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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.¹ Following the UK's second ever census, mortality rates by occupation were first calculated in the UK in 1851.² Since then, regular decennial reports provided updated estimates of occupational mortality rates, with the last published in the 1970s.³⁻⁵ Similar analyses from other countries are also rare, with existing research typically based on very broad occupational categories.^{6,7} 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.⁸⁻¹⁰ It cannot be assumed that the patterns identified in the 1970s, that still underpin our contemporary understanding, continue to apply in the 21st 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.^{11,12} Some research does use social class^{13,14} but while this is based on occupation, it indicates the social position of an individual rather than their specific occupation.¹⁵ Social class therefore often combines relatively heterogeneous groups into typically fewer than eight categories.^{16,17} 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.^{18,19} 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.²⁰ 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).²¹ Mortality rates in Scotland are consistently higher than elsewhere in the UK, a phenomenon that cannot be accounted for by socioeconomic deprivation.²² 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.²³⁻²⁶

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.²⁷ 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.^{18 19} 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.²⁸ 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.⁶ 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.⁷ 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.²⁹ 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^{30 31}, 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.^{32 33} 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.³⁴ 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.⁸⁹ 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

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

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

Employment group	Rank	SOC code*	Person-Years	EASR	95% CI
Culture, Media and Sports Occupations	1	34	26903	133	78.4-187.7
Business and Public Service Professionals	2	24	25728	158.8	103.8-213.9
Teaching Professionals	3	231	79871	179.8	151.8-207.7
Science, Research, Engineering and Technology Professionals	4	21	13446	180.4	81.9-278.8
Business and Public Service Associate Professionals	5	35	64710	188.1	146.0-230.2
Science and Technology Associate Professionals	6	31	15796	203.1	127.4-278.8
Childcare And Related Personal Services	7	612	55829	203.6	156.8-250.4
Corporate Managers and Directors	8	11	106025	208.5	178.1-238.9
Hairdressers And Related Occupations	9	622	21910	209.3	141.7-276.9
Health professionals	10	221	10099	212.5	107.2-317.8
Food Preparation Trades	11	543	18319	216.7	152.6-280.9
Secretarial And Related Occupations	12	421	112533	217.5	191.5-243.5
Elementary Sales Occupations	13	925	6775	218.3	92.8-343.9
Elementary Goods Storage Occupations	14	914	7984	219.5	103.5-335.6
Leisure And Travel Service Occupations	15	621	12344	221.8	115.5-328.1
Managers And Proprietors In Other Service Industries	16	123	23180	226.8	162.4-291.1
Customer Service Occupations Health	17	721	25489	229.9	152.6-307.2
Associate Professionals Administrative	18	321	58260	230.3	190.8-269.8
Occupations: General Social Welfare	19	415	76601	233.1	198.2-268.0
Associate Professionals Agricultural	20	323	13795	235.6	153.1-318.1
Trades	21	511	4776	251.1	113.6-388.5
Printing Trades	22	542	3557	256.4	104.2-408.6
Administrative Occupations: Government And Related Organisations	23	411	21080	263	192.0-333.9
Administrative Occupations: Finance	24	412	72532	264.1	223.1-305.1
Sales Related Occupations Transport	25	712	9852	265.3	156.1-374.6
Drivers And Operatives Healthcare And	26	821	6560	279.3	132.3-426.3
Related Personal Services Elementary	27	611	88120	289.8	254.7-324.9
Security Occupations	28	924	16424	301.2	222.3-380.2
Sales Assistants And Retail Cashiers	29	711	137985	305.2	274.9-335.5
Housekeeping Occupations	30	623	8417	305.5	204.3-406.7
Elementary Personal Services Occupations	31	922	59492	313.9	265.3-362.6
Administrative Occupations: Records	32	413	37807	332.7	271.0-394.3
Process Operatives	33	811	17107	345.8	258.8-432.7
Elementary Cleaning Occupations Skilled	34	923	65159	352.3	310.9-393.8
Metal and Electrical Trades Administrative	35	52	4745	367.1	184.0-550.1
Occupations: Communications Skilled Trades	36	414	6727	367.5	233.1-502.0
not elsewhere classified Elementary	37	549	4170	380	174.5-585.4
Administration Occupations Assemblers And	38	921	12940	383.4	275.1-491.7
Routine Operatives	39	813	34561	386.1	324.3-447.9
Managers and Proprietors in Agriculture and Services	40	12	23892	396.6	317.6-475.5
Elementary Process Plant Occupations	41	913	30212	404.7	333.6-475.7
Textiles And Garments Trades	42	541	3810	482.7	265.5-699.9
Plant And Machine Operatives	43	812	8707	516.8	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	511.6	274.6-748.7	244.2	116.6-371.7	-268.0	(-538.1, -1.1)	0.049
Production Managers	112	245.8	176.3-315.2	243.2	181.5-304.9	-3.1	(-95.4, 90.0)	0.943
Functional Managers	113	457.8	334.6-581.0	261.3	171.7-350.8	-196.0	(-345.0,-42.7)	0.014
Financial Institution And Office Managers	115	335.0	192.4-477.6	320.9	191.3-450.5	-13.8	(-209.2,180.8)	0.883
Managers In Distribution, Storage And Retailing	116	343.9	234.5-453.2	362.9	252.0-473.7	19.1	(-135.4,173.9)	0.808
Protective Service Officers	117	393.3	152.6-634.0	436.2	165.2-707.2	41.0	(-327.8,397.6)	0.816
Managers and Proprietors in Agriculture and Services	12	398.9	263.2-534.7	353.1	242.1-464.2	-45.0	(-218.1,131.9)	0.612
Managers And Proprietors In Other Service Industries	123	397.2	298.9-495.5	333.4	240.8-426.0	-64.1	(-199.7, 72.7)	0.359
Natural and Social Science Professionals	211	339.8	61.3-618.4					
Engineering Professionals	212	340.6	229.0-452.1	332.6	233.7-431.5	-7.9	(-154.4,141.6)	0.908
Information And Communication Technology Professionals	213	551.7	61.6-1041.7	214.1	80.8-347.4	-341.1	(-843.2,164.5)	0.186
Health professionals	221	300.6	140.7-460.5	145	49.8-240.2	-156.3	(-341.8, 29.9)	0.102
Teaching Professionals	231	298.5	220.0-377.0	219.3	158.0-280.6	-79.1	(-177.9, 20.9)	0.124
Research Professional	232			328	25.6-630.4			
Business and Public Services Professionals	24	309.0	214.2-403.8	217.9	149.3-286.6	-91.2	(-206.7, 23.2)	0.124
Science And Engineering Technicians	311	456.2	304.8-607.7	314.3	206.1-422.4	-141.2	(-325.3, 44.1)	0.129
Draughtspersons And Building Inspectors	312	284.7	95.1-474.2	494.2	211.8-776.7	205.5	(-134.7,541.7)	0.233
IT Service Delivery Occupations	313			224.1	0-455.6			
Health Associate Professionals	321	754.7	388.9-1120.4	438	219.5-656.5	-315.8	(-743.8,116.6)	0.144
Social Welfare Associate Professionals	323	551.9	193.4-910.3	372.1	141.1-603.1	-179.3	(-615.0,245.4)	0.422
Protective Service Occupations	331	551.9	371.6-732.2	385.7	254.7-516.8	-164.9	(-383.8, 52.8)	0.142
Culture, Media and Sports Occupations	34	469.3	289.0-649.7	306.8	186.7-426.9	-162.9	(-380.8, 53.1)	0.141
Transport Associate Professionals	351	545.0	291.9-798.0	339.3	135.6-543.0	-203.7	(-525.9,123.2)	0.225
Business And Finance Associate Professionals	353	339.8	183.6-495.9	228.5	124.6-332.5	-110.7	(-297.9, 81.6)	0.244
Sales And Related Associate Professionals	354	418.5	285.0-551.9	234.7	140.3-329.1	-185.5	(-346.4,-21.4)	0.026
Public Service And Other Associate Professionals	356	442.5	292.7-592.3	379.4	241.8-517.0	-62.1	(-260.1,141.7)	0.538
Administrative Occupations: Government And Related Organisations	411	512.5	330.4-694.6	520.9	342.6-699.3	9.8	(-247.9,265.8)	0.935
Administrative Occupations: Finance	412	364.5	207.9-521.0	303.4	161.0-445.7	-61.5	(-274.6,150.2)	0.575
Administrative Occupations: Records	413	556.2	389.5-722.8	346.2	220.0-472.4	-209.3	(-421.5, 3.8)	0.054
Administrative Occupations: Communications	414	846.0	167.8-1524.1	724.4	38.5-1410.3	-119.4	(-1089.5,841.0)	0.809

Administrative Occupations: General	415	338.1	142.1-534.0	430.3	242.3-618.3	91.4	(-181.2,363.9)	0.5
Secretarial And Related Occupations	421							
Agricultural Trades	511	446.8	352.1-541.4	446.7	349.7-543.6	-0.4	(-135.0,136.2)	0.998
Metal Forming, Welding And Related Trades	521	657.4	507.9-807.0	506.7	370.0-643.4	-151.2	(-357.5, 52.5)	0.142
Metal Machining, Fitting And Instrument Making Trades	522	556.4	456.5-656.3	431	344.1-517.9	-125.5	(-258.8, 5.4)	0.063
Vehicle Trades	523	473.9	304.1-643.7	351	230.8-471.2	-124.2	(-329.3, 81.6)	0.238
Electrical Trades	524	403.8	315.8-491.7	461.6	371.3-552.0	59.1	(-66.4,186.0)	0.366
Construction Trades	531	535.7	457.4-613.9	501.3	425.3-577.4	-34.1	(-142.5, 75.3)	0.545
Building Trades	532	571.5	431.7-711.3	513.1	380.0-646.2	-58.2	(-248.1,135.8)	0.551
Textiles And Garments Trades	541							
Printing Trades	542	313.9	107.7-520.1	638.2	314.9-961.6	325.1	(-66.7,704.2)	0.101
Food Preparation Trades	543	640.5	438.5-842.5	484.9	351.0-618.8	-156.7	(-392.8, 87.0)	0.197
Skilled Trades not elsewhere classified	549	289.4	76.2-502.7	461.3	219.2-703.5	172	(-144.5,493.2)	0.291
Healthcare And Related Personal Services	611	452.0	212.7-691.3	434.4	265.5-603.4	-18	(-313.7,275.6)	0.908
Animal Care Services	613			1124.8	127.1-2122.5			
Leisure And Travel Service Occupations	621	515.2	195.4-835.0	721	376.6-1065.3	203.5	(-267.5,675.1)	0.393
Housekeeping Occupations	623	623.0	379.8-866.3	567.8	317.5-818.1	-55.5	(-399.8,291.1)	0.763
Sales Assistants And Retail Cashiers	711	331.3	159.1-503.4	444	282.7-605.4	112.0	(-122.5,343.4)	0.35
Sales Related Occupations	712	573.4	379.5-767.2	509.1	303.4-714.7	-63.9	(-353.1,215.6)	0.656
Customer Service Occupations	721			246.7	49.3-444.2			
Process Operatives	811	575.9	456.2-695.7	475.6	359.3-592.0	-98.6	(-265.9, 67.3)	0.237
Plant And Machine Operatives	812	560.1	450.5-669.7	520.5	410.3-630.7	-41	(-197.5,114.3)	0.612
Assemblers And Routine Operatives	813	611.0	438.6-783.5	630	474.9-785.1	18.9	(-209.1,252.6)	0.88
Construction Operatives	814	533.2	399.3-667.2	623	472.0-773.9	88.7	(-116.0,292.0)	0.393
Transport Drivers And Operatives	821	643.8	569.5-718.0	503.2	440.1-566.3	-141	(-238.6,-44.3)	0.005
Mobile Machine Drivers And Operatives	822	860.7	676.7-1044.8	559	410.4-707.7	-302.6	(-541.1,-64.0)	0.014
Elementary Agricultural Occupations	911	574.1	404.1-744.2	571.9	389.7-754.2	-1.4	(-251.4,246.3)	0.997
Elementary Construction Occupations	912	814.6	656.0-973.3	936.9	771.4-1102.5	122.3	(-105.8,351.2)	0.288
Elementary Process Plant Occupations	913	614.1	462.5-765.7	829.1	665.8-992.4	215.2	(-9.9,438.8)	0.061
Elementary Goods Storage Occupations	914	612.0	481.0-742.9	618.8	486.1-751.5	6.5	(-182.0,190.6)	0.939
Elementary Administration Occupations	921	819.8	610.0-1029.6	545	390.3-699.7	-275.6	(-534.9,-14.3)	0.037
Elementary Personal Services Occupations	922	722.9	488.1-957.7	723.5	519.7-927.3	1.2	(-310.8,311.8)	0.985
Elementary Cleaning Occupations	923	777.7	586.9-968.6	769.7	605.3-934.1	-7.3	(-258.7,243.7)	0.955
Elementary Security Occupations	924	672.3	502.8-841.9	739.8	560.2-919.3	68.9	(-179.5,319.2)	0.582
No job reported	1000	1493.8	1390.6-1597.1	1241.5	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	194.3	121.6-267.1	178.1	131.2-225.0	-15.6	(-101.6, 70.9)	0.725
Managers and Proprietors in Agriculture and Services	12	385.8	242.6-528.9	235.9	147.0-324.8	-148.4	(-316.4, 17.8)	0.082
Managers And Proprietors In Other Service Industries	123	303.6	178.4-428.8	242.8	147.5-338.1	-61.1	(-216.2, 95.9)	0.438
Science, research, engineering and technology professionals	21			428.6	24.0-833.3			
Health professionals	221	258.8	15.5-502.1	214.8	63.4-366.3	-45	(-336.0,247.5)	0.764
Teaching Professionals	231	220.2	164.2-276.3	159.6	122.0-197.1	-60.6	(-129.8, 6.6)	0.079
Business and public service professionals	24	220.6	80.4-360.8	200.8	109.4-292.1	-21.3	(-189.4,147.6)	0.8
Science and technology associate professionals	31	332.3	116.3-548.4	220.4	100.4-340.5	-114.8	(-361.4,131.4)	0.366
Health Associate Professionals	321	241.6	176.6-306.6	241.3	186.4-296.3	-0.3	(-84.2, 83.0)	0.991
Therapists	322			148.2	27.5-268.9			
Social Welfare Associate Professionals	323	356.4	168.5-544.3	202.3	109.5-295.1	-154.9	(-358.6, 54.4)	0.143
Protective Service Occupations	331			569.5	41.8-1097.2			
Culture, media and sports occupations	34	339.5	31.9-647.2	202.5	82.5-322.5	-135.5	(-469.7,203.3)	0.413
Business and public service associate professionals	35	278.4	150.6-406.3	200.1	130.9-269.3	-77.5	(-221.5, 69.6)	0.302
Administrative Occupations: Government And Related Organisations	411	221.7	140.6-302.8	237.5	153.7-321.4	16.3	(-99.9,130.1)	0.777
Administrative Occupations: Finance	412	211.7	149.1-274.3	249.1	190.3-307.8	37.8	(-47.9,124.9)	0.39
Administrative Occupations: Records	413	210	128.2-291.8	222.2	147.1-297.3	12.7	(-98.8,124.6)	0.82
Administrative Occupations: Communications	414	313.5	124.8-502.2	273	117.6-428.4	-37.6	(-279.3,209.9)	0.755
Administrative Occupations: General	415	246.2	174.8-317.5	226.4	176.8-276.0	-19.1	(-107.2, 68.8)	0.666
Secretarial And Related Occupations	421	206.2	159.9-252.6	223.2	180.0-266.4	16.8	(-45.8, 81.3)	0.607
Agricultural Trades	511			117.9	15.0-220.8			
Skilled metal and electrical trades	52			387.3	80.4-694.3			
Textiles And Garments Trades	541	405.6	142.2-669.0	478.1	200.0-756.2	71.7	(-302.6,463.2)	0.708
Printing Trades	542	756.3	156.5-1356.1	329.9	37.5-622.3	-428.7	(-1105.6,229.5)	0.211
Food Preparation Trades	543	300.6	194.5-406.7	422.2	298.7-545.6	121.1	(-40.3,284.4)	0.144
Healthcare And Related Personal Services	611	287.6	221.0-354.2	283.7	237.0-330.4	-4.2	(-86.1, 78.1)	0.926
Childcare And Related Personal Services	612	198.8	96.2-301.4	232.3	155.8-308.8	33.3	(-93.5,160.8)	0.615
Leisure And Travel Service Occupations	621	257.6	35.7-479.5	228	99.4-356.6	-29.2	(-283.9,225.3)	0.825
Hairdressers And Related Occupations	622			355.5	185.2-525.7			
Housekeeping Occupations	623	323.4	140.8-505.9	254.1	128.5-379.7	-70.3	(-290.4,148.4)	0.536

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

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	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	354	126.1	(-47.2,249.5)	0.043	26.8	(-1.0, 53.0)
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	524	-128	(-235.2,-21.2)	0.019	-57.9	(-106.3, -9.6)
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	912	-235	(-432.6,-36.7)	0.022	-60.4	(-111.1, -9.4)
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)
TOTAL					-630.9	(-979.2,-284.8)

*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	12	160.0	(41.4,276.3)	0.009	35	(9.1, 60.4)
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	413	111.2	(12.5,207.3)	0.028	38.1	(4.3, 70.9)
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	543	-204.7	(-343.7,-67.0)	0.004	-43.6	(-73.2,-14.3)
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 And Routine Operatives Transport Drivers	812 813	-144.9 -108.3	(-517.4,223.1) (-221.2, 1.7)	0.438 0.055	-6 -46	(-21.3, 9.2) (-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	923	-73.9	(-143.5, -3.3)	0.042	-63.5	(-123.3, -2.8)
Occupations	924	-38.8	(-218.7,137.4)	0.677	-2.8	(-16.1, 10.1)
No occupation reported		-108.3	(-199.7,-16.3)	0.019	-135.3	(-249.6,-20.4)
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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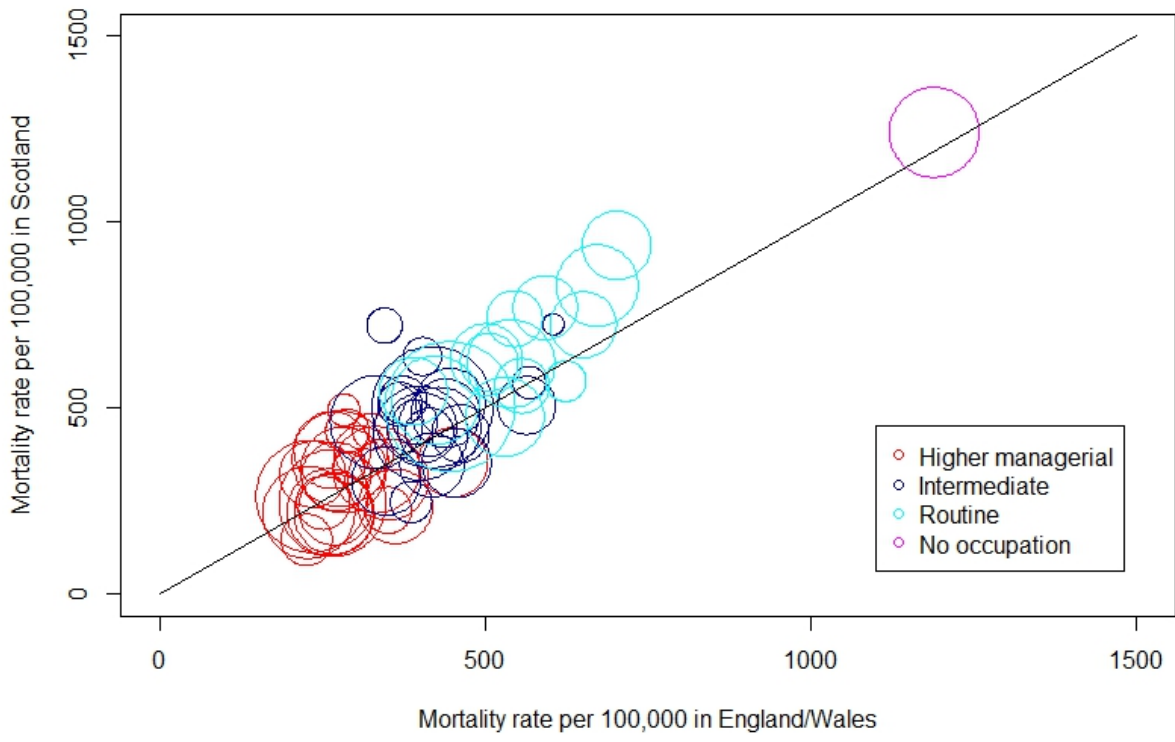
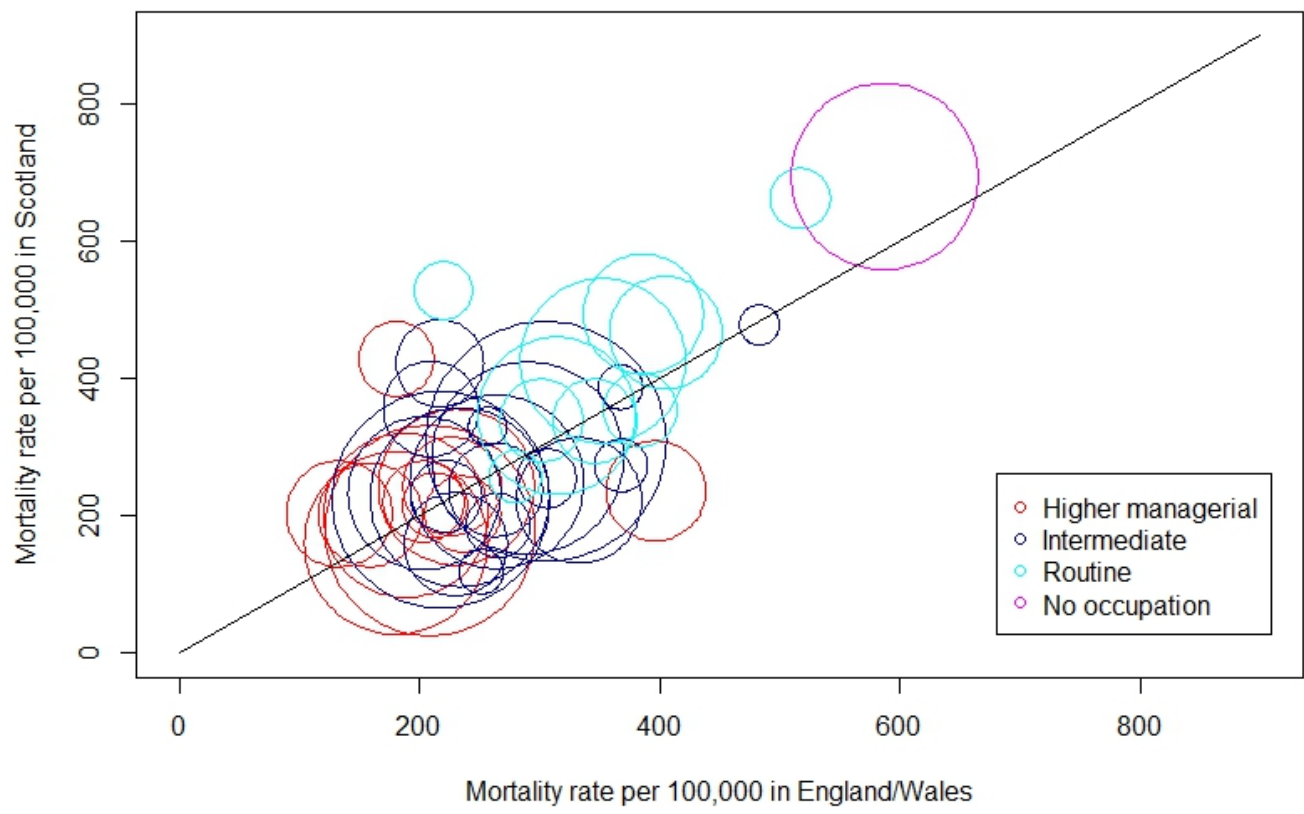


Figure1b



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
1				MANAGERS, DIRECTORS AND SENIOR OFFICIALS		
	11			CORPORATE MANAGERS AND DIRECTORS	111, 114, 118	X
		111		Chief Executives and Senior Officials		
			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		
		112		Production Managers	X	
			1121	Production, works and maintenance managers		
			1122	Managers in construction		
			1123	Managers in mining and energy		
		113		Functional Managers	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		
		114		Quality And Customer Care Managers		
			1141	Quality assurance managers		
			1142	Customer care managers		
		115		Financial Institution And Office Managers	X	
			1151	Financial institution managers		
			1152	Office managers		
		116		Managers In Distribution, Storage And Retailing	X	
			1161	Transport and distribution managers		
			1162	Storage and warehouse managers		
			1163	Retail and wholesale managers		

		117		Protective Service Officers	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		
		118		Health And Social Services Managers		
			1181	Hospital and health service managers		
			1182	Pharmacy managers		
			1183	Healthcare practice managers		
			1184	Social services managers		
			1185	Residential and day care managers		
	12			MANAGERS AND PROPRIETORS IN AGRICULTURE AND SERVICES	121+122	121+122
		121		Managers In Farming, Horticulture, Forestry And Fishing		
			1211	Farm managers		
			1212	Natural environment and conservation managers		
			1219	Managers in animal husbandry, forestry and fishing n.e.c.		
		122		Managers And Proprietors In Hospitality And Leisure Services		
			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		
		123		Managers And Proprietors In Other Service Industries	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.		
				PROFESSIONAL OCCUPATIONS		
	21			SCIENCE, RESEARCH, ENGINEERING AND TECHNOLOGY PROFESSIONALS		X
		211		Natural and Social Science Professionals	X	
			2111	Chemists		
			2112	Biological scientists and biochemists		
			2113	Physicists, geologists and meteorologists		
		212		Engineering Professionals	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.		
		213		Information And Communication Technology Professionals	X	
			2131	IT strategy and planning professionals		
			2132	Software professionals		
	22			HEALTH PROFESSIONALS		
		221		Health professionals	X	X
			2211	Medical practitioners		
			2212	Psychologists		
			2213	Pharmacists/pharmacologists		
			2214	Ophthalmic opticians		
			2215	Dental practitioners		
			2216	Veterinarians		
	23			TEACHING AND RESEARCH PROFESSIONALS		
		231		Teaching Professionals	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.		
		232		Research Professional	X	X
			2321	Scientific researchers		
			2322	Social science researchers		
			2329	Researchers n.e.c.		
	24			BUSINESS AND PUBLIC SERVICE PROFESSIONALS	X	X
		241		Legal Professionals		
			2411	Solicitors and lawyers, judges and coroners		
			2419	Legal professionals n.e.c.		
		242		Business And Statistical Professionals		
			2421	Chartered and certified accountants		
			2422	Management accountants		
			2423	Management consultants, actuaries, economists and statisticians		
		243		Architects, Town Planners, Surveyors		
			2431	Architects		
			2432	Town planners		
			2433	Quantity surveyors		
			2434	Chartered surveyors (not quantity surveyors)		

		244		Public Service Professionals		
			2441	Public service administrative professionals		
			2442	Social workers		
			2443	Probation officers		
			2444	Clergy		
		245		Librarians And Related Professionals		
			2451	Librarians		
			2452	Archivists and curators		
3				ASSOCIATE PROFESSIONAL AND TECHNICAL OCCUPATIONS		
	31			SCIENCE AND TECHNOLOGY ASSOCIATE PROFESSIONALS		X
		311		Science And Engineering Technicians	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.		
		312		Draughtspersons And Building Inspectors	X	
			3121	Architectural technologists and town planning technicians		
			3122	Draughtspersons		
			3123	Building inspectors		
		313		IT Service Delivery Occupations	X	
			3131	IT operations technicians		
			3132	IT user support technicians		
	32			HEALTH AND SOCIAL WELFARE ASSOCIATE PROFESSIONALS		
		321		Health Associate Professionals	X	X
			3211	Nurses		
			3212	Midwives		
			3213	Paramedics		
			3214	Medical radiographers		
			3215	Chiropodists		
			3216	Dispensing opticians		
			3217	Pharmaceutical dispensers		
			3218	Medical and dental technicians		
		322		Therapists	X	X
			3221	Physiotherapists		
			3222	Occupational therapists		
			3223	Speech and language therapists		
			3229	Therapists n.e.c.		
		323		Social Welfare Associate Professionals	X	X
			3231	Youth and community workers		
			3232	Housing and welfare officers		
	33			PROTECTIVE SERVICE OCCUPATIONS		
		331		Protective Service Occupations	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		Artistic And Literary Occupations		
			3411	Artists		
			3412	Authors, writers		
			3413	Actors, entertainers		
			3414	Dancers and choreographers		
			3415	Musicians		
			3416	Arts officers, producers and directors		
		342		Design Associate Professionals		
			3421	Graphic designers		
			3422	Product, clothing and related designers		
		343		Media Associate Professionals		
			3431	Journalists, newspaper and periodical editors		
			3432	Broadcasting associate professionals		
			3433	Public relations officers		
			3434	Photographers and audio-visual equipment operators		
		344		Sports And Fitness Occupations		
			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		Transport Associate Professionals	X	
			3511	Air traffic controllers		
			3512	Aircraft pilots and flight engineers		
			3513	Ship and hovercraft officers		
			3514	Train drivers		
		352		Legal Associate Professionals	X	
			3520	Legal associate professionals		
		353		Business And Finance Associate Professionals	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		Sales And Related Associate Professionals	X	
			3541	Buyers and purchasing officers		

			3542	Sales representatives		
			3543	Marketing associate professionals		
			3544	Estate agents, auctioneers		
		355		Conservation Associate Professionals	X	
			3551	Conservation and environmental protection officers		
			3552	Countryside and park rangers		
		356		Public Service And Other Associate Professionals	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		
		411		Administrative Occupations: Government And Related Organisations	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		
		412		Administrative Occupations: Finance	X	X
			4121	Credit controllers		
			4122	Accounts and wages clerks, book-keepers, other financial clerks		
			4123	Counter clerks		
		413		Administrative Occupations: Records	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		
		414		Administrative Occupations: Communications	X	X
			4141	Telephonists		
			4142	Communication operators		
		415		Administrative Occupations: General	X	X
			4150	General office assistants/clerks		

	42			SECRETARIAL AND RELATED OCCUPATIONS		
		421		Secretarial And Related Occupations	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		
		511		Agricultural Trades	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
		521		Metal Forming, Welding And Related Trades	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		
		522		Metal Machining, Fitting And Instrument Making Trades	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		
		523		Vehicle Trades	X	
			5231	Motor mechanics, auto engineers		
			5232	Vehicle body builders and repairers		
			5233	Auto electricians		
			5234	Vehicle spray painters		
		524		Electrical Trades	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
		531		Construction Trades	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.		
		532		Building Trades	X	
			5321	Plasterers		
			5322	Floorers and wall tilers		
			5323	Painters and decorators		
	54			TEXTILES, PRINTING AND OTHER SKILLED TRADES		
		541		Textiles And Garments Trades	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.		
		542		Printing Trades	X	X
			5421	Originators, compositors and print preparers		
			5422	Printers		
			5423	Bookbinders and print finishers		
			5424	Screen printers		
		543		Food Preparation Trades	X	X
			5431	Butchers, meat cutters		
			5432	Bakers, flour confectioners		
			5433	Fishmongers, poultry dressers		
			5434	Chefs, cooks		
		549		Skilled Trades n. e. c.	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		
		611		Healthcare And Related Personal Services	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		
		612		Childcare And Related Personal Services	X	X
			6121	Nursery nurses		

			6122	Childminders and related occupations		
			6123	Playgroup leaders/assistants		
			6124	Educational assistants		
		613		Animal Care Services	X	X
			6131	Veterinary nurses and assistants		
			6139	Animal care occupations n.e.c.		
	62			LEISURE AND OTHER PERSONAL SERVICE OCCUPATIONS		
		621		Leisure And Travel Service Occupations	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.		
		622		Hairdressers And Related Occupations	X	X
			6221	Hairdressers, barbers		
			6222	Beauticians and related occupations		
		623		Housekeeping Occupations	X	X
			6231	Housekeepers and related occupations		
			6232	Caretakers		
		629		Personal Services Occupations n. e. c.	X	X
			6291	Undertakers and mortuary assistants		
			6292	Pest control officers		
7				SALES AND CUSTOMER SERVICE OCCUPATIONS		
	71			SALES OCCUPATIONS		
		711		Sales Assistants And Retail Cashiers	X	X
			7111	Sales and retail assistants		
			7112	Retail cashiers and check-out operators		
			7113	Telephone salespersons		
		712		Sales Related Occupations	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		
		721		Customer Service Occupations	X	X
			7211	Call centre agents/operators		
			7212	Customer care occupations		
8				PROCESS, PLANT AND MACHINE OPERATIVES		
	81			PROCESS, PLANT AND MACHINE OPERATIVES		
		811		Process Operatives	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.		
		812		Plant And Machine Operatives	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.		
		813		Assemblers And Routine Operatives	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.		
		814		Construction Operatives	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		
		821		Transport Drivers And Operatives	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.		
		822		Mobile Machine Drivers And Operatives	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		Elementary Agricultural Occupations	X	X
			9111	Farm workers		
			9112	Forestry workers		
			9119	Fishing and agriculture related occupations n.e.c.		
		912		Elementary Construction Occupations	X	X
			9121	Labourers in building and woodworking trades		
			9129	Labourers in other construction trades n.e.c.		
		913		Elementary Process Plant Occupations	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		Elementary Goods Storage Occupations	X	X
			9141	Stevedores, dockers and slingers		
			9149	Other goods handling and storage occupations n.e.c.		
	92			ELEMENTARY ADMINISTRATION AND SERVICE OCCUPATIONS		
		921		Elementary Administration Occupations	X	X
			9211	Postal workers, mail sorters, messengers, couriers		
			9219	Elementary office occupations n.e.c.		
		922		Elementary Personal Services Occupations	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		Elementary Cleaning Occupations	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		Elementary Security Occupations	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.		
		925		Elementary Sales Occupations	X	X
			9251	Shelf fillers		
			9259	Elementary sales occupations n.e.c.		

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

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

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

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

Elementary Sales Occupations	925					
No occupation reported		64710	694.7	627.5	761.9	
All those reporting an occupation§		716950	277	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

Employment group	SOC code*	Person-Years	EASR	Low 95% CI	High 95% CI	Rank
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

Employment group	SOC code*	Person-Years	EASR	Low 95% CI	High 95% CI	Rank
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 *	Difference between England and Scotland	95% CI	p value	Expected change in deaths in England	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 Draughtspersons And Building Inspectors	311	-43.4	(-171.1, 87.7)	0.513	102.6	(-207.5, 405.0)
IT Service Delivery Occupations	312	-213.3	(-535.7,104.8)	0.19	109.1	(-53.6, 274.0)
Health Associate Professionals	313	127.4	(-164.7,429.7)	0.41	-137.7	(-464.3, 177.9)
Social Welfare Associate Professionals	321	-148	(-400.1, 98.7)	0.236	139.7	(-93.2, 377.8)
Protective Service Occupations	323	-36.9	(-327.4,251.1)	0.798	19.2	(-130.4, 169.9)
Culture, media and sports occupations	331	-122.7	(-276.2, 29.6)	0.114	361.2	(-87.1, 813.1)
Transport Associate Professionals	34	42.7	(-101.2,186.2)	0.555	-140.5	(-612.2, 332.8)
	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,
			86.0,163.8)	7	-103.8	228.1)
Sales And Related Associate Professionals			(	0.04		(-687.0, -
	354	126.1	4.7,249.5)	3	-347.3	13.1)
Public Service And Other Associate Professionals			(-236.4,	0.41		(-133.2,
	356	-69.6	95.3)	3	97.3	330.2)
Administrative Occupations: Government And Related Organisations			(-358.3,	0.15		(-69.7,
	411	-148.4	60.7)	6	170.5	411.6)
Administrative Occupations: Finance			(-			
	412	43.6	120.3,210.0	0.60		(-495.7,
			)	9	-103	284.0)
Administrative Occupations: Records			(-			(-475.7,
	413	70.6	89.8,231.4)	0.39	-145.1	184.6)
Administrative Occupations: Communications			(-			
	414	-122.7	888.1,655.2	0.75		(-147.4,
			)	6	27.6	199.9)
Administrative Occupations: General			(-			
	415	29.7	189.4,254.2	0.79		(-417.9,
			)	6	-48.8	311.4)
Agricultural Trades			(-166.9,	0.47		(-189.9,
	511	-45	77.8)	9	109.8	407.6)
Metal Forming, Welding And Related Trades			(-			
	521	54.9	123.7,232.7	0.55		(-391.5,
			)	5	-92.4	208.1)
Metal Machining, Fitting And Instrument Making Trades			(-134.7,			(-328.3,
	522	-31.1	74.8)	0.56	136.3	590.9)
Vehicle Trades			(-			(-607.8,
	523	105.8	47.1,257.7)	0.18	-249.4	111.2)
Electrical Trades			(-235.2,-	0.01		(
	524	-128	21.2)	9	547.2	90.5,1005.3)
Construction Trades			(-171.4,	0.07		(-
	531	-82.5	8.1)	3	602.6	58.9,1252.2)
Building Trades			(-223.5,	0.40		(-221.2,
	532	-67.3	92.8)	7	160.4	532.8)
Printing Trades			(-			
	542	-237.5	605.4,125.6	0.18		(-91.6,
			)	8	173.2	441.4)
Food Preparation Trades			(-			
	543	-47.8	212.8,120.7	0.58		(-284.3,
			)	7	112.7	501.1)
Skilled Trades n. e. c.			(-			
	549	-72.5	349.0,200.5	0.61		(-195.6,
			)	1	70.7	340.5)
Healthcare And Related Personal Services			(-			
	611	-19.6	232.7,190.2	0.85		(-221.4,
			)	8	22.8	270.9)
Leisure And Travel Service Occupations			(-761.4,	0.05		
	621	-376.9	11.0)	9	236.5	(-6.9, 477.7)
Housekeeping Occupations			(-			
	623	-1	302.1,298.9	0.99		(-158.8,
			)	6	0.5	160.4)
Sales Assistants And Retail Cashiers			(-			
	711	-15.7	205.1,173.5	0.86		(-588.7,
			)	9	53.1	696.3)
Sales Related Occupations			(-378.6,	0.24		(-94.2,
	712	-140.2	96.6)	5	136.7	369.3)
Customer Service Occupations			(-			
	721	137.5	137.8,409.0	0.32		(-350.7,
			)	7	-117.9	118.1)
Process Operatives			(-	0.47	-163.3	(-604.8,

Plant And Machine Operatives			87.7,196.2)	8		270.3)
	812	-97.6	(-224.4,	0.13		(-119.2,
Assemblers And Routine Operatives			30.7)	9	379.7	872.6)
	813	-127.8	(-309.8,	0.16		(-141.5,
Construction Operatives			55.0)	1	328.6	796.5)
	814	-117.3	(-301.5,	0.20		(-110.1,
Transport Drivers And Operatives			66.4)	7	194.6	500.2)
						(-
	821	-58.2	(-135.7,	0.13		147.5,1145.9
Mobile Machine Drivers And Operatives			17.5)	2	491.7)
			(-			
	822	-3.1	196.8,184.4	0.98		(-276.1,
Elementary Agricultural Occupations			)	2	4.6	294.6)
			(-			
	911	50.3	207.5,308.6	0.70		(-255.3,
Elementary Construction Occupations			)	8	-41.6	171.7)
			(-432.6,-	0.02		(
Elementary Process Plant Occupations			36.7)	2	551.7	86.1,1015.5)
						(-
	913	-156.6	(-345.0,	0.10		109.2,1145.3
Elementary Goods Storage Occupations			32.9)	7	519.9)
			(-234.9,	0.30		(-271.1,
Elementary Administration Occupations			70.1)	8	310.8	908.8)
	914	-80.3	(-329.9,	0.08		(-48.7,
Elementary Personal Services Occupations			21.3)	8	352.3	753.1)
			(-			
	922	-72.9	322.8,174.7	0.56		(-380.9,
Elementary Cleaning Occupations			)	5	159	704.0)
			(-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 Sales Related Occupations	711	-2.3	(-55.1, 50.6)	0.927	31.7	(-689.8, 751.5)
Customer Service Occupations	712	79.8	(-98.6,256.1)	0.372	-77.8	(-249.5, 96.0)
Process Operatives	721	71	(-37.2,180.1)	0.189	-178.9	(-453.9, 93.8)
Plant And Machine Operatives	811	8.8	(-133.6,154.6)	0.908	-15	(-261.6, 225.9)
Assemblers And Routine Operatives	812	-144.9	(-517.4,223.1)	0.438	124.8	(-192.1, 445.5)
Transport Drivers And Operatives	813	-108.3	(-221.2, 1.7)	0.055	370.3	(-5.9, 755.9)
Elementary Process Plant Occupations	821	21.9	(-231.8,271.1)	0.858	-14.2	(-175.9, 150.4)
Elementary Goods Storage Occupations	913	-61.7	(-206.0, 84.7)	0.406	184.3	(-253.2, 615.3)
Elementary Administration Occupations	914	-310.8	(-668.4, 53.6)	0.091	245.3	(-42.4, 527.7)
Elementary Personal Services Occupations	921	29.3	(-179.7,236.0)	0.779	-37.5	(-302.0, 230.0)
Elementary Cleaning Occupations	922	-31	(-115.1, 52.4)	0.476	182.3	(-308.0, 677.2)
Elementary Security Occupations	923	-73.9	(-143.5, -3.3)	0.042	476	(21.1, 924.3)
No occupation reported	924	-38.8	(-218.7,137.4)	0.677	63	(-223.2, 355.2)
TOTAL		-108.3	(-199.7,-16.3)	0.019	892.8	(134.7,1646.4)
					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