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Understanding vaccine hesitancy in US and UK frontline workers – The role of economic risk

Sian Moore [a,*], Eklou R. Amendah [b], Christina Clamp [c], Nigel Carter [d], Calvin Burns [e], Wesley Martin [f]

[a] Employment Relations and Human Resource Management at the Centre for Research on Employment and Work at the University of Greenwich, United Kingdom
[b] Marketing at the University of Southern Maine, United States
[c] Sociology at the Center for Co-operatives and CED at the Southern New Hampshire University, United States
[d] Research Fellow at the Centre for Research on Employment and Work at the University of Greenwich, United Kingdom
[e] Occupational Psychology in the School of Human Sciences at the University of Greenwich, United Kingdom
[f] Research Assistant at the Southern New Hampshire University, United States

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ABSTRACT

Drawing upon a comparative qualitative study of frontline workers in the US and UK this research confirms Bazzoli and Probsts' (2022) emphasis on employment instability as a limiting boundary condition for effective implementation of a strong safety climate. It suggests that there is no positive relationship between risk of Covid-19 infection and frontline worker attitudes toward the vaccine because of their exposure throughout the pandemic. The notion of moral disengagement is problematic because of the tension between the vaccine hesitancy of frontline workers and the pro-social roles they fulfilled in the pandemic. Their exposure, underpinned by dependence on non-standard contracts and limited access to sick pay, informed vaccine hesitancy. Trust in management, but also perceptions of economic risk and safety in the work environment, shape vaccine behaviour and point to the importance of workplace health and safety policies. The research suggests the necessity of work-related variables in exploring vaccine hesitancy, but also consideration of the wider political economy of legal, health and welfare systems in both countries, including hostile migration environments. While vaccination was more politicised in the US, the intersection of race and class were key factors in both countries because of the predominance of BME and BIPOC workers in essential work during the pandemic and disproportionate exposure to the virus.

1. Introduction

In a recent edition of *Safety Science*, Bazzoli and Probst (2022) identified job insecurity as an antecedent of safety related attitudes and behaviours. They concluded that, in the US context, employee job insecurity mitigates the beneficial impact of a positive COVID-19 safety climate on moral disengagement and subsequent behaviours. While moral disengagement has been associated with detrimental and *anti-social* behaviour (Bandura et al., 1996) this study explores the vaccine hesitancy of frontline (or essential) workers who fulfilled *pro-social* roles in the pandemic. It adopts Razai et al.s' proposition that 'vaccine hesitancy is a legitimate viewpoint' that can reflect ineffective public health messaging and in some cases language barriers, but also stems from historical mistrust of government and public health bodies by some BME/BIPOC[1] groups (2021a).

This paper builds upon and amplifies Bazzoli and Probsts' assertion of the role of economic insecurity. It draws on a comparative study of COVID-19 vaccine hesitancy in the UK and US, centring upon frontline workers in two comparable cities, Oxford in the southeast of the UK, and Manchester, New Hampshire in the US. It focuses upon the workplace as a key site of infection and prevention and thus integral to public health. The research indicates that perception of economic risk in relation to work influences attitudes toward COVID-19 vaccination. Trust in management, but also perceptions of safety in the work environment, shape vaccine behaviour and point to the importance of workplace health and safety policies. While drawing on a qualitative approach, the research

* Corresponding author at: Greenwich Business School Old Royal Naval College, Park Row, London SE10 9LS.
E-mail address: s.moore@greenwich.ac.uk (S. Moore).

[1] The term BME/BIPOC is used to cover the UK term Black and Minority Ethnic and the US term Black, Indigenous and People of Color.

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suggests the necessity of work-related variables in exploring vaccine hesitancy in cross-sectional studies. It echoes Antonsen's (2009) emphasis on power and conflict as a necessary focus for safety culture research. Evidence suggests tensions between organisational priorities and the safety of workers, confirming existing work that refutes assumptions that employers and workers have shared interests in Occupational Health and Safety (OHS) (Frick, 2011; Nichols & Walters, 2016).

The paper evokes the political economy of OHS as the context for vaccination in terms of legal, health and welfare systems, and role of structural relations at both the macro and organisational level (Dwyer, 1995). Perceived racism in healthcare is a strong correlate of mistrust and disengagement, with an interplay between physical, social and political environments that can reproduce learned attitudinal responses amongst communities (Ojikutu et al., 2022). This study deploys race and class as key variables (while aware that gender is also a factor) because of the predominance in both countries of BME and BIPOC workers in essential work during the pandemic and disproportionate exposure to the virus (Laiyemo, et al., 2022; Mukhtar et al., 2022).

There has been debate about the ethics of compulsory vaccination pointing to the tension between individual and societal risk as well as cost-benefit analysis characteristic of industrial hazards (Ale et al., 2023). Ale et al. suggest that during COVID-19 governments found that short-term utilitarianism had consequences that proved unacceptable 'in the eyes of the population' and adopted a deontological approach 'giving preference to saving health and lives' (2023: 230). Yet, this paper highlights that mandatory vaccination was floated in a context in which many frontline workers, often on non-standard contracts, had spent 18 months with no recourse to adequate sick pay and leave when symptomatic and who thus continued to work for financial reasons, often under pressure from employers. While compulsory vaccination was introduced in some EU countries, the primacy of labour market considerations, namely shortages of health and social care workers, led both US and UK governments to retreat from mandatory vaccination. Compulsion was also generally rejected by workers and trade unions.

The paper starts by considering extant literature on vaccine hesitancy and shortcomings of purely behavioural approaches. It then looks at the disproportionate representation of BME/BIPOC workers in frontline work and the differential impact of COVID-19 on these workers. It explores the social and political determinants of vaccine take-up in both the US and UK, before capturing the different political contexts for vaccination and the role of employers and trade unions. The paper sets out the research methods that underpin the exploration of frontline workers' experiences, perceptions and decisions about COVID-19 vaccination and risk prevention, restoring work, the workplace and access to employment rights, but particularly racialised occupational and contractual segregation, to the discussion.

1.1. Vaccine hesitancy

Studies of vaccine take-up are often based on behavioural approaches to health prevention measured at the individual psychological level. In the US context a 18-item survey instrument, designed by Opel et al. (2011), measured four domains linked to parental vaccine hesitancy: vaccination behaviour, beliefs about vaccine safety and efficacy, attitudes about vaccine mandates and exemptions, and trust. Studies suggest that those who refuse vaccination of a child know more about vaccination than those who accept a vaccine (Burton-Jeangros et al., 2005). Choosing to take a vaccine may reflect conformity rather than specific knowledge (Tickner et al., 2006). Individual risk aversion has also been seen as a factor influencing the take up of vaccines (Healy & Pickering, 2011).

Aw et al. suggest there is a correlation between vaccine hesitancy in general and COVID-19 specific hesitancy (2021). Their scoping review of literature in high-income countries groups factors associated with COVID-19 vaccine hesitancy into three categories: vaccine specific (concerns about safety and development), individual/group (lower risk perception and trust in science/healthcare), and context related factors (including demographic variables and political beliefs). Freeman et al. conducted a study of vaccine hesitancy prior to the COVID-19 roll-out, to 'estimate the provisional willingness to receive the vaccine' (Freeman et al., 2020, p.1). It used the existing Oxford Vaccine Hesitancy Scale measuring parental decisions on childhood vaccines (Shapiro et al, 2018). They found in their first model that variance in hesitancy was explained by beliefs about the collective importance, efficacy, side-effects, and speed of development of a COVID-19 vaccine. A second model highlighted 'excessive mistrust', including conspiracy beliefs, negative views of doctors, the need for chaos (defined as a desire to bring down the established political order in order to increase one's own social status) and 'positive healthcare experiences' including supportive doctor interactions and good National Health Service (NHS) care.

More discriminating explanatory models reflect a tension between individual choice and social factors. Streefland et al. (1999) stress the importance in patterns of vaccination acceptance of understanding the broader socio-cultural context. They use the concept of 'local vaccination cultures' to explain how 'shared beliefs about disease causation, including views on efficacy of modern medicine and need for preventive measures' as well as 'local health services experiences and vaccination settings' influence individual decisions. Seeing vaccination as a social norm is a powerful driver of acceptance (Sturm, 2005).

Mnookin (2011) explains how vaccination has become a source of fear and a target for misinformation looking at the role of the US and UK media in keeping vaccination scares alive. The particular role of social media in spreading misinformation has been highlighted (Comrie et al., 2019; Kata, 2012). The Social Science in Humanitarian Action Platform (SSHAP, 2021) identified the politicisation of COVID-19 vaccine development and deployment as potentially affecting confidence, including political attempts to control COVID-19 narratives, governments' previous handling of COVID-19 response and marginalised communities' worries about being experimented on. Vaccine reticence in the US predates the current pandemic. Newman et al. (2022) point to the libertarian anti-expert, populism that has existed in the US for over a century. This aligns with the partisan divide in the US with libertarian views closely aligned with the conservative shift in the Republican Party. Here aggression characteristic of moral disengagement may be salient, although this paper challenges the notion of moral disengagement as explaining the behaviour of frontline workers.

Freeman et al, (2020) concluded that while hesitancy was associated with younger age, female gender, lower income and ethnicity, socio-demographic information was not a major explanation of variation. Other surveys have indicated greater vaccine hesitancy among particular social groups, including low-income (Curtis et al., 2021) and some ethnic minorities (Razai et al., 2021a). Despite evidence that BME communities are more vulnerable to COVID-19, the Royal Society for Public Health (2020) found that UK BME groups were less likely to want a COVID vaccine. Reflecting the intersection of race and class, research conducted prior to the vaccine roll-out found that hesitancy was greatest among people from lower socio-economic and/or ethnic minority backgrounds and associated with feeling disenfranchised or not trusting government officials, with the authors suggesting that it reflected overall faith in public institutions irrespective of COVID-19 (Chaudhuri et al., 2022). Residential segregation affects access to health resources creating conditions that amplify mistrust (Razai, et al., 2021a). In the UK, Dorling emphasises deprivation as a driver of vaccine hesitancy and a factor in general higher mortality: "People who have not taken the vaccines are also so much more likely to be poor, on average, as compared to those who have, which is why their chances of dying in general are almost twice as high as for the fully vaccinated" (2021:13).

Bazzoli and Probst suggest that COVID-19 has restored the importance of organisational factors to public health (2022). While otherwise neglected in studies of COVID-19, models of workplace safety culture propose that trust between management and workers and/or the

organisation-employee relationship influence OHS behaviour and outcomes (Burns et al., 2006; Conchie and Donald, 2008; Hudson, 2003; Reason, 1997; Westrum, 1995). Empirical evidence links trust and safety performance through safety behaviours (Zacharatos et al., 2005). Liu et al. (2020) demonstrated that in a Chinese industrial context, employee trust in organisational safety and in an organisation's safety equipment are related to their safety participation behaviours. While the concept of moral disengagement can privilege individual behaviour in COVID-19 preventative measures, Bazzoli and Probst (2022) propose that organizational socialization processes 'that influence the activation of moral disengagement mechanisms in the workplace will spillover to impact the behavior of employees while in non-work public settings' (2022:4). In the context of frontline work in the pandemic the notion of antisocial behaviour inherent in moral disengagement is problematic, since the role of frontline workers was publicly deemed as pro-social in its wider sense.

At the organisational level Curcuruto et al., (2015) define employee safety participation behaviour as either prosocial or proactive. Prosocial safety behaviours involve looking out for co-workers' safety and are less focussed on changing workplace conditions (e.g., helping a co-worker to complete a task safely). Getting a COVID-19 vaccination before returning to the workplace may be an example of a prosocial safety behaviour. Proactive safety behaviour involves voicing safety concerns to effect change (e.g., reporting an unsafe act or rule violation). Accordingly, a recent study identified the proactive role of workplace trade union health and safety representatives in combatting COVID-19 risk, including in overcoming individual resistance or what was described as "a culture of denial" (Cai et al., 2022). Union representatives used their embeddedness in the workplace to create a culture of safety, transforming personal responsibility into collective responsibility.

In considering trust, the power dynamics of employment relations cannot be ignored (James, 2009) and literature has demonstrated the importance of independent worker representation in reducing risk at work (Frick, 2011). At the same time OHS is subject to the mechanisms of legal enforcement. Regulatory frameworks that endorse employer discretion over forms of OHS representation have been seen to have limited operational capacity, especially in the context of non-standard work arrangements and declining trade union presence (Loudoun & Walters, 2009).

1.2. The differential impact of COVID-19

Frontline essential workers were disproportionately exposed to COVID-19 in both the US and UK. Evidence suggests that in both countries, BME/BIPOC and migrant workers were more likely to be frontline workers, work in proximity to others and thus more vulnerable to infection. The OECD reports that in the US and UK ethnic minorities were disproportionally represented in at-risk jobs (14% compared to 12% in the UK, and 44% compared to 31% in the US) (OECD, 2022). In the US Black workers were about 50% more likely to work in the healthcare and social assistance industry and 40% more likely to work in hospitals, compared with white workers (Hawkins, 2020).

Figures from the Runnymede Trust (Haque et al., 2020) found that one third of BME people (33%) worked outside their home during the pandemic compared with closer to a quarter of White people (27%) Just under three in ten BME people (28%) were key workers, compared with closer to two in ten White people (23%). Black groups were particularly likely to be classed as key workers (34%), with the highest percentage among people of African origin – nearly four in ten of whom were key workers (37%). Further, BME groups are more likely to work in insecure and casual work, with no access to occupational sick pay (Institute of Health Equity, 2020).

Occupational segregation was one factor in the unequal distribution of risk and mortality. In the US, a *Guardian* report identified 3,600 healthcare worker deaths between mid-March 2020 and April 2021, with Black Americans disproportionately represented. More than a third of the health care workers who died were born outside the US. Of the deaths identified by country of origin 18% of US health worker deaths were Filipino (The Guardian, 2021). Hispanic/Latinx people in New Hampshire (where the US research was based) were most likely to have contracted COVID-19, and Black/African-American people were most likely to have died from it (The Covid Tracking Project, 2022). Hispanic/Latinx people represented 7,308 cases per 100,000 people, and White people 2,189 cases per 100,000. Black people accounted for 65 deaths per 100,000 people — the highest among any racial category. These figures, as reported by the New Hampshire Charitable Foundation (2021), reflected national trends; people from communities of color were three times more likely to be infected than Whites and twice as likely to die.

In the UK, Public Health England (2020) reported that 63 per cent of healthcare workers who died from COVID-19 were from a BME background. A 2020 study conducted by Oxford University Hospitals Trust (where the UK research was based) recorded the Trust's porters and cleaners had the highest rates of infection and accordingly BME staff were at greater risk, with job role a proxy for socio-economic background. In the second wave deaths were concentrated amongst those in the poorer parts of the city (Oxford University Hospitals NHS Trust, 2020).

1.3. Vaccination

The US Centers for Disease Control and Prevention (CDC) reported that as of 28 February 2022, 73.4% of people in the US aged 12 and over had received two vaccine doses (CDC, 2022a). On the same date, the UK Health Security Agency reported that 85.2% people aged 12 and over had received two vaccine doses (UK Health Security Agency, 2022). Although these data suggest that there are high rates of vaccination in both countries, there are differences in vaccine uptake on the basis of ethnicity and occupation.

The CDC (2022b) estimated the percentage of people 18 years and older in US ethnic groups that were fully vaccinated (i.e., 2 doses). In February 2022, it reported that the Asian group was most likely to be vaccinated (96.4%) and that the American Indian / Alaska Native group was least likely to be vaccinated (71.6%). Estimates for other groups included for Hispanic / Latinx (83.2%), Native Hawaiian or Other Pacific Islander (NHOPI) (83.6%), White (82.6%), and Black (80.3%). These data suggest a marked difference in vaccination rates between Asian Americans and other groups, but not necessarily between Hispanic/ Latinx, NHOPI, White and Black groups. In both countries while White groups had higher vaccination rates than Black groups, in the US the difference between the two was smaller (10%) than in the UK (17%).

The Office for National Statistics (ONS) investigated the percentage of people aged 18 years and older in UK ethnic groups who had received three vaccines (ONS, 2022a). In February 2022, the White British group (68.4%) was most likely to have had three vaccinations followed by the Indian (65.3%) and Chinese (64%) groups. The Black African (37.9%), Pakistani (37.8%) and Black Caribbean (33.9%) groups were least likely to have received three vaccines, with half (50.4%) of the 'White other' group having done so.

In both the US and UK vaccine hesitancy in Black communities has been seen as due at least in part to institutional mistrust, grounded in historical and contemporary experiences of racism (Padamsee, et al., 2022). Public Health England has proposed that historic racism, negative experiences of healthcare and consequent lack of trust in health providers and services and treatment resulted in reluctance to seek care. In particular, the effects of hostile environments against migrants, particularly failed asylum seekers and undocumented migrants, led to fears of deportation and reluctance to engage with services. The disproportionate loss of family or community members from COVID-19 compounded anxiety.

Yet the variation between different ethnic groups suggests complexity. In the US Padamsee, et al. (2022) found that Black and

White individuals were comparably hesitant to get vaccinated when the COVID-19 vaccines first became available. However, Black individuals more quickly overcame hesitancy than White individuals as they came to believe the vaccines were necessary to protect themselves and their communities (Padamsee, et al., 2022). While in the UK ONS figures confirm that particular ethnic groups were more vaccine hesitant, they also show that the proportion of adults who received three vaccinations was lower for those living in more deprived areas, who had never worked or were long-term unemployed and who identified as Muslim, compared with other religions. Differences in vaccination rates have also been found between UK occupational groups. ONS data shows that workers in the hospitality, personal services and transport sectors were less likely to have received a vaccine than workers in other sectors (ONS, 2022b). The occupations with the lowest proportion of people with three vaccinations were elementary trades and related occupations (58.3%) and skilled construction and building trades (62.3%). Data from a UK National Health Service Trust showed significantly lower COVID-19 vaccination rates among ethnic minority healthcare workers (71% in White workers compared to 59% in South Asian and 37% in Black workers) (Razai et al., 2021b). Further evidence suggests there may be avoidance by those who work in lower paid public facing roles (Razai et al., 2021a). Again, the intersectional relationship between race and class is suggested and is explored in the findings to this study.

1.4. The political framework

In January 2022, the US Supreme Court rejected President Biden's plans for compulsory vaccination or testing for 100 million workers, about two-thirds of the American labour force, including federal government workers. All US companies employing more than 100 people would have been required to ensure that their staff were fully vaccinated or to take weekly COVID-19 tests. In the US vaccination was highly politicised, with narratives revolving around personal freedom. Governors of Republican-led states pledged to challenge Biden's executive orders in court with the Governor of Texas, Greg Abbott, calling the regulations 'an assault on private businesses' (Dyer, 2021). The US Supreme Court allowed the Centers for Medicare & Medicaid Services (CMS) to proceed with the directive in states that challenged Biden's plans (Nagele-Piazza, 2022). The CMS rule applies to health care workers in Medicare and Medicaid-certified providers and suppliers, covering roughly 50,000 providers and 17 million healthcare workers. Central government employees were also covered, with the Biden administration urging state governments to follow. A number of states required vaccinations for teachers and school staff.

In the UK there has been broader consensus across the main political parties and the issue is less politicised. The government amended the Health and Social Care Act 2008 to mandate vaccination for care home workers from November 2021 in England. The Department of Health and Social Care (2021) estimated that care homes faced losing 40,000 staff from the compulsory vaccinations policy. Discussions with key informants suggest that this fear materialised and there has been some exodus. However, on January 31st 2022 the UK government removed vaccination as a condition of working in care homes and reversed its plans for mandatory vaccination for NHS staff in England (devolved governments in Scotland, Wales and Northern Ireland had no plans for a mandate). The move came three days before the 3rd of February deadline for unvaccinated staff dealing directly with patients to have had their first dose or risk losing their job. The decision came in the face of warnings by medical bodies that the government policy would exacerbate chronic workforce shortages in the health service by causing thousands of staff to lose their jobs. Government figures showed that five per cent of NHS staff remained unvaccinated (Iacobucci, 2022).

1.5. Employer and trade union responses

A February 2022 New York Times survey of 500 top US employers found that 75 of the 120 that responded required vaccinations for some of their workers; 36 deferred to government mandates at the local, state and federal level; 18 had no plans for mandates. There were another eight corporations that did not respond but had some employees subject to the federal mandates for health workers. Of the employers mandating vaccination, seven required boosters, five indicated that they would offer regular testing as an alternative and 12 reported that they would be disciplining or terminating unvaccinated workers (Ivory et al., 2022). Companies, such as McDonald's, Delta Air Lines, United Airlines and Tyson Foods, required either vaccination or regular testing among their US workforces. However, Starbucks rescinded plans for mandatory vaccination. A number of large employers altered sick pay for unvaccinated employees (Messenger, 2022). Delta Airlines had imposed a $200 monthly insurance charge on employees who were in the company insurance plan, but who were unvaccinated. Others were restricting returns to work to vaccinated workers only and requiring that all new recruits be vaccinated. Columbia Sportswear had put unvaccinated workers on unpaid leave and begun termination processes.

In the US, there has been more industrial conflict over vaccination, including the termination of municipal contracts in New York and protests by firefighters and police. A New Hampshire fire chief understood that 3,000 of 12,000 firefighters had retired in New York City 'because the ultimatum was "listen you get the vaccination, or you resign or retire"'. For US and UK trade unions there has been a tension between supporting members opposed to compulsory vaccination and promoting vaccination. In the US unions have asserted their right to bargain over the mandate even if they support mandatory vaccination or have no policy, in order to ensure there are no contract violations (Hirsch, 2021). In the UK national trade union reluctance to back mandatory vaccination reflected concerns about residual and COVID-19-related staff shortages in health and social care. While advocating a programme of education and encouragement, unions at national level asserted that making vaccination a condition of employment constituted an infringement of worker and human rights. One UK national trade union representative perceived mandatory vaccination as shifting responsibility for workplace health and safety from employers to individuals.

In the UK, in the context of staff absences and shortages, a number of employers cut sick pay for unvaccinated staff forced to isolate after being exposed to COVID-19, leaving them dependent on Statutory Sick Pay (SSP). Two major supermarkets, Tesco and Sainsbury's, withdrew additional sick pay introduced to cover those isolating during the pandemic and another major retailer, Next, reverted to its standard sick pay policy. Such moves prompted fears that employees will be less likely to disclose infection or take sick leave (Churchill, 2022).

At the same time, UK and US unions have negotiated improved sick pay as a result of COVID-19; the RMT transport union, for example, pushed for full pay from day one for cleaners working for private contractors on London Underground. In the US, the firefighters' union pushed for the government to provide money for sick pay in order that firefighters did not have to utilise existing sick leave. Meatpacking firm, Tyson Foods, negotiated with unions to provide paid sick leave as an incentive for vaccination with the United Food and Commercial Workers union (UFCW) stating it is the first national US agreement to provide paid sick leave to meatpacking workers.

2. Methods

2.1. Participants and procedure

Aw et al. note 'the dismal number of qualitative studies on COVID-19 vaccine hesitancy' stating that over three quarters of the studies they identified were cross-sectional (2021:14). The role of qualitative data has been accepted as making at least a supplementary contribution to occupational safety research (Shannon et al.,1999). This research is a comparative study that focusses upon four sectors employing front-line

workers in Oxford in the UK and Manchester, in the US (see Table 1). The four sectors are: the social care sector; the health sector; public transport; and emergency services. A US-UK comparison allows for interrogation of contexts shaped by place, culture, social and political and economic factors. It permits evaluation of health and welfare infrastructures and how different healthcare systems may shape worker responses to vaccines. The research is based on documentary evidence of policies towards vaccination; interviews with key informants; in-depth semi-structured interviews with workers in each sector, and focus groups of workers, community and trade union activists. Respondents were offered a £25 or $35 gift card for participation, reflecting the fact that they were likely to be low-paid and time-poor.

In the UK key informants included a Trades Union Congress national equalities officer; national officers from transport and firefighter unions; a member of a social care workers' organising team; a representative from a social care worker support network; a hospital manager and representatives of a local BME community group and a national BME nursing association. In the US key informants comprised a senior administrator at one of the two hospitals in Manchester; a senior administrator of a federally funded health clinic; national and local union officers; staff from housing agencies; a senior police officer, fire chief and representatives of migrant and refugee women's organisations. In the US, the fact that the hospitals are not unionized made access to workers more difficult – in contrast a number of UK respondents were recruited through trade unions recognized in NHS hospitals. While in the US nearly three quarters of the respondents were female, in the UK they were more evenly split between male and female. All but two of the UK respondents were BME; of the US participants just under two thirds were BIPOC.

Research was subject to ethical approval by both the University of Greenwich and Southern New Hampshire University Research Ethics Committee. It was conducted on the basis of informed consent with anonymity and confidentiality guaranteed. Data protection follows data protection regulations and University of Greenwich and Southern New Hampshire University protocols. Organisations are not named.

2.2. Analysis

The content analysis of the interview and focus group material combined broad comparative understandings across the cases with deep, thick analysis of each case. The material was initially analysed using thematic coding with the support of NVivo software to identify the patterns of meaning across data sets, highlighting vaccination narratives. Additionally collective inductive analysis across the research team ensured thematic coding methods did not remove meaning units from the context in which they emerged.

3. Results

3.1. The importance of work and the workplace

The study concludes that the experiences of frontline workers who worked throughout COVID-19 were a central component of subsequent vaccine behaviour. The respondents reported feeling unprotected and undervalued during the pandemic. In Manchester, US, a Community Building Manager described how some tenants were working in close quarters on the factory floor, with not all wearing masks at all times. A number had contracted COVID-19 more than once. The Service Employees International Union (SEIU) reported that janitorial workers were being told to reuse the same mask for eight-day periods when cleaning COVID-19 rooms after patients. In Oxford, UK, it was stated that initially care home and agency staff worked without adequate PPE.

There were indications of occupational segregation by race and ethnicity in both Manchester and Oxford with BME/BIPOC workers more likely to be key or essential workers. A pastor representing women from the refugee and migrant community in New Hampshire noted African workers could be doing extra hours:

> *'First of all, there was a lot of things affected the community. When this COVID was very bad, what we really was scared about, because the African people was working a lot, they was working a lot because they say like they give them double, you know? And most of the people refused to go to work, but the African people was working a lot. And some places they was not like helping them to be protected themselves, you know? And they just let them.' (US - Director, Women's Refugee project)*

In Oxford, a transport worker commented:

> *'The Black and Ethnic Minority community has been badly affected. First, it was because most of the people are on the frontline. The cleaners, nurses – because the NHS employs quite a lot of our Black and Ethnic minorities. And the accommodation that they have, because they will normally share accommodation, our culture is such a way that you have to stay with maybe your mother and your other brothers and everything. And because of the low wages that most of the people earn, it means that they will stay in intergenerational areas.' (UK - transport worker)*

The deaths of BME porters in one of the Oxford hospital trusts in the early stages of the pandemic were formative for a number of healthcare respondents. Another respondent recalled the deaths of 60 Filipino healthcare workers across the UK. There were perceptions of differential treatment of workers during the pandemic reflecting occupational hierarchies where managers were disproportionately White. In healthcare in Oxford there were stories that BME nurses were pushed into the frontline and more exposed to COVID-19. BME care workers felt that White workers were less likely to be pressured by employers to attend work or to be threatened with overall cuts in hours if they turned down specific shifts. In one Oxford hospital it was noted that an inspection had flagged that there were issues with social distancing for lower paid housekeeping staff, largely migrant workers, who had much smaller changing and washing areas and facilities than nurses in the same hospital, who were more likely to be White and/or British.

Respondents referred to contractual differentiation where BME/BIPOC and migrant workers were more likely to be on contracted-out or agency contracts, working alongside directly employed White workers. Across the US the SEIU reported the increased use of agencies and contract labour to supplant full time workers. In the UK there were particular impacts on those working in contracted-out or privatised services and on non-standard contracts with fewer employment rights and who were not paid if they were sick. In transport one respondent reported the use of agency workers in customer service roles in stations who did not get paid if they did not come into work. He recorded the anxiety of directly employed workers working alongside them, since agency workers travelled between work locations with the risk of spreading the virus.

Respondents felt that workers without employment rights, particularly if English was not their first language, often were not open about COVID-19 symptoms because they felt scared of losing their jobs, of turning down work and challenging employers. In Oxford a care worker reported fears amongst colleagues of joining unions. A union representative reported that East Timorese workers had seen colleagues fired if

Table 1
The interviews.

Sectors	Key informants		Worker interviews		Focus Groups	
	US	UK	US	UK	US	UK
Social Care	1	1	3	4	1	1
Health Sector	4	2	1	4	1	1
Emergency Services	2	1	1	1		1
Transport	1	1		3		1
Community organisations	3	4			1	1
Total	11	9	5	12	3	5

they raised concerns and emphasised the difficulties that someone on a zero-hours contract, dependent upon their employer for hours, would have raising health and safety issues.

3.2. Occupational and statutory sick pay

Experiences of frontline work were intimately linked to access to sick pay and leave in both the US and UK. Many respondents reported that frontline and lower paid workers attended work when symptomatic because of their limited rights to both occupational and statutory sick pay, with the latter inadequate to support families. This was particularly the case for those on non-standard contracts. In the US those with COVID-19 were increasingly expected to use unpaid leave if sick leave ran out. An administrator in a government health programme in New Hampshire cited the concentration of the migrant population in lower paid, frontline jobs with, by implication, no access to sick pay:

> ''*So who got sick? Folks that got exposed to the virus. And who got exposed? The ones that had to show up to the job so they can get a pay cheque. So there were a lot of people at work, and [if] you become sick then you have to leave. And you have to leave because you can't go back sick and infect everybody. Some folks had vacation time, others didn't, I would say the majority of them did not. You know our employment system in the United States is kind of divided between, we have jobs that are good jobs, union jobs, even if the pay is low you have benefits and time and leave and all that. Then you have the jobs that you get paid when you show up, if you don't show up you don't get paid. It's almost at will and there's a lot of people situated like that, and when that happens it affects folks disproportionately if you are in a job where if you get sick you're already exposing yourself, doing a job that other people don't want to do and you're showing up when other people are staying home and avoiding, and you do it. Then if you get sick you get penalised for getting sick. In a way it's unfair like that because you can't go back to work. So yes, it did affect the immigrant population folks with diverse backgrounds differently. And this is not so much as race, but I would say it's because of economic standards, economic status.*' *(US - Government Health Programme administrator)*

An Oxford care worker provided a harrowing description of working through COVID-19 and how lack of protection and employment rights for care workers spread the virus, suggesting why deaths were so high in UK care homes. Under-staffing meant she often had to cover for her colleagues' sickness and she conveyed the pressures to work when symptomatic, particularly for migrant workers, as well as the fear of raising issues. She was paid £40 by her employer for each of three periods of COVID-19 sickness. She describes care workers as *'walking weapons'* and that the lack of widely available testing in the early stages of the pandemic allowed people to work when symptomatic. Other care workers reported that they may not even qualify for the statutory minimum sick pay. An Oxford community activist said that East Timorese workers with no access to sick pay worked throughout the pandemic. In one case nine were sharing a house and all were going to work with COVID-19; '*they had to pay their rent*'. An Oxford union rep also noted that migrant workers did not come forward for testing because they could not survive financially if they tested positive and had to go off sick:

> *'And that's really where the whole system falls down, it's because if you can't make ends meet, you're just going to continue working even if you don't feel well. And that's not good for the individual but it's also obviously not good from a public health point of view. And that has never been treated as a public health issue, but it was absolutely clear in the pandemic that it is a public health issue. And that's why the lowest paid workers were the most at risk. They had the highest risk because it is a public health issue when you are working in conditions that do not allow public health initiatives to have any meaningful impact.' (UK – hospital consultant and trade union rep)*

A porter at one of the Oxford hospitals reported that while directly employed porters were paid as normal if they went sick, agency porters had no access to occupational sick pay and were reliant on SSP, which they could not live on, resulting in them coming into work sick. He pointed to the unfairness of having agency and directly employed staff working side by side, but treated differently. He also said that there were rumours that the Trust wanted to replace all directly employed staff with agency porters because such employment rights made them 'too expensive'. Respondents also linked burn-out as a result of working through COVID-19 to long-COVID. Care workers talked about silence around long-COVID, particularly by employers anxious to keep them at work.

The experiences of frontline workers, including the lack of PPE and sick pay, were explicitly linked by a number of respondents to subsequent vaccine behaviour as an Oxford care worker put it:

> *'I think from having just spent time talking to people, it's more about the fact that if you don't feel cared for by your employer and then suddenly they're saying "come and do this thing because we want to care for you to protect you"; you think "well, you've never cared for me before, why will I believe that you're doing this for me now?" Does that make sense? But there has to be a two-way trusted relationship for this to work. And when you have always felt that you were not cared for and you were just there to do your job and not make any fuss, then why would you then suddenly believe that what you were being offered was for your benefit and not for other people's benefit?' (UK – social care worker)*

An Oxford Hospital consultant and union rep also discussed the impact of the one-sided employment relationship where BME frontline workers felt that their health and safety was not being considered during the pandemic, leading to suspicion when '*suddenly we are being asked to rush to the front of the queue*' for vaccination. He also proposed that BME staff *'had racist experiences when they had accessed healthcare themselves. And I understand that degree of, not just mistrust, but also the question comes into your mind, "what is the employer trying to get from me that they want me to have this vaccine?"'*. A senior manager in an Oxford health trust suggested that the exposure of frontline workers to infection during the pandemic could foster a view that they had immunity:

> *'I was talking to some colleagues and friends and their argument is, "if I am wearing PPE, I wear a mask, I wear gloves, then I cannot infect other people and I cannot be infected because I am protected with the PPE". And they said that during the height of the COVID-19, during the first and second wave, they didn't have the vaccine [and] they did not infect or they were not infected. And that's their argument.' (UK – senior manager Health Trust)*

3.3. Migrant and refugee status

In both Oxford and Manchester, it was reported that undocumented migrant workers had particular concerns about vaccination. The UK 'hostile environment' and 'no recourse to public funds' were seen to discourage migrant workers from registering with the NHS and/or for vaccination. Here the move to vaccination centres that did not require registration or documentation was crucial. Similarly in Manchester it was reported within the migrant community that distrust of the vaccine was compounded by fear about their status. Those without documentation were anxious about being asked for identification, as a worker in a healthcare centre in Manchester reported:

> *'We have folks who do not have documentation to be here and so they were really concerned about – "this is a governmental vaccine and if I go and try to get the vaccine am I gonna get deported when they find out that I'm undocumented?" And they were asking initially for a licence or some form of identification and some of the folks that are here that are undocumented, they use another ID to work under, another name to work under that is a legal name than what their real name is. And so, then they were worried about "what name do I give when I go to get my vaccine?"*

and "if I'm giving this other name then the vaccine is gonna be in that name and not in my name." So, it was very worrisome to some folks, especially around documentation issues.' (US – healthcare centre worker)

In response the organisation did extensive outreach work to communicate to migrant workers they would not be asked for identification or documentation and would not have to have their names on vaccine cards. This respondent also acknowledged the role of community leaders in reassuring people. It was clear that requiring online registration for vaccination did not work, with access to technology another factor. Again, it was opening vaccination centres within the community where people could just turn up and get a vaccine that was effective.

3.4. Legacies of racism and discrimination

For BME/BIPOC communities in both Manchester and Oxford mistrust was historically rooted, with respondents citing medical experimentation on Black populations and communities, including the Tuskegee study of syphilis (recalled by both UK and US respondents) and AZT trials conducted on HIV-positive Africans. Some respondents identified reticence by BME/BIPOC communities, particularly those from Africa. A participant in a focus group based on an African Women's organisation in Manchester said there was a fear that vaccination would be imposed in Africa:

'They don't trust, because they say, "This isn't for the Black people," or, "If you take a vaccine, you're going to turn ghost." There is a lot of reason why, especially through the media, the social media. But they say they are bringing the vaccine to Africa. If here in America they didn't find a vaccine, which vaccine they find to bring to Africa? And we started to raise awareness. They don't trust to take the vaccine, because of all those things what they did, we don't trust in government for what they say. And people sometimes they don't trust medicine, they start to say, "They just want to kill the Blacks."' (US – focus group African Women's organisation)

A volunteer for an African community organisation in Oxford similarly commented:

'I just know from talking to people that there was a lot of people completely refused to take the vaccination because of mistrust, because of racism, because of previous trials on us and stuff like that. People are thinking "oh here we go again, this is about killing all Black people." So, obviously there are those kind of feelings there, which they are quite right and they're quite entitled. Because we always feel that, they'll say try it on them first and see what happens, so there is that big mistrust that we could never get over.' (UK – volunteer African community organisation)

Respondents also objected to the naming of COVID-19 variants as 'South African' or 'Indian' – perceiving this as racialisation. Residual mistrust was supported by more recent experiences and perceptions of racism in the health service, including, in Oxford, the disproportionate deaths of BME women in childbirth.

While legacies of racism fuelled mistrust, at the same time a number of respondents in both countries challenged the view that BME/BIPOC communities were more likely to be vaccine hesitant and some felt that the debate had been racialised. An officer from the Manchester Police Department described an anti-vaccine protest at a children's vaccination clinic by a small group of '*generally what we would frame as the free stater populations of a libertarian type population front. And that population, at least from what we see, is primarily White*.' In the UK, an Oxford union rep stated, '*the biggest propagators have been actually the organised and far right antivaxxers who are very well connected and very well-funded actually.*' A BME bus driver from Oxford concurred: *'if you went on social media and saw the marches against the forced vaccination, it was mostly White people. So I don't know where they were labelling communities with that when there was a far greater consensus of Caucasian people on these marches.'*.

3.5. The retreat from mandatory vaccination

Both national governments retreated from compulsory vaccination and there was no mandate in New Hampshire as the state itself was party to the challenge to the Biden presidency on the issue. Manchester workers thus appeared less likely to feel that their jobs were at risk, while in Oxford respondents reported that prior to the change in government policy the local Council had written to social care employers stating that care workers had to be vaccinated. Subsequently the NHS Health Trust had sent individual letters to health workers telling them they needed to be vaccinated with their first dose by 3rd February 2022 and highlighting that there would be no redeployment if they refused and were not exempt. This was perceived as a threat that workers would lose their jobs and a number of workers left their jobs in the face of mandatory vaccination or were reluctantly vaccinated to retain their jobs and felt it was forced upon them.

While the move away from mandatory vaccination was more politically driven in the US, it was stated that tight labour markets and staff shortages in both Manchester and Oxford made social care employers reluctant to enforce vaccine mandates and that there were cases where they disregarded such requirements. In the US it was reported that numbers of healthcare workers had left the sector following the pandemic, experiencing burn-out and trauma. A senior manager in a Manchester healthcare centre reflected on the impact that staff shortages had on employer approaches to vaccination:

'We face such incredible workforce shortages right now that the prospect of losing 20, 30, 40, 50 nurses is unfathomable. So we had to come up with a creative way in listening to our employees. And we held listening sessions to hear why people did not want to receive the vaccine or did not want to start a mandatory policy. And you can imagine they were all over the place, some nastier than others. But the question of pregnancy and birth was a big one and we heard that and we put our policy in place to help address that.' (US – Manager healthcare Centre)

One Oxford care worker noted that formally if she and her colleagues did not take regular COVID-19 tests they would not be put on the rota. However, employers turned 'a blind eye' if staff refused to be tested:

'They want the shifts covered. They just want us to do the job, the shifts have to be covered one way or another, whether or not – because a lot of people don't want it and a lot of people have left. I know a lot of people who have left, but they're really having staff shortages. They just want the shift covered so if you can cover it, because they don't have a lot of people, they burn out the few that have it, that are there.' (UK – social careworker)

Another care worker confirmed that while vaccination was needed when applying for care jobs and specified on application forms, employers were less strict with existing workers.

3.6. Wider narratives - trust in government

The politicisation of vaccination in the US is reflected in the interview data. As one Manchester community health director put it:

'In my opinion, vaccine hesitancy comes from a couple of different sources or reasons. Unfortunately, the biggest one is political. And we are a divided country right now. And depending on what side of the fence you're on, it's probably going to dictate some of your attitudes towards vaccines and vaccine hesitancy.' (US – senior director for community health)

A more consensual approach across political parties meant that such polarisation did not apply in the UK, but the government's performance on COVID-19 did inform UK respondents' narratives and influenced trust. A participant in the public transport focus group commented:

'The lack of trust for this specific government as well is so high across all boards. And time and time again we are just seeing – they're showing

themselves for who they are, that they're untrustworthy. I think there's a lot of people now that just distrust – and I think I was listening to a medical academic speak about this. He was saying when you have a government like this, that it's so distrustful and it is quite harmful to public health. So, it's really scary times we're in I think to be honest.' (UK – Transport focus group)

Overall behaviour reflected a spectrum of individual and structural factors, as one Oxford health worker put it:

'I was just thinking about access to vaccinations, so not only access in terms of being able to get somewhere where someone can put a shot in your arm, it's also access to relevant information. But it's about your relationship to the state and public health, and what that means about following government guidance and all of those sorts of things.' (UK-Health focus group)

Narratives around vaccine hesitancy, in both Oxford and Manchester were characterised by lack of trust; as a senior manager in a healthcare centre in Manchester put it:

'Trust is the basic denominator for providing any service to that population. Whether it's primary care, behavioural health, vaccine, name the service and if you don't have a trusting relationship there is going to be reluctance automatically.'(US – Manager Healthcare centre)

UK respondents expressed mistrust arising from the Government's initial ambiguous response to the pandemic. Political scandals surrounding its track and trace system and profits made by private companies from COVID-19, including those manufacturing the vaccine, had not helped.

A proportion of respondents suggested there was a lack of confidence in the science of the vaccine and fears of possible side-effects, including on fertility and pregnancy. In both countries a number felt that the vaccine had been developed too quickly with insufficient research and there may be longer-term outcomes. In Oxford respondents felt that the media reflected government scaremongering about the impact of the virus. In the US there was a concern that the vaccine was not approved by the US Food and Drug Administration (FDA). A small number of participants discussed misinformation including via social media, but also community television channels.

4. Discussion

While trade unions played a key role in workplace health and safety during COVID-19, they walked a fine line between encouraging vaccination, opposing mandatory measures and supporting those who were reluctant to vaccinate. In both countries employers have introduced coercive measures by withdrawing sick pay for those who are unvaccinated – this may be considered pernicious when so many workers had inadequate access to these employment rights during the pandemic. A number of respondents explicitly linked the experience of frontline workers who worked throughout COVID-19 with vaccine hesitancy, particularly for those on non-standard contracts, often BME/BIPOC workers. Figures for both countries show the disproportionate representation of these workers in frontline jobs, but further, the evidence reported here finds racialised contractual hierarchies within occupations with BME/BIPOC workers more likely to be on insecure contracts with no access to occupational sick pay. Thus, the qualitative data suggests that there is no automatic relationship between risk of COVID-19 infection and propensity to be vaccinated, at least in part because of experiences of existing exposure. One Oxford care worker described herself and colleagues as 'walking weapons'. Access to sick pay and leave is crucial to the disclosure of infection and prevention of COVID-19 transmission in the workplace. Positive experiences of health and safety in the workplace appear associated with more positive vaccine behaviour. Agency working during a pandemic, whereby workers move between sites and potentially spread infections, is counter-intuitive to prevention.

In both Manchester and Oxford there were particular issues for migrant workers and refugees with insecure employment status and fears about documentation and of deportation. Across both cities legacies of racism informed the perceptions of BME/BIPOC communities, fuelled by more recent experiences. At the same time the focus of the study on frontline workers questions the racialisation of vaccine hesitancy, suggesting the role of existing and intersecting structural inequalities.

The research suggests similarity between factors behind vaccination hesitancy in both Manchester and Oxford despite the differences in national health systems, possibly reflecting the exceptional dependence on public funding to tackle COVID-19 in both countries. The key variation is the extent to which vaccine behaviour is influenced by political polarisation in the US. This political context may inform higher convergence in vaccination rates between White and some BIPOC groups– reflecting White Republican intransigence and moral disengagement. While political factors have prevailed in the US, in the UK labour market factors predominate in the form of staff shortages in health and social care – these appear to have driven the move away from mandatory vaccination and have implications for public health policy during future pandemics. Such responses involve cost-benefit calculations that appear more utilitarian than deontological, challenging Ale et al.'s conclusion that in the face of COVID-19 governments gave preference to saving health and lives and even businesses regardless of the cost (2023). Overall the findings reported here suggest that existing labour market inequalities and reluctance to fund sick pay meant that effectively some lives were less worth saving.

4.1. Future study

The research indicates the importance of work-related variables for future studies. The next step is to collect survey data using a questionnaire based on the variables that emerged from the in-depth interviews and the focus groups. The Theory of Planned Behavior (Ajzen & Fishbein, 2005) links attitudes, subjective norms, and perceived behavioural control to behavioural intentions. Attitudinal variables included in the model may include risk perceptions of COVID-19, attitudes about COVID-19 vaccines (and vaccines in general), and trust attitudes about COVID-19 information sources (employer / management, trade union, and community group). Subjective norms could reflect family / friends and work colleagues with respect to taking COVID-19 vaccines. Crucially such a model could account for workers' perceptions of organisational safety, their experiences of working through the pandemic, and organisational policies about mandatory vaccination, to help explain COVID-19 vaccine hesitancy. One hypothesis would predict an inverse relationship between vaccine-taking action and perceptions of economic risk for frontline workers, with trust in management and perceptions of safety in the work environment influencing attitudes to vaccination.

4.2. Conclusion

In understanding vaccine behaviour it is not possible to ignore the experiences of frontline workers during COVID-19 and their exposure to the virus. The research confirms Bazzoli and Probsts' (2022) emphasis on employment instability as a limiting boundary condition for effective implementation of a strong safety climate. As they argue, job insecurity may act to attenuate the beneficial impact of a positive COVID-19 safety climate on attitudes and behaviour related to illness, disease transmission and prevention. Here the notion of moral disengagement is problematic where it is posed as individual anti-social behaviour – there is an evident tension between the vaccine hesitancy of frontline workers and the pro-social roles they fulfilled in the pandemic.

The qualitative study deploys race and class as key variables in occupational and public health. The study of race and ethnicity in

relation to the organisation of work is a neglected area (Lee & Tapia, 2021) and rarely considered in relation to OHS. Hostile migration environments inhibited access to vaccination and encouraged infection in the workplace. Respondents in Oxford (UK) and Manchester (US) testified to racialised occupational structures and contractual hierarchies reproduced through the everyday practice of work underpinned by wider social and material structures and historical legacies. BME/BIPOC workers were more likely to work throughout the pandemic and to be on non-standard contracts with limited access to sick pay and where they did not get paid if they did not turn up for work.

Respondents provided examples of measures to address vaccine hesitancy that had proved effective in both cities, focussing on tackling 'hard to reach services' rather than 'hard to reach communities' and 'informing' rather than 'promoting'. As one SEIU officer put it, open dialogue was necessary to address the 'very valid vaccine hesitancy that comes from deep historical places in particular communities and to not override it or ignore it but actually talk about it directly.'.

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CRediT authorship contribution statement

Sian Moore: Conceptualization, Methodology, Formal Analysis, Funding acquisition, Supervision, Writing – original draft. **Eklou R. Amendah:** Writing – review & editing, Writing – original draft, Validation, Methodology, Formal analysis, Data curation, Conceptualization. **Christina Clamp:** Writing – review & editing, Writing – original draft, Supervision, Project administration, Methodology, Formal analysis, Conceptualization. **Nigel Carter:** Writing – review & editing, Investigation, Formal analysis. **Calvin Burns:** Conceptualization, Methodology, Project administration, Writing – review & editing. **Wesley Martin:** Investigation.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

Ajzen, I., Fishbein, M., 2005. The influence of attitudes on behaviour. In: Albarracin, D., Johnson, B.T., Zanna, M.P. (Eds.), The Handbook of Attitudes. Lawrence Erlbaum Associates.

Ale, B.J.M., Slater, D.H., Hartford, D.N.D., 2023. The ethical dilemmas of risky decisions. Risk Anal. 43, 219–233. https://doi.org/10.1111/risa.13893.

Antonsen, S., 2009. Safety culture and the issue of power. Saf. Sci. 47 (2), 183–191. https://doi.org/10.1016/j.ssci.2008.02.004.

Aw, J., Seng, J.J.B., Seah, S.S.Y., Low, L.L., 2021. COVID-19 vaccine hesitancy—A scoping review of literature in high-income countries. Vaccines 9(8), 900–921.

Bandura, A., Barbaranelli, C., Caprara, G.V., Pastorelli, C., 1996. Mechanisms of moral disengagement in the exercise of moral agency. J. Pers. Soc. Psychol. 71 (2), 364.

Bazzoli, A., Probst, T.M., 2022. COVID-19 moral disengagement and prevention behaviors: The impact of perceived workplace COVID-19 safety climate and employee job insecurity. Saf. Sci. 150 https://doi.org/10.1016/j.ssci.2022.105703.

Burns, C., Mearns, K., McGeorge, P., 2006. Explicit and implicit trust within safety culture. Risk Anal. 26 (5), 1139–1150.

Burton-Jeangros, C., Golay, M., Sudre, P., 2005. Compliance and resistance to child vaccination: a study among Swiss mothers. Rev Epidemiol Sante Publique 53 (4), 341–350. https://doi.org/10.1016/s0398-7620(05)84616-4.

CDC, 2022a. COVID Data Tracker, COVID-19 Vaccinations in the United States. Retrieved from https://covid.cdc.gov/covid-data-tracker/#vaccinations_vacc-total-admin-rate-total.

CDC, 2022a. COVID Data Tracker, COVID-19 Vaccinations in the United States. Retrieved from https://covid.cdc.gov/covid-data-tracker/#vaccinations_vacc-total-admin-rate-total.

Chaudhuri, K., Chakrabarti, A., Chandan, J.S., et al., 2022. COVID-19 vaccine hesitancy in the UK: a longitudinal household cross-sectional study. BMC Public Health 22 (104). https://doi.org/10.1186/s12889-021-12472-3.

Churchill, F., 2022. Can employers reduce sick pay for unvaccinated staff? Retrieved from https://www.peoplemanagement.co.uk/article/1747320/can-employers-reduce-sick-pay-for-unvaccinated-staff#gref.

Cai, M., Moore, S., Ball, C., Flynn, M., Mulkearn, K., 2022. The role of union health and safety representatives during the COVID-19 pandemic: A case study of the UK food processing, distribution, and retail sectors. Ind. Relat. J. 53, 390–407.

Comrie, E.L., Burns, C., Coulson, A.B., Quigley, J., Quigley, K.F., 2019. Rationalising the use of Twitter by official organisations during risk events: Operationalising the Social Amplification of Risk Framework through causal loop diagrams. Eur. J. Oper. Res. 272 (2), 792–801. https://doi.org/10.1016/j.ejor.2018.07.034.

Conchie, S., Donald, I.J., 2008. The functions and development of safety-specific trust and distrust. Saf. Sci. 46 (1), 92–103.

Curcuruto, M., Conchie, S.M., Mariani, M.G., Violante, F.S., 2015. The role of prosocial and proactive safety behaviors in predicting safety performance. Saf. Sci. 80, 317–323.

Curtis, H. J., Inglesby, P., Morton, C. E., MacKenna, B., Walker, A. J., Morley, J., ... Hulme, W. (2021, April 9). Trends, regional variation, and clinical characteristics of COVID-19 vaccine recipients: a retrospective cohort study in 23.4 million patients using OpenSAFELY.medRxiv. Retrieved from https://www.medrxiv.org/content/10.1101/2021.01.25.21250356.

Dorling, D., 2021, September/October. Who are the unvaccinated and what is happening to them? Public Sector Focus, pp. 12-13. Retrieved May 16, 2022, from Public Sector Focus: https://flickread.com/edition/html/index.php?pdf=61791d655437f#14.

Dwyer, T., 1995. Industrial accidents: A sociological analysis. In: Slappendel, C. (Ed.), Health and Safety in New Zealand Workplaces. Dunmore Press.

Dyer, O., 2021. COVID-19: US imposes mandatory vaccination on two thirds of workforce. BMJ 2021 (374), n2238. https://www.bmj.com/content/374/bmj.n2238.

Freeman, D., Loe, B., Chadwick, A., Vaccari, C., Waite, F., Rosebrock, L., Lambe, S., 2020. COVID-19 vaccine hesitancy in the UK: The Oxford coronavirus explanations, attitudes, and narratives survey (Oceans) II. Psychol. Med. 1–15. https://doi.org/10.1017/S0033291720005188.

Frick, K., 2011. Worker influence on voluntary OHS management systems – A review of its ends and means. Saf. Sci. 49 (7), 974–987. https://doi.org/10.1016/j.ssci.2011.04.007.

Haque, Z., Becares, L., & Treloar, N. (2020, August). *Over-Exposed and Under-Protected, The Devastating Impact of COVID-19 on Black and Minority Ethnic Communities in Great Britain.* Retrieved from Runnymede-Covid19-Survey-report-v2-August-2020.pdf: https://www.nhsbmenetwork.org.uk/wp-content/uploads/2020/08/Runnymede-Covid19-Survey-report-v2-August-2020.pdf.

Hawkins, D. (2020) *The coronavirus burden is falling heavily on black Americans. Why? The Guardian*, 16th April. Available at https://www.theguardian.com/commentisfree/2020/apr/16/black-workers-coronavirus-covid-19 (Accessed: 15 September 2023).

Healy, C.M., Pickering, L.K. (2011). How to Communicate With Vaccine-Hesitant Parents. Pediatrics , 127(Supplement_1), S127–S133. https://doi.org/10.1542/peds.2010-1722S.

Hirsch, J., 2021. Why so many unions oppose vaccine mandates – even when they actually support them. Retrieved from https://theconversation.com/why-so-many-unions-oppose-vaccine-mandates-even-when-they-actually-support-them-170067.

Hudson, P., 2003. Applying the lessons of high risk industries to health care. Qual. Saf. Health Care 12 (Suppl 1), i7–i12.

Iacobucci, G., 2022. COVID-19: Government abandons mandatory vaccination of NHS staff. BMJ 2022 (376), o269. https://doi.org/10.1136/bmj.o269.

Institute of Health Equity, 2020. Build Back Fairer https://www.instituteofhealthequity.org/resources-reports/build-back-fairer-the-covid-19-marmot-review/build-back-fairer-the-covid-19-marmot-review-full-report.pdf.

Ivory, D., Collins, K., Norman, D. M., Queen, C. S., Dupré, B., Higgins, L., ... Patel, J.K., 2022. Who's Requiring Workers to Be Vaccinated? Retrieved from https://www.nytimes.com/interactive/2022/02/23/business/office-vaccine-mandate.html.

James, P., 2009. Worker representation and health and safety: Reflections on the past, present and future. In: Walters, D., Nichols, T. (Eds.), Workplace Health and Safety: International Perspectives on Worker Representation. Palgrave Macmillan.

Kata, A., 2012. Anti-vaccine activists, Web 2.0, and the postmodern paradigm – An overview of tactics and tropes used online by the anti-vaccination movement. Vaccine, 30(25), 3778-3789. https://doi.org/10.1016/j.vaccine.2011.11.112.

Laiyemo, A.O., Asemota, J., Deonarine, A., Aduli, F., McDonald-Pinkett, S., 2022. Minority Healthcare Workers' Perception of Safety and COVID-19 Vaccination Uptake. J. Gen. Intern. Med. 37 (4), 1006–1007.

Lee, T.L., Tapia, M., 2021. Confronting Race and Other Social Identity Erasures: The Case for Critical Industrial Relations Theory. ILR Rev. 74 (3), 637–662. https://doi.org/10.1177/0019793921992080.

Liu, S.-X., Zhou, Y., Cheng, Y., Zhu, Y.-Q., 2020. Multiple mediating effects in the relationship between employees' trust in organizational safety and safety participation behavior. Saf. Sci. 125, 104611.

Loudoun, R., Walters, D., 2009. Trade Union strategies to support representation on health and safety in Australia and the UK: Integration or isolation? In: Walters, D., Nichols, T. (Eds.), Workplace Health and Safety: International Perspectives on Worker Representation. Palgrave Macmillan, pp. 177–200.

Messenger, H., 2022. From Amex to Walmart, here are the companies mandating the Covid vaccines for employees. Retrieved from https://www.nbcnews.com/business/business-news/amex-walmart-are-companies-mandating-covid-vaccine-employees-rcna11049.

Mnookin, S., 2011. The Panic Virus: A True Story of Medicine. Simon & Schuster, Science and Fear.

Mukhtar, A.F., Abdul Kadir, A., Mohd Noor, N., Mohammad, A.H., 2022. Knowledge and Attitude on Childhood Vaccination among Healthcare Workers in Hospital Universiti Sains Malaysia. Vaccines 10 (7), 1017.

Nagele-Piazza, L. (2022). *Health Care Worker Vaccination Deadlines Extended in Some States.* Retrieved from https://www.shrm.org/resourcesandtools/legal-and-compliance/employment-law/pages/health-care-worker-COVID-19-vaccination-deadlines.aspx.

New Hampshire Charitable Foundation, 2021. New Community Health Workers Will Help with COVID Response in Manchester. Retrieved from https://www.nhcf.org/what-were-up-to/new-community-health-workers-will-help-with-covid-response-in-manchester/#:~:text=of%20Union%20Leader.)-,New%20community%20health%20workers%20will%20help%20with%20COVID%20response%20in,by%20the%20COVID%2D19%20pandemic.

Newman, P.A., Reid, L., Tepjan, S., Fantus, S., Allan, K., Nyoni, T., Williams, C.C., 2022, March 31. COVID-19 vaccine hesitancy among marginalized populations in the U.S. and Canada: Protocol for a scoping review. Retrieved from PLOS ONE: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0266120.

Nichols, T., & Walters, D., 2016. Safety or Profit?: International Studies in Governance, Change and the Work Environment (1st ed.). Routledge. https://doi.org/10.4324/9781315229751.

OECD Policy Responses to Coronavirus (COVID-19), 2022. The unequal impact of COVID-19: A spotlight on frontline workers, migrants and racial/ethnic minorities. https://www.oecd.org/coronavirus/policy-responses/the-unequal-impact-of-COVID-19-a-spotlight-on-frontline-workers-migrants-and-racial-ethnic-minorities-f36e931e/#section-d1e358.

Ojikutu, B.O., Bogart, L.M., Dong, L., 2022. Mistrust, Empowerment, and Structural Change: Lessons We Should Be Learning From COVID-19. Am. J. Public Health 112 (3), 401–404. https://doi.org/10.2105/AJPH.2021.306604.

ONS, 2022a. Coronavirus (COVID-19) latest insights: Vaccines. Retrieved from https://www.ons.gov.uk/peoplepopulationandcommunity/healthandsocialcare/conditionsanddiseases/articles/coronaviruscovid19latestinsights/vaccines#vaccinations.

ONS, 2022b. Coronavirus (COVID-19) Infection Survey technical article: Analysis of characteristics associated with vaccination uptake. Retrieved from.

Opel, D.J., Mangione-Smith, R., Taylor, J.A., Korfiatis, C., Wiese, C., Catz, S., Martin, D. P., 2011. Development of a survey to identify vaccine-hesitant parents: the parent attitudes about childhood vaccines survey. Hum Vaccin 7 (4), 419–425. https://doi.org/10.4161/hv.7.4.14120.

Oxford University Hospitals NHS Trust, 2020. Varying risk of COVID-19 to health workers revealed, Retrieved from Oxford University Hospitals NHS Trust: https://www.ouh.nhs.uk/news/article.aspx?id=1312.

Padamsee, T.J., Bond, R.M., Dixon, G.N., et al., 2022. Changes in COVID-19 Vaccine Hesitancy Among Black and White Individuals in the US. JAMANetw Open. 5 (1), e2144470.

Public Health England, 2020. Beyond the Data: Understanding the Impact of COVID-19 on BAME Communities. Retrieved from Public Health England: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/892376/COVID_stakeholder_engagement_synthesis_beyond_the_data.pdf.

Razai, M.S., Osama, T.M., Majeed, A., 2021a. Covid-19 vaccine hesitancy among ethnic minority groups. BMJ 2021 (372), n513. https://www.bmj.com/content/bmj/372/bmj.n513.full.pdf.

Razai, M.S., Kankam, H.K., Majeed, A., Esmail, A., Williams, D.R., 2021b. Mitigating ethnic disparities in Covid-19 and beyond. BMJ 2021 (372), m4921. https://doi.org/10.1136/bmj.m4921.

Reason, J., 1997. Managing the Risks of Organizational Accidents. Ashgate, Aldershot.

Royal Society for Public Health, 2020. Public attitudes to a COVID-19 Vaccine. Retrieved from https://www.rsph.org.uk/our-work/policy/vaccinations/public-attitudes-to-a-COVID-19-vaccine.html.

Shannon, H.S., Robson, L.S., Guastelloc, S.J., 1999. Methodological criteria for evaluating occupational safety intervention research. Saf. Sci. 31 (1999), 161–179.

Shapiro, G.K., Tatar, O., Dube, E., Amsel, R., Knauper, B., Naz, A., Rosberger, Z., 2018. The vaccine hesitancy scale: Psychometric properties and validation. Vaccine 36, 660–667.

SSHAP, 2021. What can social science research teach us about COVID-19 vaccine deployment?. Retrieved from https://www.socialscienceinaction.org/blogs-and-news/what-can-social-science-research-teach-us-about-COVID-19-vaccine-deployment/.

Streefland, P., Chowdhury, A.M., Ramos-Jimenez, P., 1999. Patterns of vaccination acceptance. Soc Sci Med 49 (12), 1705–1716. https://doi.org/10.1016/S0277-9536(99)00239-7.

Sturm, L.A., 2005. Parental beliefs and decision making about child and adolescent immunization: from polio to sexually transmitted infections. Journal of developmental and behavioral pediatrics. J. Develop. Behavioral Pediatrics, 26(6), 441-452. https://doi.org/10.1097/00004703-200512000-00009.

The Covid Tracking Project, 2022. The Covid Racial Data Tracker. Retrieved March 7 from The Covid Tracking Project at the Atlantic: https://covidtracking.com/race.

The Guardian. (2021). *Our key findings about US healthcare worker deaths in the pandemic's first year.* 8 April. Available at: The Guardian: https://www.theguardian.com/us-news/ng-interactive/2020/dec/22/lost[1]on-the-frontline-our-findings-to-date (Accessed: 15 September 2023).

The Health and Social Care Act 2008 (Regulated Activities) (Amendment) (Coronavirus) Regulations 2021Updated 9 November 2021 https://www.gov.uk/government/consultations/making-vaccination-a-condition-of-deployment-in-older-adult-care-homes/outcome/statement-of-impact-the-health-and-social-care-act-2008-regulated-activities-amendment-coronavirus-regulations-2021#central-estimate.

Tickner, S., Leman, P.J., Woodcock, A., 2006. Factors underlying suboptimal childhood immunisation. Vaccine 24 (49–50), 7030–7036. https://doi.org/10.1016/j.vaccine.2006.06.060.

UK Health Security Agency, 2022. Vaccinations in United Kingdom. Retrieved from https://coronavirus.data.gov.uk/details/vaccinations.

Westrum, R., 1995. Organisational dynamics and safety. In: McDonald, N., Johnston, N., Fuller, R. (Eds.), Applications of Psychology to the Aviation System. Aldershot, Avebury.

Zacharatos, A., Barling, J., Iverson, R., 2005. High-performance work systems and occupational safety. J. Appl. Psychol. 90, 77–93.