

## Managing infection risk in high contact occupations

### Summary

#### 1. Raising awareness of the problem of high social connectivity

- There is emerging evidence that some occupations and situations pose particularly high risk of infection due to high levels of social connection. This higher risk is linked to increased mortality in some occupations and sectors of the population, including lower income and BAME communities<sup>1</sup>.
- People in occupations involving numerous social contacts of longer duration and close proximity may be at increased risk of both contracting and spreading Covid-19. Examples of potentially higher risk occupations may include: bus and taxi drivers, social care and healthcare workers and people working in some retail, catering, security, and manufacturing settings.
- Other situations involving numerous social contacts of longer duration and close proximity also carry a higher risk of spreading Covid-19. Examples include: using public transport; large family gatherings; religious and cultural events; pubs, restaurants and cafes.
- As risk levels reduce in the general population, it is vital that all members of the public, employers, employees and self-employed people are aware of which situations will continue to pose higher risk and of what actions need to be taken by everyone to reduce the risks in these situations.

#### 2. Communicating two key principles for managing higher infection risk due to social connectivity

**2.1. People who have large numbers of contacts with different people are at higher risk of infection and transmission.** *Those in high contact or high disease exposure occupations should therefore pay particularly close attention to the social distancing and hygiene recommendations that are also recommended for the rest of the population. This is especially important when mixing with those at high risk of severe consequences of infection, such as older people or those at high risk from infection due to health conditions.*

*It is vital that the responsibility for managing infection risk due to multiple contacts is shared between the people at risk, their employers and all the people they meet. A Covid-secure risk assessment must be undertaken to ensure that risks are minimised. Wherever possible, changes to the structuring of workplace activities and environments should be prioritised. Taking extra care to manage infection risk may also involve everyone concerned undertaking additional actions such as handwashing at appropriate times, avoiding touching face or surfaces, cleaning all shared surfaces, changing/washing clothes, using and disposing of tissues, ventilating shared spaces, social distancing, wearing a face covering when close to others if social distancing is not possible. The EMG paper on Transmission of SARS-CoV-2 and Mitigating Measures (04/06/2012) sets out how to select appropriate measures.*

**2.2. People with different social networks should try to avoid meeting (especially close, prolonged, indoor contact) or sharing the same spaces**

*For example:*

- *people who share a workspace (e.g. office, section, floor) should try to avoid meeting or sharing spaces (e.g. kitchens, toilets) with people who share a different workspace*

- *contact should be avoided between teachers and pupils from different classes and especially different schools*
- *sports teams from different areas should avoid sharing facilities and enclosed spaces.*

### 3. Developing practical solutions to reduce social connectivity

The steps listed below are based on co-design principles previously described by SPI-B<sup>2,3,4</sup> for successfully developing, communicating, implementing and regulating guidance for reducing infection transmission, in order to maximise adherence. Note that all the steps listed below need to be taken, and it is vital to involve everyone in these occupations and communities in working together to find practical and acceptable solutions.

*3.1 Carry out an extensive education campaign* for employers, employees, self-employed people and the general public, working with diverse members of the target workforce/user groups and multidisciplinary experts in supporting behaviour change to provide toolkits suitable for different user audiences, with clear and convincing explanations, detailed guidance and effective behaviour change techniques

*3.2 Co-create guidance and positive solutions* with input from diverse members of all the different target workforce/user groups and their representatives (both organisational and community leads, employees and community members, including members of BAME communities) to identify opportunities, concerns, barriers and solutions. Positive solutions must be equitable, reassuring and supportive, should maintain social cohesion and support, and should promote a shared sense of responsibility for infection control.

*3.3 Redesign shared activities and spaces* to minimise contacts, for example, by adopting new shift patterns or patterns of workspace use, setting up teams or “buddies” to ensure that contact is limited to small groups of people, restricting access to communal spaces or allocating spaces to particular groups at particular times with ventilation and cleaning between use. This should be part of the Covid-safe risk assessment process described in 3.4 below.

*3.4 Use existing organisational structures and processes for implementation*, for example Health and Safety regulations and enforcement processes, including personal and workplace risk assessments to identify, apply and monitor appropriate control measures which reduce infection spread

*3.5 Monitor and feedback* to all concerned to check and reassure that infection control is being implemented effectively. All guidance developed must be extensively and iteratively tested and optimised through real-world implementation and feedback, taking particular care to consider and minimise the possible burden or anxiety that this may place on individuals and to ensure that new working practices do not result in discrimination, stigmatisation or interpersonal conflict.

## 1. The problem of high contact occupations and other high contact social networks

Potential high-risk exposure to COVID-19 can occur in the home, institutional settings such as care homes, hostels and prisons, at work or in other public spaces. As the UK attempts to ease restrictions it is important to understand the settings in which transmission occurs to target advice on minimising risk. For most people in these situations and occupations the risk of infection is important because of the risk of onward transmission to their contacts and the community and some disruption to their daily lives (due to mild or moderate illness and the need to self-isolate). However, the risks are potentially much more serious for those who have or live with someone who has increased vulnerability to Covid-19, or those exposed to a very high infecting viral load<sup>5</sup>.

Although we traditionally think of transmission occurring through defined close contacts, in reality a high proportion of transmission may come through casual or unrecognised exposure in the work place or in public spaces. Data from the Flu Watch study examining secondary household transmission of seasonal coronavirus found that around 80% of seasonal coronavirus infections were acquired outside the home. During periods of lockdown a high proportion of transmission may be within households but as we ease restrictions an increasing proportion will occur outside the household in workplace and public settings. Analysis of Flu Watch data found that the risk of acquiring acute respiratory infections was increased depending on the frequency of a range of public activities in the week before illness including use of public transport, use of shops, eating at restaurants, going to parties, going to cinemas and places of worship<sup>6,7</sup>.

In addition to households and public settings, occupational settings may act as venues for transmission. A consistent and systematic approach for the investigation of outbreaks should be developed. The resultant outbreak reports may provide insight into the routes of transmission and other causation factors – For example, there have been reports of outbreaks in chilled meat packing factories, markets, churches, care institutions, schools, telephone call centres. There is a need for a systematic review of the settings where outbreaks have been reported to help understand high risk occupations. There would also be a benefit in reviewing the settings where transmission rates are low despite high levels of potential infectivity<sup>8</sup>. Analysis of differential mortality rates may also provide insight into transmission of COVID-19 in the workplace. ONS have undertaken an analysis of deaths rates according to occupational settings<sup>9</sup>.

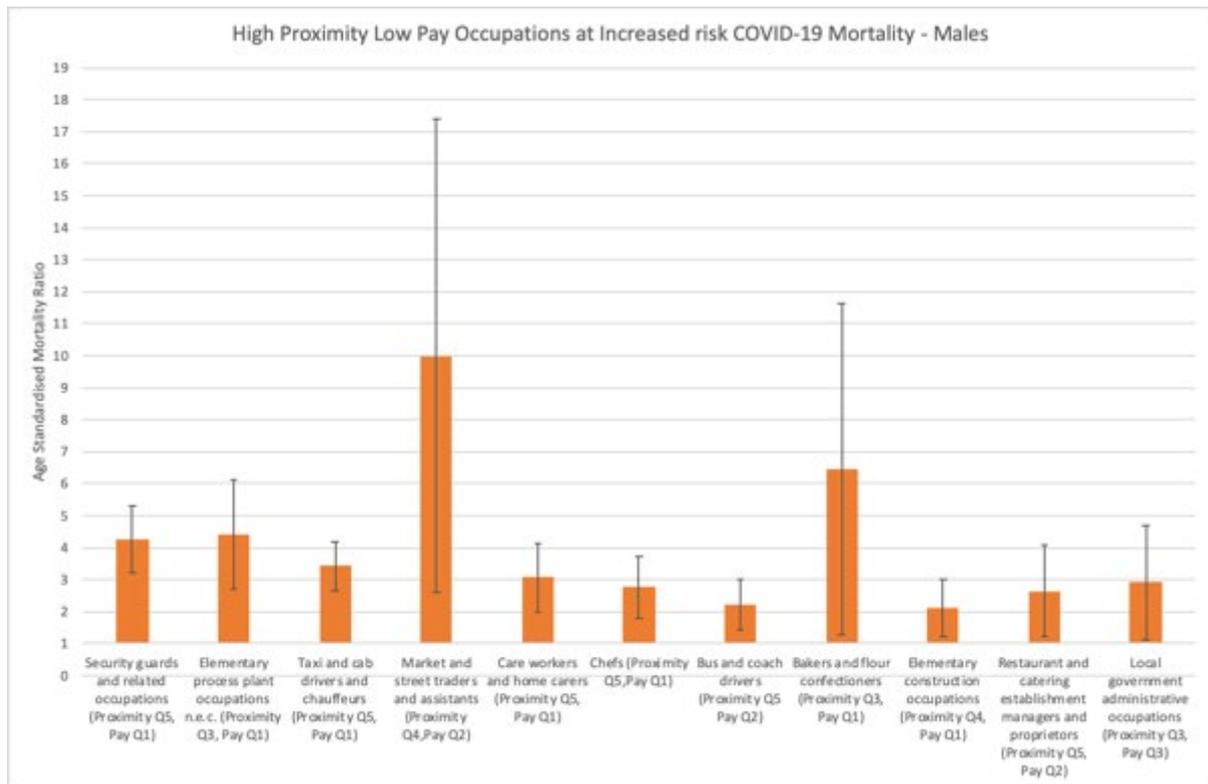
- Compared with the rate among people of the same sex and age in England and Wales, men working in the lowest skilled occupations had the highest rate of death involving COVID-19, with 21.4 deaths per 100,000 males (225 deaths).
- Men and women working in social care, a group including care workers and home carers, both had significantly raised rates of death involving COVID-19, with rates of 23.4 deaths per 100,000 males (45 deaths) and 9.6 deaths per 100,000 females (86 deaths).
- Healthcare workers, including those with jobs such as doctors and nurses, were not found to have higher rates of death involving COVID-19 when compared with the rate among those whose death involved COVID-19 of the same age and sex in the general population.
- Among men, a number of specific occupations were found to have raised rates of death involving COVID-19, including: taxi drivers and chauffeurs (36.4 deaths per 100,000); bus and coach drivers (26.4 deaths per 100,000); chefs (35.9 deaths per 100,000); and sales and retail assistants (19.8 deaths per 100,000).

This analysis does not prove conclusively that the observed rates of death involving COVID-19 are necessarily caused by differences in occupational exposure; we adjusted for age, but not for other factors such as ethnic group and place of residence.

The ONS has also published analyses of classifications of jobs according to the level of exposure to disease and proximity to others in working conditions<sup>10</sup>:

In order to explore the relationship between occupational proximity to others, degree of exposure to disease and pay the datasets from the above two ONS studies were merged. Details of the Methods and Results are included in the Appendix to this paper.

The results show associations between high proximity and low pay professions and increased COVID-19 mortality as of 20<sup>th</sup> April 2020.



Those working in enclosed transport settings (including taxi drivers and bus/coach drivers) may be at increased risk. Those working in factories (process plants) may be at increased risk. Chefs, bakers and those working in catering establishments may include those who continued to work through the pandemic as key workers (although the impact of lockdown on these findings is limited as most deaths in this dataset will have been due to infection transmission before lockdown). The association with market traders is reminiscent of the Wuhan Market which may have amplified transmission at the start of the pandemic. Some local and national government administrative occupations appeared to be at increased risk, potentially through working in open plan offices.

Care workers may be at increased risk. This is likely driven by the nursing home outbreaks and may reflect high exposure and initial lack of use of PPE. Nurses appeared at lower risk than care workers, this category may include many nurses not working at the frontline during lockdown, also nurses in the NHS may have had better access to PPE. Other health care staff also had raised Standardised Mortality Ratios (SMRs) but these did not reach statistical significance.

Because death from COVID-19 in working age adults is relatively rare, confidence intervals around SMRs for many occupations remain wide. This is particularly true for women, who are generally at lower risk of death than men (although whether this gender difference applies to all ethnic groups has not yet been investigated). Associations may also be due to differences in age structures (with the available data it was only possible to control for this at the above and below 55 years cut-off). Similarly, the analysis was not able to control for other confounders such as differing levels of chronic disease in different occupations.

Despite these limitations, the work reinforces the need for effective risk assessments to be made for all workplaces to prevent COVID-19 transmission and associated mortality. Such assessments should consider the risks from all routes of transmission (air, person-to-person, and surfaces), and are most effective if they are developed jointly by employers and the individuals performing the various work activities which comprise any job. It is encouraging in this regard to note that mortality was not elevated in healthcare workers, despite their close proximity to infection in many roles, which suggests that effective protection can be afforded by good infection control protocols and procedures.

Because BAME workers are over-represented in higher risk occupations, it is likely that their occupational risk may be contributing to the higher rates of infection and mortality noted in some ethnic minority communities<sup>11</sup>. Since BAME workers are a stigmatised group and many of the high risk occupations are also stigmatised, managing this risk poses important specific challenges in terms of ensuring that risk management is improved but does not result in further stigmatisation, discrimination or ostracisation<sup>12,13</sup>. In addition, management of this risk must, especially in the public sector, comply with equality duties in the Equality Act 2010. To avoid stigmatisation, it is vital that people from BAME communities have a high level of involvement in the creation and implementation of measures to reduce risk. This would also improve trust in official messages in these communities. Section 3 of this paper therefore highlights the need for co-creation of tailored solutions and educational materials in collaboration with BAME people in the workforce and the community.

Further collection of occupational data in all key surveys and in the Track, Trace, Isolate programme (both index cases and contacts) will help to improve the certainty of these early statistical findings. However, surveillance of high proximity workplace settings is also needed to identify outbreaks and monitor resurgence.

## 2. Communicating two key principles for managing higher infection risk due to social connectivity

Previous health promotion campaigns have successfully raised awareness that infection transmission can be reduced by hand and surface hygiene and maintaining 2 metres distance from others, and the principles for reducing environmental transmission have been communicated in a series of papers from SAGE EMG. There is less awareness and understanding by the general public of how transmission can be reduced by limiting the size and connectivity of social networks in higher risk occupational and other settings. Limiting the size and connectivity of social networks corresponds to the 'Elimination' or 'Substitution' principles within the hierarchy of control for reducing transmission, which are generally more effective than mitigation through 'Engineering', 'Administrative' or 'Personal Protective Equipment' approaches such as social distancing, hygiene measures and face coverings.

Conveying the transmission risk whilst providing clear and simple guidance on how it can be mitigated by an individual's actions is critical in successfully embedding behaviour change. Future

health campaigns could therefore usefully promote awareness of the risk created by wide transmission through social networks combined with the following two key principles for how to reduce transmission between social networks:

***2.1. People who have large numbers of contacts with different people are at higher risk of infection and transmission.***

Some occupational roles and situations require higher levels of contact with networks or groups of people, such as clients, customers, staff, community members or fellow passengers on public transport or planes. People whose work involves close, prolonged contact with many different people (e.g. hairdressers, care home workers) or going into multiple homes (e.g. carers, cleaners, plumbers) may have a higher risk of infection and transmission. People who come into contact with a very high volume of people (i.e. many contacts with clients/customers at work, even if these are brief – for example, retail workers) also have a higher risk of infection and transmission. Those in higher contact or higher disease exposure occupations should therefore pay particularly close attention to the social distancing and hygiene recommendations that are also recommended for the rest of the population. This is especially important when mixing with those at high risk of severe consequences of infection, such as older people or those at high risk from infection due to health conditions.

People in high contact roles (e.g. serving the public, providing support across a large organisation or community) and everyone they meet will need to take extra care to protect each other by reducing the risk of catching and spreading infection. Taking extra care will involve a range of measures including handwashing at appropriate times, avoiding touching face or surfaces, cleaning all shared surfaces, changing/washing clothes, using and disposing of tissues, ventilating shared spaces, keeping 2 metres apart and wearing a face covering if closer than this. This will be especially important when sharing spaces (e.g. toilets, dining rooms, entrances, lifts). There is evidence that these measures can be effective in reducing risk when carried out carefully and thoroughly. Measures for reducing risk of transmission can also be used within the home, and may be especially helpful if a family member is symptomatic, has been in contact with a confirmed case, or if someone in the household is at high risk from Covid-19<sup>5</sup>. As outlined in the EMG paper on Transmission of SARS-CoV-2 and Mitigating Measures (04/06/2012), it is important that people taking these measures consider all the routes of transmission and that the measures are taken together to provide the best protection.

Where feasible, working one week with contact/one week without contact (e.g. home working, not working, working alone) will minimise risk of spreading any asymptomatic infection caught during the week working with contact, since this will become non-infectious to others by the end of the week without contact.

***2.2. People with different social networks should avoid meeting or sharing the same spaces***

*People with different workplace or other social networks should try to avoid meeting or sharing the same spaces, to reduce transmission between the networks (even if the networks are not large). This means that in workplaces without public facing contact but where workers need to come to work and interact with each other (e.g. factories, offices) people should form teams and as far as possible only have contact with people in those teams.*

For example:

- people who share an office (which is a team/network of workers) should avoid meeting or sharing space with people who share a different office (which is a different team/network of workers);
- people who work on different shifts or days should form a team and avoid meeting other teams working on different shifts or days. Small groups of workers could be “buddied” together to create teams who always work together;
- contact should be avoided between teachers and pupils from different classes, since a teacher and their class is a small network/team;
- people who make contact with clients or customers from a particular area (e.g. of the city or country) or a particular group (e.g. an organisation or client group) should avoid meeting or sharing spaces with people who work with clients or customers from a different area or client group.

Where feasible, alternate team working, with teams working one week with contact/one week without contact (e.g. home working, not working, working alone) will minimise risk of spreading any asymptomatic infection within and between teams.

*Note that people providing supervision (e.g. management) or support (e.g. IT, maintenance, catering) to many different colleagues in an organisation have potential to spread infection across groups/networks and so also need to pay particular attention to social distancing, hygiene and wearing face-coverings if appropriate.*

### 3. Developing practical solutions to reduce social connectivity

The principles previously articulated by SPI-B for providing guidance<sup>2,3,4</sup> are relevant to successfully communicating, implementing and regulating these behaviours. These principles are well aligned with the theoretical framework used to inform CPNI’s COVID-19 Workplace Actions messaging campaign<sup>14</sup> which aims to help organisations successfully embed good health behaviours in the workplace in line with UK Government guidelines. Note that all the steps listed below need to be taken, and it is vital to involve everyone in these occupations and communities in working together to find practical and acceptable solutions.

#### *Provide a credible rationale and precise and detailed guidance*

In order to control social network contacts effectively everyone must understand how this will reduce transmission, why this is important, and exactly what they need to do to help reduce transmission between networks. There are several important target audiences, including individual employees at all levels, so they can readily identify and apply the principles in their day-to-day work and organisations/business leaders who will need to design and implement practices, processes and policies to facilitate and manage social network contacts. In addition, self-employed people and their customers (i.e. the general public) as well as members of the community encountering high risk situations in public places (e.g. gatherings, public transport) need to understand and apply the principles of social network control where needed.

These principles cannot be conveyed by simple, short messages and will require an extensive campaign with clear, consistent, detailed, positive messaging linked to effective behaviour change techniques (such as training to improve skills, goal setting and self-monitoring). Leadership teams will need to both understand how to apply these principles within their organisations themselves via their own practices and policies and how to effectively support required behaviours in their

employees via an internal awareness communication campaign and training. Organisations responsible for maintaining the UK's critical national infrastructure will need to communicate the importance of the organisations role to society, as well as the importance of individual organisational roles in enabling this<sup>15</sup>.

Supporting organisations by providing a 'how to' guide along with step-by-step guidance on how to run an internal awareness campaign with easily adaptable materials designed for this purpose should increase uptake and success<sup>4</sup>. Guidance and supporting materials should be developed with input from diverse members of the target user groups (organisational leads, unions, employees, self-employed people and members of the public, including people from BAME communities) to ensure it is comprehensible and memorable, and is viewed as feasible and beneficial. Care should be taken to ensure any guidance promotes a measured amount of concern about the risk of transmission in social networks but also provides clear and actionable advice for the target groups, that is further enabled by organisations and environments where appropriate (see below).

#### *Co-create guidance and positive solutions*

Members of the workforce can help identify opportunities, challenges and solutions for controlling transmission across networks and should be involved extensively in planning from an early stage. Engaging with all members of the workforce and members of the public who will be affected by changes will help understand their perspectives and address their concerns prior to making changes. Co-creation can also create a sense of shared responsibility and facilitate a clear understanding of the combined power of organisational and individual contributions to a COVID-safe environment. Public health messages around promoting a sense of shared responsibility have been shown to more effective than those promoting self-interest<sup>16</sup>.

Raising awareness of risk from social contacts and the actions needed to reduce it has the potential to create feelings of anxiety, resentment or isolation. It is therefore essential to introduce risk management in a way that is sensitive, equitable, reassuring and supportive. If separation between networks requires minimising contacts between members of the workforce it will be important to plan with them how to maintain social cohesion and support, for example by promoting social support within co-working teams or encouraging social networking without physical contact. When creating teams it is essential to ensure that this does not lead to discrimination, stigmatisation or hostility between teams. It is also vital to ensure that people in high contact roles do not feel excluded from social contact, and that responsibility for protecting everyone by reducing risk from infection is cooperatively shared between them and the people they meet and work with.

#### *Redesign shared activities and spaces to enable changes*

Minimising connections between networks will be achieved most effectively by re-allocation of activities and spaces to prevent mixing of networks. For example, this may involve members of the organisation adopting new shift patterns or patterns of office use. It may be necessary to remove or restrict access to some communal spaces (e.g. staff or waiting rooms) or allocate spaces to particular groups at particular times (e.g. entrances, workspaces or meeting rooms), with ventilation and cleaning between use by different networks where possible. Where shared use is unavoidable, screens and barriers (including face coverings) may help to prevent droplet transmission and ensure distancing. In order to promote adherence and limit disillusionment with changes to the work environment it must be clear why these specific changes have been adopted, and this explanation should be consistent with the overall rationale for limiting transmission as outlined in the guidance. Consideration must be given to the viability of adapted shift patterns and office use on different groups including those with caring responsibilities or medical impairments.

### *Harness organisational structures and processes*

Health and Safety regulations and enforcement processes can be harnessed to achieve better infection control across social networks in workplace settings. This involves using personal and workplace risk assessments to evaluate transmission risks to everyone in the workplace and then identify, implement and monitor appropriate methods of reducing these (e.g. staggered shifts/alternating work days to avoid mixing networks at work and when travelling to work). This strategy can be implemented through employers, health and safety officers and trade unions, reinforced by helplines to enable employers and employees to report any problems and seek advice and help for better implementation. The processes involved in reporting, investigating, and addressing concerns must be communicated clearly, and assessed in terms of benefits and effectiveness<sup>17</sup>.

### *Monitoring and providing feedback*

Monitoring behaviour and infection rates and informing all concerned is important in order to provide transparent and convincing feedback about how infection control is being implemented and how effective it is; this will inform and encourage better implementation and adherence as well as providing reassurance that risk of transmission is being monitored and minimised.

### Proposed next steps

To deliver this into operational practice we recommend the production of four key products by multidisciplinary and multicultural teams of experts and members of all target user groups:

- Awareness campaign and toolkits for all sectors of the general public (including self-employed workers and BAME communities)
- Awareness campaign at a business-level for organisations as to why their role in helping control social network contacts is an essential part of the UK effort to 'control the virus'
- Guidance toolkits for organisations to help them consider and implement pragmatic methods of controlling social network contacts
- Employer and employee behaviour change campaign toolkits and training packages that can be readily used and adapted by organisations

The multi-disciplinary and multi-cultural team should be formed of: business/organisation experts with established links to and understanding of a range of organisations and their processes/regulation (such as those within Department for Business, Energy and Industrial Strategy and the Health and Safety Executive); relevant modelling experts, occupational psychologists and behaviour change experts with experience in developing guidance and behaviour change campaigns for industry; communications experts and a wide range of diverse end-users, including those from BAME communities. All guidance developed must be extensively and iteratively tested and optimised through real-world implementation and feedback, taking particular care to consider and minimise the possible burden or anxiety that this may place on individuals.

Implementing these principles for controlling social network contacts effectively in the workplace may assist the public with applying these in their personal/daily lives as lockdown restrictions ease. The experience and approach gained by the multidisciplinary and multi-cultural team may also help inform the design and delivery of any wider public messaging campaign on the need for and how to enact these social network control principles.

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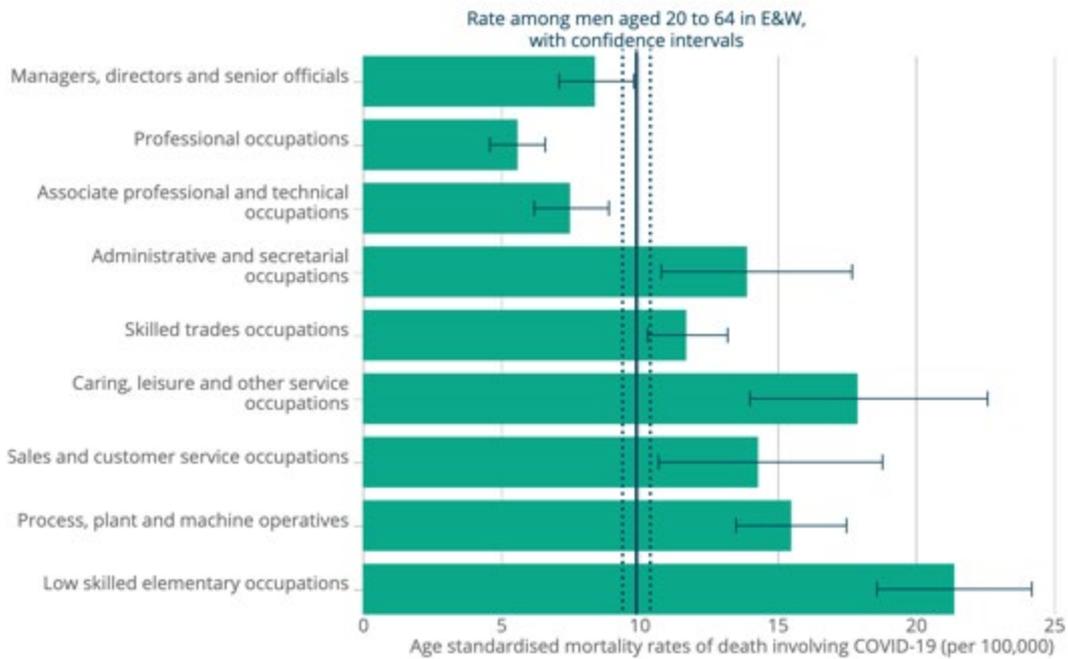
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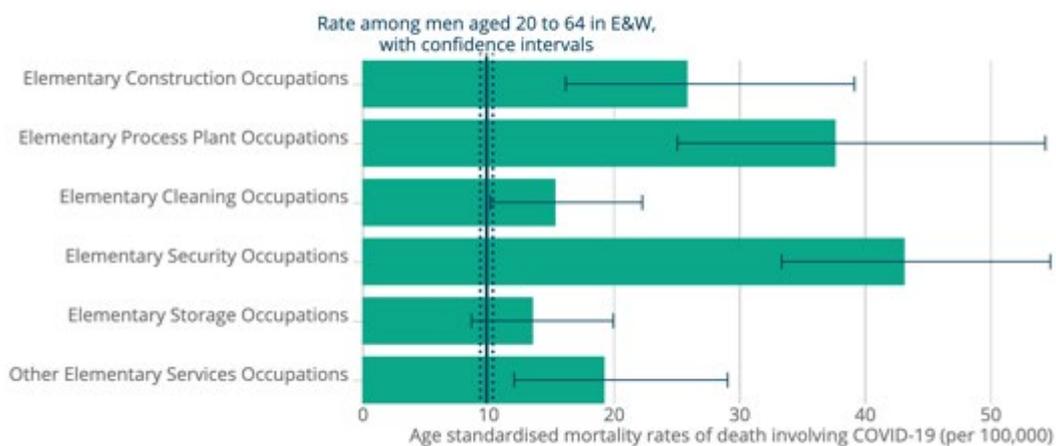
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## Appendix

Age-standardised mortality rates of death involving the coronavirus (COVID-19) in England and Wales, by major occupational group, deaths registered up to, and including, 20 April 2020

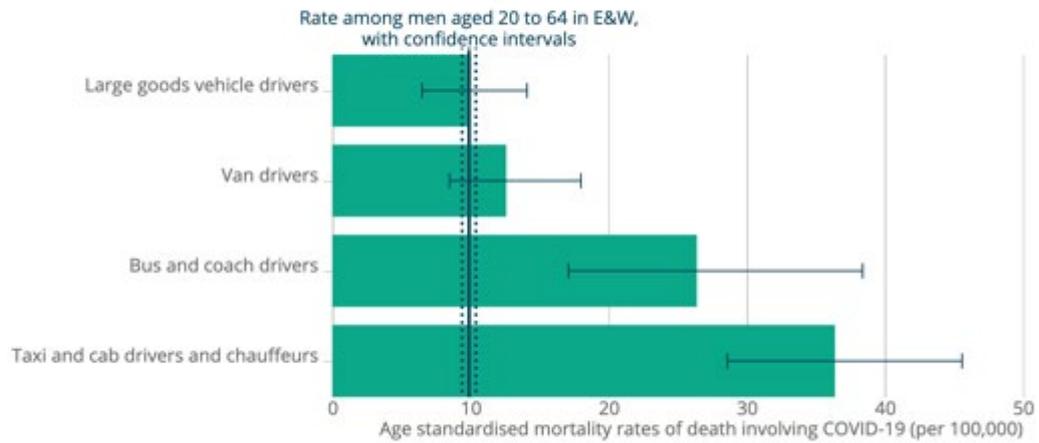


Age-standardised mortality rates of death involving the coronavirus (COVID-19) in England and Wales, deaths registered up to, and including, 20 April 2020



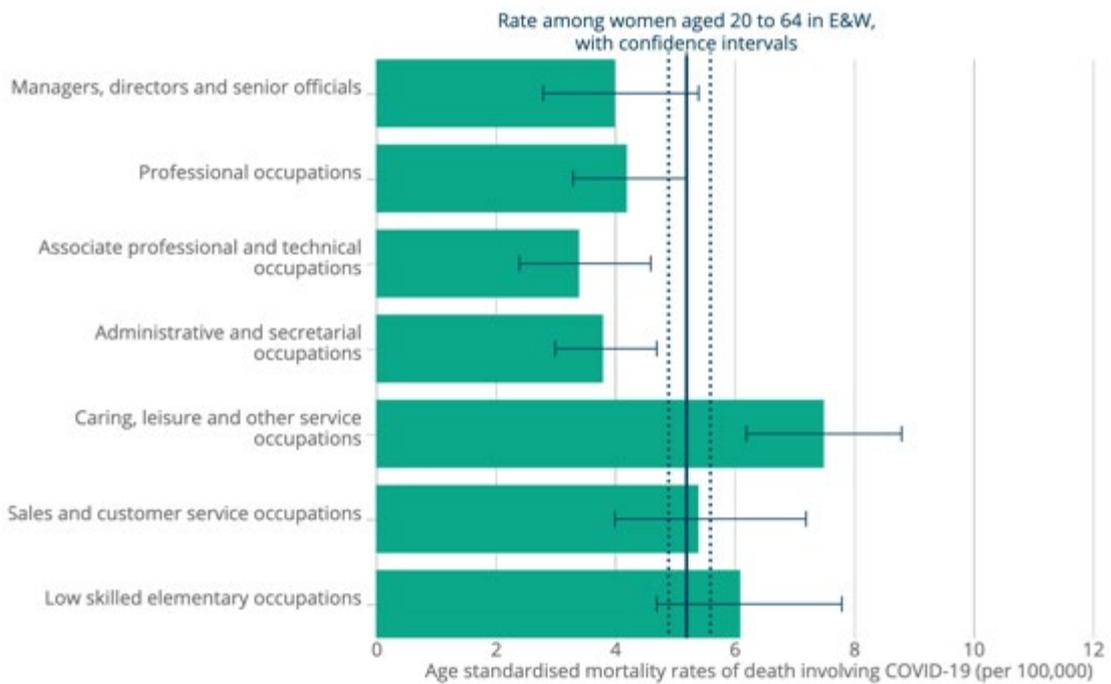
Source: Office for National Statistics

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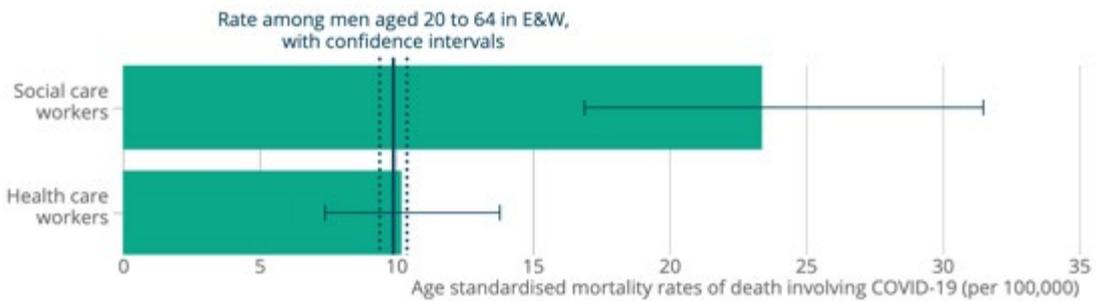
Source: Office for National Statistics

Age-standardised mortality rates of death involving the coronavirus (COVID-19) in England and Wales, deaths registered up to, and including, 20 April 2020

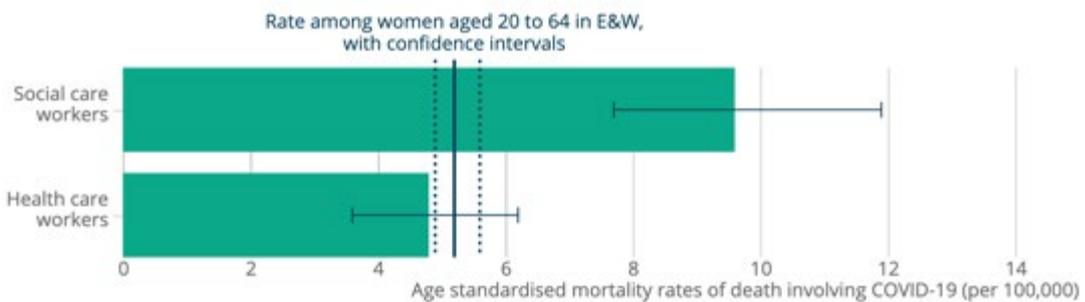


Source: Office for National Statistics

Age-standardised mortality rates of death involving the coronavirus (COVID-19) in England and Wales, deaths registered up to, and including, 20 April 2020



Age-standardised mortality rates of death involving the coronavirus (COVID-19) in England and Wales, deaths registered up to, and including, 20 April 2020



The ONS has published analyses of classifications of jobs according to the level of exposure to disease and proximity to others in working conditions, based on the following questions<sup>10</sup>.

i) How physically close to other people are you when you perform your current job?

The standardised physical proximity measure is defined by:

- 0 – I do not work near other people (beyond 100 ft.)
- 25 – I work with others but not closely (for example, private office)
- 50 – Slightly close (for example, shared office)
- 75 – Moderately close (at arm's length)
- 100 – Very close (near touching)

ii) How often does your current job require that you be exposed to diseases or infection?

The standardised exposure to disease or infections measure is defined by:

0 - Never

25 - Once a year or more but not every month

50 - Once a month or more but not every week

75 - Once a week or more but not every day

100 - Every day

In order to explore the relationship between occupational proximity to others, degree of exposure to disease and pay the datasets from the above two ONS studies were merged.

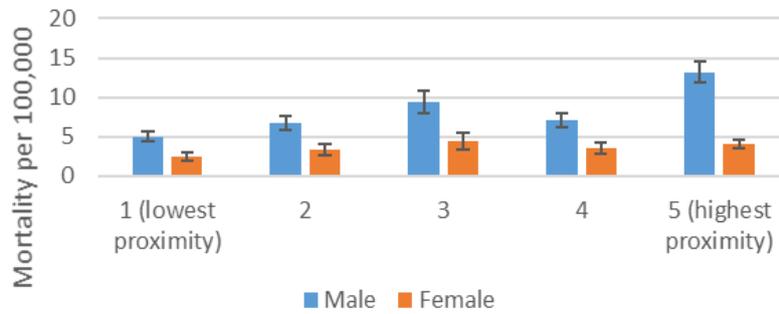
Occupations were divided into quintiles according to hourly wage and proximity to others at work. The population in each of these quintiles was summed and the % Female was applied to calculate the number of men and women in each quintile. These population totals were used as denominators to calculate population mortality rates per 100,000 population. We also summed the numbers of deaths in males and females in each occupation to provide the numerator for these mortality rates. 95% confidence around rates were calculated using Stata.

For specific occupations age standardised mortality ratios were calculated using ONS data on the proportion of COVID-19 deaths in adults aged 20-64 who were aged 55 or over for males and females separately, applied to the total number of COVID deaths in the occupational dataset. This gave the estimated total number of deaths in those aged <55 and those aged 55 or over in the occupational dataset. These deaths were then assigned according to the proportion of the population in each occupational category to give the expected number of deaths in males and females aged <55 and those aged 55 or over in the occupational dataset. Deaths were then totalled to give the total number of expected deaths in males and females. The standardised mortality ratio was calculated as observed deaths/expected deaths for each occupation. 95% confidence intervals were calculated using the formula  $SMR \pm 1.96 * \text{Square root} (\text{Observed/Expected})$ . Occupational SMRS were plotted for occupations where SMRS were > 1.4

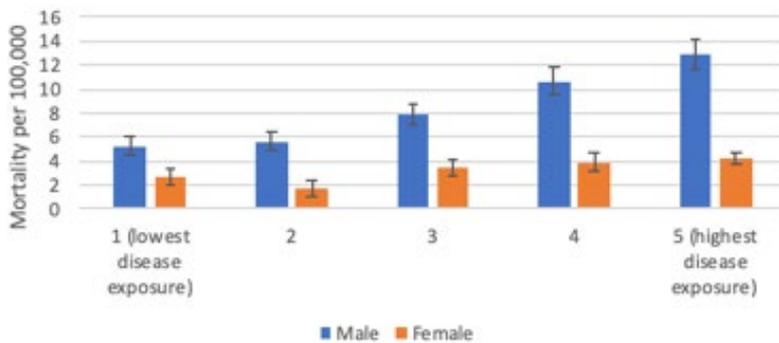
## Results

There are very strong associations between male COVID mortality and low pay, high proximity occupations and high disease exposure occupations. For each level of proximity and disease exposure mortality rates tended to be highest in the lowest paid occupations. The relationship between proximity and mortality was strongest in high disease exposure groups and was also apparent in the lowest disease exposure groups.

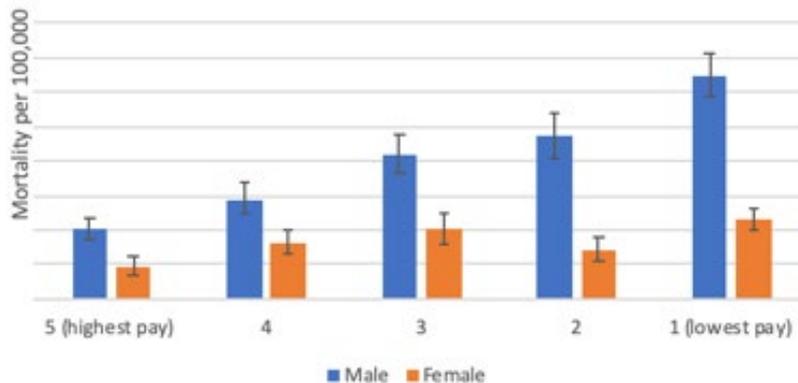
COVID-19 Mortality according to work proximity quintile of occupation. Males vs Females

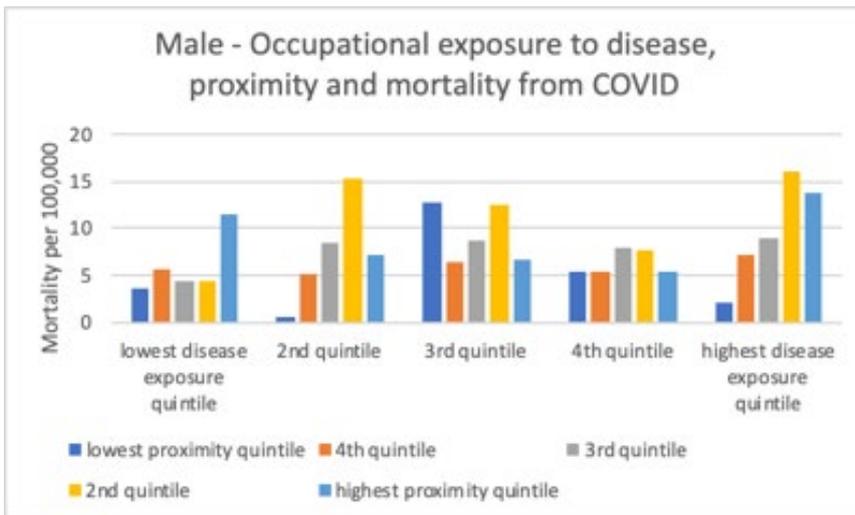
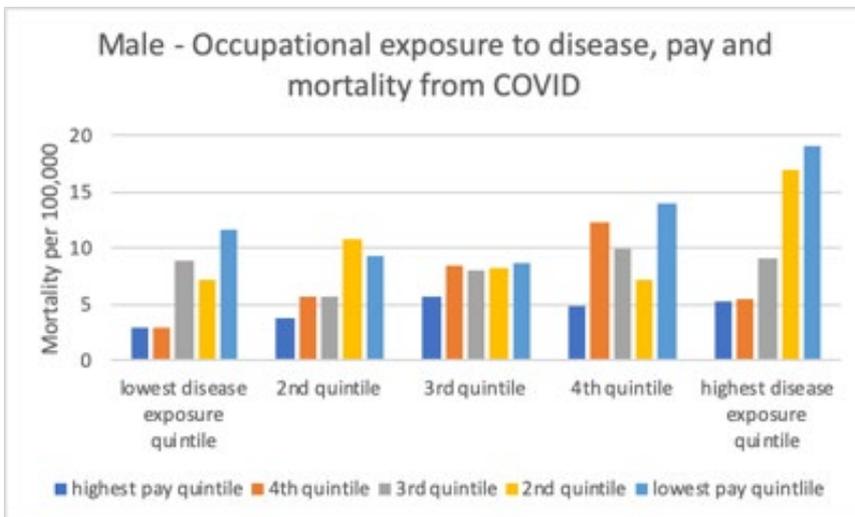
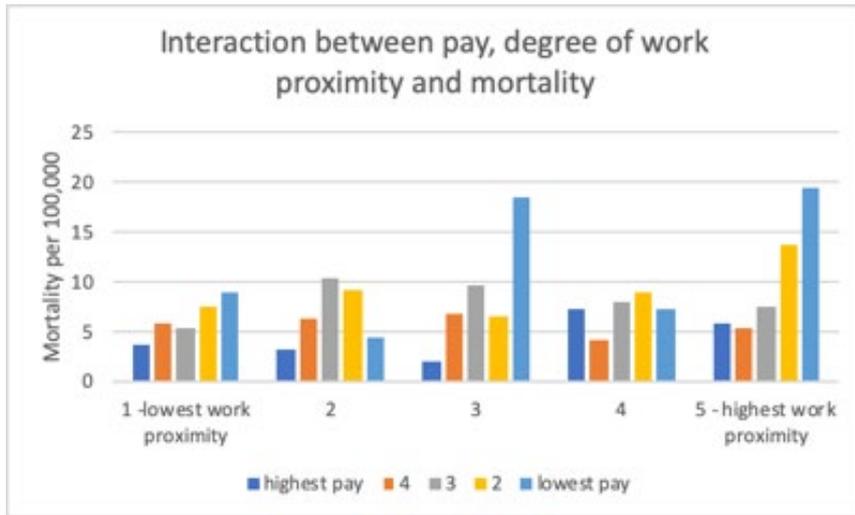


COVID-19 Mortality according to disease exposure quintile of occupation. Males vs Females



COVID-19 Mortality according to pay quintile of occupation. Males vs Females





Further analysis of Standardised Mortality Ratios in high proximity groups found similar associations with specific occupations as seen in the ONS analysis (minor differences may be due to only being able to standardise by age in two age groups < 55 and 55+ as a more detailed age breakdown was not recorded). Standardised Mortality Ratios of greater than one indicate a higher than expected mortality rate.

Occupational groups associated with increased COVID-19 mortality (also showing the quintile of workplace proximity and pay for each occupation).

