



UK Health
Security
Agency

A feasibility evaluation of daily contact testing of workers in private industries

Daily contact testing pilot evaluation team

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1. Executive summary

1.1 Overview of daily contact testing (DCT) pilot

Between December 2020 and March 2021, the UK government's Department of Health and Social Care (DHSC) managed a pilot of daily contact testing (DCT) in private institutions. Instead of self-isolating at home, contacts of positive coronavirus (COVID-19) cases were asked to take lateral flow device (LFD) tests every day for up to 7 consecutive days. For this pilot, they were able to resume normal activity, including attending work, in the 24 hours following a negative test result. If they tested positive, they ceased daily testing and needed to self-isolate for the next 10 days. The pilots took place during a period when prevalence of COVID-19 was increasing nationally.

The evaluation drew on:

- data provided by participating organisations and from DHSC data systems
- online surveys with employees and test site administrators in 5 out of the 13 organisations that participated, for which we received over 1,400 and 60 responses respectively¹
- in-depth interviews with 40 employees and test site administrators in 3 out of the 13 organisations that participated

We had survey responses from those participating in the pilot, those choosing not to participate and those involved in administering DCT within organisations.

We found that people responded positively to DCT and, despite the overheads associated with managing DCT, employers found it worthwhile.

1.2 Operational feasibility

Participating organisations reported that implementing DCT had been relatively smooth, but they also noted the significant financial and time investment incurred in setting up the programme. They made suggestions for future improvements, including more support materials to explain how regular LFD testing can be trusted to replace self-isolation, with more reassurances to show that DCT is a safe (but not mandatory) option within the workplace.

Once implemented, organisations and participants thought the actual testing experience was quick and easy. But there were some difficulties in keeping up with changes to operating

¹ The total workforce population for these 5 organisations was approximately 97,500, which gives a response rate of 2%. This response rate is a minimum estimate because the invitation to take the survey may not have reached the entire population.

procedures. And some additional assistance was required to support employees participating in DCT.

There was evidence from the pilot of substantial barriers for employees and employers in accurately recording data on DCT participation and compliance. This was in part caused by the digital process for registering LFD tests for DCT being the same as that for asymptomatic testing for other reasons.

We found that calm and experienced test administrators played a key role in alleviating any discomfort that people had with being tested. We saw some indications that participants' experiences of DCT were improved when they were familiar with those operating the test site (for example, where organisations trained their own staff for these roles).

The policy of testing in the workplace meant that travel to work was a recurrent concern, especially for those who usually took public transport. Those who drove alone or walked to work did not have to think about potentially infecting others during their commute. This also raised some problems with accessibility: the prospect of walking some distance to work and then testing positive was cited as a barrier to participation.

We found that organisations needed more support in helping to prove to employees the credibility of DCT and to demonstrate that it was an officially sanctioned public health intervention. This affected their confidence in the programme and presented some operational challenges.

1.3 Public health

We analysed the data for signals of increased levels of infection at DCT sites. We found nothing of concern. The apparent safety of DCT in the workplace may have been influenced by other protective measures (such as personal protective equipment (PPE) or social distancing) which we were not able to examine from the data available.

Positivity rates were higher in DCT workplaces compared to non-DCT workplaces, but the cause is unlikely to be DCT itself. The difference is present from the start of the pilot period. The allocation of workplaces to DCT and non-DCT groups was not randomised.

Positivity rates fell at both DCT and non-DCT workplaces during the pilot. There is no evidence of a significant difference in the rate of this decrease between the 2 groups.

We looked for workplaces which had had weeks with particularly high positivity rates. We found no evidence of a significant difference between the DCT and non-DCT groups.

We looked for workplaces where positive cases were clustered together in time. Again, we found no evidence of a significant difference between the DCT and non-DCT groups.

Just under 3 in every 5 (57%) of those individuals participating in DCT said that they would be more likely to name their contacts if they were to test positive and if DCT were available to their contacts. This could help limit the spread of infection.

1.4 Behaviours

Respondents said that the decision to participate was primarily driven by individuals' sense of civic duty, curiosity about whether they had the virus, and the ease of the process, but also a recognition that their employer wanted them to do it. Financial factors also reportedly influenced uptake, in particular for those on pro-rata wages, those who regularly worked overtime and some agency workers.

Some said that they felt more comfortable participating because of their confidence in the safety of their workplace – where PPE and other COVID-safe measures had been systematically implemented.

There were underlying concerns about infecting others during the 7 day testing period, which provided a barrier to participation in some cases. And participants described being treated with some wariness by others in the workplace because they were regarded as carrying a higher risk of being infectious.

Some individuals felt pressure from their employer to participate in DCT rather than self-isolate. Respondents weren't all completely clear about the extent to which this was an official government scheme and they didn't know their rights with this new policy. Not everyone understood that it was voluntary.

We heard that some people doubted the accuracy of the lateral flow tests used for DCT and that this influenced their decision to participate.

Employees recognised the need to maintain COVID-safe measures despite DCT. We did not find any evidence that the feeling of reassurance following a negative result led to a general relaxation of these behaviours.

Most survey respondents reported that they did not change either the amount they left home (75%) or the amount of contact they had with people outside their household (67%) following a negative result. And there was some evidence that participants were behaving more cautiously: 21% of respondents said that they left home less than usual following a negative result and 26% said they had less contact than usual with people outside their household.

1.5 Broader societal benefits

Employers reported that DCT had reduced the number of working days lost to self-isolation and reduced anxiety around COVID-19 in their workforce. A majority (97%) of test site

administrators reported that they would definitely (82%) or probably (15%) participate in DCT again.

The majority (92%) of employee participants also reported that they would definitely (73%) or probably (19%) participate in DCT again.

Modelling developed using pilot data indicates that the net economic impact of DCT is highly dependent on the cost to the business of individuals who are required to self-isolate. If they are just as productive while working from home, don't get sick pay, or any output loss can be covered at minimal net cost, then it is not clear that the employer would see value for money (VfM) from daily testing; where the opposite is true, they might well. Therefore, DCT will not represent VfM for all workplaces and needs to be appropriately targeted.

1.6 Limitations of this evaluation

This was not a formal scientific study, and the evaluation was developed rapidly at the time of a public health emergency. The evaluation was limited by the quality of the test data collected. Suspected errors in registering tests meant that some routine tests were incorrectly reported as DCT tests, which meant it was not possible to identify and analyse the DCT data accurately. Although attempts were made to correct this through manual reporting of DCT test data, problems with data remained.

This means that we could not establish whether individual transmissions occurred due to those participating in DCT. But our analysis provides some evidence that the overall levels of infections at sites operating DCT remained at a level comparable to other sites that were following standard self-isolation protocol.

The survey responses included in our analysis are from 5 out of the 13 organisations that participated, and interviews were with 3 organisations, so inferences should be made with care. Our analysis of the data available, while potentially subject to bias, nevertheless provides insights into the design and development of DCT programmes and is indicative of the experience of businesses involved in the pilot.

1.7 Conclusion

The pilot generated learning about the real-world implementation of LFD testing for DCT in the workplace, where both the risks of transmission of COVID-19 and the benefits of DCT in terms of averted staff absences are potentially high. While there are acknowledged limitations, the evaluation findings provide valuable insights into the practicalities of delivering DCT in these settings and an appraisal of its costs and benefits.

The evaluation found no evidence of the use of DCT in workplaces being unsafe. The majority of participants did not return a positive LFD result in the pilot and there was no evidence of

increased infection rates linked to DCT or (from qualitative evidence) of relaxation of COVID-safe behaviour in the workplace. Our analysis suggested that there were economic benefits of DCT to employers and employees, although these are sensitive to business context.

Participating sites acknowledged the effort needed to recruit and support participants through DCT. But, in general, they found this to be worthwhile in terms of keeping people in workplace and maintaining staff morale. Learning from this pilot may be used to provide detailed advice on how to implement DCT successfully on a larger scale.

DCT was well accepted by staff and administrators as an alternative to self-isolation. Participating staff who took part in the pilot found it on the whole straightforward, were able to stay in work, and did not show signs of relaxing their COVID-safe behaviours. The pilot demonstrated that a DCT scheme could be effective in averting work absences in people identified as close contacts, and that it could be cost saving.

Effective communication will be a key contributor to the future success of workplace DCT. For example, some people doubted the accuracy of the LFD tests used for DCT because of messages about them in the media, and this influenced their decision to participate. In some cases, despite being part of a Department of Health and Social Care (DHSC) pilot, some interview participants reported being notified to self-isolate by the NHS COVID-19 App and were therefore not confident to leave their homes to participate in DCT.

The digital process for registering LFD tests for DCT in this pilot used the asymptomatic test reporting process with the additional option of specifying that the test was undertaken for DCT. This option of specifying that the test was undertaken for DCT was not consistently used by participants (and was incorrectly used by some that were not participating), which severely impaired the quality of the data that we collected through the pilot. In future, the digital journey for DCT should be designed to support participants, encourage them to adopt behaviours that are in line with the standard operating procedure and provide high quality data for monitoring and evaluation. This needs to be in place for a wider rollout.

This was a relatively small and pragmatic pilot study, and its limitations mean that the evidence cannot be considered definitive proof that the introduction of DCT does not increase the risk of workplace transmission. Any wider application of DCT would need careful evaluation and monitoring. Since the analysis for this evaluation was completed, further studies have been conducted which examine experimentally whether DCT can be used as an alternative to self-isolation (1).

2. Introduction

2.1 Context

At the time that the pilot commenced in December 2020, the UK was experiencing a period of rising infections, vaccines were not widely available, and England was about to enter its second major lockdown. Many staff in UK private industries were unable to come to work because they were self-isolating, having been identified as close contacts of someone who has tested positive for SARS-CoV-2 (COVID-19).

Employers and DHSC sought ways to apply a highly risk-managed approach to managing close contacts in such a way that fewer days would be lost to potentially unnecessary self-isolation while not compromising the safety of staff. Government decided to implement daily contact testing (DCT) to address these concerns.

A pilot was proposed to assess the operational feasibility of DCT in a workplace setting. Thirteen private sector organisations volunteered to participate and the pilot was established at pace. It was not a research study and did not involve a control group.

2.2 Daily contact testing

2.2.1 Background

Daily contact testing (DCT) is an alternative to self-isolation for individuals who have been identified as a close contact of someone who has tested positive for COVID-19. Once identified as a contact, they test using an antigen lateral flow device (LFD) each day for 7 days. If the result of the LFD test is negative, they are exempt from self-isolation. DCT, as an intervention, is intended to find cases, while at the same time minimising the number of days spent in self-isolation which may prove not to be necessary.

At meeting 96, the Scientific Pandemic Influenza Group on Modelling (SPI-M) and Scientific Advisory Group for Emergencies (SAGE) considered a theoretical model of the expected impact on viral transmission using LFDs for DCT as an alternative approach to self-isolation (2).

SAGE was supportive of piloting regular LFD testing to avoid quarantine (that is, a minimum 10-day period of self-isolation) and assessed that this could provide a similar effect to what was then the 14-day isolation period (3).

On this basis, the Chief Medical Officer authorised a programme of DCT pilots which were begun across various operational contexts, including the general public, NHS staff, schools and other public sector institutions.

In the private institutions pilot, the requirement was for an assisted daily LFD test to be performed for a series of 7 days. Each negative test, as long as the individual remained free of symptoms, allowed a 24-hour period of normal activity. Individuals were required to self-isolate if they showed symptoms or if they had a positive test result. This close monitoring regime aimed to find asymptomatic positive cases so that they could be isolated immediately from the workplace. Staff who tested negative on LFD throughout the 7 day period were able to come to work, subject to the usual restrictions imposed through tiering or lockdown. The broad aim of the programme of DCT pilots was to investigate the potential benefits and risks set out in table 1.

Table 1. potential benefits and risk of DCT

| Benefits | Risks |
|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Contacts that test positive are more willing to comply with self-isolation | COVID-19 contacts may become PCR positive (and infectious) whilst remaining LFD negative |
| DCT leads to improved tracing of contacts and chains of transmission | Contacts may become less compliant with COVID-19 safe behaviour if testing negative, leading to increased viral transmission |
| DCT leads to increased uptake of testing in established groups/demographics | DCT leads to a higher secondary attack rate when compared to self-isolation (with current rates of compliance) |
| DCT enables improved finding of asymptomatic cases | |
| DCT supports increased sharing of contacts details should an individual prove positive | |
| DCT enables engagement with testing in groups or demographics who may not otherwise access it | |
| DCT reduces requirement of self-isolation except for those with clear evidence of the virus | |
| DCT reduces workforce days lost to self-isolation, including in critical services and infrastructure | |

2.2.2 Purpose of the pilot

From the perspective of the employer, participating in the pilot was anticipated to help them minimise the number of days spent in self-isolation by staff members who did not themselves become infected by COVID-19 through their exposure to the index case. At the same time, it allowed identification of workplace staff who were contacts who developed asymptomatic COVID-19 who would then self-isolate.

Before decisions on wider implementation of DCT to risk-manage the presence in the workplace of staff who were close contacts were taken, government required more knowledge about the feasibility and operational impact on employers of implementing and maintaining a DCT regime. Employers and government needed to understand if this intervention could be safely achieved in practice without increasing the rate of COVID-19 infection. Employers needed to understand what systems have to be in place to manage and monitor the staff in the pilot, and whether there would be benefit in having a process for daily testing in readiness for an outbreak of COVID-19 amongst staff.

We also sought further information on barriers to uptake, the cost and management effort associated with running DCT, and whether these outweigh the benefit of having more staff present in the workplace.

2.3 Pilot design

Thirteen private sector employers from a range of industry sectors agreed to participate in the pilot. They included retailers, food suppliers, heavy industry, a car manufacturer, a utility company and a medical supply company.

Organisations were recruited between December 2020 and February 2021, with the first commencing testing on the 14 December 2020 and the last on 18 February 2021. The DCT pilot ended on 15 March 2021.

2.4 Standard operating procedure

Testing for this pilot had to be carried out at an Assisted Testing Site (ATS). Each employer participating in the pilot established an ATS in line with guidance, that was dedicated to DCT testing of asymptomatic staff. DHSC prepared a Master Clinical Standard Operating Procedure (SOP) for use of LFD tests, which included a module setting out the principles of DCT including practical instructions for establishing an ATS and considerations for implementation. As a condition of participation in the DCT pilot, employers were contractually bound to adhere to the SOP. Implementation of DCT was tailored to the facilities available at each employer site: for instance, some ATS sites were done indoors with appropriate distancing and non-pharmaceutical interventions (NPI) such as face masks and PPE, while

others were done on a drive-through basis with participants remaining in their vehicle until a negative test result was received.

Throughout the pilot, all employers reported that their testing facilities and regime were compliant with the SOP, although no checks were carried out on behalf of DHSC to confirm this.

Involvement in this pilot was voluntary. If staff members did not wish to participate or line managers were unable to support the monitoring of daily testing, then the staff member remained in self-isolation as per national guidance at the time. Recruitment of individuals to the pilot was assessed and risk-managed by the employer. Eligibility was determined by the employer, but the ultimate decision to participate was down to every individual. Participants who decided to opt-out of DCT at any point during the 7 day period were required to self-isolate as per national guidance.

In addition to the employer conditions for eligibility, staff were eligible to participate:

- if they had been alerted to a COVID-19 positive encounter via the NHS COVID-19 app or by DHSC Test and Trace
- if they shared a household or support bubble with an individual with a positive test result (but some organisations in the pilot excluded this group from participating)
- regardless of their vaccination status

Staff were ineligible if:

- they had symptoms of COVID-19
- they were isolating having returned from overseas

At the start of each work shift, all contacts who had agreed and were eligible to participate were required to attend the ATS facility, take an LFD test and wait for the result before commencing work. For asymptomatic staff who continue to test negative on LFD, this testing regime was repeated every 24 hours for up to 7 days, after which time their self-isolation period would have been complete – within national guidelines and constraints.

At any point during the pilot, an individual who tested positive was required to follow national guidance, which included returning to self-isolation until receiving the result of a confirmatory PCR test. Anyone testing positive on a PCR test was required to self-isolate for 10 days, whilst those with a negative result could resume DCT.

3. Evaluation approach

3.1 Objectives

The objective of the evaluation of the pilot was to inform decision-making on a potential wider rollout of DCT in private sector settings by:

- exploring the feasibility of operating a safe DCT regime, including identifying which measures are required to effectively manage and monitor rollout
- learning from operational insights gained from participating organisations and individuals, including understanding the behaviour of those involved
- investigating whether DCT may have affected levels of infection

This was a rapid evaluation of a developing pilot with continuous learning at the forefront. In addition, the evaluation sought to provide data and information to add to the emerging body of knowledge on DCT.

The timing of the pilot and the nature of deployment in a public health emergency were such that it was not feasible to implement sophisticated control comparisons or establish randomised patterns of testing approaches. The pilot was not a scientific study and was not designed to assess the performance of LFD devices or to provide conclusive evidence on the public health effectiveness of the DCT policy.

3.2 Ethics

While the evaluation followed ethics guidelines², this was a service evaluation of a pilot of government policy and, as such, did not require review by a research ethics committee³. No personally identifiable information was linked to any data for the evaluation. Participation in interviews and surveys was optional and confidential, and efforts were made to minimise any additional burden on participants and employers.





3.3 Evaluation questions

Evaluation questions were developed to address 4 specific dimensions. These were used to frame the analysis of data and qualitative evidence obtained (Table 2).

² [GSR Ethical Assurance for Social and Behavioural Research](#).

³ Two out of 3 reviewers in the Independent DCT Review (June 2021) recommended that more consideration should be given to the need for ethics approval for workplace DCT pilots given the elements of research in the design of the evaluation.

Table 2. Evaluation questions used for private industries DCT pilot

| Evaluation dimension | Evaluation questions |
|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Operational feasibility  | 1. What was the experience of setting up and running DCT? 2. What was participants' understanding of the testing requirements of DCT? 3. How was the DCT pilot communicated across the organisations? 4. To what extent did organisations successfully communicate to employees that participation in DCT was optional? 5. What aspects of the DCT programme could be improved to make the service more likely to succeed? |
| Public health effectiveness  | 6. What effect does DCT have on the spread of infection in the workplace? Does it increase or decrease compared to self-isolation? 7. Is DCT effective at finding infected contacts before they become symptomatic? |
| Behavioural factors  | 8. Why did people agree to participate in DCT (rather than self-isolate)? 9. What are the barriers to participating in DCT? 10. What did people understand as the rationale for DCT? 11. How did participants respond to a negative test result? |
| Broader societal benefit  | 12. What has DCT helped workplaces to achieve? |

3.4 Evidence collection methods

3.4.1 Data returns from the employers

Employers submitted data returns, in spreadsheet format showing cumulative totals, directly to DHSC. Data returns were requested weekly, but were not consistently provided. No identifiable information was shared with DHSC.

Employers at each DCT site provided estimates of the staff time required for setup and administration of the DCT programme.

3.4.2 LFD and PCR test results

LFD and PCR test results were extracted from a version of the National Pathology Exchange database (NPEX) containing COVID-19 test results from all England residents. The test registration system was designed so that DCT tests could be labelled as such by the user or site support when DCT participants registered their test, with a resultant flag in the NPEX database to indicate that the test was conducted as part of DCT. However, there were problems with the quality of the data. These are described in [section 3.5](#) below.

3.4.3 In-depth interviews

40 in-depth interviews were conducted between 23 December 2020 and 12 February 2021. They took place over the phone and used a cooperative inquiry approach, which allowed for more sensitive issues and impacts of DCT to be explored in depth.

The qualitative interview transcripts were subjected to interpretative phenomenological analysis to explore the evaluation dimension themes. This type of analysis is commonly used in research that has implications for social acceptability of a new public health programme, providing rich insights into participants' experience.

This qualitative data was then synthesised with online surveys and data returns from employers for the findings in this report.

We have included quotes in this report to illustrate and give flavour to the findings. We have attributed the quotes in such a way that individuals cannot be identified.

3.4.4 Online surveys

Five of the pilot DCT organisations agreed to host an online structured survey for site administrators and employees. These were undertaken after the DCT pilot had been running for several weeks to obtain a more reflective response about the initiative.

Test site administrator surveys were completed between 7 January and 12 March 2021 and employee surveys between 7 January and 22 March 2021. We received 1,543 survey responses in total.

In the employee survey, some demographic information was collected. Around 5% of declining respondents chose not to supply demographic information.

Demographic information for the whole employee population was not available. Therefore, we do not know whether the survey sample is representative of the entire employee population. However, of those who provided their demographic information:

- 44% were male and 56% were female
- 49% were aged under 45 and 51% were 45 and over

- 93% described their ethnicity as ‘white’
- 68% worked ‘full-time’
- 21% reported having some type of caring responsibilities
- 9% reported having a health problem or disability that had some impact on their day-to-day activities

Table 3 gives details of the data collected from different organisations in the pilot.

Table 3. Data collection from each organisation

| Organisation | NPEX data and manual data returns | Online survey responses | In-depth interviews |
|----------------|-----------------------------------|-------------------------|---------------------|
| Organisation A | ü | 1,184 | 18 |
| Organisation B | ü | 25 | 10 |
| Organisation C | ü | 101 | 12 |
| Organisation D | ü | 1 | 0 |
| Organisation E | ü | 232 | 0 |
| Organisation F | ü | Not applicable | 0 |
| Organisation G | ü | Not applicable | 0 |
| Organisation H | ü | Not applicable | 0 |
| Organisation I | ü | Not applicable | 0 |
| Organisation J | ü | Not applicable | 0 |
| Organisation K | ü | Not applicable | 0 |
| Organisation L | ü | Not applicable | 0 |
| Organisation M | ü | Not applicable | 0 |
| Total | | 1,543 | 40 |

3.4.5 Sampling approach and limitations

We did not have access to a sampling frame for this evaluation (such as a list of participant names and contact details). Instead, we used a convenience sample. One organisation was extremely engaged in the process (and had a reputation of having a highly engaged workforce) and consequently their results constituted a high proportion of the employee survey responses. In addition, there was a likely self-selection bias in participation in DCT: not everyone who was eligible chose to participate. The sample is therefore unlikely to be representative of the workforce population.

Given this approach, we have not been able to establish a precise response rate. The total workforce population for the 5 organisations that distributed the survey was approximately 97,500, which gives an estimated response rate of 2%.

We sought people who had different roles and involvement in DCT for interview, providing as wide as possible perspectives. We recruited into these categories:

- site administrators – workplace representatives who were responsible for administering the DCT initiative, including a few people who had a wider organisation-level role
- participants – employees who had one or more daily tests as part of DCT
- self-isolators – employees who had opted to self-isolate rather than take part in daily testing
- others in the workplace – those not eligible for DCT because they had not been in contact with someone testing positive for COVID-19

Table 4 gives a breakdown of how survey responses and interviews were split by these categories.

Table 4. Summary of surveys and interviews completed

| | | Online survey responses (7 January 2021 to 22 March 2021) | In-depth interviews 23 December 2020 to 12 February 2021) |
|---------------------|---------------------|--------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Site administrators | | 66 | 16 |
| Employees | Participants | 399 | 16 |
| | Self-isolators | 27 | 3 |
| | Others in workplace | 1,051 | 5 |
| | Total employees | 1,477 | 24 |
| Total | | 1,543 | 40 |

We established contact with key individuals within organisations who we asked to identify volunteers for the in-depth interviews and to cascade the online survey link across their test site administrator and employee base.

All organisations were offered the opportunity to distribute surveys and take part in interviews.

All participation was voluntary and without any incentivisation. It was challenging to encourage participation in the survey and in-depth interviews due to survey fatigue.

Other reasons that we found for low uptake were that employees were not so engaged with the organisation's goals generally, that they were not desk based to facilitate an online survey, and/or that a substantial proportion of the workforce were not fluent in English.

Results were fed back on a weekly basis throughout the process allowing DHSC teams to respond to issues (or emerging insights) as they were received.

3.5 Data quality

DCT tests were conducted at 92 test sites across the 13 participating employers. Routine asymptomatic testing was also conducted at all of the 92 sites.

3.5.1 NPEX data

The test registration system was designed so that DCT tests could be labelled as such by the user or site support when DCT participants registered their test, with a resultant flag in the NPEX database to indicate that the test was conducted as part of DCT. Early analysis of the data revealed 2 problems with data quality:

1. Sites and users appeared to have in some cases incorrectly flagged routine tests as DCT tests.
2. Some tests that were DCT appeared not to have been flagged as such by users and sites.

These issues made it very difficult to identify from the data those tests that were performed as part of DCT and those as routine testing. This restricted the subsequent analysis that we were able to do on the data. For example, we were unable to calculate the positivity rate of participants and the average number of tests that participants completed.

3.5.2 Manual data returns

In addition to the data from NPEX, sites also collected data manually. Our analysis of these returns suggested similar issues with mixing up results from DCT and routine tests.

We report in table 5 the returned results from participating pilot sites to give a broad indication of the scale of the pilot rather than as a precise record of DCT.

The challenges associated with reporting data represent important learning from the pilot.

They highlight that, while implementation of DCT was generally seen by employers as successful, it will be essential to strengthen the digital journey for DCT to provide high quality data for monitoring and evaluation in any future deployment. Organisations, even with guidance, found it difficult to record test data accurately.

Table 5. Summary of participation and testing by employer/site. This data comes from manual returns from sites for DCT between 14 December 2020 and 15 March 2021*

| | Sites with DCT | Population | DCT participants | LFD results from DCT | Positive LFD results from DCT |
|----------------|-----------------------|-------------------|-------------------------|-----------------------------|--------------------------------------|
| Organisation A | 61 | 69,690 | 4,457 | 11,260 | 85 |
| Organisation B | 1 | 6,100 | 329 | 1,330 | 36 |
| Organisation C | 6 | 14,900 | 6,788 | 19,550 | 189 |
| Organisation D | 3 | 5,750 | 22 | 80 | 17 |
| Organisation E | 1 | 1,049 | 845 | 3,143 | 57 |
| Organisation F | 1 | 4,300 | 42 | 129 | 1 |
| Organisation G | 1 | 139 | 6 | 31 | 0 |
| Organisation H | 4 | 1,381 | 25 | 118 | 0 |
| Organisation I | 2 | 886 | 15 | 84 | 0 |
| Organisation J | 1 | 120 | 5 | 29 | 0 |
| Organisation K | 8 | 6,650 | 913 | 1,880 | 43 |
| Organisation L | 2 | 380 | 146 | 277 | 2 |
| Organisation M | 1 | 7,305 | 1 | 2 | 0 |
| Total | 92 | 118,650 | 13,594 | 37,913 | 430 |

* Data is of variable quality (in particular DCT participants and their test numbers or results) and should not be used to assess the risks and benefits of DCT. We report these figures to give a broad indication of the scale of the pilot rather than as a precise record of DCT.

4. Findings: operational feasibility

4.1 What was the experience of setting up and running DCT?

Organisations and participant respondents had high regard for the actual testing experience, acknowledging the speed and ease of the process. The pilot organisations we heard from understood their responsibilities in terms of the costs of setting up physical testing infrastructure and hiring test operatives. They ultimately felt that DCT brought a lot of benefits to their business which outweighed these costs.

While respondents reported that DCT was successfully established in their organisations, they also noted the significant financial and time investment incurred in setting up the programme. We are not able to assess from the evidence we gathered whether smaller businesses with more limited resources would be able to absorb the costs and have the capacity required to initiate and manage DCT.

“Should DHSC not be able to keep providing testing kits and PPE in the long-term, the additional cost to the company may become problematic ... The benefit and cost of implementing the scheme will have to be reassessed should the company need to bear the cost of testing kits and PPE in the future.”

(Interview with employer)

Participants described the process as quick and easy, well organised, with fast results. They commented favourably on the use of employees of the organisations as test operatives, which they said they found reassuring. And they also welcomed those that adopted a calm and reassuring manner in what was, to those involved, an unusual situation. While some physical environments in which tests were administered were said to be not particularly pleasant, there was a recognition that this was only a moment of discomfort.

Figure 1 illustrates that those site administrators responding to the survey largely had positive perceptions of the various operational elements of DCT. There were 2 exceptions: ratings for the registration process were lower (66%) than for other aspects of the process; and only 52% of site administrators expressing an opinion rated 'ongoing support from [DHSC]' as 'good' or 'very good'. Ratings were far more favourable for the guidance received from DHSC to support the set-up of daily testing (81%).

Figure 1. Site administrators' ratings of the operational aspects of DCT (% rating as 'good' or 'very good')

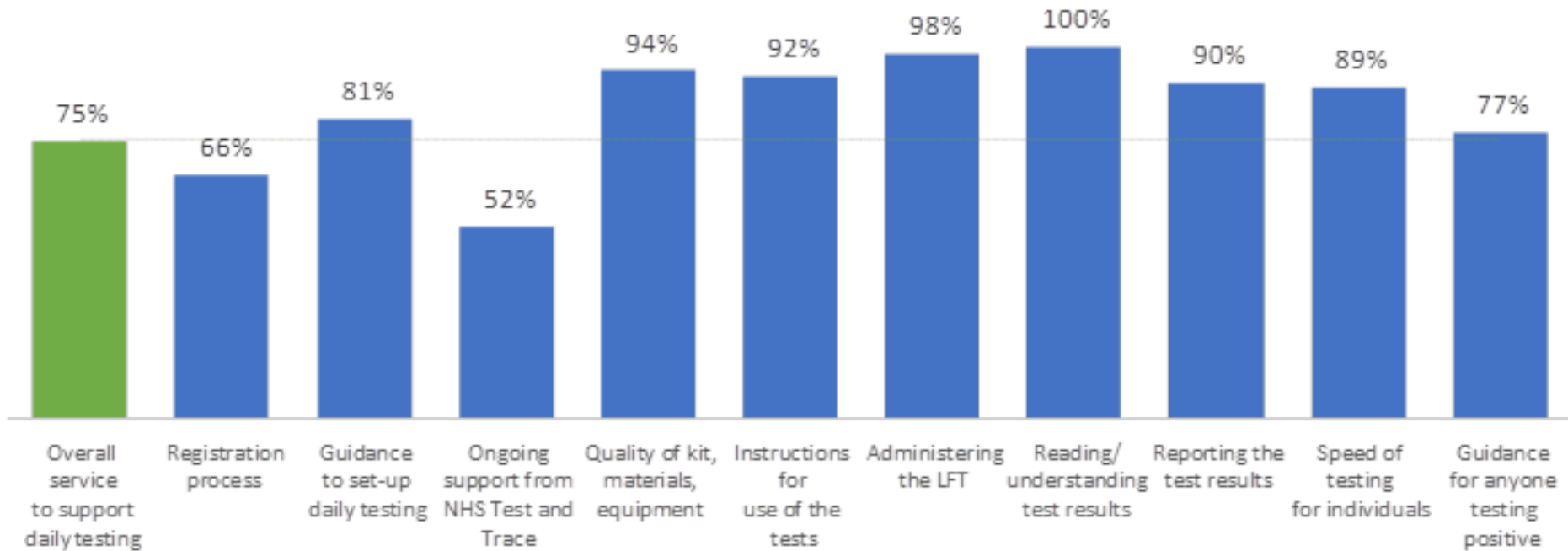
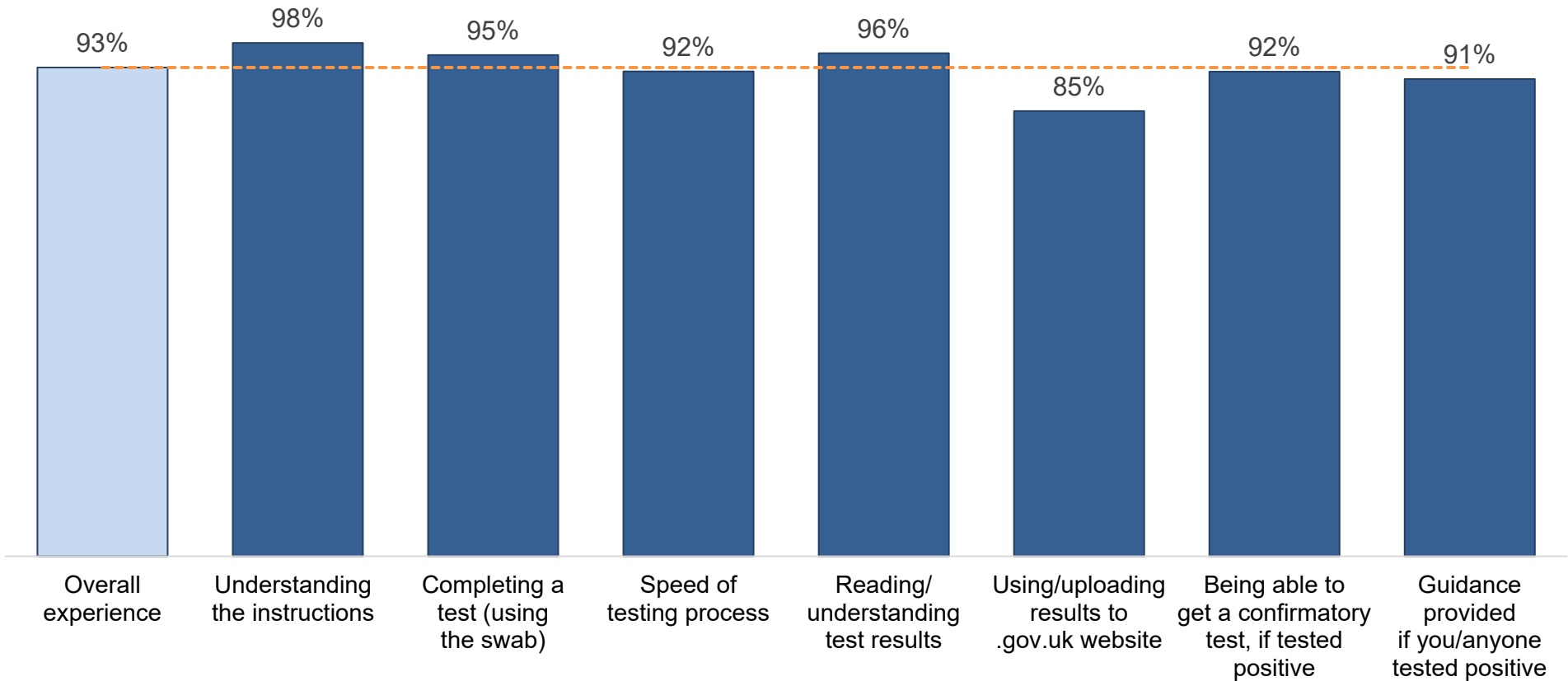


Figure 2. Participants' ratings of the operational aspects of DCT (% rating as 'good' or 'very good')



Q. Overall, how would rate your experience of the daily testing?

Q. Thinking now about the testing process, how would you rate each of the following?

Base: All participating in daily testing expressing an opinion on each attribute (base size generally 388, but reduces to 167 responses for 'ability to get a confirmatory test')

As illustrated in figure 2, participant respondents gave high ratings to the operational aspects of DCT. The elements that were scored highest were ‘understanding of instructions’ (98%) and ‘completing the test’ (95%).

The only aspect where the proportion of favourable responses dipped below 90% was ‘using/uploading results to gov.uk website’ (85%). Although this score is still high, it is instructive that this element of the service was less highly regarded by both participants and site administrators – and it accords with the data quality problems that we uncovered during the course of our analysis.

Issues that impacted the test registration experience included people being unsure how to create an NHS account and mobile phones which did not have the function to capture QR codes. Respondents also told us about the irritation of having to do repeated registrations with 7 barcodes (rather than a more seamless 7 day process that would fit with the concept of the testing regime).

4.2 What was participants’ understanding of the testing requirements of DCT?

The qualitative findings indicated that participants found the requirements of DCT complex and that it was not explained clearly enough to them. Some individuals marked themselves as having completed all the tests when, in follow up interviews, it was apparent that they had not completed 7 consecutive days of testing.

Some employees reported that they were unwilling to go to their workplace for testing on weekends and non-working days and chose instead to self-isolate on those days. They were not informed by site administrators that this was not permitted in the protocol.

Some organisations implemented DCT as a programme of testing only up to the end of an employee’s notified isolation period – which in some cases was less than 7 days rather than the 7 days as stated in the SOP.

“The intention is for daily contact testing to be conducted by consenting contacts for 7 days following contact with a positive case.”
(SOP Version 2.4)

There was not clear information about how DCT aligned with notifications to self-isolate on the NHS COVID-19 app. In some cases, the period of self-isolation remaining as indicated by the app was not consistent with the local instructions for how to conduct DCT. For example, one respondent was told that they needed to complete 7 consecutive tests when the cycle of tests would take them beyond the end of the self-isolation period indicated by the app. There were no clear instructions about which instructions to follow.

“It says 7 consecutive tests but when I said that is impossible because I am not going to come in on a weekend and that I am just going to stay at home, they said fine. Also, I already booked a day off. I had my last test on Monday morning and it came back clear. That was my third test, but it would be my 7th day of isolation. My NHS App has gone off now.”

(Interview with DCT participant)

There were instances where participants had been given incorrect advice from their employer about how a PCR test (rather than an LFD test) should be interpreted in the context of their daily contact testing regime.

“I didn’t complete the 7 days because, I was a bit curious about this. Because I had the PCR test which proved negative, when I went back in to be part of the serial testing, I said – do I actually need to carry on with that now? Do I need to continue with the serial lateral flow test? The answer was no, don’t need to bother anymore with serial flow test...I felt confident in myself and the way I felt, and the amount of test I had that came back negative.”

(Interview with DCT participant)

4.2.1 Confirmatory PCR testing

The SOP (version 2.4) noted a recommendation by Public Health England to temporarily suspend the requirement for routine confirmatory PCR for positive LFD results while prevalence was very high nationally (the proportion of false positives compared to all cases decreased as prevalence increased). This change was effective from 27 January 2021.

However, despite this, some organisations in the pilot continued to carry out confirmatory PCR tests. At some of these sites, employees were asked to book a PCR test at a community test site following a positive LFD test. Employees we spoke to said that they were aware of their employer’s requirement for them to take a PCR upon receiving a positive LFD. Respondents generally perceived PCR as the ‘NHS approved’ method of testing.

“Once you are positive (LFD), then basically it is book a test, do not talk to anyone, do not leave your car, do not go near anyone go straight to the NHS test site (take PCR test) and go straight home.”

(Interview with DCT participant)

4.3 How was the DCT pilot communicated across the organisations?

4.3.1 Organisations created their own templates for communicating with their employees

Some organisations designed their own communication material and distributed information via email, printed copies or text message according to the profile of its workforce. Small face-

to-face workshops and visual materials were put in place for manufacturing employees. Written and electronic communication was used for office-based employees. Other materials created by participating organisations include newsletters and apps.

4.3.2 Standardisation of materials was challenging due to organisations having different needs

Some organisations adapted the frequently asked questions materials provided by DHSC to produce their own guidance. This meant that DHSC was sometimes unsighted about what information was being provided to employees about the workplace testing scheme.

Some organisations reported experiencing a delay in receiving responses from DHSC when new queries were raised by employees, which impacted on employees' confidence in the testing scheme. This is likely to be one contributing factor to the low perception of on-going support reported by site administrators above in section 4.1.

4.3.3 Eligibility criteria to participate in DCT

Although the SOP permitted household contacts to participate in DCT, some organisations chose not to include them.

Where this happened, we heard that the exclusion of household contacts from DCT (in contrast to contacts in other contexts) was not clearly communicated to employees. Some employees who were household contacts did not understand why they were excluded from taking part.

“As with everything, communicating who can take part and why has been hardest. More detail should be available about the reasons why a particular group cannot take part. We have had to explain many times why people who live with a positive case or someone with symptoms cannot take part. It's all common sense, but the fear of this virus drives people to behave incorrectly; some coming to seek a test with symptoms.”

(Online survey comment, site administrator)

4.3.4 Interpreting how long a negative LFD result was valid for

Respondents reported that guidance requiring people to wait for test results in a holding area (so that anyone testing positive would not spread infection) before going into the workplace was inconsistently followed. This was due to differing interpretation of guidance indicating that a negative test result could mean an individual was free to work for the next 24 to 36 hours. Some interpreted this as meaning that employees who tested a day before did not have to wait for their most recent results before starting their shift because the negative result from the previous day was still valid.

“You need to wait only on the first day. The second day, as long as you test negative on the first day, the second day when you take the test they will just say just go and they will email

the results.”

(Interview with DCT participant)

4.3.5 DCT sometimes not recognised by contact tracers

From the in-depth interviews, we found that organisations needed more support in helping to prove to employees the credibility of DCT and to demonstrate that it was an officially sanctioned public health intervention. This affected their confidence in the programme and presented some operational challenges.

“The primary issue was the acceptance of employees to undergo the testing. Even with the letter and official documentation, they didn’t believe it was real. They were worried they did something illegal. [DHSC] didn’t back us so that really undermined the success. The police turned up 9 times, called by our employees.”

(Interview with site administrator)

There were instances where the credibility of DCT was particularly undermined when individuals were contacted by DHSC incorrectly requesting them to self-isolate despite their participation in the pilot. This created a sense of anxiety and instances when individuals were reluctant to take part in DCT for fear of being fined. This happened because some DHSC staff were unaware of the pilot.

4.4 To what extent did organisations successfully communicate to employees that participation in DCT was optional?

4.4.1 Employers’ experience of recording consent and communicating options

Employers and site administrators who took part in interviews reported having conscientiously and systematically recorded consent from employees taking part in DCT. Employees’ anonymity was protected by using barcodes on paper slips provided by DHSC. In one organisation, employees were asked to sign consent letters with every daily test received. According to employers, the optional nature of DCT was communicated clearly and repeatedly to employees through various media including verbal briefing, letters and emails:

“We made it clear that it was optional, and they could stop anytime.”

(Interview with site administrator)

“The plants got all the process leaders into a communication event to explain that people could opt in or opt out. It was very clear that it was not mandatory.”

(Interview with site administrator)

4.4.2 Employees' experience of giving consent

Although site administrators felt that the voluntary nature of DCT had been communicated, some employees perceived DCT as being implicitly mandatory and reported feeling obliged to take part. 37% percent of survey respondents who took part in DCT said that their employer wanted them to do it and 18% said they felt compelled. (42% selected one or both options.) Generally, the sense of obligation resulted from the perceived tone adopted with employees and the automatic process of managers booking in testing slots for an employee according to their shift patterns, and prior to discussing their options with them.

“It is more of something we have to do rather than something that they would choose to do because we are told we are not allowed to self-isolate for 10-days, we have to have the test. As soon as the testing site went live at [organisation] it happened. It is phrased in the way that you go and have the test voluntarily but if you don't have it, they put you on sick.”
(Interview with DCT participant)

“I was at work for the whole day and then receive a call that the person I was working with the day before tested positive and could I go for a rapid test. There was no... ‘would you like to?’, or ‘you can do this instead,’ it was, ‘please can you come in tomorrow?’.”
(Interview with DCT participant)

In some of the pilot organisations, those who self-isolated lost certain pay benefits in terms of shift allowance or were placed on Statutory Sick Pay (SSP). Some individuals mentioned that self-isolation would be viewed as a ‘sick day’ going on an employment record.

“Employer is saying you must come in for the lateral flow test, for the sake of my job you know what I mean. If I lose my job in this climate, I don't know what I will do.”
(Interview with DCT participant)

4.5 What aspects of the DCT programme could be improved to make the service more likely to succeed?

4.5.1 Careful consideration of the type of industry and workforce profile

A gap in the initial design of the DCT service was reported by employees who were working night shifts. Organisations running on shift patterns had to have strong project management capabilities to facilitate their staff complying with up to 7 days of testing at different times of the day and night.

A report from one organisation described the missed opportunity for a night shift employee who received a self-isolation notification at one o'clock in the morning when the testing facility

was closed. This resulted in the loss of shift allowance as the employee had to leave the premises to self-isolate and start DCT only on the following shift.

“The only thing I will criticise is working night shift, after 12 o’clock in the night there is no availability to get tested. If I was to ping at 1am, I will have to go home, there is no way I could go and get a test, wait for the results and go back to work. There is no option at all. You will lose your shift allowance. There is company protection onsite 24/7, if they were trained to do the test, the manager can phone up to book a test, get the test done, and go back to work.”
(Interview with DCT participant)

We also heard of a missed opportunity at another organisation to participate in DCT. This was because of a mismatch of the testing facility opening hours and the location of the testing facility, which was not convenient for a night shift working pattern of a parent with dependent children.

“I am happy to go for it not a problem and got told the only time I could go for testing is between 9am and 5pm in the daytime [works 1am to 9am]... [My partner] is not readily available to drop work [for childcare] for me to go for testing. It was put to me it was only 20 minutes but by the time I included my travel there and home you are looking at one to one and a half hours. I was told I need to go 7 days straight on my days off...with my family life it was just not an option.”
(Interview with self-isolator)

These examples illustrate the need for testing facilities to match the working patterns of the workforce.

We also heard about the importance of considering how employees travel to work. The majority of respondents to the survey (93%) either drove or walked to the test area. Respondents said that it was easier for these people to participate in DCT than those who took public transport.

Those using public transport had concerns about travelling before they had been tested that day. And they were also concerned about getting home if they subsequently tested positive.

“The only objection you tend to get from employees participating is that they may have to travel on public transport before they have the test, and they do feel a little uncomfortable about this. Lots do cycle or own their own car, so for a few people this is in their mind.”
(Online survey comment)

4.5.2 Reviewing the lead time for the implementation of DCT

Participating organisations reported that the time set between obtaining the official approval for DCT and getting employees engaged was too brief. They felt a longer lead time between

DHSC approval of the scheme and the launch of DCT in the organisation would help improve operational effectiveness in the initial stages.

In particular, employers said that an extended preparation period would allow organisations to collaborate with their trade unions and pre-empt any escalation of tensions that may jeopardise the success of the DCT programme.

4.5.3 Reinforcing pre-existing guidelines on COVID-safe behaviours

Interviews with employers suggested that an existing strong foundation, experience and capability of maintaining COVID-safe behaviours prior to the introduction of DCT facilitated the introduction and implementation of DCT. This was also observed to be an important enabling factor for those in the workplace to feel safe working alongside participants of DCT.

We heard that organisations with a mixed workforce of full-time employees and agency employees experienced challenges with maintaining good health and safety standards across a diverse workforce.

3.5.4 Official recognition of the DCT scheme

Respondents suggested the level of employee engagement was strongly influenced by the perceived legality – or lack thereof – of the DCT scheme. Both employers and employees expressed the need for DHSC to officially acknowledge and publicly endorse the DCT pilot and support employees taking part in the testing programme as an alternative to self-isolation.

Some employees of organisations were uncertain of the credibility of DCT with no prior information given to employees on the background of the testing scheme, its objectives and the authoritative body.

Additionally, participants felt greater recognition of the DCT scheme across DHSC could prevent conflicting messages from different parts of their organisations. We heard reports of employees who felt uncertain of the testing scheme calling 119 and being told that DCT was not recognised and not self-isolating was unlawful. That further decreased employees' confidence to participate. Some employees received self-isolation notices from the NHS COVID-19 App and felt uncomfortable not following the self-isolation countdown timer.

4.5.5 Closer working with trade unions so that financial arrangements underpinning DCT are perceived to present a fair choice to those eligible

Concerns were expressed by some employees and line managers about the extent to which participation in DCT was genuinely optional if employees were financially penalised for deciding instead to self-isolate.

“Raised a complaint through the union. It is going to be difficult because I know there will be many who are contract people, if they can’t work, they like the opportunity to get paid. I fully understand. I’d rather a system in place where they isolated and have support in place through isolation.”

(Interview with others in the workplace)

4.5.6 Consideration of employees who are not part of DCT

Respondents highlighted the importance of considering the needs of employees who were not eligible for DCT but are exposed to the risk of working alongside participants. Participants understood the risk of testing positive during DCT and therefore the importance of adhering to COVID-safe behaviours to protect their co-workers.

4.5.7 Reviewing logistics

Site administrators in all the pilot organisations we spoke to experienced delays in the delivery of testing kits, missing orders as well as poor communication from the supplier concerning when tests would arrive.

4.5.8 Need for streamlined and accessible training materials

Training materials provided by DHSC had to be adjusted by every organisation to suit the needs of its workforce. Site administrators reported having to review a large amount of the materials and mentioned the need for it to be tailored to different roles. In particular, several testing site administrators expressed the need for training videos and e-learning in addition to written guides.

“A lot of communication to read through initially – 140 page document not sure we needed all of that?”

(Online survey comment, site administrator)

4.5.9 Timely communication and support from DHSC

There was some degree of confusion across all organisations regarding DHSC data requirements. For many, clarification was provided a few weeks after the start of the programme and therefore was not sufficiently timely.

“Be clear upfront with what data you expect with what frequency and get agreement with the ability to provide you with that information.”

(Interview with employer)

One challenge identified by organisations was the inability to confidently address questions from employees and trade unions in a timely manner. Supporting clinical evidence such as frequently asked questions by DHSC was reported as not being readily available upon

request. As a result, some employees doubted the legality of the scheme and its compatibility with official guidelines.

4.5.10 Perception of reliability of LFD tests

It was reportedly challenging for organisations to manage expectations among employees who did not agree with the use of lateral flow tests as a replacement to self-isolation.

“I am shocked by [organisation] doing this. I know there are a lot of pressure on us at the moment as a company. It is really difficult to keep production running. Production is how we exist so I am sure there is pressure on the company to do everything they can to minimise the number of people who have to go home and isolate. I understand that pressure, but I think they have done the wrong thing trying to keep people in work, by using this lateral flow test.”
(Interview with employee)

Members of the workforce who had heard media reports questioning the efficacy of LFDs struggled to accept the testing regime as an alternative to self-isolation.

“The lateral flow test is not a Red, Green test. It is a Red, Don’t Know test. We know that the test is exceptionally poor when people are pre-symptomatic.”
(Interview with others in workplace)

Some respondents said that these doubts were allayed by a series of results.

“It is something you got to be aware of isn’t it? I presume there is false positives and false negatives. This is one of the reasons why I am glad it is not just one test. You have several tests and they can’t be all false negative or false positives can they?”
(Interview with DCT participant)

Some organisations created their own marketing materials to engage their employees by explaining why LFD tests were sufficiently accurate and reliable to use in this context.

“The managing director sent briefing emails daily throughout the week leading up to the start of serial testing of contacts. Additional communications were sent the day testing of contacts started and regular information has been fed in regularly since then.”
(Interview with site administrators)

Survey results demonstrated 69% trusted LFDs a ‘fair amount’ or a ‘great deal’ but a quarter (26%) either had ‘no trust’ in them at all, or ‘not very much’ trust’.

4.5.11 Lessons learnt

As the pilot progressed and issues arose, we compiled a list of ‘lessons learnt’, which we have included in [Annexe 1](#), and which will be helpful in any subsequent implementation of DCT.

5. Findings: public health

5.1 What effect does DCT have on the spread of infection in the workplace? Does it increase or decrease compared to self-isolation?

As long as DCT participants continue to test negative and remain asymptomatic, they are not required to self-isolate. A potential risk of this relaxation of the requirement to self-isolate is that it may lead to more transmission. For example, if someone receives a false negative result, or becomes infectious during the working day, then they could transmit the virus at work. Close contacts are more likely to test positive than the general population, so the baseline positivity rate of DCT participants is expected to be higher than average (3).

On the other hand, there are some ways in which DCT could plausibly reduce transmission through altering people's behaviour. Those with asymptomatic infections may be more likely to comply with self-isolation if they have a positive test result, reinforcing the need to isolate. DCT could also lead people to report more of their close contacts, if they know they will not necessarily have to self-isolate. Finally, the identification of new asymptomatic cases means that close contacts of those cases can then be traced as well. Modelling suggests that, if implemented effectively, DCT may be as effective as self-isolation at reducing transmission (1, 4).

Our survey data supports the hypothesis that DCT makes people more willing to report close contacts. This is discussed in section 5.2 below. But we have not been able to test the other assumptions with the data available. Instead, we have attempted to measure the overall effect of DCT on transmission by looking for any signals in testing data of increased transmission among DCT participants at a site level.

Because we were unable to distinguish DCT tests from routine asymptomatic tests in the testing data, we compared aggregated data from DCT and non-DCT testing sites using 4 approaches:

- overall positivity rates
- change in positivity rates over time
- number of weeks with unusually high positivity
- clustering of positive test results

These analyses are summarised in box 1 below, with further details provided in subsequent sections.

There was no significant difference evident in these analyses between transmission rates in DCT sites compared to non-DCT sites.

This should not be taken as strong evidence that DCT is safe, because we may not have detected small effects on transmission in the aggregated data. As the proportion of non-DCT tests included in the data set becomes larger, the effect of the DCT tests on the overall positivity rate becomes smaller. It is then more likely to fall below the threshold of statistical significance.

Box 1. Summary of analysis

We compared testing data between DCT and non-DCT testing sites to look for signs of on-site transmission:

Comparison 1 – Overall positivity rates

If DCT were leading to increased transmission we might expect to see higher positivity on DCT sites. Overall positivity rates were higher on DCT sites than non-DCT sites, but the cause is unlikely to be DCT itself. DCT allocation was not randomised, and the sites participating in DCT had higher positivity rates to begin with. The difference is present from the start of the pilot period.

Comparison 2 – Change in positivity over time

If DCT were leading to increased transmission we might expect positivity rates to rise over time, or to fall more slowly than at non-DCT sites. We found that positivity rates fell at both kinds of site during the period, and there was no significant difference in the rate of decrease between DCT and non-DCT sites.

Comparison 3 – Weeks with an unusually high positivity

If DCT were leading to increased transmission we might expect more outbreaks to occur, where large numbers of people contract COVID-19 in a short space of time. We looked for weeks across both kinds of site where the positivity was unusually large. Only 3 sites were identified by our criteria, and all were non-DCT.

Comparison 4 – Clustering of positive test results

If positive tests on a site tend to occur close together in time then this could be a sign that transmission is taking place between participating individuals.

We started with the number of positives you would predict for each week in each site if:

- the background prevalence were constant in each site

- positive tests were independent

And then we plotted the divergence for each week from that prediction. We found no differences between the 2 kinds of site.

Using these comparisons, we did not find any evidence of increased or decreased transmission among DCT sites compared to non-DCT sites.

Given its acknowledged limitations, our analysis alone should not be taken as strong evidence that DCT was equivalent to self-isolation, only that any difference did not have a large enough effect to be detected in the aggregated data.

Analysis supporting the conclusions in Box 1 is detailed in the following sections.

The data is taken from the first 8 weeks of 2021 (week 2 commenced on Sunday 3 January). The DCT site group consisted of the test sites from 2 organisations who were using DCT during almost all of the period (one started in December 2020 and one started on 11 January).

The non-DCT site group consisted of all private sector workplace asymptomatic testing sites where DCT has not so far been used (as of 1 March). This choice of grouping means that we do not have to take into account test sites changing status from non-DCT to DCT part way through the period.

All Pillar 2⁴ LFD and PCR tests from individuals who attended a site during the period in question are counted, even if the test did not take place on site. In the rare cases where an individual has tested at more than one test site in the 2 comparison groups, they are linked to the first site that they were tested at during the period. We assume that likelihood of detecting cases was equal across sites where asymptomatic testing was used, which may be a conservative assumption given we may expect sites undertaking DCT to have more stringent testing regimes, which would tend to push up their observed infection rates.

For the purposes of this analysis, if an LFD test is followed within 5 days by a PCR test from the same individual, the LFD test is ignored. (Confirmatory PCRs were in use towards the start of this period but were no longer a requirement by the end.) This ensures that the PCR result is given priority over the LFD result (a negative PCR result will override a preceding positive LFD result if taken within 5 days), and that the pair of tests is only counted once, even if it spans 2 weeks. We have not attempted to correct for false positive LFD results which are not accompanied by a confirmatory PCR.

⁴ Pillar 2 testing covers swab testing of the wider population, as set out in government guidance. It excludes swab testing in Public Health England (PHE) labs and NHS hospitals for those with a clinical need, and health and care workers.

Individuals were linked in the testing data using fuzzy matching based on name, postcode, gender, date of birth, and NHS number (where available).

5.1.1 Comparison 1 - positivity at DCT sites versus non-DCT sites

Table 6 displays testing data from DCT and non-DCT sites during the comparison period. This data is restricted to only those sites that were operating through the entire period.

Table 6. Testing data from DCT and non-DCT private sector workplace testing sites during the first 8 weeks of 2021, for those sites which were testing throughout the entire period. Week 2 commenced on Sunday 3 January.

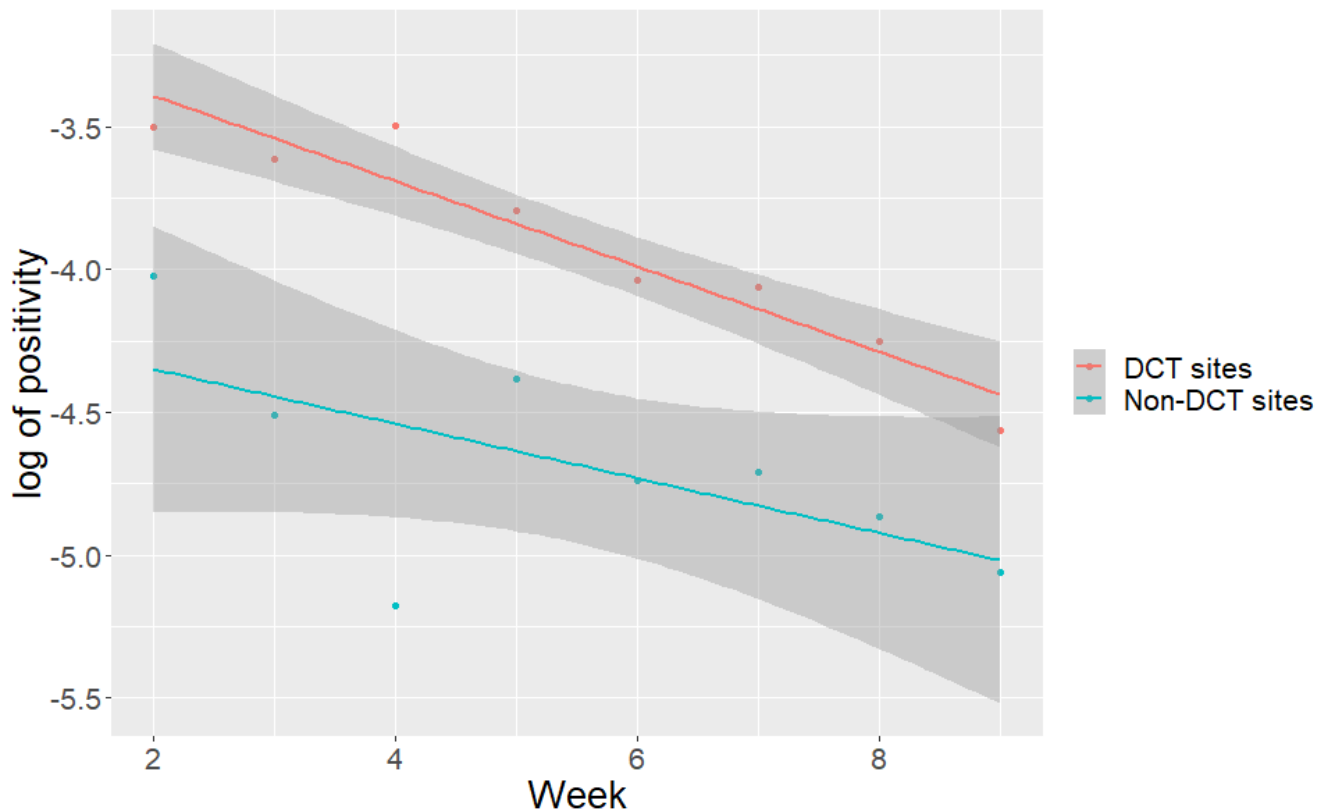
| Of all those who were tested with an LFD at one of these sites at any point during weeks 2 to 9 | | | | | | |
|-------------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------------------------------------------|------------|---------------------------------------------|-----------------------------------------------------------|------------|
| DCT sites (n=43) | | | | Non-DCT sites (n=27) | | |
| Week | # people having a LFD or PCR test this week | # people testing positive on an LFD or PCR test this week | Positivity | # people having a LFD or PCR test this week | # people testing positive on an LFD or PCR test this week | Positivity |
| 2 | 5,678 | 171 | 3.01% | 2,285 | 41 | 1.79% |
| 3 | 6,317 | 170 | 2.69% | 2,273 | 25 | 1.10% |
| 4 | 5,972 | 181 | 3.03% | 2,309 | 13 | 0.56% |
| 5 | 5,541 | 125 | 2.26% | 2,398 | 30 | 1.25% |
| 6 | 5,841 | 103 | 1.76% | 2,395 | 21 | 0.88% |
| 7 | 5,467 | 94 | 1.72% | 2,331 | 21 | 0.90% |
| 8 | 4,996 | 71 | 1.42% | 2,470 | 19 | 0.77% |
| 9 | 4,978 | 52 | 1.04% | 2,686 | 17 | 0.63% |

Positivity at DCT sites was higher than at non-DCT sites in each of the 8 weeks. The cause of the higher positivity in DCT sites is unlikely to be DCT itself, as positivity is higher from the very start of the period. Allocation of DCT and non-DCT sites was not randomised, and it seems to have been the case that sites undertaking DCT had higher positivity to begin with.

5.1.2 Comparison 2: change in positivity over time in DCT sites vs non-DCT sites

We plotted the positivity on a log scale against time and applied linear regression to compare the rate of change in positivity at the 2 kinds of site. The results are displayed in figure 3 below.

Figure 3. Log of the overall positivity rate for individuals from DCT and non-DCT workplaces, against time



Positivity has fallen at both types of site, and there is no statistically significant difference in the rate of decrease of the positivity between DCT and non-DCT sites. The gradients and associated standard errors are displayed in table 7 below.

Table 7. Results of linear regression of log positivity against week

| | Gradient of regression line | Standard error |
|---------------|------------------------------------|-----------------------|
| DCT Sites | -0.149 | 0.018 |
| Non-DCT sites | -0.096 | 0.049 |

5.1.3 Comparison 3: “outbreaks” in DCT versus non-DCT sites

Another potential warning sign of increased transmission would be if there were some weeks in some sites with an unusually large positivity rate, which could be associated with an outbreak. We have attempted to look for signs of this in both DCT and non-DCT sites.

Defining what ‘unusually large’ means is difficult. DCT sites have a higher baseline positivity to begin with, and some site weeks with a very large positivity only involve a small number of total tests, so that the large value is not statistically significant. We chose 10% as our threshold positivity, we excluded site weeks where fewer than 10 individuals were tested in total, and for remaining site weeks with a positivity greater than 10% we measured the

difference in multiples of a standard deviation estimate ($\frac{\sqrt{p(1-p)}}{2\sqrt{n}}$), to get a z-score, where p is the positivity and n is the number of individuals tested. We used the resulting score to sort the sites and look for outliers. We adopted this criterion because it was able to successfully identify a site week as an outlier where we knew that an outbreak had been declared by PHE (although this outbreak occurred outside the time window covered by this analysis).

After removing site weeks with fewer than 10 individuals tested in total, only 3 site weeks had a positivity of 10% or above, across 3 different sites. All were non-DCT sites, and all had small z-scores. Details are given in table 8 below. This would suggest that there were no clear signs that DCT sites saw unusually large positivity rates compared to non-DCT sites.

Table 8. Test site weeks with an unusually large positivity rate (greater than 10%)

| | DCT? | Week | Individuals tested | Individuals positive | z-score |
|--------|------|------|--------------------|----------------------|---------|
| Site A | No | 2 | 14 | 3 | 1.04 |
| Site B | No | 5 | 22 | 3 | 0.50 |
| Site C | No | 5 | 20 | 2 | 0.00 |

One limitation of this approach is that we know there are instances where multiple separate physical sites from the same organisation were given the same site code. This is likely to have diluted the effect of outbreaks on the data.

We have also checked how the results would change if a different threshold were chosen. With a 7.5% threshold, the same analysis identifies 4 DCT site weeks and 5 non-DCT site weeks as having unusually high positivity, so there is still no sign that DCT sites have more outbreaks. With a 5% threshold, 25 DCT site weeks and 16 non-DCT site weeks were flagged. The DCT sites now do look worse at this threshold, although we should expect this to happen at some point as the threshold is lowered, because we have already seen that the baseline positivity on DCT sites is higher.

After the study period, a spike of cases was reported in a new DCT site with 13 cases across 2 weeks. Inclusion of this case, even without additional comparison sites, would not have affected the other comparisons, although would have shown up as 2 additional DCT clusters in the table above (from the same site), with z-scores 1.76 and 1.42 (8 out of 36 and 5 out of 22).

5.1.4 Comparison 4: positive test clusters in DCT vs non-DCT sites

The 10% positivity threshold used above may mask clusters of cases that occur on a smaller scale. An alternative way to look for signals of on-site transmission is not to focus on the overall positivity, but instead to look at how positive cases are grouped together over time. If

positive tests tend to occur close to each other in clusters then this is evidence that transmission may be taking place between the participating individuals.

If background prevalence were constant, and positive results were independent, then the number of positive individuals each week would vary randomly, according to a Poisson distribution. Some weeks would see more cases, and some weeks less, but the positivity rate in any particular week should not be too far from the average across the whole period.

In reality, positive cases will be clustered together more than you would expect by chance. This is for 2 reasons:

1. Background prevalence is changing over time. This means the positive results are more likely to occur close together in the weeks with higher prevalence, instead of being spread out evenly across the period.
2. People at the workplace are likely to be infecting each other (or getting infected from the same people).

If the effect of changing background prevalence on clustering is similar between the DCT and non-DCT sites, then any differences in the amount of clustering might be attributable to differences in the amount of transmission taking place on site (though different transmission rates could still be explained by other infection control measures in the 2 kinds of workplace, rather than being caused by DCT).

We have looked for evidence of this effect in data from the DCT and non-DCT sites presented above using the following procedure:

1. Restrict to test sites which have been conducting tests over the entire period.
2. For each test site, sum the number of people who test positive in each week (either on an LFD or PCR, out of all those who had at least one LFD test at the site during the entire period) (A), then sum the number of people tested each week (out of all those people who had at least one LFD test at the site during the entire period) (B), and then divide (A) by (B), to get an estimate of the probability that an individual will test positive in a random week (given that they are tested that week).
3. For each week in each test site, predict how many positive individuals there should have been (if background prevalence were constant) by multiplying the estimate from step 2 by the number of individuals tested that week (out of all individuals who had a LFD test at the site at some point).
4. For each week, find the difference between the observed number of positive individuals and the prediction, measured in multiples of the square root of the prediction (this would be the standard deviation of the distribution if the positive tests were independent).
5. Look for weeks in each test site where the observed number of positives is far above the prediction on the above measure. This is a sign that the 2 assumptions are violated. Are there significantly more outliers in one group versus the other?

Table 9 gives counts of the weeks in each test site with an unusually high number of positives.

Table 9. The tails of the DCT and non-DCT distributions. Each row counts the number of test site weeks where the number of positives exceeded the prediction by more than the amount specified in column A.

| (A) Multiples of the square root of the prediction | DCT sites | | Non-DCT sites | |
|----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| | Proportion of DCT site weeks where the positives exceeded the prediction by more than A | Number of DCT site weeks where the positives exceeded the prediction by more than A | Proportion of non- DCT site weeks where the positives exceeded the prediction by more than A | Number of non- DCT site weeks where the positives exceeded the prediction by more than A |
| 2 | 7.6% | 26 out of 344 | 7.4% | 16 out of 216 |
| 2.5 | 4.4% | 15 out of 344 | 4.6% | 10 out of 216 |
| 3 | 2.3% | 8 out of 344 | 2.3% | 5 out of 216 |
| 3.5 | 0.9% | 3 out of 344 | 2.3% | 5 out of 216 |
| 4 | 0.3% | 1 out of 344 | 0.9% | 2 out of 216 |
| 4.5 | 0.0% | 0 out of 344 | 0.5% | 1 out of 216 |
| 5 | 0.0% | 0 out of 344 | 0.5% | 1 out of 216 |

The DCT and non-DCT groups appear broadly similar, suggesting that there were no clear indications of clusters of cases associated with DCT.

5.1.5 Limitations

There are some important limitations with the above comparisons:

1. Asymptomatic infections among contacts will be identified for people who attend the DCT sites, but not necessarily for those who attend the non-DCT sites, since they should be self-isolating and not tested unless they develop symptoms. (This affects all comparisons.)
2. It was not possible in this analysis to control for other COVID-secure measures on site. (Affects all comparisons.)
3. Multiple sites from the same organisation were sometimes given the same site code, which will have diluted the effect of outbreaks and clusters in the data. It is harder to pick up signals of clustering as the sites become larger. If we modelled each site as a collection of independent bubbles, then the overall number of positives would still be the sum of many independent random variables, and should approach a normal distribution as the number of bubbles becomes large, with signals of clustering lost in the noise. (Affects comparisons 3 and 4.)

4. Background prevalence is changing throughout the time period in question, and this also leads to clustering of positive cases. (Affects comparison 4.)

The first limitation would lead to higher positivity and more positive test clusters in DCT sites compared to non-DCT sites.

The second limitation could have affected results in either direction.

The third limitation should cause more clusters in the non-DCT sites in comparison 4, as these tended to be smaller: non-DCT sites had 87 individuals tested per site per week, while DCT sites had 130.

The final limitation should, if anything, cause more clusters in DCT sites, because the fall in positivity rates over time in DCT sites was larger in absolute terms than on non-DCT sites, and similar on a log scale.

To address the third and fourth limitations in comparison 4, we have repeated the cluster analysis only looking at weeks 6 to 9, where the positivity figures are slightly more stable, and where the average number of people tested per site per week is comparable (123 at non-DCT sites versus 121 at DCT sites). We can now include more test sites in this analysis, since more had started testing by week 6, although the shorter time period may make it harder to identify clustering. The results are in table 10.

Table 10. The tails of the DCT and non-DCT distributions. Each row counts the number of test site weeks where the number of positives exceeded the prediction by more than the amount specified in column A. Only weeks 6 to 9 are counted.

| (A) Multiples of the square root of the prediction | DCT sites | | Non-DCT sites | |
|-------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| | Proportion of DCT site weeks where the positives exceeded the prediction by more than A | Number of DCT site weeks where the positives exceeded the prediction by more than A | Proportion of non- DCT site weeks where the positives exceeded the prediction by more than A | Number of non- DCT site weeks where the positives exceeded the prediction by more than A |
| 2 | 1.8% | 4 out of 224 | 2.1% | 8 out of 376 |
| 2.5 | 0.9% | 2 out of 224 | 0.5% | 2 out of 376 |
| 3 | 0.0% | 0 out of 224 | 0.5% | 2 out of 376 |
| 3.5 | 0.0% | 0 out of 224 | 0.3% | 1 out of 376 |
| 4 | 0.0% | 0 out of 224 | 0.3% | 1 out of 376 |
| 4.5 | 0.0% | 0 out of 224 | 0.3% | 1 out of 376 |
| 5 | 0.0% | 0 out of 224 | 0.3% | 1 out of 376 |

There are still no worrying signs of more clusters in the DCT sites. If anything, clustering appears higher in non-DCT sites, although this is caused by only 2 data points.

5.2 Is DCT effective at finding infected contacts before they become symptomatic?

We heard of instances where there was a perception that more contacts were being identified through DCT compared to via the NHS COVID-19 App notification or DHSC contact tracers. The main reason was employees were self-identifying and reporting themselves to their line manager if they were in contact with someone who has symptoms or testing positive for COVID-19. DCT participants who tested positive with an LFD or knew someone who tested positive as part of DCT acknowledged that the workplace testing programme identified positive cases that could otherwise go unknown.

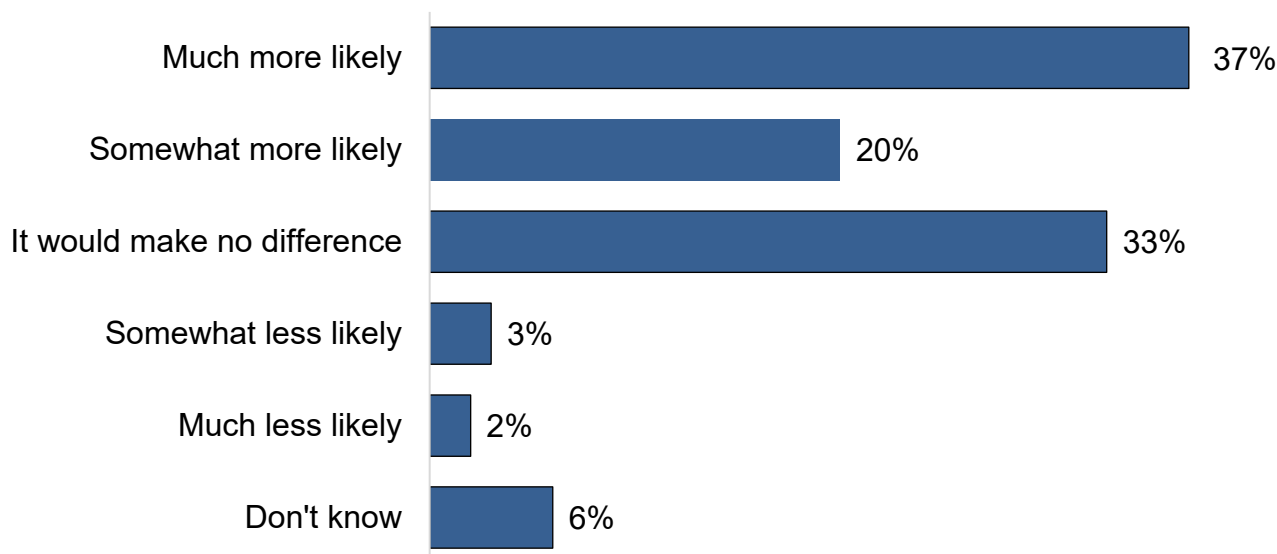
DCT participants reported that they had been informed that they were contacts by the NHS COVID-19 app and that they had to self-isolate. A minority of the participants we spoke to had self-identified as contacts – and some of these as contacts of household cases, even though participating in DCT as a household contact is not in line with the SOP. Some of this group reported for DCT even before their household member received their PCR test result.

“If I hadn’t signed up and got tested, I wouldn’t have been able to come into work. I would have had to self-isolate with my wife having symptoms.”

(Interview with DCT participant)

Nearly 3 in every 5 (57%) of those asked reported being more likely to give contact details if DCT was available, indicating that DCT would support in identifying potential transmission cases. Amongst those who had participated in DCT, the reported likelihood of providing contacts was even higher (62%).

Figure 4. Likelihood of providing contacts details if DCT available



Q. If you had a positive test in the future and you knew that your contacts would be able to have daily testing (instead of self-isolating), would you be more or less likely to give their contact details?

Base: All individuals in DCT pilot organisations asked question (which was introduced part-way through fieldwork) (993)

But there were some comments in the in-depth interviews that employees were being discouraged by their workplace to disclose contacts of co-workers when contacted by DHSC. And employees suggested there was some confusion about when and when not to use the contact tracing function of the NHS COVID-19 app in a workplace.

“I was talking to one colleague at work who told me that one manager actually told them to delete the Test and Trace app from their phones...”

(Interview with DCT participant)

“We are actively told not to give that information to track and trace. They say that if you are wearing a mask and you are following the rules of social distancing there is no reason to give the names of your co-workers that you are possibly infected. I couldn’t believe it. I thought it was a joke at first but no, there were managers that were telling people not to give that information out because they have been following the socially distant rules.”

(Interview with DCT participant)

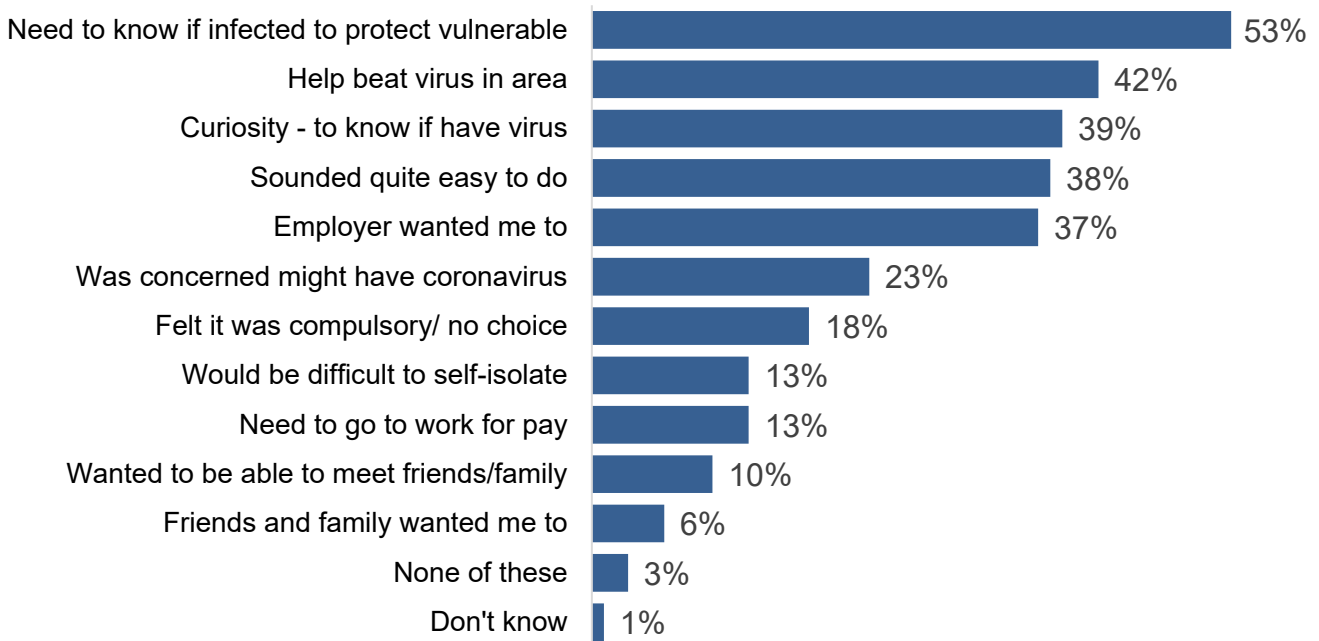
6. Findings: behaviours

6.1 Why do people agree to participate in DCT (rather than self-isolate)?

6.1.1 Main drivers for participation

People reported agreeing to take part in DCT for a mix of reasons. The main drivers centred around civic duty (protect the vulnerable and beat virus), curiosity, the ease of the process and a sense that their employer wanted them to do it. But 1 in every 10 participants also said that a reason for taking part was to be able to meet friends and family.

Figure 5. Reasons for taking part in DCT



Q. Which of these reasons, if any, best describe why you decided to take part in the daily testing?

Base: Individuals participating in DCT and answering (389)

As described above and illustrated in Figure 5, some employees perceived DCT as being implicitly mandatory and reported feeling obliged to take part. 37% of survey respondents who took part in DCT claimed that either their employer wanted them to do it and 18% said they felt compelled (42% selected one or both of these options).

The impact of sick leave on job security was also factored in by some – and in some cases this was seen as a compulsion to participate in DCT.

6.1.2 Financial considerations play a role in DCT uptake, especially for those on lower wages and working shifts

People reported having weighed up the financial consequences of participating in DCT versus self-isolation. DCT presented an opportunity to maintain income for those on pro-rata wages, those who regularly worked overtime and some agency workers.

“I don’t have a big wage. Even a small dip in my income in makes a difference you know.”
(Interview with others in the workplace)

“As soon as the testing site went live it happened. It is phrased in the way that you go and have the test voluntarily but if you don’t have it, they put you on sick.”
(Interview with DCT participant)

There were examples of policies in organisations that affected people’s financial considerations. In one organisation where shift working was common, those who could not work kept their core pay but lost their shift allowance. Another organisation made the decision to pay SSP when DCT was introduced in the workplace when employees decide to self-isolate as their option. This prompted unsupportive reactions from trade unions.

“There was discussion if it would be SSP – there was quite a bit of concern over that. I am not aware of anybody put on SSP... Without doubt it would have pressurised, let’s be honest about this. If rumours were coming around that is happening in other areas, that is a considerable pressure that would influence your decision on what to do, wouldn’t it?”
(Interview with DCT participant)

6.2 What are the barriers to participating in DCT?

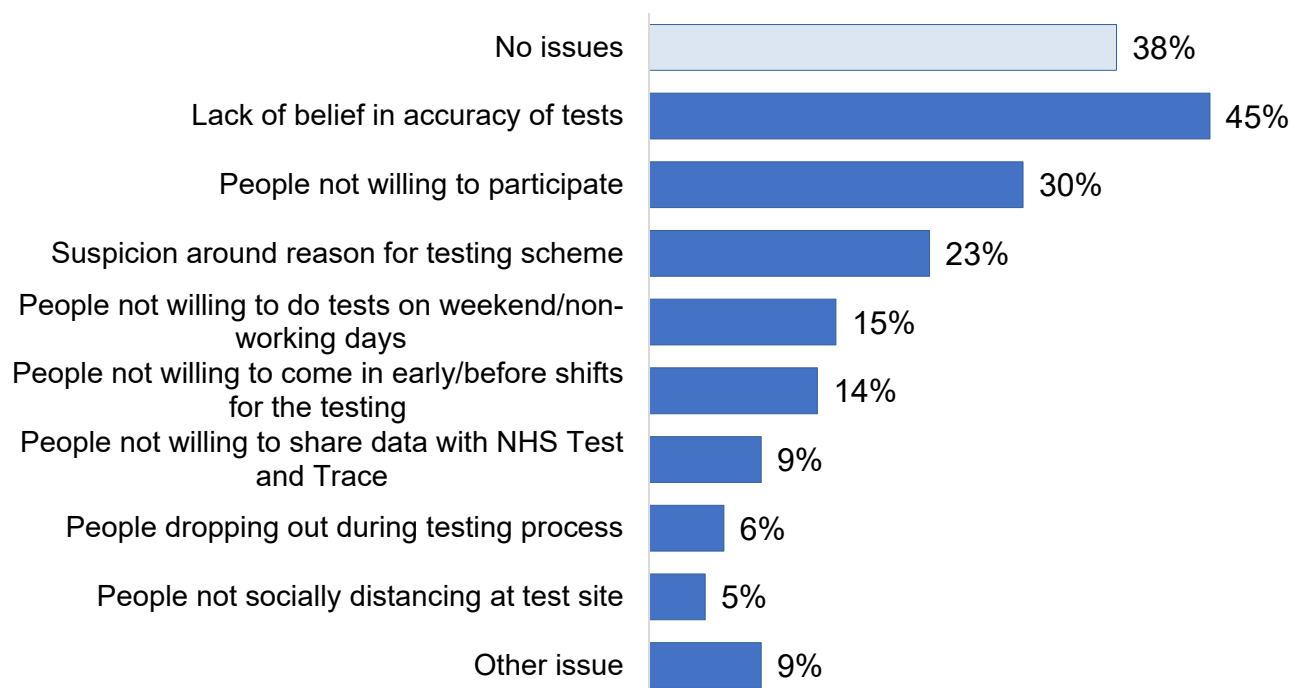
More than half (58%) of site administrators completing the survey reported that they had had a member of staff who decided to self-isolate rather than participate in DCT. The 2 most widely cited reasons given by site administrators were that staff preferred to take time off (55% of those with staff who self-isolated), or that it was easier for staff to self-isolate than undergo DCT (53%).

But our research also uncovered other factors that led people to self-isolate, or which made them feel less comfortable with DCT (even though they may have still participated).

6.2.1 Doubts about the accuracy of LFDs

People reported having heard stories in the media questioning the reliability of LFDs, which affected their confidence in the efficacy of DCT in mitigating the risk of infection. This was cited by 45% of site administrators as an issue for staff participation in DCT (Figure 6).

Figure 6. Issues for participation in DCT (site administrators)



Q. What issues, if any, did you have in terms of participation in the daily testing?

Base: Site administrators (66)

Two-thirds (69%) trusted LFDs a ‘fair amount’ or a ‘great deal’ but a quarter (26%) had ‘no’ or ‘not very much’ trust in them.⁵ In the in-depth interviews, employees recognised and talked about PCR tests as the ‘NHS test’, perhaps reflecting the branding used at test sites. We heard reports of participants following up with a PCR test during the period of DCT.

“...the flow test is obviously not an NHS test so I see it as... I’m not saying it is not 100% but obviously to be tested positive, you need an NHS test to be done.”

(Interview with DCT participant)

“Nothing has been briefed out from the Government or the NHS but the employer suggests that the lateral flow test is 100% effective to find COVID-19 cases...people are going for the NHS test (PCR) even with the lateral flow. So the lateral flow test is neither here nor there. I went out for an NHS test on the weekend because I don’t trust the lateral flow test.”

(Interview with DCT participant)

More positively, respondents reported that confidence in lateral flow tests improved through the personal experience of completing 7 days of testing (or through repeated testing more broadly), and the continued reporting of a negative test result.

“I was definitely still conscious until my 7 days was up completely. When there is 7 negative tests produced I feel a lot safer. I was interacting with people the same of course, maintaining

⁵ Survey question introduced 1 February, results based on 411 responses.

the guidelines like social distance and hand washing. First time, sceptical. But after the 7 days, all testing, felt better about it. Surely one of them would have tested positive if I had it? Would say it's a better option to do rather than just isolating."

(Interview with DCT participant)

6.2.2 Underlying concern about infecting others during the DCT period

People spoke of being concerned about infecting others when not self-isolating. Sometimes this was a generalised concern, but it was sometimes with specific reference to their journey to and from their place of work.

There were particular concerns about travelling back home if they tested positive at the workplace. The majority of participants in the survey either drove or walked to the test area (93%). Consideration needs to be made to ensure that those who need to travel on public transport to get to work do not feel that they are excluded from DCT.

"I think asking people to come in to have a test on public transport, mixing with other people is a very bad idea."

(Online survey comment)

Stories of colleagues testing positive part way through the process increased this uncertainty, although a run of negative tests helped to improve trust.

"I took the rapid test 3 times at work, all were negative including last one which I took when not feeling well. Next day did home test and it was positive. They are not reliable enough."

(Online survey comment)

Participants responding to the survey recognised that was still some risk of infecting others even when testing negative: 70% felt there was either a great deal of risk, a fair amount of risk or a little risk of passing on the virus to others, even with a negative result.

"If I have the virus, I might pass it on to people that I travel with. I don't travel for 5 minutes; I travel for an hour. The safest is at home, my GP which I can walk to, a grocery store like a large Tesco. Have the facility that I don't have to travel and can walk to."

(Interview with others in workplace)

"I feel that it is a social responsibility to isolate away from people who might live with vulnerable people. Also the percentages for the lateral flow test are below what I would feel comfortable with aka how accurate they are. I don't want no one's blood on my hands."

(Online survey from self-isolator)

6.2.3 Uncertainty about whether DCT was an officially sanctioned programme

Employees were not always aware that the DCT programme was overseen by DHSC. They sometimes saw it as an initiative led by their company. There was no strong branding for the scheme, with it sometimes being referred to as serial testing, 7 day testing, daily test or rapid flow tests. This could have been a result of employers developing their own materials. As described above, there were instances where people were contacted by DHSC and asked to self-isolate despite their participation in the pilot. This created a sense of anxiety and led some people to feel reluctant to take part in DCT for fear of being fined.

“As soon as she [mother in the same household] tested positive the NHS send out a message to say whoever is in your household has to self-isolate for 10 days as per Government guidelines. I explained this to my manager and my manager response was [organisation] overwrites all the rules.”

(Interview with DCT participant)

“A lot of confusion and mixed messages when our staff have been calling the 119 helpline who have been told that they shouldn’t be doing the testing and should isolate.”

(Online survey from site administrator)

6.2.4 Increased chance of testing positive, which would force others in household to self-isolate restricting their ability to earn an income

Some respondents felt that taking part in DCT could increase the risk of testing positive at some point. This would then mean that others in their household would have to legally self-isolate. This came through as a greater issue in low income households and for those living in multiple household occupancy facilities (with non-family members), who were on a basic living wage and who were heavily reliant on being paid each week.

6.2.5 Financial costs associated with the travel to test sites, or the need to take tests in non-work time (either prior to shifts starting, or during non-working days)

Individuals were conscious about additional cost to them of participating in DCT, both in terms of time and, for those on contracts and part-time workers, money. Of the 27 self-isolators in the online survey, 3 (12%) mentioned that they did not take part because they would not be paid for the extra time required for testing. And 15% of site administrators mentioned that an unwillingness of employees to be tested on non-work days was a barrier to participation.

“Having to drive 30 minutes to get a test. Then being told my shift doesn’t start till I have the test. I start work at 6 and couldn’t get a test to 8:30. So instead of my normal 6 to 2 I have had to work 8:30 to 4:30. It was unclear that my travel would be paid for too.”

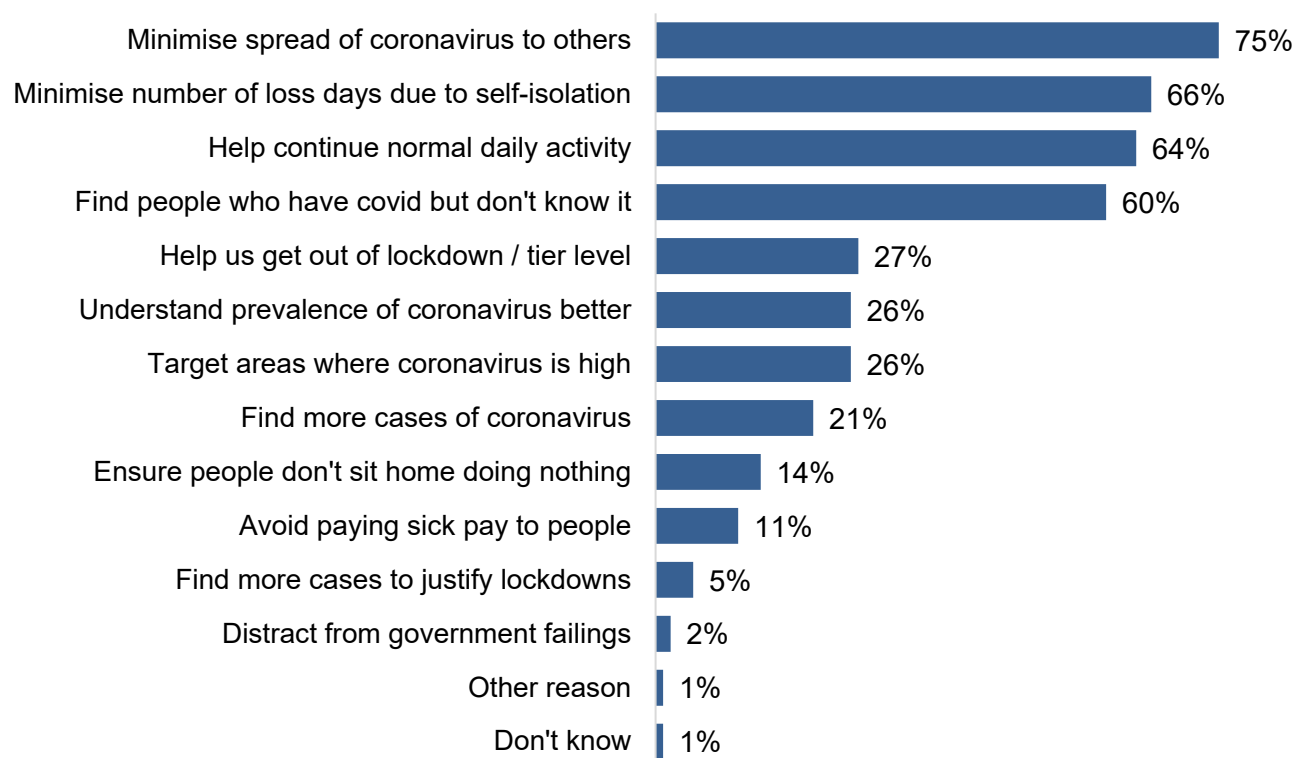
(Online survey from self-isolator)

6.3 What did people understand as the rationale for DCT?

6.3.1 Reducing transmission and allowing businesses to function

Most employees recognised that DCT had a dual objective of helping to break the chains of transmissions (75%) whilst allowing them and their business to continue daily activity (64% and 66%).

Figure 7. Why employees think their organisation is running DCT



Q. Why do you think your organisation is running this scheme?

Base: All individuals in DCT pilot organisations and heard of DCT at their organisation (1,341).

“Can prevent COVID-19 from spreading and decrease the R rate.”

(Online survey comment)

“From a health point of view I would like to know if I had contracted COVID-19 or not. Knowing the result on a daily basis would allow me to continue with normal life, of course under the lockdown restrictions which are prevailing.”

(Online survey comment)

Site administrators said that staff were generally positive about DCT: 86% felt that staff were either very positive or fairly positive about DCT, whilst 8% felt that staff were negative about DCT.

In some in-depth interviews some people stated that DCT started a little late, and it was viewed as a proactive and welcomed initiative to keep the workplace open. Seeing first-hand the number of staff not able to come into work allowed employees to embrace DCT as a proactive way forward, particularly in terms of reducing the strain on staff left working the shift.

“Finally, it is something that we are doing to be on top of things, to be active and proactive and not reactive. We have been reacting hugely, in this country and worldwide, this is the first step to being proactive. If you have the virus the sooner you know, it is better for everyone.”

(Interview with others in workplace)

“I would continue to go to work because I think after doing my self-isolation... I also didn't factor my mental wellbeing. That there will not be a knock-on effect, if I have results that came back negative, I can continue with normality rather than isolating myself in my room which I did learn was not good for my mental wellbeing.”

(Interview with self-isolator)

Site administrators mentioned that DCT had been vital in terms of keeping the business running and that it had helped save the business from additional (overtime) staff costs. Also, they felt it had provided reassurance and peace of mind to employees, which reflected well on the company.

“It has enabled us to give [employees] confidence both in work and at home, that is, they are not infecting their loved ones, or those close to them. Overall a simple system to [use] and we are very grateful.”

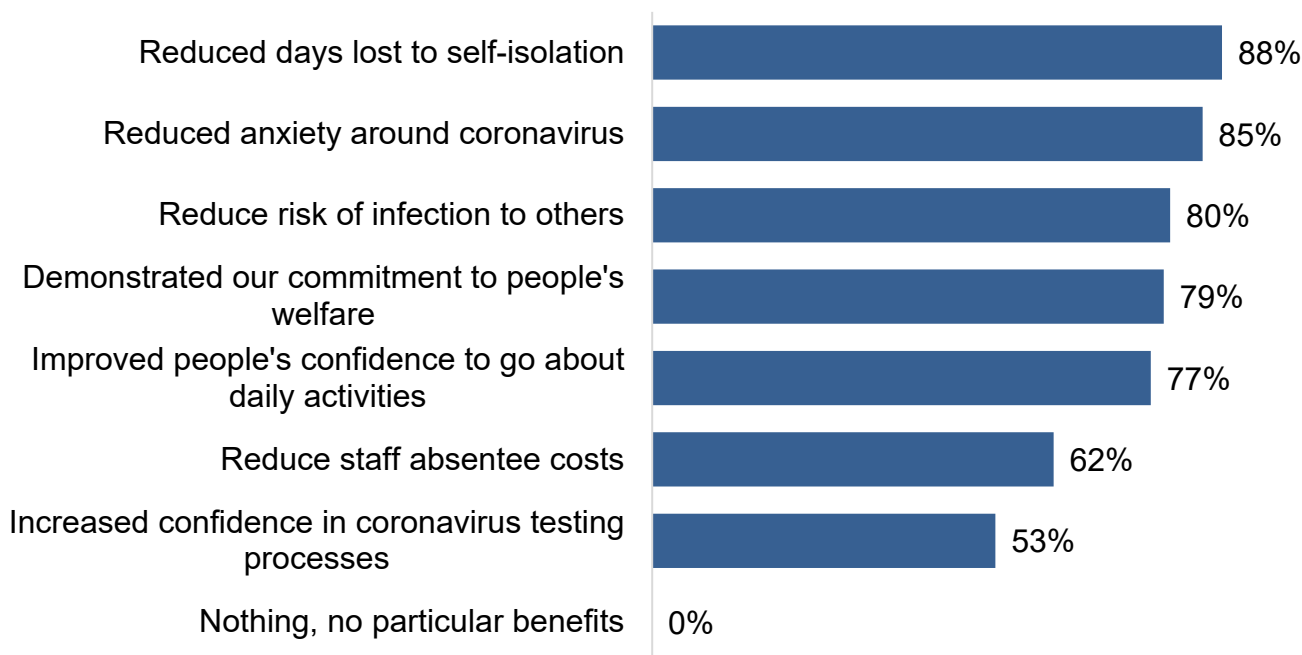
(Online survey comment, site administrators)

“Without Serial Testing we would have stopped our operations on at least 5 occasions over the Christmas period.”

(Online survey comment, site administrators)

With regards to the benefits of DCT to society more widely, 80% felt that it had reduced the risk of infection to others, with around half (53%) reporting they felt it had increased confidence in COVID-19 testing.

Figure 8. What DCT has helped to achieve



Q. Which of the following, if any, do you think the daily testing has helped you achieve?
 Base: Site administrators (66).

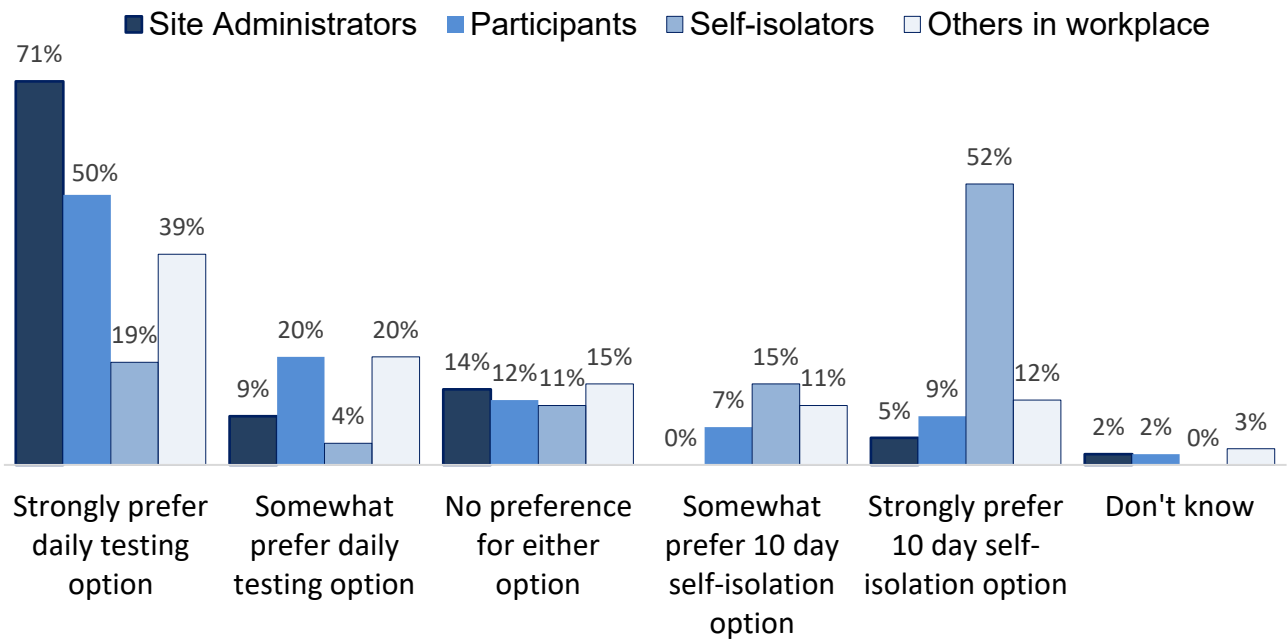
6.3.2 Views on continuing DCT having participated

Amongst employees who had participated in DCT, the majority (92%) claimed they would participate again (73% 'definitely', 19% 'probably'). Sentiment was even stronger amongst site administrators: there was near universal agreement to participate again (82% 'definitely', 15% 'probably', with the remaining 3% stating 'don't know').

As a round-up to the online interview, site administrators and employees were asked their preference for DCT vs self-isolation. As illustrated in Figure 9, respondents expressed a preference for DCT over self-isolation, except for those who had self-isolated in the first instance.

| | Site administrators | Participants | Self-isolators | Others in workplace |
|--------------------|---------------------|--------------|----------------|---------------------|
| % would prefer DCT | 80% | 70% | 22% | 59% |

Figure 9. Preference trade-off between self-isolation and DCT



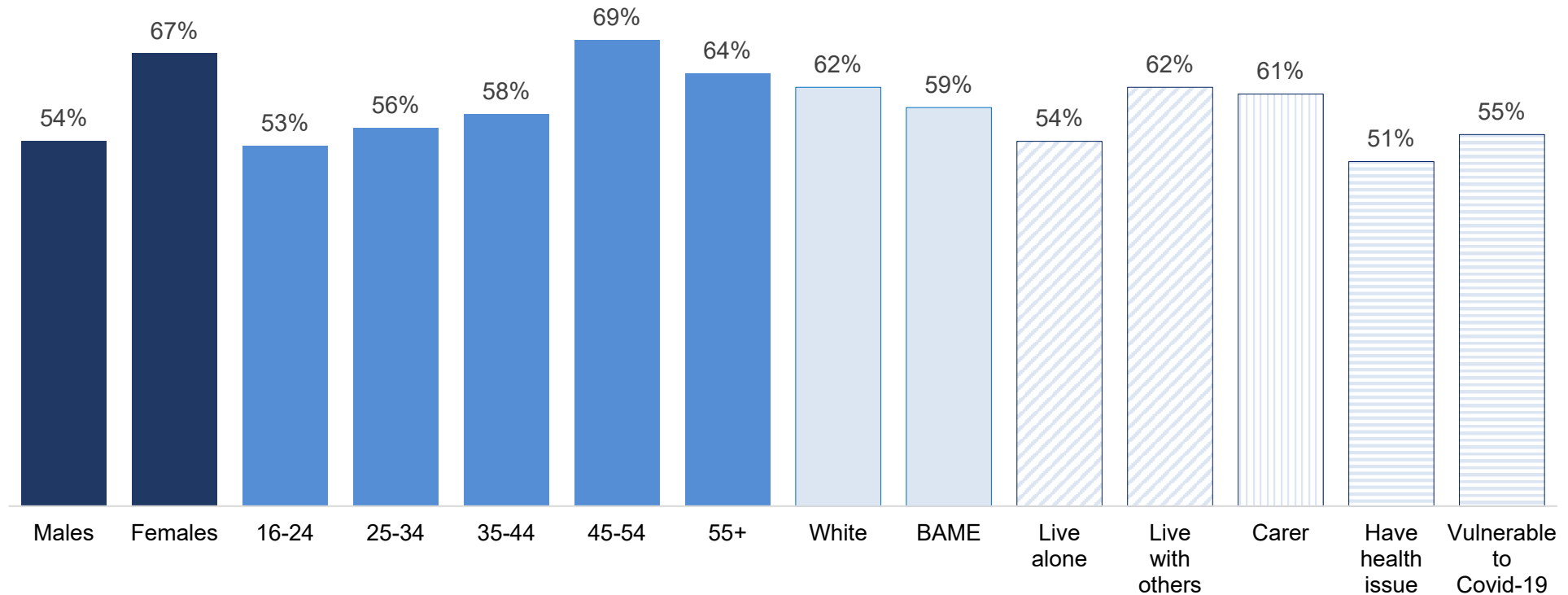
Q. If you have been in contact with someone testing positive for COVID-19, the usual option is to self-isolate by staying at home for 10 days. The new daily testing option (being run at your organisation) is for daily tests for up to 7 days, which means that every day you have a negative test you can carry on with your normal activities and do not need to self-isolate. Which option do you prefer?

Base: Site administrators (66).

Base: Participants (399), Self-isolators (27), Other employees who said DCT didn't apply to them, or they didn't know if it applied (996).

Exploring preference by sub-groups (with the caveat that the responses here are heavily weighted to one organisation and the non-heterogeneous nature of their workforce), there were signs that preference for DCT may have been marginally lower amongst those in our sample aged 16-24 (who are more likely to have no preference either way), those who live alone or those have a health issue that impacts their day-to-day activities. All groups, however, showed a net preference for DCT.

Figure 10. Percentatage claiming to prefer daily testing option (somewhat or strongly)



Q. If you have been in contact with someone testing positive for COVID-19, the usual option is to self-isolate by staying at home for 10 days. The new daily testing option (being run at your organisation) is for daily tests for up to 7 days, which means that every day you have a negative test you can carry on with your normal activities and do not need to self-isolate. Which option do you prefer?

Lowest base size for BAME (92).

As described earlier in the report, preference for self-isolating centred on the feeling that it safer for everyone, particularly due to the concerns over the lateral flow test. Those who preferred DCT, however, also mentioned the importance of reassurance but in the context of being able to continue with day-to-day activities.

“Because personally it would allow me to continue as normal, for example, attending work and from a business view it can significantly reduce those not attending work due to self-isolating.”
(Online survey comment)

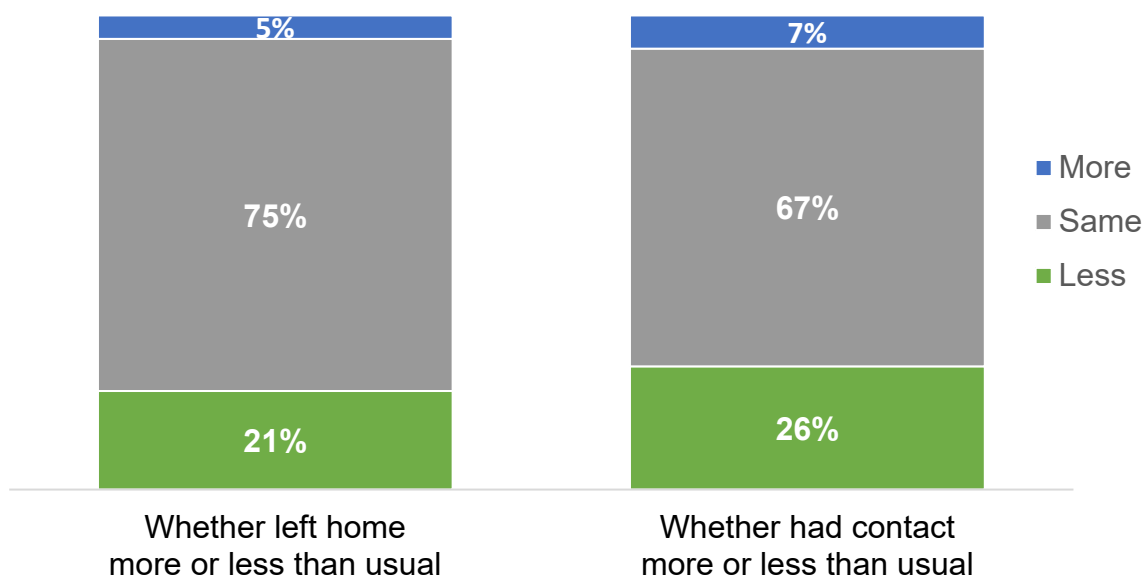
6.4 How did participants respond to a negative test result?

6.4.1 Effect on behaviour

We did not find evidence that the feeling of reassurance following a negative result led to a general relaxation of COVID-safe behaviour. Most survey respondents reported that the amount they left home (75%) and the amount of contact they had with people outside their household (67%) did not change following a negative result.

And there was some evidence that participants were behaving more cautiously: 21% of respondents said that they left home less than usual following a negative result and 26% said they had less contact than usual with people outside their household.

Figure 11. Behaviour following a negative test – leaving home and contact with others



Thinking about the days you had a negative test result, did this mean ...

...you left home more or less than usual, or was it about the same?

...you had more or less contact with people you do not live with, or was it about the same?

Base: All participating in daily testing, tested a negative and expressing an opinion.

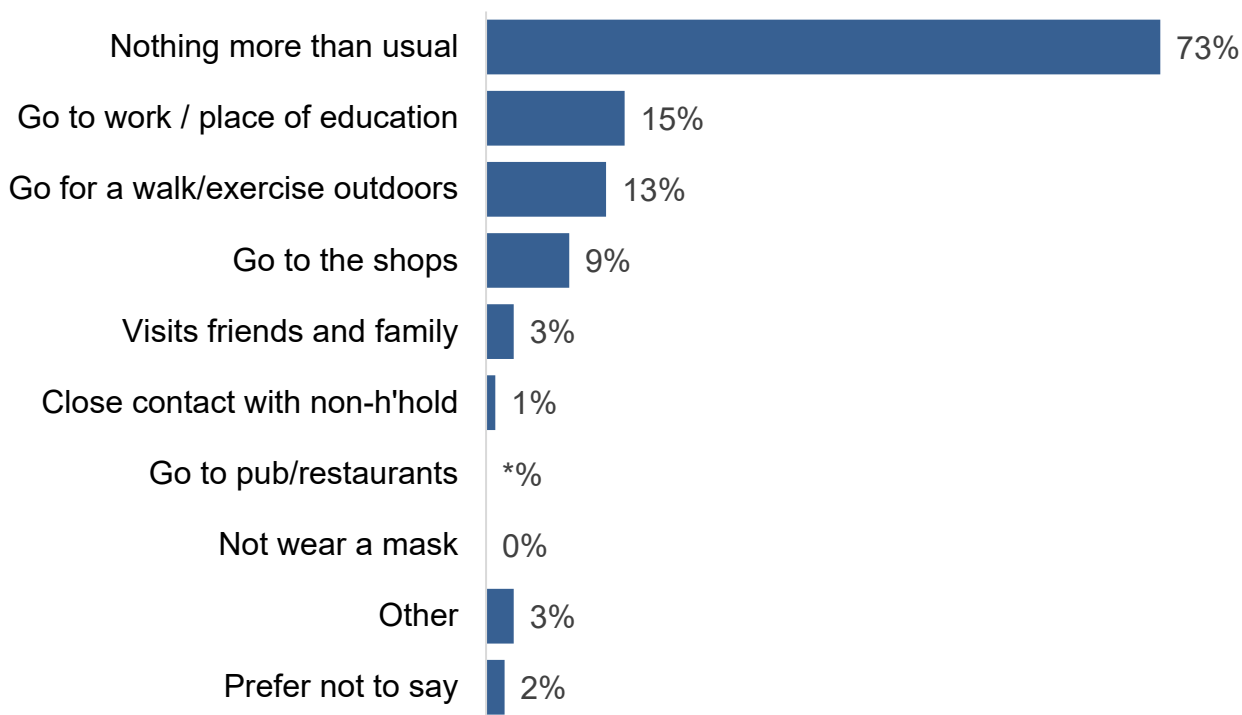
Lowest base size for whether left home more or less than usual (346 responses).

Although there were no objective measures of participants' actual behaviours to validate the survey results, these self-reported findings are consistent with the observations reported by site administrators that being identified as a contact made people even more cautious than they would otherwise have been.

There was further evidence of this caution in responses to a question about specific activities undertaken after a negative test result (Figure 12). Most (73%) reported undertaking no more activities than usual, following a negative test result. Although a quarter did one or more activities 'more than usual', generally these would not be deemed as risky behaviour: the top options were 'going to workplace' (part of the rationale of DCT) and 'going for walk or exercise outdoors'.

It is important to place these findings in the context of a lockdown situation, with fewer opportunities available for individuals.

Figure 12. Behaviour following a negative test – activities undertaken more than usual



Q. Did having a negative result mean you did any of the following more than usual?
Base: All participating in daily testing and not testing positive (355 responses).

6.4.2 Reporting contacts

Nearly 3 in every 5 (57%)⁶ respondents reported being more likely to give contact details if DCT were available, indicating that DCT could support in identifying onwards transmission.

⁶ This question was introduced part-way through fieldwork and results are based on 993 respondents.

The likelihood of providing contacts was higher (62%) amongst those who had participated in DCT.

6.4.3 Maintaining COVID-safe behaviour

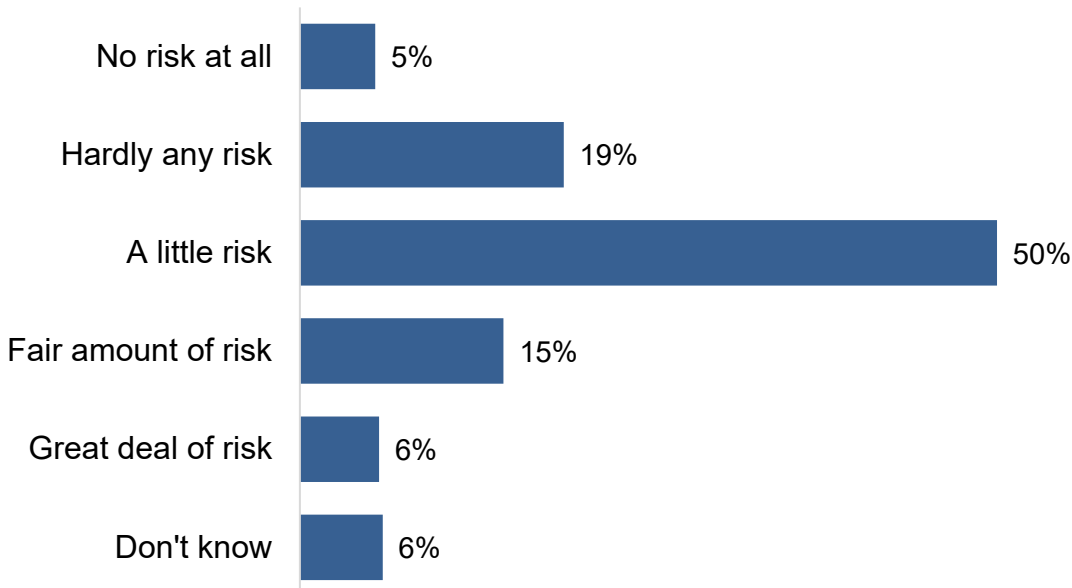
Employees and employers said that safety guidelines were maintained throughout the implementation of the DCT scheme, although there are no objective measures to verify this. They reported that people maintained standards, including hand sanitisation, wearing face masks and social distancing remained, following a negative result from an LFD test.

Participants in DCT reported remaining careful or becoming even more cautious because they were aware that they could still present a risk of transmission. We heard similar reports from site administrators.

“They were aware that they could take the test, get a negative in 30 minutes, walk on the street bumped into someone and pick it up (COVID-19). People understood that side of it. People were grateful that they had an opportunity to take it.”
(Interview with DCT participant)

When DCT participants who tested negative were asked what they thought having a negative result in a daily test meant about the risk they presented of passing on the virus, most (71%) felt that there was some risk, with a quarter (24%) reporting they felt there was either ‘no’ risk or ‘hardly any’ risk. We heard in interviews that people who were identified as a contact of a positive case were perceived as being at a higher risk of transmitting to others.

Figure 13. Perceived risk of passing virus to others following a negative test result



Q. What do you think having a negative result in a daily COVID-19 test means about your risk of passing on the virus to others in the following 24 hours?

Base: All participating in daily testing, not testing positive or don't know if tested positive| 372 responses.

“We have a theory, but this isn’t definite, we think that the people who go into DCT are much more aware that they might be at risk so are better at compliant with the rules. So we don’t see issues regarding social distancing as much as the rest of the population. Behaviour is better among daily testers. We’re not seeing chains of transmission in the testing groups. Maybe the data will prove it.”

(Interview with site administrator)

“I was definitely still conscious until my 7 days was up completely. When there are 7 negative tests produced, I feel a lot safer. I was interacting with people the same of course maintain the guidelines like social distance and hand washing.”

(Interview with DCT participant)

7. Findings: broader societal benefits

7.1 What has DCT helped workplaces to achieve?

Our interviews and wider engagement suggested that DCT in the workplace has had benefits in terms of business operations as well as in terms of employee welfare. If businesses were able to remain economically viable through the COVID pandemic due in whole or part to DCT, on a national level this could have significant social and economic benefits. For example, it has been estimated that there can be significant medium to long term impacts of lockdown-induced recessions in terms of both excess deaths and lost quality adjusted life years (QALYs).⁵ We wanted to explore these claims via bespoke modelling, in particular to examine conditions where workplace DCT might not carry economic benefits. This was intended to assist the future targeting of DCT.

Our approach examined 2 main elements of the cost/benefit of daily contact testing:

- the logistical cost of conducting testing (test units, staffing and space)
- the benefit to the employer of returning employees to workplaces earlier than would otherwise be the case, allowing them to resume normal duties or full capacity

The headline finding from this work was that workplace DCT would not necessarily make economic sense for employers in all cases. A small part of the equation is the logistical cost of implementing testing; the larger part of our analysis revolved around operational resilience to staff working at home. In contexts where this is impractical, especially when employers need to make up for any shortfall in output at a premium (for example through skilled and/or scarce contract workers) it is far more likely that daily contact testing would pay dividends for the employer.

7.1.1 Logistical costs

The first element of logistical costs is the simplest to assess: we use assumptions for LFD test costs based on cost estimates from operational and commercial teams. This includes the cost of the devices and the time spent doing the testing. For workplace DCT, there is additional cost of site-based testing related to delivery and implementation costs associated with running testing at business sites. There is some fixed cost associated with this, albeit relatively minor, which is accounted for.

We estimate that a full round of workplace DCT would cost in the region of £70. These costs could vary – for example, if it is particularly complex for an organisation to set up a test site.

7.1.2 Employer benefits

The second element requires assumptions about staff productivity and pay while isolating and use and cost of 'cover' staff by the employer. These provide the basis for the employer cost per staff member per day of isolation (loss in productivity, minus reduction in pay, minus cover by other staff, plus cost of cover).

We require input assumptions regarding:

1. Staff productivity while isolating.⁷
2. Effects on the productivity (potential increases and decreases) of colleagues when a staff member is absent due to self-isolation.
3. Staff pay while isolating.
4. Use of cover staff by the employer.
5. Premium for doing so (that is, for contract staff).
6. Point after contact at which testing begins (there is a limit to how soon after contact an infection will be detectable, but testing later reduces the scope for early return).

The assumption for point 6 has been generated in consultation with operational and policy teams. Points 1 to 5 will vary by employer and employee, meaning it is not possible to produce robust generalised estimates without a full knowledge of the national workforce – they must be on a per case basis. We can, however, assert that employer benefits are higher when:

- COVID-19 prevalence is lower among DCT participants (so that fewer tests are required and tests are more likely to enable non-infected employees to continue attending work sites)
- staff (and cover) pay is higher and productivity is lower during isolation than in normal times

Whether or not workplace DCT will represent value for money (VfM) in all private sector contexts will be highly dependent on the cost to the business of individuals who are required to self-isolate. If employees are just as productive while working from home, don't get sick pay and/or any output loss can be covered at minimal net cost, then it is not clear that the employer would see VfM from daily testing. Where self-isolation would result in a drop in productivity, there are notable benefits to employers particularly of higher level earners (as explored below).

7.1.3 Net employer impacts (examples)

To demonstrate these features, a method for determining whether workplace DCT provides value for money is considered with the examples below. All the examples assume that DCT

⁷ In practice this should be treated as the sum of productivity/output lost (that is, including for people they manage and so on) as a proportion of the isolating staff member's pay. This can include business critical losses, but that may more reasonably be captured under offset cost/premium.

will begin 4 days after the initial contact. A full round of workplace DCT will cost in the region of £70. An individual will begin isolating if they test positive, but otherwise continue working as usual. On average, this will mean people return to work 3 to 4 days earlier than the average non-participant.

The examples given here are not intended to represent typical workers in the UK or elsewhere, but rather are intended to be illustrative: they demonstrate how the value for money proposition of DCT changes as you change various input assumptions, and in particular highlight the assumptions that combine to generate low, mid and high value instances.

1. Taking a lower quartile earning group (sales occupations)

Official statistics indicate that typical earnings are around £70 per day, costing the employer £90.⁸

If we assume that:

- employees can deliver around 90% of their typical output while self-isolating
- employees will receive 100% of their regular pay
- employers will not attempt to offset the shortfall in output

We find the following:

- the value recovered from early return to the workplace equates to around £35 per participant
- the net benefit to the employer is therefore around -£35 per participant (that is, a net cost)

2. Using a median earning group (administrative occupations)

Typical earnings are around £90 per day, costing the employer £120.⁹

If we assume that:

- employees can deliver around 50% of their typical output while self-isolating
- employees will receive 100% of their regular pay
- employers will offset 50% of the shortfall in output at a 20% premium (that is, for contract staff)

We find the following:

⁸ Annual Survey for Hours and Earnings.

⁹ Annual Survey for Hours and Earnings.

- the value recovered from early return to the workplace equates to around £215 per participant
- the net benefit to the employer is therefore around £145 per participant (that is, a net benefit)

3. Using an upper quartile earning group (business, media and public service professionals)

Typical earnings are around £160 per day, costing the employer £200.¹⁰

If we assume that:

- employees can deliver around 25% of their typical output while self-isolating
- employees will receive 100% of their regular pay
- employers will offset 100% of the shortfall in output at a 50% premium (that is, for contract staff)

We find the following:

- the value recovered from early return to the workplace equates to around £770 per participant
- the net benefit to the employer is therefore around £700 per participant (that is, a net benefit)

These scenarios are summarised in Table 11.

Table 11. Preference trade-off between self-isolation and DCT

| Assumption | Scenario 1: lower earning group | Scenario 2: median earning group | Scenario 3: upper earning group |
|-----------------------------------------------------|---------------------------------------|----------------------------------------|---------------------------------------|
| Typical earnings | £70 | £90 | £160 |
| Cost to employer | £90 | £120 | £200 |
| Self-isolation output % | 90% | 50% | 25% |
| Employee pay % | 100% | 100% | 100% |
| Shortfall offset % (employers) | 0% | 50% | 100% |
| Premium (for example, for contractors) | - | 20% | 50% |
| Value of return to workplace per participant | £35 | £215 | £770 |
| Net employer benefit per participant | -£35 | £145 | £700 |

¹⁰ Annual Survey for Hours and Earnings.

As noted above, altering the proportion of typical output while in self-isolation changes the picture substantially. As an indication, changing self-isolation output to 25% for the lower earning group moves the net employer benefit to £50 per participant; changing self-isolation output to 90% for the upper earning group moves the net employer benefits to £31 per participant.

These analyses also relate to tests conducted on site in the workplace. Site-based testing would typically be expected to cost more than home based testing due to increased overheads. Therefore, we might expect an increased benefit and/or reduced cost if DCT tests were conducted at home. However, there would be other public health considerations such as reduced ability to monitor compliance with the testing regime and reduced test performance in unsupervised setting. Further research and modelling would be required to fully assess the wider social and economic benefits of home-based DCT.

These analyses relate to the saving per participant and potentially more extreme assumptions would need to be made if the productivity of workers doing DCT also substantially affected other workers around them. For example, where the absence of an employee would cause entire production lines to stop. In these cases, businesses may be prepared to pay higher premiums on offsetting the shortfall, which may vary according to availability of workers or skills. If it was not possible to offset the shortfall (including temporarily) there would be larger benefits from DCT.

These analyses do not consider total social and economic value for money of DCT, which as noted above would be difficult to derive without detailed modelling of factors such as the resilience of productivity to self-isolation requirements across affected industries.

8. Discussion

The pilot generated learning about the real-world implementation of LFD testing for DCT in the workplace, where both the risks of transmission COVID-19 and the benefits of DCT in terms of averted staff absences are potentially high. While there are acknowledged limitations, the evaluation findings provide valuable insights into the practicalities of delivering DCT in these settings and an appraisal of its costs and benefits.

The evaluation found no evidence of the use of DCT in workplaces being unsafe. The majority of participants did not return a positive LFD result in the pilot and there was no evidence of increased infection rates linked to DCT or (from qualitative evidence) of relaxation of COVID-safe behaviour in the workplace. Our analysis suggested that there were economic benefits of DCT to employers and employees, although these are sensitive to business context.

Participating sites acknowledged the effort needed to recruit and support participants through DCT. But, in general, they found this to be worthwhile in terms of keeping people in workplace and maintaining staff morale. Learning from this pilot may be used to provide detailed advice on how to implement DCT successfully on a larger scale.

DCT was well accepted by staff and administrators as an alternative to self-isolation. Participating staff who took part in the pilot found it on the whole straightforward, were able to stay in work, and did not show signs of relaxing their COVID-safe behaviours. The pilot demonstrated that the DCT programme could be effective in averting work absences in people identified as close contacts, and that it could be cost saving.

Effective communication will be a key contributor to the future success of workplace DCT. For example, some people doubted the accuracy of the LFD tests used for DCT because of messages about them in the media, and this influenced their decision to participate. In some cases, despite being part of a DHSC pilot, some interview participants reported being notified to self-isolate by the NHS COVID-19 App and were therefore not confident to leave their homes to participate in DCT.

The digital process for registering LFD tests for DCT in this pilot was the same as that for asymptomatic testing for other reasons. This caused confusion and severely impaired the quality of the data that we collected through the pilot. The digital journey for DCT should support participants, encourage them to adopt behaviours that are in line with the standard operating procedure and provide high quality data for monitoring and evaluation. This needs to be in place for a wider rollout.

This was a relatively small and pragmatic pilot study, and its limitations mean that the evidence cannot be considered definitive proof that the introduction of DCT does not increase the risk of workplace transmission. The lack of high-quality data on DCT participants limited the evaluation analysis and precluded a direct comparison of the effects of DCT versus

quarantining of close contacts. Therefore, any wider application of DCT would need careful evaluation and monitoring. Since this evaluation, further studies have been completed which examine experimentally whether DCT can be used as an alternative to self-isolation ([1](#)).

9. References

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Annexe 1. Lessons learnt

The table below gives a list of lessons learnt from this study that will be helpful in any subsequent implementation of DCT.

| Area | Lesson learnt |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Adaptable SOP with inclusive design | <p>Guidance to adapt DCT to different types of industry and workforce profile</p> <p>Organisations will benefit from a briefing on instructions of what they can and cannot do to amend the standard operating procedure as required to suit their workforce and operations.</p> |
| Basic COVID-safe behaviour | <p>Ensuring a good foundation of health and safety (Hand, Face and Space) processes</p> <p>These were found to be key in terms of facilitating DCT, particularly for those working alongside DCT participants.</p> |
| Consultation | <p>Involving trade unions during the design phase</p> <p>Consultation with trade unions could help to build trust and understand concerns raised early enough in the design process to enable change.</p> |
| Guidance | <p>Guidance about managing the risk of infection during COVID-19 incubation period</p> <p>Site administrators need clearer procedures for when contacts test positive mid-course.</p> |
| Logistics | <p>Reviewing logistics operations</p> <p>Organisations reported some delays in the delivery of testing kits and some missing orders.</p> |
| Perception of reliability of test and testing regime | <p>Low trust in LFDs impacted take up of testing as an alternative to self-isolation. These concerns were having to be addressed through marketing materials at participating organisations.</p> |
| Recognition | <p>Official recognition of the DCT scheme</p> <p>Employees did not always see DCT as a government scheme and received conflicting messages from their company and DHSC about self-isolation.</p> |
| Risk to co-workers | <p>Stating liability to employees who are not part of DCT</p> <p>That is, those who work alongside DCT participants but have not provided 'informed consent' themselves.</p> |

| Area | Lesson learnt |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Support from DHSC | <p>Communication and support from DHSC</p> <p>There was confusion from organisations about the data requirements, and a need for materials to be provided quickly to address concerns from their workforce.</p> |
| Timing | <p>Review lead time for implementation of DCT</p> <p>Organisations reported that the time between obtaining the official approval and getting employees engaged was too brief.</p> |
| Training | <p>Streamlined and accessible training materials</p> <p>Training materials had to be adjusted by organisations. More tailored and accessible training (including videos) would be of benefit.</p> |

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