

DATA INSIGHTS

Occupation and COVID-19 deaths: Scotland in a comparative perspective

Author: Dr Serena Pattaro | Serena.Pattaro@glasgow.ac.uk

Date: December 2021

DOI:

SUMMARY OF PROJECT

There are occupational disparities in the risk of COVID-19. People working in occupations with close contact with others may be at a higher risk of death due to COVID-19. Occupational exposures may also be modified by the workplace policies put in place to protect workers in different national contexts.

In this Data Insights, we explore how COVID-19 mortality rates vary by occupation for women and men in Scotland in the period between 1st March 2020 and 31st January 2021. Using a national novel linked data collection, we contrast preliminary results for Scotland with those from a similar linked data study for England. Generally, Scottish adults had higher COVID-19 mortality rates compared to English adults, with women showing lower rates than men.

In Scotland, men working in essential elementary service occupations, such as kitchen assistants and waiters, along with large goods vehicle and taxi drivers had exceptionally high mortality rates. In contrast to English men, lower mortality rates were observed for Scottish men working as health professionals and as care and home workers, suggesting that the policies implemented in the health and social care sector in Scotland may offer a higher degree of protection.

WHAT WE DID

We established a large linked data collection by combining:

- Individual-level 2011 Census data and health administrative data from Public Health Scotland COVID-19 Research Database, and
- Household identifiers from Ordnance Survey's Unique Property Reference Number (UPRN) covering every address in Scotland from a CURL residential linkage tool developed at SCADR.

Occupation is taken from 2011 Census records, some ten years prior to the pandemic. It is coded using UK Standard Occupational Classification (SOC) 2010.

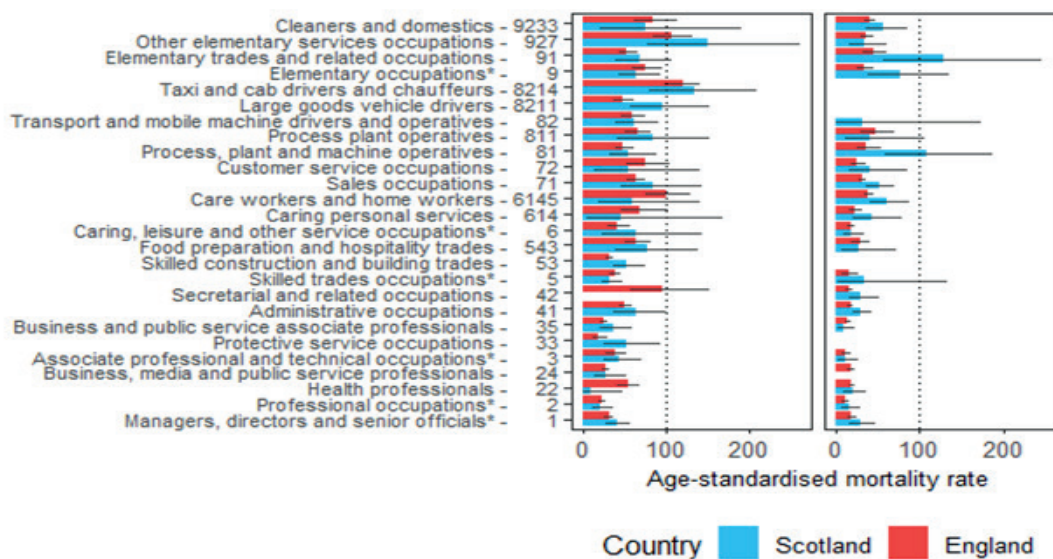
For later stages, we plan to add a number of small-area measures of potential risks, including population mobility indices from mobile phone records (provided through a partnership with the UKRI ESRC-funded Urban Big Data Centre) and environmental data from a range of data sources.

This innovative data collection was established as part of the COVID-19 Data and Intelligence Network to provide rapid intelligence to Scottish Government and inform its pandemic policy responses. A large study was commissioned by the Government’s Chief Statistical Office to identify a range of social (non-health) risk factors for COVID-19 health outcomes. These include the risk of testing positive for SARS-CoV-2, being admitted to the hospital with COVID-19 symptoms, receiving critical care and death involving COVID-19. This Data Insights focusses on the latter outcome in relation to occupational risk.

WHAT WE FOUND

Figure 1 shows how age-standardised COVID-19 mortality rates*** vary by occupation for men and women aged 40 to 64 years in Scotland and England. Occupations are ranked in descending order by Standard Occupational Classification (SOC) 2010 codes**.

Figure 1. Annualised age-standardised COVID-19-related mortality rates per 100,000 adults aged 40 to 64 years in Scotland and England



Notes:

Scotland: Age-standardised mortality rates calculated using the direct method and 95% confidence intervals calculated using the Dobson (1991) method to account for the small number of COVID-19 related deaths; deaths occurring between 1st March 2020 and 31st January 2021.

England: * Weighted averages reported when occupational groups were aggregated to SOC one-digit codes for Scotland; weighted averages calculated assuming that the English population had the same sex composition of the Scottish population; Source: Nafilyan et al. (2021; table 2, pp. 8-9).

Scotland and England: Data were not reported if there were less than 10 deaths; mortality rates were standardized to the 2013 European Standard Population.

** Some occupational groups with a particular policy relevance and sufficient sample size were displayed using SOC 4-digit codes. Other occupational groups with smaller sample sizes and/or lower policy relevance were aggregated to SOC codes of 3 digits or less. The more aggregated categories exclude the finer categories: e.g. '82' excludes '8211' and '8214' which are identified separately.

*** The age-standardised mortality rate is a weighted average of the age-specific mortality rates per 100,000 persons, where the weights are proportions of persons in the corresponding age groups of the 2013 European Standard population.

WHAT WE FOUND

Key findings include:

- Differences in mortality rates across occupations reflect both occupational risks and the social class gradient in underlying health. This stands out as we move from the higher-status end of the classification (Managers, director and senior officials) to the lower end (Cleaners and domestic workers).
- Higher COVID-19 mortality rates were observed among the adult population in Scotland compared to that in England. In both countries, women displayed lower mortality rates compared to men.
- In Scotland, exceptionally higher mortality rates were recorded among men working in 'Other elementary service occupations' such as kitchen and catering assistants, waiters and hospital porters, along with taxi and cab drivers, and large goods vehicle drivers.
- Among Scottish women, higher rates were observed among those working in 'Elementary trades and related occupations', including industrial cleaning occupations, packers, bottlers and canners. Higher rates were also observed among female workers employed as 'Process, plant and machine operatives', which included occupations from process operatives in food, drink and textile industries, to assemblers and sewing machinists, as well as more general 'Elementary occupations', such as postal workers and couriers, and elementary sales occupations, such as shelf fillers in stores.
- Compared to England, in Scotland there were lower mortality rates among men working as 'Health professionals' (e.g. medical practitioners, nurses and pharmacists), in 'Caring personal services' (e.g. nursing auxiliaries and assistants, ambulance staff), and among both care and home workers.

WHY IT MATTERS

As we move through the different stages of the pandemic, it is crucial to understand the drivers of occupational differences in COVID-19 mortality by sex and country. This is needed to design policy interventions which help to target protection measures to higher risk and more vulnerable occupational groups.

WHAT NEXT?

This is work in progress and one of the next steps will be to model the risk of COVID-19 related death in Scotland using survival analysis and accounting for individuals clustered within households and geographical areas.

Primary care and prescribing data will be used to better characterise the pre-pandemic health status for adults identified in the cohort. By doing this, we can get closer to identifying the risks arising from the occupation itself. In addition, small-area measures of population mobility derived from mobile phone records will provide an alternative way of identifying occupational risks by capturing the extent to which people in different areas had to continue travelling to places of work during the various 'lockdown' phases of this period. Extending the analyses to hospital and critical admissions will help us to look at the different pathways leading to COVID-19 mortality.

Acknowledgements

We would like to acknowledge the invaluable contribution of our colleague, Evan Williams (1990-2021), who has recently passed away.

We would also like to thank colleagues from Scottish Government, ADR Scotland Data Acquisition Team, National Records of Scotland (NRS), and electronic Data Research and Innovation Services (eDRIS) for their help and support during the development of this research project.

We gratefully acknowledge funding awarded by UK Research Innovation Economic and Social Research Council: ES/S007407/1 and ES/R005729/1.

This research used data assets made available by National Safe Haven as part of the Data and Connectivity National Core Study, led by Health Data Research UK in partnership with the Office for National Statistics and funded by UK Research Innovation: MC_PC_20029 and MC_PC_20058.

References:

- Dobson, A. J., Kuulasmaa, K., Eberle, E., and Scherer, J. (1991), 'Confidence intervals for weighted sums of poisson parameters', *Statistics in Medicine* 10(3): 457-462.
- Nafilyan, V., Pawelek, P., Ayoubkhani, D., Rhodes, S., Pembrey, L., Matz, M., Coleman, M. P., Allemani, C., Windsor-Shellard, B., van Tongeren, M., and Pearce, N. (2021), 'Occupation and COVID-19 mortality in England: a national linked data study of 14.3 million adults', *medRxiv* 2021.05.12.21257123, <https://www.medrxiv.org/content/10.1101/2021.05.12.21257123v1> [accessed 07.12.2021].

The Scottish Centre for Administrative Data Research (SCADR) analyses public sector data, using new data sources and novel methodologies to deliver cutting-edge applied research with real-world impact. We work with our partners to provide evidence-based insights, which inform policy and practice for public benefit.

Data Insights is produced by the Scottish Centre for Administrative Data Research
Website: www.scadr.ac.uk | Twitter: [@scadr_data](https://twitter.com/scadr_data) | Email: scadr@ed.ac.uk

The centre is a multi-institutional initiative hosted at the University of Edinburgh, which is a charitable body registered in Scotland (Registration number: SC005336).

