PROTECT
A COVID-19 National Core Study

Perceptions of transmission and mitigation of SARS-CoV-2: Cross sector Theme 3 WP1 Deep dives.

Views of those operating in selected work sectors under the 'Living with COVID' phase of the pandemic (August – September 2022).

Prepared for

The PROTECT COVID-19 National Core Study on transmission and environment

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The PROTECT COVID-19 National Core Study on transmission and environment is a UK-wide research programme improving our understanding of how SARS-CoV-2 (the virus that causes COVID-19) is transmitted from person to person, and how this varies in different settings and environments. This improved understanding is enabling more effective measures to reduce transmission – saving lives and getting society back towards 'normal'.

This cross-sector research follows on from work carried out between October 2020 to March 2022 by PROTECT researchers into eight sectors. Circumstances for all of these sectors, and their workers, have evolved as the pandemic has changed. Between August and September 2022, eleven semi-structured qualitative interviews were conducted with 'organisational leaders' and 'sector experts' across six work sectors. This report summarises findings from this phase two research, some six months on since legislation changed to enable the 'Living with COVID' phase of the pandemic in the UK.

In general, study findings highlight that different sectors have different workforce and workplace characteristics that will determine the risk factors for consideration in the prevention of transmission of the COVID-19 virus. Most sectors/organisations reported feeling better prepared for a future health emergency, following the learning gained during the COVID-19 pandemic. Partnerships formed within and across sectors were also considered invaluable to responding quickly and effectively to change over the course of the pandemic.

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The team would like to thank all our participants for generously giving up their time to speak to us candidly as part of the stakeholder engagement and / or participation in interviews.

Perceptions of transmission and mitigation of SARS-CoV-2: Cross sector Theme 3 WP1 Deep dives.

Views of those operating in selected work sectors under the 'Living with COVID' phase of the pandemic (August – September 2022).

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Executive Summary

Different industrial sectors face different challenges when it comes to controlling workplace transmission of SARS-CoV-2. This is both in terms of likely transmission routes and which control measures can be practically and effectively implemented.

This cross-sector research follows on from work carried out between October 2020 to March 2022 by PROTECT researchers into eight sectors, namely: care homes; close contact retail; construction; energy production; food and drink processing; higher education; logistics/delivery; and public transport. The extent to which sector specific research findings were common or distinct across the sectors was considered during phase one of the present study (reported separately – Canham et al., 2023).

Circumstances for all of these sectors, and their workers, have evolved as the pandemic has changed. Since February 2022[1], the majority of mitigations have been removed across the sectors as the UK moved into the 'Living with COVID' phase of the pandemic. During phase two of the present study, we returned to a small sub-sample of work sectors (and people within these) in the autumn of 2022 to explore, through interviews, what the current situation was and how sectors /organisations were planning for the future. This phase two research aimed to:

> 'Understand current (Autumn 2022) approaches being taken in response to government guidance on 'Living with COVID' since February 2022' (e.g. mitigations retained and ease of response to future COVID-19 variants or other health emergencies).

Between August and September 2022, eleven semi-structured qualitative interviews were conducted (n=12 participants) via video-conferencing technology (Zoom or MS Teams), with 'organisational leaders' and 'sector experts' across six work sectors, namely: construction, energy production, food and drink processing, higher education, logistics, and public transport. This report summarises findings from this phase two research, some six months on since legislation changed to enable the 'Living with COVID' phase of the pandemic in the UK.

In general, study findings highlight that different sectors (and subsectors) have different workforce and workplace characteristics that will determine the risk factors for consideration in the prevention of transmission of the COVID-19 virus. Most sectors/organisations reported feeling better prepared for a future health emergency, following the learning gained during the COVID-19 pandemic. Partnerships formed within and across sectors were also considered invaluable to responding quickly and effectively to change over the course of the pandemic. These findings along and others detailed within this report present many opportunities for learning from the experiences under the 'Living with COVID' phase of the pandemic.

Study findings should be considered in the context of ongoing change, relative to the time of data of data collection (August-September 2022), particularly where participants views have changed since phase one of this research. For example, at the time of interviews, the

[1] The legislation began to change in February 2022 (when Government published guidance (below), this took time to be enacted at sector and organisational level so some participants refer to March / April 2022 when changes were made.

majority of mitigation measures, across all sectors, had been removed and COVID-19 related sickness absence was being recoded generally as business as usual. This was despite a common perception shared within earlier research (phase one) that many mitigation measures would remain in place across these sectors, even after restrictions were lifted.

Recommendations are provided relative to managing the short term issues remaining as sectors/organisations continue 'Living with COVID' and other respiratory diseases (e.g. seasonal flu); and longer term planning for any future health emergencies. These can be summarised as follows:

1. Recovery phase from the COVID-19 pandemic

- Don't forget the short term potential for COVID-19 rates to increase,
- Keep in mind longer term improvements,
- Develop clear and accurate recommendations and associated methods of communication that meet the needs of the target audience,
- Maintain monitoring,
- Maintain and further develop partnerships.

2. In preparation for the next public health crisis

- A "one size fits all" approach does not work,
- Increased consideration for the wider health and well-being of workers,
- Don't lose organisational learning and memory,
- Consider bridging guidance between UK countries,
- Carry out further research.

Contents

Abbreviations

COVID-19	Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2)
C	Construction
E	Expert
DfE	Department for Education
EP	Energy Production
JCVI	Joint Committee on Vaccination and Immunisation
FP	Food (and drink) Processing
HE	Higher Education
HSE	Health and Safety Executive
L	Logistics/delivery
NCS	National Core Study
OL	Organisational Leader
PHE	Public Health England
PPE	Personal Protective Equipment
PT	Public Transport
PROTECT	Partnership for Research in Occupational, Transport and Environmental COVID-19 Transmission
SARS-CoV-2	The virus causing COVID-19
UKHSA	UK Health Security Agency

1 Introduction

The PROTECT ('Partnership for Research in Occupational, Transport and Environmental COVID Transmission') National Core Study (https://sites.manchester.ac.uk/covid19-national-project/) conducted a series of 'deep dives' into specific [industrial] sectors to gain understanding of the issues that promote or reduce transmission of 'SARS-CoV-2' (the virus that causes COVID-19) in selected occupational settings (Theme 3, work package 1).

When it comes to controlling workplace transmission of SARS-CoV-2, different industrial sectors face different challenges, both in terms of likely transmission routes and which control measures can be practically and effectively implemented. Theme 3 (Sector specific studies) of PROTECT is conducting targeted studies to improve understanding of specific risks associated with COVID-19 infection and support these sectors to return to more normal operation. Study findings will help generate recommendations to help the government, and the sectors studied, respond more effectively to infectious disease outbreaks and keep services operating. They will also highlight gaps in information resources and where further research is needed.

This cross-sector work follows on from work carried out in eight sectors between October 2020 to March 2022 by the PROTECT team, these being: care homes; close contact retail; construction; energy production; food and drink processing; higher education; logistics/delivery; and public transport. In April 2022, a face-to-face workshop (phase one of the cross sector study) was held with PROTECT researchers to discuss the similarities and differences in the sector specific research, findings from which are reported separately (Canham et al, 2023). As the pandemic evolved, circumstances for all sectors and workers within these also evolved. Since February 2022[2], the majority of mitigations in most sectors have been reduced or removed as the UK moved into the 'Living with COVID' phase of the pandemic. In autumn 2022, we therefore returned to a small sub-sample of work sectors (and people within these) to explore, through semi-structured interviews, what the current situation is now and how sectors /organisations are planning for the future (phase two of the cross sector study).

This report summarises the findings of the cross sector interviews conducted between August and September 2022, some six months on since legislation changed to enable the 'Living with COVID' phase of the pandemic in the UK.

1.1 'Living with COVID'

The Government's objectives for 'living with COVID' were set out with the aim of:

'*enabling the country to manage COVID-19 like other respiratory illnesses, while minimising mortality and retaining the ability to respond if a new variant emerges with more dangerous properties than the Omicron variant, or during periods of waning immunity, that could again threaten to place the NHS under unsustainable pressure'*. (UK Government, 2022).

[2] The legislation began to change in February 2022 (when Government published guidance (below), this took time to be enacted at sector and organisational level so some participants refer to March / April 2022 when changes were made.

To meet this aim, the Government structured its ongoing response around four principles:

1. Living with COVID-19: removing domestic restrictions while encouraging safer behaviours through public health advice, in common with longstanding ways of managing most other respiratory illnesses;
2. Protecting people most vulnerable to COVID-19: vaccination guided by Joint Committee on Vaccination and Immunisation (JCVI) advice, and deploying targeted testing;
3. Maintaining resilience: ongoing surveillance, contingency planning and the ability to reintroduce key capabilities such as mass vaccination and testing in an emergency;
4. Securing innovations and opportunities from the COVID-19 response, including investment in life sciences.

Alongside this, legislative changes were made including: removing the last domestic restrictions (e.g. reporting disease); ending the legal duty to self-isolate (with associated changes to sick pay); removing legislation around vaccination for employment in certain sectors (e.g. care homes); and removal of any remaining international travel restrictions. All of which were revoked by end of March 2022.

2 Aims and methods

In this context, the current research represents phase two, which followed on from a knowledge share workshop with PROTECT researchers (phase one), conducted in April 2022 (Canham et al, 2023) which aimed to understand the extent of similarities and differences in sector specific research findings with respect to: risk factors for transmission; barriers and enablers to sectors responding to the COVID-19 virus; implementation of mitigations to prevent transmission; and unintended consequences to mitigation measures put in place. This is with a view to providing recommendations for policy and practice for different stakeholders.

This current research (phase two) aimed to:

> Understand current (Autumn 2022) approaches being taken in response to government guidance on ‘Living with COVID’ since February 2022 (e.g., mitigations retained, ease of response for future COVID-19 variants and other health emergencies.

Between August and September 2022 eleven semi-structured qualitative interviews were conducted (n=12 participants) with ‘organisational leaders’/ ‘sector experts’ to explore the impacts of COVID-19 in six work sectors (construction; energy production; food and drink processing; higher education; logistics/delivery; and public transport). Sectors were chosen where the research team already had established links from previous projects (see Table 1 and Canham et al, 2023) and participants were willing to engage in further research into COVID-19. We explored perceptions of transmission risk and risk mitigation since the Government started to lift all rules and regulations from February 2022.

We initially returned to contacts already established through past sector-specific research conducted and also used a ‘snowballing’ approach, asking existing study contacts to help suggest further participants. We invited up to four participants from each of the six sectors of interest to participate in a qualitative interview. Interviews were focused on the changes in working practices since legislative changes were formally introduced from February 2022

('Living with COVID') and if applicable, since their participation in previous sector specific research conducted in 2021/22.

Qualitative interviews explored the following topics:

- Changes to the participant's COVID related work,
- Transmission of COVID-19,
- Mitigations/managing COVID-19,
- Worker sickness and support,
- Knowledge gaps,
- Lessons/learning,
- Future challenges.

Within each sector we tried to gain a spread of participants (e.g., public transport sector may include different modes of transport; bus, train, tram etc.) and different job roles (policy, organisational leader etc.) to gain a breadth of information. Each person was invited to participate in an interview (maximum 60 minutes conducted remotely by phone or video conferencing (Zoom or Microsoft TEAMS)).

Qualitative thematic analysis (Braun and Clarke, 2006) of written transcripts was conducted using Excel to identify and code patterns of responses, thereby highlighting key themes and trends in the data. This was an iterative process to identify any distinct and interlinked themes. Anonymised quotations (from interviews) have been extracted from the data and are used where helpful to illustrate salient points within the findings. To maintain anonymity each respondent is given a unique ID code comprising a letter to indicate a sector, a letter to indicate job role (E or OL) and a consecutive number (see Table 1).

2.1 Context

The participants in this phase of the research represented six sectors and had a variety of job roles. Table 1 summarises the representation of interview participants across the sectors of interest, along with the distribution of job roles and a link to prior sector-specific research conducted by fellow PROTECT NCS researchers. It can be seen that nine participants were organisational leaders while three were experts (policy, academic) in their respective field, having applied their expertise to one of the sectors of interest.

In addition to the semi-structured interviews conducted with representatives of the above mentioned sectors, concurrent research was being conducted by other PROTECT NCS researchers within Theme 3 in a specific geographical area of England (case study). This research engaged with Directors of Public Health, Environmental Health teams and local authority public health COVID-19 leads (Lewis et al 2023). This constituted interviews with participants across all local authorities in the geographic area, plus online surveys with local employers and employees. Similar questions were asked of the participants (including facilitators and barriers to support workplaces, the current situation and recommendations for the future).

Table 1: Participants and their sector and job role

Sector	Participants	Related sector specific research	Type of job role		Participant ID codes[3]
			Expert (E)	Organisational leader (OL)	
Construction (C)	Contacts approached from a previous sector specific research project (global or UK wide companies)	Balmforth et al. (2021) Bourne et al. (2022)	0	3	COL1-3
Energy production (EP)	New research project with a single nuclear energy production company (conducted concurrently)	Clabon et al. (2023)	0	2	EPOL1-2
Food & drink processing (FP)	Contacts approached from a previous sector specific research project (work with different food and drink sub-sectors)	Loh et al. (2022)	1	1	FPE1, FPOL1
Higher Education (HE)	Contacts identified through researchers personal contacts	N/A	1	0	HEE1
Logistics (L)	Contacts approached from a previous sector specific research project (home delivery organisations in UK)	Wei et al. (2022) Whitfield et al. (2022)	0	1	LOL1
Public transport (PT)	Contacts approached from previous sector specific research projects (including different transport modes and UK locations).	Coleman et al. (2022a) Coleman et al. (2022b)	1	2	PTE1, PTOL1-2
Total			**3**	**9**	

[3] Presented in brackets after a quote throughout the report.

In the present study, participants were asked about their current role and how much time was presently being spent on issues relating directly and indirectly to COVID-19. For the majority of participants their substantive role had not changed since February 2022. However, almost all participants stated that since February 2022 they were spending proportionally less time directly on COVID-19 related activities. However, some of the experts were still spending a substantial amount of time on issues directly related to COVID-19 (research, making policy, preparing for new COVID-19 waves etc.) and looking at the after effects of COVID-19. The higher education respondent stated that recently (September 2022) time spent on COVID-19 issues had increased again due to the current intake of new students. In contrast, the organisational leaders tended to cite less time spent on issues related directly to COVID-19 and indicated that over the last six months this had dropped substantially under the 'Living with COVID' phase when their focus had become more about dealing with the consequences of COVID-19 and integrating COVID-19 monitoring as part of 'business as usual', Here there was more of a focus on supporting business to 'catch up' on issues such as complying with new legislation, training and development or future sustainability. All of which was less important at the height of the pandemic.

> *"Lots disappeared and changed, so we were meeting almost weekly at some point, and then obviously quite a few meetings with all the outbreak investigations. […] when we went from each of the restrictions being lifted to business as usual to when we stopped asymptomatic testing, all the advice around isolation and guidance, mask wearing. So yeah, there's been a quite seismic change." (HEE1)*

> *"We seriously monitored…I mean, to within an inch of our lives monitored COVID and the implications of COVID for our business. As things started to tail off and things became business as usual it became part of the landscape of normal sickness absence. […] the government's living with COVID plan, health and safety executive said we don't need to have a specific COVID risk assessment any longer, it can be included in other things. We were no longer being directly regulated." (LOL1)*

3 Findings

3.1 Rates of COVID

Participants were asked about their perceptions of current (August – September 2022) rates of COVID-19 infection in their work sector and what evidence informed their view. All participants, at the time of the interviews, stated rates were low but caveated this by explaining this was very difficult to quantify due to a lack of tools for measuring rates:

> *"I don't think we have granular data to be able to support, I'm not sure we have the level of surveillance. We are not seeing significant disruption to services. We are seeing, where it's still seeing some isolated disruption from unexpected short-term absences as a consequence of COVID infections. But nothing like the scale that we've seen previously." (PTE1).*

Many of the organisational leaders stated that sickness absence is monitored in general (no longer distinguishing COVID-19 related absence) and since (free) testing had been stopped they were unaware of current rates at places of work and in the wider community, for example:

"… we were recording everything on a weekly basis and reporting up and we've stopped doing that, so I can't tell you how many are on [sick leave for reasons related to COVID-19], and we've got a lot less people onsite now as well though. […] at the moment I'm not aware of any COVID cases on our site, I'm sure there may be some people that have got it but, maybe, they don't even know they've got it now." (COL2).

The expert from the food and drink processing sector suggested that since monitoring effectively stopped, their sector along with many others, was suffering negative consequences of COVID-19, both with respect to resultant short term illness (when workers have the infection) and longer term effects (e.g., Long COVID, discussed further in section 3.4.3).

"So, people have huge disruptions in all aspects of life since the regulations were lifted in the spring, and we've got to get on and live with COVID, and COVID basically doesn't exist anymore. I think there's a strong political message that, crack on with it, get on with it. And the consequences are exactly what we're seeing now, broken supply chains, broken infrastructure, inflation caused by lack of workers being able to do their work. […] And longer term issues, not just immediate sickness but the longer…long COVID issues are now starting to come through." (FPE1)

In contrast to the majority, the energy production sector representatives explained they were still carrying out some testing and recording cases of COVID-19 at the time of interview, though positive cases of transmission of the SARS-CoV-2 virus amongst their workforce was estimated to be low. This approach was due to the importance of maintaining nuclear energy production as part of the UK's critical infrastructure which requires a highly skilled and specialist workforce to maintain high hazard operations on a 24-hour basis.

"I would say they're relatively low. The reasons some of our data probably appears to be, maybe, higher than some other sectors is that we've still got quite an aggressive test and trace policy […] we're still informed by any kind of low-level symptoms…" (EPOL1).

3.2 Routes of transmission

Participants were asked what they perceived was the main route of viral transmission in their work sector. Almost all suggested airborne mechanisms, strongly linked to close proximity / contact and social interaction, being enhanced indoors and with increasing duration together.

"So, for me probably you know, airborne in small, you know, not greatly ventilated spaces […] fitting our apartments, you know, I think that's probably the biggest risk, less in terms of sitting in the canteen 'cause you can, you know, people still space out there anyway. Much less around washing hands and what have you because, you know...yeah, I would say it's probably airborne is the biggest risk...." (COL2)

"Our people touch these parcels all the time. It's a very hands on industry, and if it was a physical contact, touching one element and then somebody else touching that same item, our transmission rates would have been enormous because it was unavoidable." (LOL1)

In addition, a few of the participants (namely energy production, construction, logistics and public transport) mentioned the virus being more likely to have been acquired outside of the workplace than at work (due to controls that were or are still in place at work):

"… people who are testing positive now, we can place it to an external factor, so either a household member who's also got COVID, or they've been on...a lot of them, people coming back from holiday tend to be particularly high risk […] In terms of actual cases onsite, we do occasionally see, as [person] mentioned, small clusters in some teams and groups, particularly if they've been doing something inside together." (EPOL1)

"So we demonstrated that several people lived in the same household and therefore that's where the transmission was most likely to be rather than in the workplace, because yes, they all work for [named company] but they didn't work on the same site or in the same area." (LOL1)

Despite most participants acknowledging that fomite transfer of the virus (touching surfaces) was a much lower risk that airborne transmission, almost all participants over the course of interviews mentioned that enhanced cleaning regimes were ongoing (visible mitigation) as well as the provision of hand sanitiser. For example:

"…a lot of work was done on proactive communication around cleaning. I mean, I think some probably bordering on biosecurity theatre, to kind of mangle a metaphor. But essentially, as we've seen elsewhere, a lot of people as well in haz-chem suits with fogging machines walking down railway carriages and then those clips being played on the news and the like. Doubtful as to whether that had any effect on safety. But I mean, that perception clearly played relatively well with the public." (PTE1)

In addition, energy production sector respondents mentioned the ongoing use of infra-red thermal cameras at entrances to check staff temperatures, despite acknowledging low validity of the mechanism. Senior leaders within the organisation in question purchased this technology with the primary objective of benefit of deterring anyone who may have a temperature from trying to access sites.

3.3 Mitigations and managing COVID-19

3.3.1 Importance of actively controlling transmission since February 2022

The majority of the participants across all sectors explained that although controlling the spread of the virus was important and of concern, there was no longer any legislation in place regarding COVID-19 mitigations and therefore it had become very hard for workplaces to control transmission. The message from Government has been focused on 'Living with COVID-19' and treating it like a cold or flu, emphasising the importance of getting back to business as usual, rather than maintaining control measures to reduce transmission. Several of the sectors (construction, energy production and higher education) said they were encouraging their workers (and service users) to become good citizens and do the right things in this context. This included reporting respiratory tract infections and removing themselves from the work environment for five days from symptoms starting. However, it was recognised that this is harder for some due to differences in industry/company rules on sick pay and the balance of different worker contracts (e.g., proportion of contract/agency staff and those on zero hours contracts, noted to be prominent in logistics, construction and energy production).

"So, I'd say we're probably treating it more like we would do with flu and colds now, so still promoting the good hygiene, encouraging people not to attend the workplace if they're symptomatic and potentially infectious. But rather than our, kind of, hands, face, space, and fresh air strategy that we ran up until February 2022, we're no longer promoting significant behavioural changes in terms of how people socialise and interact." (EPOL1)

However, some changes were being made as a result:

"so we used to have somebody like me, I get full sick pay for a year, the operatives are straight onto statutory sick pay. We've had a change in terms of our policies, whereby everybody gets the same sickness absence and flexible working for as many people as possible." (COL3)

3.3.2 Which mitigations are still in place by sector and why?

It is important to note that different sectors have different workforce and workplace characteristics, which determined the unique risk factors for transmission of COVID-19 in individual sectors and organisations. This will have resulted in different types of mitigation measures being seen as appropriate to implement in different sectors and at different stages of the pandemic. Some control measures could be more important than others in the layering of control strategies, depending on the workplace setting and workforce, whilst also being informed by the site-specific risk assessments. Since the legislation changed in spring 2022, the Health and Safety Executive (HSE) stated that "*We no longer expect every business to consider COVID-19 in their risk assessment or to have specific measures in place. Employers may still choose to continue to cover COVID-19 in their risk assessments"*.[4] The HSE however also reiterated that there is a requirement to protect those who will *"come into contact with the virus"* due to their work activity.[5]

At the time of interviews, the majority of participants, across all sectors described a situation of far fewer mitigation measures being in place since the restrictions were relaxed after February 2022. They described a scenario of encouragement to 'do the right thing' but no longer having any means of enforcing the use of mitigations. Therefore, the mitigations still in place were often available but optional for both workers and the public that they interact with, e.g., face coverings, hand sanitiser, social distancing. The main exception was most participants describing the continuation of enhanced cleaning/sanitisation, considered useful either for general hygiene and/or as a visible sign of reassurance to workers and service users reducing risk perceptions and enhancing confidence.

"So we've gone back to multiple gangs in welfare, we've gone back to multiple vehicles in fleet. The one-way systems and signage and all that has gone, the only thing that we still have is we kept the cleaners in each of the depots, so they are still going around cleaning. […] Most of our offices are 'air conned' as well, so there is that mechanical ventilation of removing and swapping air over. So, it has most certainly relaxed backwards…" (COL3)

"The only thing that we have retained is access to hand sanitiser because nobody's using it outside of the business. People aren't really using it inside. So all the COVID marshals, the social distancing, the coms, the posters, the reminders, the monitoring checks that we did, the reporting functions, everything ceased because it's become part of the normal landscape of sickness absence…" (LOL1)

[4] Coronavirus (COVID-19) – Advice for workplaces (hse.gov.uk)
[5] Under the Control of Substances Hazardous to Health 2002 Regulations (COSHH), employers must protect workers who come into contact with COVID-19

Of all the sectors, energy production reported having retained the greatest amount of measures and monitoring since February 2022, including requirements for their workers to continue to test and isolate with the continued collection of COVID-19 related data also reported (discussed within section 3.3.5 COVID related data / information still collected or shared).

> *"…we've still got the sort of, isolation rules in place around the kind of, five days and the double tests. […] we're still testing contacts and we're still providing lateral flow tests free." (EPOL1)*

Organisational leaders within multiple sectors (public transport, energy production and logistics) reported taking a cautious approach to removing all mitigations following changes to government legislation (February 2022), despite this meaning COVID-19 measures/requirements within the workplace being at odds with wider societal practices (discussed further within section 3.3.4) for a time. One transport operator had only just removed the last of the controls at the time of interview (September 2022). The energy production sector organisational leaders reported a two to three week delay in lifting mitigation measures within the business following any changes to government guidelines to enable time to monitor the impact of such changes in the local community prior to adoption in the workplace.

> *"… We've actually only just removed our last controls, and so considerable period of time after the governments of the UK, all three of them removed their legal requirements. […] we were getting feedback, look, I can go to the pub and I can go to the supermarket and I can sit next to a stranger, thank you very much, and you won't let me in work. So we were I think on the more cautious side, it took us a long time to allow our drivers to remove the assault screens if they wanted to…" (PTOL2)*

> *"We delayed what the government did, so that took a huge amount of communication to our people because, well, we don't have to do this when we go out and we do things in our private lives, why the hell have we got to do all these things at work. So standard kind of health and safety response is 'this is our site and we make the rules here'. Obviously not that blunt, but that was effectively the message" (LOL1)*

Some participants (e.g. food and drink processing, public transport) suggested that some of the more costly, but ultimately more effective long term mitigations had not been implemented e.g. changes to ventilation systems. The expert from the food and drink processing sector suggested longer term prevention investment is needed (discussed further within section 3.3.4 - Barriers to controlling transmission since February 2022).

> *"We're quite backward here in the UK. Many societies are investing hundreds of billions, if not trillions, like the USA, in air cleaning. Why are they doing that? Because they want to get advantage, commercial advantage, economic advantage, social advantage […] these small air purifiers are very short term. […], they'll last a year or two but it's not a long term solution to society." (FPE1)*

They went on to explain ventilating effectively costs extra money and this comes at a time when all costs for businesses are rising, suggesting a trade-off between health and economics, something echoed by the higher education expert:

> *"…do we keep the workforce safe by keeping ventilation systems at a higher rate? But that means that the energy costs go up because I've got to have more energy driving the air handling units to push that new air into the buildings and extract the current air. […] Are you going to pay that if you're operating on margins of, you know, 1 per cent? No." (FPE1)*

"We worked with the information that was available to us, and also in light of changing policy legislation and the sort of balancing act between the economy and health. I think COVID really highlighted that relationship in a huge way." (HEE1)

3.3.3 Enablers that supported sectors to control transmission since February 2022

Both construction and public transport representatives specified that vaccinations had enabled the sector to better control transmission of COVID-19 since February 2022. This was considered to provide workers with protection from the virus whilst other mitigations were being lifted.

"… so if we're talking on a national scale, I think definitely the vaccines had some major part to play, in terms of reducing that exposure risk and the risk of transmissibility between people." (COL3)

As mentioned in section 3.3.2, unlike other sectors, the energy production sector still had a variety of mitigations in place following February 2022. A representative from the sector explained that having mitigations in place, maintaining COVID-19 supplies and monitoring COVID-19 rates enabled them to proactively manage transmission and track when workers have COVID-19.

"…It's test and trace, it's making sure we've got good supplies of the test kits, the LFTs, making sure we've still got good supplies of face masks and the kind of hand sanitisers and things like that. […] and we've kept the monitoring process in place, so we're still gathering information on case rates, we're still assessing that and liaising with the doctors." (EPOL1)

The expert from the higher education sector was hoping that by educating people to be 'good citizens' (i.e. reporting illness, isolating when ill etc.), this would become the norm and enable people to work and study safely.

"…the plans are really around that whole respiratory etiquette and being a good citizen, so we're using the catch it, bin it, kill it that's been around forever on top of the mask wearing […] I think it's a case of keeping up that communication message." (HEE1)

3.3.4 Barriers to controlling transmission since February 2022

In February 2022, legal guidance was removed and replaced with public health advice for workplaces. This meant that powers of enforcement related to COVID-19[2] were reduced, something perceived to make it harder for organisations in multiple sectors (public transport, higher education, construction and logistics) to formally apply/enforce mitigations and access accurate data on which to base their ongoing decision making.

"Virtually impossible […] there is no way would I try to do something unilaterally, we would follow government guidance, that would be the strict line. If the government said stop people travelling on public transport again, we would toe the line and put those messages out and about on the network." (PTOL1)

"From 1 April, because of the paucity of data, we've known that cases went up, but it's been hard to pinpoint any additional prevention and control measures that were needed, and testing and – sorry, Test and Trace stopped as well. And then in May, I think the local authorities got the notice that the COPI [Control of Patient Information Notice] legislation wouldn't be extended any further…" (HEE1)

Some participants (construction, public transport and logistics) specified compliance fatigue as a barrier to controlling transmission since February 2022. They explained that workers were less willing to perform protective behaviours (rule fatigue) than earlier in the pandemic (e.g. opening windows as a natural means of ventilation at work, especially as winter approaches).

> *"It's not at the forefront of people's minds anymore, so it makes it very difficult behaviourally, to get people to follow certain rules and the residual control measures that are left, […] If we think that people are going to still have windows open and things, for ventilation, we're probably lying to ourselves because the reality to people is, we've been with it for the last two years, I haven't been affected that badly, therefore the risk of me getting cold is higher than the risk of me getting COVID. So, I think the perception is probably the biggest challenge now". (COL3)*

These same participants also highlighted challenges in enforcing measures within the workplace, that were no longer required within the surrounding community (explored further within section 3.3.2 - Which mitigations are still in place). Differing opinions about when was the right time to lift COVID-19 measures was also apparent between stakeholder groups in some sectors:

> *"Our passengers were weeks and months ahead of us […] I must admit I was an advocate of taking everything down as quickly as possible, which was dead easy to do in the end, but some of my colleagues were questioning it […] I knew from being out and about on the network that it was going to be impossible to enforce anything […] If the whole world has stopped, you know, why should we be alone, and why should we be putting people off? You need to get people back travelling again. In fact I'm sure there were probably regular commuters who were quite relieved." (PTOL1)*

3.3.5 COVID related data / information still collected or shared

The majority of participants across sectors reported that they were now collecting data as part of business as usual, not directly related to COVID-19. Because of this, figures on staff sickness absence in relation to COVID-19 were no longer considered to be as accurate as during the height of the pandemic.

The energy production sector was again an exception, due to the critical nature of the sector requiring highly skilled individuals, they still, at the time of interview, reported collecting COVID-19 data from workers (e.g. test data, sickness absence information, vaccination status) and more widely (e.g. looking at Office of National Statistics (ONS) data) and the senior teams still met once every two weeks to review this data.

> *"So, we still have what we call our [named] COVID hub, so through our HR reporting tool, test data still goes in there when people are completing tests, as does any sickness or illness and it's badged in a way that means you can extract it from a reporting point of view and see if it's COVID […] We also monitor people's vaccination details, so we've got a way of recording people's first, second, and third doses. […] the doctors still look at and monitor national trends and more localised trends around the locations that we have." (EPOL1)*

The expert from the higher education sector explained that they used to collect very useful COVID-19 related data (testing and contact) which provided a helpful early warning mechanism, but that now they were having to rely on staff and students to do the right thing, reporting illness but with no supporting confirmatory tests, as COVID-19 was no longer a notifiable disease. This respondent was also trying to use data and patterns from other

countries to help predict what could happen with both COVID-19 and flu during the coming autumn/winter, especially as their population (younger workers and students) did not all qualify for the autumn booster or flu vaccination in the UK.

> *"So the reporting will be changing to just upper respiratory tract infections [this autumn] that require people to stay at home for five days is our advice […] so if you've tested positive, please report […] we're not expecting people to have confirmatory testing data. […] What we know from the data from the southern hemisphere is that all respiratory viruses will be rising this autumn. We've obviously got a lot of the influenza strains covered by flu vaccine, but not that many of our staff and students will be eligible for flu vac [sic] and the COVID booster as well." (HEE1)*

3.3.6 Feedback from workers / customers used to shape changes since February 2022

Interview participants cited the use of multiple channels to gather feedback from internal and external stakeholder groups including staff surveys/questionnaires, feedback via social media or regular face-to-face meetings (including but not isolated to matters of COVID-19 as part of business as usual). Many of the participants, across all sectors, stated that during the pandemic and in the majority of cases continuing afterwards, workers were/are consulted about COVID-19 related decisions being made.

> *"I have a workforce engagement meeting every month, I have supervisors for an hour, and I have the operatives for another. And the last time we talked about COVID was around about March, April time." (COL1)*

Participants from public facing sectors (public transport and higher education) also reported drawing upon feedback from their customers/service users (where appropriate) to inform COVID-19 decision making. A logistics sector respondent however reported that feedback was now only being collected as part of business as usual:

> *"We're not seeking feedback because we're not doing anything actively. This is reactive monitoring. And that is simply back to the fact that the business as usual living with COVID government advice just downgraded everything to we just don't need to be monitoring that, and we will start if somebody notices it's starting to create an issue for our workforce." (LOL1)*

Those in the public transport, energy production and higher education sectors also mentioned consulting regularly with unions as well as workers and passengers/students.

> *"… All decisions were taken with our national union reps […] we do have analysis of our customer feedback and since we last spoke about this work we've opened up a customer contact centre linking in information from all of our businesses, so we have better access to data now than we probably did in the middle of the pandemic from our customers. We have strong social media presence, […] if people comment or have comments on cleanliness, for example, or anything else on vehicle, we would pick that up as part of our business as usual" (PTOL2)*

> *"…So, we created like a working level pandemic group which covered both unions...so, [named Union] and safety reps, and people could feed into that forum...so we gave them multiple routes to feed in either by the line leader, the pandemic lead onsite, or via the union reps."* (EPOL2)

3.3.7 Acceptability of changes made to mitigations since February 2022

Most participants thought that in general the changes made since February 2022 had been widely accepted and in many cases welcomed by their workers and those that interact with them. They also accepted that in all circumstances there was a continuum of views and they could not please everyone all of the time so at times they had to choose a way forward to suit the majority.

> *"The workforce were grateful to go back to normal. They were happy to remove the COVID marshals, they were happy not to be wearing face coverings anymore. […] So as soon as we were able to remove some of these control measures the workforce were very grateful. There was a little bit of reluctance in some areas from some individuals, but not really." (LOL1)*

> *"…my impression is my colleagues' attitudes changed in a, sort of, a big bang, almost a sigh of relief, I think we were ready for it at that one time. There was a spate late last year, where just about everybody seemed to be getting COVID and was like, right, that's it, over and done with now, it's not as impactful because we've all had the vaccine now, let's get back to normal." (PTOL1)*

Within the construction sector, one respondent described a general understanding of rules and measures being put in place due to health and safety regulations within and outside of the sector, and workers just accepting when COVID-19 measures were lifted in line with changes to these regulations.

> *"… There are people that have been in the sector for a long time, you know the rules, you go to a new site, day one you're inducted, […] you have to follow the rules of the site and if you don't follow the rules of the site then you won't be working there. […] so I think that does help." (COL2)*

Energy production participants stated that whilst the relaxation of mitigations is now accepted, it took some individuals a while to adjust to these changes.

> *"I think initially there were some people who thought it might all be a bit quick, in terms of the national, sort of, pivot towards moving to living with COVID and the reaction to Omicron back at Christmas last year. But that quietened quite quickly as it became clear that we weren't seeing an increased number of hospitalisations in the UK as a whole." (EPOL1)*

The higher education respondent pointed to the many different people, (workers and students) that the pandemic impacted upon and their different requirements and needs:

> *"I think we've had such a huge change to normal life, it was very hard for some people, and obviously people were affected so differentially. We've had people who were classed as essential, so had to come in, and from all areas of the university, versus those people who were lucky like we were that could work from home. […] And then obviously students, they need the student experience and they've obviously lost out with COVID." (HEE1)*

3.4 Worker sickness and support

3.4.1 Limited current cases of COVID-19

Most of the participants across sectors reported the number of staff currently off with COVID-19 to be low. However, some sectors were making plans in case levels of COVID-19 were to rise again in the autumn/winter due to circulating respiratory tract infections, people spending more time indoors and potential new COVID-19 variants. For example, the higher education respondent was looking at figures and patterns within the school sector to give them early warning of what might happen in higher education, as there was no specific guidance issued from The Department for Education (DfE) at the time of interview:

> *"… What was interesting is that DfE have issued guidance to local authorities for how to manage schools, and we're basically following that at the moment, because there's not been anything specific for the higher education institutions. So yeah, I think waiting for the schools data, see what's circulating in terms of notifiable diseases, see what happens with the normal start of the academic year, symptoms and absences, so they're usually a couple of weeks to a month ahead of us, so whatever happens in schools is likely to happen to us." (HEE1)*

3.4.2 COVID-19 sickness contribution to worker shortages

In most of the sectors, participants stated that COVID-19 was still a minor factor (at the time of interview) contributing to worker sickness and absence at times, although not the only factor contributing to worker shortages. Instead, most participants cited other external factors, such as BREXIT, cost of living and competition between sectors for the same workers as the main causes/contributors of worker shortages.

> *"…so the production roles are minimum wage, etc. And obviously the changes of EU exit has caused as well. So COVID on top, it's caused a little bit of shortage. So there were issues where there were outbreaks and people isolating causing again labour shortages. But when they talked to me about shortage of staff, it's not the fact that the staff there but they can't work. It's the fact that there isn't staff to work…" (FPOL1)*

> *"We're still above what I would call historic levels of absenteeism in the workforce, so it's frontline staff. But I think we are under-resourced because of general staff availability in competition…so I know my engineers are leaving for higher pay elsewhere, and probably an easier life, and a company car, and X, Y and Z; and we can't compete. So we're suffering from staff absences that are unrelated to COVID, possibly in an indirect way related to COVID, but not because of people being ill or being off." (PTOL1)*

> *"So, I know from a resource point of view a number of them [contract workers] have gone and started to drive for [named delivery company] because the wages are, kind of, good and they get to go home. So, we've had a few individuals from a supply base have, kind of, changed careers." (EPOL2)*

An expert from the food and drink processing sector described the wider fall out from the COVID crisis, including problems with supply chains and resource and staff shortages across wider sectors:

"You only need to look at going into your shop, seeing the food on the shelves, often there're things missing, or you can't get on an aeroplane because there're no people to handle the bags, or no cabin crew. So, people have huge disruptions in all aspects of life since the regulations were lifted earlier in the year […] I think there's a strong political message that, crack on with it, get on with it. And the consequences are exactly what we're seeing now, broken supply chains, broken infrastructure, inflation caused by lack of workers being able to do their work. Whether in services or in public sector or in factories or in transport or holidays, aviation, hospitality, every sector has been disrupted by COVID." (FPE1)

However, the representatives from the energy production sector stated that at the time of the interviews they still had a five-day rule in place (unlike other sectors who encouraged workers to be mindful of not attending work when unwell). At times, this was said to have caused issues for maintaining business as usual operations, especially during busy periods or when individuals with the same skillset were off at the same time.

"So, if we've already got a busy bank holiday weekend, say, or […] we're doing an awful lot of work in, kind of, 24 hour working conditions. Then having an extra three or four people not available suddenly becomes quite a big problem. And it's where we've got people of common skillsets who are both ill simultaneously, so it's more, few and far between now that it becomes a problem. And with the relaxation in terms of the isolation rules from, sort of, losing people for a whole ten days and being able to do the double test to return, it's easier to work through it and mitigate it than it once was." (EPOL1)

3.4.3 Long COVID or similar long term illness

There was some concern amongst participants, especially the Experts interviewed that Long COVID is a problem that has not been considered enough, actively monitored or managed by the sectors.

"Long COVID issues are now starting to come through […] basically we threw the baby out with the bathwater in the spring and here we are, we're picking up the consequences now in society, not just our society, all around the world, other than China, have done the same. So, we have huge economic impact now and it's not going to get any better." (FPE1)

Most sectors could identify one or two examples of workers off with Long COVID or similar conditions, but few appeared to think Long COVID was a particular risk or challenge requiring active management amongst their workforce at present.

"We have had some (workers off with long COVID), but they weren't from the operative pool, they were from the design and management pool that we had a number of people off." (COL3)

The respondent from the higher education sector reported being unaware of any Long COVID cases directly but caveated this by explaining that information had not explicitly been sought from the wider organisation.

"We've not asked for that [data on long COVID cases], but the occupational health team might be seeing people. But I think with a workforce as large as ours, it would be unusual if there wasn't." (HEE1)

However, a respondent from the construction sector raised concern that if people were off sick, including with long term illness that their sector could struggle with resilience:

"I think we are very fragile because of our reliance on people and if we have huge swathes of people who are either ill, drop out, become long-term ill, we don't have the resilience in that people capital, within the industry, to back-fill them. I think that's the biggest weakness that we've got, I think particularly when you've got the government driving in infrastructure spending." (COL3)

3.5 Knowledge gaps

3.5.1 Issues for potential new COVID waves

Some participants (construction, public transport, and energy production) explained that whilst new variants of the SARS-CoV-2 virus could potentially be problematic for their sector/business, they felt prepared with contingency plans to take action as and when required.

"I think it's a risk that we always need to be aware of, if it's one of the variants that we've currently had, I think we're in a pretty good place, as a population, to deal with it. If it's a new variant, you could say that we're drilled, in response that we have to take, we are carrying more stock now, in terms of our PPE and your cleaning products, things like that, not to a huge degree but more than we did before." (COL3).

However, the higher education sector expert believed that potential problems could be created by no longer undertaking systematic testing for COVID-19 recording the results of such data. Data could therefore no longer be triangulated and act as an early warning system of potential new waves of infection:

"I think all of the issues started to occur after 1 April[6] when the living with COVID legislation all changed, testing was no longer free. So I think February to April we were getting ready but we still had all the different mechanisms to do adequate testing, prevention and control and also just investigating where we think the hotspots might be." (HEE1).

3.5.2 Lack of joined up guidance across the UK.

Several participants (construction, logistics and public transport) whose businesses worked within multiple countries of the UK raised frustrations with inconsistencies in COVID-19 rules, advice and guidance across the devolved nations at the height of the pandemic. Participants highlighted this lack of joined up information as a gap in knowledge, said to make the management of COVID-19 measures and issuing of company guidance challenging for businesses where workers were frequently needing to cross UK boundaries (e.g. rail staff on trains traveling between countries).

"… for a national business like ours, where we do cross those boundaries frequently, so we'd have people coming from England to Scotland and back again or England to Wales and back again, trying to keep abreast of what the current situation is in that landscape of ever changing documentation was a nightmare actually. […] What I would want is something that says this is what you're do in Scotland, this is what you do in Wales, this is what you do in England, but actually this is what you need to know if you operate across these boundaries." (LOL1)

[6] The legislation began to change in February 2022 (when Government published guidance (below), this took time to be enacted at sector and organisational level so some participants refer to March / April 2022 when changes were made.

"if I look across government and also HSE, for example, everybody [HSE and different UK countries] was publishing kind of their own set of guidance, and I do think what's really important is you have a single authoritative voice […] they were all broadly the same but slightly different, and didn't sort of cross-reference well. Definitely the lesson both internally and also when you look at how they approached this in the three different countries." (PTOL2)

This was not identified as an issue affecting operations at the time of interviews, with relaxation of the rules broadly consistent across the devolved nations during the 'Living with COVID' phase. It would however be important to consider if rates of COVID were to rise again or there was another health emergency to enable organisations to be able to communicate accurate and timely messages to their workers and service users (as applicable).

3.5.3 Understanding transmission risk factors, air quality and behavioural science

Further knowledge gaps still outstanding for participants at the time of the interviews included: transmission rates of the virus and identification of risk factors for transmission (e.g. duration and proximity of contact), highlighted by the food and drink processing and construction industry participants; and knowledge around air flow dynamics, ventilation and air quality, highlighted by participants from the public transport and food and drink processing sectors.

"Knowing more about the transmission, the rate of transmission and the areas of risk would be helpful. […] if we could know more about actual risk of transmission through people being in close proximity for a length of time or, you know, does mask wearing really help you to stop spreading it or others to contract it. What are the most effective controls for our work environment?" (COL2)

"I think air flow. I think if we're talking specifically about transport, I would really want to see some more emphatic work on the efficacy of air filtration as a means of kind of mitigation for COVID-19 transmission in enclosed spaces. I think we have some good anecdotal information and kind of, common sense plus, is how I would describe it at the moment." (PTE1)

"I think there was probably a knowledge gap of understanding what good quality air is, because there isn't, because if you looked for a standard on how well do we balance, if you've got a controlled atmosphere that you need to keep to a temperature, there is a cost in cooling or heating." (FPOL1)

Public transport sector participants also spoke about gaps in knowledge surrounding behavioural science and how best to encourage performance of safer behaviours amongst passengers, particularly over a sustained period of time as risk perceptions decrease.

"I guess one might be pejoratively described as nudging, in terms of emotional and behavioural change around adherence to restrictions and the like. And around, kind of, encouraging safer behaviours for passengers. So encouraging the adoption of face coverings, countering some disinformation narratives." (PTE1)

3.6 Learning and Lessons

3.6.1 Lessons learnt in sectors in last 18 months

Many of the participants highlighted the benefits of working together across organisations/sectors in partnership to share information, best practice and in some cases keep the industry up and running:

> *"The industry also, sometimes it doesn't, because of contracts and it's quite competitive, it didn't always work together […] But during the pandemic they did, there is this best practice forum, and I did go and speak to them a couple of times. So these were all the very large producers were actually working together." (FPOL1)*

One construction representative stated that, because of the pandemic, they have learnt how much the sector depend on people to get jobs done. This became evident when people were isolating with COVID-19 and unable to work. This was reported to have had a direct impact on how they treated their workers, with policy changes made accordingly (e.g. all staff now have the same access to sickness pay and flexible working).

> *"So, without people, we've got nothing, so we don't have an automated production line that can just keep chucking off a product, we rely purely on a man in a van, with a spade or a drill, whatever it may be. It's [COVID-19] spurred us on to think that, how do we reduce our reliance on that resource, that human resource to either automate or engineer some of our processes. […] we have massively, massively increased our value of our people. We've had a change in terms of our policies, whereby everybody gets the same sickness absence and flexible working for as many people as possible." (COL3)*

One of the public transport organisational leaders explained that their crisis arrangements had worked but risk perceptions and willingness to comply with rules and regulation reduces over time. To keep people complying with the rules longer term, they felt that individuals needed to maintain understanding of the risk likelihood and severity over time.

> *"The key lessons in terms of the organisation are for me that our crisis arrangements do work, but people have to feel they're in a crisis, that's the important one. That actually compliance with rules diminishes significantly over time when threat is not perceived by individuals, and we can say as much as we like, you need to carry on being compliant, you need to carry on being compliant, but if people don't believe the rules anymore…" (PTOL2)*

There was also a general feeling that there was a need to develop policy strategies / carry out further research to minimise the potential impacts of COVID-19 or other health risks for the future. For example, the expert from public transport discussed this in line with other 'high impact low likelihood' risks:

> *"We as a responsible government body are planning for contingencies around the resurgence of COVID-19 or an analogous respiratory, sort of, highly infectious respiratory disease. And are kind of, working through what that response will look like. Working through a kind of escalation response beyond the remit, which is currently outlined in Living with COVID. And thinking in the planning purposes only and not government policy terms, what that might look like as a contingency." (PTE1)*

The higher education respondent considered communication to be all the more important to encourage people to 'be good citizens' and do the right things to protect one another (also

discussed within section 3.3 Mitigations and managing COVID-19) as they expected no changes to legislation for the foreseeable future.

> *"I don't expect there to be any changes to legislation, but I think we will start getting more of this whole good citizenship message to really implement to communicate effectively and to be able to monitor what's happening in those people we're responsible for as an early warning system for what might be happening elsewhere and also for the prevention control of diseases on our campus." (HEE1)*

And a public transport expert agreed that clarity of message at all levels was and will be important:

> *"As we move towards Living with COVID and that transition, and there have been competing narratives, science and evidence are major competing narratives here. So I think a key lesson is about getting facts straight and communicating those back to the sector." (PTE1)*

3.6.2 Doing things differently in future

Participants were asked what, if anything, they would do differently as a direct result of the pandemic. Many participants (e.g. energy production, construction, higher education and public transport) stated that in the event of a future health emergency or rising COVID-19 rates, they would be quicker to react and implement measures at a faster rate.

> *"I think we did all right in general, you know, looking back over the last 18 months, but I think we were slowed a lot by some poor decision making, again because it was feeding into that sort of political machinery; oh, now is not the right time, such and such needs to be briefed on this before we can do that. I think I would just take action a lot sooner." (PTOL1)*

> *"Yeah, we'd put in everything that we learned over the period of those two or three months, we'd do straightaway so we'd get the sanitisers in, we would get them in the key areas that we learned from the workers where they should go. We'd put them in the lifts, we'd put them at the start, we wouldn't just have one the beginning of the building, one at the end of the building, we'd have all of them in between." (COL1)*

Participants (energy production, higher education, logistics and public transport) also spoke about aligning risk management approaches and/or communications - between business sites, within the sector and/or across sectors.

> *"the blueprint is there, the main learning point for me, to do anything different and we're probably unique more than the rest of [named company with sites close together] our security covers both and what we found was that sometimes [named sites] weren't necessarily aligned, and it was confusing for people. So, I think going into it again it would be very much have one approach." (EPOL2)*

> *"I think we needed to communicate more clearly and more centrally. I think there was a disconnection sometimes about local decision making and communication. So more control from the centre really from people who understand the bigger picture to prevent local decision making from becoming a problem. We did have issues where we had site managers saying right, we're just going to have mandatory face coverings. […] and so trying to then undo that because that was not the right decision to make, it was done with the right intentions but without the right information." (LOL1)*

"Communications consistency - again this is a dispersed delivery model that we operate. How do we ensure that communications are consistent […] I think particularly as we move towards Living with COVID and that transition, and there have been competing narratives, science and evidence are major competing narratives here. So I think a key lesson is about getting facts straight and communicating those back to the sector." (PTE1)

3.6.3 Sector specific lessons learned

Some respondent's highlighted lessons learned that were specific to their sector, as follows.

Food and drink processing sector

Both food and drink processing sector participants emphasised the importance of ventilation to preventing viral transmission amongst otherwise healthy individuals when at work within the sector:

"You need to break the pathway to stop others who are healthy getting infected, which means you've got to ventilate. Ventilation, ventilation, ventilation, ventilation. Now if they're using transport mask up, FFP2, FFP3. Ventilation systems are absolute priority. It could be full fresh air systems, six air changes an hour, or use UVC systems to improve the ventilation so that it's better than six air changes an hour equivalent decontamination rate." (FPE1)

Public transport sector

A public transport respondent reflected on the trade-off between being open to learning lessons from other subsectors to enhance their own organisational decision-making whilst not delaying their own decision making for the sake of this collaboration.

"I was kind of relying on non-transport professionals, sort of policy people, that sort of stuff, to kind of say, wait, this needs to be tied in with that message. […] I think we could have taken a lead from the rail industry. We didn't. So the main lesson for me, be more decisive, take those messages from the rail industry, and just run with them, and be a bit less collaborative; which sounds like a bad thing to be want to be less collaborative, but we were almost too collaborative with the sort of local political machinery here" (PTOL1)

While another spoke of not taking respiratory illness seriously enough in the past and that changing behaviours was now key.

So I think one of the things we've learned is that we didn't take respiratory illness seriously – or illness […] So now it's much less acceptable to come into…if I focus on our office staff, it's not acceptable to come in with a streaming cold, that's no longer the expectation […] So there are behavioural changes and then there are some practical things that just seemed common sense as we head into the winter to keep." (PTOL2)

Higher education sector

The higher education respondent explained that a big lesson nationally was not to continue with a complex central reorganisation of structures, such as the National public health support, mid-pandemic. They were of the belief that access to free asymptomatic testing should have continued.

"One of my biggest issues was the need to rearrange a national public health service in the middle of a pandemic? The importance of that whole local team really was absolutely vital, so the university team having support from the director of public health and the health protection team at PHE and then UKHSA, having that whole thought process around wider health of the population as we live with COVID and for our staff and students and visitors." (HEE1)

3.7 Challenges for the future

3.7.1 Challenges unrelated to COVID-19

Many participants spontaneously mentioned a variety of non-COVID-19 related issues (discussed in section 3.4.2 COVID-19 sickness contribution to worker shortages) which included the impact of BREXIT, and the cost of living crisis. The war in Ukraine was also cited as another challenge said to be driving prices up within the public transport sector.

"Most industries right now are struggling for people, across the board, and that is driving up wages and competition. I think the economy at large still needs to settle down post-COVID; it hasn't. And then of course you've got the war in Ukraine driving prices up. And we haven't really got over one shock and we're now dealing with the next one." (PTOL1)

These increased costs were reported as a cause for concern relative to the stability of the sector, especially following messages during the pandemic to stay away from public transport and subsequent changes to commuting patterns and subsidies, designed to keep the sector afloat, from the Government ending in October 2022. Passenger numbers were reported not to have returned to pre-pandemic levels.

"And we were always quite profitable, we always had enough money that we could make positive decisions, we could increase staff numbers, we could buy new [vehicles]. But we just don't have the money to do it […] It's interesting, we see a lot of people going to football matches, no problem, people have no problem travelling on crowded [vehicles] to get to a leisure destination, but they don't want to do it to go to work." (PTOL1)

Other sectors (construction and energy production) mentioned the issue of BREXIT leading to the shortage of skilled workforce available across sectors (as discussed within section 3.4.2 COVID-19 sickness contribution to worker shortages and 3.7.1 Challenges unrelated to COVID-19):

"Only the thing that's causing us problems is the ability to get competent operatives because of BREXIT, you know, that's our biggest problem." (COL1)

"I look at it with a selfish view as a supply chain. So, transient contractors that come to site to carry out a job, live away from home in digs, […] So, I know a number of them have gone and started to drive for [named competitor] because the wages are, kind of, good and they get to go home. So, we've had a few individuals from a supply base have changed careers." (EPOL2).

3.7.2 Potential rise in Autumn/winter cases

Some participants (e.g. energy production and logistics) also raised the potential issues if COVID-19 rates were to rise again in the short term (autumn/winter). For example, a respondent from the energy production sector noted that if there was to be a rise in COVID rates then implementing certain mitigations such as facemasks and working from home would be difficult for the company. While the logistics representative spoke about the winter months being their busiest period with enormous pressures on resources, without having to factor in COVID-19.

> *"So, if we were to activate more of a plan B scenario where we're doing facemasks and working from home then yeah, that would make things challenging. But if we generally...which I can't see personally, I mean, what do I know, but I can't see the political appetite to do that unless we had a vaccine resistant strain that really took off in the UK." (EPOL1)*

> *"Coming into our peak time obviously at the moment, heading towards black Friday, cyber Monday and Christmas, anything that disrupts our workforce in that time is incredibly challenging because everything is planned very carefully […] So having to reintroduce social distancing during that time of business intensity would be an enormous pressure because of the resource that would be required both to put all of those measures in place and then to monitor them." (LOL1)*

3.7.3 Preparedness for future pandemic/health emergency

Almost all participants suggested that they, their organisations and the wider sector would be better prepared for another pandemic or health emergency in the future. This was due to the learning gained at different levels within the system (national, sectoral, organisational) from having gone through the COVID-19 pandemic, including:

- Better understanding of barriers and facilitators to preventing viral transmission;
- Knowing which people and organisations to engage with and which levers to use to make things happen. For example, when to emphasise consequences for business operations versus personal consequences to workers themselves to encourage compliance;
- Knowing which knowledge and support sources were available and most useful;
- Having processes (e.g. escalation and risk assessment), plans and procedures in place, prepared and in some many cases now tried and tested for use;
- Knowing how to best inform and implement decision making across the system;
- Developing and utilising partnerships within and across sectors.

The following respondent quotes illustrate some of these points that emerged during interview from the different sector representatives.

> *"So the escalation process still exists, it sits there in the background. The risk assessment still exists, or versions of it, obviously because it's changed. […] So if we need to jump into action everything's there ready for us to do that. It's just we don't feel at the moment that there is a need for us to do that." (LOL1)*

"… We are aware of the people within the industry who hold the levers. We, as a, kind of, convening body, understand the way in which we all kind of invoke those levers and build the necessarily relationships. We know across operators, across representative groups, there are centres of expertise on these issues and taking…the key thing I think is just embedding those experiences in operational processes in Business as Usual. […] I think we are in a relatively good place to respond in a more deliberate way, having learned lessons." (PTE1)

"I feel like we are now well prepared [...] by living through it and adapting to it and getting the plans in place. And in retrospect we should have done that more proactively ahead of plan, but now if something was to happen, I don't think there would be the consternation and the difficulties we experienced." (EPOL1)

Public transport and construction sector participants were also keen to emphasise that the application of the knowledge gained may depend on the nature of another health emergency and acknowledged the potential need for their organisation to adapt solutions and enter another learning phase in the future.

"So I would say we've learned a lot about ourselves and how we operate and the things that we can and can't do, but it would very much depend on the health emergency, so it was another respiratory infection. If it was something else, we would be learning again. Or if there were very different routes of infection, of transmission." (PTOL2)

"So, I think we have learnt a whole lot and, you know, I don't think that'll go away but, you know, next time this sort of thing happens everybody's going to go and take their stuff off the shelf and try to do what they did this time, and that may not be the most appropriate." (COL2)

Other participants pointed to the impact of timing if there were to be another health emergency. People and businesses were reportedly still exhausted and hence facing such a challenge again so soon would not be easy. Conversely, if it were years later then challenges with personal and organisational memory fade would come into play. Participants stressed the need to have the facilitators ready in order to respond to another emergency (e.g. plans, partnerships, supplies etc.).

"Having lived through this, it's not something we'll forget. And like I said, improve decision making, we can show leadership, we know what's going on. We know our strengths and weaknesses. The problem is if it happened tomorrow, I think we're all a bit stressed and knackered, and I don't know if we would cope very well." (PTOL1)

However, there was a requirement to keep momentum on learning going, not let things slip and have to start again from scratch

"You actually need to live through it, don't you, to actively learn from these things. So yeah, I would say that we're not really prepared to just pick it up and go, but actually the corporate knowledge exists at the moment. It's not eroded to that point where we'd be thinking okay, what the hell do we do? We know what worked. We know what we need to do. We've been there, done that kind of thing." (LOL1)

A construction respondent noted there were issues relating to policy in terms of the sectors ability to adapt quicker in response to a public health emergency, they stated there "was a lot of pauses" when responding to the pandemic.

"[…] the biggest thing that we need from policy, whether that is from government or organisation, is the ability to adapt quicker because there was a lot of pauses, a lot of uncertainty, a lot of, are we doing the right thing." (COL3)

3.7.4 Complexities of planning for future emergencies

Summing up multiple issues the public transport expert, whose job includes planning for such future emergencies, explained just how complex the situation for an individual sector is:

> *"The financial viability point needs to be central, intrinsic to our policy thinking and needs to be intrinsic in our resilience planning. The way we leverage data, share and aggregate it […] There's passenger safety confidence and trust points, we were thinking about future infection-resilient environments, social behavioural measures, etc. […], a sector and government response and communications consistency […] there's something else about the agility, innovation and agility and complex systems, complex bureaucratic systems that we work in - trying to transcend that to the degree that it is possible. And working in an agile way to make sure that, and I don't mean agile in terms of the agile project management methodology, I mean real agility to get responsive technologies to address these challenges into use." (PTE1)*

There was also a general acknowledgement of the tensions between dealing with the immediate issues in each sector to enable them to maintain functionality and longer-term sustainability, while also planning for future emergencies was a challenge.

3.8 Discussion

There was a lot of consistency in the main messages coming from across the six sectors consulted, and almost all participants believed that, at the time of the interviews, rates of COVID infection were low amongst their workforce. Caveats to this however included there being little data collected at the time on COVID infections, either by companies themselves or from other sources (with systematic local and national testing no longer in place) and lateral flow tests no longer made freely available (unless provided by companies). Instead, greater reliance was placed on workers being honest about sickness and 'doing the right thing' (i.e. staying away from the workplace when feeling unwell).

There was some general concern, especially from experts interviewed, that if more people become sick with COVID-19 this may cause extra short term challenges to sectors already struggling with staff shortages, and in the longer-term this could equate to higher levels of Long-COVID. This could impact the fragile UK economy already struggling with the legacy of COVID-19 lock downs, BREXIT etc., especially in the context of many over 50s recently dropping out of the workforce (ONS, 2022).

Since February 2022 ('Living with COVID' phase of pandemic) the pandemic response for all organisational leaders had become part of business as usual, with COVID-19 no longer being differentiated within sickness absence records. Organisational Leaders reported a need to redirect their attention towards wider challenges (e.g. BREXIT, the cost of living crisis and the war in Ukraine), said to be impacting business operations, worker shortages and costs, and subsequently their future sustainability.

For Experts, while these wider challenges gave cause for concern, they reported still spending a significant amount of their time developing contingencies for any potential COVID-19 spike. Such contingencies related to:

- seasonal differences (autumn / winter); potential new variants;

- uptake of COVID-19 vaccines (not generally offered to under-50s along with growing apathy around boosters (Ryan, 2022)); and
- longer-term policy and strategy to combat both COVID-19 and other potential health emergencies (e.g. ventilation systems/air quality monitoring, worker policies related to sick pay and mental health support).

'Rule fatigue' was described by some participants who expressed doubt over how effective mitigations might be if they had to be reinstated in the near future. For example, evidence concluded that all types of face coverings were, to some extent, effective at limiting the spread of COVID-19 (UK Government, 2021). However, their use is no longer mandated and they are seldom worn in almost all contexts (including many healthcare settings). Some health professionals believe that the more vulnerable section of the population, protected by shielding during the height of the pandemic, could struggle as they wish/need to maintain precautions when others have the clear desire to 'live normally' (Nagpaul, 2022). This has caused issues in some sectors when trying to maintain a balance of normality vs protection (continuum of views) to keep all workers and customers engaging with services safely.

Many participants, and their organisations, struggled with the ever-changing rules and regulations passed down from Government throughout the pandemic. Some participants highlighted the differences in COVID-19 rules across the devolved countries of the UK, also recognised to change at different points in time. This was said to be particularly confusing and cause issues for those whose businesses operations crossed country boundaries (public transport, logistics and construction). The speed of changing rules was said to compound this challenge, along with limited understanding of why rules were necessary and a lack of clarity in how businesses should apply the regulations. With the cascade and interpretation of messaging from Government Departments, through to Sectors, organisations and ultimately to individuals, it is easy to see how the key message and its reasoning could be lost.

Participants still wished to gain further insight into which mitigations worked best and in what contexts. This was, at least in part, difficult to ascertain as all mitigations had been introduced at pace and at the same time, leaving some experts and organisational leaders unsure on which measures where the most impactful and therefore should be prioritised in the event of rising COVID-19 cases and / or a different health emergency in the future. It is also clear that different sectors, and even sub-sectors (e.g. different types of food and drink processing – meat processing, picking crops etc.; or different modes of public transport – train, bus, tram etc.), have a different workforce composition and workplace characteristics. These in turn will determine the unique barriers and risk factors of individual sectors/organisations/individuals for COVID-19 transmission and mitigation, as discussed in detail within the phase one workshop report (Canham 2023). Therefore, some control measures could be more important than others in the layered control strategies which sectors/companies used, depending on the different workplace settings, informed by the site-specific risk assessments undertaken.

Participants were keen to highlight the lessons they had learnt during the pandemic. For all sectors, this included: benefits gained from working in partnership across sectors and organisations to share information and good practice; the need for clarity of messaging (at all levels); the importance of establishing communication mechanisms/channels to avoid

misunderstanding, confusion and/or misinformation; and the need for developing policy and strategies and further research to minimise the ongoing impacts of COVID-19 and other potential health risks in the future.

3.8.1 Consistencies and differences in perspective over time

When considering the findings of this phase two cross sector research relative to that of sector specific research conducted prior to this study (consolidated during the phase one knowledge share workshop with PROTECT researchers in April 2022 (Canham et al, 2023)), it can be seen how industry/organisational perspectives of the COVID-19 pandemic have changed.

The majority of mitigation measures had been removed (at the time of phase 2 data collection) from different workplace settings and sectors, with a few exceptions (e.g. continuation of enhanced cleaning within the public transport sector). This is contrary to the research findings shared during phase one (April 2022), where participants across the different sectors commonly anticipated that many of the mitigation measures would remain in place across the sectors, even after restrictions were lifted.

Two common barriers cited during phase one related to communication of messages (including changing government guidelines) and financial challenges (e.g. cost of implementing mitigation measures). The phase two findings describe organisational challenges in maintaining protective behaviours within workplaces when government messaging no longer advocated or required their implementation within community settings. Some sectors/businesses described a cautious approach to lifting measures following changes in government guidance towards the “living with COVID phase”, which enabled them to observe the impact of such changes in the community before implementing them within the workplace. Indeed, the stage two findings suggest some sectors had not implemented more costly mitigation measures, such as ventilation, and highlighted the cost to implement mitigation measures at a time where other costs were said to be rising (e.g. relative to increasing business rates, cost of living crisis, and general operational/manufacturing costs).

Testing was the only common enabler identified to support seven out of the eight sectors represented within the phase one research. However during phase two, a number of interview respondents acknowledged that they had lost ‘early warning signs’ for increasing rates of COVID-19 following the cessation of freely accessible COVID-19 testing and NHS contact tracing (i.e. ‘track and trace’). It is therefore possible that sectors/organisations may have had difficulty in directing and justifying mitigation measures to prevent transmission of the COVID-19 virus after such data sources stopped (April 2022) and henceforth.

During phase one of this study, the relative effectiveness and cost effectiveness of different mitigation measures was raised as a knowledge gap, with many sectors and organisations implementing multiple measures simultaneously or in quick succession. Other knowledge gaps included the need for greater understanding of the factors affecting people’s compliance with COVID-rules and regulations. These gaps were echoed once again within the phase two interviews with sector representatives and suggest that further research evidence in these areas would be of value to support planning and preparation for future health emergencies.

3.9 Recommendations

Through the analysis of the data collected from across the six sectors, we have identified a number of areas for consideration which present opportunities for learning from the experiences under the 'Living with COVID' phase of the pandemic. It should be noted that these arose at the time of data collection (August-September 2022) and will need to be considered in the context of ongoing change.

Evidence and knowledge gained during this phase of the pandemic should be used to develop clear and effective strategies to allow for coherent and rapid responses to changes in COVID-19 and any future health emergencies. Dissemination of knowledge gained is important and will help to develop clear and timely messaging throughout all work sectors.

It should also be noted that as well as common themes and recommendations there are very specific sector, sub-sector and workforce contexts which will need careful consideration. These include, for example:

- the energy production sector being part of the nation's critical infrastructure. Whilst plants can't be closed, this continued operation needs to be balanced with worker safety;
- the higher education sector having a younger, more mobile population who have close interactions with workers;
- the logistics and construction sectors generally having poorer contracts (e.g. zero hours) and wellbeing benefits (e.g. sick pay) and due to the nature of the work more likely to use shared transportation;
- the public transport sector needing to overcome government messaging advising against travel using their services at the height of the pandemic in order to increase footfall and improve revenue take as Government subsidies to the sector have ended;
- the food and drink processing sector having unique and varied operational activities and environments (e.g. working outdoors picking produce is very different to a close proximity indoor production line) as well as huge variation in their workforce characteristics (e.g. increased proportions of migrant workers).

Recommendations include:

1. Recovery phase from the COVID-19 pandemic

Don't forget the short term potential for COVID-19 rates to increase

While wider factors such as BREXIT, the cost of living crisis, and business sustainability etc. are proving challenging for organisations, the short term potential of COVID-19 rates rising again (fewer mitigations, combination with other winter illness, Long COVID, lower booster uptake etc.) should not be forgotten. Organisations could once again cause short-term workforce shortages and increase competition for workers with certain skills between sectors.

Keep in mind longer term improvements

While moving back to business as usual, consideration should be made for the longer term improvements necessary to keep workers and the public safe, some of which have additional benefits beyond COVID-19 transmission. For example, improvements to

ventilation in buildings or on vehicles (possible development of new standards) or use of CO2 monitors have the added benefit of improving indoor air quality. There is however, always a trade-off between investment for the longer-term and the need to protect the current stability of sectors as industries learn to 'live with COVID'.

Develop clear and accurate recommendations and associated methods of communication that meet the needs of the target audience.

Work should continue across all levels (national, regional, organisational, individual) to develop the most effective, clear and accurate messages that are then communicated in the best ways to keep workers and the public engaging with services as safely as possible. It is important to keep in mind the views of workers and users of services. Consideration for ongoing consultation with target populations would be beneficial to inform decision-making related to content of messaging and methods of communication.

Maintain monitoring

Consideration should be given to maintaining non-invasive event monitoring within businesses and across sectors. This is particularly important given that wide scale testing, collecting and dissemination of data) have been stopped. For example, the higher education sector continuing to monitor advice provided to schools, or many sectors asking workers to consider others before attending the workplace when ill and encouraging them to 'do the right thing'.

Maintain and further develop partnerships

Trying to act quickly in response to a crisis is always a challenge. The sectors found some of the decision making and quick implementation of changes challenging, especially as guidance changed rapidly. In many cases, the partnerships established during the pandemic continue and currently present helpful contact points for joint decision making both within and across the industry (organisations, regulators, unions etc.). The trust built over time from working together, can help facilitate enhancements in knowledge, sharing of best practice and available data, and production of consistent messages for workers and the public (where appropriate).

2. In preparation for the next public health crisis

A "one size fits all" approach does not work

While general advice is crucial, each context (country, organisation, vehicle/office etc.) differs in terms of the workforce and environment characteristics. Therefore, immediate advice and longer term policy guidance, needs to be flexible enough to improve on a 'one-size fits all' approach and signpost to more localised agency sources that can guide local level implementation.

Increased consideration for the wider health and well-being of workers

Consideration should be given to the wider health and well-being of workers (as assets to an organisations operations) in broader policy developments. This could include better sick pay, clearer guidance on not attending work when ill, considerations for identifying and supporting

those experiencing Long-COVID symptoms and support, stability of contracts etc. Adopting a narrow focus on business operations and profitability in isolation may present a risk to worker health and wellbeing as well as a threat to fellow workers and the organisations brand/reputation (e.g. if workers are forced to choose between feeding their family and attending work when unwell).

Don’t lose organisational learning and memory

Care should be taken not to lose organisational memory regarding the COVID-19 pandemic resulting in organisations potentially becoming less prepared for future health emergencies. Periodic review and recap of policies, practices and contingencies will help ensure that knowledge is retained at the organisational level to enable prompt action to be taken as and when necessary.

Consider bridging guidance between UK countries.

Consideration should be given to bridging guidance in order to better support organisations /individuals with operations that cross UK country boundaries. For example, where vehicles (e.g. trains) travel through different countries or companies have sites in different countries. Different rules/recommendations across the four devolved nations was identified as a continued source of confusion throughout the COVID-19 pandemic.

Carry out further research

Consider conducting more research into which mitigations against COVID-19 were the most useful in reducing COVID-19 transmission, the most cost effective and could best be utilised for future health emergencies, so sectors can be better prepared. Also consider research on behavioural science to understand what factors impact on compliance and how this potentially changes over time. Both of these would help to plan for future health emergencies and contribute to developing policy (at all levels) and future risk assessments.

4 Conclusion

As we have seen sectors have all faced some common challenges since the rules and regulations around COVID-19 were relaxed in February 2022. These included: gaining accurate and timely data to inform decision-making; lack of understanding and evaluation of which mitigations work best in which circumstances; lack of ability to enforce any remaining mitigations; the inability to please all workers (continuum of risk aversion and continued use of mitigations) and the cost of mitigations and future planning for such health emergencies (e.g. how much to invest in future COVID-19 protection vs current challenges such as cost of living crisis, BREXIT, etc.).

Some facilitators for managing the ‘Living with COVID’ phase were also found to be common across sectors including: making use of the partnerships / relationships established during the pandemic within and across sectors; knowing which levers (financial, behavioural, partnership etc.) are most effective to use in what circumstances; maintaining some mitigations e.g. enhanced cleaning, which also help with other transmissible illnesses; the

importance of accurate, clear and timely communications at all levels; and keeping in mind lessons learnt as future plans are put in place e.g. improving ventilation.

It is interesting to note that since previous work undertaken (e.g. Balmforth et al. 2022, Bourne et al. 2022, Coleman et al. 2022a & b, Loh et al. 2022, Wei et al. 2022) prior to the changes in legislation (February 2022), participants views have changed. Many previously suggested that risk mitigation measures should stay in place to keep workers and those with direct contact (e.g. public transport passengers) safe from COVID-19 infection. However, since the 'Living with COVID' regulations changed, the majority of people had adjusted to accepting that the majority of work sectors needed to return to business as usual with the need for fewer such mitigations.

Our general recommendations (above) relate to the barriers and facilitators for both managing the short term issues remaining as sectors / organisations continue 'Living with COVID' and other respiratory diseases e.g. seasonal flu, and longer term planning for any future health emergencies. These should be of direct interest to policy makers (Government Departments), regulators, Trades Unions, organisations and individuals from the six sectors we spoke to, but also from other sectors in the wider business community.

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The PROTECT COVID-19 National Core Study on transmission and environment is a UK-wide research programme improving our understanding of how SARS-CoV-2 (the virus that causes COVID-19) is transmitted from person to person, and how this varies in different settings and environments. This improved understanding is enabling more effective measures to reduce transmission – saving lives and getting society back towards 'normal'.

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