Health and inequality:
The implications of the COVID-19 pandemic

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Key findings

- Rather than an equal opportunity virus, COVID-19 infections and mortality have mirrored and often magnified existing inequalities in health.
- Besides age and sex, important differences in COVID-19 mortality rates have been seen by occupation, ethnicity, and area-level deprivation
- These inequalities are very likely due to differential exposures and susceptibility due to geography, occupations, living arrangements and co-morbidities.
- Inequalities in acute COVID-19 outcomes will likely contribute meaningfully to long-term health inequalities due to impacts of infection and hospitalisation on functioning, organ damage due to the virus, and inflammatory or and long-term immune effects of Long Covid.
- COVID-19 will have important impacts on health inequalities via the health effects of social and economic upheavals due to the pandemic including job loss and social isolation.
- While direct COVID-19 impacts are more severe for older adults, the economic impact and long-term indirect health effects may be more profound for younger adults.
- Women, ethnic minorities, and the socially disadvantaged were more likely to have their work hours reduced or lost their job during the crisis.
- COVID-19 resulted in an increase in those who lost jobs, unemployed and being furloughed. Schemes exacerbated existing inequalities by excluding those already disadvantaged in the labour market (temporary jobs, gig-economy, zero hour contracts).
- Intergenerational inequalities have grown with youth having their education, training and employment prospects disrupted. Younger workers were more likely to lose their job, experience a reduction in earnings, had the highest redundancy and unemployment rates. This has the potential for longer-term scarring that will impact multiple areas of their lives beyond employment, including health, housing, partnership and family formation.
- Increased unemployment, lower income and higher labour market uncertainty and insecurity can have both short and longer term health consequences.
- We find little evidence of any deep changes in lifestyle health behaviours before and after the announcement of UK's first lockdown in April 2020.
- Loneliness and isolation were associated with an increase in health-compromising behaviour that lead to adverse physical and mental health consequences.
- Young adults and seniors, women, those living alone, singles, the socio-economically disadvantaged, and those with poorer health were at greater risk of loneliness and isolation during the COVID-19 period, with the potential for longer lasting effects.

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COVID-19 and Inequalities in Health the UK

In the early days of the COVID-19 pandemic when Prime Ministers were among the high-profile patients, it was often stated that "the virus doesn't discriminate." While it's true that the virus doesn't care about a host's standing in society, ultimately COVID-19 has spread and killed with patterns that look all too familiar to social and health scientists. Public health figures as far back as Edwin Chadwick and Florence Nightingale described the clear link between individuals living in poverty and increased infectious disease morbidity and mortality compared to their more wealthy counterpart (Chadwick 1842; Duffy 1992; Monteiro 1985). Friedrich Engels, in his book entitled "The Condition of the Working Class in England", published in the mid-1800s, argued that poverty was a main factor influencing the health and well-being of the working poor (Engels 1993), who at the time were suffering a disproportionate burden of infectious diseases. While the epidemiological transition in the 1950's ushered in a new focus on chronic diseases and health inequalities, associations between socioeconomic factors and infectious disease have never really left us (OMRAN 2005).

We now know that both COVID-19 infections and mortality are higher in certain ethnic groups and those with lower socioeconomic status, often mirroring or magnifying existing patterns of underlying health inequalities in our country. Looking forward, the long-term impact of COVID-19 on health inequalities will come from both the direct impacts of the virus and indirect and disparate impacts of the social, educational and economic shocks of the pandemic.

This report first summarizes current knowledge about inequalities in the burden of COVID-19 infections and mortality in the UK. We then examine economic and labour market changes and the subsequent consequences for health. This is followed by an exploration of the impact of COVID-19 on mental health and inequalities in loneliness and isolation. We conclude with a reflection on potential policies that might help mitigate health inequalities in the short and longer term.

1. Inequalities in COVID-19 infections and mortality

Unfortunately, since March 2020 COVID-19 over 60,000 deaths in the U.K. have occurred with COVID-19 listed on the death certificate, likely underestimating the true excess death toll by 20% (Aburto et al. 2020). Existing analyses largely reflect mortality in the first wave in the UK and will need to be updated with availability of disaggregated second wave COVID-19 mortality. Age is the single most important risk factor for COVID-19 mortality, with people over 80 being seventy times more likely to die than those under age 40 ((PHE) 2020). Biological sex is another important risk factor, with males having double the age-specific death rate for COVID-19 between ages 40-79 compared to women, which is higher than the normal baseline sex differential in mortality for these ages ((PHE) 2020). Beyond age and sex, differences in mortality rates have been identified by occupation, area-level deprivation, and race/ethnicity.

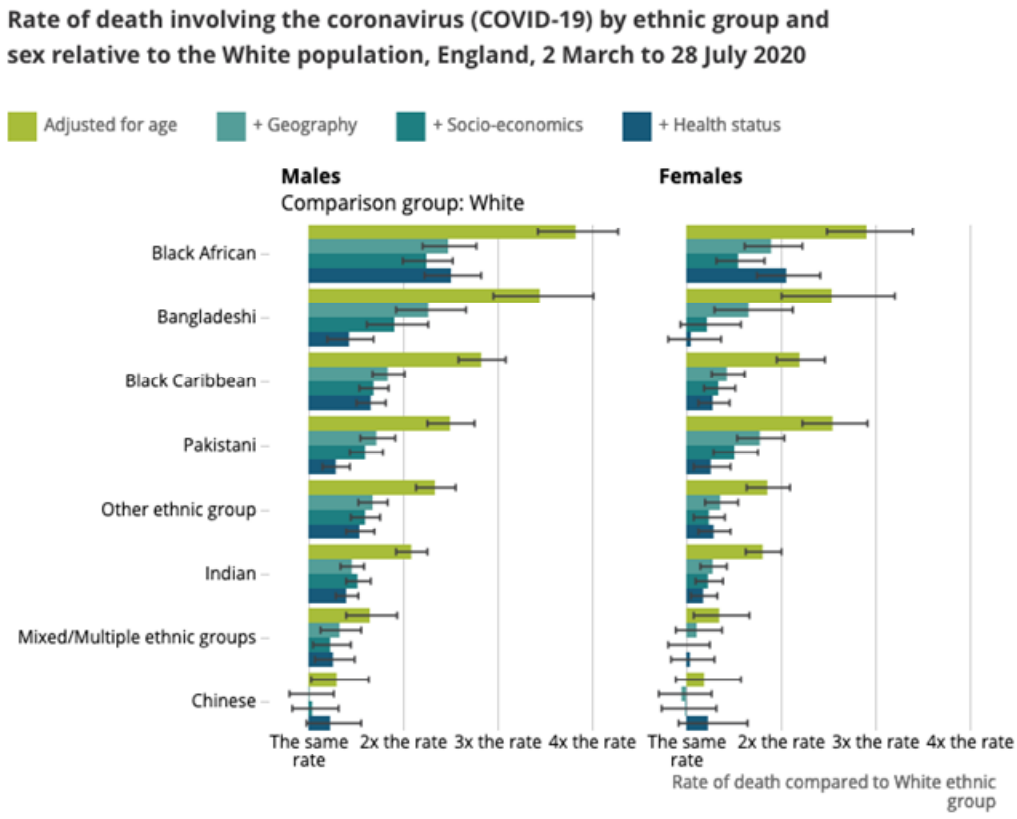
1.1 Ethnicity

Most ethnic minority groups in the U.K are younger on average than the white majority, a factor that should be protective against COVID-19 mortality (Dowd et al. 2020; Platt & Warwick 2020). While around a quarter of the white population in England and Wales is over age 60, only 17 per cent of the black Caribbean population, 12 per cent of Indians, and just 6 per cent of Pakistanis and 4 per cent of black Africans fall into this age category. Black Caribbeans, on the other hand, have a similar age profile to the white majority (Platt & Warwick 2020).

Despite this demographic advantage, through the first wave death rates for COVID-19 were higher in Black and Asian ethnic groups compared to Whites. The first wave was dominated by early spread in London, and ethnic minorities are more likely to live in urban areas that were early virus hotspots. Thus, the geographic distribution of ethnic groups and deprived areas will be important in explaining COVID-19 inequalities over time and space.

In England and Wales through July 28th, Black males had a COVID-19 death rate 2.7 times higher than Whites, while for black females this was 2 times higher. Indian, Pakistani and Bangladeshi groups also had significantly higher mortality than whites. While the prevalence of pre-existing conditions such as cardiovascular and metabolic conditions such as diabetes is higher in ethnic minorities, accounting for these conditions has not yet explained mortality differentials (ONS 2020a) (Figure 1.1).

Figure 1 Rate of death involving the coronavirus (COVID-19) by ethnic group and sex relative to the White population, England, 2 March to 28 July 200



Source: Office of National Statistics (ONS 2020a)

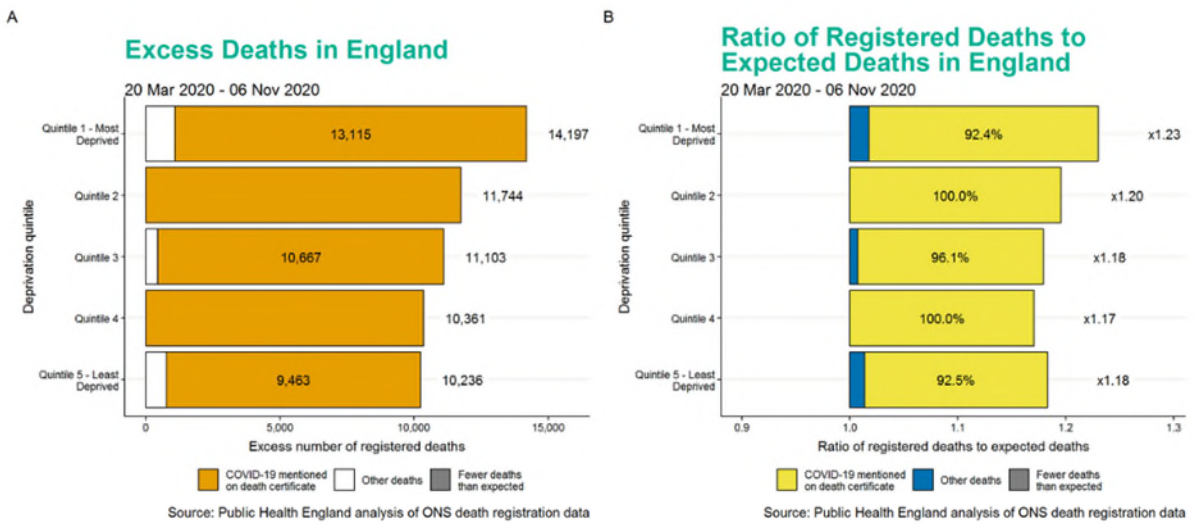
Adjustments for geographical factors (local authority, population density) and demographic and socioeconomic characteristics including household composition and occupational exposure contribute more to explaining ethnic differences in mortality, but significant unexplained differences still remain. Relative mortality differences between ethnic groups are larger for those under 70, which could be related to differences in occupational risk by ethnic group. The ONS results are consistent with the large OPENSafely study that also showed elevated mortality risk among ethnic minority groups that was not accounted for by measurement of pre-existing conditions from primary care data (Williamson et al. 2020).

1.2 Deprivation

As individual level income and education data are not easily linked with official mortality statistics, patterns of COVID-19 mortality by socioeconomic status have primarily been documented by local area deprivation measured by the Index of Multiple Deprivation (IMD). The IMD is a composite measure of average local area characteristics including income, employment, education, and crime (McLennan & et al. 2020). In the first wave, confirmed COVID-19 mortality rates in the most deprived local areas were more than double that of the least deprived areas. Examining excess deaths through November 6th, while there were more absolute deaths in the most deprived areas, this reflected 1.23 times the expected number of deaths compared to 1.18 times for the least deprived quintile (McLennan & et al. 2020), suggesting that COVID-19 mortality differentials are similar in magnitude to baseline area-level inequalities in mortality (Figure 1.2). These differences in all-cause mortality by IMD quintile can also be seen in Figure 1.3.

Figure 1.2A Cumulative excess deaths since 20 March 2020 between deprivation quintiles

Figure 1.2B Ratio of observed to expected deaths by deprivation quintile since 20 March 2020

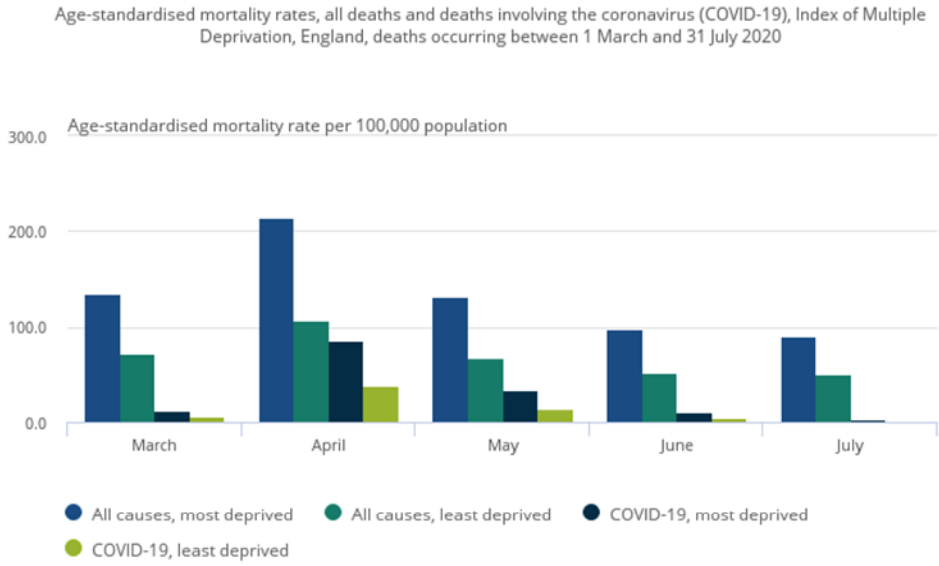


Source: Public Health England (ONS 2020b).

Similar to ethnic differences, observed disparities in COVID-19 mortality by area-level deprivation were most pronounced among working age (20-64), with those living in deprived

areas almost twice as likely to die, while for those 65 and over only a 9% higher risk of death compared to the least deprived areas was concerned.

Figure 1.3 Age–standardised mortality rates, all deaths and deaths involving the coronavirus (COVID-19), Index of Multiple Deprivation, England, deaths occurring between 1 March and 31 July 2020



Source: Office for National Statistics – Deaths involving COVID-19 by local area and socioeconomic deprivation

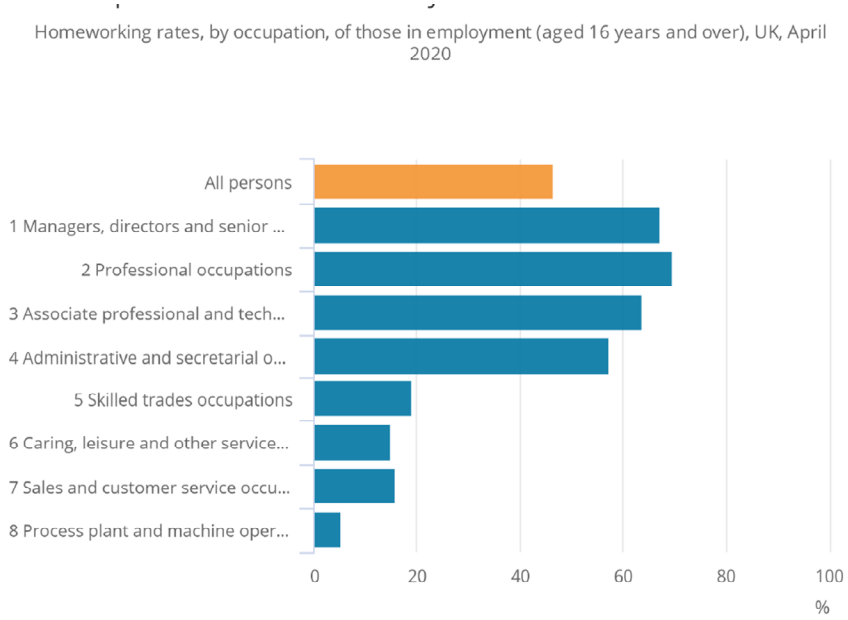
Source: (ONS 2020b)

1.3 Mechanisms underlying COVID-19 inequalities

Exposures

Inequalities in infections and mortality by both deprivation and ethnicity may reflect risks in occupational exposures by social class that make infection more likely and limit one's ability to stay home. In England and the US, there is evidence that higher income areas saw the largest reductions in mobility as measured by cell-phone data during the pandemic, suggesting lower income citizens may face barriers to physical distancing, especially in the need to work outside the home (Figure 1.4) (Jay et al. 2020; Lee et al. 2020).

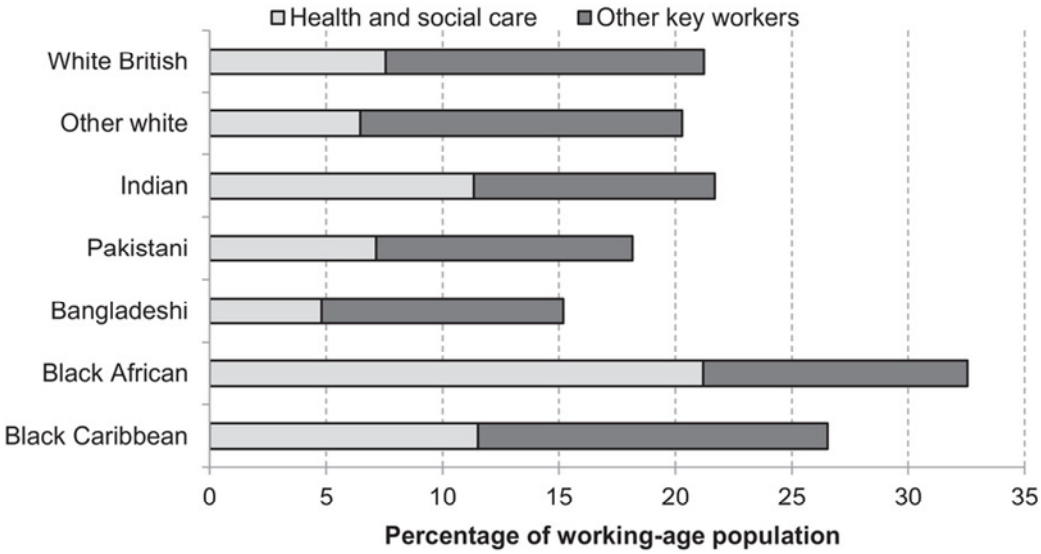
Figure 1.4. Occupations requiring higher qualifications and experience more likely to do some work at home



Source: ONS (ONS 2020c).

ONS analysis of COVID-19 mortality by occupation found that early death rates were highest in occupations such as construction and factory workers as well as care workers and ambulance drivers, and lowest among professional occupations (ONS 2020d). Occupational inequalities were not as pronounced in women, but death rates were highest for women employed in caring, leisure, and other service occupations and lowest among those in professional occupations. At-risk occupations vary significantly by ethnicity (Figure 1.5). A majority of nurses are from ethnic minority groups, and those of Indian ethnicity make up over 14% of doctors but only 3.2% of the working-aged population in the UK, and [8]. Besides increased risk of occupational exposures, ethnic minorities living in multigenerational households and more crowded accommodations, facing higher risks of household transmission and difficulties in self-isolating if needed. In a retrospective cohort study in Leicester, Black and South Asian adults were more likely to be PCR positive for SARS-CoV-2 upon presenting for clinical assessment in March and April. Having a larger household size was found to be a stronger predictor of PCR positivity after lockdown (Martin et al. 2020). Black and South Asian groups in the UK Biobank study were also more likely to test positive for SARS-CoV-2 as well as be hospitalized compared to the white British, with little attenuation in effects accounting for baseline health or socioeconomic factors (Niedzwiedz et al. 2020). Socioeconomic deprivation and low educational attainment were also associated with a higher risk of confirmed infections in the Biobank sample. We are again seeing ethnic differences in infection during the second wave in the U.K, a continued reflection of the how social and demographic factors shape risk of exposure.

Figure 1.5 Share of key workers among those of working age in each of seven ethnic groups



Notes and Source: Key workers defined based on government guidance from 19 March 2020 using four-digit Standard Occupational Classification (SOC) codes to identify key jobs in health and social care, education, public services, food, public order and transport (Platt & Warwick 2020).

It is difficult to accurately measure inequalities in SARS-CoV-2 infections given the low levels of testing early in the pandemic, which meant only the most severe cases were confirmed by testing. In the REACT study, a nationally representative study of SARS-CoV-2 antibody seroprevalence in England indicating previous exposure, Blacks had the highest estimated seroprevalence of 15%, followed by Asians at 10.1% and Whites at 5.2% (Ward & et al.). This strongly suggests that true infection levels varied strongly by ethnicity in the first wave and not just detection. In the second wave, confirmed infection incidence has continued to be higher in Pakistani and Indian groups but lower in Black ethnic groups compared to whites. (Figure 1.6).

Incidence is also higher in areas of higher IMD deprivation, except in the 17-19 year old age group which may reflect returns to residential university living for better off students (Figure 1.7). These differences in infection rates even in young people could have important implications for long-term health inequalities, especially given the potential chronic health effects of "Long-Covid," including damage to the heart, lungs, and other organs (CDC 2020; Dennis & et al. 2020; Mitrani et al. 2020).

Figure 1.6 Weekly incidence per 100,000 by ethnicity, England, ONS

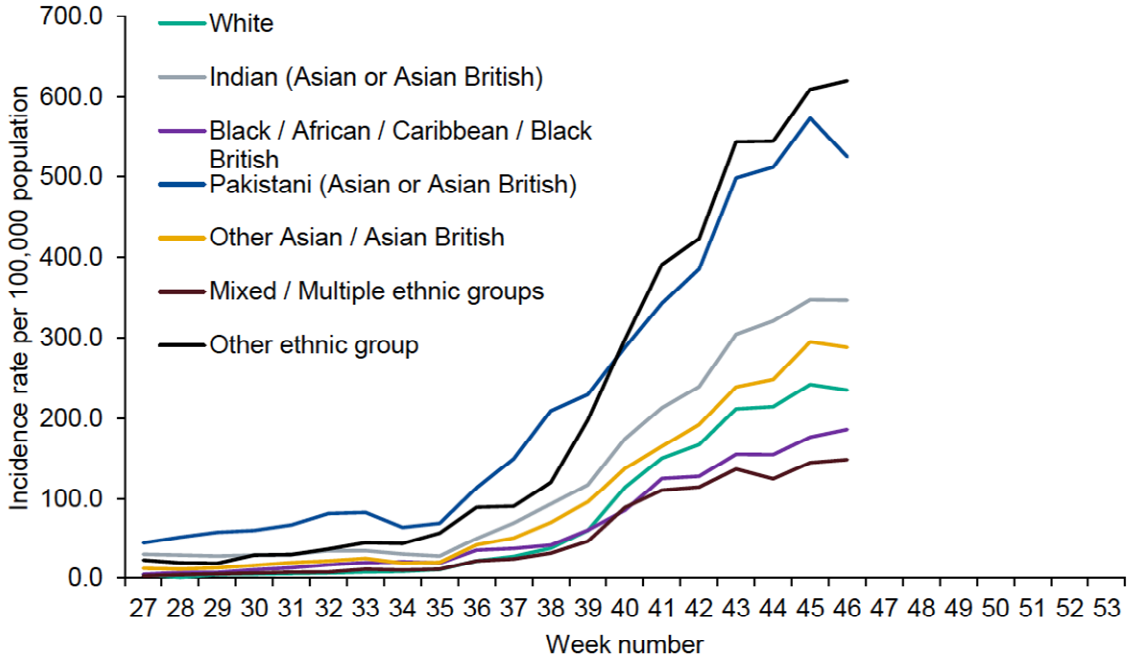
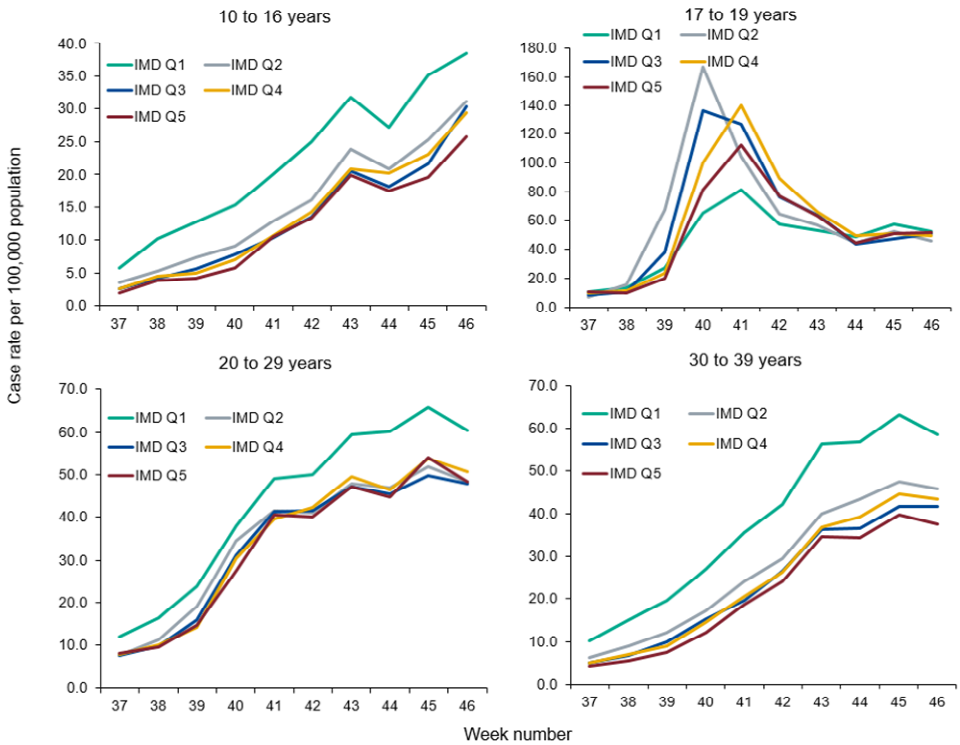


Figure 1.7 Weekly COVID-19 incidence rate per 100,000 by IMD quintile (1=most deprived).



Source: Public Health England Weekly Influenza and COVID-19 surveillance report.

Susceptibility

Besides increased exposure risk another potential mechanism underlying inequalities in COVID-19 infections and severity is differences in the immunity and susceptibility. Even prior to COVID-19, social exposures were associated with a greater number of infections. Social gradients in the prevalence of a variety of common bacterial, viral and parasitic infections including influenza, herpesviruses, Helicobacter pylori (H. pylori) and Toxoplasma gondii (T. gondii) have been identified beginning early in life and across the life course (Cohen et al. 2007). In the Whitehall study of UK civil servants aged 51-72, those with lower employment grade had evidence of previous exposure to more common infections such as Chlamydia pneumoniae, cytomegalovirus (CMV), and herpes simplex virus-1 (HSV-1) (Steptoe et al. 2006). While a higher seroprevalence to such infections may in part reflect increased exposure to pathogens due to housing or occupational conditions, there is also evidence that lower socioeconomic status is associated a higher force of infection (i.e., instantaneous per capita rate of acquisition), upon exposure (Colugnati et al. 2007). These data suggest that individuals living in lower socioeconomic environments not only have greater exposure to infectious agents, but also experience higher rates of susceptibility to infection.

Exposure to chronic stressors may be one cause of decreases in immunity and increased susceptibility to infection. When an individual is exposed to stressors, the central nervous system interacts with hormones that communicate directly with various components of the immune system including the thymus gland, which regulates the production of naïve T cells available to respond to novel pathogens, as well as numerous immune cells involved in the innate and adaptive immune responses (Clevenger et al. 1998; Cloez-Tayarani 2003; ELENKOV & CHROUSOS 2002; Glaser & Kiecolt-Glaser 2005; Miller et al. 1998; SUN et al. 2004). Those experiencing socioeconomic disadvantage in early life have poorer immune function in adulthood including increased susceptibility to respiratory infections (Cohen et al. 2004), elevated levels of pro-inflammatory markers (Slopen et al. 2015) and decreased expression of genes that serve to regulate inflammation (Miller & Chen 2007). Together this means that even with similar exposure risks, more deprived individuals may be less able to fight off the virus and may also be predisposed to severe inflammatory responses.

Another biologic pathway by which social factors may adversely influence immune function across the life course is via accelerating immune system aging (i.e., immunosenescence) (Pawelec et al. 2009). Recent studies suggest that low socioeconomic status and exposure to other psychosocial stressors may be key determinants of aging of the adaptive immune system across the life course (Aiello et al. 2016b,a; Sommershof et al. 2009). In the U.S. city of Detroit, lower income was associated with T-cell markers of aging-specifically the ratio of effector to naïve (E/N) CD4 and CD8 T cell subsets and CD4:CD8 ratio (Aiello et al. 2016b). This type of immunosenescence has been hypothesized to exacerbate COVID-19 and may help explain the severity of the disease in older adults (Napoli et al. 2020). Thus differences in both susceptibility to infection immune response by social factors across the life course may be a mechanism driving current social inequalities in severe COVID-19 outcomes and mortality.

1.4 Long-term health implications

Foregone care

With concerns about overwhelming the NHS as well as getting infected in health care settings, there has been a dramatic reduction in non-COVID health care seeking during the pandemic. For example, emergency department visits were down 56.6% in April 2020 compared to 2019, and urgent referrals for early cancer diagnoses fell almost 90% (NHS 2020a,b). The full impact of delayed care remains to be evaluated but will likely hit ethnic minority and disadvantaged communities with larger burdens of chronic diseases especially hard.

Post-hospitalization impacts

The differential impact of COVID-19 on social and ethnic groups is troubling not only for its acute health effects but the potential for long term effects. Long-term effects of hospitalization and mechanical ventilation can be devastating for older people who may never recover full functionality. Over 200,000 patients have been hospitalized with COVID-19 in the UK since March, with over 1500 currently being admitted daily in November 2020. Hospitalised COVID-19 patients often suffer from inflammation and legions that may result in long-term lung damage (Salehi et al. 2020), as well as cardiac injury (Li et al. 2020). Patients admitted to the ICU are at risk of developing post-intensive care syndrome (PICS), cognitive impairments, and ICU-acquired weakness and physical deconditioning (Felten-Barentsz et al. 2020). Relatively young patients who survive Acute Respiratory Distress Syndrome (ARDS) have been shown to have exercise limitations and reduced physical quality of life five years after their illness and did not return to baseline levels of health care utilization (Herridge et al. 2011). Psychological and emotional dysfunction is also persistent in both patients and caregiver for many years after discharge from the ICU. Thus in addition to the direct mortality burden, the long term costs of care and lost productivity for those hospitalized for COVID-19 could be high and disproportionately impact disadvantaged groups.

Long Covid

Since early in the pandemic there have been troubling accounts of long-lasting symptoms even among non-severe COVID-19 cases, termed “long covid.” Symptoms include profound fatigue, trouble breathing, skin rashes, palpitations, body aches and more and are often characterized by intermittent relapses (Nabavi 2020). In a German study of 100 recovered patients, 67% of whom were asymptomatic or had mild disease, cardiovascular magnetic resonance (CMR) imaging showed cardiovascular involvement in most (78%), with myocardial inflammation and regional scar the most prevalent abnormalities, suggesting potential long-term cardiovascular consequences of COVID-19 even for mild infections (Puntmann et al. 2020). Evidence for direct impacts on multiple organ systems is also accumulating (Farouk et al. 2020). A recent study of a young, low risk population in the UK found that almost 70% had impairment in one or more organs four months after initial symptoms of SARS-CoV-2 infection [51]. While systematic data collection on long covid needs to be conducted to properly track these impacts, these early data suggest potential lasting biological scars from the pandemic even among young people.

As the pandemic hopefully recedes, we must keep in mind the literature on long-lasting impacts of infections on longevity and chronic disease (Crimmins & Finch 2006; Dowd et al. 2009). We are still studying the long-term health effects of 1918 influenza infection in-utero which raised the risk of diabetes, heart disease, and early mortality in affected cohorts (Easterlin et al. 2020), and it has been proposed that in utero exposure to SARS-CoV-2 could cause developmental difficulties and accelerated aging over the next century. These lasting and not yet quantifiable impacts are another important reason to continue to minimize the number of infections until new vaccines can be deployed across the population (Mills & et al. 2020).

2. COVID-19 economic and labour market changes the consequences for health

The COVID-19 pandemic is not only a health crisis, but also an economic crisis that has touched many people. To mitigate the spread of virus, rigorous non-pharmaceutical interventions (NPIs) were implemented to restrict the spread of the virus including social distancing, working from home, and reduction of economic activity. This was particularly the case for what was deemed non-essential businesses such as retail and entertainment. As a result, these multiple measures led to a widespread transformation of the labour market and economy with considerable work hour reductions, income loss, and job loss amongst particular parts of the UK labour force. We know from previous research that economic downturns exacerbate existing socioeconomic inequalities, with the socioeconomic disadvantaged groups hit the hardest (Hu 2020; McEwen & Stellar 1993). Shocks to wealth and income, poorer access to health care, and an increase in stress and negative emotions due to economic downturn are likewise detrimental for long-term health (Antonova et al. 2017).

The aim of this section is to review COVID-19 related labour market consequences, how they exacerbated existing societal inequalities and in turn their short and long-term implications on health. The impact of COVID-19 on the labour market has been extremely unequal, with some individuals more vulnerable than the others. As we explore in this section, women, those who were already more socially disadvantaged and ethnic minorities were more likely to have reduced their hours, lost their jobs and suffered falls in earning during the crisis (Reichelt et al. 2020; Zhuo et al. 2020). There have also been a large decrease in the number of young people aged 16-24 years in employment over June to August 2020. In this section we summarise the COVID-19 impact on labour market from the following aspects: 1) intergenerational inequalities; 2) gender inequalities; 3) ethnic inequalities; and, 4) social class inequalities. This is followed by linking these changes to their consequences for health and health inequalities.

2.1 COVID-19 policies and inequality in coverage

The impact of the COVID-19 lockdown on the labour market in the UK and beyond was immediate in terms of job loss and furloughing (i.e., COVID-19 government sponsored leave of absence). The UK government announced a series of policy responses to assist businesses in an attempt to ameliorate the economic shocks to workers and households following the

first lockdown in March, 2020. A centrepiece has been the Job Retention Scheme, widely known as the "furlough" scheme. Employees who are furloughed receive 80 per cent (up to a limit of £2,500 per month) of their regular wages via the Coronavirus federal grant. The scheme was meant to keep workers on the payroll to allow them to easily slot back into their jobs once lockdown is lifted, with the aim to avoid large-scale redundancies and job loss. A few weeks after the announcement of the Job Retention Scheme, the Self-Employment Income Support Scheme was implemented, directed at the self-employed workers.

Evidence from real time surveys conducted in the UK in March and April 2020 reported that in early April, 15% of individuals in the sample reported having lost their jobs within the previous four weeks due to the COVID-19 outbreak. In addition to that, 43% of employees in the UK stated that they had been furloughed within their main job (Adams-Prassl et al. 2020a). Data from UK Labour Force Survey also showed that the unemployment rate rose sharply by the end of October 2020. Since March 2020, the number of payroll employees in the UK had fallen by 782,000 (ONS 2020e). As of 18 October 2020, around 9.6 million jobs were furloughed from 1.2 million employers (gov.uk 2020).

These schemes, however, have left several gaps and exacerbated existing inequalities in the labour market, which has disproportionately forgotten certain groups or reinforced inequalities. Those who are the most disadvantaged in the labour market have been those in temporary jobs, the gig-economic and on zero hours contract, who were subsequently left out of these schemes. According to the ONS Labour Force Survey, in early 2019, 2.7% of the people in employment were on a zero-hours contract, which increased in April-June 2020 to 3.2% (ONS 2020f). This increase in more precarious labour market positions is often accompanied with little bargaining and labour market protection and negative impacts on individuals and their families (Taiji & Mills 2020).

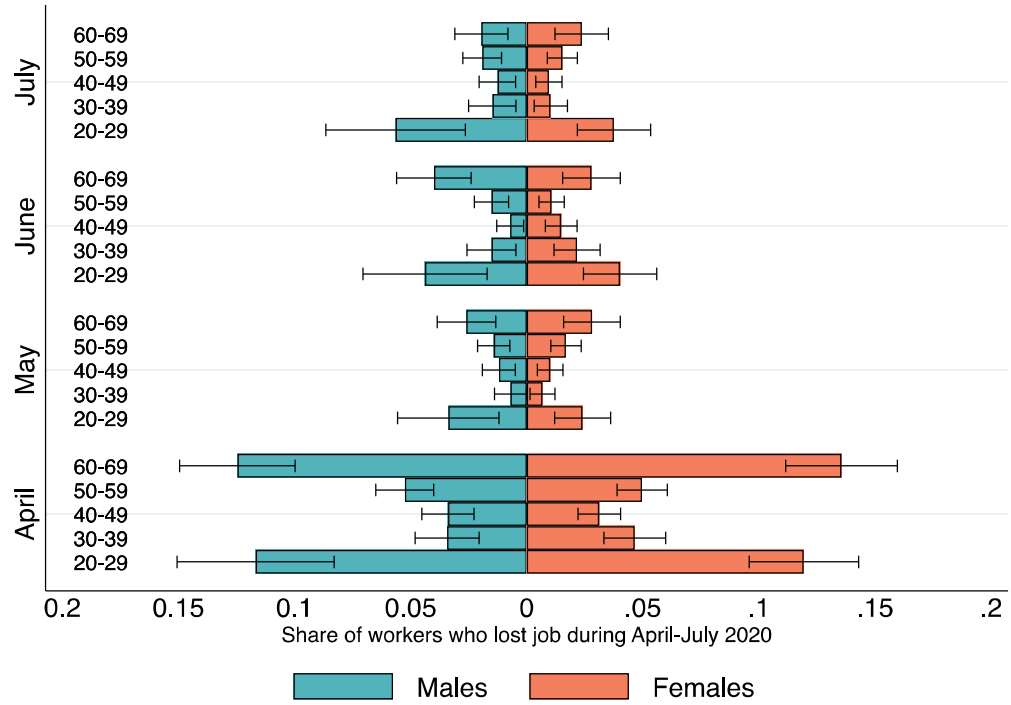
2.2 Intergenerational inequalities

The pandemic has disproportionately affected the younger generations, primarily by disrupting their education, training and employment prospects (Susskind & Vines 2020). It was estimated by the International Labour Office (ILO) that one in six young people surveyed had stopped working since the start of the pandemic (ILO 2020). Young workers, particularly those who have recently entered the labour market and those who would have entered work this year, face potentially long-lasting scarring from the economic downturn. University graduates who are about to finish their education will struggle to find jobs. Some who had secured employment may find job offers being withdrawn. Others will become unemployed or economically inactive. Some will have to settle for lower-level jobs which do not fully exploit their capabilities and are low paid (Mayhew & Anand 2020). A study drawing from 4,000 individuals conducted at the end of March 2020, showed that younger workers were much more likely to have lost their job due to COVID-19, and were more likely to have experienced a reduction in earnings than older workers (Adams-Prassl et al. 2020b). Between July to September 2020, the redundancy rate was highest for those ages 16 to 24 years in the UK (ONS 2020g). Figure 2.1 illustrates the job loss probability by age group and gender from April to July 2020 in the UK, illustrating this strong age pattern. In the early phases of COVID-19 in April, we see a U-shape of both younger (20-29) and older workers (60-69) workers pushed out of the labour market, which stabilised and eventually disproportionately

impacted those 20-29 in later months. As we see in Figure 2.2, the youngest age groups 20-29 had a disproportionately higher share being furloughed compared to other age groups.

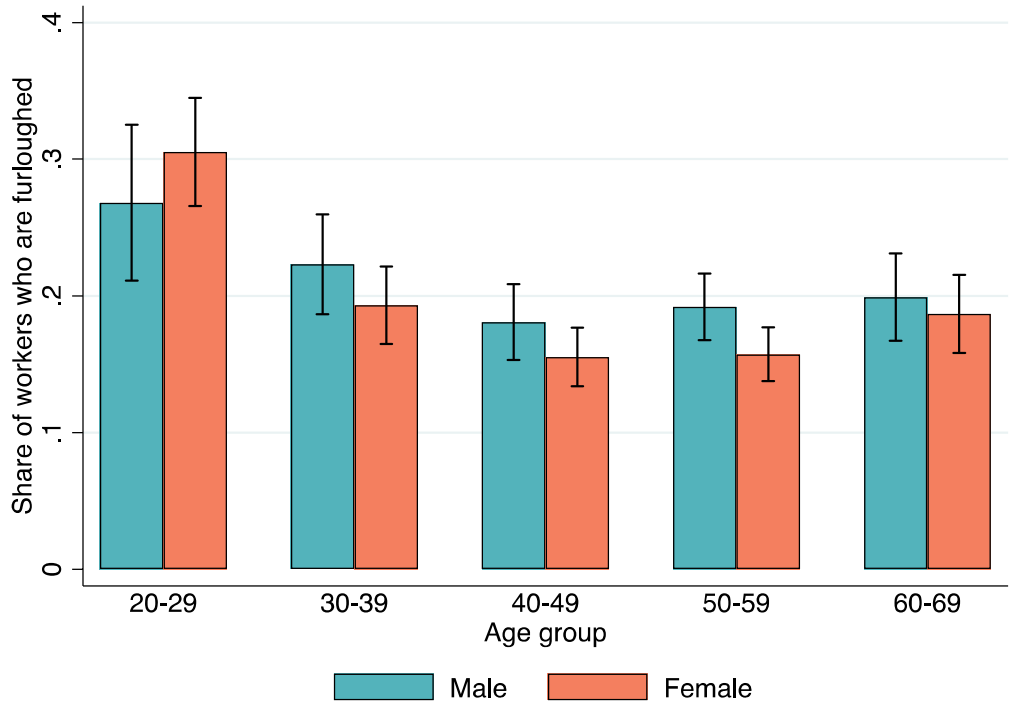
We know from previous research that it is difficult for individuals to switch to more suitable employment; the longer an individual remains unemployed or in mis-matched employment, the harder it gets[Error! Bookmark not defined.] (Vancea & Utzet 2017). Longer-term difficulties in entering the labour market or employment mismatches have likewise been demonstrated to have longer term life course impacts. This includes the delay or ability to live independently or buy a house and to engage in partnership and family formation (Mills & Blossfeld 2005). Younger people may continue to face higher unemployment, lower pay and poor job prospects for many years compared to other cohorts who entered the work force before and after the pandemic. This disproportionate impact is likely to contribute to the acceleration of a trend of widening economic inequalities between generations.

Figure 2.1 Job loss probability due to COVID-19 by age group and gender



Source: Produced by Authors from Understanding Society COVID-19 Survey Wave 1-4.

Figure 2.2 Furlough probability among people who are in the labour force due to COVID-19 by age and gender



Source: Produced by Authors from Understanding Society COVID-19 Survey Wave 1-4.

2.3 Gender inequalities

The COVID-19 crisis likewise intensified existing gender gaps in wages and employment. Throughout this report all figures are divided by gender, showing differential effects. Emerging evidence suggests that women have been affected more severely by the COVID-19 shock (Adams-Prassl et al. 2020b; Kristal & Yaish 2020; Zhuo et al. 2020). Unlike previous recessions where the economic shocks fell disproportionately on men, COVID-19 has a larger impact on service industries that had high concentrations of female workers (Alon et al. 2020; Reichelt et al. 2020) (see also Appendix 1). Others reported that women were significantly more likely to have lost their jobs during the pandemic (Adams-Prassl et al. 2020a). Conversely, women were also more likely to be employed in some core key-sector jobs, such as health care and retail workers (e.g., supermarkets). The high proportion of female workers in key sectors and in some cases when schools were closed, induced a harder time in juggling work and home responsibilities (Blundell et al. 2020; Zhuo et al. 2020).

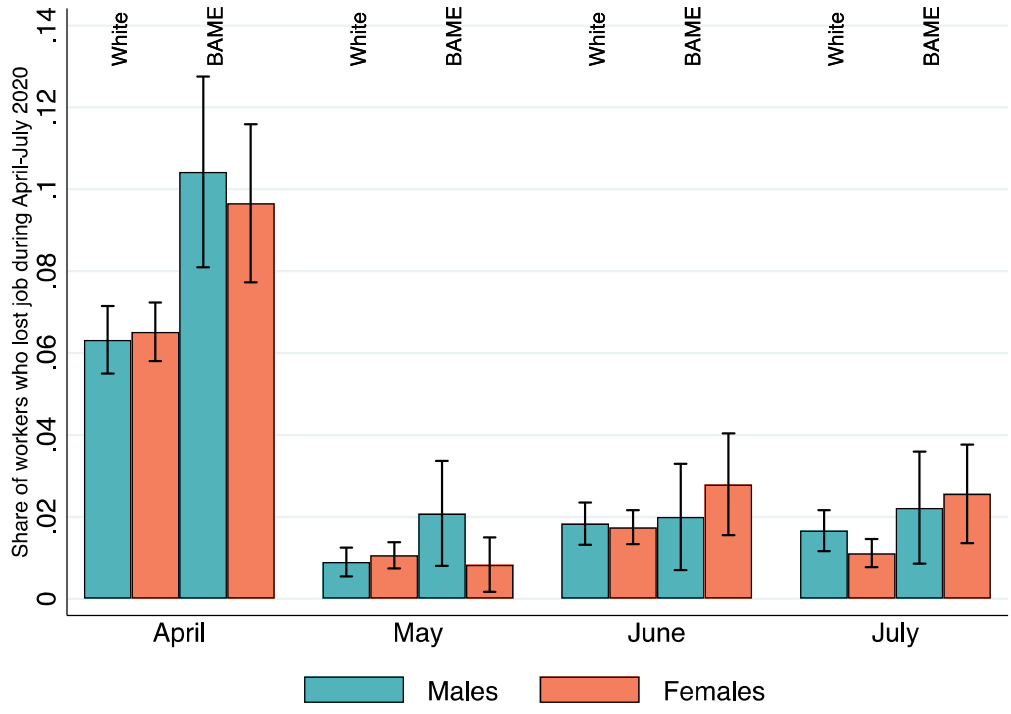
The empirical evidence on economic impacts and gender inequality in the UK is mixed. One study reported that in the first months of the COVID-19 economic downturn, women were hit less by furloughs and job loss due to the fact they were lower earners (compared to the median of their occupation) and employed in fewer hours. This structural disadvantage of the gender pay gap for women may have led employers to prioritize higher earners for furloughs to save more labour costs (Witteveen 2020). Another reason is that some men were less likely to be in occupations where they could work from home, which may explain the higher probability of furlough and cut in work hours for men. Using data from the 2020 UK Household

Longitudinal Survey COVID study, however, one study did find a similar reduction in women's and men's paid work time and earnings (Zhuo et al. 2020).

2.4 Ethnic Inequalities

A large number of studies have demonstrated the larger economic impact of COVID-19 amongst different ethnic groups, and exacerbate entrenched socio-economic disadvantages faced by BAME (Black, Asian, and Minority Ethnic) in the UK. BAME groups are more likely to experience job loss during this period, and are less likely to enjoy employment protection such as the furlough scheme. Although those who were UK-born white British were more likely to reduce work hours during the pandemic than BAME migrants, the former group were less likely to experience income loss and face increased financial hardship during the pandemic compared to BAME migrants (Hu 2020). Keyworkers are also disproportionately represented among ethnic minorities, particularly of black backgrounds (Blundell et al. 2020). Figure 2.3 illustrates the probability of job loss by ethnicity and gender from April to July 2020. Here we see that those from BAME groups were more likely to lose their jobs during the first month in April and in the following months this levelled off, but still was higher for BAME groups.

Figure 2.3 Job loss probability due to COVID-19 by ethnicity and gender

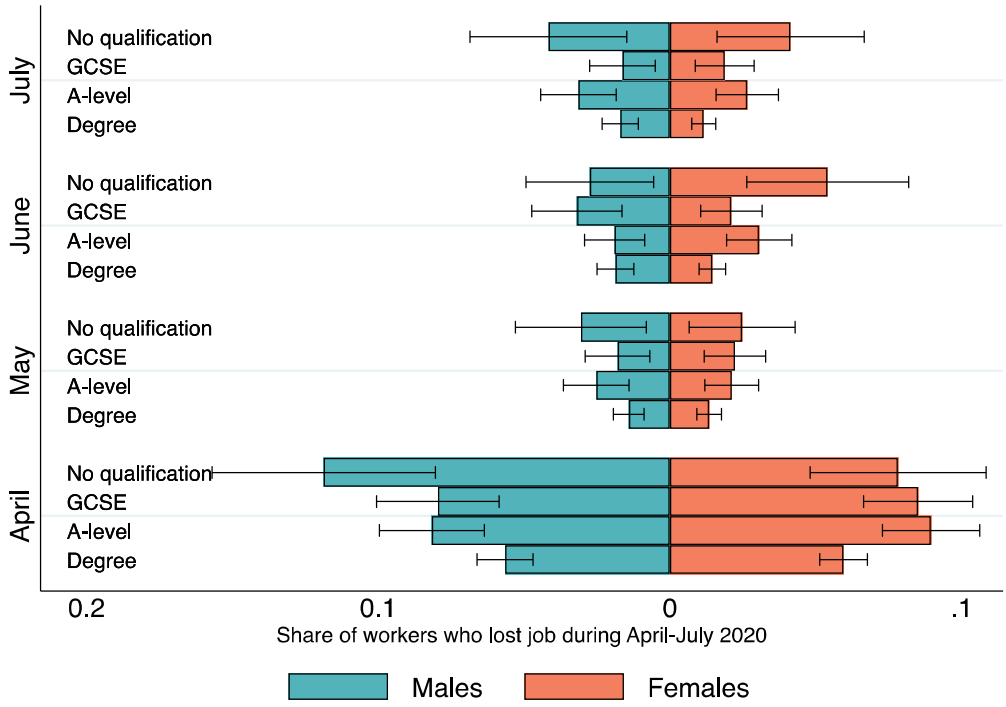


Source: Produced by Authors from Understanding Society COVID-19 Survey Wave 1-4.

2.5 Social class inequalities: Education, Occupation and Work Hours

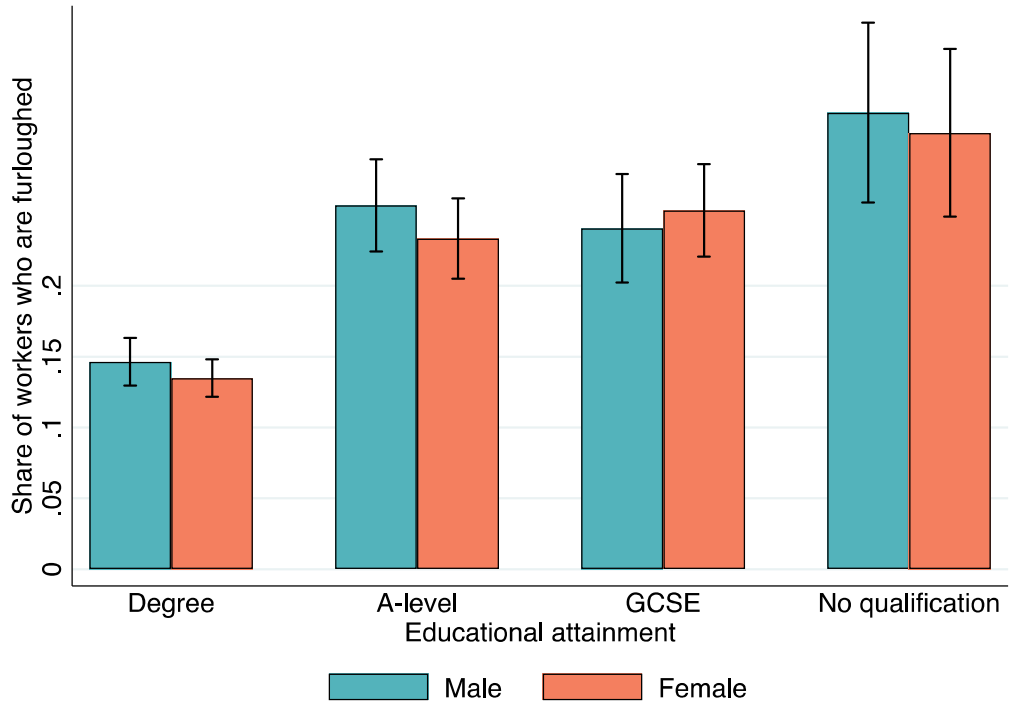
There is a strong relationship between social class (income, educational attainment, occupation) and the likelihood of exposure to economic hardship during the pandemic. Previous research found that those in the higher-earnings group (Blundell et al. 2020), the higher-educated (Zhuo et al. 2020), and in occupations where more tasks could be performed from home (Adams-Prassl et al. 2020a) were less likely to experience a reduction in work hours, furloughs, or job dismissals. Figure 2.4 shows the difference in job loss probability from April to July 2020 by educational level and gender, with Figure 2.5 illustrating the furlough probabilities. We see that those with no qualifications experienced the highest job losses in April and were also more likely to be furloughed.

Figure 2.4 Job loss probability due to COVID-19 by education and gender



Source: Produced by Authors from Understanding Society COVID-19 Survey Wave 1-4.

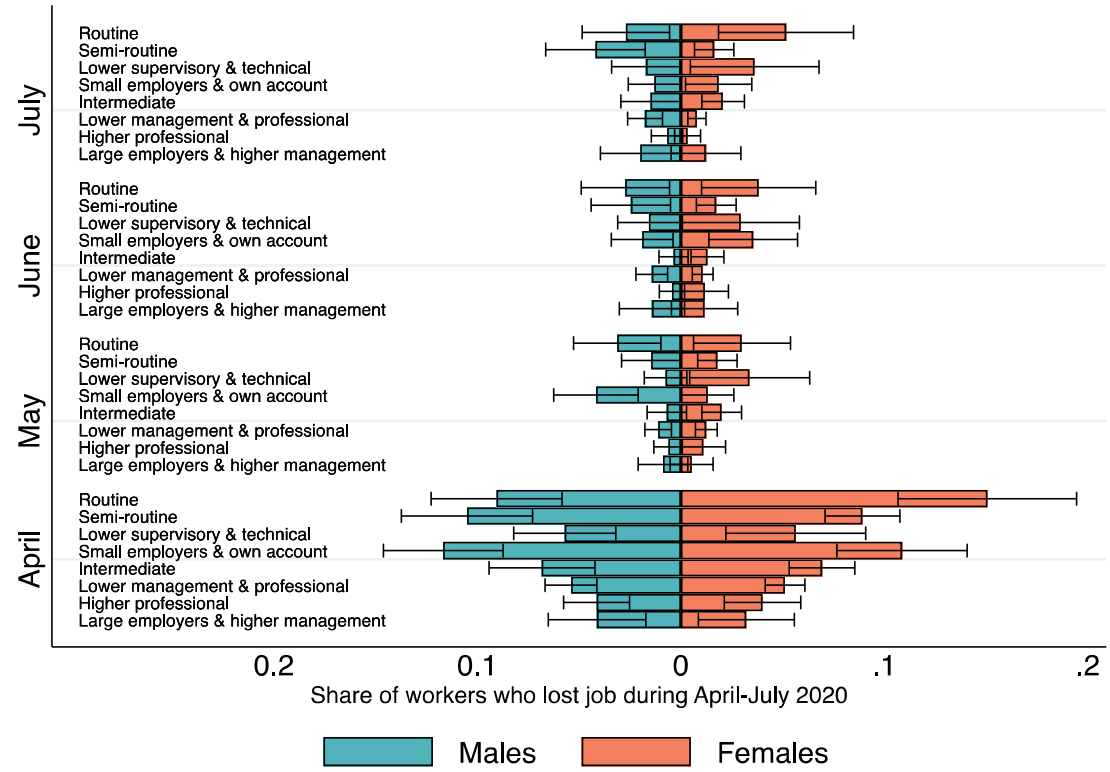
Figure 2.5 Furlough probability among people who are in the labour force due to COVID-19 by education and gender



In the UK, redundancy rates increased for most industries between July to September 2020. The largest rates were seen in the sectors of accommodation and food service activities and construction (ONS 2020g). The self-employed were also struck exceptionally hard by the crisis. Studies observed a substantial reduction in work hours for the self-employed using the LSE-CEP Survey of UK Self-employment, 2020. The self-employed worked an average of 11-20 hours per week, down from 31-40 hours in the previous year. Over 60% of workers earned less than £1,000 this April, more than twice as many as the previous year (Blundell, Richard & Machin 2020). The survey suggests that this reduction in income likely caused severe financial distress for the families of the self-employed. Although some have noted that certain groups of the self-employed tend to have a relatively high savings buffer compared to dependent employed workers.

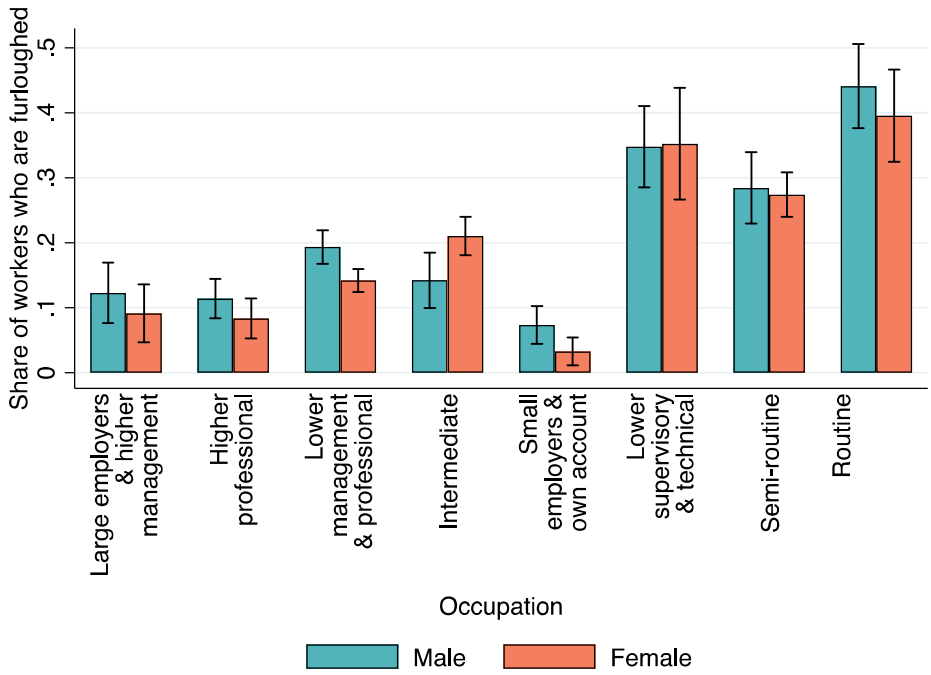
Figures 2.6 and 2.7 show the probability of job and being furloughed, respectively, by occupation and gender. Turning first to Figure 2.6 we see that particularly routine workers and small and own account workers lost their jobs in April. This then stabilized somewhat in the following months. Figure 2.7 illustrates the comparative numbers of the share of workers who were furloughed showing that those in routine, semi-routine and lower supervisory and technical occupations were more likely to be furloughed.

Figure 2.6 Job loss probability due to COVID-19 by occupation and gender



Source: Produced by Authors from Understanding Society COVID-19 Survey Wave 1-4.

Figure 2.7 Furlough probability among people who are in the labour force due to COVID-19 by occupation and gender



Source: Produced by Authors from Understanding Society COVID-19 Survey Wave 1-4.

2.6 Health consequences of COVID-19 labour market changes

All of the labour market and economic impacts that we have described until now such as unemployment, a drop in earnings and increased uncertainty and insecurity can have both short and longer term health consequences. The effects of involuntary job loss on health has been widely described (Eliason & Storrie 2009; Gallo et al. 2000). Job loss is a major social stressor that may simultaneously disrupt multiple dimensions of life including income, occupational prospects, wealth, family life and social connections. Job loss is hazardous to health for several core reasons.

First, job displacement typically entails a major loss of income and increased financial strain, which may lead to a lower living standard, limited access to healthy food, health services and advanced health technology (Cutler et al. 2020). Second, involuntary job loss is stressful, since individuals lose self-esteem, social status, social connections, networking possibilities, meaning in life, social support, sense of control and time structure. In addition, it may create a sense of anxiety, insecurity and shame (Burgard et al. 2007). These prolonged episodes of stress can lead to psychological distress and have physical consequences, disrupting regulatory systems and ultimately worsening health (McEwen & Stellar 1993). Job loss or furloughing may a serious source of acute stress and immediate disruption to a major social role, as well as potential chronic stress and long-term economic and social consequences. Third, unemployed individuals are more likely to adopt self-destructive behaviours, such as such as smoking, excessive alcohol consumption, or even (attempted) suicide (Eliason & Storrie 2009). We discuss psychological aspects related to COVID-19 in the next section in more detail.

Empirical evidence has found that the groups that suffer the greatest economic losses are more likely to experience poor psychological health, poor quality of life, higher prevalence of risk behaviours, and less-healthy lifestyles (Vancea & Utzet 2017). The early imprints of job loss may have a persistent long-term effect throughout the life course. Research using administrative data found that 20 years after job displacement, workers who experienced job loss faced a 10-15% increase in mortality rates compared with other workers (Sullivan & Wachter 2009).

There is no consistent finding on whether the health consequences of job loss differ across gender or social class. However, the impact of unemployment on health is higher for young people. As described previously, failure to find a first job can have substantially long-term consequences on quality of life and health. Unemployment at a young age is associated with a series of later-in-life problems of sickness, disability and mortality (Aguilar-Palacio et al. 2015).Unemployment harms the integration of young people into society, and this is particularly true in the case of long-term unemployment (Hammer 2003). The negative effects of unemployment tend to be exceptionally detrimental when the most disadvantaged youth become unemployed.

Despite the negative association between job loss and health, some scholars argue that there may be a positive trend in health and lifestyles during the economic downturn. People may adopt healthier lifestyles, smoking and drinking less and participating in more physical activities (Gallo et al. 2001). To examine whether this was the case, we plotted key health and lifestyle factors before and after the first lockdown in April 2020 of physical activity (Table 3.1), smoking (Table 3.2) and drinking (Table 3.3) by labour market employment status. Using the 2020 UK Household Longitudinal Survey COVID Study, we found subtle differences in

changes in lifestyles. We note, however, that the sample sizes in the cells are small and should be judged with caution. We found some evidence that a higher proportion of furloughed workers engaged in more physical activities than before the pandemic, and the proportion of no physical activity among the furloughed workers was reduced. However, the proportion of furloughed workers who previously met the NHS recommended level of physical activities before the pandemic was also reduced. There was no obvious change observed for smoking behaviours. Alcohol consumption decreased across all employment status categories.

Table 3.1 Physical activity by employment status, before and after the first lockdown in April 2020.

	No physical activity		Some physical activity		NHS recommended	
	Before %	After %	Before %	After %	Before %	After %
Lost Job	42	39	34	38	24	23
	[36,48]	[35,43]	[29,40]	[34,42]	[19,29]	[20,27]
Furloughed	35	29	35	47	30	25
	[31,38]	[26,31]	[32,39]	[44,49]	[27,34]	[22,27]
Self-employed	28	26	39	45	32	28
	[25,32]	[24,29]	[35,43]	[42,48]	[29,37]	[26,31]
Employed	36	32	45	48	19	20
	[34,38]	[31,34]	[43,47]	[46,49]	[18,21]	[19,21]
Not in the labour force	48	46	32	31	20	22
	[46,50]	[45,48]	[31,34]	[30,33]	[19,22]	[21,24]

Note: 95% confidence interval is presented in square brackets.

Source: Produced by Authors from Understanding Society COVID-19 Survey Wave 1-4.

Table 3.2 Smoking (number of cigarettes) by employment status, before and after the first lockdown in April 2020.

	<=10 per day		11-20 per day		20+ per day	
	Before %	After %	Before %	After %	Before %	After %
Lost Job	65	64	29	31	6	5
	[54,75]	[51,76]	[20,40]	[20,43]	[3,14]	[2,15]
Furloughed	63	57	32	37	6	6
	[55,69]	[50,64]	[25,39]	[30,44]	[03,10]	[4,11]
Self-employed	56	53	36	39	7	8
	[47,65]	[44,62]	[28,46]	[30,48]	[4,14]	[4,15]
Employed	61	56	36	40	3	4
	[57,64]	[52,60]	[32,40]	[36,44]	[2,5]	[2,5]
Not in the labour force	49	49	42	44	9	7
	[44,54]	[44,53]	[37,63]	[39,49]	[7,12]	[5,10]

Note: 95% confidence interval is presented in square brackets.

Source: Produced by Authors from Understanding Society COVID-19 Survey Wave 1-4.

Table 3.3 Drinking by employment status, before and after the first lockdown in April 2020.

	0 drinks		1-2 drinks		3-4 drinks		5+ drinks	
	Before %	After %	Before %	After %	Before %	After %		
Lost Job	8	20	52	55	29	18	11	6
	[6,12]	[17,24]	[46,57]	[51,60]	[24,34]	[15,22]	[8,15]	[4,9]
Furloughed	7	12	49	56	28	22	16	9
	[6,10]	[10,14]	[46,52]	[54,59]	[25,31]	[20,25]	[14,19]	[8,11]
Self-employed	11	16	53	54	29	22	8	8
	[9,13]	[14,19]	[49,57]	[51,57]	[25,32]	[20,24]	[7,10]	[6,10]
Employed	7	14	52	58	28	21	13	7
	[6,8]	[13,15]	[50,53]	[56,59]	[27,30]	[20,22]	[12,14]	[6,7]
Not in the labour force	12	21	63	61	19	14	7	4
	[10,13]	[19,22]	[61,65]	[60,62]	[17,20]	[13,15]	[6,7]	[3,5]

Note: 95% confidence interval is presented in square brackets.

Source: Produced by Authors from Understanding Society COVID-19 Survey Wave 1-4.

3. COVID-19, loneliness, social isolation and the relationship with health inequalities

Another impact of COVID-19 has been the widespread measures of lockdown and restrictions in social mixing in limited bubbles, sheltering of certain groups and advice to work at home and limit social interactions (Block et al. 2020). However, there are concerns that such measures have a potential to contribute to and exaggerate existing health inequalities. Different demographic groups are differentially exposed to the harmful consequences of loneliness and isolation. In this section we provide a rapid review of COVID-related studies on loneliness and isolation, their physical and mental health consequences along with a description of the social groups that experienced higher levels of loneliness and isolation during the COVID-19 pandemic in the UK.

3.1 Physical health consequences of loneliness and isolation

Existing research recognises the critical role that social isolation and loneliness play in relation to mortality. In the UK, for example, one study found that all-cause mortality is higher amongst those who were more socially isolated and lonely (Steptoe et al. 2013). Recent empirical studies likewise suggest that social isolation and loneliness are factors contributing to deterioration in health amongst people with pre-existing health conditions. Loneliness is associated with a 55% greater severity of Parkinson's amongst adults in the US during the pandemic with social isolation a risk factor for the severity of the disease (Subramanian et al. 2020). Both results are statistically significant. Recent evidence also suggests that social isolation is correlated with an increased risk of all-cause mortality among people with cardiovascular disease (Yu et al. 2020). There are also longer-term consequences of periods of social isolation. In a 10-year follow-up study in Taiwan which adjusted for demographic and

health factors, social isolation was found to be not only a significant predictor of all-cause mortality, but also observed even after taking into account loneliness (Yu et al. 2020).

Further research is needed to better understand the underlying mechanisms behind the links between loneliness, isolation, and physical health in the context of the current pandemic. Of the studies that do exist, however, some point to health-compromising behaviours. For example, one study detected changes in weight-related behaviours among adults in the UK during the lockdown (Robinson et al. 2020). According to this study, 79% of participants experienced a decline in protective behaviours against weight-gain and those with obesity were the most likely to report a decline in their weight management. Another investigation found that loneliness, domestic isolation, and social disengagement were associated with poorer physical performance among older adults in the UK, even after adjusting for multiple confounders (Philip et al. 2020). An international study on the effects of COVID-19 related self-isolation towards eating behaviours and physical activity found a trend of health-compromising behaviours as well (Ammar et al. 2020). Researchers identified an increase in daily sitting times and unhealthy food choices, which impact not only for physical but also mental health.

3.2 Mental health consequences of loneliness and isolation

A considerable amount of literature has been published on the adverse impacts of loneliness and isolation on mental health in the course of the COVID-19 pandemic in the UK. The majority of studies show that loneliness is one of the strongest predictors of increased depression, anxiety, and stress levels. One study demonstrates that increased feelings of loneliness result in worsening mental health during the April-May, 2020 period (Chandola et al. 2020). Researchers show that loneliness is the major contributor to mental health deterioration, but other factors including childcare, home-schooling, and working from home also play a role. Notably, researchers base their analysis on a nationally representative sample from the UK Household Longitudinal Study, which signals the generalisability of observed trends. Others use data from the PROTECT study, which is an online longitudinal survey covering adults 50 years and older in the UK, and observe similar trends where loneliness is shown to be a risk factor of worsening mental health (Creese et al. 2020). However, it is important to note that the PROTECT study is not nationally representative and mostly covers females of white origins with higher education. Another study observed that greater perceived loneliness is associated with greater depression, anxiety, and stress scores during the pandemic in the UK (Jia et al. 2020). Here they used a cross-sectional online survey, where around 3,000 UK adults provided information during April 2020. Notably, loneliness is detected to be a stronger predictor of mental health than socio-demographic factors.

Such empirical evidence from the UK is very much aligned to trends from other contexts. A rapid systematic literature review of 63 studies on the impact of social isolation and loneliness on mental health identified that social isolation and loneliness increase the risk of depression, and the duration of loneliness (not its intensity), which was correlated with mental health symptoms (Loades et al. 2020). Most studies were using self-reported loneliness in healthy participants. Another relevant study is a systematic literature review published in *Lancet* focussed on the psychological impact of quarantine, finding largely negative consequences such as post-traumatic stress symptoms, confusion, and anger (Brooks et al. 2020).

Furthermore, longer quarantine duration was identified as one of the stressors along with infection fears, frustration, and others.

Loneliness has also been associated with suicide. A systematic literature review found that loneliness is linked not only to suicide attempts but also to completed suicides among older adults (Fässberg et al. 2012). The current pandemic is not an exception from the trend with others observing an increase in suicidal ideation among adults in the UK during the first six weeks of lockdown (O'Connor et al. 2020).

There is limited literature on understanding and describing the mechanisms through which loneliness and isolation worsen mental health, but we know that health-compromising behaviours during the pandemic are likely to play an important role. For example, evidence from Canada suggests that self-isolation was a significant predictor of cannabis use during the pandemic (Bartel et al. 2020). Others observed an increase in sedentary lifestyles and unhealthy food behaviours, which are additional factors driving the relationship between loneliness, isolation, and mental health (Ammar et al. 2020).

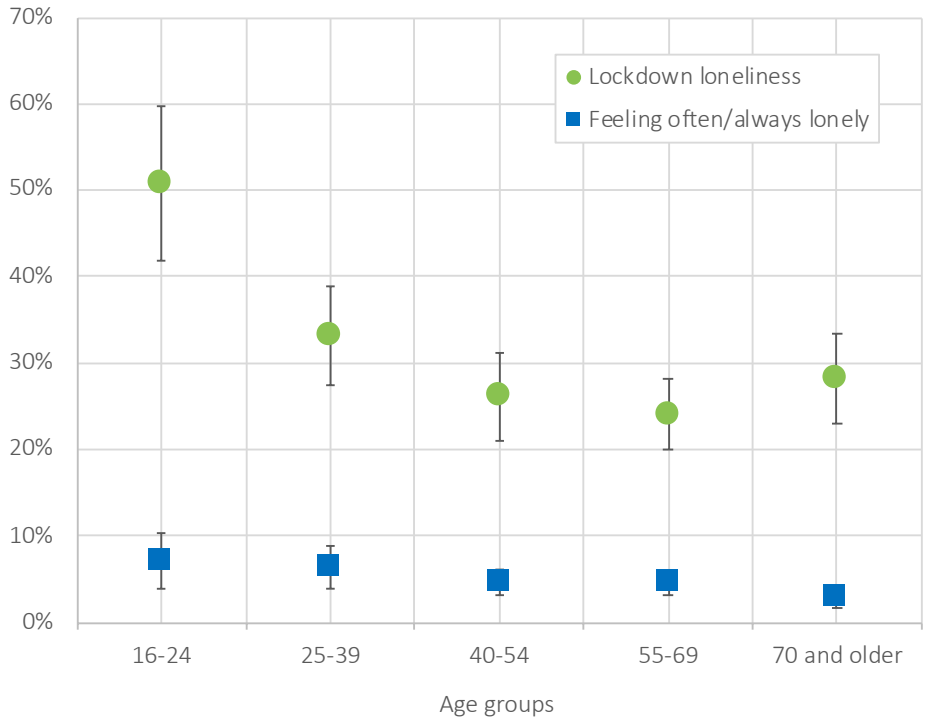
3.3 Loneliness and isolation varied by demographic, social and employment factors during COVID-19 pandemic in the UK

The literature also reveals that different demographic, social and employment related characteristics were important in who experienced more loneliness and isolation during the COVID-19 pandemic. Here we look at these different groups and reflect on longer-term consequences.

Young adults and seniors

Current empirical evidence suggests that young adults and seniors had a higher risk of being lonely during the pandemic in the UK (Bu et al. 2020a,b; Groarke et al. 2020; Philip et al. 2020). Such observations are consistent across nationally representative and non-representative data sources with the applications of different statistical techniques. This trend is also observed in the data from the Office of National Statistics (ONS 2020h). Figure 4.1 below graphically represents ONS data reflecting percentages of those reported chronic and lockdown loneliness by different age groups. Consistent with the existing studies (Bu et al. 2020a; Li & Wang 2020; Robb et al. 2020), ONS data demonstrates that young people (aged 16-24 years) experienced the highest jump in lockdown loneliness. Older adults (>70 years old) has second-high prevalence of being lonely during lockdown. Notably, chronic loneliness does not have a distinct age pattern.

Figure 4.1 Proportion of people who feel lonely, by age, during the period between April 3 to May 3, 2020



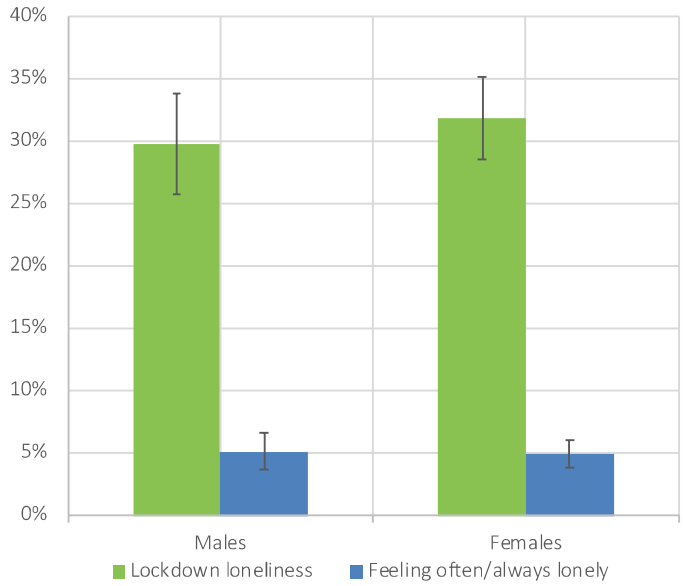
Source: Figure produced by authors from Opinions and Lifestyle Survey, Office for National Statistics

Notes. 95% confidence intervals. Feeling often/always lonely is an indicator where all respondents were asked "How often do you feel lonely?" and the % of those reporting often/always lonely is reflected (N= 5,260). Lockdown loneliness is an indicator of those reported that loneliness affected their well-being in the past 7 days (N=2,440)

Gender

Research also shows that women are more likely to experience loneliness in comparison to males (Bu et al. 2020a,b; Li & Wang 2020). For example using the UCL COVID-19 Social Study (a weekly panel study), covering almost 40,000 adults in the UK, one study found that women were more likely to be lonely (with estimated odds ratios of 1.59) (Bu et al. 2020a). Figure 4.2, which draws from ONS data, also partially supports this finding and demonstrates that there are slightly more women experiencing lockdown loneliness compared to men, while chronic loneliness does not differ across genders.

Figure 4.2. Proportion of people who feel lonely, by gender, during the period between April 3 to May 3, 2020



Source: Figure produced by authors from Opinions and Lifestyle Survey, Office for National Statistics

Notes. 95% confidence intervals. Feeling often/always lonely is an indicator where all respondents were asked "How often do you feel lonely?" and the % of those reporting often/always lonely is reflected (N= 5,260). Lockdown loneliness is an indicator of those reported that loneliness affected their well-being in the past 7 days (N=2,440)

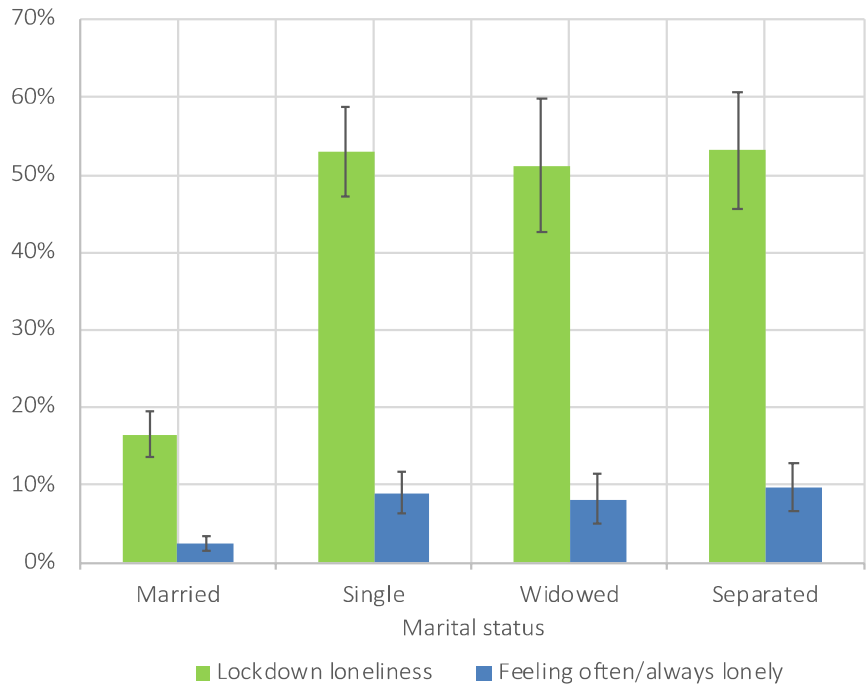
Partnership status

Partnership status plays an important role in the likelihood to report experiencing loneliness. Living with a partner is associated with statistically significant lower chances to experience loneliness (Groarke et al. 2020; Li & Wang 2020). Moreover, those who were single, widowed, separated or divorced during the lockdown in the UK were more likely to indicate higher levels of depression and anxiety (Robb et al. 2020), which was replicated by others (Groarke et al. 2020).

Figure 4.3 presents portions of people who feel lonely based on ONS data, by partnership status. The largest percentage of people that experienced loneliness during lockdown are concentrated amongst those without partners (i.e., separated, widowed, divorced), which is consistent with existing research. Although chronic loneliness is also concentrated amongst those without a partner, the difference with married participants is lower than for lockdown loneliness.

Household composition also played a role. Living with others served as a protective factor against loneliness during the pandemic in the UK, while living alone resulted in a greater risk (Bu et al. 2020a,b). Interestingly, owning an animal was also protective against loneliness (Ratschen et al. 2020).

Figure 4.3. Proportion of people who feel lonely, by marital status, during the period between April 3 to May 3, 2020



Source: Figure produced by authors from Opinions and Lifestyle Survey, Office for National Statistics

Notes. 95% confidence intervals. Feeling often/always lonely is an indicator where all respondents were asked "How often do you feel lonely?" and the % of those reporting often/always lonely is reflected (N= 5,260). Lockdown loneliness is an indicator of those reported that loneliness affected their well-being in the past 7 days (N=2,440). The 'married' category includes married, cohabiting, same-sex cohabitation, and civil partnership. Separated category includes divorced, separated, separated from civil partnership.

Lower education and income

Two studies from Bu and colleagues (2020a; 2020b) show that people with lower income and with lower levels of educational attainment are more likely to experience loneliness. The estimates for income are based on a longitudinal analysis of the UCL COVID-19 Social Study (estimated odds ratios are 1.30), while educational attainment differences arising from cross-sectional comparison. An additional study confirms that people from more socially disadvantaged backgrounds experienced more dramatic deterioration of mental health during the lockdown in the UK (O'Connor et al. 2020).

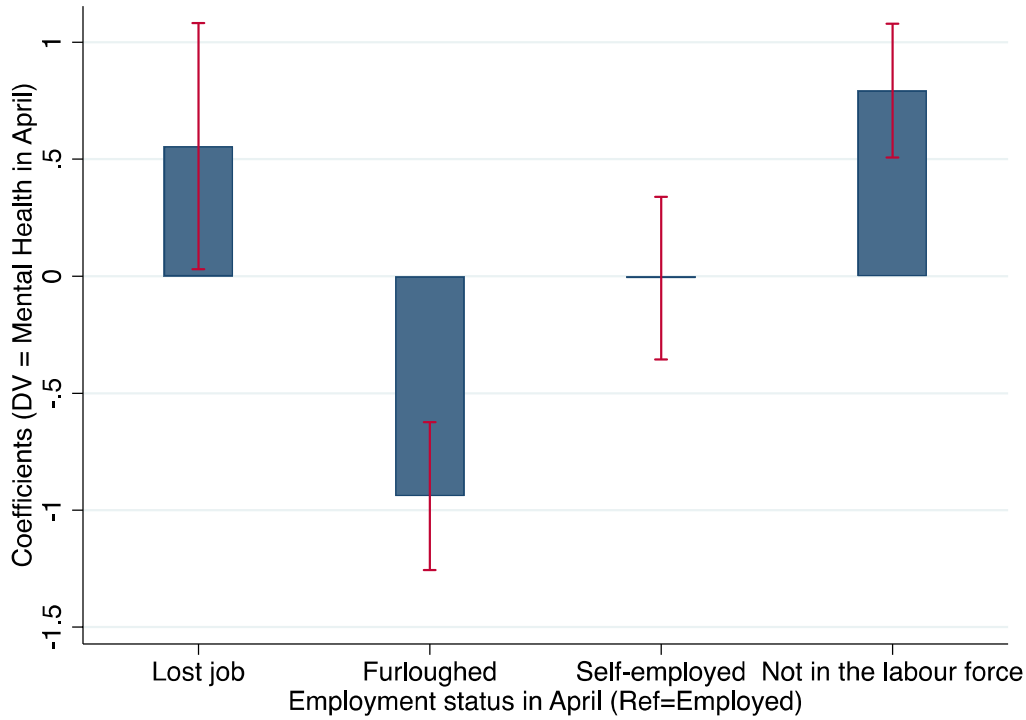
Economically inactive, unemployed and employment status

In the previous section we discussed how some individuals were disproportionately impacted by COVID-19 in being more likely to become unemployed, furloughed or in precarious employment. Li & Wang (2020) showed that having a job was a protective factor against general psychiatric disorders and loneliness in the UK during COVID-19. Both studies from Bu and colleagues (2020a; 2020b) replicate these results and show that economic inactivity

(including studying) and unemployment were significant predictors of increased loneliness (estimated odds ratios are 1.3-2.04).

Using the Understanding Society data collected from April to July 2020 during COVID, we conducted a regression analysis of the relationship between labour market activity status and mental health. Figure 4.4 plots the regression coefficient of mental health in April by and individuals' employment status in April, also controlling for multiple confounders. A higher score indicates poorer mental health showing that those who were out of the labour force or those their jobs had poorer mental health compared to those who remained employed. To the contrary, at least in April 2020, those who were furloughed had better mental health than those who remained employed.

Figure 4.4. Association between employment status and mental health



Source: Produced by Authors from Understanding Society COVID-19 Survey Wave 1-4.

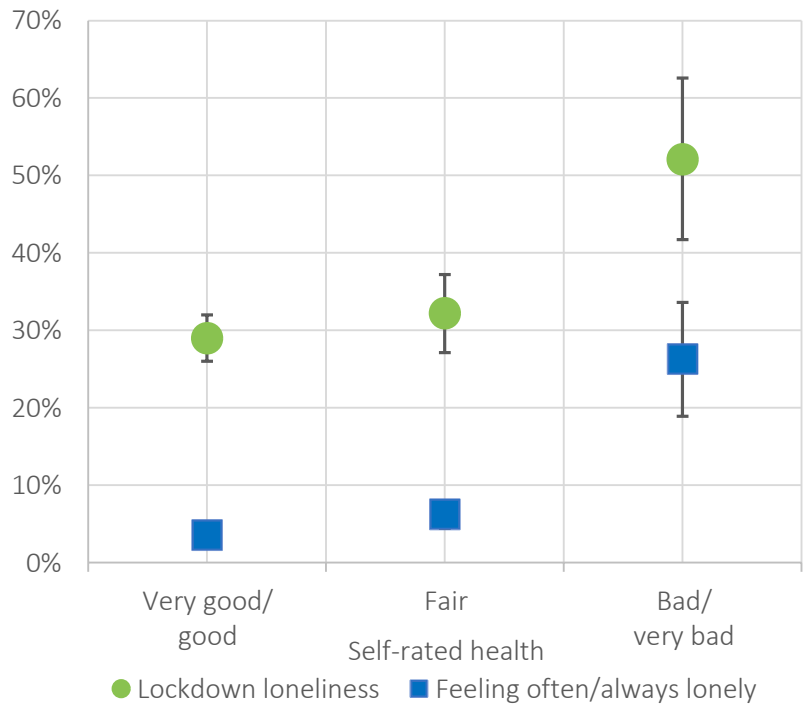
Note: The barplot shows the magnitude of the effect of employment status on general mental health, controlling for age, sex, education, race, financial situation, physical activity, smoking, drinking, and life stage (marital status, young children in the household). Significance level at 90%. Higher score indicates worse mental health (N=9,921)

Health groups

Health is also associated the likelihood of experiencing loneliness. People with mental health conditions are more likely to report loneliness during the lockdown (Bu et al. 2020a; O'Connor et al. 2020). Additionally, those who had COVID-19-related symptoms were at greater risk to develop general psychiatric disorders and report being lonelier (Li & Wang 2020). There were also health-related factors such as poor-quality sleep associated with higher loneliness (Groarke et al. 2020).

To add to this research we used the ONS data (ONS 2020h) to demonstrate the prevalence of loneliness by self-rated health groups. Figure 4.5 shows that the highest percentage of those experiencing both chronic and lockdown loneliness is amongst those with bad or very bad self-rated health. Also, those with disabilities and pre-existing health conditions have significantly higher levels of loneliness than among those without health problems.

Figure 4.5 Proportion of people who feel lonely, by self-rated health status, during the period between April 3 to May 3 2020



Source. Opinions and Lifestyle Survey, Office for National Statistics

Notes. 95% confidence intervals. Feeling often/always lonely is an indicator where all respondents were asked "How often do you feel lonely?" and the % of those reporting often/always lonely is reflected (N= 5,260). Lockdown loneliness is an indicator of those reported that loneliness affected their well-being in the past 7 days (N=2,440)

Ethnicity and place of residence

Existing COVID-19 research has had a limited focus on the role of ethnic background on loneliness. One study did not find significant differences between ethnic groups both samples from UK Household Longitudinal Study and UCL COVID-19 Social Study (Bu et al. 2020a). Two studies from Bu and colleagues (2020a; 2020b) show that people from rural areas were significantly less likely to experience loneliness during the COVID-19 pandemic in the UK. These researchers categorise rural areas and living as protective factors against loneliness.

How individuals adapt to isolation and loneliness has also been examined. Weinstein and Nguyen (2020) in their longitudinal analysis of online survey covering participants from the UK and US demonstrate that Individuals who endorsed the importance of self-isolation did not report any changes in loneliness, depression or anxiety during the time spent alone

(Weinstein & Nguyen 2020). Notably, researchers cover voluntary isolation. Brooke and Clark (2020) in their qualitative analysis of semi-structured interviews with found that good social support mediates death anxiety among seniors (aged > 70 years old).

4. Policy implications

The aim of this report was to report the main scientific evidence in the area of health inequalities during COVID-19, both directly due to the disease and indirectly from the social and economic impacts of lockdown and economic recession. We summarise relevant policy implications below.

- While the hope of vaccines is on the near-term horizon, there will likely be many more COVID-19 infections and deaths during late 2020 and early 2021 that will continue to disproportionally impact disadvantaged groups less able to stay home from work and effectively self-isolate in their homes. Financial support to enable self-isolating, both directly and through provision of temporary accommodation can protect these groups and lower overall national transmission.
- Not only health care workers, but also high risk occupations such as healthcare and care home workers and other high contact services should be a high priority for vaccine deployment (Mills & et al. 2020). Targeted health communication and community involvement is needed to ensure high vaccine uptake in vulnerable communities to minimize continued unequal burdens of COVID-19 morbidity and mortality.
- Direct health impacts of COVID-19 infection, hospitalization, and long covid will mean a need for high quality primary care services in affected communities with effective monitoring of long-term health effects of the virus. Both data and real-time tools can be developed and extended to aid local authorities to pro-actively isolate risk areas, building on ongoing COVID-19 research (Verhagen et al. 2020). Efforts to compensate for disrupted care for existing chronic diseases must also be a priority.
- Long-term disability compensation and other employment policies will be needed to support those suffering long term health effects that impact their ability to work.
- Investment in long-term data collection on those infected will be crucial to understanding and intervening on chronic health inequalities arising from COVID-19 infections. We recommend leveraging the large population representative ONS infection studies for longitudinal follow-up as well as facilitating other data linkages and follow-up for confirmed infections and hospitalizations. Such data will help quantify the on-going and future health and social care needs of those affected by the pandemic.
- In addition to those who have been furloughed, lost their jobs or self-employment due to COVID-19, attention will need to be placed on those in precarious, zero-hour contracts and the under-employed who continued and will continue to work under difficult and unprotected circumstances in the short term. This is not only the responsibility of the government but also businesses and related employee organisations, to ensure that employees are provided adequate labour market protection.

- Attention needs to be placed to a growth in intergenerational inequalities and the longer-term labour market and health inequalities of youth who have been disproportionality impacted in their early life course.
- To address the long-term impact of COVID-19 on the life chances of youth in multiple life, a joined up policy approach from multiple government departments and actors that spans policies to support youth including education, employment, apprenticeships and rental and housing related policies.
- As the economy stabilizes and individuals return to employment, attention is required to gender pay gap differentials, with many employers prioritizing furloughs for higher wage, often male workers. If employees continue to work from home, attention is required for work-family balance, particularly for women.
- COVID-19 revealed structural economic, employment and health disadvantages of BAME and lower socio-economic groups, who were more likely to experience job loss but also disproportionality represented in key worker occupations and had higher mortality. Attention to 'level up' these groups will be essential.
- If job displacement increases or remains, it will lead to increased financial strains, lower living standards, limited access to healthy food and strain on many individuals and families. In addition to economic support, attention to should be to strengthening community and local support since prolonged inactivity episodes can lead to physical and mental health deterioration.
- The country is forecasted to experience very high levels of unemployment. Unemployment has been linked to more self-destructive health behaviours, such as smoking, increased alcohol consumption, weight gain and mental health problems. Particularly for youth, who are the hardest hit, this can have life-long health consequences. Retraining, educational, apprenticeships, volunteering and related community programmes to keep these groups active and connected to society will enhance health and avoid longer-term high health costs.
- A large group of individuals have fallen into loneliness and isolation during periods of lockdown, which should be monitored to avoid continuation or longer term consequences. Innovative programmes that build on volunteering, connecting the young and the old and work experience can ensure continued interaction and active populations.

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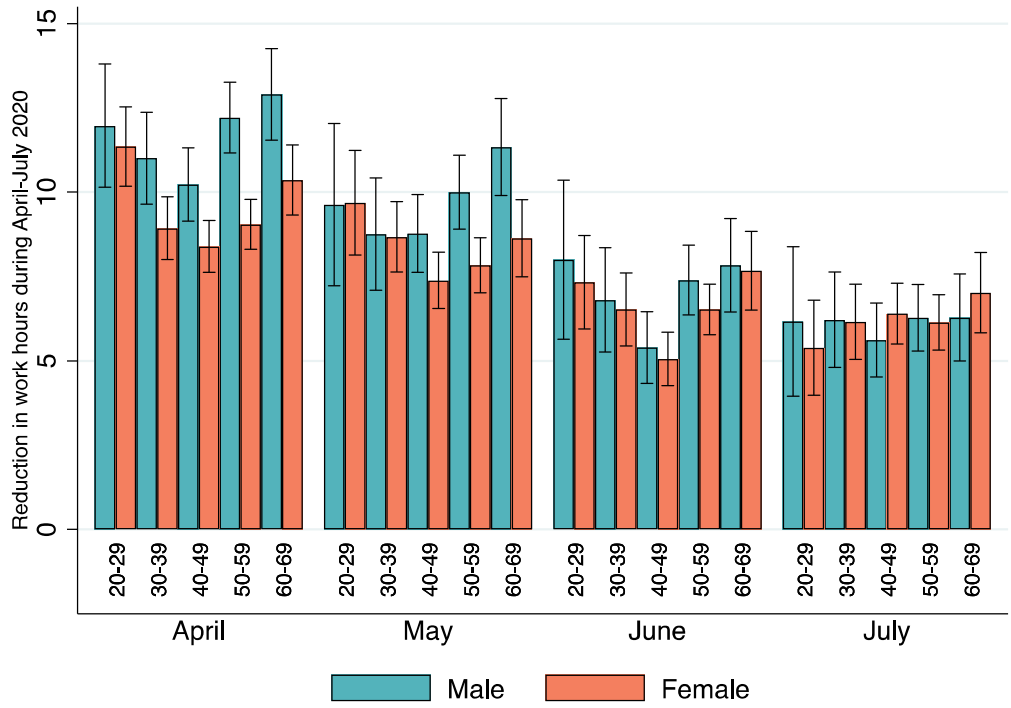
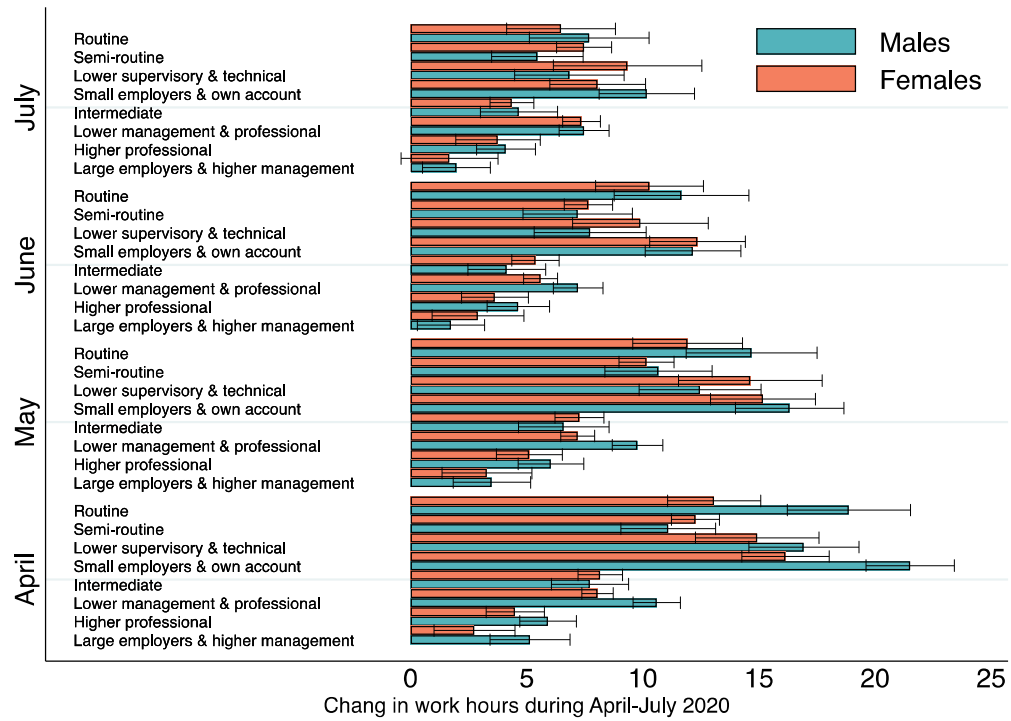
Appendix 1. Additional information

Figure S.1 Work hours reduction due to COVID-19 by age and gender



Source: Produced by Authors from Understanding Society COVID-19 Survey Wave 1-4.

Figure S.2 Work hours reduction due to COVID-19 by occupation and gender



Source: Produced by Authors from Understanding Society COVID-19 Survey Wave 1-4.