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**Changing patterns of occupational mortality in the countries of the United Kingdom, 1991-2011: A comparative analysis of linked census-mortality records**

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## **Abstract**

### **Background**

Recent, detailed assessments of occupational mortality rates are lacking. We provide up-to-date assessments of mortality by occupation across the United Kingdom.

### **Methods**

We analysed representative samples of working age adults (aged 20-59 years), using linked census and death records. Self-reported main occupation was coded into 60+ groups in the 2001 census, with follow-up for death until the end of 2011. Comparable occupation data were available for Scotland in 1991 and used to assess trends over time. All-cause mortality rates (per 100,000 person-years) were calculated, stratified by sex and age-standardised.

### **Findings**

Over three-fold differences in occupational mortality rates were seen during 4.51 million person-years of follow-up. Among men in England, health professionals had the lowest mortality (224.7, 95%CI 145.3-304.1), with managers and teachers also having low rates. The highest mortality occurred in elementary construction jobs (701.3, 95%CI 593.1-809.4), housekeeping jobs and factory workers. Among women, teachers and business professionals experienced low mortality, with factory workers and those in the garment trade having high rates. Mortality rates have generally fallen, but stagnated or even increased amongst women in some occupations, such as cleaners. Simulation models suggest if occupational mortality rates in England/Wales applied to Scotland, there would be 631 fewer men and 273 fewer women of working age dying in Scotland every year.

### **Interpretation**

Occupational mortality rates show large differences throughout the UK. The known excess mortality in Scotland is concentrated amongst disadvantaged groups, some experiencing increases in absolute mortality.

### **Funding**

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## **Research in context**

### Evidence before this study

We searched the Medline and Embase databases in May 2015 using terms including ‘occupation’, ‘job’, ‘mortality’ and ‘deaths’ to identify studies which reported occupational mortality rates. Technological and societal developments have brought about major changes in the nature of many occupations in recent decades yet our understanding of occupational patterns of mortality in the United Kingdom still relies largely on studies done in the 1980s. Internationally, occupational mortality rates have been reported in South Korea and New Zealand but these studies are based on relatively few occupational categories. No recent studies which report detailed occupational mortality were identified. Similarly, occupational mortality rates across the UK have not been compared in recent decades.

### Added value of this study

Mortality rates continue to show very large variation between occupations amongst the working age population of the UK. Among men, health professionals, managers and teachers had particularly low age-standardised mortality rates. The highest mortality occurred in elementary construction jobs, housekeeping jobs and factory workers. Among women, teachers and business professionals experienced low mortality, with factory workers and those in the garment trade having high mortality rates. Most occupational groups have experienced reduced mortality rates over time but this was not the case for all groups, with some occupations that had high mortality rates in the 1990s experiencing little improvement or even increased mortality rates. Among those doing the same jobs, mortality was generally higher in Scotland than England/Wales, but excess Scottish deaths were concentrated amongst those with the highest mortality risk.

### Implications of all the available evidence

Mortality rates show over three-fold differences between occupations amongst the working age population of the UK. While most occupational groups have experienced improvements, some have experienced increased mortality – reasons for this require urgent investigation.

Among those doing the same jobs, mortality was generally higher in Scotland than England/Wales, but excess Scottish deaths were concentrated amongst those with the highest mortality risk.

## **Background**

Work has been long established as a fundamental determinant of health.<sup>1</sup> Following the UK's second ever census, mortality rates by occupation were first calculated in the UK in 1851.<sup>2</sup> Since then, regular decennial reports provided updated estimates of occupational mortality rates, with the last published in the 1970s.<sup>3-5</sup> Similar analyses from other countries are also rare, with existing research typically based on very broad occupational categories.<sup>6,7</sup> Recent and ongoing changes in the labour market make a reassessment of mortality by occupation timely. In particular, there is growing concern that trends in the job market (such as the rise of 'zero hours' contracts) could have adverse impacts on health and health inequalities.<sup>8-10</sup> It cannot be assumed that the patterns identified in the 1970s, that still underpin our contemporary understanding, continue to apply in the 21<sup>st</sup> century.

There has been a discernible shift away from a focus on occupational mortality, with more recent research on inequalities in health focussing on where people live, using area-based deprivation measures (such as the Index of Multiple Deprivation). This is exemplified by images of large differences in life expectancy within a single city, such as Glasgow, or in the populations living close to stations on the London underground.<sup>11,12</sup> Some research does use social class<sup>13,14</sup> but while this is based on occupation, it indicates the social position of an individual rather than their specific occupation.<sup>15</sup> Social class therefore often combines relatively heterogeneous groups into typically fewer than eight categories.<sup>16,17</sup> What research on mortality by occupation exists has reported on proportional mortality ratios, which identify the causes of death that are over-represented in different groups.<sup>18,19</sup> While such research is helpful in detecting which diseases are most likely to present in different groups, it does not provide information on how absolute mortality rates differ between occupations and is therefore of little use to inform policy choices.<sup>20</sup> Furthermore, those seeking employment have little contemporary information on the health risks they may face.

There are large differences in health among the countries of the United Kingdom (UK).<sup>21</sup> Mortality rates in Scotland are consistently higher than elsewhere in the UK, a phenomenon that cannot be accounted for by socioeconomic deprivation.<sup>22</sup> Existing research has suggested that this excess mortality appears to occur across the socioeconomic spectrum, but studies so far have relied on broad classifications of social class, household socioeconomic position or area-based deprivation.<sup>23-26</sup>

In this paper, we describe mortality rates by detailed occupational groups in each part of the UK for the first time in over three decades, looking at how they have changed over time and whether they differ among countries within the UK.

## **Methods**

### **Data Sources**

We studied representative populations of working age adults (aged 20-59 years at baseline) in the UK. Three different data sources were used for different parts of the United Kingdom: the ONS Longitudinal Study (LS) provides a 1% sample of respondents to the 2001 census in England/Wales; the Scottish Longitudinal Study (SLS) provides a 5.3% sample of Scotland's census respondents for both 2001 and 2011; and the Northern Ireland Mortality Study (NIMS) includes 100% of the Northern Irish population responding to the 2001 census. We analyse census data linked to mortality

records to create a cohort. Deaths were identified through administrative record linkage to national registers. For England/Wales and Scotland, deaths from throughout the UK were available from the Office for National Statistics and National Records Scotland. As the follow-up process for deaths in Northern Ireland differed, with deaths occurring outside of Northern Ireland unavailable, we report deaths for Northern Ireland in supplementary analyses. Patterns by occupational group were broadly similar for Northern Ireland but observed mortality rates were lower due to under-ascertainment of deaths. For all three datasets, the researchers had access to no identifiable individual level data, with all data derived from linkages that were anonymised prior to handover.

### **Exposure Measures**

Occupation was self-reported in the 2001 census, in response to the question “What is the full title of your main job?” The Standard Occupational Classification (SOC) 2000 codes are used by statistical agencies in the UK and elsewhere to classify occupations into meaningful groups, based on comparable levels of training, prestige and economic reward.<sup>27</sup> The SOC coding system is hierarchical in nature, with the most refined classification provided by four digit unit groups (consisting of 371 categories). These are nested in 81 minor groups (defined by 3 digit codes) which lie within 25 sub major groups (defined by two digit codes). At the top of the hierarchy are nine major groups, which are defined by a single code. In order to gain adequate statistical power to investigate mortality rates by occupation, we amalgamated these codes into three digit SOC codes and, where appropriate, combined them further. Those not reporting an occupation were categorised as a separate group for the analysis. Due to disclosure control restrictions, we are unable to report occupational groups that include fewer than ten deaths during the follow-up period. When this criterion was not met, we combined groups within the hierarchical categories. We sought to ensure that comparable occupational groups were used for analysis across all three datasets and that as detailed codes as possible were used. Employment status (at the time of the census) by occupational group could not be considered within the analysis for disclosure control reasons and due to differences in coding of variables. Therefore, the exposure measure is based on the person’s self-reported last main job, rather than the job an individual was actually carrying out on the date of the census. The classification used for categorising occupation is detailed in Appendix 1.

### **Statistical Analysis**

Due to data security restrictions, analysis was conducted separately for each dataset on a standalone computer within each UK country. For all three datasets, occupational groups were categorised on the basis of responses in the 2001 census. Each sample was followed up for all-cause mortality until the end of 2011. We calculated directly age-standardised mortality rates, stratified by sex. The standard population used was the WHO European standard population of 2013. To assess trends over time, we assessed occupational mortality rates for the 1991 census sample in Scotland, followed up until the end of 2001.

Since the role of chance could not be directly tested within a single statistical model across the multiple datasets, we used a Monte Carlo simulation to derive P values and 95% confidence intervals (CIs) for the difference in mortality rates over time and between England/Wales and Scotland. 10,000 simulated occupation-specific mortality rates based on the mean and standard error of the age-standardised rate for each occupation in England/Wales and Scotland were carried out. These

simulated rates were compared across countries for each simulation, noting the proportion of times that rates in Scotland were higher than in England/Wales and the 2.5% and 97.5% quantiles of the difference in rates.

Lastly, in order to help interpret the public health importance of our findings, we carried out a simulation of the number of expected deaths in England/Wales and Scotland under different scenarios. To do so, we first retrieved information on the age-sex structure of these countries. We then created a baseline scenario in which we calculated the number of people that would be expected to be in each occupational group; assuming the person-years observed in each of our country samples were reflected across the working age population of their respective countries in 2001. We then applied mortality rates for each occupational group within each country to calculate the number of expected deaths per year within each country under this baseline scenario. Following this, we modelled anticipated deaths under two alternative scenarios: first, by applying the occupation-specific mortality rates for England/Wales to Scotland and, second, applying the occupation-specific mortality rates for Scotland to England/Wales. These two scenarios provide estimates of how many deaths could be averted within Scotland if occupation-specific mortality rates for England/Wales applied and how many excess deaths there would be if England/Wales experienced Scottish rates, respectively. To estimate 95% confidence intervals (CI), we carried out Monte Carlo modelling with 10,000 samples.

### **Role of the funding source**

The funders of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

## **Results**

The LS and SLS provided 4.51 million person-years of follow-up for the investigation of occupational mortality rates (2.31 million person-years for females). There were very large differences in occupational mortality rates in all parts of the UK, with more than three-fold differences between the lowest and highest observed rates in both men and women in all three datasets. The largest differences in occupational mortality rates were seen in Scotland.

### **Patterns of occupational mortality**

Table 1a reports the mortality rates by occupation for England and Wales in men. The patterns of high and low occupational mortality rates were broadly similar across the UK (Web Supplement Tables 1 and 2), given the imprecise estimation of rates within specific groups. For men, health professionals (comprising medical doctors, dentists, psychologists, pharmacists, opticians and vets) had the lowest mortality rates in all three datasets. The business and public services professionals (including lawyers, architects and accountants) also had very low mortality, followed by different groups of managerial staff. Out of the intermediate skilled jobs, those working in electrical trades (including electricians, telecommunications engineers and computer engineers) had relatively low mortality compared to other jobs of a similar skill level. The highest mortality rates were seen amongst unskilled construction workers and those working in factories or similar settings (i.e.

elementary process plant jobs which include packers, canners, fillers and labourers in foundries). Elementary personal services occupations, which include hospital/hotel porters, kitchen and catering assistants and bar staff, also had very high mortality rates. Occupational groups that included large numbers of people and tended to have high mortality rates were goods storage occupations (which includes dockers, as well as other goods handling occupations), process operatives (people involved in the processing of goods, such as food, drink, rubber, plastics etc.) and transport drivers and operatives (e.g. drivers of heavy goods vehicles, taxis and buses). Administrative and sales jobs had intermediate mortality rates. The highest mortality rates overall occurred in men who reported never having had a job.

Among women, the lower mortality rates resulted in some variability in the ranking of some smaller occupational groups across the three datasets. The groups that had low mortality rates within England, as well as Northern Ireland and Scotland, included business and public services professionals, teachers and corporate managers and directors (Table 1b and Supplementary File). Nurses and allied health professionals had relatively low mortality, while administrative jobs tended to have intermediate mortality rates. Of the intermediate skilled jobs, childcare and related personal services had relatively low mortality rates when compared to jobs of a similar skill level. The highest mortality rates occurred in factory workers, including those working in the textile and garment trade. As with men, elementary process plant occupations had high mortality rates. Of the larger occupational groups, assemblers and routine operatives (e.g. assemblers of electrical products, inspectors and routine testers), elementary cleaning occupations and elementary personal services occupations had high mortality rates. Those reporting an occupation had lower mortality rates than those who did not.

#### Comparison across UK geographies and trends over time

Mortality rates in Northern Ireland could not be directly compared to other parts of the UK due to under-ascertainment of mortality in the study data. However, the relative ranking of occupations was generally comparable to other geographies. It was possible to report some specific occupational mortality rates from Northern Ireland that could not be ascertained in other geographies for disclosure control reasons. For example, research professionals were found to have relatively low mortality rates in both men and women in Northern Ireland (Supplementary File, Table 3).

Mortality rates in Scotland tended to be slightly higher in many occupations (Figures 1a and 1b, for men and women respectively). Among both men and women, mortality rates did not seem to differ systematically between Scotland and England/Wales for more highly skilled jobs. In contrast, lower skilled occupations with high mortality rates tended to have even higher mortality rates in Scotland. However, given the relatively small sample size for many categories, few specific occupational groups recorded a statistically significant difference.

Assessment of trends within Scotland showed that men and women in most occupational groups had experienced falls (Tables 2a and 2b). However, this was not universally the case, with mortality rates increasing amongst some occupations. Three occupational groups (assemblers and routine operatives, elementary cleaning occupations and those reporting no job) which had high mortality rates in 1991 experienced a rise over time in women which did not appear to be due to chance. For example, age-standardised death rates amongst women reporting their occupation as a cleaner in



1991 was 336.8 deaths per 100,000 person years (95% CI 291.6-382.0) which rose to 425.7 in 2001 (95% CI 371.0-480.5).

Our simulation analyses (Tables 3a and b), which applied mortality rates from England/Wales to the population of Scotland, found a total of 630.9 (95% CI 284.8-979.2) excess deaths in men and 272.6 (95% CI 26-512.6) excess deaths in women amongst the working age population of Scotland per year. If Scottish occupational mortality rates applied across England/Wales, there would be 6,084.8 (95% CI 3,007.6-9,174.7) more expected deaths in men and 2,273.2 more deaths (95% CI -164.7-4688) in women each year.

## **Discussion**

Over three-fold differences in occupational mortality rates exist in the UK. In men, health professionals, managers and teachers had particularly low mortality rates while those working in elementary agricultural, construction and housekeeping jobs had high mortality rates. In women, teachers and business professionals experienced low mortality, with factory workers and those working in the garment trade having high mortality rates. When comparing Scotland to England/Wales, we found that mortality rates were often even higher amongst health-disadvantaged occupational groups in Scotland but no consistent differences were seen amongst people in the most health-advantaged occupations. Simulation models suggest that there are 631 excess deaths (630.9, 95% CI 284.8-979.2) in men and 273 in women (272.6, 95% CI 26.0-512.6) every year in Scotland's working age population. We studied trends over a twenty year period in Scotland and found mortality rates have fallen in most occupations but have remained stagnant or even increased amongst women in some occupational groups.

Our study has a number of important strengths. We have analysed three nationally representative administrative datasets. Furthermore, we have been able to compare trends in occupational mortality over time, due to the availability of similarly categorised occupational information within Scotland. The use of linked data avoids the potential for numerator-denominator bias, a known problem as reports of occupation from death certificates and self-report can differ. Our large sample has allowed us to investigate occupational categories in greater detail than is usually possible. However, there are several limitations which should be noted. First, our exposure variable was based on self-reported main occupation at a single time point. This therefore reflects a respondent's perceived main occupation but may not reflect their occupation at that or other specific times. Our analysis was not able to investigate the role of employment status – at least in part due to the challenges in carrying out parallel analyses within three different safe settings which made pooling of data impossible. Although our study is very large, the low risk of mortality in working age precludes investigation of cause-specific mortality outcomes within the available administrative data samples. Lastly, due to the lack of comparability of outcome ascertainment within Northern Ireland, it is a matter of concern that we were unable to compare the rates there to other parts of the UK.

While our study is the first to consider occupational mortality rates in the UK for over three decades, other research has investigated whether specific causes of death are over-represented within some occupations through the reporting of proportional mortality ratios.<sup>18 19</sup> This approach has the

advantage of not requiring information on the number of people within each occupational group and facilitates the early identification of potential work-related hazards. However, it does not inform policies to help particular occupational groups.<sup>28</sup> There is research on occupational mortality rates from other countries but it has generally used broad occupational groups. Holmes and colleagues reported occupational mortality rates in New Zealand men according to the nine broadest SOC categories, finding an approximately two-fold difference between the highest and lowest rates.<sup>6</sup> Similarly, Lee et al reported occupational mortality rates for the nine most aggregated SOC codes in South Korea and again found an approximate doubling of mortality rates between the lowest and highest groups.<sup>7</sup> Our study provides a much more fine-grained picture of occupational mortality than has hitherto been presented in recent decades.

The labour market has changed radically since the publication of the last assessment of occupational mortality rates in the UK over three decades ago, with workers today experiencing very different health outcomes. While, historically, occupational health has focused on risks arising from specific physical, chemical and environmental hazards, many current health risks are likely to be mediated by mechanisms affecting psychological, social and material resources. Monitoring changes in occupational mortality rates is necessary to inform policy responses to address new health risks that arise in response to upcoming changes in the labour market, including the likely reduction in availability of unskilled jobs as a consequence of increasing automation.<sup>29</sup> Occupational mortality rates are valuable in guiding prioritisation of scarce health and other resources. Furthermore, interest is growing in the implementation of workplace-based interventions to improve health<sup>30 31</sup>, but the choice of which workplaces to target has not been informed by a systematic assessment of need – a gap that our study fills. We have identified specific large occupational groups which may benefit from targeted prevention approaches – for example, interventions targeted at male transport drivers and female cleaners.

Our study has particular relevance to Scottish policymakers. There has been considerable concern that health outcomes in Scotland are poorer than elsewhere in Western Europe.<sup>32 33</sup> The results of this paper suggest that the poorer health outcomes experienced in Scotland arise as a consequence of excess mortality amongst the most disadvantaged in society, rather than the whole Scottish population experiencing a generally higher mortality risk. Our study echoes recent findings which suggest excess mortality in Scotland is particularly concentrated amongst people living in the most disadvantaged areas.<sup>34</sup> Efforts to address Scotland's 'sick man of Europe' status need to focus on meeting health needs amongst those experiencing the full spectrum of socioeconomic disadvantage.

Future research that investigates the specific causes of death at the detailed occupational level will be valuable. Investigating the inter-relationship between occupational group and employment status will help understand the implications of increasing precariousness of work.<sup>8 9</sup> Our study has identified very poor, and potentially even worsening, mortality risks for some specific occupational groups. This should be a matter of great concern, stimulating further research to understand what is happening.

Figure 1: Bubble graph showing occupational mortality rates in England and Scotland, 2001-2011 for a) men and b) women \*

\*Each bubble is proportional to the size of the employment group in England

### **Contributors**

SVK and DS conceived the idea for the study. All authors contributed to study design. SVK led the analysis, with input from AHL and KR. All authors contributed to the interpretation of results. SVK drafted the manuscript and all authors critically revised the paper. All authors read and approved the final manuscript.

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### **Declarations of interest**

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### **Data sharing**

The ONS Longitudinal Study, Scottish Longitudinal Study and Northern Ireland Mortality Study are available to researchers by application from the data holders.

### **Ethical approval**

Not required.

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**Table 1a: Occupational mortality rates in England in males**

<b>Employment group</b>	<b>Rank</b>	<b>SOC code*</b>	<b>Person-Years</b>	<b>EASR</b>	<b>95% CI</b>
Health professionals	1	221	12873	<b>224.7</b>	145.3-304.1
Business and Public Service Professionals	2	24	41276	<b>228.1</b>	182.4-273.8
Functional Managers	3	113	61089	<b>233.2</b>	193.5-272.9
Financial Institution And Office Managers	4	115	21375	<b>234.2</b>	169.7-298.7
Corporate Managers and Directors	5	11	13934	<b>250.4</b>	174.6-326.1
Teaching Professionals	6	231	36736	<b>261.7</b>	209.9-313.4
Production Managers	7	112	55718	<b>264.6</b>	218.7-310.5
Protective Service Occupations	8	331	28834	<b>264.6</b>	189.6-339.6
Information And Communication Technology Professionals	9	213	31489	<b>267.4</b>	186.9-347.9
Business And Finance Associate Professionals	10	353	25992	<b>268.6</b>	198.3-338.9
Science And Engineering Technicians	11	311	23177	<b>269.9</b>	199.0-340.7
Managers In Distribution, Storage And Retailing	12	116	44677	<b>276.6</b>	226.2-326.9
Engineering Professionals	13	212	35715	<b>281.8</b>	226.1-337.6
Draughtspersons And Building Inspectors	14	312	5009	<b>282.1</b>	136.5-427.8
Health Associate Professionals	15	321	9248	<b>287.5</b>	171.3-403.6
Transport Associate Professionals	16	351	5078	<b>290.1</b>	116.5-463.6
Public Service And Other Associate Professionals	17	356	13681	<b>308.6</b>	211.8-405.3
Protective Service Officers	18	117	6365	<b>323.4</b>	188.1-458.7
Managers And Proprietors In Other Service Industries	19	123	36544	<b>332.5</b>	278.1-387.0
Electrical Trades	20	524	41849	<b>332.5</b>	275.8-389.2
Social Welfare Associate Professionals	21	323	5084	<b>333.8</b>	166.4-501.2
Leisure And Travel Service Occupations	22	621	6145	<b>344.6</b>	165.3-523.9
Administrative Occupations: Finance	23	412	23118	<b>347</b>	264.9-429.2
Secretarial And Related Occupations	24	421	4784	<b>348.3</b>	186.8-509.8
Culture, Media and Sports Occupations	25	34	32202	<b>350.2</b>	272.6-427.7
IT Service Delivery Occupations	26	313	10582	<b>350.2</b>	169.0-531.5
Sales And Related Associate Professionals	27	354	26967	<b>361.6</b>	284.9-438.2
Sales Related Occupations	28	712	9552	<b>368</b>	250.7-485.3
Administrative Occupations: Government And Related Organisations	29	411	11250	<b>373.1</b>	267.6-478.6
Customer Service Occupations	30	721	8397	<b>385.3</b>	197.5-573.2
Elementary Administration Occupations	31	921	22354	<b>389</b>	305.4-472.6
Skilled Trades not elsewhere classified	32	549	9553	<b>391.4</b>	258.6-524.1
Metal Machining, Fitting And Instrument Making Trades	33	522	42963	<b>400.1</b>	341.7-458.4
Agricultural Trades	34	511	23913	<b>402.1</b>	324.7-479.4
Printing Trades	35	542	7140	<b>402.9</b>	244.1-561.7
Healthcare And Related Personal Services	36	611	11400	<b>413.3</b>	287.4-539.1
Administrative Occupations: Records	37	413	20129	<b>417.5</b>	318.4-516.6
Construction Trades	38	531	71558	<b>418.7</b>	370.3-467.2
Plant And Machine Operatives	39	812	38091	<b>423.3</b>	359.9-486.7
Sales Assistants And Retail Cashiers	40	711	33239	<b>428.7</b>	331.3-526.2
Food Preparation Trades	41	543	23061	<b>438.6</b>	335.4-541.7
Transport Drivers And Operatives	42	821	82677	<b>445</b>	401.2-488.9
Building Trades	43	532	23344	<b>445.9</b>	360.1-531.7
Managers and Proprietors in Agriculture and Services	44	12	23348	<b>449.9</b>	364.1-535.7
Vehicle Trades	45	523	23097	<b>455.5</b>	358.1-553.0
Administrative Occupations: General	46	415	16102	<b>461.2</b>	341.5-580.9

Hairdressers And Related Occupations	47	622	2755	<b>492.4</b>	225.9-759.0
Assemblers And Routine Operatives	48	813	25176	<b>501.3</b>	409.7-592.9
Construction Operatives	49	814	16247	<b>505.3</b>	399.2-611.3
Process Operatives	50	811	30195	<b>529.3</b>	444.5-614.2
Elementary Goods Storage Occupations	51	914	37887	<b>538.8</b>	458.8-618.7
Elementary Security Occupations	52	924	15272	<b>544.1</b>	433.2-655.0
Mobile Machine Drivers And Operatives	53	822	14661	<b>555.7</b>	435.3-676.1
Elementary Sales Occupations	54	925	3571	<b>555.8</b>	208.5-903.0
Metal Forming, Welding And Related Trades	55	521	16479	<b>562.9</b>	450.6-675.2
Housekeeping Occupations	56	623	5202	<b>566.9</b>	401.5-723.3
Textiles And Garments Trades	57	541	3809	<b>569.2</b>	330.3-808.2
Elementary Cleaning Occupations	58	923	20096	<b>591.5</b>	487.2-695.7
Administrative Occupations: Communications	59	414	2204	<b>603.9</b>	245.9-962.0
Elementary Agricultural Occupations	60	911	8101	<b>622.9</b>	441.2-804.7
Elementary Personal Services Occupations	61	922	21359	<b>650</b>	509.8-790.1
Elementary Process Plant Occupations	62	913	32513	<b>671.6</b>	576.3-767.0
Elementary Construction Occupations	63	912	22988	<b>701.3</b>	593.1-809.4
No occupation reported			39614	<b>1189.1</b>	1014.3-1363.9
All those reporting an occupation§			1457772	<b>384</b>	373.7-394.3

EASR = European age-standardised mortality rates

\*Standard Occupational Classification (SOC) codes have been modified for disclosure control purposes. See Web Appendix for details.

§Note that this includes not only SOC categories listed, but also small occupational groups that have been suppressed for disclosure control (equating to a total of 1.2% of all person-years). Therefore, person-years for the SOC codes listed do not total to the last two rows.

Source: ONS Longitudinal Study

**Table 1b: Occupational mortality rates in England in females**

<b>Employment group</b>	<b>Rank</b>	<b>SOC code*</b>	<b>Person-Years</b>	<b>EASR</b>	<b>95% CI</b>
Culture, Media and Sports Occupations	1	34	26903	<b>133</b>	78.4-187.7
Business and Public Service Professionals	2	24	25728	<b>158.8</b>	103.8-213.9
Teaching Professionals	3	231	79871	<b>179.8</b>	151.8-207.7
Science, Research, Engineering and Technology Professionals	4	21	13446	<b>180.4</b>	81.9-278.8
Business and Public Service Associate Professionals	5	35	64710	<b>188.1</b>	146.0-230.2
Science and Technology Associate Professionals	6	31	15796	<b>203.1</b>	127.4-278.8
Childcare And Related Personal Services	7	612	55829	<b>203.6</b>	156.8-250.4
Corporate Managers and Directors	8	11	106025	<b>208.5</b>	178.1-238.9
Hairdressers And Related Occupations	9	622	21910	<b>209.3</b>	141.7-276.9
Health professionals	10	221	10099	<b>212.5</b>	107.2-317.8
Food Preparation Trades	11	543	18319	<b>216.7</b>	152.6-280.9
Secretarial And Related Occupations	12	421	112533	<b>217.5</b>	191.5-243.5
Elementary Sales Occupations	13	925	6775	<b>218.3</b>	92.8-343.9
Elementary Goods Storage Occupations	14	914	7984	<b>219.5</b>	103.5-335.6
Leisure And Travel Service Occupations	15	621	12344	<b>221.8</b>	115.5-328.1
Managers And Proprietors In Other Service Industries	16	123	23180	<b>226.8</b>	162.4-291.1
Customer Service Occupations Health	17	721	25489	<b>229.9</b>	152.6-307.2
Associate Professionals Administrative	18	321	58260	<b>230.3</b>	190.8-269.8
Occupations: General Social Welfare	19	415	76601	<b>233.1</b>	198.2-268.0
Associate Professionals Agricultural	20	323	13795	<b>235.6</b>	153.1-318.1
Trades	21	511	4776	<b>251.1</b>	113.6-388.5
Printing Trades	22	542	3557	<b>256.4</b>	104.2-408.6
Administrative Occupations: Government And Related Organisations	23	411	21080	<b>263</b>	192.0-333.9
Administrative Occupations: Finance	24	412	72532	<b>264.1</b>	223.1-305.1
Sales Related Occupations Transport	25	712	9852	<b>265.3</b>	156.1-374.6
Drivers And Operatives Healthcare And	26	821	6560	<b>279.3</b>	132.3-426.3
Related Personal Services Elementary	27	611	88120	<b>289.8</b>	254.7-324.9
Security Occupations	28	924	16424	<b>301.2</b>	222.3-380.2
Sales Assistants And Retail Cashiers	29	711	137985	<b>305.2</b>	274.9-335.5
Housekeeping Occupations	30	623	8417	<b>305.5</b>	204.3-406.7
Elementary Personal Services Occupations	31	922	59492	<b>313.9</b>	265.3-362.6
Administrative Occupations: Records	32	413	37807	<b>332.7</b>	271.0-394.3
Process Operatives	33	811	17107	<b>345.8</b>	258.8-432.7
Elementary Cleaning Occupations Skilled	34	923	65159	<b>352.3</b>	310.9-393.8
Metal and Electrical Trades Administrative	35	52	4745	<b>367.1</b>	184.0-550.1
Occupations: Communications Skilled Trades	36	414	6727	<b>367.5</b>	233.1-502.0
not elsewhere classified Elementary	37	549	4170	<b>380</b>	174.5-585.4
Administration Occupations Assemblers And	38	921	12940	<b>383.4</b>	275.1-491.7
Routine Operatives	39	813	34561	<b>386.1</b>	324.3-447.9
Managers and Proprietors in Agriculture and Services	40	12	23892	<b>396.6</b>	317.6-475.5
Elementary Process Plant Occupations	41	913	30212	<b>404.7</b>	333.6-475.7
Textiles And Garments Trades	42	541	3810	<b>482.7</b>	265.5-699.9
Plant And Machine Operatives	43	812	8707	<b>516.8</b>	370.3-663.3
No occupation reported			83370	587.1	522.9-651.2
All those reporting an occupation§			1485036	263.2	254.7-271.6

EASR = European age-standardised mortality rates

\*Standard Occupational Classification (SOC) codes have been modified for disclosure control purposes. See Web Appendix for details.

§Note that this includes not only SOC categories listed, but also small occupational groups that have been suppressed for disclosure control (equating to a total of 2.0% of all person-years). Therefore, person-years for the SOC codes listed do not total to the last two rows.

Source: ONS Longitudinal Study



**Table 2a: Differences in occupational mortality rates in Scotland between 1991-2001 and 2001-2011 in men**

Employment group	SOC code*	1991 follow-up period		2001 follow-up period		Difference in mortality rates over time §		
		EASR	95% CI	EASR	95% CI	Difference in rates	95% CI	p value
Corporate Managers and Directors	11	<b>511.6</b>	274.6-748.7	<b>244.2</b>	116.6-371.7	-268.0	( -538.1, -1.1)	0.049
Production Managers	112	<b>245.8</b>	176.3-315.2	<b>243.2</b>	181.5-304.9	-3.1	( -95.4, 90.0)	0.943
Functional Managers	113	<b>457.8</b>	334.6-581.0	<b>261.3</b>	171.7-350.8	-196.0	( -345.0,-42.7)	0.014
Financial Institution And Office Managers	115	<b>335.0</b>	192.4-477.6	<b>320.9</b>	191.3-450.5	-13.8	( -209.2,180.8)	0.883
Managers In Distribution, Storage And Retailing	116	<b>343.9</b>	234.5-453.2	<b>362.9</b>	252.0-473.7	19.1	( -135.4,173.9)	0.808
Protective Service Officers	117	<b>393.3</b>	152.6-634.0	<b>436.2</b>	165.2-707.2	41.0	( -327.8,397.6)	0.816
Managers and Proprietors in Agriculture and Services	12	<b>398.9</b>	263.2-534.7	<b>353.1</b>	242.1-464.2	-45.0	( -218.1,131.9)	0.612
Managers And Proprietors In Other Service Industries	123	<b>397.2</b>	298.9-495.5	<b>333.4</b>	240.8-426.0	-64.1	( -199.7, 72.7)	0.359
Natural and Social Science Professionals	211	<b>339.8</b>	61.3-618.4					
Engineering Professionals	212	<b>340.6</b>	229.0-452.1	<b>332.6</b>	233.7-431.5	-7.9	( -154.4,141.6)	0.908
Information And Communication Technology Professionals	213	<b>551.7</b>	61.6-1041.7	<b>214.1</b>	80.8-347.4	-341.1	( -843.2,164.5)	0.186
Health professionals	221	<b>300.6</b>	140.7-460.5	<b>145</b>	49.8-240.2	-156.3	( -341.8, 29.9)	0.102
Teaching Professionals	231	<b>298.5</b>	220.0-377.0	<b>219.3</b>	158.0-280.6	-79.1	( -177.9, 20.9)	0.124
Research Professional	232			<b>328</b>	25.6-630.4			
Business and Public Services Professionals	24	<b>309.0</b>	214.2-403.8	<b>217.9</b>	149.3-286.6	-91.2	( -206.7, 23.2)	0.124
Science And Engineering Technicians	311	<b>456.2</b>	304.8-607.7	<b>314.3</b>	206.1-422.4	-141.2	( -325.3, 44.1)	0.129
Draughtspersons And Building Inspectors	312	<b>284.7</b>	95.1-474.2	<b>494.2</b>	211.8-776.7	205.5	( -134.7,541.7)	0.233
IT Service Delivery Occupations	313			<b>224.1</b>	0-455.6			
Health Associate Professionals	321	<b>754.7</b>	388.9-1120.4	<b>438</b>	219.5-656.5	-315.8	( -743.8,116.6)	0.144
Social Welfare Associate Professionals	323	<b>551.9</b>	193.4-910.3	<b>372.1</b>	141.1-603.1	-179.3	( -615.0,245.4)	0.422
Protective Service Occupations	331	<b>551.9</b>	371.6-732.2	<b>385.7</b>	254.7-516.8	-164.9	( -383.8, 52.8)	0.142
Culture, Media and Sports Occupations	34	<b>469.3</b>	289.0-649.7	<b>306.8</b>	186.7-426.9	-162.9	( -380.8, 53.1)	0.141
Transport Associate Professionals	351	<b>545.0</b>	291.9-798.0	<b>339.3</b>	135.6-543.0	-203.7	( -525.9,123.2)	0.225
Business And Finance Associate Professionals	353	<b>339.8</b>	183.6-495.9	<b>228.5</b>	124.6-332.5	-110.7	( -297.9, 81.6)	0.244
Sales And Related Associate Professionals	354	<b>418.5</b>	285.0-551.9	<b>234.7</b>	140.3-329.1	-185.5	( -346.4,-21.4)	0.026
Public Service And Other Associate Professionals	356	<b>442.5</b>	292.7-592.3	<b>379.4</b>	241.8-517.0	-62.1	( -260.1,141.7)	0.538
Administrative Occupations: Government And Related Organisations	411	<b>512.5</b>	330.4-694.6	<b>520.9</b>	342.6-699.3	9.8	( -247.9,265.8)	0.935
Administrative Occupations: Finance	412	<b>364.5</b>	207.9-521.0	<b>303.4</b>	161.0-445.7	-61.5	( -274.6,150.2)	0.575
Administrative Occupations: Records	413	<b>556.2</b>	389.5-722.8	<b>346.2</b>	220.0-472.4	-209.3	( -421.5, 3.8)	0.054
Administrative Occupations: Communications	414	<b>846.0</b>	167.8-1524.1	<b>724.4</b>	38.5-1410.3	-119.4	(-1089.5,841.0)	0.809

Administrative Occupations: General	415	<b>338.1</b>	142.1-534.0	<b>430.3</b>	242.3-618.3	91.4	( -181.2,363.9)	0.5
Secretarial And Related Occupations	421							
Agricultural Trades	511	<b>446.8</b>	352.1-541.4	<b>446.7</b>	349.7-543.6	-0.4	( -135.0,136.2)	0.998
Metal Forming, Welding And Related Trades	521	<b>657.4</b>	507.9-807.0	<b>506.7</b>	370.0-643.4	-151.2	( -357.5, 52.5)	0.142
Metal Machining, Fitting And Instrument Making Trades	522	<b>556.4</b>	456.5-656.3	<b>431</b>	344.1-517.9	-125.5	( -258.8, 5.4)	0.063
Vehicle Trades	523	<b>473.9</b>	304.1-643.7	<b>351</b>	230.8-471.2	-124.2	( -329.3, 81.6)	0.238
Electrical Trades	524	<b>403.8</b>	315.8-491.7	<b>461.6</b>	371.3-552.0	59.1	( -66.4,186.0)	0.366
Construction Trades	531	<b>535.7</b>	457.4-613.9	<b>501.3</b>	425.3-577.4	-34.1	( -142.5, 75.3)	0.545
Building Trades	532	<b>571.5</b>	431.7-711.3	<b>513.1</b>	380.0-646.2	-58.2	( -248.1,135.8)	0.551
Textiles And Garments Trades	541							
Printing Trades	542	<b>313.9</b>	107.7-520.1	<b>638.2</b>	314.9-961.6	325.1	( -66.7,704.2)	0.101
Food Preparation Trades	543	<b>640.5</b>	438.5-842.5	<b>484.9</b>	351.0-618.8	-156.7	( -392.8, 87.0)	0.197
Skilled Trades not elsewhere classified	549	<b>289.4</b>	76.2-502.7	<b>461.3</b>	219.2-703.5	172	( -144.5,493.2)	0.291
Healthcare And Related Personal Services	611	<b>452.0</b>	212.7-691.3	<b>434.4</b>	265.5-603.4	-18	( -313.7,275.6)	0.908
Animal Care Services	613			<b>1124.8</b>	127.1-2122.5			
Leisure And Travel Service Occupations	621	<b>515.2</b>	195.4-835.0	<b>721</b>	376.6-1065.3	203.5	( -267.5,675.1)	0.393
Housekeeping Occupations	623	<b>623.0</b>	379.8-866.3	<b>567.8</b>	317.5-818.1	-55.5	( -399.8,291.1)	0.763
Sales Assistants And Retail Cashiers	711	<b>331.3</b>	159.1-503.4	<b>444</b>	282.7-605.4	112.0	( -122.5,343.4)	0.35
Sales Related Occupations	712	<b>573.4</b>	379.5-767.2	<b>509.1</b>	303.4-714.7	-63.9	( -353.1,215.6)	0.656
Customer Service Occupations	721			<b>246.7</b>	49.3-444.2			
Process Operatives	811	<b>575.9</b>	456.2-695.7	<b>475.6</b>	359.3-592.0	-98.6	( -265.9, 67.3)	0.237
Plant And Machine Operatives	812	<b>560.1</b>	450.5-669.7	<b>520.5</b>	410.3-630.7	-41	( -197.5,114.3)	0.612
Assemblers And Routine Operatives	813	<b>611.0</b>	438.6-783.5	<b>630</b>	474.9-785.1	18.9	( -209.1,252.6)	0.88
Construction Operatives	814	<b>533.2</b>	399.3-667.2	<b>623</b>	472.0-773.9	88.7	( -116.0,292.0)	0.393
Transport Drivers And Operatives	821	<b>643.8</b>	569.5-718.0	<b>503.2</b>	440.1-566.3	-141	( -238.6,-44.3)	0.005
Mobile Machine Drivers And Operatives	822	<b>860.7</b>	676.7-1044.8	<b>559</b>	410.4-707.7	-302.6	( -541.1,-64.0)	0.014
Elementary Agricultural Occupations	911	<b>574.1</b>	404.1-744.2	<b>571.9</b>	389.7-754.2	-1.4	( -251.4,246.3)	0.997
Elementary Construction Occupations	912	<b>814.6</b>	656.0-973.3	<b>936.9</b>	771.4-1102.5	122.3	( -105.8,351.2)	0.288
Elementary Process Plant Occupations	913	<b>614.1</b>	462.5-765.7	<b>829.1</b>	665.8-992.4	215.2	( -9.9,438.8)	0.061
Elementary Goods Storage Occupations	914	<b>612.0</b>	481.0-742.9	<b>618.8</b>	486.1-751.5	6.5	( -182.0,190.6)	0.939
Elementary Administration Occupations	921	<b>819.8</b>	610.0-1029.6	<b>545</b>	390.3-699.7	-275.6	( -534.9,-14.3)	0.037
Elementary Personal Services Occupations	922	<b>722.9</b>	488.1-957.7	<b>723.5</b>	519.7-927.3	1.2	( -310.8,311.8)	0.985
Elementary Cleaning Occupations	923	<b>777.7</b>	586.9-968.6	<b>769.7</b>	605.3-934.1	-7.3	( -258.7,243.7)	0.955
Elementary Security Occupations	924	<b>672.3</b>	502.8-841.9	<b>739.8</b>	560.2-919.3	68.9	( -179.5,319.2)	0.582
No job reported	1000	<b>1493.8</b>	1390.6-1597.1	<b>1241.5</b>	1131.4-1351.6	-251.8	( -401.9,-99.1)	0.002

EASR = European age-standardised mortality rates

\*Standard Occupational Classification (SOC) codes have been modified for disclosure control purposes. See Web Appendix for details.

§ To assess differences over time, Monte Carlo simulation was used to estimate the difference between the rate in 2001-2011 and 1991-2001. 95% CI and p values were calculated using this method as well.

Source: Scottish Longitudinal Study

**Table 2b: Differences in occupational mortality rates in Scotland between 1991-2001 and 2001-2011 in women**

Employment group	SOC code*	1991 follow-up		2001 follow-up		Difference in mortality rates over time §		
		EASR	95% CI	EASR	95% CI	Difference in rates	95% CI	p value
Corporate managers and directors	11	<b>194.3</b>	121.6-267.1	<b>178.1</b>	131.2-225.0	-15.6	( -101.6, 70.9)	0.725
Managers and Proprietors in Agriculture and Services	12	<b>385.8</b>	242.6-528.9	<b>235.9</b>	147.0-324.8	-148.4	( -316.4, 17.8)	0.082
Managers And Proprietors In Other Service Industries	123	<b>303.6</b>	178.4-428.8	<b>242.8</b>	147.5-338.1	-61.1	( -216.2, 95.9)	0.438
Science, research, engineering and technology professionals	21			<b>428.6</b>	24.0-833.3			
Health professionals	221	<b>258.8</b>	15.5-502.1	<b>214.8</b>	63.4-366.3	-45	( -336.0,247.5)	0.764
Teaching Professionals	231	<b>220.2</b>	164.2-276.3	<b>159.6</b>	122.0-197.1	-60.6	( -129.8, 6.6)	0.079
Business and public service professionals	24	<b>220.6</b>	80.4-360.8	<b>200.8</b>	109.4-292.1	-21.3	( -189.4,147.6)	0.8
Science and technology associate professionals	31	<b>332.3</b>	116.3-548.4	<b>220.4</b>	100.4-340.5	-114.8	( -361.4,131.4)	0.366
Health Associate Professionals	321	<b>241.6</b>	176.6-306.6	<b>241.3</b>	186.4-296.3	-0.3	( -84.2, 83.0)	0.991
Therapists	322			<b>148.2</b>	27.5-268.9			
Social Welfare Associate Professionals	323	<b>356.4</b>	168.5-544.3	<b>202.3</b>	109.5-295.1	-154.9	( -358.6, 54.4)	0.143
Protective Service Occupations	331			<b>569.5</b>	41.8-1097.2			
Culture, media and sports occupations	34	<b>339.5</b>	31.9-647.2	<b>202.5</b>	82.5-322.5	-135.5	( -469.7,203.3)	0.413
Business and public service associate professionals	35	<b>278.4</b>	150.6-406.3	<b>200.1</b>	130.9-269.3	-77.5	( -221.5, 69.6)	0.302
Administrative Occupations: Government And Related Organisations	411	<b>221.7</b>	140.6-302.8	<b>237.5</b>	153.7-321.4	16.3	( -99.9,130.1)	0.777
Administrative Occupations: Finance	412	<b>211.7</b>	149.1-274.3	<b>249.1</b>	190.3-307.8	37.8	( -47.9,124.9)	0.39
Administrative Occupations: Records	413	<b>210</b>	128.2-291.8	<b>222.2</b>	147.1-297.3	12.7	( -98.8,124.6)	0.82
Administrative Occupations: Communications	414	<b>313.5</b>	124.8-502.2	<b>273</b>	117.6-428.4	-37.6	( -279.3,209.9)	0.755
Administrative Occupations: General	415	<b>246.2</b>	174.8-317.5	<b>226.4</b>	176.8-276.0	-19.1	( -107.2, 68.8) (	0.666
Secretarial And Related Occupations	421	<b>206.2</b>	159.9-252.6	<b>223.2</b>	180.0-266.4	16.8	-45.8, 81.3)	0.607
Agricultural Trades	511			<b>117.9</b>	15.0-220.8			
Skilled metal and electrical trades	52			<b>387.3</b>	80.4-694.3			
Textiles And Garments Trades	541	<b>405.6</b>	142.2-669.0	<b>478.1</b>	200.0-756.2	71.7	( -302.6,463.2)	0.708
Printing Trades	542	<b>756.3</b>	156.5-1356.1	<b>329.9</b>	37.5-622.3	-428.7	(-1105.6,229.5)	0.211
Food Preparation Trades	543	<b>300.6</b>	194.5-406.7	<b>422.2</b>	298.7-545.6	121.1	( -40.3,284.4)	0.144
Healthcare And Related Personal Services	611	<b>287.6</b>	221.0-354.2	<b>283.7</b>	237.0-330.4	-4.2	( -86.1, 78.1) (	0.926
Childcare And Related Personal Services	612	<b>198.8</b>	96.2-301.4	<b>232.3</b>	155.8-308.8	33.3	-93.5,160.8)	0.615
Leisure And Travel Service Occupations	621	<b>257.6</b>	35.7-479.5	<b>228</b>	99.4-356.6	-29.2	( -283.9,225.3)	0.825
Hairdressers And Related Occupations	622			<b>355.5</b>	185.2-525.7			
Housekeeping Occupations	623	<b>323.4</b>	140.8-505.9	<b>254.1</b>	128.5-379.7	-70.3	( -290.4,148.4)	0.536

Sales Assistants And Retail Cashiers	711	<b>279</b>	231.1-326.9	<b>307.9</b>	264.4-351.3	28.7	( -34.4, 94.3) (	0.38
Sales Related Occupations	712	<b>372.2</b>	136.9-607.6	<b>185.5</b>	46.3-324.7	-187.1	-467.2, 88.6)	0.182
Customer Service Occupations	721			<b>157.9</b>	82.7-233.1			
Process Operatives	811	<b>330.5</b>	194.3-466.6	<b>337.6</b>	218.2-457.0	7.2	( -172.5,185.3)	0.935
Plant And Machine Operatives Assemblers	812	<b>481.4</b>	140.7-822.1	<b>662.9</b>	320.1-1005.6	184.9	( -302.2,666.9)	0.465
And Routine Operatives Transport Drivers	813	<b>285.8</b>	206.6-364.9	<b>493.7</b>	399.3-588.0	206.4	( 81.9,330.6)	0.001
And Operatives Elementary Agricultural	821	<b>436</b>	112.1-760.0	<b>256.8</b>	51.6-461.9	-177.1	( -570.1,196.0)	0.367
Occupations Elementary Process Plant	911	<b>425.1</b>	49.6-800.5					
Occupations Elementary Goods Storage	913	<b>363.4</b>	229.9-496.9	<b>466.8</b>	338.3-595.3	101.5	( -84.4,286.1)	0.287
Occupations Elementary Administration	914	<b>521.3</b>	195.1-847.5	<b>528.3</b>	189.3-867.3	4.5	( -465.2,477.1)	0.982
Occupations Elementary Personal Services	921	<b>313.8</b>	60.6-567.0	<b>354.4</b>	180.3-528.4	41.2	( -265.1,348.1)	0.782
Occupations Elementary Cleaning	922	<b>306.7</b>	238.7-374.7	<b>345.7</b>	276.3-415.0	38.3	( -58.4,135.2)	0.443
Occupations Elementary Security	923	<b>336.8</b>	291.6-382.0	<b>425.7</b>	371.0-480.5	88.3	( 18.2,158.5)	0.013
Occupations	924	<b>145.7</b>	26.3-265.1	<b>338.7</b>	177.8-499.7	193.2	( -12.4,397.4)	0.066
No job reported	1000	<b>596.7</b>	557.4-636.0	<b>694.7</b>	627.5-761.9	97.6	( 18.2,174.4)	0.015

EASR = European age-standardised mortality rates

\*Standard Occupational Classification (SOC) codes have been modified for disclosure control purposes. See Web Appendix for details.

§ To assess differences over time, Monte Carlo simulation was used to estimate the difference between the rate in 2001-2011 and 1991-2001. 95% CI and p values were calculated using this method as well. Simulated 95% CI are indicated using brackets.

Source: Scottish Longitudinal Study

**Table 3a: Expected change in deaths in Scotland among working age men if occupational mortality rates for England applied §**

<b>Employment group</b>	<b>SOC code*</b>	<b>Difference between rates in England and Scotland</b>	<b>95% CI</b>	<b>p value</b>	<b>Expected change in deaths in Scotland</b>	<b>95% CI</b>
Corporate managers and directors	11	6.1	(-142.4,154.7)	0.936	0.6	( -14.9, 16.2)
Production Managers	112	21	( -57.1, 97.0)	0.595	8.4	( -22.9, 38.8)
Functional Managers	113	-28.2	(-125.3, 71.0)	0.567	-11.8	( -52.5, 29.8)
Financial Institution And Office Managers	115	-86.1	(-234.6, 57.8)	0.245	-11.6	( -31.7, 7.8)
Managers In Distribution, Storage And Retailing	116	-87.1	(-206.9, 33.7)	0.154	-22.8	( -54.2, 8.8) (
Protective Service Officers	117	-111.1	(-410.2,182.7)	0.478	-6.2	-23.0, 10.3) (
Managers and proprietors in agriculture and services	12	97	( -42.3,237.5)	0.169	20.5	-8.9, 50.2)
Managers And Proprietors In Other Service Industries	123	-1.2	(-109.9,105.3)	0.986	-0.4	( -32.7, 31.3)
Engineering Professionals	212	-51.2	(-164.8, 61.9)	0.38	-15.1	( -48.6, 18.3)
Information And Communication Technology Professionals	213	52.4	(-103.8,208.8)	0.51	10.5	( -20.7, 41.8)
Health professionals	221	79.2	( -45.4,202.4)	0.21	10.4	( -6.0, 26.6)
Teaching Professionals	231	42.8	( -35.7,123.6)	0.293	14	( -11.7, 40.4)
Business and public service professionals	24	10.2	( -71.6, 91.9)	0.815	3.7	( -26.2, 33.7)
Science And Engineering Technicians	311	-43.4	(-171.1, 87.7)	0.513	-11.1	( -43.8, 22.4)
Draughtspersons And Building Inspectors	312	-213.3	(-535.7,104.8)	0.19	-13.9	( -34.9, 6.8)
IT Service Delivery Occupations	313	127.4	(-164.7,429.7)	0.41	11.5	( -14.8, 38.7)
Health Associate Professionals	321	-148	(-400.1, 98.7)	0.236	-13.4	( -36.1, 8.9)
Social Welfare Associate Professionals	323	-36.9	(-327.4,251.1)	0.798	-2.4	( -21.1, 16.2)
Protective Service Occupations	331	-122.7	(-276.2, 29.6)	0.114	-41.4	( -93.2, 10.0)
Culture, media and sports occupations	34	42.7	(-101.2,186.2)	0.555	8.9	( -21.2, 38.9)
Transport Associate Professionals	351	-49.1	(-324.3,229.2)	0.708	-3.6	( -23.5, 16.6)
Business And Finance Associate Professionals	353	39.1	( -86.0,163.8)	0.537	7.4	( -16.3, 31.1)
Sales And Related Associate Professionals	<b>354</b>	<b>126.1</b>	<b>( -47.7,249.5)</b>	<b>0.043</b>	<b>26.8</b>	<b>( -1.0, 53.0)</b>
Public Service And Other Associate Professionals	356	-69.6	(-236.4, 95.3)	0.413	-10.3	( -35.0, 14.1)
Administrative Occupations: Government And Related Organisations	411	-148.4	(-358.3, 60.7)	0.156	-17.5	( -42.3, 7.2)
Administrative Occupations: Finance	412	43.6	(-120.3,210.0)	0.609	7.2	( -19.7, 34.5)
Administrative Occupations: Records	413	70.6	( -89.8,231.4)	0.39	14.5	( -18.5, 47.6)
Administrative Occupations: Communications	414	-122.7	(-888.1,655.2)	0.756	-3	( -21.7, 16.0)
Administrative Occupations: General	415	29.7	(-189.4,254.2)	0.796	3.7	( -23.8, 32.0)
Agricultural Trades	511	-45	(-166.9, 77.8)	0.479	-16.8	( -62.2, 29.0)
Metal Forming, Welding And Related Trades	521	54.9	(-123.7,232.7)	0.555	10.7	( -24.1, 45.3)

Metal Machining, Fitting And Instrument Making Trades	522	-31.1	(-134.7, 74.8)	0.56	-13	( -56.2, 31.2)
Vehicle Trades	523	105.8	( -47.1,257.7)	0.18	22.4	( -10.0, 54.6)
Electrical Trades	<b>524</b>	<b>-128</b>	<b>(-235.2,-21.2)</b>	<b>0.019</b>	<b>-57.9</b>	<b>(-106.3, -9.6)</b>
Construction Trades	531	-82.5	(-171.4, 8.1)	0.073	-58.3	(-121.2, 5.7)
Building Trades	532	-67.3	(-223.5, 92.8)	0.407	-15.3	( -50.8, 21.1)
Printing Trades	542	-237.5	(-605.4,125.6)	0.188	-13.1	( -33.4, 6.9)
Food Preparation Trades	543	-47.8	(-212.8,120.7)	0.587	-12.1	( -53.6, 30.4)
Skilled Trades n. e. c.	549	-72.5	(-349.0,200.5)	0.611	-4.9	( -23.4, 13.5)
Healthcare And Related Personal Services	611	-19.6	(-232.7,190.2)	0.858	-2.4	( -29.0, 23.7)
Leisure And Travel Service Occupations	621	-376.9	(-761.4, 11.0)	0.059	-25	( -50.4, 0.7)
Housekeeping Occupations	623	-1	(-302.1,298.9)	0.996	-0.1	( -21.3, 21.1)
Sales Assistants And Retail Cashiers	711	-15.7	(-205.1,173.5)	0.869	-4.4	( -57.4, 48.5)
Sales Related Occupations	712	-140.2	(-378.6, 96.6)	0.245	-12.3	( -33.2, 8.5)
Customer Service Occupations	721	137.5	(-137.8,409.0)	0.327	15.2	( -15.2, 45.1)
Process Operatives	811	53	( -87.7,196.2)	0.478	14.2	( -23.6, 52.7)
Plant And Machine Operatives	812	-97.6	(-224.4, 30.7)	0.139	-32.4	( -74.5, 10.2)
Assemblers And Routine Operatives	813	-127.8	(-309.8, 55.0)	0.161	-33.6	( -81.3, 14.4)
Construction Operatives	814	-117.3	(-301.5, 66.4)	0.207	-23.8	( -61.2, 13.5)
Transport Drivers And Operatives	821	-58.2	(-135.7, 17.5)	0.132	-48.1	(-112.1, 14.4)
Mobile Machine Drivers And Operatives	822	-3.1	(-196.8,184.4)	0.982	-0.6	( -38.3, 35.9)
Elementary Agricultural Occupations	911	50.3	(-207.5,308.6)	0.708	7	( -29.1, 43.3)
Elementary Construction Occupations	<b>912</b>	<b>-235</b>	<b>(-432.6,-36.7)</b>	<b>0.022</b>	<b>-60.4</b>	<b>(-111.1, -9.4)</b>
Elementary Process Plant Occupations	913	-156.6	(-345.0, 32.9)	0.107	-40.3	( -88.7, 8.5) (
Elementary Goods Storage Occupations	914	-80.3	(-234.9, 70.1)	0.308	-25.4	-74.2, 22.1) (
Elementary Administration Occupations	921	-154.3	(-329.9, 21.3)	0.088	-29	-61.9, 4.0)
Elementary Personal Services Occupations	922	-72.9	(-322.8,174.7)	0.565	-16.6	( -73.4, 39.7)
Elementary Cleaning Occupations	923	-179.1	(-375.5, 16.9)	0.072	-37.2	( -78.0, 3.5)
Elementary Security Occupations	924	-196	(-406.6, 12.6)	0.07	-29.1	( -60.3, 1.9)
No occupation reported		-51	(-262.0,154.1)	0.634	-52.4	(-269.1,158.3)
<b>TOTAL</b>					<b>-630.9</b>	<b>(-979.2,-284.8)</b>

\*Standard Occupational Classification (SOC) codes have been modified for disclosure control purposes. See Web Appendix for details.

§ To assess differences between Scotland and England, Monte Carlo simulation was used to estimate the difference between the rate in Scotland and England. 95% CI and p values were calculated using this method as well. Simulated 95% CI are indicated using brackets.

Source: ONS Longitudinal Study and Scottish Longitudinal Study



**Table 3b: Expected change in deaths in Scotland among working age women if occupational mortality rates for England applied §**

Employment group	SOC code*	Difference between rates in England and Scotland	95% CI	p value	Expected change in deaths in Scotland	95% CI
Corporate managers and directors	11	30.4	( -25.6, 86.9)	0.293	23.4	( -19.7, 66.8)
Managers and proprietors in agriculture and services	<b>12</b>	<b>160.0</b>	<b>( -41.4,276.3)</b>	<b>0.009</b>	<b>35</b>	<b>( -9.1, 60.4)</b>
Managers And Proprietors In Other Service Industries	123	-16.4	(-132.4, 98.0)	0.77	-2.9	( -23.7, 17.5)
Science, research, engineering and technology professionals	21	-251.6	(-669.6,158.7)	0.229	-29.6	( -78.8, 18.7)
Health professionals	221	-1.3	(-190.8,185.0)	0.985	-0.1	( -22.6, 22.0)
Teaching Professionals	231	20.4	( -26.9, 67.1)	0.393	15	( -19.9, 49.6)
Business and public service professionals	24	-42.4	(-150.1, 63.8)	0.445	-10.2	( -36.2, 15.4)
Science and technology associate professionals	31	-17.2	(-154.8,123.6)	0.802	-2.5	( -22.3, 17.8)
Health Associate Professionals	321	-10.5	( -79.6, 57.4)	0.763	-6.9	( -52.7, 38.0)
Social Welfare Associate Professionals	323	33.6	( -91.7,159.7)	0.603	6.6	( -18.1, 31.5)
Culture, media and sports occupations	34	-68.9	(-200.1, 61.9)	0.311	-11.2	( -32.5, 10.1)
Business and public service associate professionals	35	-11.4	( -92.6, 66.8)	0.787	-6.2	( -50.5, 36.4)
Administrative Occupations: Government And Related Organisations	411	25.1	( -84.9,132.0)	0.658	6.5	( -22.0, 34.2)
Administrative Occupations: Finance	412	14.8	( -55.5, 87.2)	0.687	8.7	( -32.7, 51.4)
Administrative Occupations: Records	<b>413</b>	<b>111.2</b>	<b>( -12.5,207.3)</b>	<b>0.028</b>	<b>38.1</b>	<b>( -4.3, 70.9)</b>
Administrative Occupations: Communications	414	91.5	(-114.7,293.8)	0.382	7.8	( -9.8, 25.1)
Administrative Occupations: General	415	6.0	( -56.2, 68.5)	0.857	4.5	( -42.4, 51.6)
Secretarial And Related Occupations	421	-5.8	( -56.8, 45.3)	0.821	-4.7	( -46.4, 37.0)
Agricultural Trades	511	133.7	-38.5,302.4)	0.134	5.5	( -1.6, 12.5)
Skilled metal and electrical trades	52	-18.6	(-378.7,336.4)	0.914	-0.6	( -13.1, 11.6)
Textiles And Garments Trades	541	8.1	(-339.6,360.7)	0.965	0.3	( -12.7, 13.5)
Printing Trades	542	-73.1	(-396.8,251.1)	0.667	-2	( -11.1, 7.0)
Food preparation trades	<b>543</b>	<b>-204.7</b>	<b>(-343.7,-67.0)</b>	<b>0.004</b>	<b>-43.6</b>	<b>( -73.2,-14.3)</b>
Healthcare And Related Personal Services	611	6.6	( -51.4, 65.8)	0.823	6	( -46.6, 59.7)
Childcare And Related Personal Services	612	-28.7	(-119.6, 60.3)	0.538	-12.2	( -51.1, 25.8)
Leisure And Travel Service Occupations	621	-5.5	(-172.5,166.9)	0.948	-0.7	( -22.8, 22.1)
Hairdressers And Related Occupations	622	-146.1	(-330.2, 37.2)	0.118	-27.6	( -62.4, 7.0)
Housekeeping Occupations	623	50.4	(-112.1,211.4)	0.538	4.9	( -10.9, 20.5)
Sales Assistants And Retail Cashiers	711	-2.3	( -55.1, 50.6)	0.927	-3.2	( -76.1, 69.9)
Sales Related Occupations	712	79.8	( -98.6,256.1)	0.372	6.2	( -7.7, 19.9)

Customer Service Occupations	721	71	( -37.2,180.1)	0.189	19.7	( -10.3, 49.9)
Process Operatives	811	8.8	(-133.6,154.6)	0.908	1.6	( -23.7, 27.4)
Plant And Machine Operatives Assemblers	812	-144.9	(-517.4,223.1)	0.438	-6	( -21.3, 9.2)
And Routine Operatives Transport Drivers	813	-108.3	(-221.2, 1.7)	0.055	-46	( -93.9, 0.7)
And Operatives Elementary Process Plant	821	21.9	(-231.8,271.1)	0.858	1.1	( -11.6, 13.5)
Occupations Elementary Goods Storage	913	-61.7	(-206.0, 84.7)	0.406	-13.2	( -44.1, 18.1)
Occupations Elementary Administration	914	-310.8	(-668.4, 53.6)	0.091	-13.5	( -29.1, 2.3)
Occupations Elementary Personal Services	921	29.3	(-179.7,236.0)	0.779	2.9	( -17.6, 23.1)
Occupations Elementary Cleaning	922	-31	(-115.1, 52.4)	0.476	-21.5	( -79.8, 36.3)
Occupations Elementary Security	<b>923</b>	<b>-73.9</b>	<b>(-143.5, -3.3)</b>	<b>0.042</b>	<b>-63.5</b>	<b>(-123.3, -2.8)</b>
Occupations	924	-38.8	(-218.7,137.4)	0.677	-2.8	( -16.1, 10.1)
No occupation reported		<b>-108.3</b>	<b>(-199.7,-16.3)</b>	<b>0.019</b>	<b>-135.3</b>	<b>(-249.6,-20.4)</b>
TOTAL					-272.6	(-512.6,-26)

\*Standard Occupational Classification (SOC) codes have been modified for disclosure control purposes. See Web Appendix for details.

§ To assess differences between Scotland and England, Monte Carlo simulation was used to estimate the difference between the rate in Scotland and England. 95% CI and p values were calculated using this method as well. Simulated 95% CI are indicated using brackets.

Source: ONS Longitudinal Study and Scottish Longitudinal Study

**Figure 1: Bubble graph showing occupational mortality rates in England and Scotland, 2001-2011 for a) men and b) women \***

\*Each bubble is proportional to the size of the employment group in England

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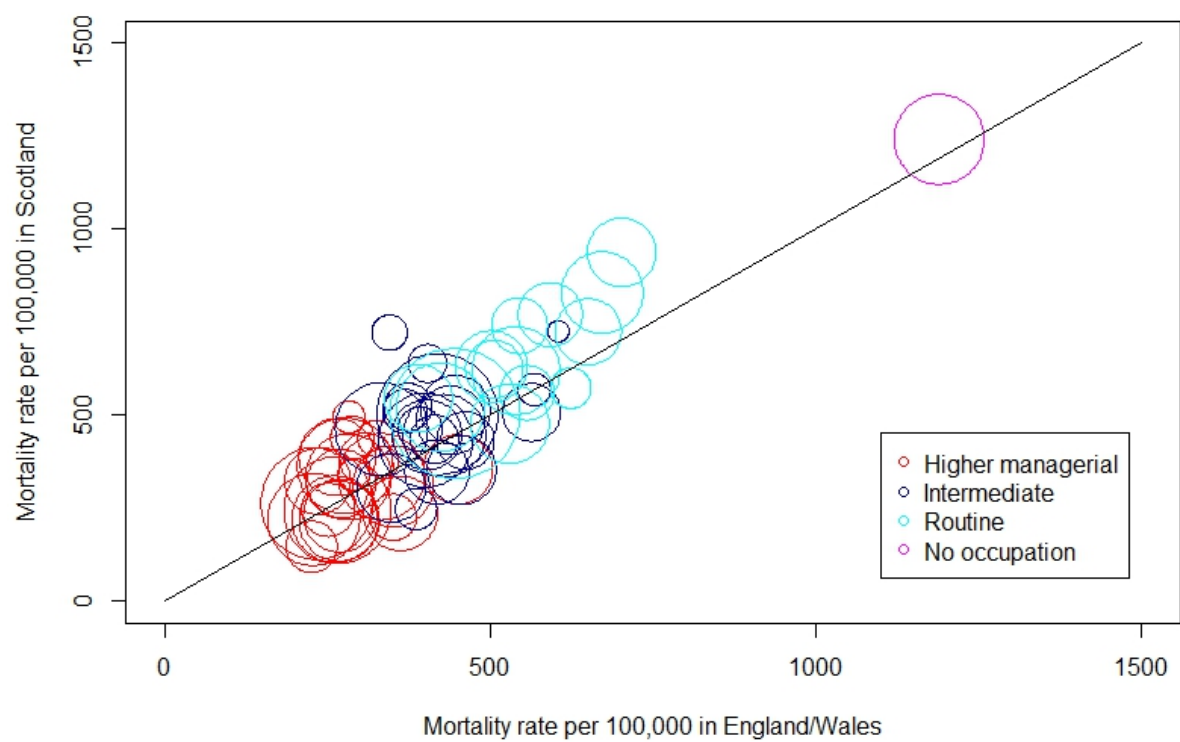
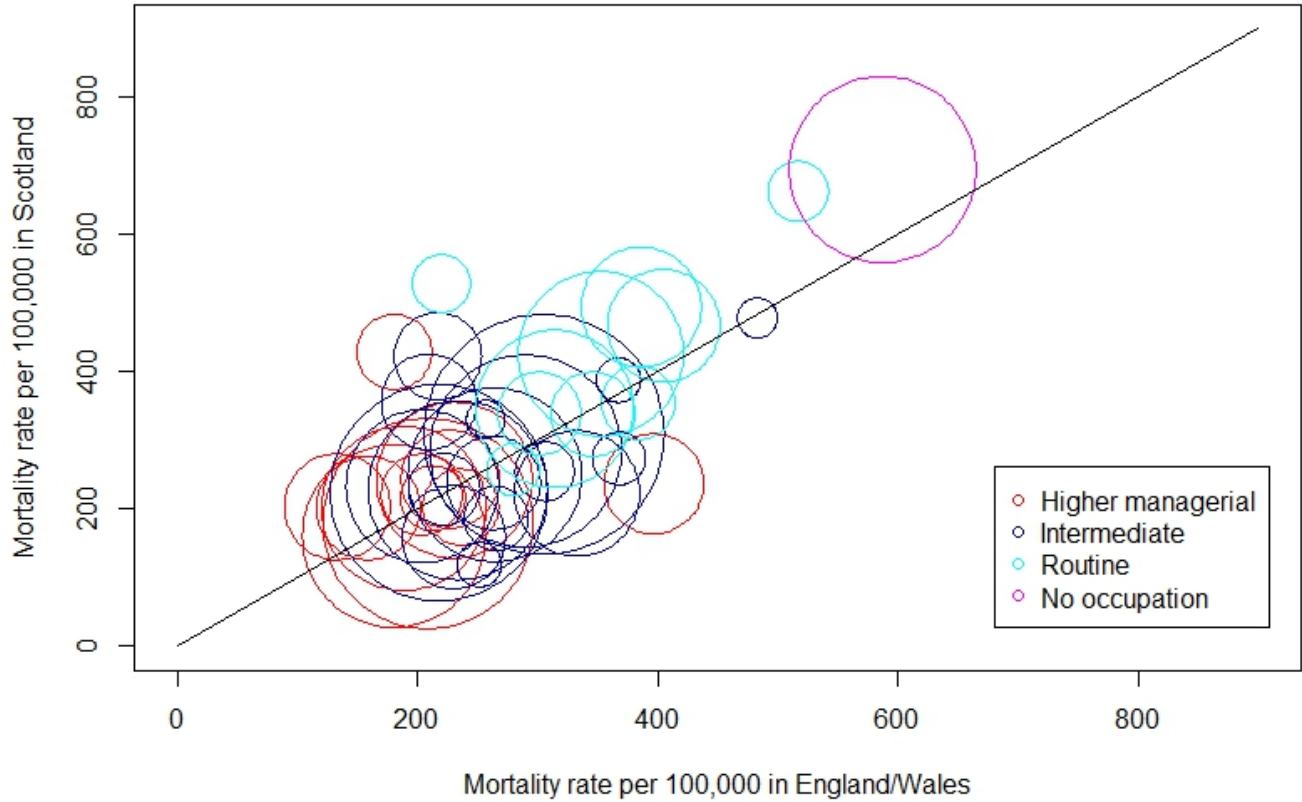


Figure1b



## Necessary Additional Data

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### Appendix Table 1: Classification of Occupational Classification (SOC) codes

In order to adhere to disclosure control guidelines and ensure adequate statistical power, the classification of SOC codes was modified. In general, the most disaggregated three digit codes possible were reported separately.

The below table indicates which SOC codes were used. For some specific categories, additional SOC codes were grouped together and are indicated by numbers in the table below. For example, SOC code 11 in males included SOC codes 111, 114 and 118, but SOC codes 112, 113, 115, 116 and 117 were coded separately.

Major Group	Sub-Major Group	Minor Group	Unit Group	Group Title	Men	Women
<b>1</b>				<b>MANAGERS, DIRECTORS AND SENIOR OFFICIALS</b>		
	<b>11</b>			<b>CORPORATE MANAGERS AND DIRECTORS</b>	111, 114, 118	X
		<b>111</b>		<b>Chief Executives and Senior Officials</b>		
			1111	Senior officials in national government		
			1112	Directors and chief executives of major organisations		
			1113	Senior officials in local government		
			1114	Senior officials of special interest organisations		
		<b>112</b>		<b>Production Managers</b>	X	
			1121	Production, works and maintenance managers		
			1122	Managers in construction		
			1123	Managers in mining and energy		
		<b>113</b>		<b>Functional Managers</b>	X	
			1131	Financial managers and chartered secretaries		
			1132	Marketing and sales managers		
			1133	Purchasing managers		
			1134	Advertising and public relations managers		
			1135	Personnel, training and industrial relations managers		
			1136	Information and communication technology managers		
			1137	Research and development managers		
		<b>114</b>		<b>Quality And Customer Care Managers</b>		
			1141	Quality assurance managers		
			1142	Customer care managers		
		<b>115</b>		<b>Financial Institution And Office Managers</b>	X	
			1151	Financial institution managers		
			1152	Office managers		
		<b>116</b>		<b>Managers In Distribution, Storage And Retailing</b>	X	
			1161	Transport and distribution managers		
			1162	Storage and warehouse managers		
			1163	Retail and wholesale managers		

		<b>117</b>		<b>Protective Service Officers</b>	X	
			1171	Officers in armed forces		
			1172	Police officers (inspectors and above)		
			1173	Senior officers in fire, ambulance, prison and related services		
			1174	Security managers		
		<b>118</b>		<b>Health And Social Services Managers</b>		
			1181	Hospital and health service managers		
			1182	Pharmacy managers		
			1183	Healthcare practice managers		
			1184	Social services managers		
			1185	Residential and day care managers		
	<b>12</b>			<b>MANAGERS AND PROPRIETORS IN AGRICULTURE AND SERVICES</b>	121+122	121+122
		<b>121</b>		<b>Managers In Farming, Horticulture, Forestry And Fishing</b>		
			1211	Farm managers		
			1212	Natural environment and conservation managers		
			1219	Managers in animal husbandry, forestry and fishing n.e.c.		
		<b>122</b>		<b>Managers And Proprietors In Hospitality And Leisure Services</b>		
			1221	Hotel and accommodation managers		
			1222	Conference and exhibition managers		
			1223	Restaurant and catering managers		
			1224	Publicans and managers of licensed premises		
			1225	Leisure and sports managers		
			1226	Travel agency managers		
		<b>123</b>		<b>Managers And Proprietors In Other Service Industries</b>	X	X
			1231	Property, housing and land managers		
			1232	Garage managers and proprietors		
			1233	Hairdressing and beauty salon managers and proprietors		
			1234	Shopkeepers and wholesale/retail dealers		
			1235	Recycling and refuse disposal managers		
			1239	Managers and proprietors in other services n.e.c.		
				<b>PROFESSIONAL OCCUPATIONS</b>		
	<b>21</b>			<b>SCIENCE, RESEARCH, ENGINEERING AND TECHNOLOGY PROFESSIONALS</b>		X
		<b>211</b>		<b>Natural and Social Science Professionals</b>	X	
			2111	Chemists		
			2112	Biological scientists and biochemists		
			2113	Physicists, geologists and meteorologists		
		<b>212</b>		<b>Engineering Professionals</b>	X	
			2121	Civil engineers		
			2122	Mechanical engineers		
			2123	Electrical engineers		



			2124	Electronics engineers		
			2125	Chemical engineers		
			2126	Design and development engineers		
			2127	Production and process engineers		
			2128	Planning and quality control engineers		
			2129	Engineering professionals n.e.c.		
		<b>213</b>		<b>Information And Communication Technology Professionals</b>	X	
			2131	IT strategy and planning professionals		
			2132	Software professionals		
	<b>22</b>			<b>HEALTH PROFESSIONALS</b>		
		<b>221</b>		<b>Health professionals</b>	X	X
			2211	Medical practitioners		
			2212	Psychologists		
			2213	Pharmacists/pharmacologists		
			2214	Ophthalmic opticians		
			2215	Dental practitioners		
			2216	Veterinarians		
	<b>23</b>			<b>TEACHING AND RESEARCH PROFESSIONALS</b>		
		<b>231</b>		<b>Teaching Professionals</b>	X	X
			2311	Higher education teaching professionals		
			2312	Further education teaching professionals		
			2313	Education officers, school inspectors		
			2314	Secondary education teaching professionals		
			2315	Primary and nursery education teaching professionals		
			2316	Special needs education teaching professionals		
			2317	Registrars and senior administrators of educational establishments		
			2319	Teaching professionals n.e.c.		
		<b>232</b>		<b>Research Professional</b>	X	X
			2321	Scientific researchers		
			2322	Social science researchers		
			2329	Researchers n.e.c.		
	<b>24</b>			<b>BUSINESS AND PUBLIC SERVICE PROFESSIONALS</b>	X	X
		<b>241</b>		<b>Legal Professionals</b>		
			2411	Solicitors and lawyers, judges and coroners		
			2419	Legal professionals n.e.c.		
		<b>242</b>		<b>Business And Statistical Professionals</b>		
			2421	Chartered and certified accountants		
			2422	Management accountants		
			2423	Management consultants, actuaries, economists and statisticians		
		<b>243</b>		<b>Architects, Town Planners, Surveyors</b>		
			2431	Architects		
			2432	Town planners		
			2433	Quantity surveyors		
			2434	Chartered surveyors (not quantity surveyors)		

		<b>244</b>		<b>Public Service Professionals</b>		
			2441	Public service administrative professionals		
			2442	Social workers		
			2443	Probation officers		
			2444	Clergy		
		<b>245</b>		<b>Librarians And Related Professionals</b>		
			2451	Librarians		
			2452	Archivists and curators		
3				<b>ASSOCIATE PROFESSIONAL AND TECHNICAL OCCUPATIONS</b>		
	<b>31</b>			<b>SCIENCE AND TECHNOLOGY ASSOCIATE PROFESSIONALS</b>		X
		<b>311</b>		<b>Science And Engineering Technicians</b>	X	
			3111	Laboratory technicians		
			3112	Electrical/electronics technicians		
			3113	Engineering technicians		
			3114	Building and civil engineering technicians		
			3115	Quality assurance technicians		
			3119	Science and engineering technicians n.e.c.		
		<b>312</b>		<b>Draughtspersons And Building Inspectors</b>	X	
			3121	Architectural technologists and town planning technicians		
			3122	Draughtspersons		
			3123	Building inspectors		
		<b>313</b>		<b>IT Service Delivery Occupations</b>	X	
			3131	IT operations technicians		
			3132	IT user support technicians		
	<b>32</b>			<b>HEALTH AND SOCIAL WELFARE ASSOCIATE PROFESSIONALS</b>		
		<b>321</b>		<b>Health Associate Professionals</b>	X	X
			3211	Nurses		
			3212	Midwives		
			3213	Paramedics		
			3214	Medical radiographers		
			3215	Chiropodists		
			3216	Dispensing opticians		
			3217	Pharmaceutical dispensers		
			3218	Medical and dental technicians		
		<b>322</b>		<b>Therapists</b>	X	X
			3221	Physiotherapists		
			3222	Occupational therapists		
			3223	Speech and language therapists		
			3229	Therapists n.e.c.		
		<b>323</b>		<b>Social Welfare Associate Professionals</b>	X	X
			3231	Youth and community workers		
			3232	Housing and welfare officers		
	<b>33</b>			<b>PROTECTIVE SERVICE OCCUPATIONS</b>		
		<b>331</b>		<b>Protective Service Occupations</b>	X	X

			3311	NCOs and other ranks		
			3312	Police officers (sergeant and below)		
			3313	Fire service officers (leading fire officer and below)		
			3314	Prison service officers (below principal officer)		
			3319	Protective service associate professionals n.e.c.		
	34			CULTURE, MEDIA AND SPORTS OCCUPATIONS	X	X
		341		<b>Artistic And Literary Occupations</b>		
			3411	Artists		
			3412	Authors, writers		
			3413	Actors, entertainers		
			3414	Dancers and choreographers		
			3415	Musicians		
			3416	Arts officers, producers and directors		
		342		<b>Design Associate Professionals</b>		
			3421	Graphic designers		
			3422	Product, clothing and related designers		
		343		<b>Media Associate Professionals</b>		
			3431	Journalists, newspaper and periodical editors		
			3432	Broadcasting associate professionals		
			3433	Public relations officers		
			3434	Photographers and audio-visual equipment operators		
		344		<b>Sports And Fitness Occupations</b>		
			3441	Sports players		
			3442	Sports coaches, instructors and officials		
			3443	Fitness instructors		
			3449	Sports and fitness occupations n.e.c.		
	35			BUSINESS AND PUBLIC SERVICE ASSOCIATE PROFESSIONALS		X
		351		<b>Transport Associate Professionals</b>	X	
			3511	Air traffic controllers		
			3512	Aircraft pilots and flight engineers		
			3513	Ship and hovercraft officers		
			3514	Train drivers		
		352		<b>Legal Associate Professionals</b>	X	
			3520	Legal associate professionals		
		353		<b>Business And Finance Associate Professionals</b>	X	
			3531	Estimators, valuers and assessors		
			3532	Brokers		
			3533	Insurance underwriters		
			3534	Finance and investment analysts/advisers		
			3535	Taxation experts		
			3536	Importers, exporters		
			3537	Financial and accounting technicians		
			3539	Business and related associate professionals n.e.c.		
		354		<b>Sales And Related Associate Professionals</b>	X	
			3541	Buyers and purchasing officers		

			3542	Sales representatives		
			3543	Marketing associate professionals		
			3544	Estate agents, auctioneers		
		<b>355</b>		<b>Conservation Associate Professionals</b>	X	
			3551	Conservation and environmental protection officers		
			3552	Countryside and park rangers		
		<b>356</b>		<b>Public Service And Other Associate Professionals</b>	X	
			3561	Public service associate professionals		
			3562	Personnel and industrial relations officers		
			3563	Vocational and industrial trainers and instructors		
			3564	Careers advisers and vocational guidance specialists		
			3565	Inspectors of factories, utilities and trading standards		
			3566	Statutory examiners		
			3567	Occupational hygienists and safety officers (health and safety)		
			3568	Environmental health officers		
				ADMINISTRATIVE AND SECRETARIAL OCCUPATIONS		
4						
	41			ADMINISTRATIVE OCCUPATIONS		
		<b>411</b>		<b>Administrative Occupations: Government And Related Organisations</b>	X	X
			4111	Civil Service executive officers		
			4112	Civil Service administrative officers and assistants		
			4113	Local government clerical officers and assistants		
			4114	Officers of non-governmental organisations		
		<b>412</b>		<b>Administrative Occupations: Finance</b>	X	X
			4121	Credit controllers		
			4122	Accounts and wages clerks, book-keepers, other financial clerks		
			4123	Counter clerks		
		<b>413</b>		<b>Administrative Occupations: Records</b>	X	X
			4131	Filing and other records assistants/clerks		
			4132	Pensions and insurance clerks		
			4133	Stock control clerks		
			4134	Transport and distribution clerks		
			4135	Library assistants/clerks		
			4136	Database assistants/clerks		
			4137	Market research interviewers		
		<b>414</b>		<b>Administrative Occupations: Communications</b>	X	X
			4141	Telephonists		
			4142	Communication operators		
		<b>415</b>		<b>Administrative Occupations: General</b>	X	X
			4150	General office assistants/clerks		

	42			SECRETARIAL AND RELATED OCCUPATIONS		
		<b>421</b>		<b>Secretarial And Related Occupations</b>	X	X
			4211	Medical secretaries		
			4212	Legal secretaries		
			4213	School secretaries		
			4214	Company secretaries		
			4215	Personal assistants and other secretaries		
			4216	Receptionists		
			4217	Typists		
5				SKILLED TRADES OCCUPATIONS		
	51			SKILLED AGRICULTURAL TRADES		
		<b>511</b>		<b>Agricultural Trades</b>	X	X
			5111	Farmers		
			5112	Horticultural trades		
			5113	Gardeners and groundsman/groundswomen		
			5119	Agricultural and fishing trades n.e.c.		
	52			SKILLED METAL AND ELECTRICAL TRADES		X
		<b>521</b>		<b>Metal Forming, Welding And Related Trades</b>	X	
			5211	Smiths and forge workers		
			5212	Moulders, core makers, die casters		
			5213	Sheet metal workers		
			5214	Metal plate workers, shipwrights, riveters		
			5215	Welding trades		
			5216	Pipe fitters		
		<b>522</b>		<b>Metal Machining, Fitting And Instrument Making Trades</b>	X	
			5221	Metal machining setters and setter-operators		
			5222	Tool makers, tool fitters and markers-out		
			5223	Metal working production and maintenance fitters		
			5224	Precision instrument makers and repairers		
		<b>523</b>		<b>Vehicle Trades</b>	X	
			5231	Motor mechanics, auto engineers		
			5232	Vehicle body builders and repairers		
			5233	Auto electricians		
			5234	Vehicle spray painters		
		<b>524</b>		<b>Electrical Trades</b>	X	
			5241	Electricians, electrical fitters		
			5242	Telecommunications engineers		
			5243	Lines repairers and cable jointers		
			5244	TV, video and audio engineers		
			5245	Computer engineers, installation and maintenance		
			5249	Electrical/electronics engineers n.e.c.		
	53			SKILLED CONSTRUCTION AND BUILDING TRADES		X
		<b>531</b>		<b>Construction Trades</b>	X	
			5311	Steel erectors		

			5312	Bricklayers, masons		
			5313	Roofers, roof tilers and slaters		
			5314	Plumbers, heating and ventilating engineers		
			5315	Carpenters and joiners		
			5316	Glaziers, window fabricators and fitters		
			5319	Construction trades n.e.c.		
		<b>532</b>		<b>Building Trades</b>	X	
			5321	Plasterers		
			5322	Floorers and wall tilers		
			5323	Painters and decorators		
	54			TEXTILES, PRINTING AND OTHER SKILLED TRADES		
		<b>541</b>		<b>Textiles And Garments Trades</b>	X	X
			5411	Weavers and knitters		
			5412	Upholsterers		
			5413	Leather and related trades		
			5414	Tailors and dressmakers		
			5419	Textiles, garments and related trades n.e.c.		
		<b>542</b>		<b>Printing Trades</b>	X	X
			5421	Originators, compositors and print preparers		
			5422	Printers		
			5423	Bookbinders and print finishers		
			5424	Screen printers		
		<b>543</b>		<b>Food Preparation Trades</b>	X	X
			5431	Butchers, meat cutters		
			5432	Bakers, flour confectioners		
			5433	Fishmongers, poultry dressers		
			5434	Chefs, cooks		
		<b>549</b>		<b>Skilled Trades n. e. c.</b>	X	X
			5491	Glass and ceramics makers, decorators and finishers		
			5492	Furniture makers, other craft woodworkers		
			5493	Pattern makers (moulds)		
			5494	Musical instrument makers and tuners		
			5495	Goldsmiths, silversmiths, precious stone workers		
			5496	Floral arrangers, florists		
			5499	Hand craft occupations n.e.c.		
6				PERSONAL SERVICE OCCUPATIONS		
	61			CARING PERSONAL SERVICE OCCUPATIONS		
		<b>611</b>		<b>Healthcare And Related Personal Services</b>	X	X
			6111	Nursing auxiliaries and assistants		
			6112	Ambulance staff (excluding paramedics)		
			6113	Dental nurses		
			6114	Houseparents and residential wardens		
			6115	Care assistants and home carers		
		<b>612</b>		<b>Childcare And Related Personal Services</b>	X	X
			6121	Nursery nurses		

			6122	Childminders and related occupations		
			6123	Playgroup leaders/assistants		
			6124	Educational assistants		
		<b>613</b>		<b>Animal Care Services</b>	X	X
			6131	Veterinary nurses and assistants		
			6139	Animal care occupations n.e.c.		
	62			LEISURE AND OTHER PERSONAL SERVICE OCCUPATIONS		
		<b>621</b>		<b>Leisure And Travel Service Occupations</b>	X	X
			6211	Sports and leisure assistants		
			6212	Travel agents		
			6213	Travel and tour guides		
			6214	Air travel assistants		
			6215	Rail travel assistants		
			6219	Leisure and travel service occupations n.e.c.		
		<b>622</b>		<b>Hairdressers And Related Occupations</b>	X	X
			6221	Hairdressers, barbers		
			6222	Beauticians and related occupations		
		<b>623</b>		<b>Housekeeping Occupations</b>	X	X
			6231	Housekeepers and related occupations		
			6232	Caretakers		
		<b>629</b>		<b>Personal Services Occupations n. e. c.</b>	X	X
			6291	Undertakers and mortuary assistants		
			6292	Pest control officers		
7				SALES AND CUSTOMER SERVICE OCCUPATIONS		
	71			SALES OCCUPATIONS		
		<b>711</b>		<b>Sales Assistants And Retail Cashiers</b>	X	X
			7111	Sales and retail assistants		
			7112	Retail cashiers and check-out operators		
			7113	Telephone salespersons		
		<b>712</b>		<b>Sales Related Occupations</b>	X	X
			7121	Collector salespersons and credit agents		
			7122	Debt, rent and other cash collectors		
			7123	Roundsmen/women and van salespersons		
			7124	Market and street traders and assistants		
			7125	Merchandisers and window dressers		
			7129	Sales related occupations n.e.c.		
	72			CUSTOMER SERVICE OCCUPATIONS		
		<b>721</b>		<b>Customer Service Occupations</b>	X	X
			7211	Call centre agents/operators		
			7212	Customer care occupations		
8				PROCESS, PLANT AND MACHINE OPERATIVES		
	81			PROCESS, PLANT AND MACHINE OPERATIVES		
		<b>811</b>		<b>Process Operatives</b>	X	X

			8111	Food, drink and tobacco process operatives		
			8112	Glass and ceramics process operatives		
			8113	Textile process operatives		
			8114	Chemical and related process operatives		
			8115	Rubber process operatives		
			8116	Plastics process operatives		
			8117	Metal making and treating process operatives		
			8118	Electroplaters		
			8119	Process operatives n.e.c.		
		<b>812</b>		<b>Plant And Machine Operatives</b>	X	X
			8121	Paper and wood machine operatives		
			8122	Coal mine operatives		
			8123	Quarry workers and related operatives		
			8124	Energy plant operatives		
			8125	Metal working machine operatives		
			8126	Water and sewerage plant operatives		
			8129	Plant and machine operatives n.e.c.		
		<b>813</b>		<b>Assemblers And Routine Operatives</b>	X	X
			8131	Assemblers (electrical products)		
			8132	Assemblers (vehicles and metal goods)		
			8133	Routine inspectors and testers		
			8134	Weighers, graders, sorters		
			8135	Tyre, exhaust and windscreen fitters		
			8136	Clothing cutters		
			8137	Sewing machinists		
			8138	Routine laboratory testers		
			8139	Assemblers and routine operatives n.e.c.		
		<b>814</b>		<b>Construction Operatives</b>	X	X
			8141	Scaffolders, staggers, riggers		
			8142	Road construction operatives		
			8143	Rail construction and maintenance operatives		
			8149	Construction operatives n.e.c.		
	82			TRANSPORT AND MOBILE MACHINE DRIVERS AND OPERATIVES		
		<b>821</b>		<b>Transport Drivers And Operatives</b>	X	X
			8211	Heavy goods vehicle drivers		
			8212	Van drivers		
			8213	Bus and coach drivers		
			8214	Taxi, cab drivers and chauffeurs		
			8215	Driving instructors		
			8216	Rail transport operatives		
			8217	Seafarers (merchant navy); barge, lighter and boat operatives		
			8218	Air transport operatives		
			8219	Transport operatives n.e.c.		
		<b>822</b>		<b>Mobile Machine Drivers And Operatives</b>	X	X
			8221	Crane drivers		
			8222	Fork-lift truck drivers		
			8223	Agricultural machinery drivers		



			8229	Mobile machine drivers and operatives n.e.c.		
9				ELEMENTARY OCCUPATIONS		
	91			ELEMENTARY TRADES, PLANT AND STORAGE RELATED OCCUPATIONS		
		911		<b>Elementary Agricultural Occupations</b>	X	X
			9111	Farm workers		
			9112	Forestry workers		
			9119	Fishing and agriculture related occupations n.e.c.		
		912		<b>Elementary Construction Occupations</b>	X	X
			9121	Labourers in building and woodworking trades		
			9129	Labourers in other construction trades n.e.c.		
		913		<b>Elementary Process Plant Occupations</b>	X	X
			9131	Labourers in foundries		
			9132	Industrial cleaning process occupations		
			9133	Printing machine minders and assistants		
			9134	Packers, bottlers, canners, fillers		
			9139	Labourers in process and plant operations n.e.c.		
		914		<b>Elementary Goods Storage Occupations</b>	X	X
			9141	Stevedores, dockers and slingers		
			9149	Other goods handling and storage occupations n.e.c.		
	92			ELEMENTARY ADMINISTRATION AND SERVICE OCCUPATIONS		
		921		<b>Elementary Administration Occupations</b>	X	X
			9211	Postal workers, mail sorters, messengers, couriers		
			9219	Elementary office occupations n.e.c.		
		922		<b>Elementary Personal Services Occupations</b>	X	X
			9221	Hospital porters		
			9222	Hotel porters		
			9223	Kitchen and catering assistants		
			9224	Waiters, waitresses		
			9225	Bar staff		
			9226	Leisure and theme park attendants		
			9229	Elementary personal services occupations n.e.c.		
		923		<b>Elementary Cleaning Occupations</b>	X	X
			9231	Window cleaners		
			9232	Road sweepers		
			9233	Cleaners, domestics		
			9234	Launderers, dry cleaners, pressers		
			9235	Refuse and salvage occupations		
			9239	Elementary cleaning occupations n.e.c.		
		924		<b>Elementary Security Occupations</b>	X	X
			9241	Security guards and related occupations		
			9242	Traffic wardens		
			9243	School crossing patrol attendants		

			9244	School mid-day assistants		
			9245	Car park attendants		
			9249	Elementary security occupations n.e.c.		
		<b>925</b>		<b>Elementary Sales Occupations</b>	X	X
			9251	Shelf fillers		
			9259	Elementary sales occupations n.e.c.		

**Appendix Table 2a: Occupational mortality rates in Scotland in men**

<b>Employment group</b>	<b>SOC code*</b>	<b>Person-Years</b>	<b>EASR</b>	<b>Low 95% CI</b>	<b>High 95% CI</b>	<b>Rank</b>
Corporate managers and directors	11	5312	<b>244.2</b>	116.6	371.7	9
Production Managers	112	20347	<b>243.2</b>	181.5	304.9	8
Functional Managers	113	21323	<b>261.3</b>	171.7	350.8	11
Financial Institution And Office Managers	115	6876	<b>320.9</b>	191.3	450.5	15
Managers In Distribution, Storage And Retailing	116	13312	<b>362.9</b>	252	473.7	23
Protective Service Officers	117	2858	<b>436.2</b>	165.2	707.2	30
Managers and proprietors in agriculture and services	12	10763	<b>353.1</b>	242.1	464.2	22
Managers And Proprietors In Other Service Industries	123	15127	<b>333.4</b>	240.8	426	18
Engineering Professionals	212	14990	<b>332.6</b>	233.7	431.5	17
Information And Communication Technology Professionals	213	10171	<b>214.1</b>	80.8	347.4	2
Health professionals	221	6685	<b>145</b>	49.8	240.2	1
Teaching Professionals	231	16617	<b>219.3</b>	158	280.6	4
Research Professional	232	2740	<b>328</b>	25.6	630.4	16
Business and public service professionals	24	18640	<b>217.9</b>	149.3	286.6	3
Science And Engineering Technicians	311	13016	<b>314.3</b>	206.1	422.4	14
Draughtspersons And Building Inspectors	312	3318	<b>494.2</b>	211.8	776.7	38
IT Service Delivery Occupations	313	4575	<b>224.1</b>	0	455.6	5
Health Associate Professionals	321	4593	<b>438</b>	219.5	656.5	31
Social Welfare Associate Professionals	323	3278	<b>372.1</b>	141.1	603.1	24
Protective Service Occupations	331	17173	<b>385.7</b>	254.7	516.8	26
Culture, media and sports occupations	34	10630	<b>306.8</b>	186.7	426.9	13
Transport Associate Professionals	351	3690	<b>339.3</b>	135.6	543	19
Business And Finance Associate Professionals	353	9666	<b>228.5</b>	124.6	332.5	6
Sales And Related Associate Professionals	354	10799	<b>234.7</b>	140.3	329.1	7
Public Service And Other Associate Professionals	356	7539	<b>379.4</b>	241.8	517	25
Administrative Occupations: Government And Related Organisations	411	6005	<b>520.9</b>	342.6	699.3	45
Administrative Occupations: Finance	412	8347	<b>303.4</b>	161	445.7	12
Administrative Occupations: Records	413	10452	<b>346.2</b>	220	472.4	20
Administrative Occupations: Communications	414	1241	<b>724.4</b>	38.5	1410.3	56
Administrative Occupations: General	415	6396	<b>430.3</b>	242.3	618.3	27
Secretarial And Related Occupations	421					
Agricultural Trades	511	18949	<b>446.7</b>	349.7	543.6	33
Metal Forming, Welding And Related Trades	521	9910	<b>506.7</b>	370	643.4	41
Metal Machining, Fitting And Instrument Making Trades	522	21221	<b>431</b>	344.1	517.9	28
Vehicle Trades	523	10771	<b>351</b>	230.8	471.2	21
Electrical Trades	524	22986	<b>461.6</b>	371.3	552	35
Construction Trades	531	35967	<b>501.3</b>	425.3	577.4	39
Building Trades	532	11551	<b>513.1</b>	380	646.2	43
Textiles And Garments Trades	541					
Printing Trades	542	2804	<b>638.2</b>	314.9	961.6	53
Food Preparation Trades	543	12822	<b>484.9</b>	351	618.8	37
Skilled Trades n. e. c.	549	3415	<b>461.3</b>	219.2	703.4	34
Healthcare And Related Personal Services	611	6333	<b>434.4</b>	265.5	603.4	29
Animal Care Services	613	479	<b>1124.8</b>	127.1	2122.5	61
Leisure And Travel Service Occupations	621	3368	<b>721</b>	376.6	1065.3	54
Hairdressers And Related Occupations	622					

Housekeeping Occupations	623	3591	<b>567.8</b>	317.5	818.1	48
Sales Assistants And Retail Cashiers	711	14228	<b>444</b>	282.7	605.4	32
Sales Related Occupations	712	4458	<b>509.1</b>	303.4	714.7	42
Customer Service Occupations	721	5608	<b>246.7</b>	49.3	444.2	10
Process Operatives	811	13674	<b>475.6</b>	359.3	592	36
Plant And Machine Operatives	812	16897	<b>520.5</b>	410.3	630.7	44
Assemblers And Routine Operatives	813	13354	<b>630</b>	474.9	785.1	52
Construction Operatives	814	10330	<b>623</b>	472	773.9	51
Transport Drivers And Operatives	821	42023	<b>503.2</b>	440.1	566.3	40
Mobile Machine Drivers And Operatives	822	9897	<b>559</b>	410.4	707.7	47
Elementary Agricultural Occupations	911	7130	<b>571.9</b>	389.7	754.2	49
Elementary Construction Occupations	912	13061	<b>936.9</b>	771.4	1102.5	60
Elementary Process Plant Occupations	913	13085	<b>829.1</b>	665.8	992.4	59
Elementary Goods Storage Occupations	914	16057	<b>618.8</b>	486.1	751.5	50
Elementary Administration Occupations	921	9548	<b>545</b>	390.3	699.7	46
Elementary Personal Services Occupations	922	11572	<b>723.5</b>	519.7	927.3	55
Elementary Cleaning Occupations	923	10567	<b>769.7</b>	605.3	934.1	58
Elementary Security Occupations	924	7543	<b>739.8</b>	560.2	919.3	57
Elementary Sales Occupations	925					
No occupation reported		52255	<b>1241.5</b>	1131.4	1351.6	
All those reporting an occupation§		680710	<b>437.3</b>	421.2	453.5	

EASR = European age-standardised mortality rates

\*Standard Occupational Classification (SOC) codes have been modified for disclosure control purposes. See Web Appendix Table 1 for details.

§Note that this includes not only SOC categories listed, but also small occupational groups that have been suppressed for disclosure control (equating to a total of 1.5% of all person-years). Therefore, person-years for the SOC codes listed do not total to the last two rows.

Source: Scottish Longitudinal Study

**Appendix Table 2b: Occupational mortality rates in Scotland in women**

<b>Employment group</b>	<b>SOC code*</b>	<b>Person-Years</b>	<b>EASR</b>	<b>Low 95% CI</b>	<b>High 95% CI</b>	<b>Rank</b>
Corporate managers and directors	11	39799	<b>178.1</b>	131.2	225	5
Managers and proprietors in agriculture and services	12	11323	<b>235.9</b>	147	324.8	18
Managers And Proprietors In Other Service Industries	123	9257	<b>242.8</b>	147.5	338.1	21
Science, research, engineering and technology professionals	21	6091	<b>428.6</b>	24	833.3	37
Health professionals	221	6144	<b>214.8</b>	63.4	366.3	11
Teaching Professionals	231	38283	<b>159.6</b>	122	197.1	4
Research Professional	232					
Business and public service professionals	24	12492	<b>200.8</b>	109.4	292.1	8
Science and technology associate professionals	31	7445	<b>220.4</b>	100.4	340.5	12
Health Associate Professionals	321	34289	<b>241.3</b>	186.4	296.3	20
Therapists	322	4924	<b>148.2</b>	27.5	268.9	2
Social Welfare Associate Professionals	323	10220	<b>202.3</b>	109.5	295.1	9
Protective Service Occupations	331	2481	<b>569.5</b>	41.8	1097.2	42
Culture, media and sports occupations	34	8413	<b>202.5</b>	82.5	322.5	10
Business and public service associate professionals	35	28254	<b>200.1</b>	130.9	269.3	7
Administrative Occupations: Government And Related Organisations	411	13429	<b>237.5</b>	153.7	321.4	19
Administrative Occupations: Finance	412	30513	<b>249.1</b>	190.3	307.8	22
Administrative Occupations: Records	413	17717	<b>222.2</b>	147.1	297.3	13
Administrative Occupations: Communications	414	4428	<b>273</b>	117.6	428.4	25
Administrative Occupations: General	415	39050	<b>226.4</b>	176.8	276	15
Secretarial And Related Occupations	421	42318	<b>223.2</b>	180	266.4	14
Agricultural Trades	511	2138	<b>117.9</b>	15	220.8	1
Skilled metal and electrical trades	52	1786	<b>387.3</b>	80.4	694.3	34
Skilled construction and building trades	53					
Textiles And Garments Trades	541	1931	<b>478.1</b>	200	756.2	39
Printing Trades	542	1446	<b>329.9</b>	37.5	622.3	28
Food Preparation Trades	543	11025	<b>422.2</b>	298.7	545.6	35
Skilled Trades n. e. c.	549					
Healthcare And Related Personal Services	611	46928	<b>283.7</b>	237	330.4	26
Childcare And Related Personal Services	612	22117	<b>232.3</b>	155.8	308.8	17
Leisure And Travel Service Occupations	621	6846	<b>228</b>	99.4	356.6	16
Hairdressers And Related Occupations	622	9776	<b>355.5</b>	185.2	525.7	33
Housekeeping Occupations	623	5033	<b>254.1</b>	128.5	379.7	23
Sales Assistants And Retail Cashiers	711	71571	<b>307.9</b>	264.4	351.3	27
Sales Related Occupations	712	4023	<b>185.5</b>	46.3	324.7	6
Customer Service Occupations	721	14348	<b>157.9</b>	82.7	233.1	3
Process Operatives	811	9176	<b>337.6</b>	218.2	457	29
Plant And Machine Operatives	812	2135	<b>662.9</b>	320.1	1005.6	43
Assemblers And Routine Operatives	813	21991	<b>493.7</b>	399.3	588	40
Transport Drivers And Operatives	821	2587	<b>256.8</b>	51.6	461.9	24
Elementary Agricultural Occupations	911					
Elementary Process Plant Occupations	913	11075	<b>466.8</b>	338.3	595.3	38
Elementary Goods Storage Occupations	914	2256	<b>528.3</b>	189.3	867.3	41
Elementary Administration Occupations	921	5060	<b>354.4</b>	180.3	528.4	32
Elementary Personal Services Occupations	922	35905	<b>345.7</b>	276.3	415	31
Elementary Cleaning Occupations	923	44486	<b>425.7</b>	371	480.5	36
Elementary Security Occupations	924	3801	<b>338.7</b>	177.8	499.7	30

Elementary Sales Occupations	925					
No occupation reported		64710	<b>694.7</b>	627.5	761.9	
All those reporting an occupation§		716950	<b>277</b>	264.4	289.6	

EASR = European age-standardised mortality rates

\*Standard Occupational Classification (SOC) codes have been modified for disclosure control purposes. See Web Appendix Table 1 for details.

§Note that this includes not only SOC categories listed, but also small occupational groups that have been suppressed for disclosure control (equating to a total of 1.6% of all person-years). Therefore, person-years for the SOC codes listed do not total to the last two rows.

Source: Scottish Longitudinal Study

**Appendix Table 3a: Occupational mortality rates in Northern Ireland in men**

<b>Employment group</b>	<b>SOC code*</b>	<b>Person-Years</b>	<b>EASR</b>	<b>Low 95% CI</b>	<b>High 95% CI</b>	<b>Rank</b>
Corporate managers and directors	11	380331	232.7	216.7	248.7	6
Managers and proprietors in agriculture and services	12	55930	348.9	297.7	400	25
Managers And Proprietors In Other Service Industries	123	89047	257.8	227.1	288.4	9
Natural and Social Science Professionals	211	11302	317.8	215.6	419.9	14
Engineering Professionals	212	64710	199.5	158.6	240.4	3
Information And Communication Technology Professionals	213	47305	243	140.3	345.7	7
Health professionals	221	40230	136.8	97.7	176	1
Teaching Professionals	231	126477	203.1	180.9	225.4	4
Research Professional	232	14439	257.6	155.9	359.3	8
Business and public service professionals	24	107453	181.9	155.3	208.4	2
Associate professional and technical occupations	3	514830	284.7	267.8	301.6	10
Administrative Occupations: Government And Related Organisations	411	110582	338.2	304.7	371.6	19
Administrative Occupations: Finance	412	58421	338.8	284.6	393	20
Administrative Occupations: Records	413	44727	315.1	254.2	376	13
Administrative Occupations: Communications	414	5381	398.4	213.8	582.9	35
Administrative Occupations: General	415	93181	345.5	299.4	391.6	24
Secretarial And Related Occupations	421	8339	221.9	115.4	328.4	5
Agricultural Trades	511	174085	286.8	262.5	311.1	11
Metal Forming, Welding And Related Trades	521	62668	418.4	360.6	476.2	41
Metal Machining, Fitting And Instrument Making Trades	522	128242	349.1	315.2	383	26
Vehicle Trades	523	70657	334	284.1	383.9	17
Electrical Trades	524	140711	318.2	285.5	351	15
Construction Trades	531	300939	340.9	316.9	364.8	22
Building Trades	532	103712	407.1	365.2	449	38
Textiles And Garments Trades	541	10779	336.8	224.5	449.2	18
Printing Trades	542	11865	350.6	227.9	473.2	27
Food Preparation Trades	543	81829	417.9	359.9	476	40
Skilled Trades n. e. c.	549	30695	380	294.6	465.4	34
Healthcare And Related Personal Services	611	32005	406.9	327.6	486.3	37
Childcare And Related Personal Services	612	3058	471.1	158.7	783.6	47
Animal Care Services	613	2704	613.9	291.5	936.3	51
Leisure And Travel Service Occupations	621	11486	427.3	274.6	579.9	42
Hairdressers And Related Occupations	622	6260	321.5	136.1	506.9	16
Housekeeping Occupations	623	22329	358.7	291.7	425.7	30
Sales Assistants And Retail Cashiers	711	101906	350.8	297.3	404.3	28
Sales Related Occupations	712	27734	302.2	238.9	365.5	12
Customer Service Occupations	721	14179	411.7	234.8	588.6	39
Process Operatives	811	136199	405	367.1	442.8	36
Plant And Machine Operatives	812	109011	339.4	300.7	378	21
Assemblers And Routine Operatives	813	71774	370.2	314.3	426.2	31
Construction Operatives	814	63498	353.2	306.7	399.7	29
Transport Drivers And Operatives	821	282078	373	350.6	395.3	32
Mobile Machine Drivers And Operatives	822	64764	437.8	386.1	489.4	43
Elementary Agricultural Occupations	911	41969	448.9	378.6	519.2	45
Elementary Construction Occupations	912	122572	521.8	481.2	562.4	49
Elementary Process Plant Occupations	913	90871	539.4	486.2	592.7	50
Elementary Goods Storage Occupations	914	100886	438.6	393.3	484	44
Elementary Administration Occupations	921	52375	344.1	286.3	402	23
Elementary Personal Services Occupations	922	66949	638.6	562.8	714.4	52

Elementary Cleaning Occupations	923	55962	468.4	410.3	526.4	46
Elementary Security Occupations	924	54217	504.9	449.4	560.4	48
Elementary Sales Occupations	925	9258	373.5	169.8	577.1	33

EASR = European age-standardised mortality rates

\*Standard Occupational Classification (SOC) codes have been modified for disclosure control purposes. See Web Appendix Table 1 for details.

Source: Northern Ireland Mortality Study



**Appendix Table 3b: Occupational mortality rates in Northern Ireland in women**

<b>Employment group</b>	<b>SOC code*</b>	<b>Person-Years</b>	<b>EASR</b>	<b>Low 95% CI</b>	<b>High 95% CI</b>	<b>Rank</b>
Corporate managers and directors	11	212609	166.1	145.8	186.5	7
Managers and proprietors in agriculture and services	12	50035	229.6	183.5	275.6	23
Managers And Proprietors In Other Service Industries	123	50206	210.6	172	249.3	16
Science, research, engineering and technology professionals	21	29248	154.8	82.4	227.3	5
Health professionals	221	33077	94.5	45	144.1	1
Teaching Professionals	231	271711	133.7	120	147.4	2
Research Professional	232	13904	205.1	84.6	325.6	15
Business and public service professionals	24	68042	144.8	108.3	181.3	3
Associate professionals and technical occupations	3	533249	176.9	163.7	190.1	9
Administrative Occupations: Government And Related Organisations	411	117934	197.9	170.3	225.4	14
Administrative Occupations: Finance	412	193982	195.7	172.7	218.6	13
Administrative Occupations: Records	413	87098	172.8	141	204.6	8
Administrative Occupations: Communications	414	22074	285.5	215	356	34
Administrative Occupations: General	415	270682	222.6	202	243.2	18
Secretarial And Related Occupations	421	274263	186.4	169.2	203.5	11
Agricultural Trades	511	14029	239.3	160.5	318.1	26
Skilled metal and electrical trades	52	14197	302.8	209.7	395.8	37
Skilled construction and building trades	53	6231	278.7	148.9	408.4	33
Textiles And Garments Trades	541	13885	331	249.2	412.9	40
Printing Trades	542	6202	180.8	73.7	287.9	10
Food Preparation Trades	543	93290	249.5	215.9	283.1	27
Skilled Trades n. e. c.	549	7858	336.5	194.3	478.7	41
Healthcare And Related Personal Services	611	269033	227.3	208.9	245.7	21
Childcare And Related Personal Services	612	145457	158.3	134	182.7	6
Leisure And Travel Service Occupations	621	26611	219.9	145.9	293.9	17
Hairdressers And Related Occupations	622	77852	229.8	180.4	279.2	24
Housekeeping Occupations	623	28147	256.1	202.7	309.4	29
Sales Assistants And Retail Cashiers	711	473183	233.9	218.2	249.7	25
Sales Related Occupations	712	15244	154.3	86.2	222.4	4
Customer Service Occupations	721	36599	226.6	133	320.2	19
Process Operatives	811	124130	319	288	349.9	38
Plant And Machine Operatives	812	32976	293	226.8	359.3	36
Assemblers And Routine Operatives	813	192729	323.9	298.3	349.5	39
Transport Drivers And Operatives	821	11733	290.8	177.4	404.3	35
Elementary Agricultural Occupations	911	8532	192.8	96.5	289.1	12
Elementary Process Plant Occupations	913	79215	339.2	298.5	379.8	42
Elementary Goods Storage Occupations	914	12120	227.2	130.4	323.9	20
Elementary Administration Occupations	921	28668	276.3	208.8	343.9	31
Elementary Personal Services Occupations	922	194105	267.7	243.1	292.3	30
Elementary Cleaning Occupations	923	253449	276.8	258.3	295.2	32
Elementary Security Occupations	924	36509	253.5	206.2	300.8	28
Elementary Sales Occupations	925	17610	228.2	139.2	317.1	22

EASR = European age-standardised mortality rates

\*Standard Occupational Classification (SOC) codes have been modified for disclosure control purposes. See Web Appendix Table 1 for details.

Source: Northern Ireland Mortality Study

**Appendix Table 4a: Expected change in deaths in England among working age men if occupational mortality rates for Scotland applied §**

Employment group	SOC code *	Differen ce between England and Scotland	95% CI	p valu e	Expecte d change in deaths in Englan d	95% CI
Corporate managers and directors	11	6.1	(-142.4,154.7)	0.936	-8.7	(-220.1,202.6)
Production Managers	112	21	(-57.1,97.0)	0.595	-119.4	(-551.9,325.0)
Functional Managers	113	-28.2	(-125.3,71.0)	0.567	176.2	(-443.1,781.4)
Financial Institution And Office Managers	115	-86.1	(-234.6,57.8)	0.245	188	(-126.2,512.1)
Managers In Distribution, Storage And Retailing	116	-87.1	(-206.9,33.7)	0.154	397.3	(-153.9,944.1)
Protective Service Officers	117	-111.1	(-410.2,182.7)	0.478	72.2	(-118.7,266.6)
Managers and proprietors in agriculture and services	12	97	(-42.3,237.5)	0.169	-231.3	(-566.1,100.8)
Managers And Proprietors In Other Service Industries	123	-1.2	(-109.9,105.3)	0.986	4.5	(-393.0,410.2)
Engineering Professionals	212	-51.2	(-164.8,61.9)	0.38	186.8	(-225.9,600.9)
Information And Communication Technology Professionals	213	52.4	(-103.8,208.8)	0.51	-168.6	(-671.4,333.6)
Health professionals	221	79.2	(-45.4,202.4)	0.21	-104.1	(-266.0,59.7)
Teaching Professionals	231	42.8	(-35.7,123.6)	0.293	-160.6	(-463.8,134.1)
Business and public service professionals	24	10.2	(-71.6,91.9)	0.815	-43.1	(-387.2,301.7)
Science And Engineering Technicians	311	-43.4	(-171.1,87.7)	0.513	102.6	(-207.5,405.0)
Draughtspersons And Building Inspectors	312	-213.3	(-535.7,104.8)	0.19	109.1	(-53.6,274.0)
IT Service Delivery Occupations	313	127.4	(-164.7,429.7)	0.41	-137.7	(-464.3,177.9)
Health Associate Professionals	321	-148	(-400.1,98.7)	0.236	139.7	(-93.2,377.8)
Social Welfare Associate Professionals	323	-36.9	(-327.4,251.1)	0.798	19.2	(-130.4,169.9)
Protective Service Occupations	331	-122.7	(-276.2,29.6)	0.114	361.2	(-87.1,813.1)
Culture, media and sports occupations	34	42.7	(-101.2,186.2)	0.555	-140.5	(-612.2,332.8)
Transport Associate Professionals	351	-49.1	(-324.3,229.2)	0.708	25.4	(-118.9,168.1)

Business And Finance Associate Professionals			)			
	353	39.1	( -	0.53		(-434.8,
Sales And Related Associate Professionals			86.0,163.8)	7	-103.8	228.1)
	354	126.1	(	0.04		(-687.0, -
Public Service And Other Associate Professionals			4.7,249.5)	3	-347.3	13.1)
	356	-69.6	(-236.4,	0.41		(-133.2,
Administrative Occupations: Government And Related Organisations			95.3)	3	97.3	330.2)
Administrative Occupations: Finance			(-358.3,	0.15		( -69.7,
	411	-148.4	60.7)	6	170.5	411.6)
			(-			
	412	43.6	120.3,210.0	0.60		(-495.7,
Administrative Occupations: Records			)	9	-103	284.0)
			( -			(-475.7,
Administrative Occupations: Communications			89.8,231.4)	0.39	-145.1	184.6)
			(-			
	414	-122.7	888.1,655.2	0.75		(-147.4,
Administrative Occupations: General			)	6	27.6	199.9)
			(-			
	415	29.7	189.4,254.2	0.79		(-417.9,
Agricultural Trades			)	6	-48.8	311.4)
	511	-45	(-166.9,	0.47		(-189.9,
Metal Forming, Welding And Related Trades			77.8)	9	109.8	407.6)
			(-			
	521	54.9	123.7,232.7	0.55		(-391.5,
Metal Machining, Fitting And Instrument Making Trades			)	5	-92.4	208.1)
Vehicle Trades			(-134.7,			(-328.3,
	522	-31.1	74.8)	0.56	136.3	590.9)
			( -			(-607.8,
Electrical Trades			47.1,257.7)	0.18	-249.4	111.2)
			(-235.2,-	0.01		(
Construction Trades			21.2)	9	547.2	90.5,1005.3)
	531	-82.5	(-171.4,	0.07		( -
Building Trades			8.1)	3	602.6	58.9,1252.2)
	532	-67.3	(-223.5,	0.40		(-221.2,
Printing Trades			92.8)	7	160.4	532.8)
			(-			
	542	-237.5	605.4,125.6	0.18		( -91.6,
Food Preparation Trades			)	8	173.2	441.4)
			(-			
	543	-47.8	212.8,120.7	0.58		(-284.3,
Skilled Trades n. e. c.			)	7	112.7	501.1)
			(-			
	549	-72.5	349.0,200.5	0.61		(-195.6,
Healthcare And Related Personal Services			)	1	70.7	340.5)
			(-			
	611	-19.6	232.7,190.2	0.85		(-221.4,
Leisure And Travel Service Occupations			)	8	22.8	270.9)
	621	-376.9	(-761.4,	0.05		
Housekeeping Occupations			11.0)	9	236.5	( -6.9, 477.7)
			(-			
	623	-1	302.1,298.9	0.99		(-158.8,
Sales Assistants And Retail Cashiers			)	6	0.5	160.4)
			(-			
	711	-15.7	205.1,173.5	0.86		(-588.7,
Sales Related Occupations			)	9	53.1	696.3)
	712	-140.2	(-378.6,	0.24		( -94.2,
Customer Service Occupations			96.6)	5	136.7	369.3)
			(-			
	721	137.5	137.8,409.0	0.32		(-350.7,
Process Operatives			)	7	-117.9	118.1)
	811	53	( -	0.47	-163.3	(-604.8,

			87.7,196.2)	8		270.3)
Plant And Machine Operatives	812	-97.6	(-224.4, 30.7)	0.13 9	379.7	(-119.2, 872.6)
Assemblers And Routine Operatives	813	-127.8	(-309.8, 55.0)	0.16 1	328.6	(-141.5, 796.5)
Construction Operatives	814	-117.3	(-301.5, 66.4)	0.20 7	194.6	(-110.1, 500.2)
Transport Drivers And Operatives						(-
	821	-58.2	(-135.7, 17.5)	0.13 2	491.7	147.5,1145.9 )
Mobile Machine Drivers And Operatives			(-			
	822	-3.1	196.8,184.4 )	0.98 2	4.6	(-276.1, 294.6)
Elementary Agricultural Occupations			(-			
	911	50.3	207.5,308.6 )	0.70 8	-41.6	(-255.3, 171.7)
Elementary Construction Occupations			(-432.6,-	0.02		(
	912	-235	36.7)	2	551.7	86.1,1015.5)
Elementary Process Plant Occupations						(-
	913	-156.6	(-345.0, 32.9)	0.10 7	519.9	109.2,1145.3 )
Elementary Goods Storage Occupations			(-234.9,	0.30		(-271.1,
	914	-80.3	70.1)	8	310.8	908.8)
Elementary Administration Occupations			(-329.9,	0.08		( -48.7,
	921	-154.3	21.3)	8	352.3	753.1)
Elementary Personal Services Occupations			(-			
	922	-72.9	322.8,174.7 )	0.56 5	159	(-380.9, 704.0)
Elementary Cleaning Occupations			(-375.5,	0.07		( -34.7,
	923	-179.1	16.9)	2	367.5	770.6)
Elementary Security Occupations			(-406.6,			( -19.6,
	924	-196	12.6)	0.07	305.6	634.1)
No occupation reported			(-			(-
			262.0,154.1	0.63		623.3,1059.6
		-51	)	4	206.2	)
						(3007.6,9174
TOTAL					6085.8	.7)

\*Standard Occupational Classification (SOC) codes have been modified for disclosure control purposes. See Web Appendix for details.

§ To assess differences between Scotland and England, Monte Carlo simulation was used to estimate the difference between the rate in Scotland and England. 95% CI and p values were calculated using this method as well. Simulated 95% CI are indicated using brackets.

Source: ONS Longitudinal Study and Scottish Longitudinal Study

**Appendix Table 4b: Expected change in deaths in England among working age women if occupational mortality rates for Scotland applied §**

Employment group	SOC code*	Difference between England and Scotland	95% CI	p value	Expected change in deaths in England	95% CI
Corporate managers and directors	11	30.4	( -25.6, 86.9)	0.293	-318.7	(-910.7, 268.6)
Managers and proprietors in agriculture and services	12	160	( 41.4,276.3)	0.009	-377.9	(-652.7, -97.8)
Managers And Proprietors In Other Service Industries	123	-16.4	(-132.4, 98.0)	0.77	37.6	(-224.6, 303.4)
Science, research, engineering and technology professionals	21	-251.6	(-669.6,158.7)	0.229	334.5	(-211.0, 890.3)
Health professionals	221	-1.3	(-190.8,185.0)	0.985	1.2	(-184.7, 190.6)
Teaching Professionals	231	20.4	( -26.9, 67.1)	0.393	-160.7	(-529.7, 212.4)
Business and public service professionals	24	-42.4	(-150.1, 63.8)	0.445	108	(-162.2, 381.9)
Science and technology associate professionals	31	-17.2	(-154.8,123.6)	0.802	26.9	(-193.0, 241.9)
Health Associate Professionals	321	-10.5	( -79.6, 57.4)	0.763	60.2	(-330.8, 458.5)
Social Welfare Associate Professionals	323	33.6	( -91.7,159.7)	0.603	-45.8	(-217.9, 125.1)
Culture, media and sports occupations	34	-68.9	(-200.1, 61.9)	0.311	183.4	(-164.6, 532.3)
Business and public service associate professionals	35	-11.4	( -92.6, 66.8)	0.787	73	(-427.3, 592.2)
Administrative Occupations: Government And Related Organisations	411	25.1	( -84.9,132.0)	0.658	-52.4	(-275.1, 177.0)
Administrative Occupations: Finance	412	14.8	( -55.5, 87.2)	0.687	-106.3	(-625.1, 397.8)
Administrative Occupations: Records	413	111.2	( 12.5,207.3)	0.028	-415.8	(-774.9, -46.9)
Administrative Occupations: Communications	414	91.5	(-114.7,293.8)	0.382	-60.8	(-195.4, 76.3)
Administrative Occupations: General Secretarial And Related Occupations	415	6	( -56.2, 68.5)	0.857	-45.5	(-518.5, 426.0)
421	421	-5.8	( -56.8, 45.3)	0.821	64	(-503.7, 632.2)
Agricultural Trades	511	133.7	( -38.5,302.4)	0.134	-63.1	(-142.8, 18.2)
Skilled metal and electrical trades	52	-18.6	(-378.7,336.4)	0.914	8.7	(-157.9, 177.7)
Textiles And Garments Trades	541	8.1	(-339.6,360.7)	0.965	-3	(-135.9, 128.0)
Printing Trades	542	-73.1	(-396.8,251.1)	0.667	25.7	( -88.3, 139.6)
Food preparation trades	543	-204.7	(-343.7,-67.0)	0.004	370.9	( 121.5, 622.7)
Healthcare And Related Personal Services	611	6.6	( -51.4, 65.8)	0.823	-57.5	(-573.5, 448.0)
Childcare And Related Personal Services	612	-28.7	(-119.6, 60.3)	0.538	158.2	(-332.9, 660.3)
Leisure And Travel Service Occupations	621	-5.5	(-172.5,166.9)	0.948	6.7	(-203.7, 210.5)
Hairdressers And Related Occupations	622	-146.1	(-330.2, 37.2)	0.118	316.6	( -80.5, 715.5)

Housekeeping Occupations	623	50.4	(-112.1,211.4)	0.538	-41.9	(-176.0, 93.3)
Sales Assistants And Retail Cashiers	711	-2.3	( -55.1, 50.6)	0.927	31.7	(-689.8, 751.5)
Sales Related Occupations	712	79.8	( -98.6,256.1)	0.372	-77.8	(-249.5, 96.0)
Customer Service Occupations	721	71	( -37.2,180.1)	0.189	-178.9	(-453.9, 93.8)
Process Operatives	811	8.8	(-133.6,154.6)	0.908	-15	(-261.6, 225.9)
Plant And Machine Operatives	812	-144.9	(-517.4,223.1)	0.438	124.8	(-192.1, 445.5)
Assemblers And Routine Operatives	813	-108.3	(-221.2, 1.7)	0.055	370.3	( -5.9, 755.9)
Transport Drivers And Operatives	821	21.9	(-231.8,271.1)	0.858	-14.2	(-175.9, 150.4)
Elementary Process Plant Occupations	913	-61.7	(-206.0, 84.7)	0.406	184.3	(-253.2, 615.3)
Elementary Goods Storage Occupations	914	-310.8	(-668.4, 53.6)	0.091	245.3	( -42.4, 527.7)
Elementary Administration Occupations	921	29.3	(-179.7,236.0)	0.779	-37.5	(-302.0, 230.0)
Elementary Personal Services Occupations	922	-31	(-115.1, 52.4)	0.476	182.3	(-308.0, 677.2)
Elementary Cleaning Occupations	923	-73.9	(-143.5, -3.3)	0.042	476	( 21.1, 924.3)
Elementary Security Occupations	924	-38.8	(-218.7,137.4)	0.677	63	(-223.2, 355.2)
No occupation reported		-108.3	(-199.7,-16.3)	0.019	892.8	( 134.7,1646.4)
TOTAL					2273.2	(-164.7,4688)

\*Standard Occupational Classification (SOC) codes have been modified for disclosure control purposes. See Web Appendix for details.

§ To assess differences between Scotland and England, Monte Carlo simulation was used to estimate the difference between the rate in Scotland and England. 95% CI and p values were calculated using this method as well. Simulated 95% CI are indicated using brackets.

Source: ONS Longitudinal Study and Scottish Longitudinal Study