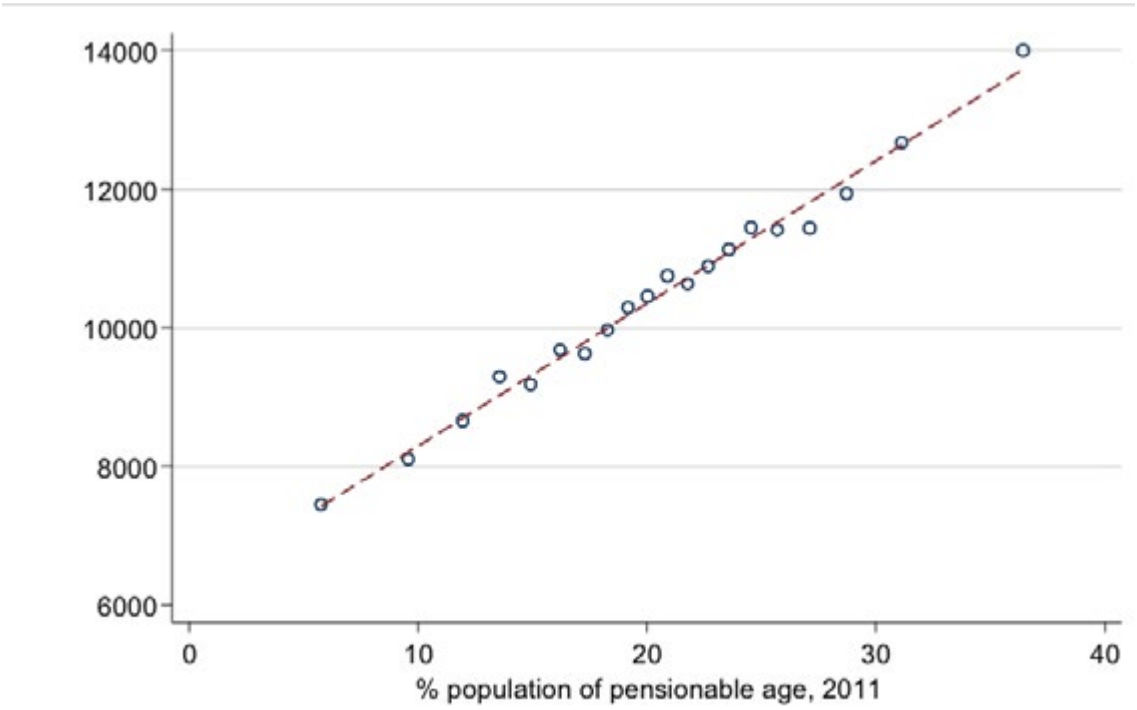
For comparison, the scatterplot in Figure 9-2 presents the association between emergency hospital admission rates and the proportion of population who are of pensionable age.

Figure 9-2 Emergency hospital admission rates by % population of pensionable age, Scottish data zones



This relationship is essentially linear if it is first controlled for levels of income deprivation, as displayed in Figure 9-3 below.

Figure 9-3 Emergency hospital admission rates by percentage of population of pensionable age, controlled by levels of income deprivation, Scottish data zones



Therefore, if levels of income deprivation are accounted for, the proportion of population of pensionable age has more impact on emergency hospital admission rates.

Corresponding to this, the percentage of older population generally has a higher influence in neighbourhoods experiencing less deprivation. The table below displays the percentage of variation explained by the proportion of pensionable aged population for emergency hospital admission rates for each decile in the SIMD 2012 rank.

Table 9-3 Percentage of variation in emergency hospital admission rates, all ages, explained by Percentage of Pensionable Population

SIMD 2012 Deciles Lowest to highest	Percentage of variation in emergency hospital admission rates explained by Percentage of Pensionable Population
1	23% (R^2=0.227, F (1, 649)=191.29, p=0.00)
2	31% (R^2=0.308, F (1, 648)=290.2, p=0.00)
3	29% (R^2=0.294, F (1, 649)=271.98, p=0.00)
4	26% (R^2=0.26, F (1, 648)=229, p=0.00)
5	22% (R^2=0.225, F (1, 649)=189.18, p=0.00)
6	21% (R^2=0.209, F (1, 646)=171.48, p=0.00)
7	20% (R^2=0.196, F (1, 649)=159.08, p=0.00)
8	37% (R^2=0.375, F (1, 647)=389.12, p=0.00)
9	38% (R^2=0.379, F (1, 649)=397.43, p=0.00)
10	44% (R^2=0.435, F (1, 648)=500.85, p=0.00)

Within areas experiencing less multiple deprivation (deciles 8, 9 and 10) the proportion of pensionable population has a higher influence on emergency hospital admission rates than areas experiencing high levels of multiple deprivation (44% for the least deprived 10%, compared to 23% for the most deprived 10%). Considering the previous analysis, admission rates for neighbourhoods experiencing high levels of multiple deprivation may be highly influenced by other contributing factors – particularly income and employment related factors.

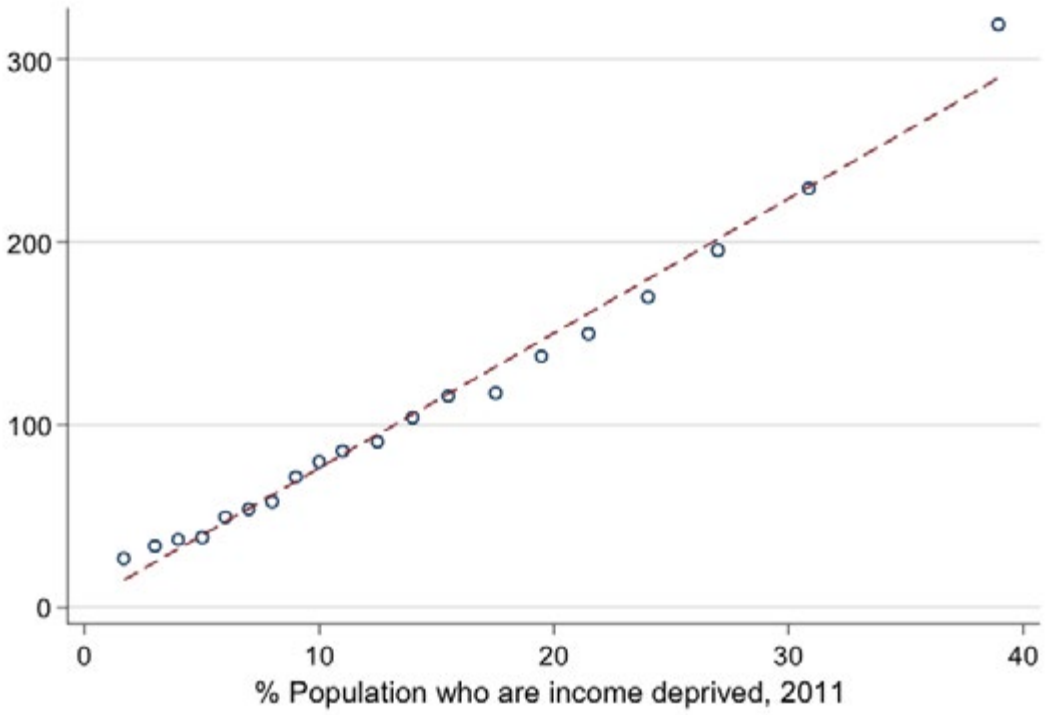
Planned hospital admissions generally have much lower relationships with income and employment deprivation than emergency hospital admission rates. Across Scotland as a whole, population demographics have a larger influence on planned admission rates than income or employment deprivation. The percentage of population who are pensionable age explains 10% of variance of planned hospital admission rates (R^2 = 0.1, F (1, 6500) = 746.95, p = 0.00)[31].

9.1.2 Hospital stays due to alcohol and drug use

The rates of hospital stays due to alcohol and drug use also have a strong and significant positive correlation with the percentage of income deprivation within an area.

31 Percentage of income deprivation only explains 5% of variance (R^2 = 0.05, F (1, 6499) = 347.22, p = 0.00)

Figure 9-4 - Hospital admission rates due to alcohol by Income deprivation



Income deprivation levels explain 51% of the variance for hospital stays due to alcohol across the whole of Scotland (R^2 = 0.51, F (1, 6499) = 6694.98, p = 0.00). This explanation rises to nearly 65% for the most and least deprived cohorts within this study (R^2 = 0.646, F (1, 656) = 1197.14, p = 0.00). Income deprivation levels explain 34% of variance for hospital stays due to drug use, across the whole of Scotland (R^2 = 0.34, F (1, 6499) = 3346.76, p = 0.00). This rises to over 50% for the most and least deprived cohort in this study (R^2 = 0.52, F (1, 656) = 718.56, p = 0.00)[32].

9.1.3 Life expectancy, intermediate geographies

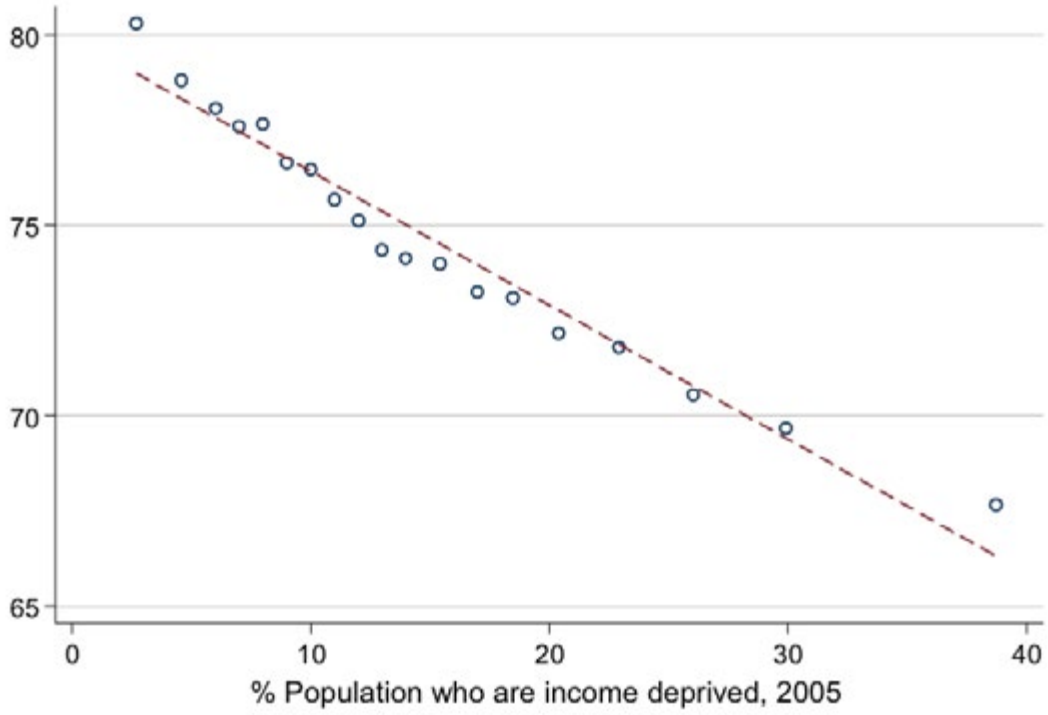
Further analysis was conducted using intermediate geography zones to consider association between emergency hospital admission rates, levels of income deprivation and life expectancy. Correlation analysis illustrates a strong significant negative association between life expectancy and levels of income deprivation across intermediate geographies in Scotland (Spearman's rho: -0.84 p<0.01).

The scatterplot in Figure 9-5 displays average male life expectancy for intermediate geographies across Scotland, sorted by levels of income deprivation. Levels of income deprivation explain approximately 69% of variation in life expectancy[33]. For every unit increase in levels of income deprivation, the average change in the mean of life expectancy decreases by approximately 0.35 years.

32 Including benefit dependency indicators into the model did not increase the explanation of variation.

33 R^2 = 0.69, F (1, 1208) = 2709.66, p = 0.00

Figure 9-5 Male life expectancy by level of income deprivation



The relationship between life expectancy and emergency hospital admission rates in Scotland was also considered. Emergency hospital admission rates associate with both male[34] and female[35] life expectancy and levels of income deprivation, independently of each other. The strongest association, however, is with levels of income deprivation ("β =0.5,p=0.00). Combined these three variables explain approximately 61% of variation in emergency hospital admission rates on an intermediate geography level[36].

This suggests that levels of income deprivation are a stronger predictor of emergency hospital admission rates than life expectancies are. This coincides with the previous statement that although emergency hospital admissions relate to wellbeing, there are patterns in admission rates that are unexplained by differences in health.

The binned scatterplot in Figure 9-6 displays emergency hospital admission rates by average male life expectancies across intermediate geographies in Scotland.

There is a significant association between emergency admissions and male life expectancy within intermediate geographies but this association is also significantly influenced by levels of income deprivation within these areas.

34 ("β =-0.23,p=0.00)"

35 ("β = -0.11,p=0.00)"

36 R2 = 0.61, F (3, 1193) = 617.9, p = 0.00

Figure 9-6 Emergency hospital admission rates by life expectancy, 2005-2009, intermediate geographies

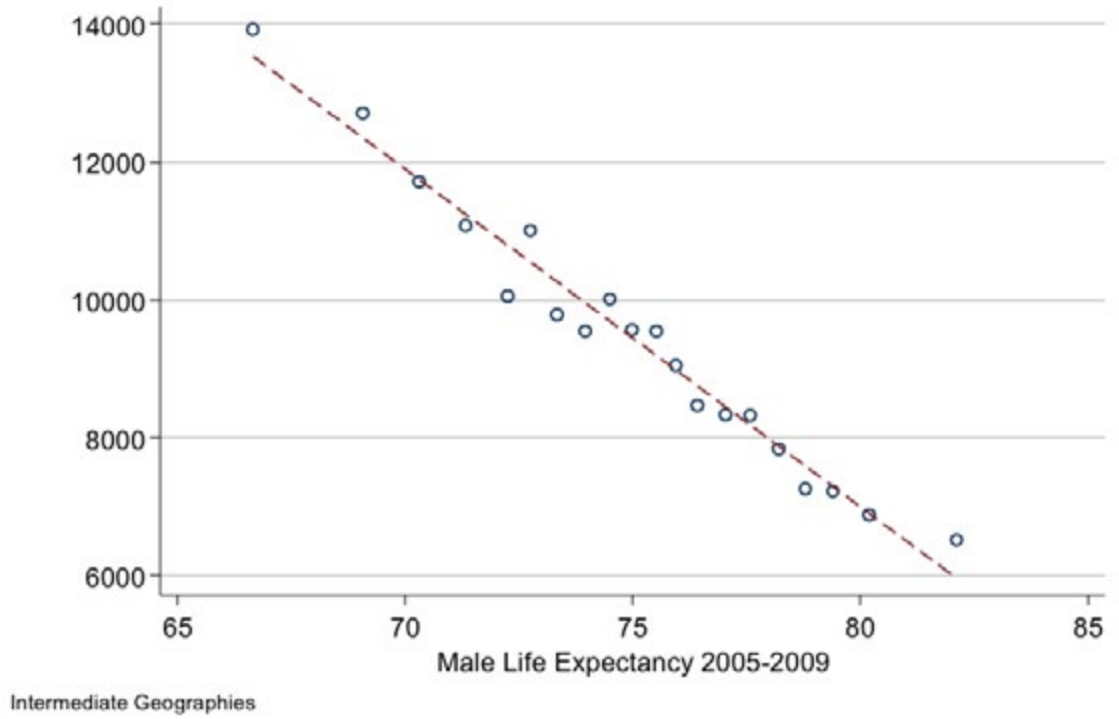
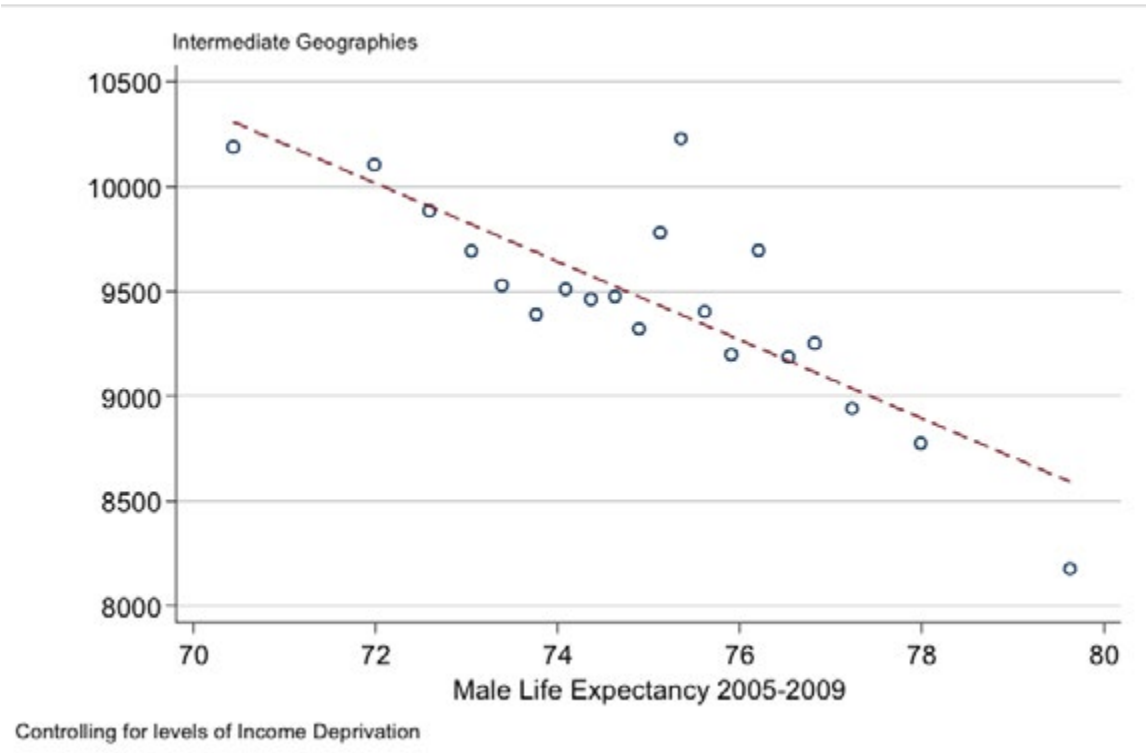


Figure 9-7 Emergency admissions by male life expectancy, controlling for levels of income deprivation, intermediate geographies



Once controlled for levels of income deprivation, as displayed in Figure 9 7 above, the association between emergency admissions to hospital and male life expectancy is not as significant. This is likely due to the strong connection between income deprivation and health.

9.2 Education as the Dependent Variable

All the variables listed in the table below associate with average S4 and S5 tariff scores, and the proportion of school leavers in positive destinations across data zones in Scotland. The strongest correlation is between Secondary attendance rates and average S4 and S5 tariff scores, closely followed by levels of income deprivation.

Table 9-4 Spearman's rank correlation coefficient, education

p<0.05	Average S4 tariff, 2011/12	Average S5 tariff 2011/12	% Positive Destinations 2011/12
% Positive Destinations 2011-12	0.28	0.33	-
% Leavers Further education 2011-12	-0.26	-0.25	-0.07
% Leavers Higher education 2011-12	0.46	0.5	0.33
% Leavers Training 2011-12	-0.3	-0.32	-0.25
% Leavers Unemployed seeking employment 2011-12	-0.05	-0.08	-0.25
% Income Deprivation 2011	-0.61	-0.62	-0.33
% Council tax bands A-C 2011	-0.6	-0.61	-0.3
% Social Rented Housing 2001	-0.59	-0.61	-0.34
% First mums aged 19 & under 2009-11	-0.36	-0.37	-0.22
% First mums aged 35 & over 2009-11	0.31	0.3	0.15
Primary Attendance Rate, 2010-11	0.56	0.56	0.3
Secondary Attendance Rate 2010-11	0.62	0.62	0.34
Urban/Rural Classification code 2011/12	0.12	0.13	0.07

Further analyses were conducted to evaluate the impact these variables have on average S4 attainment while controlling for other contributing variables.

Multiple regression analyses with average S4 tariff scores as the dependent variable indicate that when income deprivation is present in the model alongside proportion of council tax bands A-C and proportion of social rented housing, it is not significant. This is because these three variables are very closely related. If these two variables are removed from the model income deprivation becomes significant.

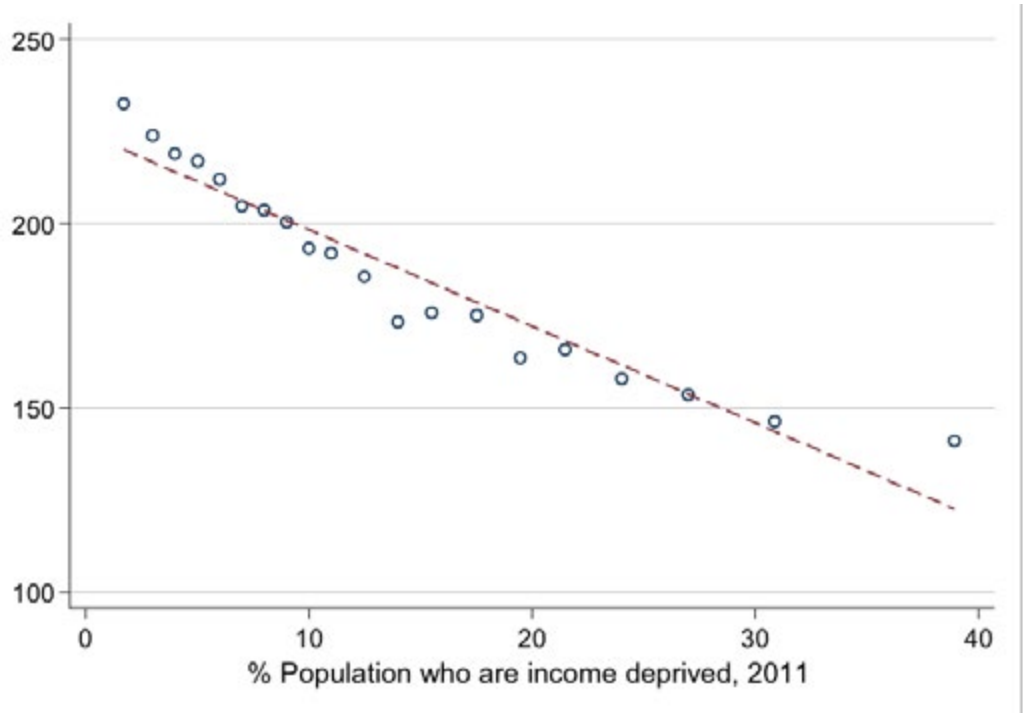
Combined levels of income deprivation, primary attendance, secondary attendance and percentage of school leavers in higher education explains just over 40% of the variance for average S4 tariff scores across data zones in Scotland ($R^2 = 0.41$, $F(4, 6429) = 1105.64$, $p = 0.00$). Although all four independent variables are significant in the model and each, therefore, have an association with S4 attainment whilst controlling for other variables, Secondary Attendance Rates ("β = 0.3,p = 0.00)" and levels of income deprivation ("β = -0.21,p = 0.00)" have the strongest influence.

Similar results emerge with average S5 tariff scores as the dependent variable in the model. Correspondingly, levels of income deprivation are insignificant alongside the percentage of social rented housing and percentage of council tax bands A-C.

If these two variables are removed from the model, approximately 43% of the variance in average S5 tariff scores is explained. This relationship relies most prominently on Secondary attendance rates ("β = 0.25,p = 0.00"), followed by levels of income deprivation ("β = -0.22,p = 0.00") and the percentage of initial leavers going on to higher education ("β = 0.21,p = 0.00"). Using proportions of social rented housing and council tax bands instead of levels of income deprivation has very little impact on the overall model.

Further study suggests that the relationship between education and income has decreased on some level since 2002/3. In 2002/3 regression analysis predicted that levels of income deprivation explained over 40% of variance for average S4 tariff scores ($R^2 = 0.414$, $F (1, 6383) = 4504.3$, $p = 0.00$). This rose 8% by including council tax housing brackets into the model ($R^2 = 0.493$, $F (3, 6381) = 2073.47$, $p = 0.00$)[37] (employment and health indicators made very little difference to the equation). These relationships were stronger for more extreme cases: for the least and most deprived cohorts in this study, income deprivation explained about 75% of average S4 tariff scores in 2002/3 ($R^2 = 0.749$, $F (1, 610) = 1819.76$, $p = 0.00$).

Figure 9-8 Average S4 tariff score by income deprivation, Scottish data zones



37 Income Deprivation ("β = -0.385,p=0.00)" , % Council tax A-C ("β = -0.276,p=0.00)" , % Council tax F-H ("β = 0.132,p=0.00)"

By 2011/12, income deprivation explained approximately 30% of variance for average S4 tariff scores (R^2 =0.304, F (1, 6434)=2812.71, p=0.00). By including council tax bands into the equation a further 6% can be explained (R^2 =0.361, F (3, 6432)=1212.3, p=0.00)[38]. These again are stronger for more extreme cases: income deprivation 2011 explains nearly 60% of average S4 tariff scores for the most and least deprived cohorts in this study (R^2 = 0.57, F (1, 645)=845.85, p=0.00), a further 4% can be explained by including council tax brackets (R^2 = 0.61, F (3, 643)=339.15, p=0.00)[39].

Table 9-5 Average S4 tariff scores, percentage of variance explained by income deprivation, 2002 to 2010

	2002/03	2005/6	2007/8	2008/9	2009/10	2010/11	2011/12
Neighbourhood Level across Scotland	41%	37%	39%	38%	35%	33%	30%
Most and Least deprived cohort	75%	60%	67%	68%	60%	59%	57%

The relationship between income deprivation and S4 attainment has decreased to some extent, but this is not the case for S5 attainment. In 2011, income deprivation explained approximately 32% of variance for S5 tariff scores (R^2 = 0.32, F (1, 6431)=2979.72, p=0.00)[40]. Models including council tax bands indicate a similar result.

Average tariff scores on a neighbourhood level have a relatively low effect on the percentage of positive leaver destinations within these areas. Regression analysis was performed with positive destinations 2011/12 as the dependent variable and average S4 tariff scores, average S5 tariff scores and percentage of income deprivation (2011) as the independent variables. The results predicted 12% of variance (R^2 =0.12, F (3, 6337)=288.98, p=0.00), weighting heaviest on average S5 tariff scores ("β = 0.17,p=0.00) followed by income deprivation (β = -0.163,p=0.00)" and average S4 tariffs ("β = 0.077,p=0.00).

SIMD crime rate as the dependent variable

All the variables listed in the table below correlate significantly (p<0.05) with SIMD recorded crime rates. The strongest associations being with income and employment related indicators.

Variable	SIMD Crime Rates, 2010/11
% Income Deprivation, 2011	0.68
% Employment Deprivation, 2011	0.68
% JSA. 2011	0.69

38 Percentage of Income Deprivation ("β = -0.29,p = 0.00)" , percentage of Council Tax bands A-C ("β = -0.26,p=0.00)" , percentage of Council Tax bands F-H ("β = 0.12,p=0.00)"

39 Percentage of Income Deprivation ("β = -0.28,p=0.00)" , percentage of Council Tax bands A-C ("β = -0.39,p=0.00)" , percentage of Council Tax bands F-H ("β = 0.14,p=0.001)"

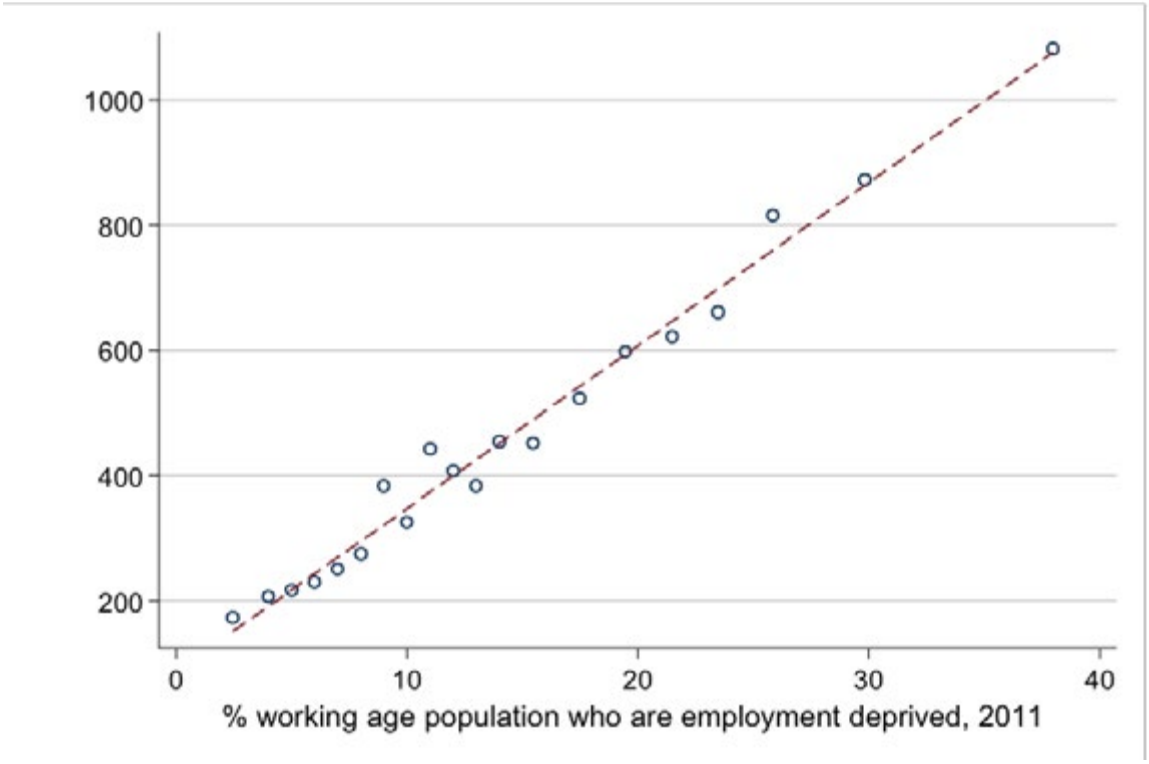
40 similar in 2004: R^2 = 0.33, F(1, 6415)=3236.75, p=0.00)

Variable	SIMD Crime Rates, 2010/11
% Initial school leavers unemployed (not seeking employment), 2011/12	0.05
% Initial school leavers unemployed (seeking employment), 2011/12	0.18
% Social Rented Housing, 2001	0.59
% population prescribed drugs for anxiety, depression or psychosis, 2007	0.37
% Council tax bands A-C, 2011	0.57
Urban Rural Classification 2011/12	-0.27
Hospital admissions due to alcohol, ratio, 2007-10	0.63
Hospital admissions due to drug misuse, ratio, 2007-10	0.56

Further analysis was conducted to calculate levels of association while controlling for other contributing variables. Multiple regression analysis was conducted with levels of income deprivation; percentage of social housing; percentage of council tax bands A-C; Urban Rural classification; hospital admissions due to alcohol ratios, and hospital admissions due to drug misuse ratios as the independent (predictor) variables.

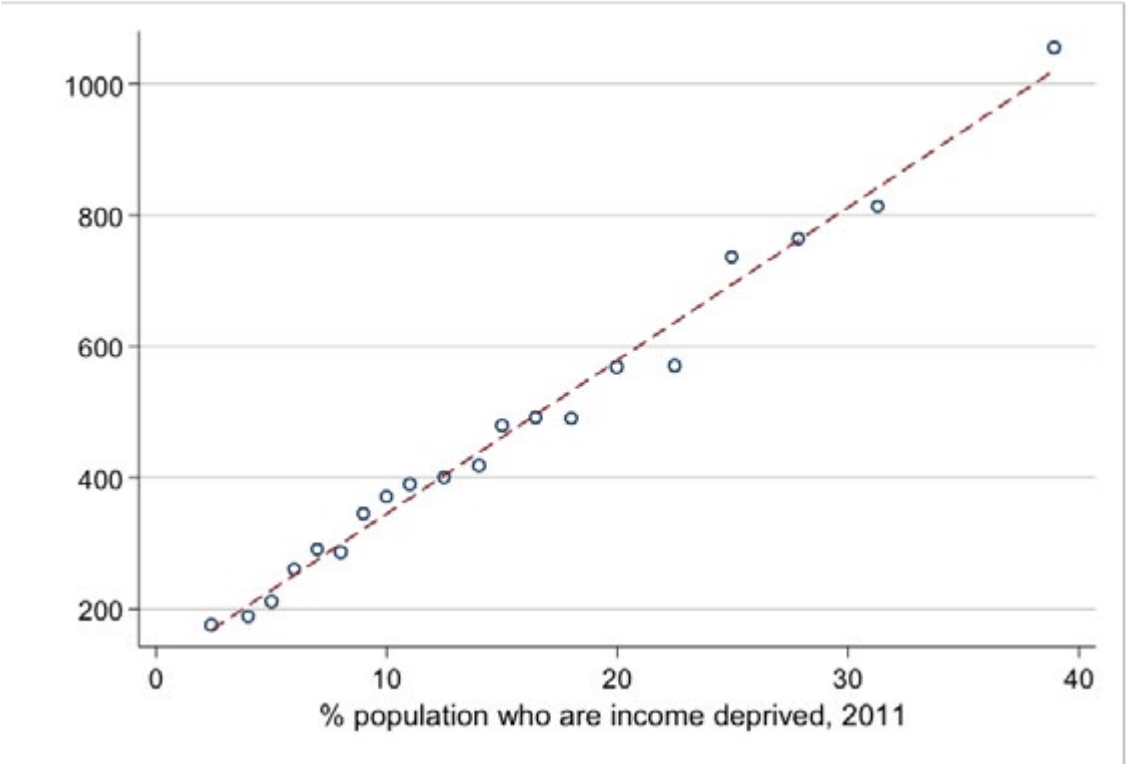
All six variables were significant in the model, therefore, each one associates on some level with SIMD crime rates independently from the other variables in the model. Combined, these variables explain approximately 28% of variance in SIMD crime rates, relying most prominently on levels of income deprivation (“β = 0.27,p = 0.00”) and hospital admissions due to alcohol ratios (“β = 0.23,p = 0.00”). Corresponding to previous analyses, the proportions of social rented housing and council tax bands A-C had very little impact in the model whilst alongside levels of income deprivation. Replacing employment deprivation with income deprivation made very little difference to the model.

Figure 9-9 SIMD crime rate by employment deprivation, Scottish data zones



The percentage of employment deprivation on a neighbourhood level explains 22% of variance for SIMD crime rates, 2012 (R^2 = 0.218, F (1, 5943) = 1658.19, p = 0.00). For the most and least deprived cohorts this rises to 45% of variance (R^2 = 0.447, F (1, 586) = 475.34, p = 0.00). Percentage of population claiming JSA for the most and least deprived cohorts explains 48% of the variance for SIMD crime rates, on a local level (R^2 =0.48, F (1, 586)=544.56, p=0.00) – 23% for the whole of Scotland (R^2 = 0.227, F (1, 5945) = 1753.11, p = 0.00).

Figure 9-10 SIMD crime rate by income deprivation, Scottish data zones



Income deprivation explains approximately 20% of variance for SIMD crime rates 2010/11 (R^2 = 0.20, F (1, 5944) = 1492.98, p = 0.00).

9.3 Relationship Between Life Outcomes: Summary

The results from the regression analyses highlight the extent to which economic and employment related indicators explain other life outcomes in Scotland. Despite variation, economic and employment related variables continuously yielded either the highest or second highest explanations of variance whether the dependent variable was educational attainment, emergency hospital admission rates, positive future destinations for school leavers, or SIMD crime rates. Educational attainment was the only domain where levels of income or employment deprivation did not have the strongest impact in the model. Secondary attendance rates also have a strong influence on educational attainment. This may be the direct consequence of pupils missing out in education and learning but may also, on some level, indicate a cultural aspect. In speculation, pupils with low attendance rates may also be less committed or determined to perform well in school. This questions how educational services can better engage with such pupils, their families, and their communities. This engagement requires both communicating the benefits and value of education as well as listening to what they think an education service should provide. This includes understanding how schools could better prioritise the needs of pupils from all

backgrounds and academic levels.

Despite a significant relationship between levels of income deprivation and educational attainment ($R^2 = 0.304$, $F (1, 6434) = 2812.71$, $p = 0.00$), there is evidence to suggest that among neighbourhoods income deprivation does not have as strong an impact on S4 attainment as previously. In 2002 levels of income deprivation among neighbourhoods in Scotland explained over 40% of variance for average S4 tariff scores ($R^2 = 0.414$, $F (1, 6383) = 4504.3$, $p = 0.00$), in 2011/12 this reduced to 30%. This is not reciprocated among S5 results and there is still a significantly strong relationship between S4 attainment and income deprivation, nonetheless, these results imply progress in the right direction.

On a neighbourhood level, the percentage of population who are income deprived explains a higher percentage of variance for emergency hospital admission rates than age demographics. This implies that across neighbourhoods in Scotland, income deprivation has a higher impact on emergency hospital admission rates than age demographics do. It should be recognised that this calculation was measured across neighbourhoods in Scotland, not individual households; therefore possible reasons for this could include higher concentrations of people who are income deprived than those who are pensionable age. Nonetheless, that does not undermine the significance of this result. Across neighbourhoods in Scotland the level of income deprivation and unemployment has a detrimental impact on the rate of emergency hospital admissions, the level of educational attainment in S4 and S5 and the number of recorded crimes (SIMD) in that area.

Regression analyses for SIMD crime rates highlighted a slightly stronger relationship (2-3 percentage points) between SIMD crime rates and employment related indicators than between SIMD crime rates and economic variables. Although these indicators are very closely related, this implies there could be a specific connection between unemployment and crime levels among neighbourhoods. This has been discussed in previous studies: Hooghe et al. (2011) identified a strong and significant relationship between unemployment figures and crime rates in Belgium, where unemployment figures showed a stronger impact than that of income levels. Hooghe et al. (2011) attributed this to those without a job being less mobile, and therefore, more vulnerable to be victimised within their own community.

Most of the analyses presented above, except for that regarding life expectancy, were performed on a data zone level across Scotland but similar relationships exist among intermediate geographies and multi-member wards. Although these relationships are still significant between more aggregated geographies, the scale of variation is more extreme between data zones.

10. 1000 Communities, Summary and Conclusions

Overall, in terms of multiple deprivation, there was limited change for the three cohorts selected within *1000 Communities* between 2002 and 2012. Over 80% of these 990 data zones remain in their original 15% of rankings (SIMD 2004 to SIMD 2012), over 90% for the most deprived cohort and over 95% for the least deprived cohort. The central cohort experienced the most change in SIMD ranking over this period, but data zones moved in both directions, by relatively equal distances.

Across data zones in Scotland, all variables used within this study correlated significantly with one another, highlighting the relationship between domains of inequality. The same areas experiencing a given type of deprivation tend to often be disadvantaged in other respects. Table 10-1 presents the percentage difference between average values and the Scottish average, for each of the three cohorts in this study. The most deprived cohort represents the 330 most deprived neighbourhoods from SIMD 2004, most recent data sets indicate that these neighbourhoods continue to perform well below the Scottish average in educational attainment, have considerably higher emergency hospital admission rates and are over double the Scottish average for income deprivation levels and SIMD crime rates. The central cohort remains relatively in line with the Scottish average regarding tariff scores and emergency hospital admissions, and has lower levels of both income deprivation and recorded crime. The least deprived cohort continues to perform well above the Scottish average in all the indicators presented in this study.

Table 10-1 1000 Communities, percentage difference from national average

	Most Deprived Cohort	Central Cohort	Least Deprived Cohort
Average S4 tariff score, 2012/13	22% below	2.6% above	24% above
Average S5 tariff score, 2012/13	28% below	<1% below	31% above
Emergency Hospital Admission rate, all ages, 2012	49% above	<1% below	33% below
Emergency Hospital Admission rate, ages 65 plus, 2012	53% above	2% below	27% below
% Population who are income deprived, 2011	168% above	11.5% below	79% below
SIMD crime rate per 10,000 population, 2010/11	118% above	17.5% below	60% below

It is important to recognise that, as with any average, variation exists both within cohorts and data zones themselves. For the majority of indicators analysed within this study, variation within cohorts was not as substantial as the variation between cohorts. Although for some

indicators, such as Average S5 tariff scores and Emergency Hospital Admission Rates, ages 65 plus, interquartile ranges overlapped slightly between cohorts. For example, in 2012/13 75% of data zones within the most deprived cohort had an average S5 tariff score lower than 302, whereas within the central cohort 75% of data zones had an average score higher than 293. For other indicators, such as levels of income deprivation and average S4 tariff scores, interquartile ranges do not overlap between any cohorts. Furthermore, interquartile ranges do not overlap between the most and least deprived cohorts for any of the indicators tested in this study. This thus exemplifies the sizeable difference in averages between cohorts for the majority of data zones presented.

The strongest improvements across cohorts were experienced in educational attainment and SIMD crime rates. Educational attainment increased for all three cohorts and the Scottish average, and SIMD crime rates steadily decreased between 2004 and 2010/11. Averages for emergency hospital admissions, however, were less positive. By 2012, admission rates had increased and the aim of reducing unplanned hospital admissions (as proposed in *Delivery for Health*, 2005) had not yet been accomplished. The percentages of population claiming Jobseekers Allowance also increased significantly between 2007 and 2012, and by 2011 the proportion of income deprived population in the most deprived cohort was still over 2.5 times higher than the Scottish average. Results from further analyses into variation across Scotland reflected similar patterns. Disregarding SIMD crime rates, variation among indicators have all either grown or remain largely as they were in 2002.

This reflects the perpetuation of inequalities throughout Scotland. The disparities in multiple indicators are generally persistent and in some cases continuing to grow. It is recognised that this study was profiled over the beginning of an economic recession; this is very recognisable within particular outcomes, such as proportion of JSA claimants, which rose dramatically in 2008. It is outside of the remit of this report to speculate as to what the figures would show had the level of public spending not been spent over this period. However, Scotland cannot afford continued rise in public expenditure, which questions what these percentages may look like in the decade ahead of us, with public budget cuts on the horizon.

The limitations to this research should also be considered. The majority of indicators profiled in this report are only available up to 2011 or 2012. This fails to capture possible impacts or progress from more recent and current policies. This does not, however, deter from the apparent stability of unequal outcomes across Scotland up to 2012.

10.1 Standardisation Does Not Equal Universalism

The persistence of inequality calls into question the effectiveness of policies put in place to reduce inequalities in Scotland, as well as the ability of public services to meet demands equally across society. The division in educational attainment for example, illustrates how people in some areas may benefit and achieve more from educational services than others. Pupils living in Scotland's most deprived areas tend to attend school less and achieve lower results than pupils living in other areas in Scotland. Education is provided across the whole of Scotland but the results of such are not universal. This questions whether this service is indeed universal or more simply standard. A truly universal service should be designed and implemented to serve all people across society equally. This may mean different approaches in different areas and effective use of targeting resources: universal educational equality does not mean standard provision in all areas.

This theory applies not only to education but also across broader public services. People

living in areas with different levels of deprivation use health care services differently. Within Scotland's most deprived neighbourhoods, for example, people are more likely to be admitted to hospital in an emergency than planned in advance. The opposite occurs within the central and least deprived cohorts. As discussed within previous literature, certain health care messages benefit some members of society more effectively than others (Mackenbach, 2006). This does not mean that there is not a place for such messages but this method fails to address inequality effectively.

This does not suggest that public services themselves are a cause of inequality, on the contrary, but the implications of inequality affect them and it is, therefore, within their interest to address it. Public service policy is becoming increasingly focussed on prevention, equality, and improving outcomes for all but it is important that this consideration is adopted in other policy areas as well.

10.2 Income and Employment

Literature concerned with improving equity—whether with respect to education (e.g. Cody 2012; Clifton and Cook 2012; Raffe 2006), health (e.g. Kickbusch and Behrendt 2013; WHO 2013; Mackenbach 2006; Auditor General for Scotland 2012), or crime and community safety (e.g. Lea 2007; Newburn 2002)—tends to emphasise the wide and disperse social influences on inequality. This argues for multiple agency response and partnership delivery. In this sense, each sector focuses on the social determinants of disadvantage such as poor health, low education attainment or high crime levels. These social determinants are evidently interlinked; therefore if these determinants can be successfully targeted they have the potential to improve equality within many sectors.

Within the regression models tested in this study, income deprivation and unemployment rates continuously had one of the highest impacts on other indicators in the model. This suggests that income and employment related factors influence other domains of inequality. In this respect, successful economic development could potentially improve wellbeing across many aspects in life, hence reducing pressure on other public services, such as health care, policing, social services etc. Successful economic development itself is, therefore, a form of prevention for a whole range of services, and needs to be recognised as this.

In no instance did the regression analyses explain 100% of variation. Importantly, this means that there are other factors that affect life outcomes that are not accounted for by the current indicators. It could also be questioned whether it is income itself, or the lack of more nebulous attributes that coincide with steady employment—such as structure, fulfilment, and purpose—that contribute to negative life outcomes. There exists the possibility that achieving these attributes and qualities through means other than formal employment could reduce the association between low income and negative indicators. Nonetheless, as this is unknown, this paper focuses on what is known: income and unemployment have a strong association with various other indicators of deprivation.

The annual report of the chief medical officer for Scotland 2011 ascribes Scottish health inequalities to the heavy loss of jobs in industries such as shipbuilding, steel making, heavy engineering, and mills. It states that lack of jobs can result in people losing self-esteem and lacking self-control, and this (alongside alcohol and drugs) can create a chaotic environment for families and children.

In recent years, there has been much emphasis within public service debate and reform

on *prevention* strategies. The National Health Service is attempting to move to a service focussed on better health in Scotland as opposed to reacting to ill health, there is also much focus on the early years and education to improve opportunities for children and prevent future negative outcomes. Nonetheless, even if education improves for the lowest 20%, they will continue to experience the same obstacles if that is where they remain (Raffe, 2006). Several authors (e.g. Cody, 2012, in Clifton and Cook, 2012) comment on the limited ability of schools to address inequalities in educational attainment due to other determinants of low attainment. Clifton and Cook (2012) argue that to fully address social mobility among socio-economic classes and improve equity in post-16 education, the youth labour market and unreliable, low-quality jobs also need addressed.

The results from the inferential analyses in this study back up Clifton and Cook's (2012) argument. Due to the impact of income and employment, effective targeting on economic outcomes in disadvantaged neighbourhoods could be beneficial to both education and social mobility. A study by Duncan et al. in 2001 found evidence to suggest that family income has a positive impact on the eventual school achievement of preschool children. Duncan et al. (2001) experimented with a series of welfare-to-work programmes, assigned to randomly selected low-income, welfare-recipient single parents: all designed to increase employment and reduce welfare, but some also specifically designed to increase income. The results illustrated that all the programmes boosted employment to similar degrees but earnings supplement programmes achieved the largest impacts. Estimates of impacts on educational achievement were positive for all programme types, but only in the case of the earnings supplement programmes was the coefficient statistically significant.

Considering the evidence of economic impact on other variables, it is unexpected that indicators such as for educational attainment, have continued to improve over a period of economic recession. However, there have been significant investments made within education in Scotland over the past ten years and large-scale reform to improve the curriculum directly. There remains a considerable gap in educational attainment between the cohorts studied in this report and the gap between highest and lowest achievers did not reduce between 2002 and 2012, nonetheless, both S4 and S5 attainment did improve right across Scotland over this period – at both ends of the scale. This illustrates success in Scotland's education, particularly over a period of economic recession, but does not detract from the strength of economic indicators on variables of inequality, including education. Inequality across the country remains high.

Given the evidence presented within this and previous studies, it is reasonable to argue for income and employment improvement strategies to be seen as preventative policies in themselves. The Scottish Government has committed to 'tackle the significant inequalities' in Scotland by 2017 (Scottish Government, 2010a in EHRC and OPM, 2010), creating reliable and sustainable income and employment in the most disadvantaged areas in Scotland has the potential to achieve substantial benefits, across a variety of sectors. In December 2014 ScotPHO published a study on modelled interventions for improving health and reducing health inequalities and found that regulatory and tax options which affect income were the most effective intervention for reducing inequalities. Increasing the living wage in the model, for example, improved population health as well as reducing health inequalities and increases in employment reduced inequalities but only when targeted in most deprived areas (ScotPHO, 2014). Policies and programmes such as these would have financial costs, but money will be spent in these areas – whether in health care, social work, unemployment benefits or crime prevention. Targeted spending on employment and sustainable income could help save in the long run.

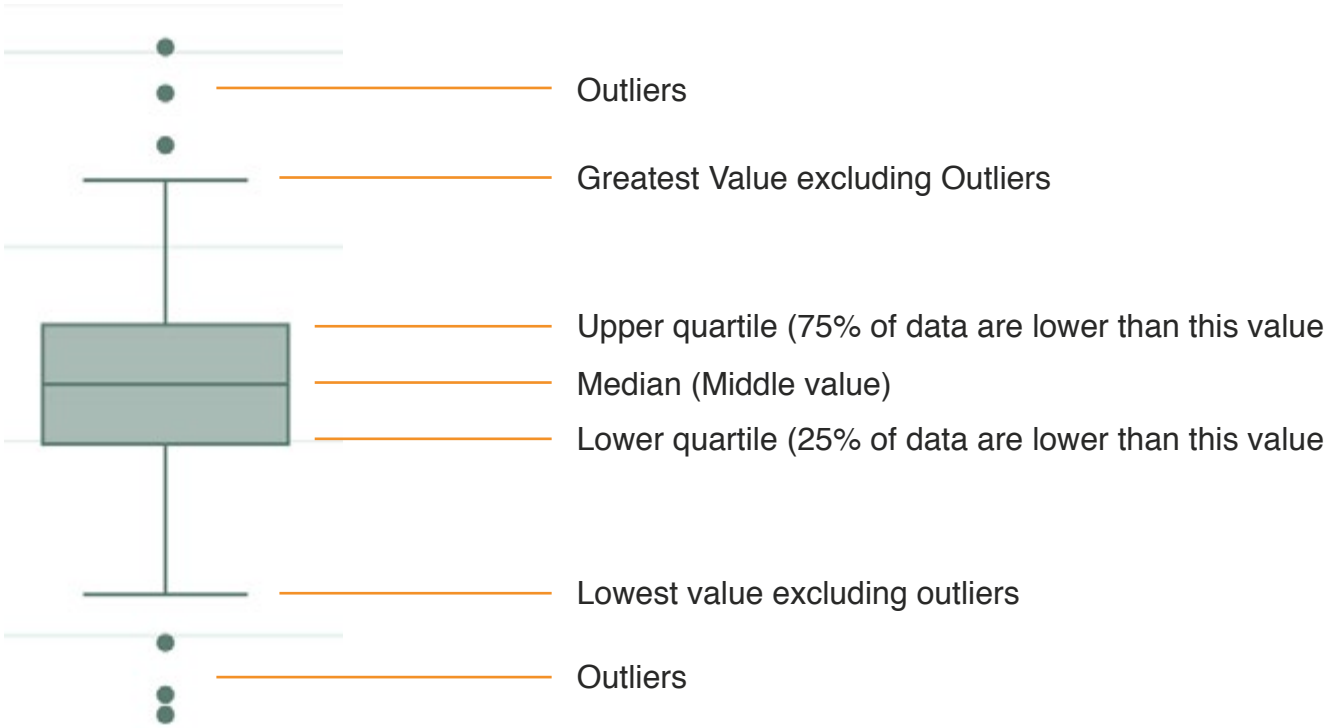
Increasing income and employment at the lower end of the pay scale could also potentially reduce the high level of income inequality in Scotland. As discussed in this report, there are many arguments for the detrimental impact of income inequality. The correlations in section 7 present significant associations between income inequality and PISA 2009 scores in mathematics, PISA 2012 percentage of top performers in mathematics, and homicide rates between countries in Europe. Although these correlations do not prove a causal relationship, they highlight that European countries with more equal income distribution tend to perform better within the indicators listed above. Several commentators argue that reducing income inequality could potentially improve outcomes across many sectors in society, including economic growth (IMF, 2014). In this respect, improving Scotland's very high level of income inequality may improve outcomes, as well as equity of outcomes, across the whole of society.

11. Appendices

11.1 Box Plots

Several box plot diagrams are used throughout this report to display the distribution of variables within and between cohorts. Box plots display the spread of data (in this case, data zones) by presenting the median, upper and lower quartiles, maximum and minimum values, and outliers. Box plots are particularly valuable for visualising and interpreting analyses as they contain a great deal of information about the distribution of data, in the one diagram.

The following information provides some guidance for reading a box plot:



The box between the lower and upper quartile on a box plot represents the middle 50% of values, this is known as the interquartile range (IQR). The IQR (the sum of the difference between upper and lower quartiles) is a robust statistic because it measures the mid-range of data in a data set and is, therefore, not influenced by outliers.

Outliers are data that are distant from the majority of the data set. Values may be identified as outliers using different methods but in this report a value is defined as an outlier if it is higher than the upper quartile or lower than the lower quartile by over 1.5 times the IQR (Q1-1.5*IQR or Q3+1.5*IQR). It is important to observe and acknowledge outliers because they have the potential to distort the results of statistical analyses.

11.2 Measures of Variation

Combinations of measures are used throughout this report to analyse variation and dispersion within and between cohorts.

Standard Deviation

The standard deviation is used to measure the level of variation from the average (mean). The higher the standard deviation is, the higher the amount of variation surrounding the mean is. It is calculated by the square root of a data set's variance (how far the data set's numbers are spread).

Coefficient of Variation (CV)

The coefficient of variation (CV) also measures the level of variation from the average but, unlike the standard deviation, the CV is unitless. In other words, it is a normalised measure of dispersion that does not depend on a variable's measurement unit. It can, therefore, be used to compare the degree of variation between two data series with considerably different means. For example, a data set with a mean of 1000 is likely to have a considerably higher standard deviation than a data set with a mean of 100. Calculating the CV of these two data sets will provide a normalised measure of distribution to the mean and will, therefore, be comparable between the two. The CV is calculated by dividing the standard deviation (σ) by the mean (μ).

$$Cv = \frac{\sigma}{\mu}$$

Interquartile Range (IQR)

As mentioned previously, the interquartile range (IQR) is the sum of the difference between the upper and lower quartile of a data set. In other words, it measures the degree of variance for the mid 50% of data. The IQR is particularly useful because it is not influenced by selective outlying data that can influence other measures of dispersion.

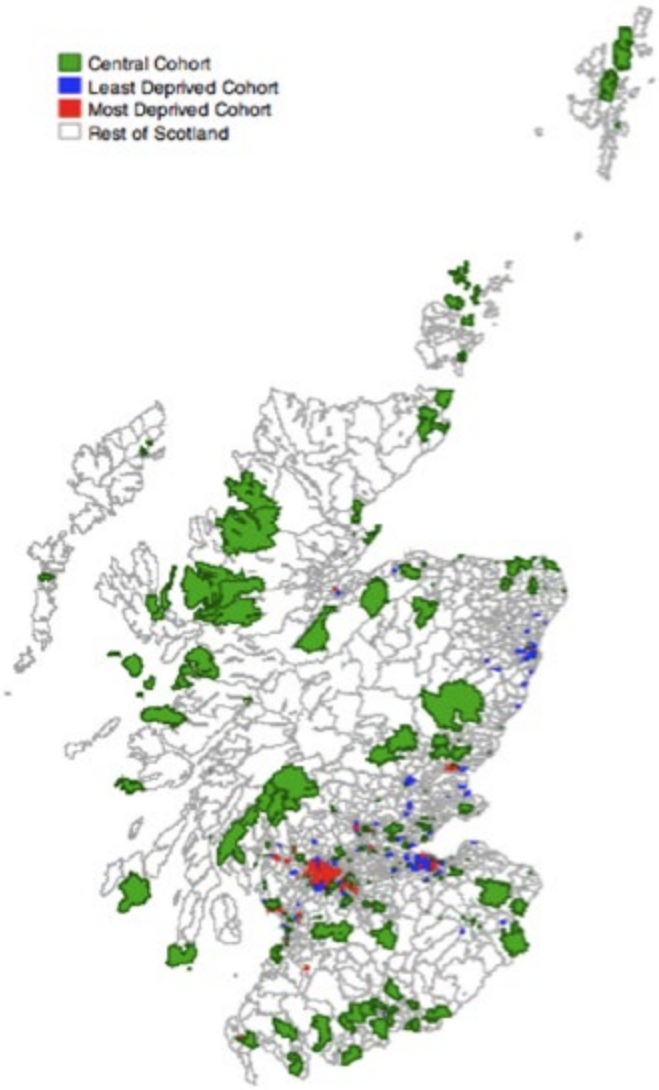
Recording upper and lower quartile limits also indicate other details about the distribution of data. For example, considering the upper and lower quartile limits can indicate whether an increase in the data sets average is reflected by increases across the whole data set or whether this increase was only experienced at one end (widening dispersion).

11.3 Mapping 1000 Communities

Three cohorts are studied in *1000 Communities*, all of which are selected from SIMD 2004: the 330 most deprived data zones, the 330 central data zones and the 330 least deprived data zones.

These data zones are highlighted in Map 11-1. Notably the central cohort contains many more rural data zones than either the most or least deprived cohorts.

Map 11-1 1000 Communities, Scotland



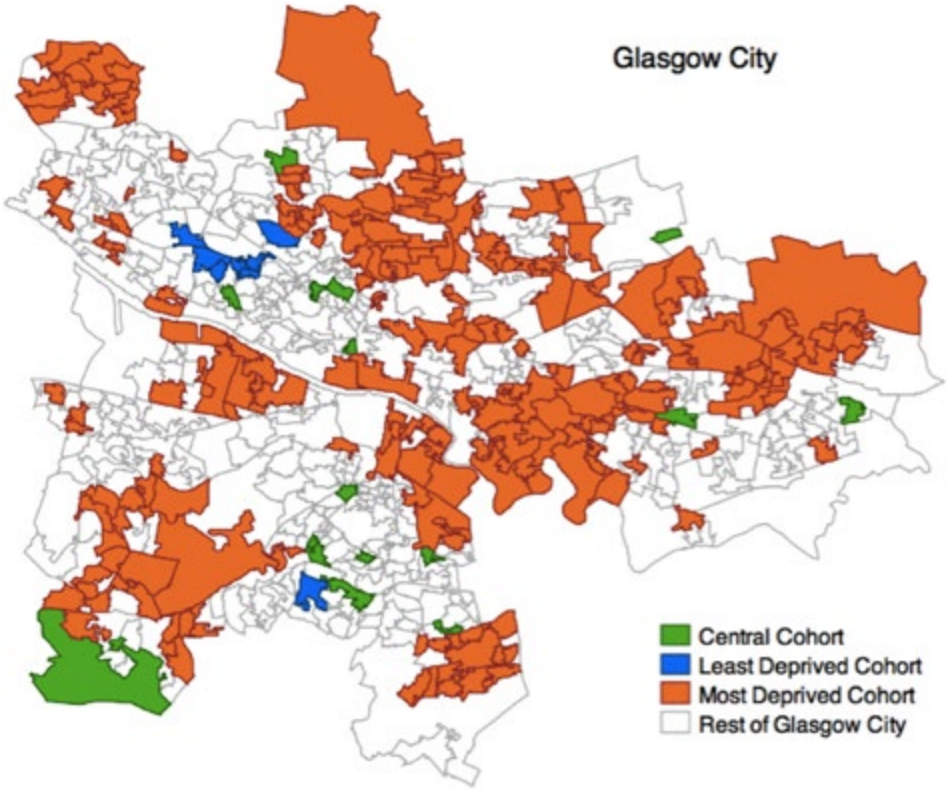
Data zones within the most and least deprived cohorts are more centred within urban areas in Scotland. 229 (69%) of the 330 data zones in the most deprived cohort are in Glasgow City alone. Table 11-1 displays the number of data zones from each cohort for each of Scotland's Local Authorities. Notably only the central cohort has data zones in each of Scotland's 32 Local Authorities.

Table 11-1 Data zones in 1000 Communities by local authority area

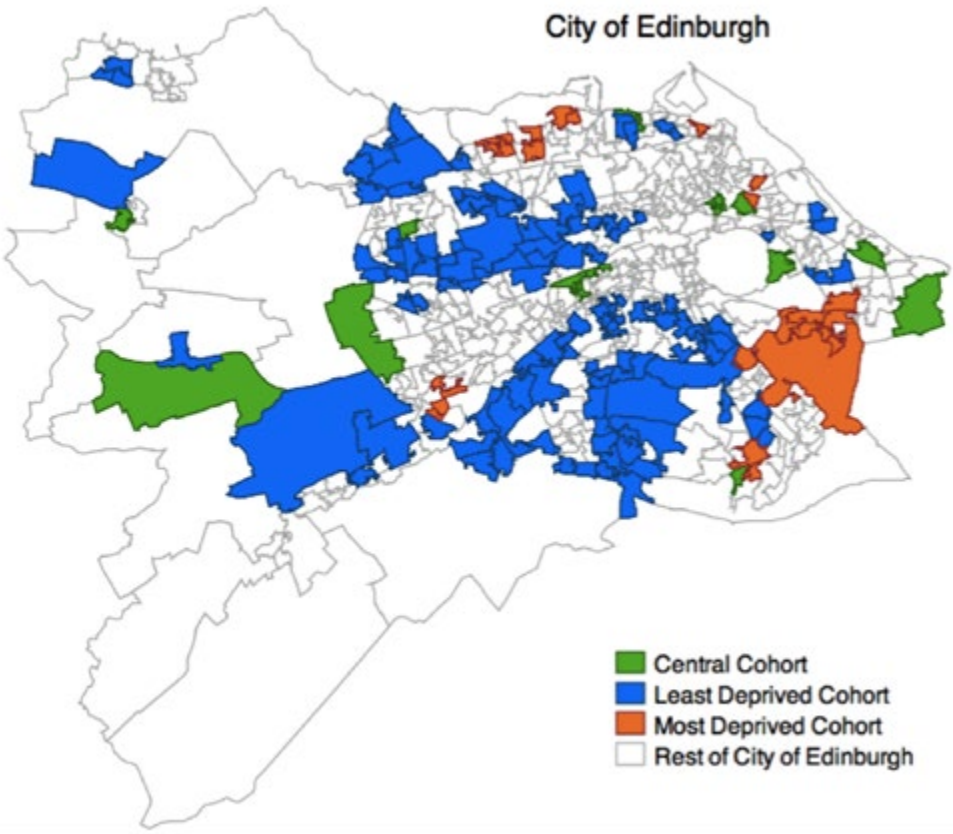
Local Authority	Number of data zones		
	Most Deprived Cohort	Central Cohort	Least Deprived Cohort
Aberdeen City	2	12	42
Aberdeenshire	.	12	27
Angus	.	9	2
Argyll & Bute	.	11	2
Clackmannanshire	2	8	1
Dumfries & Galloway	1	25	1
Dundee City	9	3	4
East Ayrshire	7	4	2
East Dunbartonshire	.	2	25
East Lothian	.	6	5
East Renfrewshire	1	2	31
Edinburgh, City of	26	17	111
Eilean Siar	.	7	.
Falkirk	1	8	4
Fife	1	30	12
Glasgow City	229	16	8
Highland	3	30	2
Inverclyde	6	3	2
Midlothian	.	6	8
Moray	.	7	2
North Ayrshire	6	5	2
North Lanarkshire	10	16	.
Orkney Islands	.	3	.
Perth & Kinross	.	8	7
Renfrewshire	8	5	3
Scottish Borders	.	14	2
Shetland Islands	.	3	.
South Ayrshire	1	11	3
South Lanarkshire	8	27	7
Stirling	3	4	6
West Dunbartonshire	6	7	.
West Lothian	.	9	9

Glasgow City contains 229 data zones from the most deprived cohort, 16 from the central cohort and 8 from the least deprived cohort. These are displayed in Map 11-2.

Map 11-2 1000 Communities, subset in Glasgow City

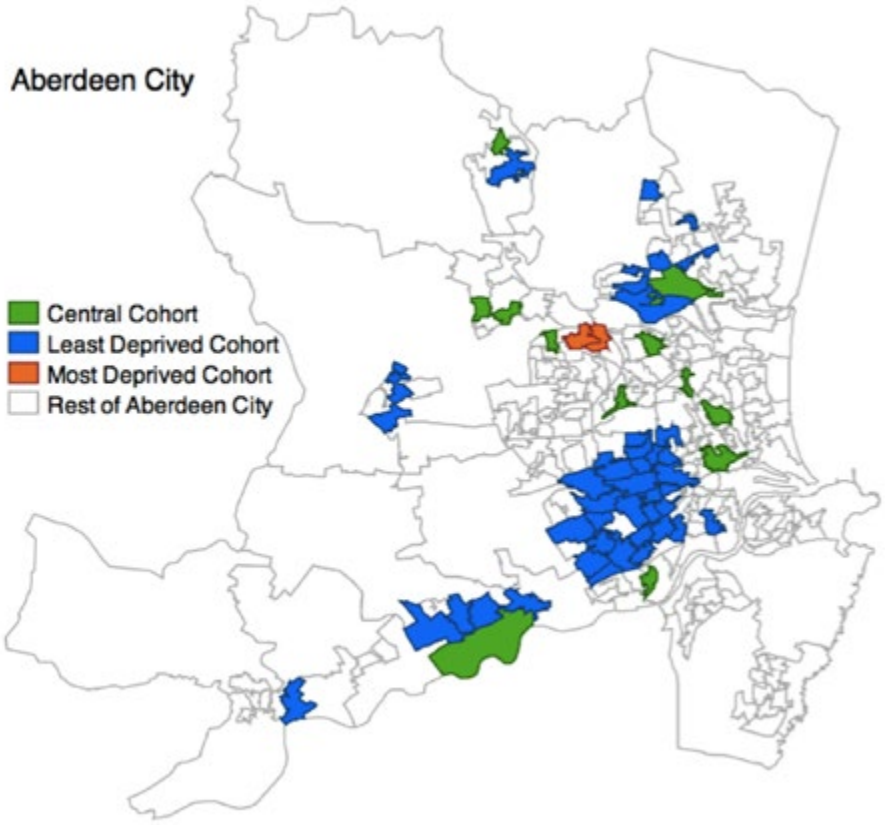


Map 11-3 1000 Communities, subset in City of Edinburgh



The City of Edinburgh contains 26 of the neighbourhoods from the most deprived cohort, 17 from the central, and 111 from the least deprived cohort. These are displayed in Map 11-3.

Map 11-4 1000 Communities, subset in Aberdeen City



Aberdeen City contains 2 data zones from the most deprived cohort, 12 data zones from the central cohort, and 42 from the least deprived cohorts. These are displayed in Map 11-4.

As presented in Map 11-1, the most and least deprived cohorts are largely centred within conurbations. Nearly 88% of data zones in the most deprived cohort are within settlements of over 125,000 people and a further 11% are within settlements of between 10,000 to 125,000 people. Only 5 (1.5%) data zones in the most deprived cohort are outside urban areas (classification codes 3 to 6).

Table 11-2 1000 Communities, Urban Rural Classification 2011/12

Six-fold Urban Rural Classification code, 2011/12	Most Deprived Cohort	%	Central Cohort	%	Least Deprived Cohort	%
1	290	87.88	69	20.91	218	66.06
2	35	10.61	103	31.21	66	20
3	2	0.61	28	8.48	30	9.09
4	0		23	6.97	7	2.12
5	1	0.3	54	16.36	7	2.12
6	2	0.61	53	16.06	2	0.61
Total	**330**	**100**	**330**	**100**	**330**	**100**

Within the least deprived cohort 66% of data zones are within settlements of over 125,000 people, and a further 20% are in settlements between 10,000 and 125,000 people.

Data zones within the central cohort, however, are more spread across urban and rural areas in Scotland. Just over 50% of data zones in the central cohort are within urban settlements (classification codes 1 and 2). A further 32% of data zones are within accessible or remote rural areas (classification codes 5 and 6).

Table 11-3 Six-fold urban rural classification (source: Scottish Government)

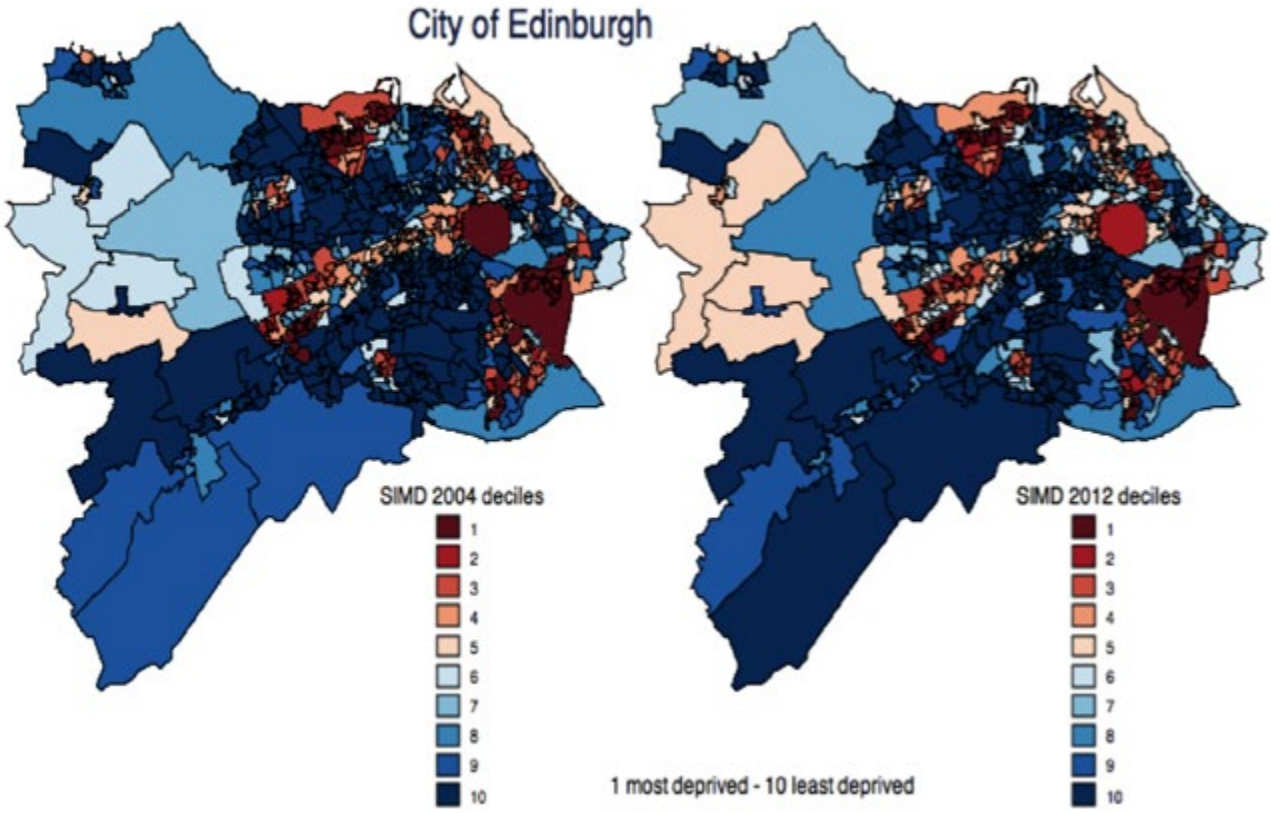
Six-fold Urban Rural Classification		
1	Large Urban Areas	Settlements of over 125,000 people
2	Other Urban Areas	Settlements of 10,000 to 125,000 people
3	Accessible Small Towns	Settlements of between 3,000 and 10,000 people and within 30 minutes drive of a settlement of 10,000 or more.
4	Remote Small Towns	Settlements of between 3,000 and 10,000 people and with a drive time of over 30 minutes to a settlement of 10,000 or more.
5	Accessible Rural	Areas with a population of less than 3,000 people, and within a 30-minute drive time of a settlement of 10,000 or more.
6	Remote Rural	Areas with a population of less than 3,000 people, and with a drive time of over 30 minutes to a settlement of 10,000 or more.

11.4 Map Comparisons, SIMD 2004 and 2012

11.4.1 Least deprived cohort

111 (34%) of the 330 data zones in the least deprived cohort are in the City of Edinburgh. Map 11-5 displays SIMD deciles in the City of Edinburgh for 2004 and 2012.

Map 11-5 SIMD 2004 and 2012 deciles, City of Edinburgh

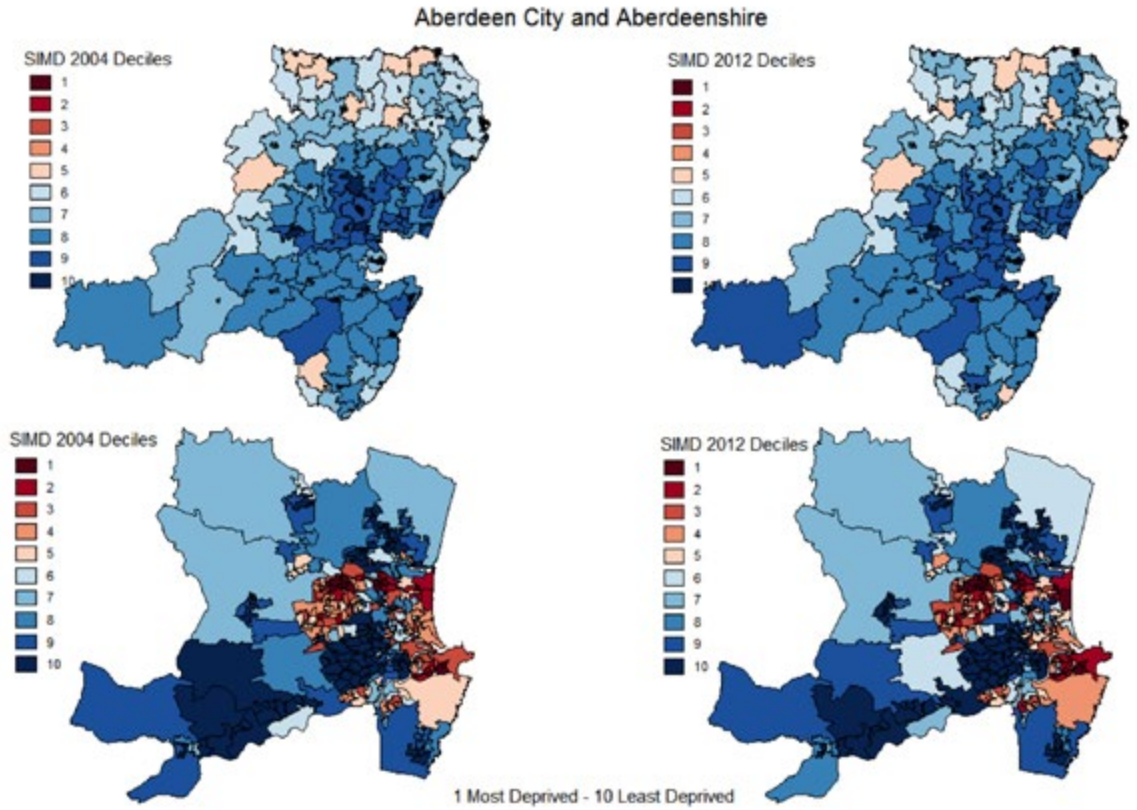


There were some minor changes between 2004 and 2012 with several data zones moving into neighbouring SIMD deciles. This movement was, however, relatively modest and the majority of areas in the City of Edinburgh remain relatively close in ranking to where they were in SIMD 2004.

Aberdeen City and Aberdeenshire also had a high proportion of neighbourhoods within the least deprived cohort: 42 and 27 respectively. Combined they represent 20% of the least deprived cohort. Map 11-6 displays SIMD deciles in 2004 and 2012 for both Aberdeen City and Aberdeenshire.

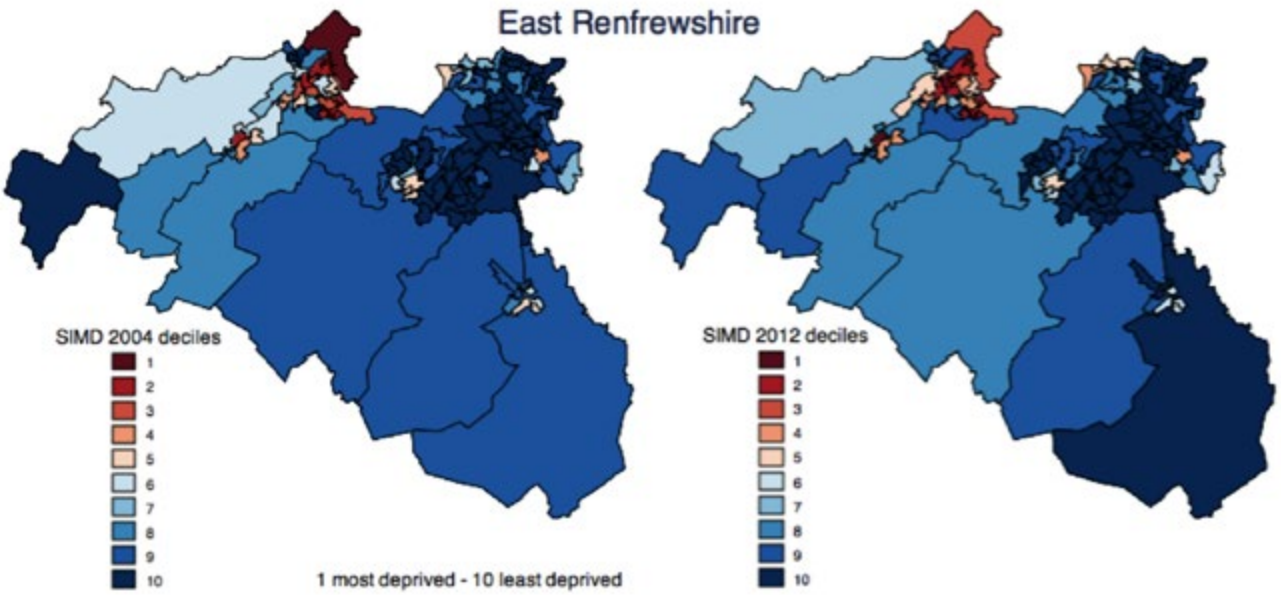
Similar with Edinburgh, the majority of areas in Aberdeen remain relatively close in SIMD ranking to their positions in SIMD 2004. Although there were some minor changes between deciles, this movement was relatively modest.

Map 11-6 SIMD 2004 and 2012 deciles, Aberdeen City and Aberdeenshire



31 of the neighbourhoods in the least deprived cohort are in East Renfrewshire. This represents 9% of data zones in the cohort.

Map 11-7 SIMD 2004 and 2012 deciles, East Renfrewshire



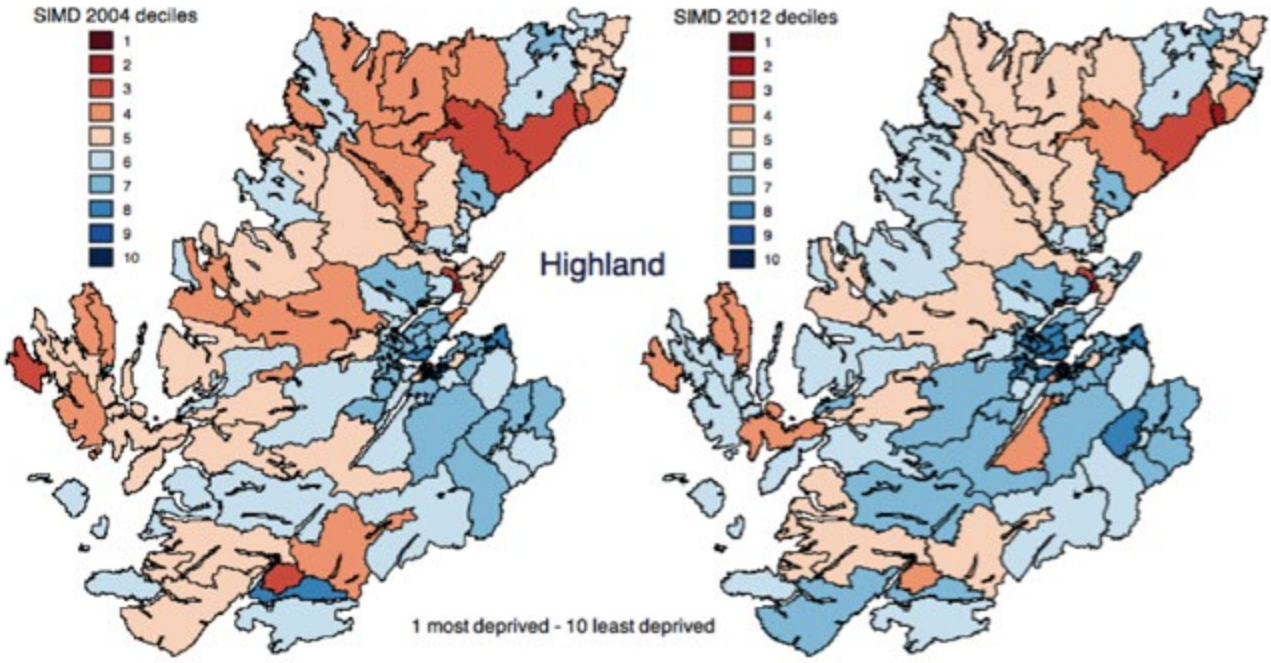
Similar with Aberdeen and Edinburgh, in East Renfrewshire there were some changes

between SIMD deciles in 2004 and SIMD deciles in 2012. The majority of these changes were into neighbouring deciles and most neighbourhoods in East Renfrewshire remain moderately close to their ranks in 2004.

11.4.2 Central cohort

The central cohort is the only cohort that consists of neighbourhoods from all 32 Local Authorities in Scotland. Fife and Highland contain the highest number of data zones from this cohort, each with 30.

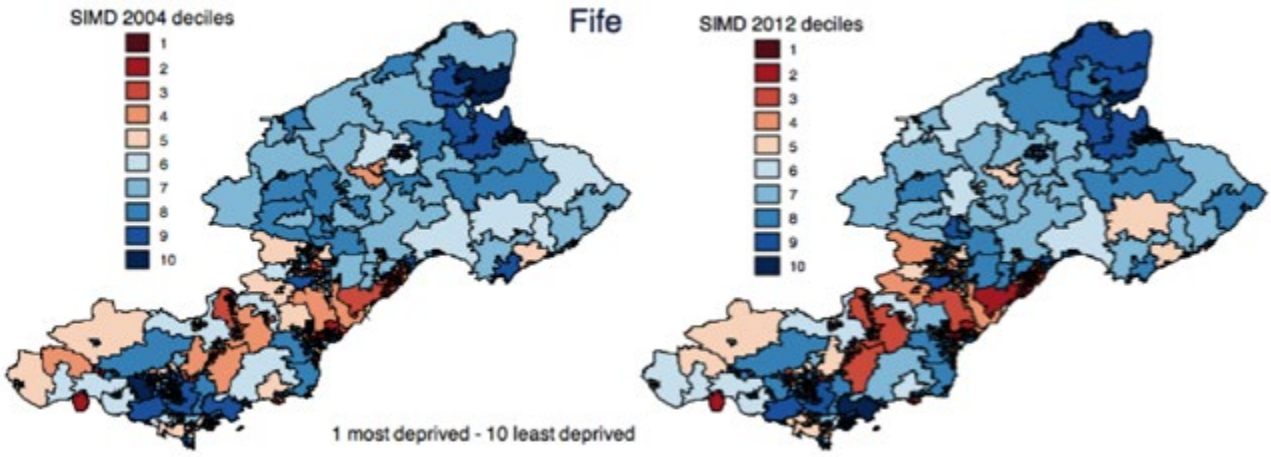
Map 11-8 SIMD 2004 and 2012 deciles, Highland



As displayed in Map 11-8, there was some movement between SIMD deciles in Highland, particularly between the central deciles on the SIMD rank (areas displayed as light pink and light blue in the maps).

Fife also displays some minor differences between deciles in SIMD 2004 and SIMD 2012.

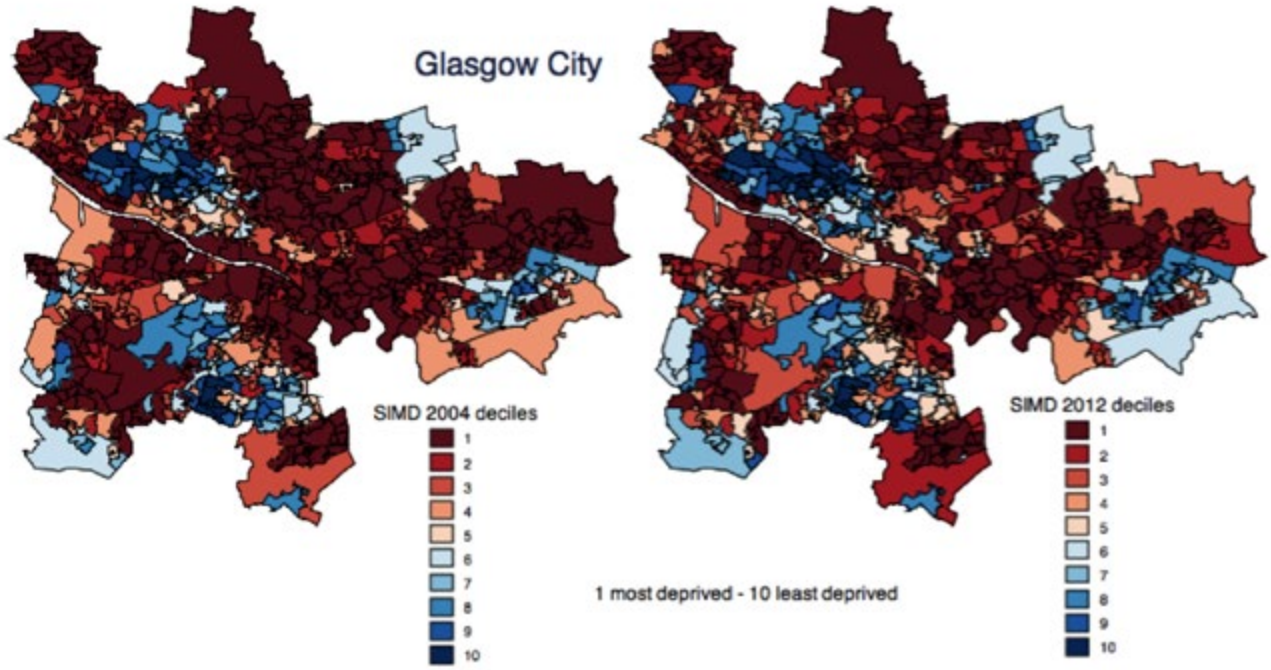
Map 11-9 SIMD 2004 and 2012 deciles, Fife



11.4.3 Most deprived cohort

229 (69%) of the 330 neighbourhoods in the most deprived cohort are in Glasgow City. Map 11-10 displays SIMD deciles in Glasgow City for 2004 and 2012.

Map 11-10 SIMD 2004 and 2012 deciles, Glasgow City



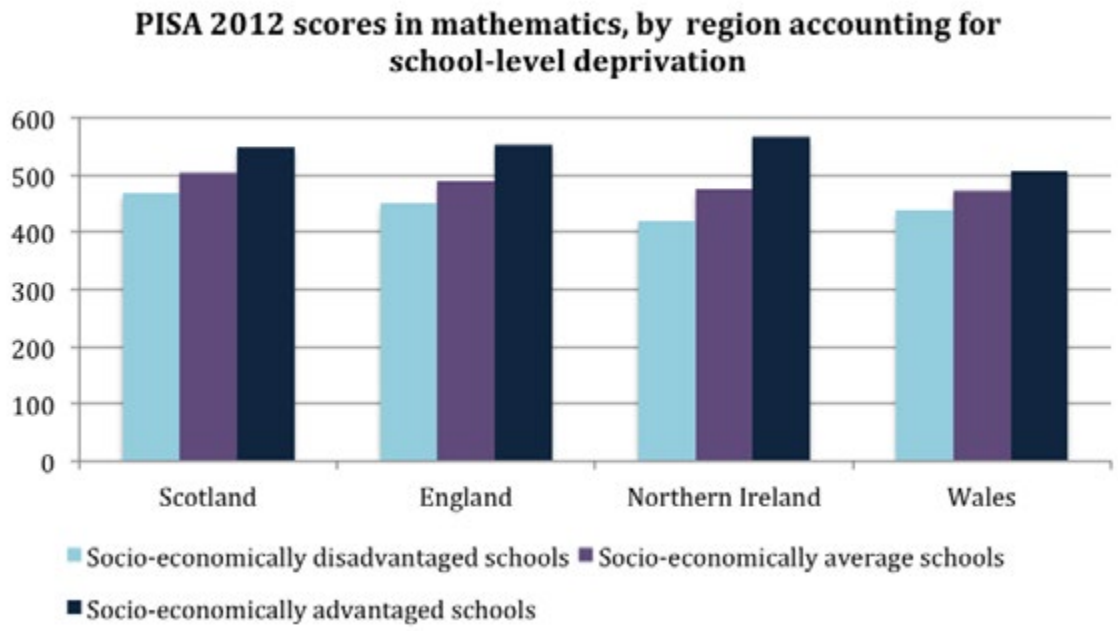
There was some movement in SIMD deciles between 2004 and 2012, with several data zones moving from the decile 1 to decile 2 (most deprived to the second most deprived). In general, however, the majority of areas in Glasgow City remain relatively close in ranking to where they were in SIMD 2004.

11.5 PISA results

The bar chart in Figure 11-1 displays average PISA[1] scores in mathematics by socio-economically disadvantaged, average and advantaged schools in the UK. PISA is an international survey ran by the OECD[2] to evaluate education worldwide[3]. Socioeconomic background is measured using the Index of Economic, Social Cultural Status (ESCS) and is constructed from students survey responses on parental education and occupation, learning resources in the home and access to IT. This measure is comparable across all countries that participate in PISA.

111 Scottish secondary schools participated in the PISA 2012 survey. These schools were selected randomly from a stratified sample according to previous exam performance (5 categories), whether schools were publicly funded or independent, urban/rural location and school size, and whether schools were single-sex or mixed. From these schools, a total of 2,945 15-year old pupils took part in the survey. Because PISA scores are created on survey information there is, therefore, a margin of error surrounding the mean. Due to this margin of error slight differences in mean scores may not be statistically significant.

Figure 11-1 PISA 2012 scores in mathematics by region accounting for school level deprivation, UK



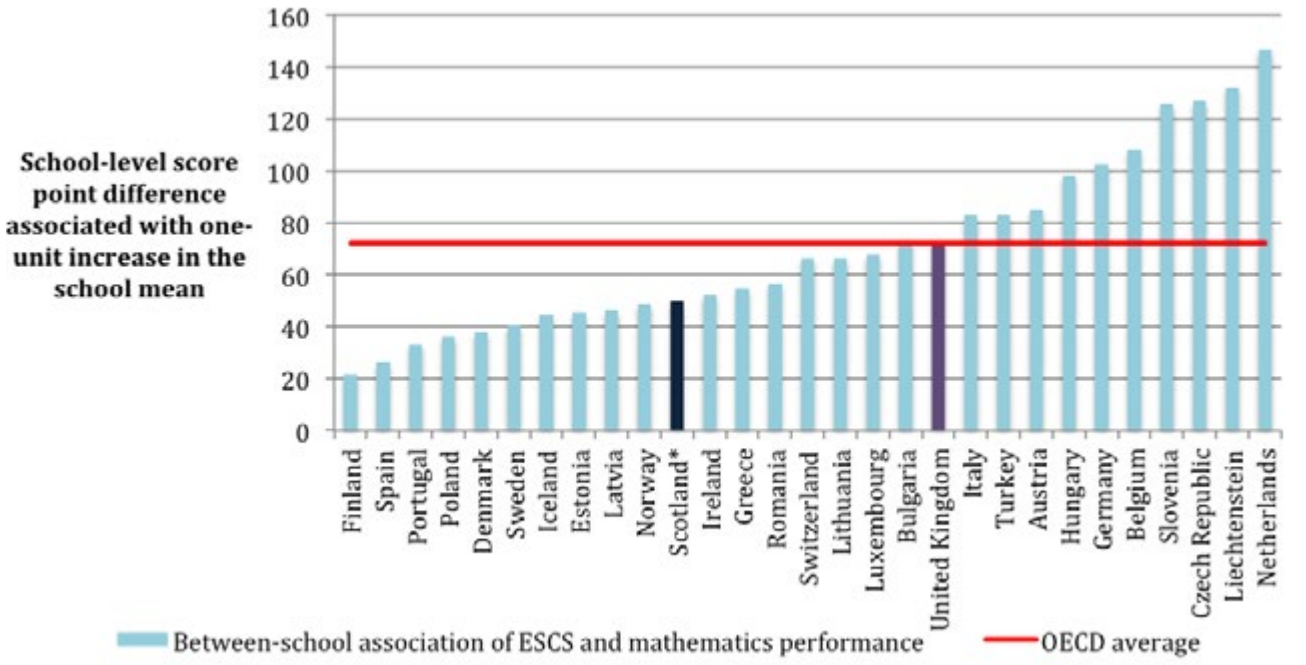
The scores presented in Figure 11 1 indicate a clear divide in mathematics between schools according to socio-economic advantage or disadvantage. Scotland's socioeconomically advantaged schools scored 80 points higher than the equivalent for Scotland's socio-economically disadvantaged schools (548 compared to 468). Despite this variation, however, these scores are not as divided as the equivalent in England and Northern Ireland.

1 Programme for International Student Assessment

2 Organisation for Economic Co-operation and Development

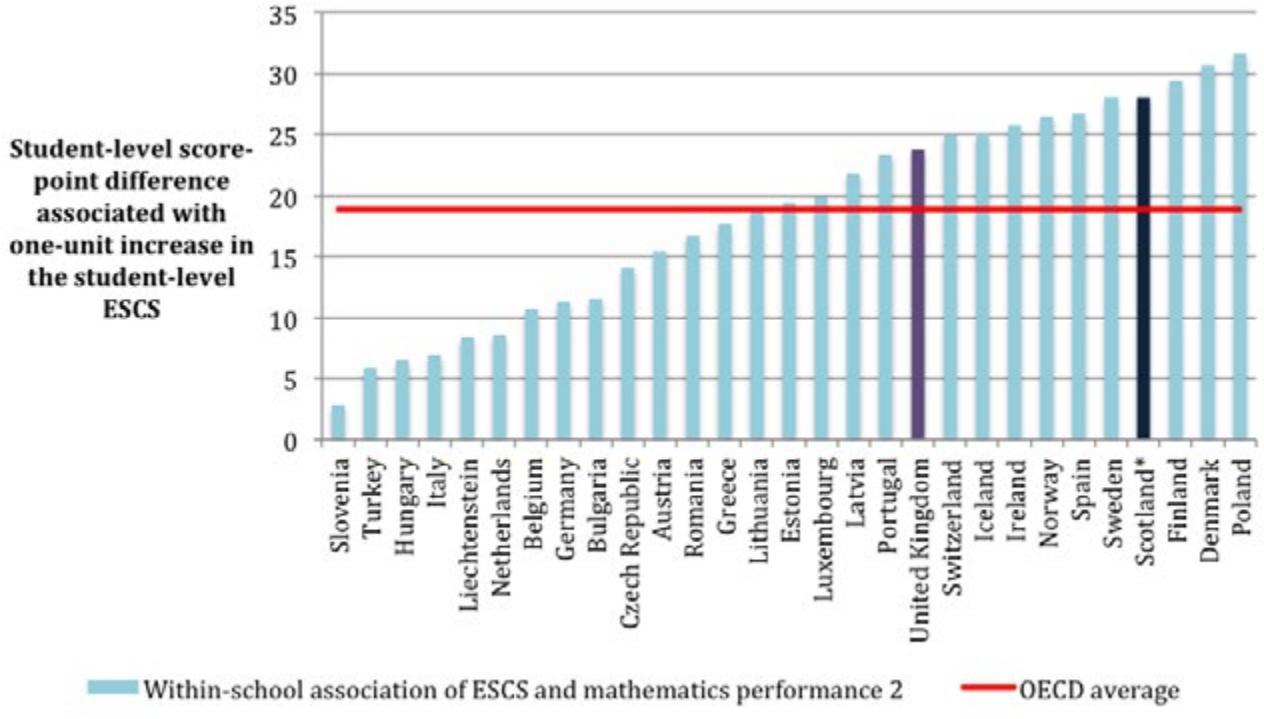
3 The survey tests the skills and knowledge of 15-year-old pupils but is not based on any taught curriculum. This survey is repeated every 3 years with the latest results from 2012. PISA surveys in all OECD countries and a selection of non-OECD countries, currently students have participated from more than 70 countries in the assessment.

Figure 11-2 Between-school association of ESCS and mathematics performance



Scotland (49.9) has a relatively low ratio in the between-school association between socioeconomics and mathematic performance, in comparison to the UK (73.1) and OECD (72.3) averages. This suggests that attainment (as recorded by PISA) is not as divided between schools in Scotland as it is in the rest of the UK and the majority of OECD countries. This is not the case, however, for division *within* schools.

Figure 11-3 Within-school association of ESCS and mathematics performance

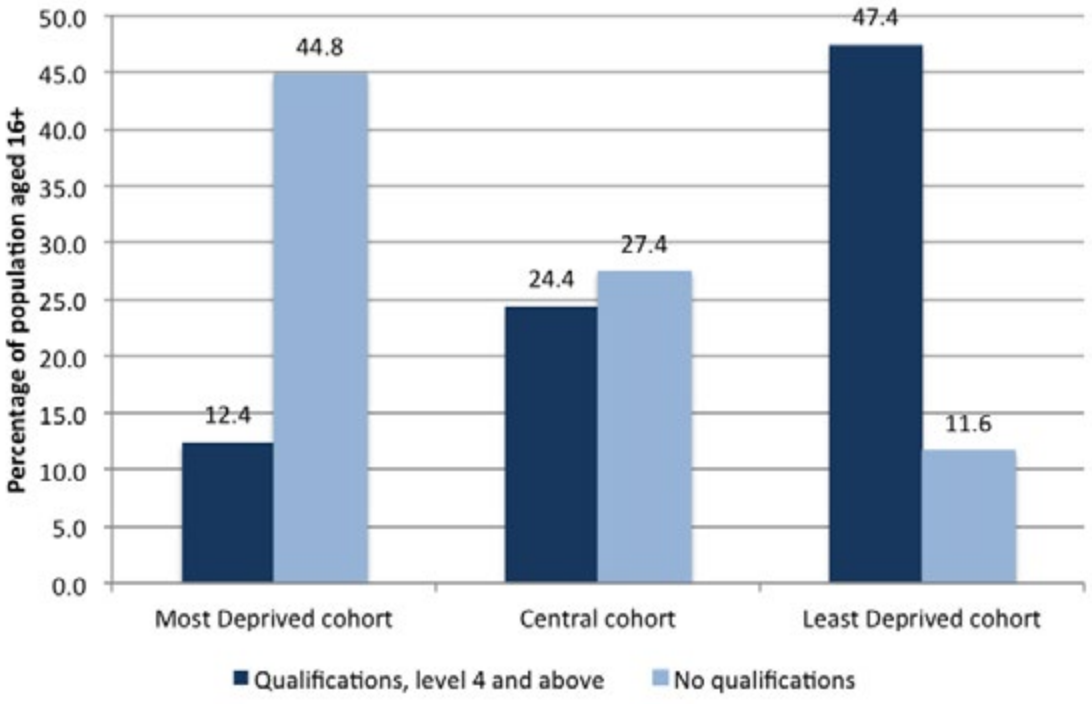


Across countries in Europe, Scotland has one of the highest *within-school* ratios of association between PISA's socioeconomic indicator (ESCS) and performance in mathematics (28 in a range from 2.8 in Slovenia to 31.6 in Poland - see Figure 11 3). This highlights that pupils attending the same schools in Scotland perform very differently in mathematics according to their socioeconomic background (there were similar results in PISA 2009). Mathematical performance within schools in Scotland is, therefore, more divided by socioeconomic status than it is across the rest of the United Kingdom.

11.6 Scottish Census 2011 – Education

The results from the 2011 Scottish Census (as displayed in Figure 11-4) reveal that within the most deprived cohort nearly 45% of the population aged 16 and above have no qualifications and just over 12% have qualifications level 4 or above (higher or further education). This is reversed within the least deprived cohort; under 12% have no qualifications and over 47% have qualifications level 4 or above. Within the central cohort 24% of the population have qualifications level 4 or above, but a further 27% have no qualifications. Therefore, despite some improvement in tariff scores, it should not be ignored that considerable inequalities in educational attainment persist between these areas in Scotland.

Figure 11-4 Percentage of population aged 16+ qualifications

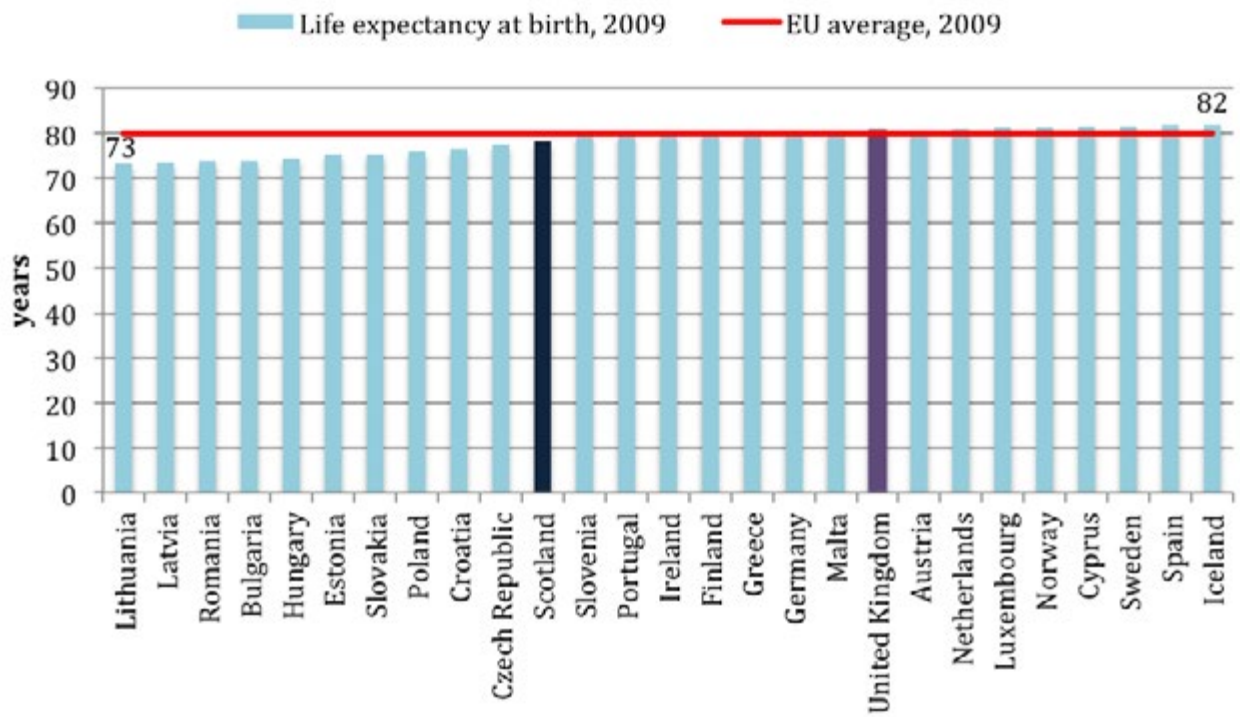


Adapted from: Scottish Census (2011

11.7 Life Expectancy, Europe

As displayed in Figure 11-5, among the European countries presented, life expectancy at birth varies from 73 to 82 years. Scotland's life expectancy is almost four years short of the maximum (Iceland - 82), nearly two and a half years less than the average for similar Northern and Western EU members and just under two years short of the EU average (79.8).

Figure 11-5 Life expectancy Europe



Life expectancies between 2011 and 2013 varied considerably between Scottish Local Authorities: from 83.9 years for females and 80.5 years for males in East Dunbartonshire to 78.5 years for females and 73 years for males in Glasgow City (National Records of Scotland). The poor health in South Western Scotland has received much publicity in recent public debate (for example, BBC News, 2014; BBC News, 2006; The Guardian, 2012; Herald Scotland, 2012; The Economist, 2012). Current studies from the Glasgow Centre of Population Health (GCPH) question why mortality rates in Glasgow are higher than comparable post-industrial cities in England. Manchester, Liverpool and Glasgow have very similar socioeconomic profiles but mortality rates in Glasgow are suggestively higher than in these other two cities (Walsh et al. 2010). This was labelled the *Glasgow* or *Scottish Effect*.

Although the GCPH research specifically explores the causes of 'excess' mortality (above what is explained by socioeconomic deprivation) in Glasgow, it does not dismiss that all three of these cities suffer from poor health. GCPH report that life expectancy rates in Liverpool, Manchester and Glasgow are all lower than any other city in the UK because they also have the highest levels of deprivation. Although there is evidence for further influences on Glasgow's poor health, deprivation plays a detrimental role and focus cannot be diverted from this. The GCPH explicitly states that the role of socioeconomic deprivation on health is beyond dispute.

11.8 Correlation Analysis

Table 11-4 Association statistics (Blaikie, 2003)

Correlation Coefficient (from Blaikie, 2003):	Strength:
0.01-0.09	Negligible
0.10-0.29	Weak
0.30-0.59	Moderate
0.60-0.74	Strong
0.75-0.99	Very Strong
1.00	Perfect

11.9 Regression Tables

Table 11-5 Regression table, dependent variable: emergency admissions, all ages

Source	SS	df	MS
Model	6.7755e +10	5	1.3551e+10
Residual	4.0645e+10	6495	6257879.56
Total	1.0840e+11	6500	16676865.1

Number of obs	6501
F(5, 6495)	2165.42
Prob>F	0.0000
R-squared	0.6250
Adj R-squared	0.6248
Root MSE	2501.6

Emergency Hospital admission rate all ages, 2011	Coef.	Std.Err.	t	P>ltl	Beta
% pensionable aged population, 2011	211.188	4.226	49.97	0.000	0.383
Hospital admissions due to alcohol ratio 2007-10	8.982	0.438	20.53	0.000	0.223
% council tax bands A-C 2011	8.75	1.56	5.61	0.000	0.07
% social rented housing 2001	8.114	2.909	2.79	0.005	0.047
% income deprivation 2011	193.201	7.42	26.04	0.000	0.464
Cons	1761.47	112.48	15.66	0.000	.

Table 11-6 Regression table, dependent variable: emergency admissions ages 65 years and over

Source	SS	df	MS
Model	2.0407e+11	6	3.4012e+10
Residual	5.4275e+11	6490	83628522.5
Total	7.4682e+11	6496	114965904

Number of obs	6497
F(6, 6490)	406.70
Prob>F	0.0000
R-squared	0.2733
Adj R-squared	0.2726
Root MSE	9144.9

Emergency Hospital admission rate 65 years & over 2011	Coef.	Std.Err.	t	P>ltl	Beta
% population aged 80 and over, 2011	616.227	40.9	15.07	0.000	0.16

Emergency Hospital admission rate 65 years & over 2011	Coef.	Std.Err.	t	P>ltl	Beta
% Income Deprivation, 2011	426.172	27.367	15.57	0.000	0.39
Hospital admission due to alcohol ratio 2007-10	17.374	1.739	9.99	0.000	0.165
Hospital admission due to drugs ratio 2007-10	-5.598	1.005	-5.57	0.000	-0.08
% council tax bands A-C, 2011	14.226	5.711	2.49	0.013	0.044
% social rented housing, 2001	-4.335	10.65	-0.41	0.684	-0.01
Cons	14884.7	312.94	47.56	0.000	.

Figure 11-6 Linear regression, dependent variable: male life expectancy 2005-09

Source	SS	df	MS
Model	12431.4	1	12431.4
Residual	5542.1	1208	4.59
Total	17973.5	1209	14.87

Number of obs	1210
F(1, 1208)	2709.66
Prob>F	0.0000
R-squared	0.692
Adj R-squared	0.691
Root MSE	2.142

Male Life Expectancy 2005-09	Coef.	Std.Err.	t	P>ltl	Beta
% Income Deprivation 2005	-0.352	0.007	-52.05	0.000	-0.832
Cons	79.94	0.113	704.5	0.000	.

Figure 11-7 Linear Regression, dependent variable: emergency hospital admission rates, all ages, 2005

Source	SS	df	MS
Model	4.9905e+09	3	1.6635e+09
Residual	3.2117e+09	1193	2692148.06
Total	8.2022e+09	1196	6858028.53

Number of obs	1197
F(3, 1193)	617.90
Prob>F	0.0000
R-squared	0.6084
Adj R-squared	0.6074
Root MSE	1640.8

Emergency Hospital Admission Rate, 2005	Coef.	Std.Err.	t	P>ltl	Beta
Male Life Expectancy 2005-09	-155.08	24.186	-6.41	0.000	-0.227
Female Life Expectancy 2005-09	-93.501	24.438	-3.83	0.000	-0.106
% Income Deprivation 2005	142.7	9.635	14.81	0.000	0.497
_Cons.	26553.17	2185.868	12.15	0.000	.

Table 11-7 Regression table, dependent variable: average S4 tariff scores

Source	SS	df	MS
Model	5945096.94	6	990849.491
Residual	7987749.88	6427	1242.84268
Total	13932846.8	6433	2165.83971

Number of obs	6434
F(6, 6427)	797.24
Prob>F	0.0000
R-squared	0.4267
Adj R-squared	0.4262
Root MSE	35.254

Average S4 tariff score, 2011/12	Coef.	Std.Err.	t	P>ltl	Beta
% Income Deprivation, 2011	-0.167	0.104	-1.62	0.106	-0.353
Primary attendance rate 2010/11	2.493	0.346	7.20	0.000	0.101
Secondary attendance rate 2010/11	3.735	0.189	19.73	0.000	0.272
% Council tax bands A-C, 2011	-0.294	0.023	-12.68	0.000	-0.207
% social rented housing 2001	-0.139	0.042	-3.33	0.001	-0.0702
% leavers in higher education 2011/12	0.181	0.021	8.70	0.000	0.099
Cons	-370.576	33.414	-11.09	0.000	.

Table 11-8 Regression table, dependent variable: average S4 tariff scores

Source	SS	df	MS
Model	5678330.63	4	1419582.66
Residual	8254516.19	6429	1283.95026
Total	13932846.8	6433	2165.83971

Number of obs	6434
F(4, 6429)	1105.64
Prob>F	0.0000
R-squared	0.4075
Adj R-squared	0.4072
Root MSE	35.832

Average S4 tariff score, 2011/12	Coef.	Std.Err.	t	P>ltl	Beta
% Income Deprivation 2011	-0.977	0.071	-13.80	0.000	-0.206
Primary attendance rate, 2010/11	2.903	0.351	8.27	0.000	0.118
Secondary attendance rate, 2010/11	4.09	0.19	21.49	0.000	0.298
% leavers in higher education, 2011/12	0.265	0.02	13.00	0.000	0.145
Cons	-455.46	33.445	-13.62	0.000	.

Table 11-9 Regression table, dependent variable: average S5 tariff score

Source	SS	df	MS
Model	31124913.7	6	5187485.62
Residual	38545117.7	6424	6000.17399
Total	69670031.4	6430	10835.1526

Number of obs	6431
F(6, 6424)	864.56
Prob>F	0.0000
R-squared	0.4467
Adj R-squared	0.4462
Root MSE	77.461

Average S5 tariff score, 2011/12	Coef.	Std.Err.	t	P>ltl	Beta
% income deprivation, 2011	-0.352	0.229	-1.54	0.124	-0.033
Primary Attendance rate 2010/11	5.243	0.761	6.89	0.000	0.095
Secondary Attendance rate 2010/11	6.913	0.42	16.46	0.000	0.224
% council tax bands A-C, 2011	-0.627	0.051	-12.31	0.000	-0.198
% social rented housing 2001	-0.461	0.092	-5.02	0.000	-0.104
% leavers in higher education 2011/12	0.665	0.046	14.49	0.000	0.162
Cons	-747.646	73.348	-10.19	0.000	.

Table 11-10 Regression table, dependent variable: average S5 tariff score

Source	SS	df	MS
Model	29733456.8	4	7433364.19
Residual	39936574.7	6426	6214.842
Total	69670031.4	6430	10835.1526

Number of obs	6431
F(4, 6426)	1196.07
Prob>F	0.0000
R-squared	0.4268
Adj R-squared	0.4264
Root MSE	78.834

Average S5 tariff score, 2011/12	Coef.	Std.Err.	t	P>|t|	Beta
% Income Deprivation 2011	-2.389	0.156	-15.37	0.000	-0.225
Primary attendance rate, 2010/11	6.097	0.772	7.9	0.000	0.111
Secondary attendance rate, 2010/11	7.811	0.423	18.48	0.000	0.254
% leavers in higher education, 2011/12	0.854	0.045	19.02	0.000	0.208
Cons	-940.503	73.521	-12.79	0.000	.

Table 11-11 Regression table, dependent variable: average S5 tariff scores

Source	SS	df	MS
Model	30151789.9	5	6030357.98
Residual	39543494	6426	6153.67165
Total	69695283.9	6431	10837.3945

Number of obs	6432
F(5, 6426)	979.96
Prob>F	0.0000
R-squared	0.4326
Adj R-squared	0.4322
Root MSE	78.445

Average S5 tariff scores, 2011/12	Coef.	Std.Err.	t	P>|t|	Beta
Primary attendance rates, 2010/11	6.839	0.731	9.35	0.000	0.124
Secondary attendance rate, 2010/11	7.553	0.42	17.99	0.000	0.245
% leavers in higher education 2011/12	0.796	0.045	17.65	0.000	0.194
% social rented housing 2001	-0.994	0.069	-14.42	0.000	-0.225
% council tax band A 2011	-0.095	0.052	-1.82	0.070	-0.023
Cons	-988.311	67.479	-14.65	0.000	.

Table 11-12 Regression table, dependent variable: average S4 tariff scores 2007/8

Source	SS	df	MS
Model	7626409.65	5	1525281.93
Residual	6749360.41	6451	1046.25026
Total	14375770.1	6456	2226.73018

Number of obs	6457
F(5, 6451)	1457.86
Prob>F	0.0000
R-squared	0.5305
Adj R-squared	0.5301
Root MSE	32.346

Average S4 tariff score 2007/8	Coef.	Std.Err.	t	P>|t|	Beta
% Income Deprivation 2008	-0.354	0.083	-4.29	0.000	-0.085
% Social rented housing 2001	-0.338	0.036	-9.34	0.000	-0.169
Primary attendance rate, 2007/8	2.191	0.344	6.36	0.000	0.084
Secondary attendance rate, 2007/8	4.302	0.159	27.08	0.000	0.351
% leavers in higher education, 2007/8	0.362	0.021	17.54	0.000	0.179
Cons	-418.771	31.919	-13.12	0.000	.

Table 11-13 Regression table, dependent variable: SIMD crime rates

Source	SS	df	MS
Model	436104626	6	72684104.4
Residual	1.1163e+09	5939	187965.962
Total	1.5524e+09	5945	261132.796

Number of obs	5946
F(6, 5939)	386.69
Prob>F	0.0000
R-squared	0.2809
Adj R-squared	0.2802
Root MSE	433.55

SIMD crime rate 2010/11	Coef.	Std.Err.	t	P>|t|	Beta
% income deprivation 2011	13.808	1.316	10.49	0.000	0.265
% social rented housing 2001	-3.583	0.503	-7.12	0.000	-0.165
% council tax band A 2011	1.393	0.3	4.64	0.000	0.069
Urban rural class 2011/12	-29.175	3.832	-7.61	0.000	-0.089

SIMD crime rate 2010/11	Coef.	Std.Err.	t	P>ltl	Beta
Hospital admission rates due to alcohol, ratio, 2007-10	1.154	0.838	13.76	0.000	0.233
Hospital admission rates due to drugs, ratio, 2007-10	0.555	0.048	11.55	0.000	0.17
Cons	208.21	15.047	13.84	0.000	.

11.10 Additional Scatterplots

Figure 11-8 Scatterplot, hospital admissions by Income deprivation, 2011

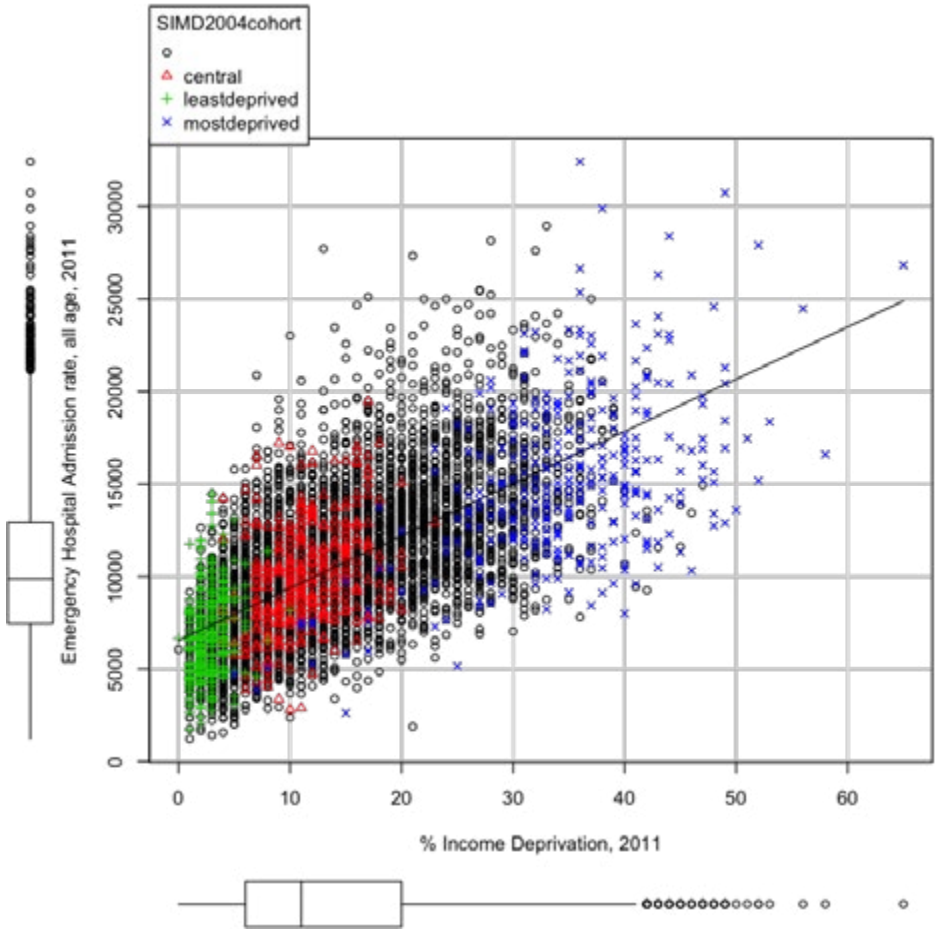


Figure 11-9 Scatterplot, hospital admission due to alcohol by income deprivation

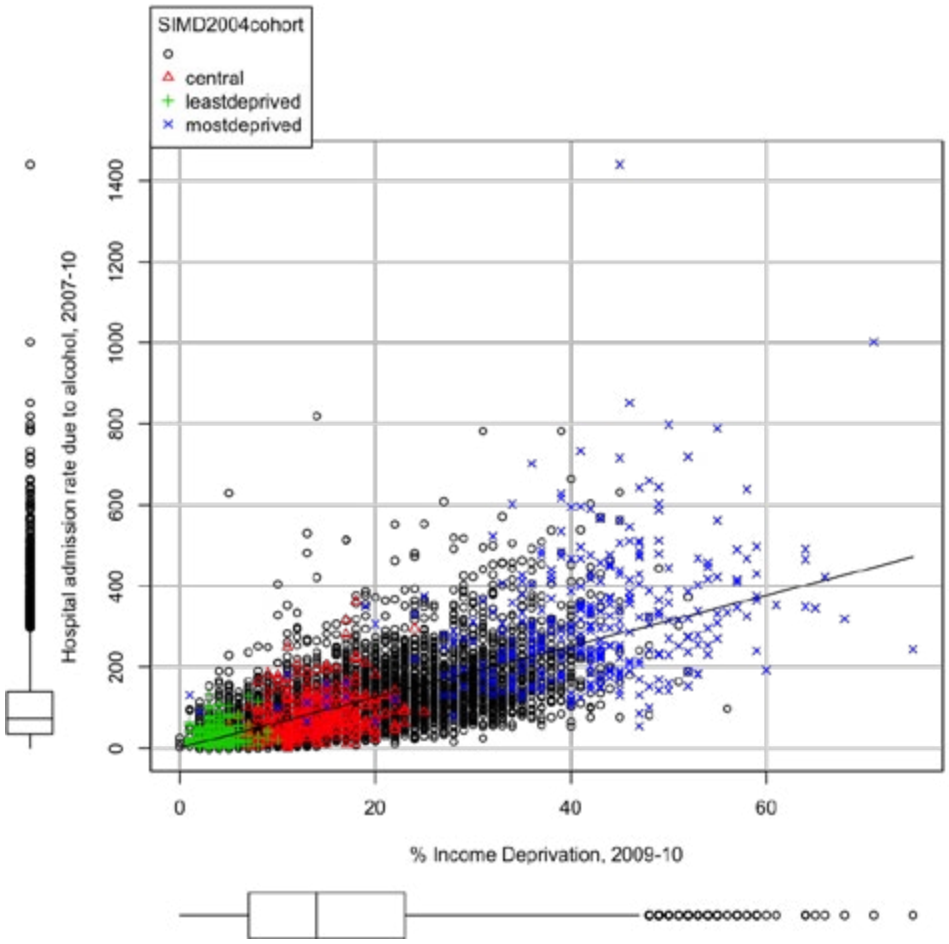


Figure 11-10 Scatterplot, male life expectancy by income deprivation, 2005, IGZs

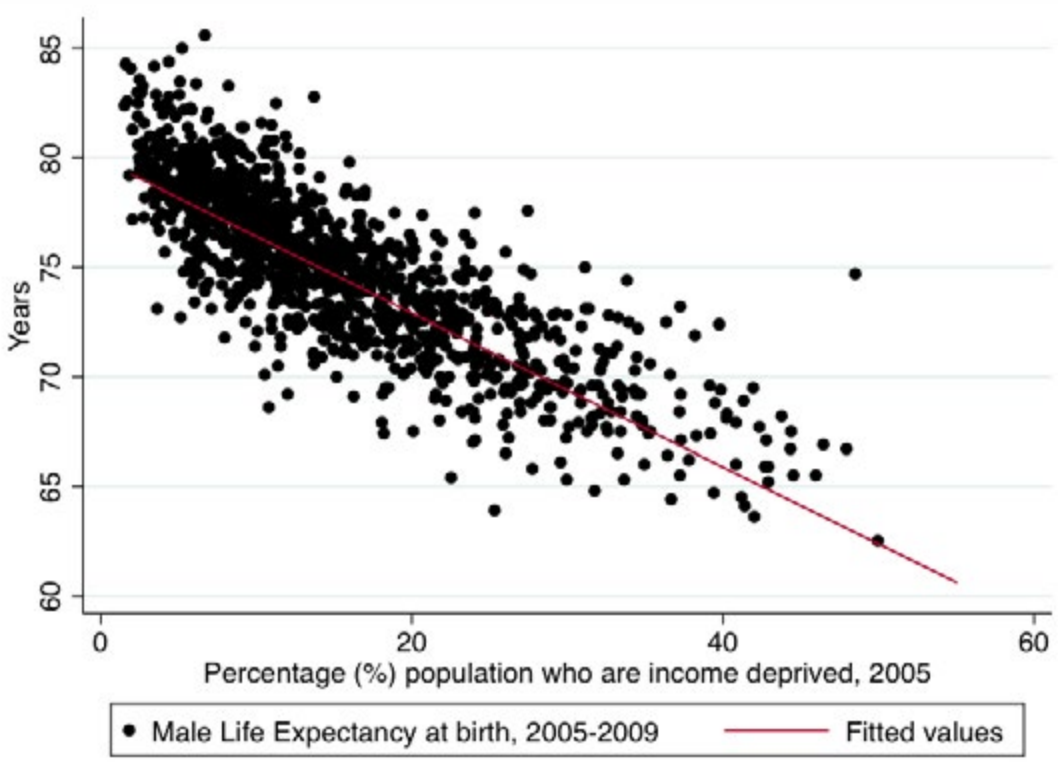


Figure 11-11 Scatterplot, S4 tariff scores by income deprivation

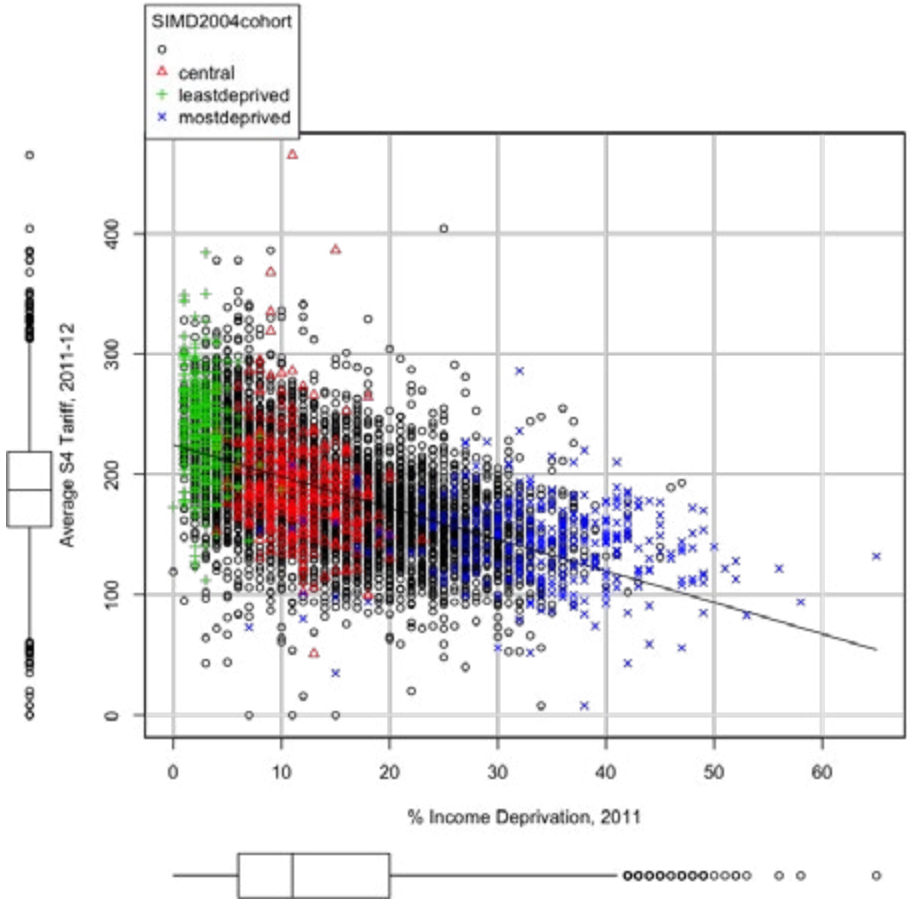
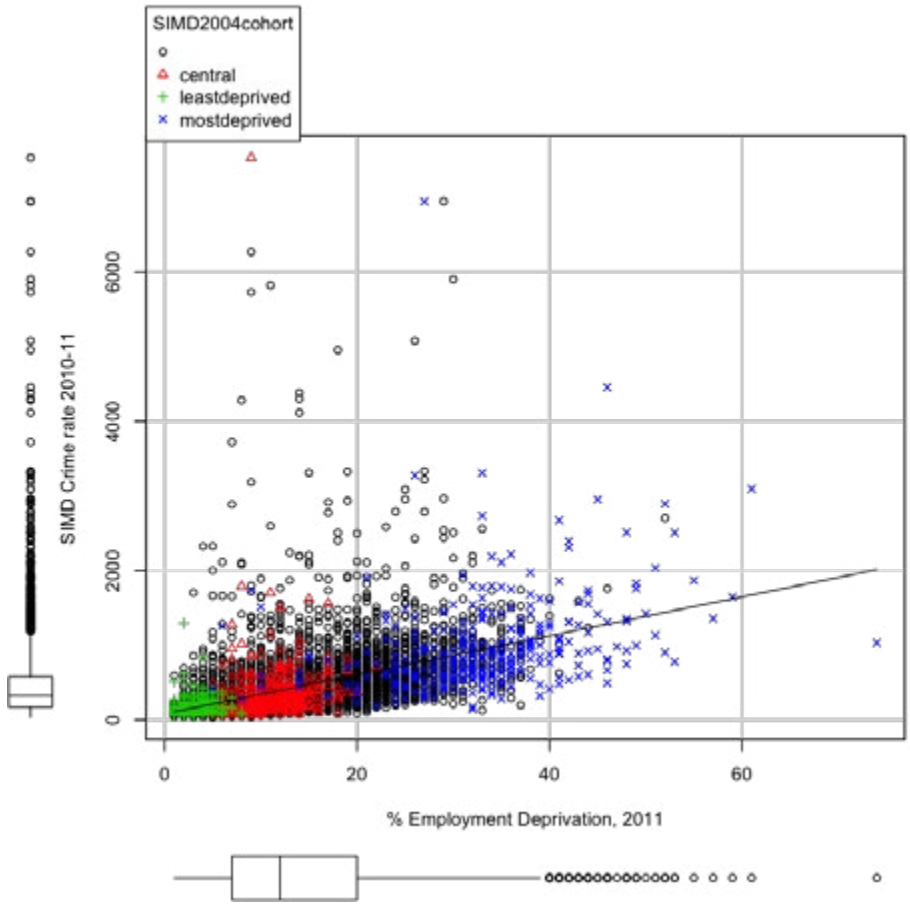
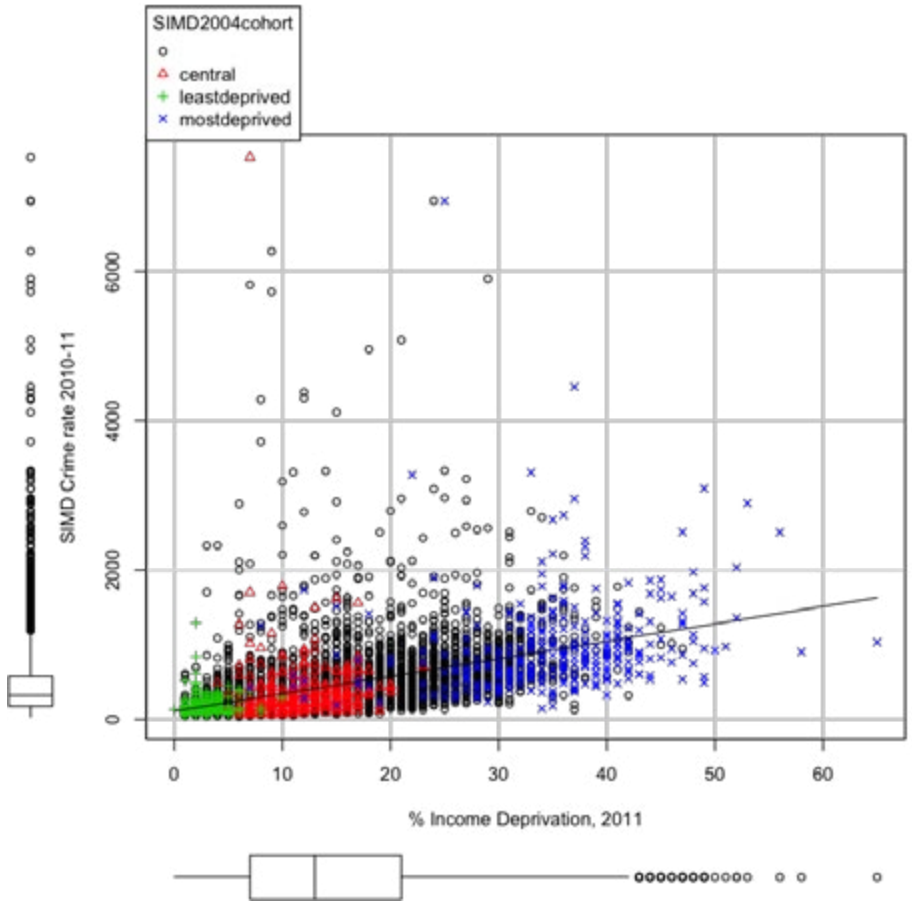


Figure 11-12 Scatterplot, SIMD crime by employment deprivation



one outlier removed – S01003410 Glasgow City Centre (>15000)

Figure 11-13 Scatterplot, SIMD crime by income deprivation



one outlier removed – S01003410 Glasgow City Centre (>15000)

11.1 Data Sources

Education		
Average S4 Tariff Score	Scottish Neighbourhood Statistics	http://www.sns.gov.uk
Average S5 Tariff Score	Scottish Neighbourhood Statistics	http://www.sns.gov.uk
Percentage of pupils in positive follow up destinations	Scottish Neighbourhood Statistics	http://www.sns.gov.uk
Percentage of population aged 16+ with no qualifications/qualifications level 4 or above	Scottish Census 2011	http://www.scotlandscensus.gov.uk/en

Health		
Emergency Hospital Admissions	Scottish Neighbourhood Statistics	http://www.sns.gov.uk
Planned Hospital Admissions	Scottish Neighbourhood Statistics	http://www.sns.gov.uk
Hospital admissions for drug misuse	Scottish Neighbourhood Statistics	http://www.sns.gov.uk
Hospital stays due to alcohol misuse	SIMD Scottish Neighbourhood Statistics	http://www.scotland.gov.uk/Topics/Statistics/SIMD/DataAnalysis/Background-Data-2012/Background5Health2012 http://www.sns.gov.uk

Crime		
SIMD Crime Rate	SIMD Scottish Neighbourhood Statistics	http://www.scotland.gov.uk/Topics/Statistics/SIMD/DataAnalysis/Background-Data-2012/Background9Crime2012 http://www.sns.gov.uk

Economic Activity and Welfare Dependency		
Percentage of Population claiming JSA	Scottish Neighbourhood Statistics	http://www.sns.gov.uk
Percentage of children in poverty	Scottish Neighbourhood Statistics	http://www.sns.gov.uk
Percentage of population who are employment deprived	SIMD Scottish Neighbourhood Statistics	http://www.scotland.gov.uk/Topics/Statistics/SIMD/DataAnalysis/Background-Data-2012/Background4Employment2012 http://www.sns.gov.uk
Percentage of population who are income deprived	SIMD Scottish Neighbourhood Statistics	http://www.scotland.gov.uk/Topics/Statistics/SIMD/DataAnalysis/Background-Data-2012/Background3Income2012 http://www.sns.gov.uk
Percentage of economically active 16-74 year olds who are unemployed	Scottish Census 2011	http://www.scotlandscensus.gov.uk/en/

Council Tax Brackets		
Percentage of dwellings in bands A-C	Scottish Neighbourhood Statistics	http://www.sns.gov.uk
Percentage of dwellings in bands D-E	Scottish Neighbourhood Statistics	http://www.sns.gov.uk
Percentage of dwellings in bands F-H	Scottish Neighbourhood Statistics	http://www.sns.gov.uk

Population		
Percentage of population who are of pensionable age	Scottish Neighbourhood Statistics	http://www.sns.gov.uk
Total population by age bands	Scottish Neighbourhood Statistics	http://www.sns.gov.uk

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