Why we Need an NHS "COVID-19 Risk Calculator"

A CASS POLICY PAPER

Amanda H Goodall PhD
Cass Business School
City, University of London &
IZA Centre for Labor Economics, Bonn
Amanda.Goodall.1@city.ac.uk
Contact: 07962 211317

Ruth Mc Cabe MRCP
NHS Nightingale
London Education Faculty
ruth.mc-cabe@cass.city.ac.uk

Caroline Wiertz PhD
Cass Business School
City, University of London
C.Wiertz@city.ac.uk

May 12th 2020

Abstract

How aware are you of your COVID-19 risk? How aware is your employer? As lockdown starts to lift and employees begin to go back to work, many are fearful about their own safety yet unsure of their personal risk. Available information from the NHS is vague. This policy paper highlights the need for an NHS COVID-19 Risk Calculator to inform employee/employer back-to-work negotiations. Its main purpose is to recognise that the virus affects individuals differently, and that return-to-work policies therefore need to be personalised for different risk profiles. The NHS Calculator would also act as a central link for additional resources. Trust in government will only be possible through transparency of information about individualised COVID-19 risk factors.

Introduction

How aware individuals are of their COVID-19 risk is important as the UK lockdown begins to loosen in the coming weeks. There is both economic and social pressure to lift the lockdown, with a rise in reported depression (Holmes et al., 2020) and domestic violence. A number of policies are being considered, including a 'test, track and trace strategy', a rolling age release (Oswald & Powdthavee, 2020) and various regional initiatives.

The global economy is about to move into recession (Baker, et al., 2020). Unemployment has risen to 25% in Ireland, with youth unemployment at 53%. The US is reporting 15% unemployment (30% among the youth). In the UK, 1.8 million claims were made for Universal Credit. It is therefore important that people go back to work if they can. It is also imperative to ensure their safety – and many are fearful of COVID-19. A recent academic study found that 64% of the UK population is afraid of COVID-19 (Wiertz et al, 2020), and a survey by the HR professional body CIPD found that 44% of UK employees surveyed reported that they felt anxious about returning to their workplace. The Trades Union Congress (TUC) says that "No one should have to return to work without tough new measures on safety", pointing to Section 44 of the Employment Rights Act 1996 which provides workers with the right to withdraw from and refuse to return to a workplace that is unsafe.

The risks from coronavirus are not spread evenly. Research and media coverage about risk heterogeneity are growing. We began the outbreak knowing that those with underlying health conditions were more vulnerable. We now know that people in their 60s are approximately 55-times more likely to die than those in their 20s (see Figure 1 & Table 1); severe obesity doubles your risk, and males have twice the risks of females; being a member of an ethnic minority group adds further risks (see Figure 2), which are compounded by socioeconomic factors. Therefore, return-to-work policies should not only be tailored to different industries, but they must also be tailored to different individual risk profiles (e.g. see case studies in Appendix).

'Stay Alert' and Know Thy Risk

The Government has published employer guidance on working safely during COVID-19, but the CIPD has raised concerns about the degree to which employees' fears about their own safety are recognised. This is particularly relevant for those who cannot work from home (Baker, 2020), and those employed in jobs known to be more at risk (see Figures 3 & 4). Many

labour-related organisations are calling for the return to work to be gradual and cautious, with start dates agreed mutually between the employer and the employed.

Yet, a transparent consultation process between organisations and workers requires access to reliable and credible data about COVID-19 risk factors at the individual level. Without this information, negotiations for both sides will be hindered and conflict more likely. In this policy document we are calling on government and the NHS to create a COVID-19 Risk Calculator that informs individuals and organisations about employee risk factors.

Currently, the NHS Website "Who's at higher risk from coronavirus" publishes two levels of risk from COVID-19: the 'high risk (clinically extremely vulnerable)' who are advised to shield, and the 'moderate risk (clinically vulnerable)' who are advised to follow the current government advice to everyone. The NHS site does not currently include ethnicity, sex, or social deprivation, yet we know that being male, a member of an ethnic minority group, or being socially deprived are recognised risk factors (ICNARC 2020, OpenSAFELY et al 2020, Docherty et al 2020). These are significant omissions. While the NHS website has links to disease-specific charities to try to further inform vulnerable people, these vary in the level of information that they provide, and often only repeat what is said by the NHS.

An interactive COVID-19 Risk Calculator would take all known risk factors into account based on the latest available Office of National Statistics (ONS) data, as well as research insights about COVID-19. Weekly ONS data from actual COVID-19 deaths have made it possible to understand more fully the stratification of risk factors, some of which are modifiable. For example, the chance of a hospital death from COVID-19 rises as the degree of obesity increases from being 25% more likely to die if your BMI is 30, compared to being over two and a quarter times more likely to die if your BMI is over 40, compared to a BMI of less than 30 (OpenSAFELY, 2020). Similarly, compared to not having diabetes, controlled diabetes increases your chance of dying by 50% while the increased death risk from poorly controlled diabetes is more than double this (OpenSAFELY, 2020). The proportion of critically ill or dying with COVID-19 rises dependent on individuals' level of social deprivation (ICNARC 2020, OpenSAFELY et al., 2020). The COVID-19 Risk Calculator would bring all of these and further risk factors together and provide a personalised assessment. Depending on the outcome of the risk assessment, the NHS site could then provide access to further resources. These could include a match-making service between the many NHS volunteers and at-risk citizens in need of help, contact to local charities and support resources, as well as guidance for return-to-work scenarios.

It is important that the NHS take the lead because some private software companies have already started to generate their own unregulated versions, e.g., the 'COVID Survival Calculators'.

The UK needs a trusted body such as the NHS to provide a reliable and transparent source of information for the public, employers and government. The easy accessibility of tailored, high quality information, advice, and support would allow citizens to assess their own level of risk and make informed choices about their ability to re-engage in public life. Our suggested NHS COVID-19 Risk Calculator would enable employees to have frank discussions with their employer about their return-to-work strategy, which would include trying to tailor their risk e.g. modifying the degree of public facing work.

Conclusion

The interactive NHS COVID-19 Risk Calculator should:

- Take account of all known risk factors, including medical conditions, age, gender, ethnicity, socio-economic background, geographic location and population density, lifestyle and diet, and infection precautions.

- Based on individuals' risk profiles, it should provide tailored information and advice on possible lifestyle and health modification, as well as support to local charities and volunteers.

- See case studies in Appendix.

- *(We assume that safeguarding privacy and guaranteeing security are a given.)*

Figure 1: Age-group risk estimates from COVID-19 using UK data

Case fatality rate (%) = Number of deaths by COVID-19 in that age-group/Total number of all deaths by COVID-19: England and Wales as of 10th April 2020
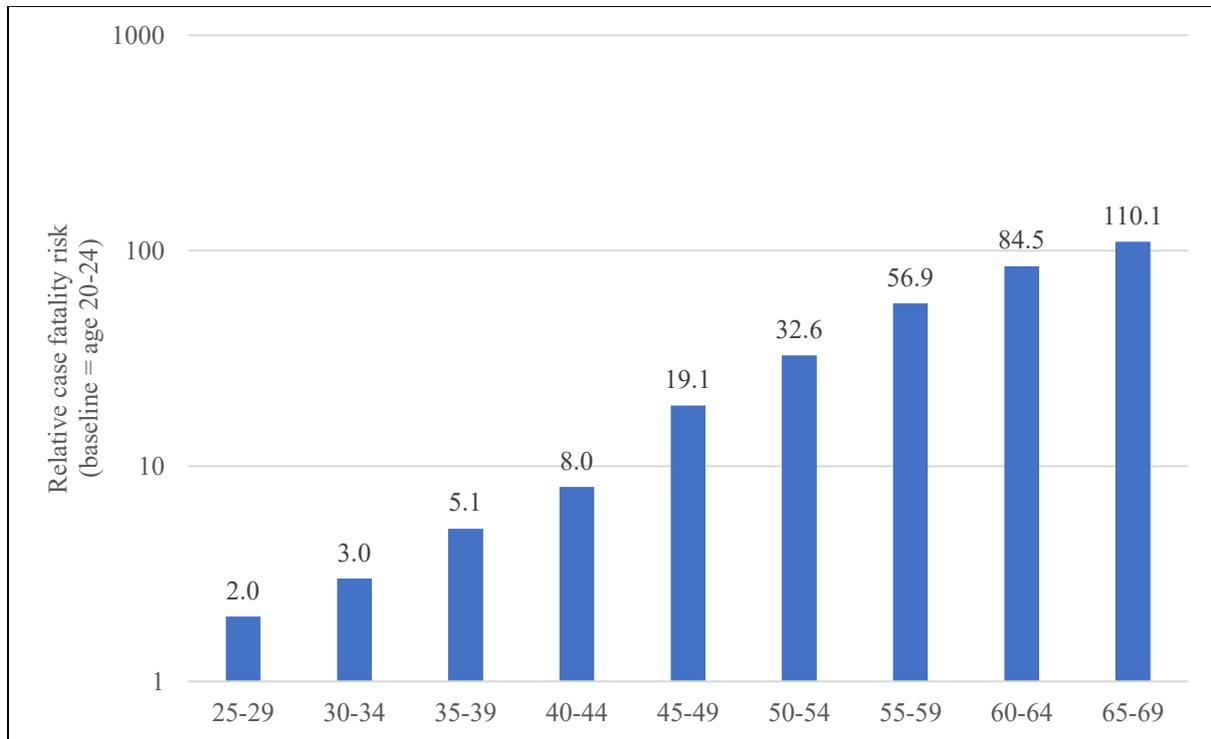
Age is on the horizontal axis. Log risk scale on the vertical axis.

Notes: Total number of deaths by COVID-19 as of 17th April 2020 = 13,121.
These vertical bars depict relative risks. Here they are measured relative to the age-group 20-24 which is set to 1.0. (This table is reproduced from Oswald & Powdthavee, 2020.)
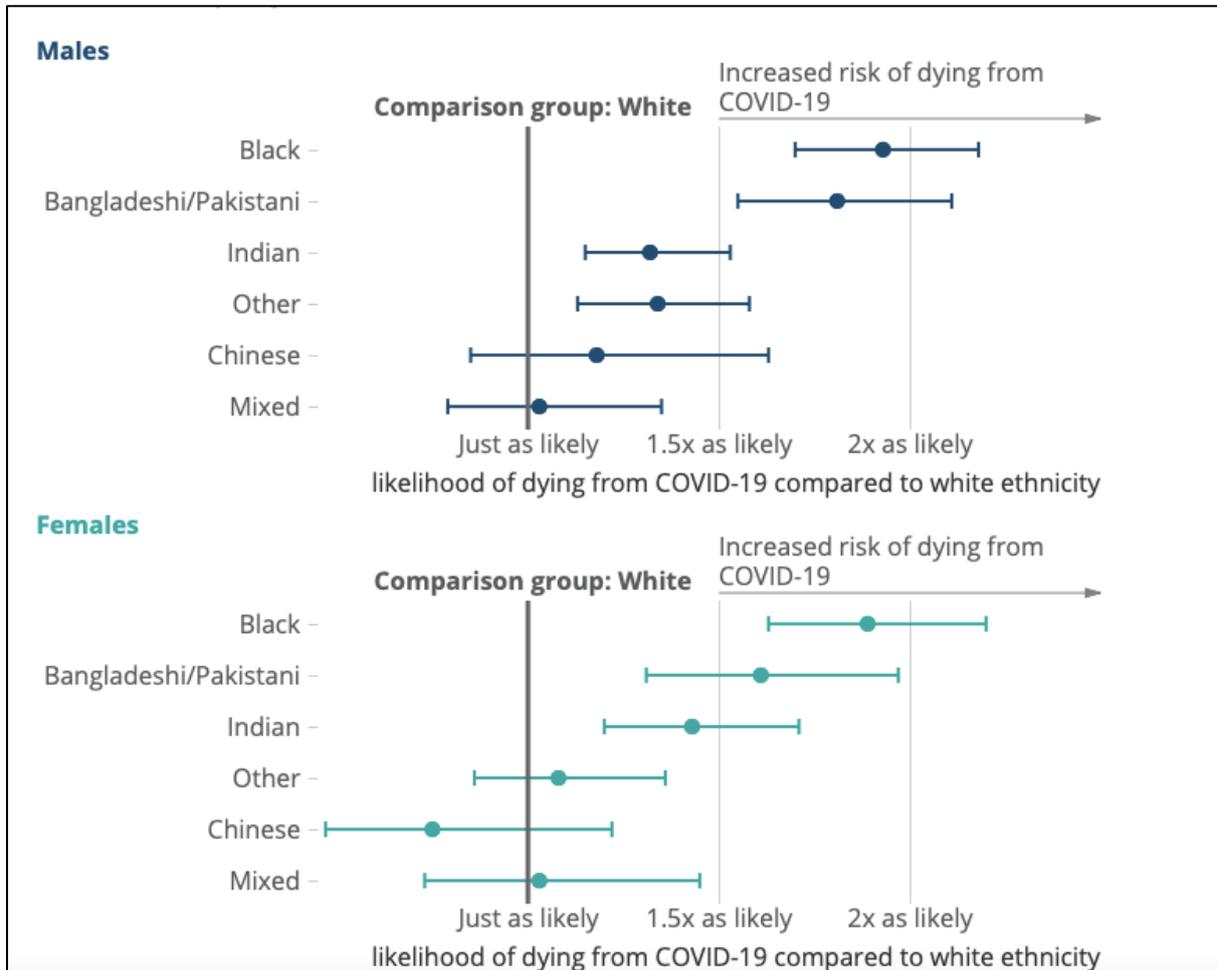
Source: Office of National Statistics (ONS)

Table 1: COVID-19 deaths by age group in England and Wales in one week (week ending April 24)

Age	Number of Deaths
20-29	10 people
30-39	25 people
40-49	79 people
50-59	298 people
60-69	550 people

Source: ONS data, released May 5th 2020

**Figure 2: Risk of COVID-19-related death by ethnic group and sex, England and Wales, 2 March to 10 April 2020**

Panel A - Age-adjusted model

Source: Office of National Statistics (ONS)

Figure 3: Men working in low-skilled or caring, leisure and other service occupations had the highest rates of death involving COVID-19

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

Rate among men aged 20 to 64 in E&W, with confidence intervals

Age standardised mortality rates of death involving COVID-19 (per 100,000)
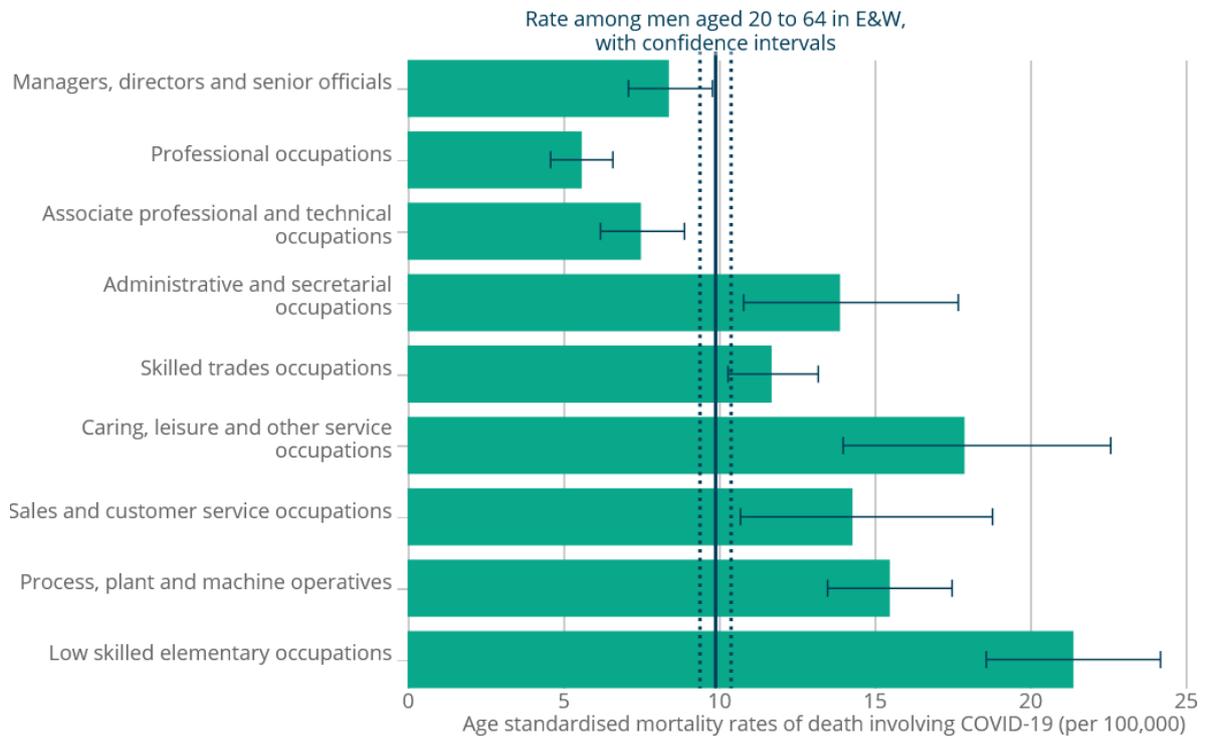
Source: Office for National Statistics

Figure 4: Women working in caring, leisure and other service occupations had the highest rate of death involving COVID-19 compared with women of the same age in the general population

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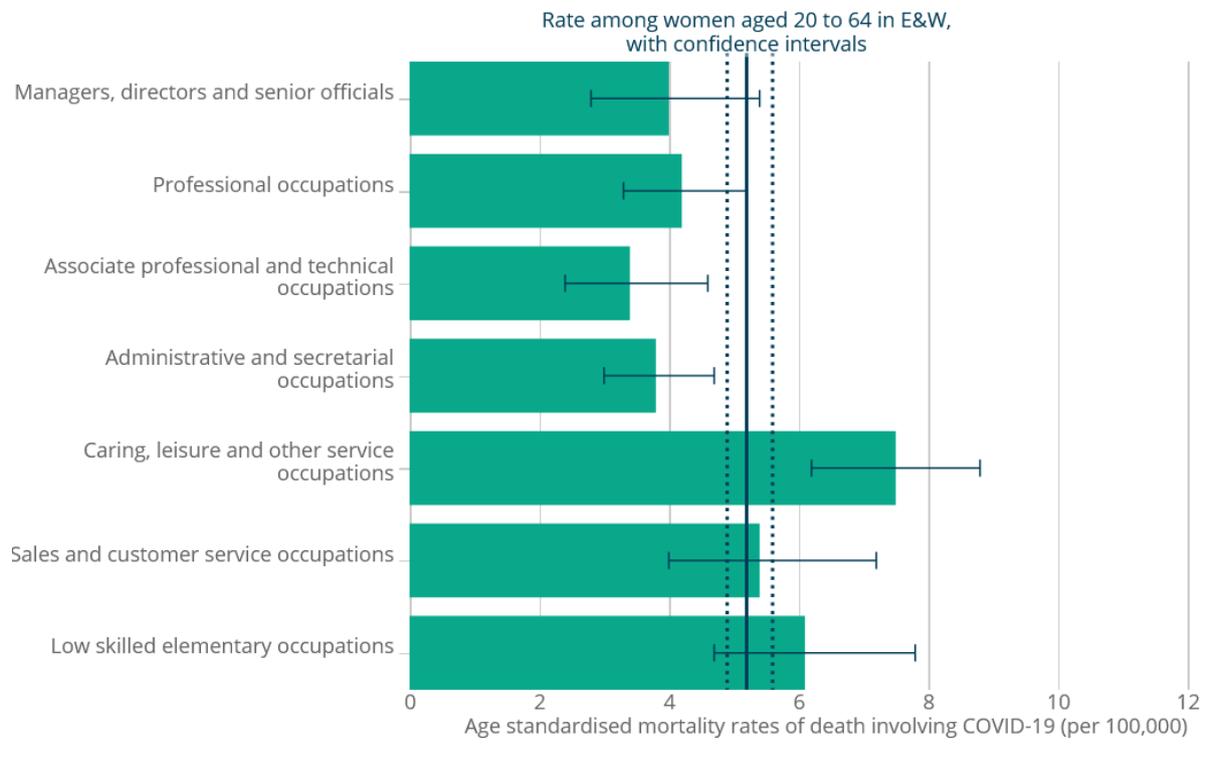
Source: Office for National Statistics

References

Baker, M.G., 2020. Characterizing occupations that cannot work from home: a means to identify susceptible worker groups during the COVID-19 pandemic. *medRxiv*.

Baker, S.R., Bloom, N., Davis, S.J. and Terry, S.J. 2020. Covid-induced economic uncertainty (No. w26983). National Bureau of Economic Research.

Docherty, A.B., Harrison, CE.M., Green, C.A., Hardwick, H., Pius, R., Norman, L., Holden, K.A., Read, J.M., Dondelinger, F., Carson, G., Merson, L., Plotkin, D., Sigfrid, L., Halpin, S., Jackson, C., Gamble, C., Horby, P.W., Nguyen-Van-Tam, J.S., ISARIC4C Investigators, Dunning, J., Openshaw, P.J.M., Baillie, J.K., Semple, M.S. 2020. Features of 16,749 hospitalised UK patients with COVID-19 using the ISARIC WHO Clinical Characterisation Protocol. medRxiv, https://doi.org/10.1101/2020.04.23.20076042

Holmes, E.A., O'Connor, R.C., Perry, V.H., Tracey, I., Wessely, S., Arseneault, L., Ballard, C., Christensen, H., Silver, R.C., Everall, I. and Ford, T. 2020. Multidisciplinary research priorities for the COVID-19 pandemic: a call for action for mental health science. *The Lancet Psychiatry*.

ICNARC report on COVID-19 in critical care, 2020. Intensive Care National Audit and Research Centre. https://www.icnarc.org/Our-Audit/Audits/Cmp/Reports

Oswald, A.J. and Powdthavee, N. 2020. The Case for Releasing the Young from Lockdown: A Briefing Paper for Policymakers.
 https://warwick.ac.uk/fac/soc/economics/research/centres/cage/news/06-04-20-the_case_for_releasing_the_young_from_lockdown_a_briefing_paper_for_policymakers/

The OpenSAFELY Collaborative, Williamson, E., Walker, A.J., Bhaskaran, K., Bacon, S., Bates, C., Morton, C.E., Curtis, H.J., Mehrkar, A., Evans, D., Inglesby, P., Cockburn, J., McDonald, H.I., MacKenna, B., Tomlinson, L., Douglas, I.J., Rentsch, C.T., Mathus, R., Wong, A., Grieve, R., Harrison, D., Forbes, H., Schultze, A., Croker, R., Parry, J., Hester, F., Harper, S., Perera, R., Evans, S., Smeeth, L., Goldacre, B. 2020. OpenSAFELY: factors associated with COVID-19-related hospital death in the linked electronic health records of 17 million adult NHS patients. medRxiv, doi: https://doi.org/10.1101/2020.05.06.20092999

Wiertz, C., Banerjee, A., A. Acar, O.A. and Ghosh, A. 2020. Predicted adoption rates of contact tracing app configurations: Insights from a choice-based conjoint study with a representative sample of the UK population. White Paper. : https://ssrn.com/abstract=3589199.

Appendix – Case studies

We present three stylised case studies to demonstrate the complexities of assessing COVID-19 risks. These highlight the need for a central, up-to-date NHS COVID-19 Risk Calculator.

Case 1: Michael

Michael is a 43-year-old Afro-Caribbean male, who works as a plant operator (currently furloughed). Michael enjoys weightlifting. He has stage 1 obesity (BMI 31) and diabetes, controlled by daily tablets. He is in IMD 2, a relatively low level of socioeconomic deprivation.

COVID-19 risk: Michael has a higher rate of death by occupational class (15.5 per 100,000 men, ONS) compared to other men of working age; he is also at higher risk of death in hospital due to his ethnicity (70% higher risk), and diabetes (50% higher risk), despite the fact that his diabetes is well controlled. He is at low risk due to his age (70% reduced risk compared to a man in his 50's), but as a man, his risk is double that of a woman. His socioeconomic deprivation level increases his risk by 13%, and his weight increases it by 27%. If he was able to lose weight over the next few months and reduce his BMI to less than 30, this risk would return to baseline and be a significant risk reduction for him. The weight loss would also make it easier to control his diabetes.

Michael is at higher risk than many of his colleagues and peers in the population, and this information would allow him and his employer to consider factors such as when to return from furlough, PPE and start times that would avoid rush hour travel.

Case 2: Hansa

Hansa is a 28-year-old Asian woman. She has stage 2 obesity (BMI 37), with no medical conditions. Hansa is from a moderate level of socioeconomic deprivation (IMD 3). She works as a care worker and sometimes does night shifts.

COVID-19 risk: Hansa's risk of death from COVID-19 is already half that of a similar man due to her sex, and her age makes her 93% less likely to die in hospital than a 50-year-old. Hansa's Asian heritage raises her risk by 62% compared to a white woman, and her socioeconomic deprivation raises it by 23%. Hansa's employment as a carer also carries a higher risk than among women the same age in the general population (12.7 deaths per 100,000 women). Her BMI of 37 (stage 2 obesity) increases her risk of death by 56%; this falls to 27%

if she can lose weight and drop her BMI to under 35. Her risk normalises once her BMI is under 30.

Hansa is likely to have been at work throughout the pandemic in her key worker role in social care. While she has risk factors, she remains at lower risk of death than Michael in Case 1. It would be important for her employer to provide adequate PPE, and it would be beneficial if she could lose some weight over the next few months – the NHS could support her in this.

Case 3: Rowan

Rowan is a 72-year-old white male, retired from the military. He is from the least deprived sector of society (IMD 1). Rowan is generally fit and well, goes for a run every day, is a normal weight (BMI 24), and takes a tablet each day which completely controls his mild high blood pressure.

COVID-19 risk: Although in good general health, and from the least deprived sector of society, Rowan is at much greater risk of death due to his age – his risk now is 4.77 times more likely than if he was in his 50's. By controlling his weight, he is ensuring that he can minimise any other risk. But as he makes his decisions around increasing the amount of time he spends outside his home, he needs to be aware that his age group risk is greater than the risk of having received an organ transplant (4.27 time increased risk).

Data taken from ONS

and OpenSAFELY paper.