UK Health Security Agency

Evaluation of daily testing for contacts of COVID-19 cases (DTCC)

Evaluation and Social Research unit

Contents

Executive summary

The policy

Daily Testing of Contacts of COVID-19 (DTCC) public health pandemic intervention was launched on 14 December 2021 as part of the response to the emergence and rapid transmission of the Omicron variant of coronavirus (COVID-19). The policy ended on 25 February 2022 when formal contact tracing ceased as part of the UK government's 'Living with COVID-19' strategy.

The DTCC policy applied to close contacts who were not legally required to self-isolate (predominantly those adults who were fully vaccinated or children between the ages of 5 and 18). It took the form of non-mandatory guidance for this group to take daily lateral flow device (LFD) tests:

- every day for 7 days, or
- until 10 days since last contact with the person who tested positive for COVID-19

If they tested positive, they were required to follow the self-isolation policy for COVID-19 cases.

The evaluation

This evaluation was developed rapidly alongside the launch of DTCC. It served both as a mechanism for the collation and presentation of rapid insight to UK Health Security Agency (UKHSA) operational teams to monitor the launch of the new policy, and also as a longer-term investigation into its effectiveness.

The evaluation made use of existing sources of information, primarily through the analysis of routine management information and the addition of questions to user surveys that were already running.

How the change in policy affected demand for lateral flow and polymerase chain reaction tests (PCRs)

LFD delivery through all testing channels (not just those tests for DTCC) fluctuated following DTCC launch, with particularly high levels seen in the first half of January. Survey findings tell us that DTCC was one of the factors contributing to the increase in the demand – possibly accounting for around one in 10 of the tests taken at that time. Other factors, including the

emergence of the Omicron variant and concern about mingling during the Christmas period, also contributed to the sharp rise.

The delivery of LFD tests through different channels (for example, home delivery and collect from pharmacy) varied in response to both operational challenges and societal pressures.

There was evidence of unmet demand through all delivery channels following the launch of DTCC, but this appeared to reduce from mid-January. As described above, DTCC was one of a number of factors driving this demand. There was also evidence that people ordered replacement tests at a similar rate to which they were using them, rather than stockpiling them.

There was evidence of substantial under-reporting of LFD test results. Using survey data to derive an estimate, the number of LFDs taken by the general population was likely to have been at least 6 times greater than the number of results reported during this period. However, as described below, despite not reporting test results, the evidence pointed towards people's actions being compliant with national guidance.

The DTCC policy led to a reduction in demand for PCR testing from close contacts.

How far people followed the guidance to test and act appropriately on the results of the tests

The findings from data matching undertaken as part of the evaluation and 2 surveys indicate a relatively high uptake of DTCC amongst those to whom the guidance applied. The data does not allow us to settle on a precise figure, but we estimate that 50 to 60% of those to whom the guidance applied complied. This is high but broadly consistent with findings from another analysis conducted by members of this team (in press), which found that 40 to 50% of close contacts took a PCR test around the time they were contacted (during a period when the guidance recommended that action).

Survey results show that most cases identified through DTCC self-isolated as a consequence (in line with typical behaviour of individuals following a positive test), whilst contacts who tested negative exercised a certain level of caution in their day-to-day activities. In these ways, DTCC appears to have been useful in mitigating the potential spread of infection, without having any notable unwanted negative effects.

Motivations for undertaking DTCC were the relative ease and perceived acceptability of LFD testing, confidence in the accuracy of LFD results and a desire to protect oneself and others. Barriers included the availability of tests, confusion about the guidance (in particular who the guidance applied to) and concerns that testing each day was wasteful.

Similar to findings from the assessment of other contact testing policies, there was some indication that uptake of daily testing was highest among females and those aged between 35 and 54 years of age.

The impact of DTCC on the transmission of COVID-19

The data is not available to calculate the impact of DTCC directly (because is it not possible to distinguish testing for DTCC from that for other reasons).

We developed a theoretical model to estimate the impact of DTCC relative to other contact testing policies. The model incorporates several assumptions, some of which are based on evidence drawn from the first 2 sections of this evaluation.

We used the model to compare DTCC and PCR testing of close contacts, the policy in place immediately prior to the introduction of DTCC. The model suggested that DTCC may reduce onwards infection from close contacts by 2.5% relative to PCR testing of close contacts under the same conditions. By way of benchmarking, the online price for 7 lateral flow tests from a major retailer was, on 7 September 2022, roughly a quarter of that for a PCR test (£14 versus £60). The actual price paid by health services will vary depending on the terms of the purchasing arrangement, but this gives an indicator of the relative cost of the 2 testing policies. This indicates that DTCC is likely the more cost-effective approach to testing: the public health benefits are broadly similar – possibly a little greater for DTCC – and the cost of DTCC is less.

In this model, compared to a theoretical scenario in which contacts were not being asked to test or self-isolate, DTCC was estimated to lead to a 12.3% reduction in onwards infections.

Further information on the model design, input parameters and a sensitivity analysis investigating the relative impact of the various input parameters and how they interact is presented in a separate modelling report, which is published alongside this document.

Considerations for future policy design

With the move to the Living with COVID-19 strategy, which relies on individuals taking greater accountability for their own risks and actions, this work can be used to demonstrate what can be achieved with voluntary testing and help inform future decision making. The findings presented here suggest that, under the right circumstances, voluntary interventions can achieve a 50 to 60% uptake and a substantial impact on transmission.

However, DTCC took place at a time when availability of testing was high, people were in the habit of using lateral flow tests, and there was considerable concern about the spread of the Omicron variant at a time when families were meeting for Christmas. These factors all

contributed to the uptake. To achieve this level of uptake in future scenarios, careful consideration would need to be given to the widespread availability of tests and the accompanying messaging.

The widespread use of point-of-care, unsupervised LFD tests brings advantages of convenience and speed but means that public health authorities are incompletely sighted on how tests are being used and what the results are. DTCC was implemented as an additional risk reduction measure – it was not an alternative to self-isolation. This means that the importance of more complete data was less than, for example, daily contact testing as an alternative to mandatory self-isolation, For policies that replace (rather than are additional to) other risk reduction measures, it is essential to know that the adherence is such that the public health impact is comparable to the measures that it is replacing. Much better data would be required to make this judgment. This point is crucial for the future consideration of any similar policy.

Introduction

This report presents the findings from the evaluation of the Daily Testing of Contacts of COVID-19 (DTCC) policy. The evaluation was developed and instigated alongside the launch of the policy, with the aim of providing real-time insights to UKHSA's contact testing programme. This report presents a picture of how the policy was launched, its take up by the population and an assessment of its impact on the spread of COVID-19.

The evaluation is based on data that were collected and used for real-time insight at the time the policy was active, and subsequent analysis and modelling carried out after the policy closed.

The DTCC policy

DTCC was launched on 14 December 2021 as part of the response to the emergence and rapid transmission of the Omicron variant of COVID-19. The policy ended on 25 February 2022 when formal contact tracing ceased as part of the UK government's Living with COVID-19 strategy. The DTCC policy applied to close contacts who were not legally required to self-isolate (predominantly those adults who were fully vaccinated or children between the ages of 5 and 18). It took the form of non-mandatory guidance for this group to take daily lateral flow device (LFD) tests:

- every day for 7 days, or
- until 10 days since last contact with the person who tested positive for COVID-19

If they tested positive, they were required to follow the self-isolation policy for COVID-19 cases. Until 11 January 2022, this included following a positive LFD test with a confirmatory PCR test. The aim of this policy, as with most testing regimes, was to reduce COVID-19 transmission through increased testing, identifying more cases (potentially earlier in the pre-symptomatic phase) and breaking the chains of transmission by encouraging positive contacts to self-isolate and consequently reducing their number of onward contacts.

The guidance for close contacts prior to the launch of DTCC was that introduced in August 2021, whereby the requirement to self-isolate was removed for fully vaccinated individuals, adults exempt from vaccination and those aged between 5 and 18½ who were contacts of a confirmed COVID-19 case. However, they were advised to take a PCR test on identification as a contact.

DTCC was therefore not an alternative to self-isolation (that is, test to release). The contacts for whom DTCC was advised were those not under a legal duty to self-isolate, so this policy was a risk reduction measure, replacing guidance to take a single PCR test with guidance to take daily lateral flow tests. A separate programme of 'Daily Contact Testing' was also in place within specific settings and applied to non-vaccinated individuals (that is, those contacts required

legally to self-isolate). The Daily Contact Testing programme had much more specific requirements around adherence given the legal requirements around self-isolation.

The DTCC policy was launched with only very minor changes to Test and Trace digital systems. There was not a bespoke system to distribute and monitor DTCC related tests and there was no data flag to distinguish tests taken for DTCC from testing for any other purpose. Instead, close contacts were encouraged to make use of existing mechanisms for ordering LFDs and reporting test results.

The evaluation

The DTCC policy was announced and launched in a short time frame due to the emergence of the Omicron variant of COVID-19. The evaluation was developed rapidly alongside the launch of DTCC. It served both as a mechanism for the collation and presentation of rapid insight to UKHSA operational teams to monitor the launch of the new policy and also a longer-term analytical project to investigate the effectiveness of the policy in meeting its aims. The evaluation was primarily based on existing data and evidence streams that UKHSA had in place to monitor and understand the behaviour of close contacts, as there was no scope to commission bespoke research and data collection.

Insight from the evaluation was supplied to the contact testing programme within UKHSA routinely through the early weeks of the service, primarily through a daily dashboard, weekly evaluation reports and routine ‘show-and-tell’ sessions. This report presents much of the material that was used in these continuous sessions, but for the entire period for which the policy was live.

The evaluation was structured around 3 main questions:

1. How did the change in policy affect demand for lateral flow tests and PCRs?
2. To what extent did people follow the guidance to test and act appropriately on the results of the tests?
3. What impact did the policy have on transmission of COVID-19?

Information sources

Due to the rapid nature of both the launch of DTCC and the evaluation of the policy there was limited potential to commission dedicated data collection or research. Instead, the evaluation made use of existing sources of information, primarily through the analysis of existing continuous data sets and the addition of questions to user surveys that were already funded and taking place.

LFD testing management information

During the time the DTCC policy was live, close contacts were encouraged to follow the guidance to test daily with LFDs using the existing mechanisms for ordering tests and reporting results. This data was available from UKHSA's systems, but there were no specific indicators to distinguish whether a test was ordered or used for DTCC (as opposed to routine or any other testing). The data was used in the evaluation to track the overall pattern of LFD usage in the context of the introduction of DTCC.

Data matching (NPEx testing data and CTAS data)

As noted above, management information on the use of LFDs specifically for the purpose of DTCC was not available. As an alternative, quantitative data analysis using data matching was carried out on a group of people known to be contacts (thereby meeting the criteria for DTCC) to examine testing patterns during the 7-day testing period for DTCC.

There are 3 routes by which people can be designated contacts and meet the criteria for DTCC

1. Contacts whose details were provided to the contact tracing advisory service (CTAS) database by a COVID-19 case (trace contacts).
2. Contacts who were notified by the COVID-19 app (app contacts).
3. People who had identified themselves as a contact by any other mechanism (self-referral contacts).

Data was not available for app contacts (because of anonymisation) or self-referral contacts (because they would not be captured on central databases). Therefore, trace contacts are the only population for whom the data is available for this analysis. Therefore, all analysis under the data matching sections in this report considers trace contacts only.

Other analysis that we have carried out comparing trace, app and self-referral contacts indicates that an analysis of trace contacts will provide useful indicators about the overall contact population. However, this group may be more likely to comply with guidance as they will have been given a strong official steer on their required actions from the contact tracing service.

The matching was performed between individuals on the CTAS database and test results on the national pathology exchange (NPEx) testing database. Tests were matched to contacts using surname, date of birth and postcode. This methodology is imperfect, and there is likely to be a degree of both over and under-matching.

Reporting of all self-test LFD test results is trust-based. Therefore, a known limitation of this analysis is the impact of under-reporting of LFDs. In addition, there is no way to check whether tests results have been accurately interpreted and/or reported.

Voice of the Customer survey

The Voice of the Customer (VOTC) survey was a continuous customer experience feedback programme that captured views from customers at the main stages of the test, trace and isolate journey. The trace and isolate surveys ran from October 2021 to March 2022, closing shortly before these services came to an end.

The trace survey, from which the data in this report is taken, was emailed to people shortly after their contact details were provided to the tracing service. It was an online survey, and DTCC specific questions were fielded between 17 December 2021 and 24 February 2022 to capture the views of contacts during the period when DTCC guidelines were in place. This report focuses on the feedback from contacts only, who completed the survey between 2 and 9 days after contact tracing.

Data in this report is based on large samples sizes of 9,838[1] respondents (varying slightly between questions), with responses collected between 17 December 2021 and 19 January 2022 (data quoted as December to January), and 2,280 respondents, with responses collected between 29 January and 24 February 2022 (data quoted as January to February). Some specific comparisons are made with the Office of National Statistics self-isolation compliance (ONS SIC) survey (see details below), where the data is taken from a similar time-period to the ONS SIC survey wave 3 (10 to 15 January 2022) and filtered only on those contacts that had had 2 or 3+ vaccine doses (sample size of 1,270).

The VOTC survey data provided valuable real-time insights and is our best source of information about the self-reported experience of contacts that have just been through the contact tracing service. However, the survey was self-selecting, unweighted and cannot be said to be representative of all contacts. At the time of publication of this report, findings from the VOTC survey had not been published elsewhere.

Comparatively, the ONS SIC survey (see below) is the best source for representative data on behaviour and compliance with DTCC guidelines.

[1] The sample is almost entirely from contacts that went through the digital journey (99.96%) – which reflects the operational processes at the time whereby the call centre was only calling cases

ONS self-isolation compliance surveys (contacts not required to self-isolate)

The ONS self-isolation compliance (SIC) surveys were nationally representative telephone surveys which looked at the behaviour of COVID-19 cases and contacts. The 'contacts non-self-isolating' survey focused on fully vaccinated contacts to whom DTCC would have been applicable and should have been offered (during the period in which the policy was live). From wave 3 of this survey, questions specific to the newly launched DTCC policy were added, with a total of 3 such waves being run until the survey was discontinued upon the removal of the legal requirement to isolate on the 24 February 2022. Respondents were reached around 10 days after the date of exposure to the original case: this should be the final day of daily testing if DTCC guidance had been followed. Data for this evaluation are drawn from 3 consecutive waves:

- wave 3: fieldwork 10 to 15 January 2022, 1,078 participants
- wave 4: fieldwork 31 January to 5 February 2022, 1,091 participants
- wave 5: 21 to 26 February 2022, 1,112 participants[2]

Qualitative research (focus groups)

To supplement the various surveys and data analyses, further qualitative research was conducted by an external agency on behalf of UKHSA in the form of focus groups to understand public opinion on testing and COVID-19 restrictions.

The research was carried out during the weeks commencing 10 and 17 January 2022, and consisted of:

a) 6 90-minute online focus groups, North and South England, consisting of:

- 2 groups of engaged people and following guidance
- 2 groups following guidance on an ad hoc basis
- 2 groups of the least engaged or least likely to follow guidance

b) 6 60-minute in-depth interviews with those aged between 18 and 24, none of whom were following any COVID-19 regulations

Respondents were selected by a network of recruiters across the country. The recruiters used databases of potential participants that they have built up over time and are refreshed regularly. Recruiters initially add people to their databases through a variety of means, including cold calling and referrals from people who have previously participated.

[2] The full findings from these surveys can be found on the Coronavirus and behaviour of the vaccinated population after being in contact with a positive case in England

The focus groups were about attitudes towards COVID-19 and response to guidance in general. They only briefly covered the DTCC policy.

At the time of publication of this report, the findings from the focus groups had not been published elsewhere.

Public Perceptions Tracker

UKHSA also ran a regular Public Perceptions Tracker, which took the form of surveys with a nationally representative sample. Five waves were run between December 2021 and February 2022. The data collected from these surveys was used in the evaluation to understand the level of LFD stock held by households, the rate of LFD ordering and replenishment, reasons for testing and intentions to test and other wider context of DTCC as a programme compared to other guidelines and behaviours.

At the time of publication of this report, the findings from the Public Perceptions Tracker had not been published elsewhere.

Question 1. 'How did the change in policy affect demand for lateral flow tests and PCRs?'

The DTCC guidance was introduced at a time of rising prevalence and when the public were being encouraged to test routinely using LFDs regardless of whether they were a contact. DTCC was an additional testing policy, and as such was expected to further increase demand for LFDs.

This part of the evaluation explores whether UKHSA had sufficient supply to meet the increased demand that DTCC contributed to. The evaluation team provided real-time data to the operations team at the time of the policy to inform decision-making. To answer this question, we focus on the period from mid-December to the end of January, which was when the pressures on LFD supply were most acute. From February onwards, the demand had stabilised and was well within the capacity of supply.

The ordering of LFDs

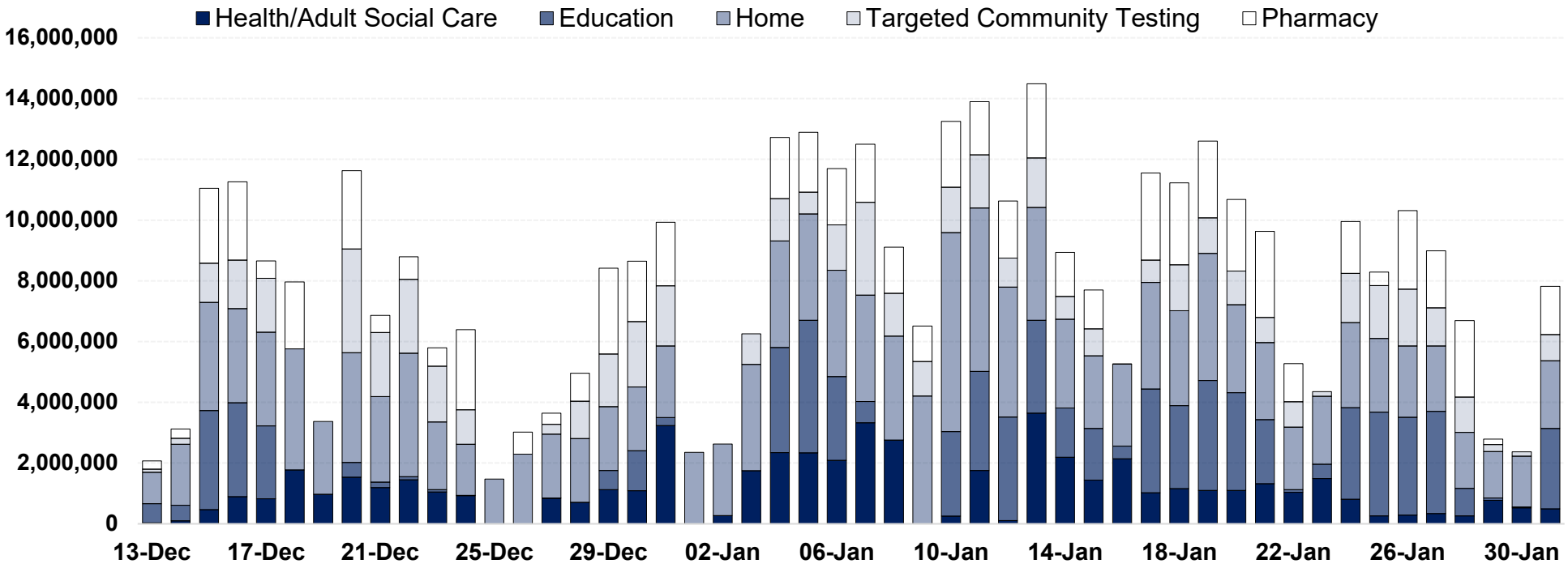
LFD delivery through all testing channels (not just those tests for DTCC) fluctuated following DTCC launch, with particularly high levels seen in the first half of January.

Throughout this time period the fulfilment of LFD delivery varied by channel.[3] This was likely due to a combination of both operational challenges (for example, maximum capacity having been reached in the home channel in December) and other societal factors (for example, no opportunity to deliver via the education channel during school holidays). There appears to have been unmet demand through all delivery channels at times, as we can see from responses to surveys that there were times of low delivery aligned with a lower ordering success rate. However, demand appeared to lessen from mid-January and indicators for demand being met returned to their early December levels by the end of January.

Figure 1 shows the volume of LFD deliveries through the different channels taken from UKHSA management information. There is no way of identifying tests that were used to follow DTCC guidance, so this information reported is for all LFDs. Other than some high-volume delivery days immediately after the policy launched on 14 December, there was a period of relatively low delivery over the Christmas period. The period of low delivery was likely to be due to limits in the supply capacity rather than demand. At this time there were known challenges with delivery, particularly in the lead up to Christmas.

[3] During the pandemic, tests were delivered to the public via different routes, known as 'channels'. These channels included: adult social care (including care homes); education (including schools); home delivery; pharmacies; and targeted community testing, which gave local areas the opportunity to deploy large-scale testing to asymptomatic individuals in the way that best suit the needs of their communities.

Figure 1. LFD tests delivered (extracted from DTCC operations dashboard 1 February 2022), 13 December 2021 to 31 January 2022



Delivery levels remained high for the first half of January, reaching record levels. The week commencing 10 January was the highest ever week for distribution, with 13 January being the single biggest day with approximately 14 million tests delivered. Following that peak, demand softened and the volume of deliveries returned to business-as-usual levels across all channels.

This pattern is broadly reflected in the results from the Public Perception Tracker stock-in-hand data (Table 1), which shows an increase in the average number of tests taken by an individual per fortnight increasing from 3.3 in early-mid December to 3.7 in early January (fieldwork undertaken 17 to 20 December and 14 to 17 January)

Table 1. Estimated LFD usage by adults, Public Perceptions Tracker[4]

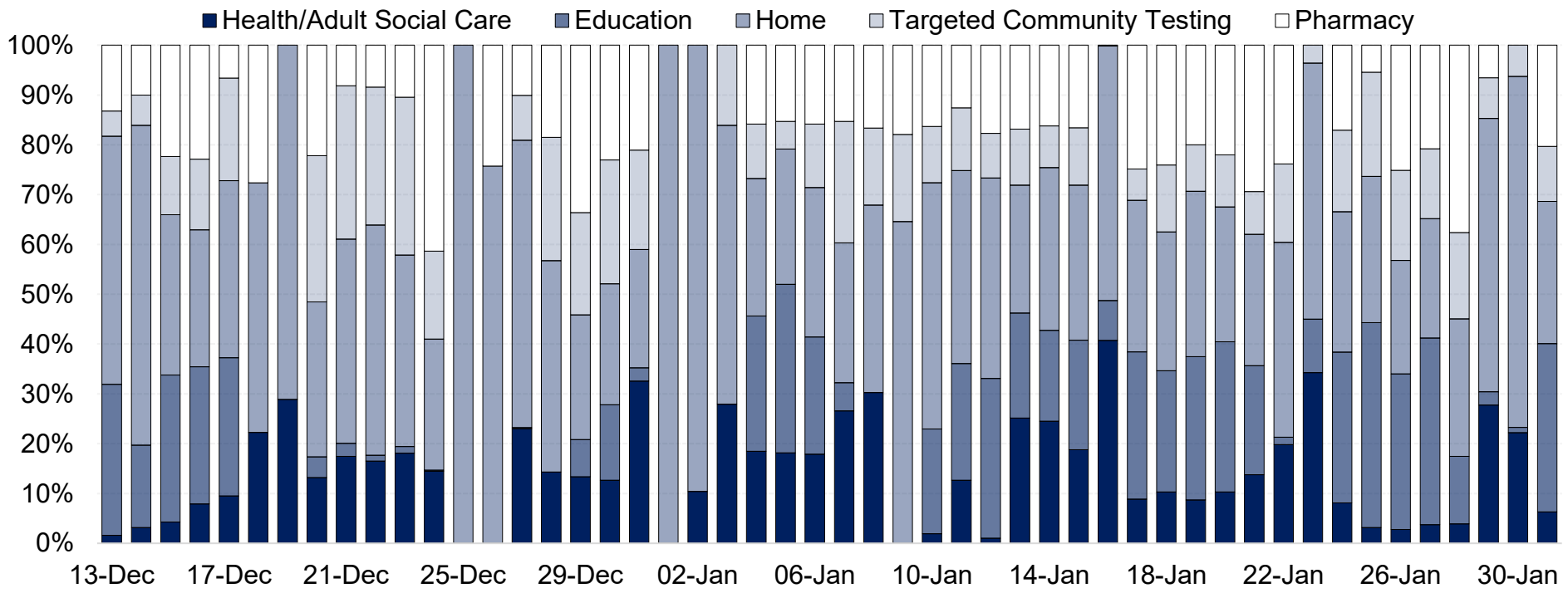
	Survey fieldwork dates		
	17 to 20 December 2021	**29 December 2021 to 4 January 2022**	**14 to 17 January 2022**
% of adults who had taken an LFD in the previous 2 weeks	46%	59% (↑)	55%
Average number of LFDs taken (amongst those who had taken in the previous 2 weeks)	3.3	3.4	3.7
Estimated number of adults who had taken an LFD in the previous 2 weeks*	20.6m	26.4m	24.6m
Total estimated volume of LFDs taken in the previous 2 weeks**	68.0m	89.9m	91.2m

* Calculated as percentage of adults who had taken an LFD multipled by the adult population of England.
** Calculated as number of adults who have taken an LFD multiplied by the average number of LFDs taken.
(↑↓) significantly higher or lower compared with previous wave.

Figure 2 shows the same data as Figure 1, but displayed as a proportion, making it easier to visualise the change in distribution between delivery channels over time, and demonstrates some findings not immediately obvious from Figure 1. For example, on some days (Christmas Day and New Year's Day) the only channel delivering tests was the home channel.

[4] Source: Basis Research. COVID-19 surveys – wave 1 (17 to 20 December 2021), wave 2 (29 December 2021 to 4 Janury 2022), wave 4 (14 to 17 January 2022). B1b. 'When did you last take a Covid-19 test?' D1. 'In the last 2 weeks, how many rapid lateral flow tests, if any, have you personally taken in total?' Base: All respondents: wave 1 (n=1,014), wave 2 (n=1,079), wave 4 (n=1,010). All those who have taken an LFT within the last 2 weeks: wave 1 (n=461), wave 2 (n=636), wave 4 (n=557).

Figure 2. Proportion of tests delivered via different channels per day, 13 December 2021 to 31 January 2022

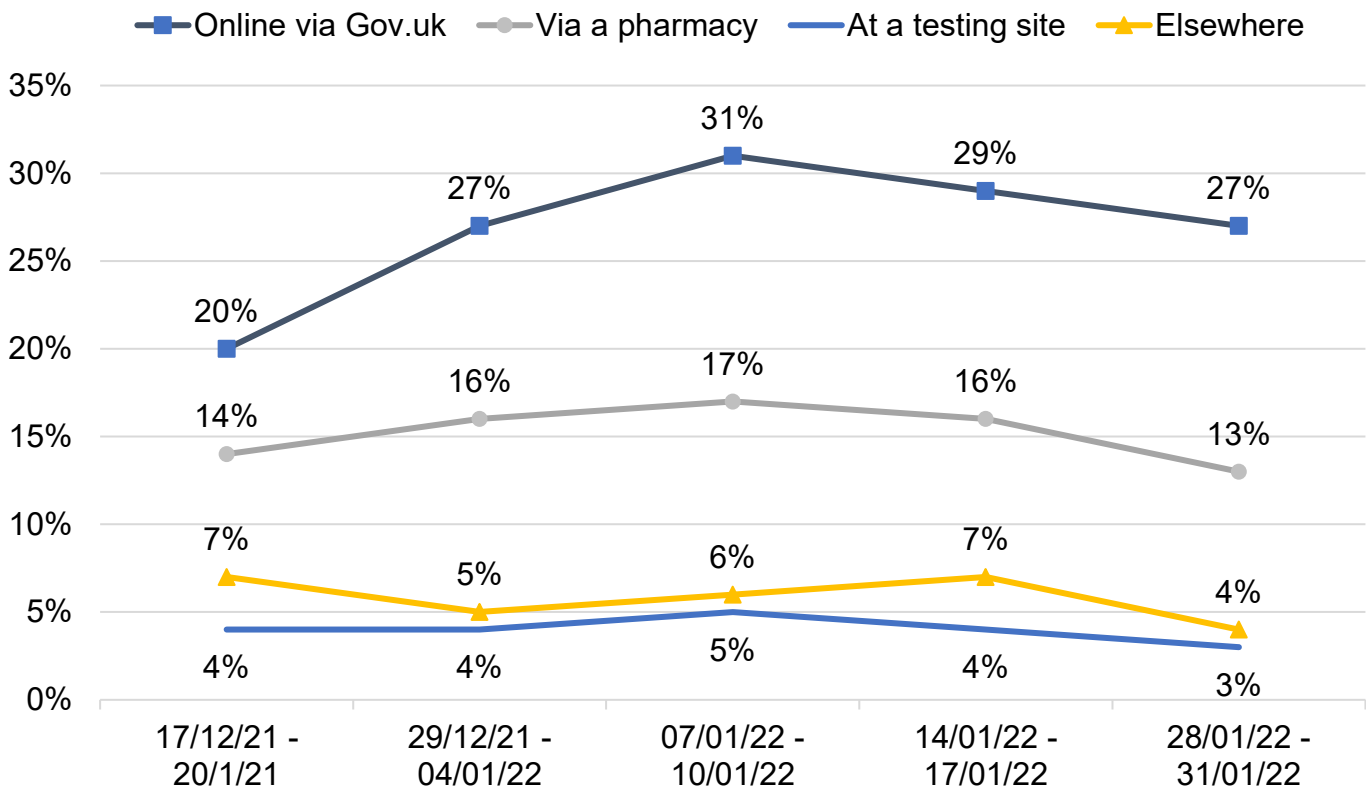


An expected finding over this time is the change in delivery through the education channel. Shortly after the launch of the DTCC policy there were very few deliveries through this channel (18 December to 2 January), which coincides with the school holiday period. From mid to late December the proportion of tests delivered via the pharmacy and targeted community testing (TCT) channels was relatively high, coinciding with the period in which there were known challenges within the home channel. Throughout January the pharmacy and TCT channels were more stable in terms of proportion of tests delivered, with education and home making up the bulk of the rest of the deliveries.

The findings from the data analysis above are broadly supported by the findings from the Public Perceptions Tracker which gives an indication of the success respondents had when attempting to order LFD tests. Figure 3 and Figure 4 show the results from subsequent rounds of the survey on the percentage of respondents who indicated they had attempted to order LFD tests through various channels, and their subsequent success rate in doing so. This shows that from December the attempts to order LFD tests increased across most channels (GOV.UK, pharmacy, test site) but started to decline in the later survey rounds. The elsewhere category (friends, school, work) showed a decrease in attempts to order, potentially as people were more successful in ordering via other channels.

These findings also show a reduction in the successful ordering of tests over the course of December and January, the most substantial being a drop from 73% to 51% success rate in pharmacies. This suggests that demand outstripped availability across channels. The success rate then grew across all channels as demand reduced.

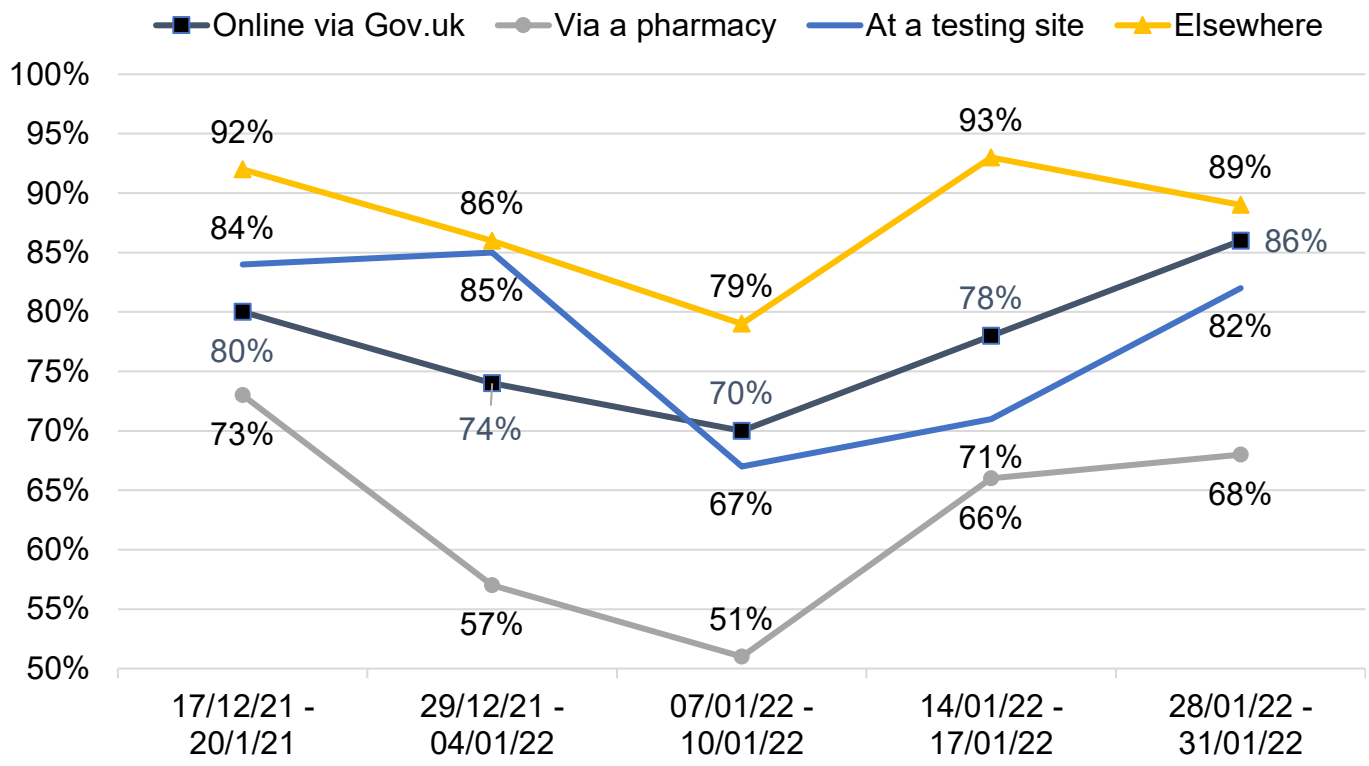
Figure 3. Attempts to order LFD tests by distribution route, Public Perceptions Tracker (dates refer to when survey fieldwork was completed[5])



[5] Source: Basis Research.'COVID-19 surveys: wave 1 (17 to 20 December 2021), wave 2 (29 December 2021 to 4 January 2022), wave 3 (7 to 10 January 2022), wave 4 (14 to 17 January 2022), wave 5 (28 to 31 January 2022). D7. Where did you try to order or obtain these rapid Lateral Flow test kits from?' Base: All respondents answering in wave 1-5 (n=1,014, 1,079, 1,001, 1,010, 1,000).

Figure 4. Success rates of ordering LFD tests by distribution route, Public Perceptions Tracker

Dates refer to when survey fieldwork was completed[6]



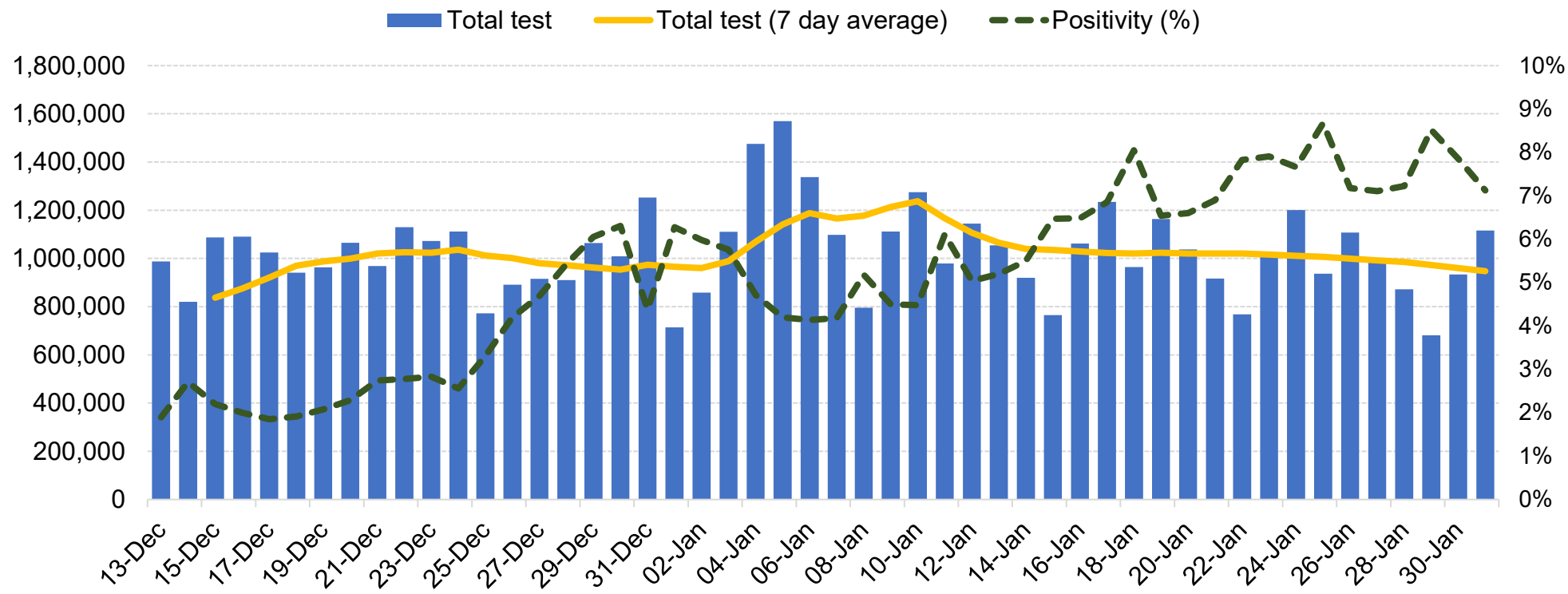
The usage of LFDs

By looking at survey data and delivery data alongside data for tests reported, we can see that a minority of test results were reported during this period. After making estimates to account for this, we can see that LFD usage followed a similar pattern to demand.

Figure 5 shows the number of LFD test results reported between December 2021 and January 2022 (all tests not just DTCC tests). When DTCC launched, LFD reporting was relatively constant at approximately 1 million tests a day. Over the Christmas period there was a notable reduction in tests reported, followed by a peak in daily tests reported in early January, coinciding with the return of schools after the Christmas break. Following that, testing levelled off to pre-Christmas levels, and broadly decreased, consistent with the LFD delivery information presented in Figure 1.

[6] Source: Basis Research. 'COVID-19 surveys – wave 1 (17 to 20 December 2021), wave 2 (29 December 2021 to 4 January 2022), wave 3 (7 to 10 January 2022), wave 4 (14 to 17 January 2022), wave 5 (28 to 31 January 2022). D8: 'And were you successful in managing to order or obtain rapid lateral flow test kits from the following?' Base varies: All those who tried to order LFDs per channel per week. Average tests per channel per wave. Online via GOV.UK (n=274), Pharmacy (n=156), (n=156) Testing site (n=39) Elsewhere (n=56).

Figure 5. LFD tests reported (extracted from DTCC operations dashboard 1 February 2022) 13 December 2021 to 31 January 2022

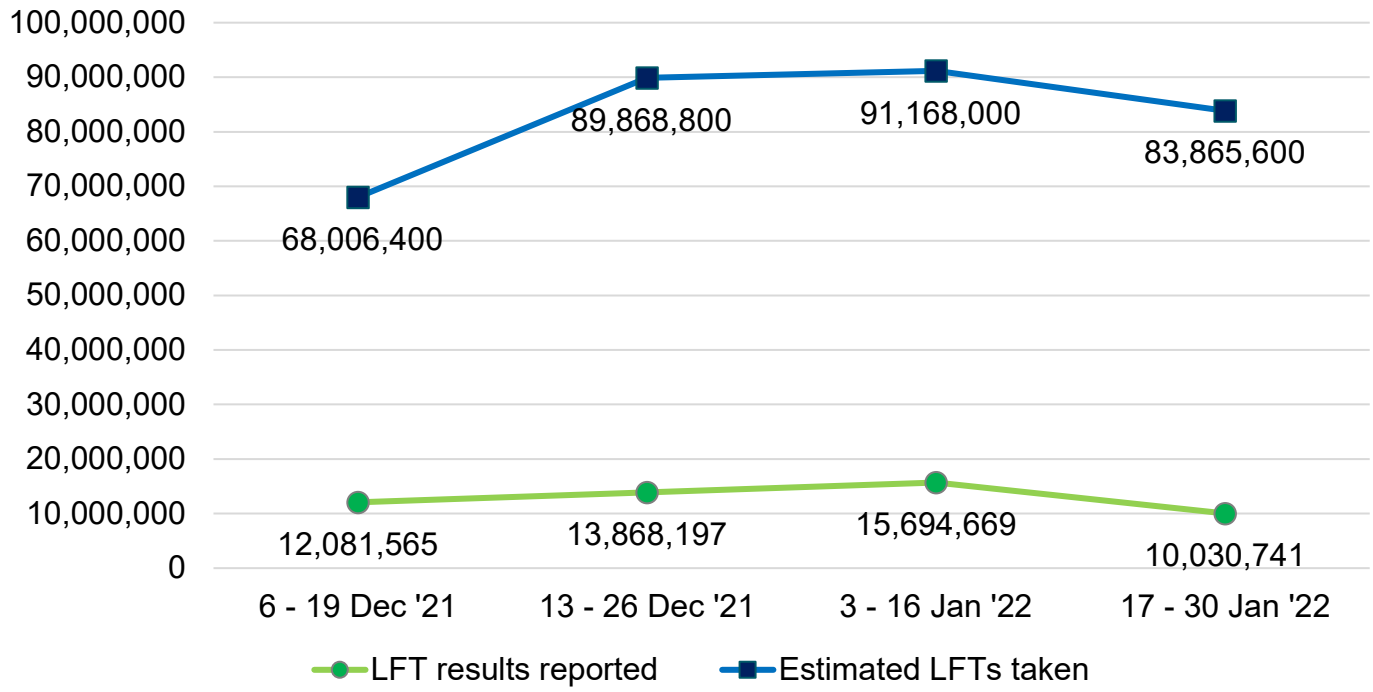


Despite following broadly similar patterns, there is a difference in the scale of magnitude between Figure 1 and Figure 5. LFD delivery often exceeded 10 million per day, but tests reported rarely exceeded 1.2 million per day. This suggests tests are either taken and not reported, or ordered but not taken (for example, stored for future use). However, as described in the next chapter, despite not reporting test results, the evidence pointed towards people's actions being compliant with national guidance.

Using the Public Perceptions Tracker (PPT), we can derive an estimate of the total number of LFDs taken in a 2-week period, by combining the findings on proportion of people taking LFDs in the previous 2 weeks and the average number of tests taken (Table 1). Comparing this to the number of tests reported suggests that the majority of tests taken are not reported, with the number of tests estimated to be taken at least 6 times higher than those actually reported (Figure 6).[7]

Figure 6. Estimated level of under-reporting of LFDs using Public Perceptions Tracker data

(The estimated figures for LFTs taken are derived from survey questions about behaviour in the previous 2 weeks. These dates therefore involve a degree of approximation – especially for wave 2 (relating in this chart to 13 to 26 December 2021), where the fieldwork happened in 2 parts over the New Year).[8]



The impact of DTCC on the increased demand for and use of LFDs

Results from several sources indicate that compliance with DTCC policy contributed to the demand for and usage of LFDs throughout December 2021 and January 2022.

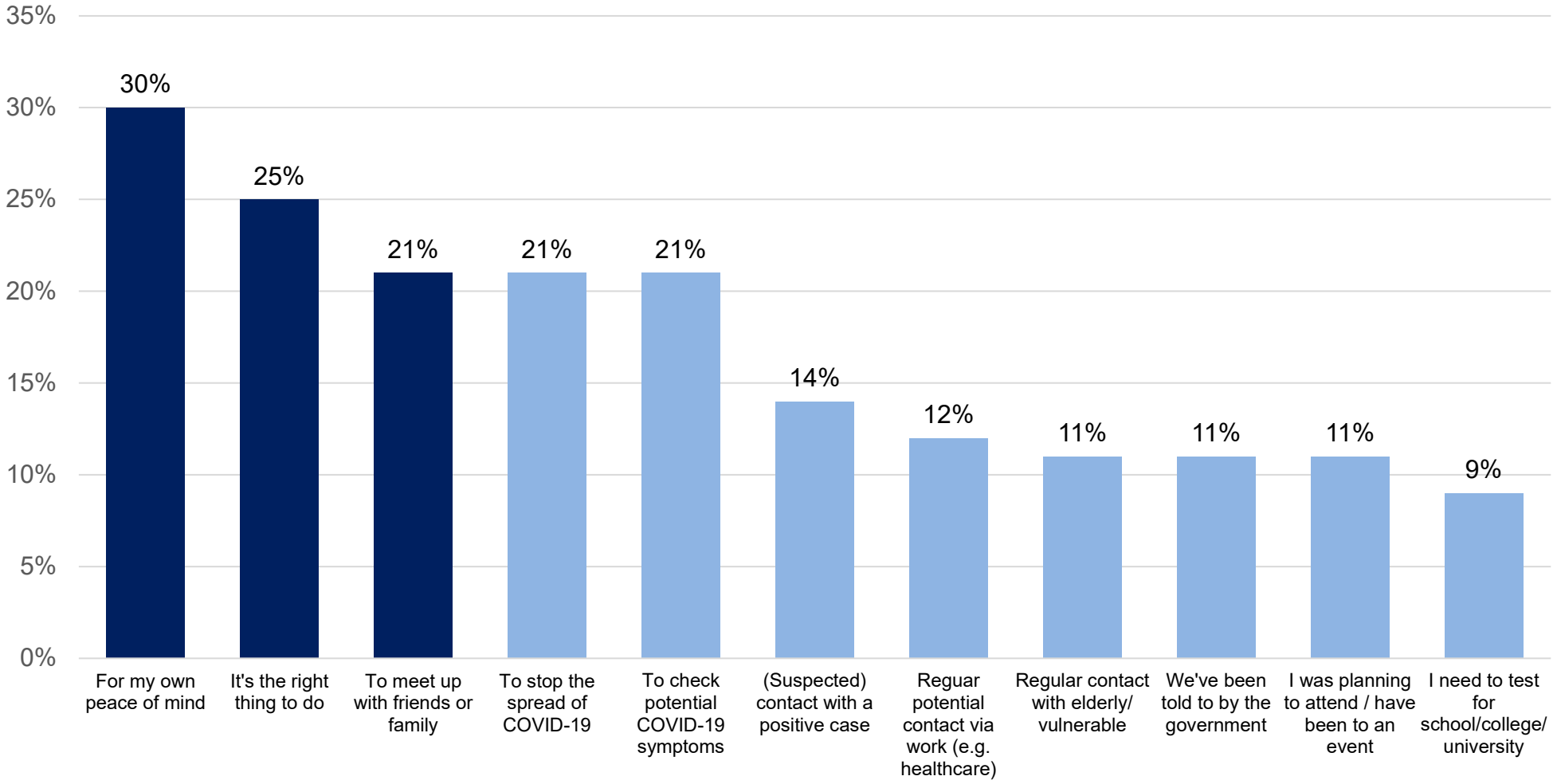
[7] PPT estimates are for adults only, whereas reporting data will also include those aged under 18. The true level of under-reporting may therefore be even greater than suggested in Figure 6.

[8] Source: Basis Research. COVID-19 Surveys – wave 1 (17 to 20 December 2021), wave 2 (29 December 2021 to 4 January 2022), wave 4 (14 to 17 January 2022). Estimated LFTs taken calculated from survey data: B1b. 'When did you last take a COVID-19 test?' D1. 'In the last 2 weeks, how many rapid lateral flow tests, if any, have you personally taken in total?' Base: All respondents: wave 1 (n=1,014), wave 2 (n=1,079), wave 4 (n=1010). All those who have taken an LFT within the last 2 weeks: wave 1 (n=461), wave 2 (n=636), wave 4 (n=557).

The data above shows a clear increase in testing with LFDs following the launch of DTCC. We cannot directly attribute any observed impact of the launch of the DTCC guidance, as the data does not distinguish between ‘users’ of the DTCC guidance and other people who were testing using LFDs. However, from surveys we can determine if people intended to follow the guidance if they were a contact or followed the guidance when they were a contact.

The Public Perceptions Tracker survey asked respondents the reasons why they took their most recent LFD test (Figure 7). The most common reasons given included a sense of social responsibility or to facilitate safe socialising with friends and family. However, some of the listed responses potentially related to DTCC; suspected contact with a positive case (14%) and we’ve been told to by the government (11%). Multiple reasons can be selected for a given test, therefore there is likely to be a high degree of cross-over between the responses. However, we use this data to estimate that the proportion of tests taken due to contact testing (that is, DTCC) was in the region of one in 10. Using the estimates of total tests taken in Table 1, this could have been between approximately 7 million and 9 million tests per fortnight since DTCC launched.

Figure 7. Reasons for taking the most recent LFD test, Public Perceptions Tracker – wave 4 (14 to 17 January 2022)[9]
(Note: multiple reasons could be given for taken a test)



[9] Source: Basis Research. COVID-19 surveys – wave 4 (14 to 17 January 2022). C1. 'Thinking about the most recent rapid lateral flow test that you took, why did you take this test?' Base: All who have taken a rapid lateral flow test (n=2,229).

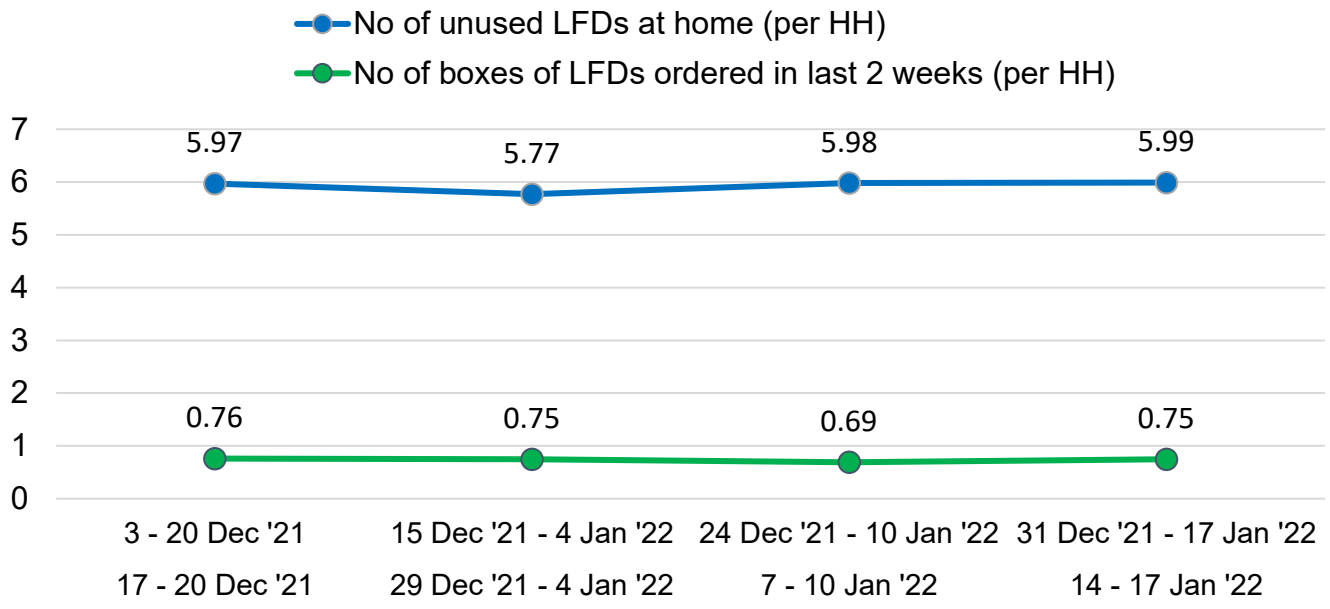
The use of existing stock for LFD testing (and DTCC)

There was a reduction in both number of unused LFDs held at home, and test ordering in late December and early January. However, both measures then returned to their earlier levels. These results suggest people were broadly making use of the stock in the system, were replenishing their home stock at an appropriate time and that unused tests were not being stockpiled at a high level.

Figure 8 shows the average number of boxes of LFD tests ordered in the last 2 weeks (from the time of surveying), and the number of unused tests per household, taken from the Public Perceptions Tracker. On average people appear to have around one box of tests per household (just under 6 tests). Over Christmas there was a slight decline in stock holding, from 5.97 to 5.77. This may have been due to higher than average testing over Christmas and lower success rates for ordering LFDs.

In the survey conducted between 7 and 10 January respondents reported a slightly lower volume of ordering in the previous 2 weeks (24 December to 7 January). This may have been due to an inability to order during the time of constraints in the system in late December. In the later survey both measures returned to their early-December values.

Figure 8. Public Perceptions Tracker stock-in-hand results over time[10]



[10] Source: Basis Research. COVID-19 Surveys – wave 1 (17 to 20 December 2021), wave 2 (29 December 2021 to 4 January 2022), wave 3 (7 to 10 January 2022), wave 4 (14 to 17 January 2022). D4. 'To the best of your knowledge, how many unused rapid lateral flow tests do you have in your home (each box contains 7 tests)?' D14. 'And how many boxes of rapid lateral flow tests, if any, do you expect to order or collect within the next 2 weeks (assuming they are readily available)?' Base: All respondents: wave 1 (n=1,014), wave 2 (n=1,079), wave 3 (n=1,001), wave 4 (n=1,010).

The demand for PCR tests

From both data analysis and the responses to surveys of contacts we can see a clear reduction in the rate at which close contacts took a PCR test immediately following the launch of DTCC. This reduction isn't detectable in the overall PCR testing volumes, suggesting PCR testing of contacts wasn't a significant factor driving high PCR testing prior to the launch of DTCC.

However, we can be confident that the DTCC policy led to a reduction in the demand for PCR testing among close contacts, and therefore eased the pressure on PCR testing capacity compared to the previous policy for testing of close contacts.

There are a variety of reasons by which the DTCC policy may have impacted the demand for PCR tests:

1. Potential increase

From increased detection of asymptomatic cases through daily LFD testing, and subsequent confirmatory PCR testing, particularly for asymptomatic cases who may not have taken up the PCR testing of close contacts offer.

2. Potential decrease

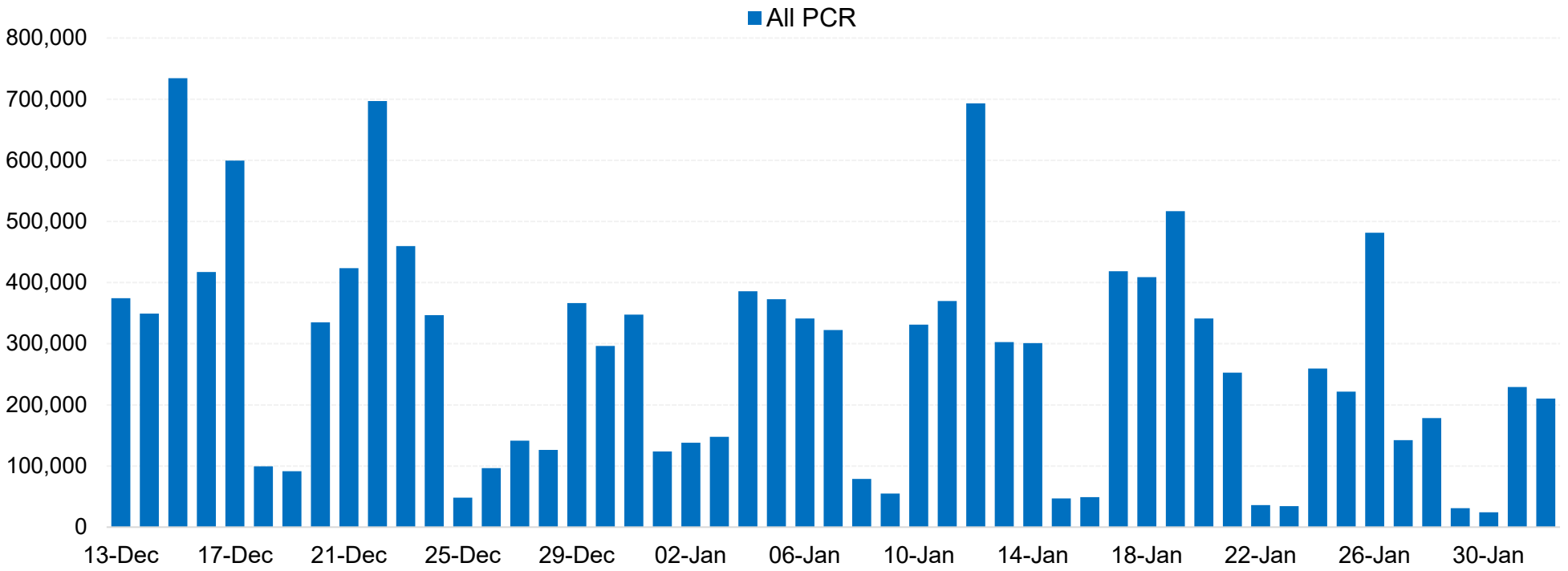
DTCC replaced the previous policy, which advised PCR testing for all contacts, regardless of symptom status.

Therefore, we can assume that DTCC would have only increased demand on PCR testing if the increased case finding exceeded the expected reduction in demand if contacts were accurately following the guidance.

From 11 January the requirement to take a confirmatory PCR test following a positive LFD result was removed (with some exceptions) to reduce pressure on the PCR testing service. From this point DTCC should have put no demand on PCR testing.

Figure 9 shows the number of PCR tests taken per day since the launch of DTCC. This shows some days of high testing immediately following the DTCC service launch. After that the level of testing appears broadly stable, before falling at the end of January. This may be a consequence of the removal of confirmatory PCR requirements, but as this chart shows all PCR testing, it is likely to be strongly driven by the overall prevalence of COVID-19 and the demand for symptomatic testing.

Figure 9. PCR tests taken per day, 14 December 2021 to 31 January 2022

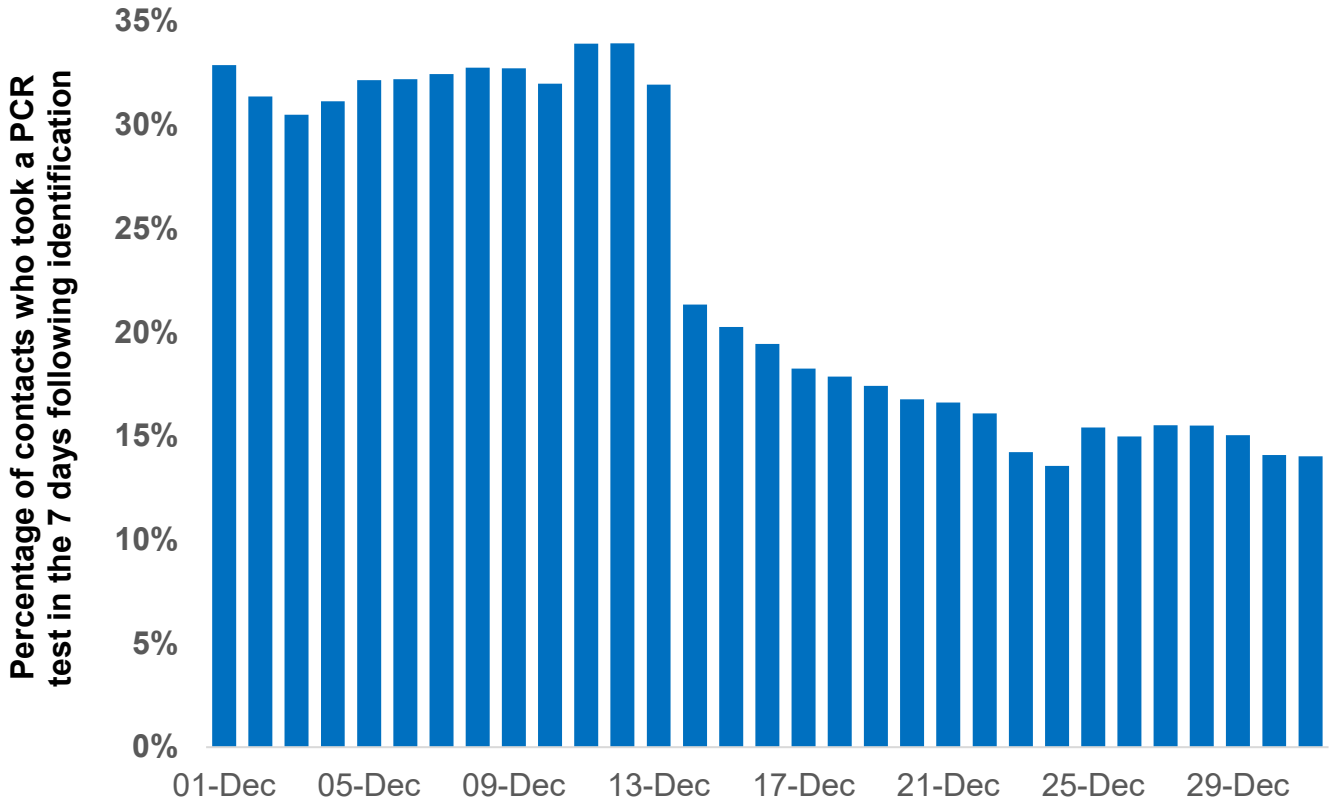


Previous work by the evaluation team has considered data analysis methods to assess the uptake of the PCR testing of close contacts service.[11] Figure 10 shows the results of this analysis for December 2021. The chart shows the portion of successfully traced contacts who took a PCR test in the 7 days after they were identified as a contact (the equivalent period to when daily LFDs should be taken under DTCC). A clear fall in this value can be seen from the day at which DTCC was launched, suggesting the new guidance was successful in changing the behaviour of close contacts from PCR testing to daily LFD testing. Contacts who tested after the launch of DTCC are likely to be those who have become symptomatic and taken a test, potentially even before they were able to be contact traced, or those who met the criteria for a different testing policy.

[11] PCR testing in contacts of cases (without release) in England, UKHSA (awaiting publication).

A similar analysis for the uptake of LFD testing is presented in the question 2 section of this evaluation report.

Figure 10. Proportion of trace identified close contacts who took a PCR test in the 7 days following identification as a close contact, December 2021



In the ONS SIC wave 2 (22 to 27 November) 56% of contacts reported taking a PCR test. By wave 5 this value had reduced to 14%, providing further evidence that DTCC supported a shift away from PCR towards LFD testing for close contacts.

Main findings

The policy of DTCC was live during a period of high demand for LFDs, with supply often not keeping up with demand. There were several factors contributing to this demand, including high prevalence, other changes to testing policy and guidance and changes in testing behaviour over the Christmas period. The evidence gathered for this evaluation demonstrates that DTCC contributed to this demand.

The main findings from this part of the evaluation were:

1. LFD delivery through all testing channels (not just those tests for DTCC) fluctuated following DTCC launch, with particularly high levels seen in the first half of January.
2. Survey findings tell us that DTCC was one of the factors contributing to the increase in the demand for LFD tests in December and January – possibly accounting for around one in 10

of the tests taken at that time. Other factors, including the emergence of the Omicron variant and concern about mingling during the Christmas period, also contributed to the sharp rise.

3. The delivery of LFD tests through different channels varied in response to both operational challenges and societal pressures.
4. There was evidence of unmet demand through all delivery channels following the launch of DTCC, but this appeared to reduce from mid-January.
5. There was evidence that people made use of the stock within the system rather than stockpiling tests.
6. There was evidence of substantial under-reporting of LFD test results. Using survey data to derive an estimate, the number of LFDs taken by the general population was likely to have been at least 6 times greater than the number of results reported to NHS Test and Trace during this period. However, as described in the next chapter, despite not reporting test results, the evidence pointed towards people's actions being compliant with national guidance.
7. The DTCC policy led to a reduction in demand for PCR testing from close contacts.

Question 2. ‘To what extent did people follow the guidance to test and act appropriately on the results of the tests?’

The DTCC policy was launched in December 2021, a time when there were other changes to testing policy and a significant amount of public health guidance being distributed around the emergence of the Omicron variant of COVID-19. This question was designed to understand how successful the new DTCC guidance was at getting contacts to test using LFDs and how well the guidance was understood by users of the service. To answer this question, we consider data analysis covering the entire period for which DTCC was active policy, and the result of surveys and research conducted at various point between December 2021 and January 2022.

The uptake of DTCC by close contacts

We have assessed the uptake of the DTCC using data matching, the VOTC survey and ONS SIC survey. We consider the ONS SIC survey to be the most reliable source of data here, and this suggests DTCC is adopted by between 64 to 75% of trace contacts. The VOTC survey results support this finding as they also consistently showed high levels of claimed participation in DTCC.

The data matching does not suggest as high a level of uptake, but these results are impacted by known under reporting of LFD tests. The findings on DTCC uptake from the various sources are summarised in Table 2.

Table 2. The uptake of DTCC from different information sources

	Data matching CTAS and NPEx	Voice of the customer survey	Self-isolation compliance survey
Indicative uptake	Proportion of trace contacts who reported at least one LFD test in the 7 days after they were notified by CTAS Pre-policy: approximately 10% After policy launch: 15 to 20% Late January: 25 to 30% Adjustment for under-reporting gives approximately 40 to 60%	Proportion of contacts not isolating who said that they had manage or would manage to take LFTs every day/most days for 7 days December to January: 66% every day/19% most days = 85% January to February: 75% every day/13% most days = 88%	Proportion of contacts who said they had undertaken daily LFDs (asked after DTCC period) January (wave 3): 70% (64% full compliance) February (wave 4): 80% (75% full compliance) February (wave 5): 76% (67% full compliance)

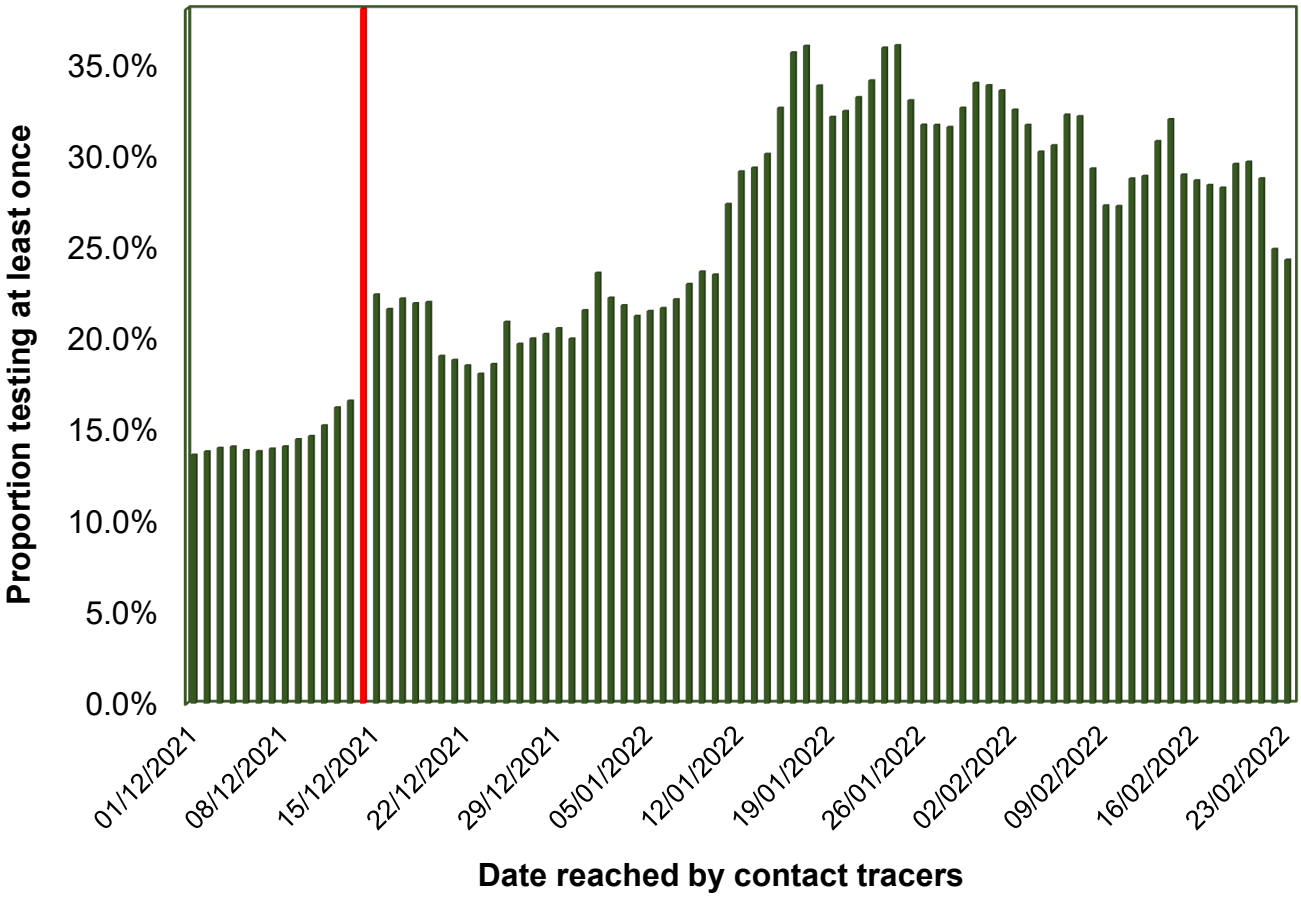
Survey data has a known bias to more optimistic estimates, as survey participants can be more engaged than the general population. Therefore, the actual level of uptake is unlikely to be as high as the maximums suggested by the survey results presented here.

Data matching

We have performed data matching between UKHSA's contact tracing and testing databases to assess how many of the close contacts identified during the lifetime of the DTCC policy reported an LFD test result. Given the high vaccination rates within the general population, the guidance to undertake DTCC would have applied to most of these contacts. Figure 11 shows the uptake of DTCC amongst trace contacts throughout the duration of the policy, where uptake of the service is defined as a contact who had 'reported one or more LFD test results between zero and 7 days (inclusive) from the date of their contact tracing'.[12]

[12] The absolute values in this matching analysis will be limited by the under-reporting of LFD results (see Annexe 1).

Figure 11. The proportion of trace contacts who reported at least one LFD test in the 7 days after they were notified by CTAS, December 2021 to February 2022



Prior to the introduction of the DTCC guidance, some close contacts (approximately 14%) were reporting LFD test results. Technically this would not have been aligned with the contact testing guidance at the time (PCR tests were recommended). However, there are many other reasons why a contact may have taken a test: they may have been required to for work (for example, in a healthcare setting) or education, or they may have been being cautious around their social interactions in the lead up to Christmas. Furthermore, the DTCC guidance was announced prior to its implementation so people may have seen this and followed it before the guidance became official.

On 14 December 2021 (the day of the DTCC policy launch), there is a clear increase in the uptake of LFD testing amongst contacts. Of those contacts reached on 14 December over 20% registered an LFD test in the next 7 days: around double the value from the preceding days. Uptake rose again in early-mid January with over 30% of trace contacts reporting at least one LFD result on most days. Uptake remained relatively high throughout the remainder of the policy's life cycle although the rate was slowly declining throughout February (when the public would have known about the upcoming removal of restrictions).

Figure 12 shows, for the complete set of trace contacts, the number of LFD test results reported. As previously shown in Figure 11, the reported level of uptake is relatively low, that is,

the majority of contacts report zero tests. Hence this chart is dominated by the 'blue' category for people who haven't reported any LFD results.

Figure 12. The proportion of trace contacts reporting {0, 1, 2 … 8} tests in the 7 days after being reached by contact tracers

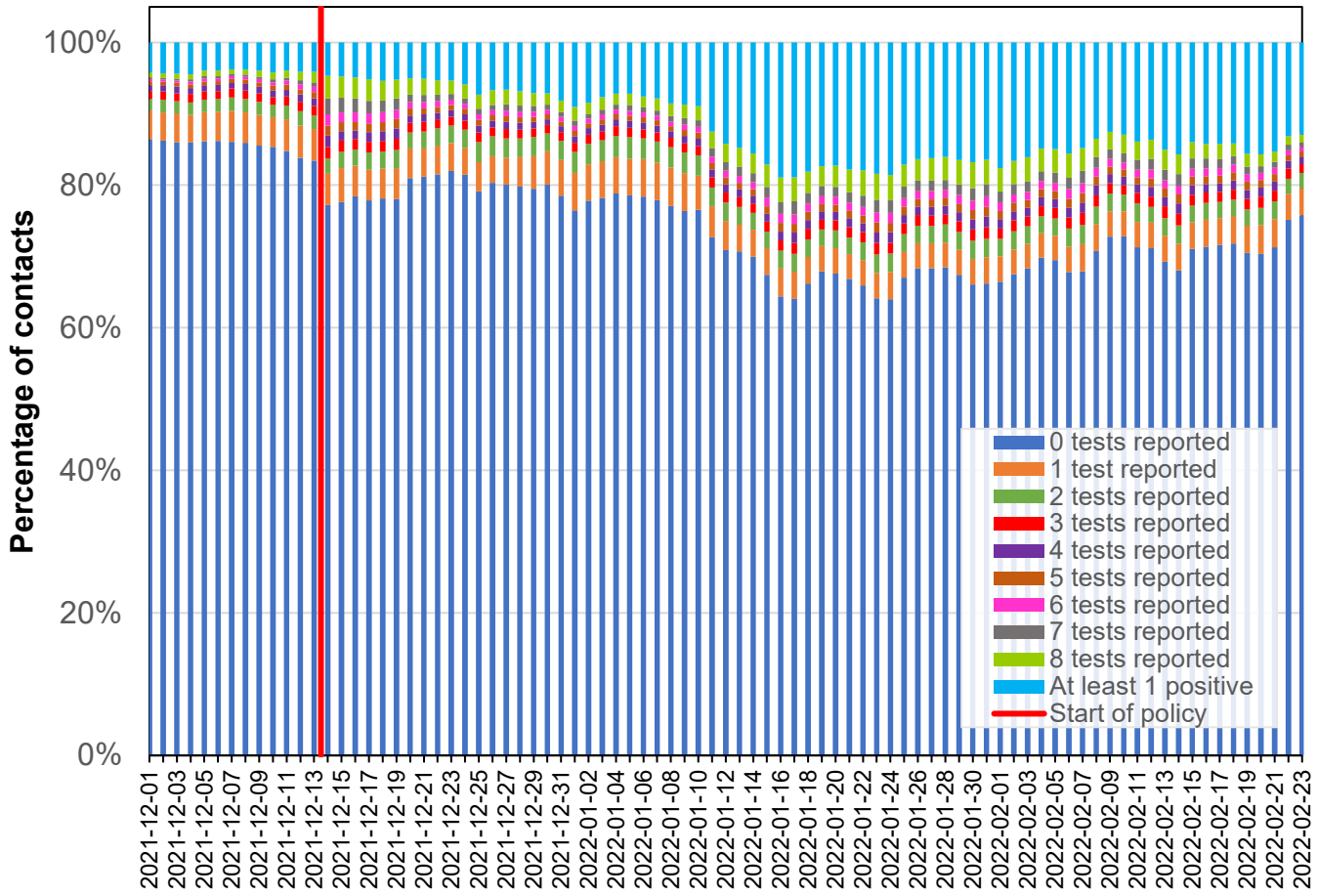
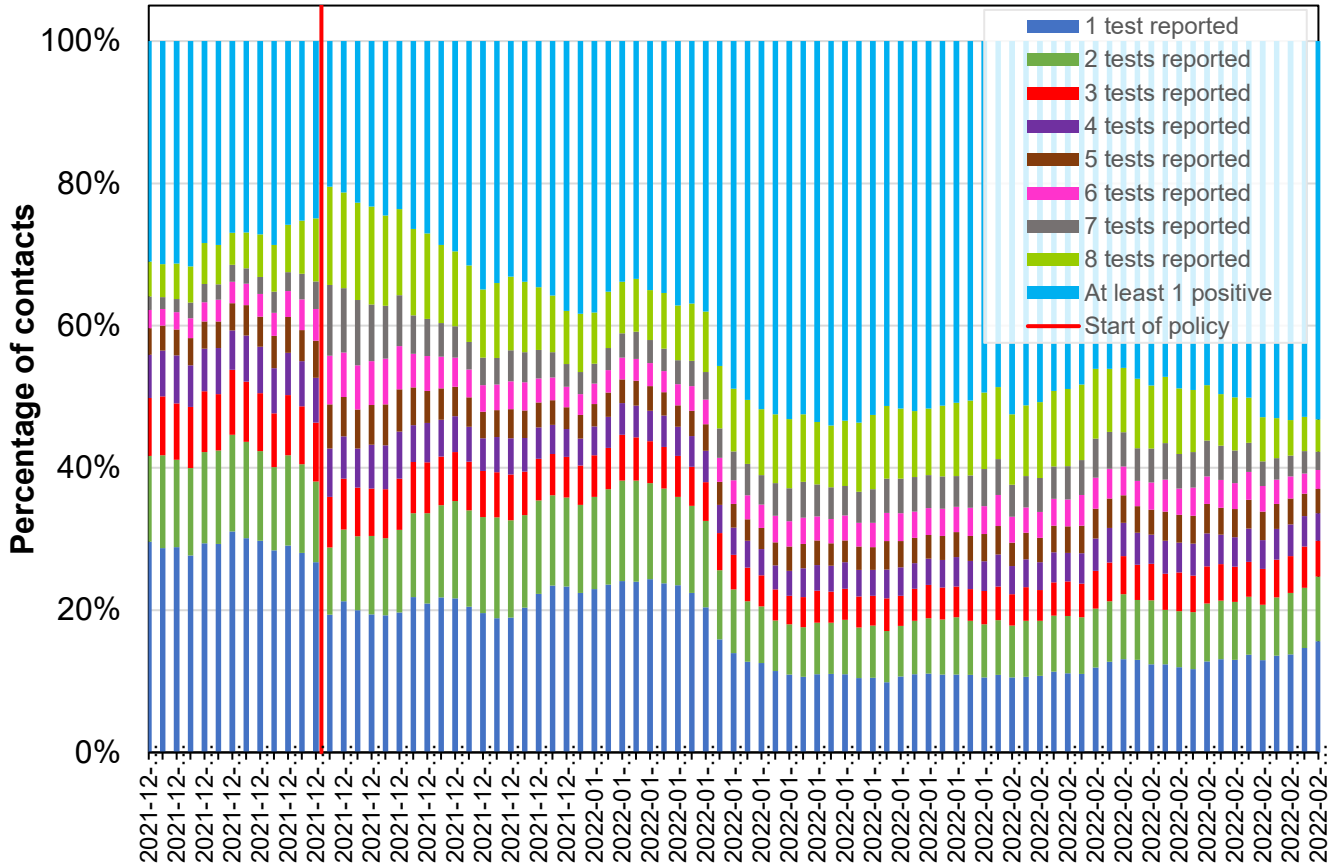


Figure 13 shows the same data, but with the zero category removed. This makes it much easier to see how many contacts are reporting between 1 and 7 tests. Full compliance with the DTCC policy would be taking 7, or even 8, tests in the 7 days after being contacted by CTAS[13], or having tested until a positive result is returned. As can be seen, the proportion of contacts taking 7 or 8 tests was very low. Since the implementation of the policy, this population as a proportion of all contacts taking at least one test falls in the range 6.3% to 23.8%. As a proportion of the entire contact population, the proportion taking all daily tests as suggested by DTCC guidance was consistently less than 5%.

[13] An individual reached by contact services on Day 0 would be expected to test either that day and each of the next 6 days (ending Day 6) or the next day and each subsequent day (ending Day 7). An individual starting on Day 0 and continuing all the way to Day 7 is counted as taking 8 tests.

Figure 13. For trace contacts who have reported at least one LFD test result, the proportion reporting {1, 2 … 8} tests (that is, excluding contacts who haven't reported any tests)



As stated above, although those testing on 7+ days above are adherent to the policy, so are any individuals taking tests daily until testing positive and then stopping. From mid-January onwards a higher proportion of contacts were testing positive on one of their tests, of which some portion would also be adherent. This would likely reduce the proportion of people who managed to complete the full 7 or 8 tests. Across the time period considered, the completion of tests on 7+ days was highest on the day of the policy launch, suggesting a strong impact of the new guidance as it became official policy. This measure subsequently reduced across December and then improved throughout January, following a similar pattern to the uptake of DTCC.

Voice of the Customer survey

In the December to January results from the VOTC survey 66% of contacts that were not isolating claimed they had managed or would manage to take LFTs every day for 7 days. A further 19% say they had or would take them most days, but probably not all 7. In January to February this increased to 75% claiming they had or would take LFTs every day for 7 days, with a further 13% saying they would on most but not all days. Therefore, uptake of daily testing by close contacts could have been as high as 85% in December to January, and 88% in January to February, with the majority of those testing fully adhering to the guidance to test on every day. This is far higher estimate than the uptake values given by the data analysis.

ONS SIC survey

From wave 3 of the ONS SIC survey, contacts were asked ‘Have you undertaken daily rapid lateral flow testing?’ The results from this in wave 3 indicated that 70% of respondents had undertaken DTCC (that is, answered ‘yes’ to the questions). In wave 4 this rose to 80%, but declined slightly to 76% in wave 5.

Contacts were also asked if they were able to complete all the tests required at the time of the interview (that is, every day up until the interview). The results suggest a very high level of adherence to the DTCC guidelines in that around 9 in 10 of those who had undertaken DTCC suggested they had completed all their tests (92% in wave 3, 94% in wave 4, and 89% in wave 5).

Combining responses on successful completion of all tests with the uptake rates suggest that 64%, 75% and 67% of all contacts were able to complete the full course of tests suggested by the DTCC guidance in waves 3, 4, and 5 respectively.

Note that the respondents considered here are ‘engaged’; they have had their vaccines as required and have chosen to participate in the survey. However, the SIC surveys could be considered our best source of evidence, as the questions are directly aimed at known contacts and are asked after they had had the opportunity to complete DTCC in full.

Relationship between matching analysis and survey data

There is a large discrepancy between the uptake suggested by the data analysis (up to 30%) and the survey data (as high as 88%) which is unlikely to be a consequence of survey optimism. In order for an LFD result to reach the UKHSA data systems, a user needed to report the result of their test online. While users were recommended to report their results, this was not enforced (and practically not enforceable), and there was known to be a high level of under-reporting of LFD test results (see Annexe 1).

Annexe 2 presents some further analysis that attempts to account for the known under-reporting of LFD tests and other limitations within the matching methodology. Using the data and time frame from wave 3 of the ONS SIC survey, the output of this analysis suggests that when the data matching gives an uptake of 17.1%, the actual uptake may be as high as 41.5% and 61.4%, which closes the gap between the data analysis and the results of the various surveys.

Changes in testing behaviour before and after the DTCC policy was introduced

Multiple sources of evidence have shown that LFD testing in the general population increased around the time that DTCC launched. There were many driving factors for this in both the

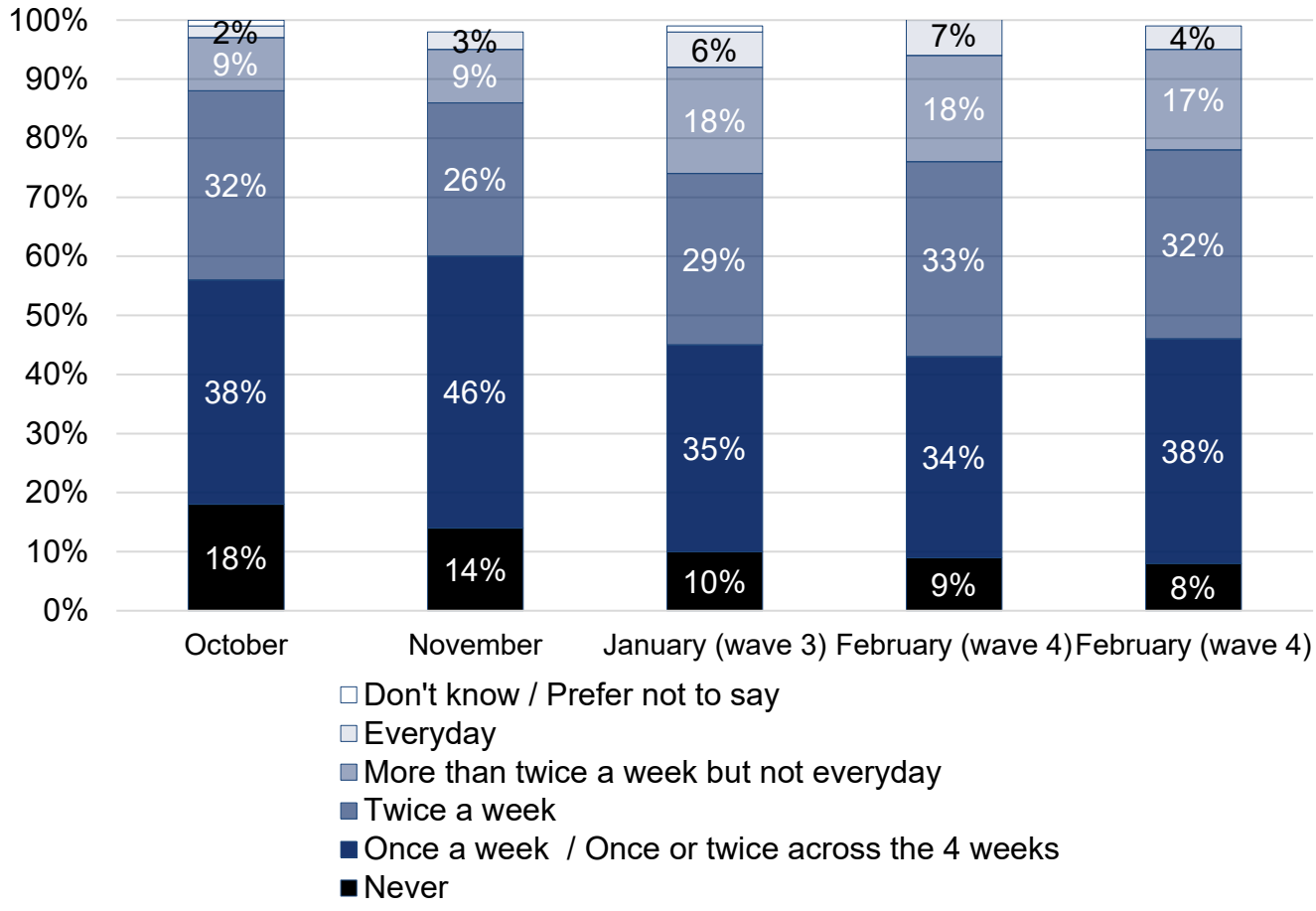
general population and close contact groups. However, for the ONS SIC, we can see that frequency of testing with LFDs by contacts increased after December 2021, which can be attributed to the launch of DTCC.

ONS SIC survey

The ONS SIC surveys includes a question about how frequently contacts were testing in the 4 weeks prior to being contacted by NHS Test and Trace, the results of which are presented in Figure 14. This gives an indication as to the level of background testing within the population (although some could have been previously contacted by NHS Test and Trace). These results show that prior to DTCC (October and November) between 14% and 18% of respondents never took LFD tests and the majority had taken at least one test in the 4 weeks prior to being contacted. However, very few respondents took lateral flow tests daily (3% or less).

The equivalent data for January shows a general increase in the frequency of testing after DTCC was introduced, with fewer respondents never testing and more testing several times each week, a trend that continued into February. This illustrates that factors other than DTCC were also driving an increase in testing at that time – most notably concern during the Omicron wave and social mixing over the Christmas and New Year period.

Figure 14. In the 4 weeks prior to you being contacted by NHS Test and Trace, how often did you take a lateral flow test? ONS self-isolation compliance surveys



Public Perceptions Tracker

The Public Perception Tracker data showed that 2 main factors drove increased LFD testing overall in December and January:

1. An increase in testing in order to visit someone over Christmas.
2. An increase in testing due to having symptoms.

Overall, 14% of people who took an LFD test in January reported doing so due to coming into contact with someone who they felt could have COVID-19.

Whether the actions taken by people on receipt of a negative or positive result from daily LFD testing in-line with guidance

Anyone taking part in DTCC and testing positive should self-isolate for 10 days as per the guidance for COVID-19 cases. People taking daily LFD tests as a contact and testing negative may choose to continue to act with increased caution given their knowledge that they had been in contact with a COVID-19 case. Conversely though, a negative test could conceivably lead to people acting with less caution, as they believe they are not at risk of spreading COVID-19 to other people.

Survey results show that DTCC is useful in identifying positive cases and that cases are self-isolating as a consequence, whilst contacts who test negative are exercising a certain level of caution in their day-to-day activities. In these ways, DTCC appears to have been useful in mitigating the potential spread of infection.

ONS SIC survey

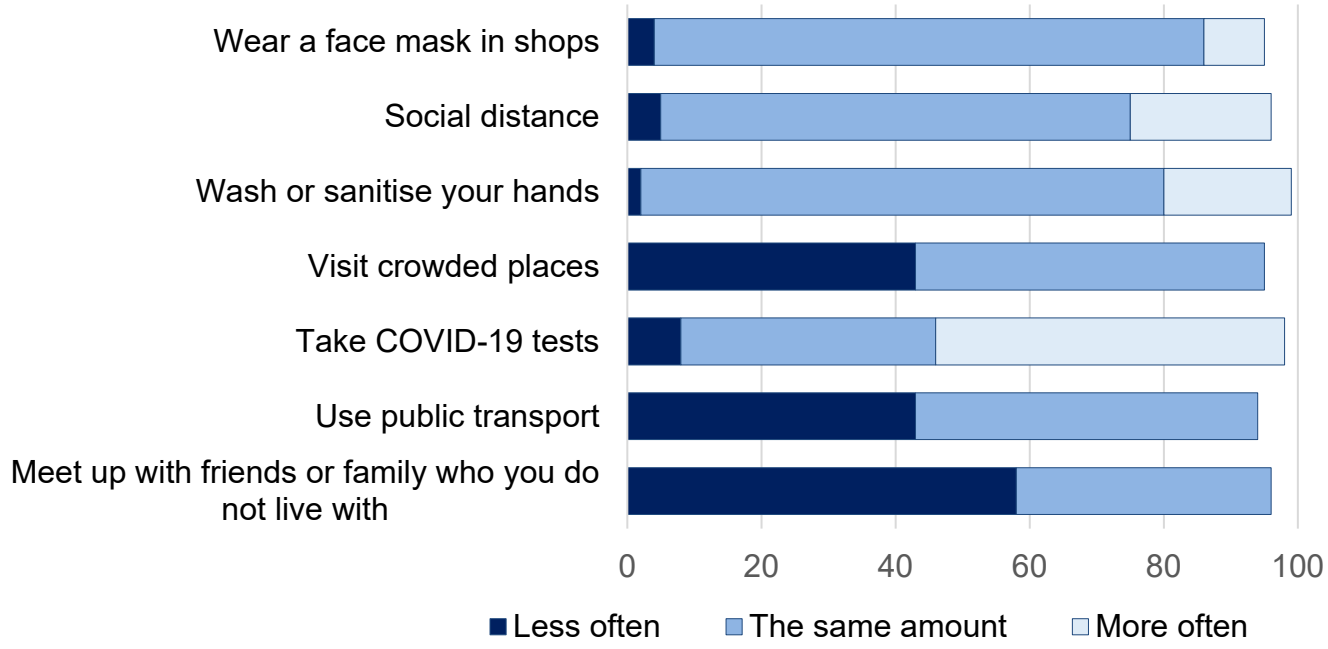
Data from the ONS SIC surveys showed that in January around 14% of fully vaccinated contacts taking any of the COVID-19 tests available tested positive for COVID-19 (16% in wave 3, 13% in wave 4, and 12% in wave 5). Given the high reported uptake of DTCC in this survey, it is reasonable to conclude that some of these positive cases will have been detected by the daily LFD testing.

Of all respondents from the ONS SIC survey, 18% stated that they were currently self-isolating in wave 3, 16% in wave 4, and 15% in wave 5. Of these 76%, 72% and 74% (for each wave respectively) stated that they had tested positive for COVID-19. This suggests that contacts were largely following guidance to self-isolate once they tested positive for COVID-19.

These findings are broadly consistent with the rate of adherence to self-isolation guidance after testing positive for COVID-19. For example, between 29 November and 4 December 2021, 74% of respondents reported fully adherence to requirements throughout their self-isolation period.[14]

Figure 15 shows the actions contacts say they have done more often, less often or the same following receipt of a negative test during DTCC in the responses to wave 3 of the ONS SIC survey. Broadly these indicate an increased level of caution as a known contact. People are more likely to wear a face mask in shops, socially distance and wash their hands. Similarly, they are less likely to visit crowded places, use public transport or meet up with friends and family. Only a very small percentage indicate the inverse of these choices. This suggests that DTCC is not leading to an increase in behaviours that might exacerbate the spread of COVID-19. Responses to this question were similar across wave 4 and wave 5.

Figure 15. Responses to the question: 'Since day 1 of undertaking daily rapid lateral flow testing and having tested negative, how often have you?' ONS trace contacts survey (wave 3)



Voice of the Customer survey

Data from the VOTC survey indicates that of those contacts that were fully vaccinated and had a COVID-19 test since being informed they were a close contact, 34% tested positive for COVID-19 in December to January. This remained consistent, with 35% testing positive in January to February. It is clear from this data that testing as a contact picked up a significant number of new cases, which could then go on to self-isolate.

Among those fully vaccinated and not testing positive, the VOTC survey found that some contacts were self-isolating instead of testing daily as they were unsure of the DTCC guidelines. In addition, some chose to self-isolate instead of or as well as undertaking DTCC. Overall, the

[14] Coronavirus and self-isolation after testing positive in England (ONS)

results from this survey suggest that around 1 in 3 fully vaccinated contacts testing negative for COVID-19 were self-isolating, despite this no longer being a legal requirement. Most also exercised some caution as a fully vaccinated contact and not self-isolating, with 67% in December to January and 57% in January to February reporting that they had been limiting social contacts, especially around elderly and vulnerable people. As with the results from the ONS SIC survey, these findings suggest that DTCC didn't lead to an increase in risky behaviours in the close contact population.

The barriers and motivations to contact testing

There are a number of barriers that may have limited the uptake of DTCC between December 2021 and February 2022. Multiple sources found evidence that a lack of availability of LFD tests played a factor in people's ability to get tests or make decisions around the uptake of DTCC, particularly in December 2021 shortly after the policy was launched. Another major barrier appears to be confusion in the contact population around the guidance, particularly around who the guidance applied to.

Conversely, there appears to have been a growing acceptance of LFDs as a tool for managing COVID-19, with users commenting on the ease of these tests and a high confidence in their accuracy, suggesting that the nature of LFDs was making daily testing acceptable to the general public.

ONS SIC survey

Waves 3 to 5 of the ONS SIC surveys suggested that 20 to 30% of contacts did not undertake DTCC. When asked why they had not, the most common responses were "I did not have access to enough lateral flow tests", or "I don't think it's useful".

Table 3. Percentage of contacts not undertaking DTCC, and the most common reason why, ONS SIC surveys waves 3 to 5

Wave	Percentage of contacts who did not undertake DTCC	Most common reasons for not undertaking DTCC	Percentage who held this opinion
3	30%	I did not have access to enough lateral flow tests	32%
4	20%	I don't think it's useful	27%
5	24%	I don't think it's useful	33%

The results from wave 3 provide strong evidence that at the commencement of DTCC in December 2021 a lack of availability of LFDs was a barrier to the uptake of DTCC, corroborating findings presented as part of Question 1 in this evaluation. This suggests that there were some users who would have followed the DTCC guidance, and produced the further

positive effects of the policy in the early weeks following launch had there been less pressure on the supply of LFD tests during this time. However, as time progressed and the availability of LFDs became less of an issue, the results show that many were unconvinced as to the merits of undertaking DTCC.

Similarly, from the group who had undertaken DTCC but had not taken all tests, the most frequently mentioned reason for not being able to complete all tests in wave 3 was a lack of available lateral flow tests during the commencement of the DTCC policy. In waves 4 and 5 the responses were more specific in the reasons for a lack of testing completion. Again, this suggests that a lack of availability of LFDs was a barrier to the uptake of DTCC during its initial commencement, and that there were some users who would have tested more frequently had more LFDs been available.

Table 4. Percentage of contacts not able to complete all DTCC tests and the reason for not doing so, ONS SIC survey waves 3 to 5

Wave	Percentage of contacts who started but did not complete DTCC	Most common reasons for not being able to complete all tests	Percentage who held this opinion
3	5%	I didn't have enough lateral flow tests (to complete daily testing)	48%*
4	5%	Other or unspecified reason	32%*
5	8%	Other ot unspecified reason	26%*

* Sample size for this group of under 30 respondents.

Of those who took part in daily testing but did not complete all tests, a further 27% in wave 3 and 14% in wave 5 reported doing so because 'I tested positive'. These people would not be expected to continue testing according to DTCC guidance, so this response is an indication they have followed the guidance. Therefore, only a small percentage of people suggested they had undertaken DTCC but not done all the tests (sample size under 30 for wave 3). While not a true 'barrier', the fact that some DTCC participants would be expected to receive positive results should be taken into consideration when assessing how many participants complete the 'full' set of 7 daily tests.

The ONS SIC survey showed that respondents were confident and understood DTCC guidance. For those who undertook DTCC, approximately 86% reported being very or moderately confident that they understood the guidance on taking daily rapid lateral flow tests in wave 3, with waves 4 and 5 revealing that this level of understanding increased to 90% and 88% respectively.

Regarding the requirement to undertake DTCC, in wave 3, 90% of all respondents correctly said that double vaccinated contacts should undertake DTCC. This was statistically significantly lower amongst those aged over 55 (84%). A total 89% of respondents correctly stated this in waves 4 and 5, a figure which was statistically significantly lower in both waves 4 and 5

amongst males (85% for wave 4 and 86% for wave 5) when compared with females (94% for wave 4 and 92% of wave 5).

Qualitative research and Public Perceptions Tracker

The qualitative research focus groups considered the views of various members of the public to better understand the motivations and barriers to undertaking DTCC, and LFD testing in general. The main motivators or facilitators were:

1. The relative ease of LFD testing: LFD testing is now generally seen as being easy and familiar, particularly compared to PCR testing:

> "This is easier, I don't need to book in to have a PCR a day or 2 later go and do it or have it sent to me a day later to get the results… this is 3 days or so with everything on hold right."

2. Confidence in LFD results accuracy: LFD testing accuracy is now seen by a high proportion of people as being 'fit for purpose'. The Public Perceptions Tracker results from January 2022 showed that 72% of the English population trust LFDs to provide accurate results.
3. Doing the right thing: DTCC taps into the need to provide control to those who want to do the right thing and for those who need reassurance to manage risk to themselves or others.

The barriers to completing DTCC were in part specific the context at that time, and also to a degree about LFD testing more broadly – not just limited to DTCC:

- availability of tests: respondents gave a strong message that access to tests was problematic
- lack of motivation: respondents showed a general unwillingness to participate, particularly if they were fully vaccinated and had no symptoms
- people having confidence in their own decisions: at a relatively late stage in the pandemic, and having gone through many iterations of COVID-19 guidelines, people appear to be confident in making their own decisions on how to be COVID-safe; 48% of people reported making their own decisions
- concerns around wastage: the appropriateness and usefulness of daily testing was questioned, particularly if a contact was not going to be meeting anyone; "It doesn't make sense to do this, it feels wasteful, and is not useful"

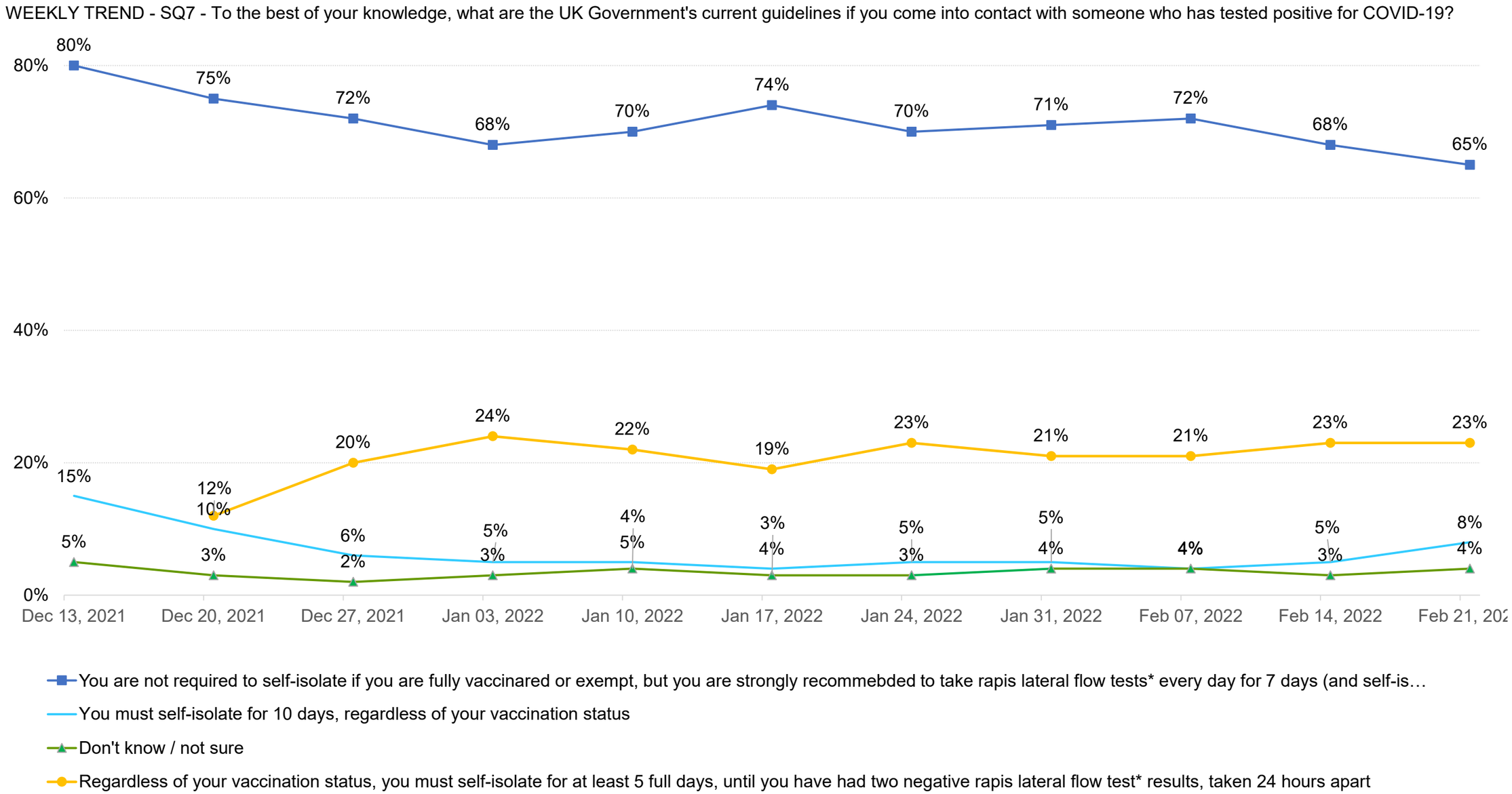
Voice of the Customer survey

Lack of clarity over the guidance was a common theme across the VOTC survey, meaning confusion, including not understanding that daily testing was the correct advice to follow, was likely a significant barrier to DTCC participation, particularly in the first few days after being contacted by the contact tracing service. In December to January, basic recognition of DTCC was fairly high among contacts, with 66% being able to pick the correct guideline from a list of options presented, rising slightly to 70% among those fully vaccinated (that is, the target

population for DTCC). Overall recognition dropped to 62% in January to February, but this was due to the unvaccinated or not fully vaccinated being more uncertain, with those who were fully vaccinated remaining consistent with 70% recognising the correct guideline across the period.

This left 30% of those fully vaccinated DTCC unsure of the correct action, either believing they needed to self-isolate for 5 to 7 days until a negative test (this was the new guidance for cases), they needed to self-isolate for 10 days regardless of vaccination status (the previous guidelines for cases), or simply being unsure. Overall, when looking at the weekly trend, the VoTC results suggested a long-term decline in recognition of the DTCC guidelines among those fully vaccinated from 17 December 2021 to 24 February 2022 (see Figure 16). Which may be partly explained by the addition of the new guidance for cases introduced in late December.

Figure 16. VOTC survey – What is the guidance for contacts, 13 December 2021 to 24 February 2 2022, 11,302 contacts with 2+ doses of the COVID-19 vaccination



In addition to this, around 1 in 4 fully vaccinated contacts (22%) in December to January, falling to 18% in January to February, said they did not understand or were unsure about the information provided about ‘Whether I should take rapid lateral flow tests every day for 7 days’. Furthermore, around 1 in 3 (32%) in December to January, falling to 28% in January to February did not think the information provided was easy to understand.

Among those saying they were unsure or did not understand whether they should be doing daily testing, the areas of concern expressed were:

1. Contradictory information across channels or source:

    > "My test and trace email told me I had to self isolate after someone I live with tested positive on a lateral flow, but test and trace told other people I live with that they do not need to isolate, despite us all being vaccinated and in the same position"

2. Confusion as to what terms such as 'fully vaccinated' and 'exempt' mean:

    > "Test and trace said I need to self isolate for 7 days unless exempt, but it didn't say what qualifies as exempt."

3. Confusion with the new guidelines for cases.
4. Complexity when someone is both a case and a contact.

The results from the VOTC survey generally suggest a lower understanding of the guidance than that in the results from the ONS SIC survey. However, given that that the VOTC survey is done earlier during an individuals' 10 days of testing this is partly expected, as people will have had a chance to do further research and gain clarity on the requirements by the time they are reached by the ONS SIC survey. In addition, the surveys are worded slightly differently, which may also contribute to the difference in the findings. The VOTC survey focussed on the experience of DTCC communications and identifying correct guidance among different options, and the ONS SIC survey focussed on whether respondents were aware they should be undertaking DTCC.

The variation in DTCC uptake by demographic factors

The ONS SIC survey is the only good source of data to assess an impact of different demographic factors on the uptake of DTCC. While there are some differences between waves, the results showed that females were generally more likely to undertake daily lateral flow testing than males. Similarly the middle age group (35 to 54 years) were more likely to report having taken part in daily testing than the younger (18 to 34 years) and older (55 years and over) age groups.

ONS SIC survey

Across waves 3 to 5 of the SIC survey female respondents consistently reported a higher uptake of daily lateral flow testing. In wave 3 of the survey 72% of females indicated they had undertaken daily testing compared to 68% in males. The equivalent figures in wave 4 were 85% for females and 76% for male, and in wave 5 81% for females and 70% for males.

The results for wave 3 indicate that uptake of daily rapid testing was higher in the middle-aged group (35 to 54 years at 85%) than both older ages (55 years and over at 74%) and younger age groups (18 to 34 years at 80%). Similar findings were reported for wave 4 (35 to 54 years at 85%, 55 years and over at 74%, 18 to 34 years at 80%). In wave 5 the uptake was equal for the 18 to 34 and 35 to 54 year groups (both at 78%), which was still higher than the 55 year and over group (71%).

Wave 5 reported some further results by region, which suggested a lower uptake and completion of all tests in the East of England (60%). Comparatively, the regions with the highest uptake were the North East (81%) and the South East (74%).

Main findings

DTCC was launched at the time of the emergence of the Omicron variant, when other changes to public health policy and guidance were being made. The main findings from this part of the evaluation were:

1. The findings from data matching and the 2 surveys indicate a relatively high uptake of DTCC amongst those targeted by the DTCC guidance. The data does not allow us to settle on a precise figure, but we estimate that 50 to 60% of fully vaccinated contacts followed the guidance.
2. Survey results show that most cases identified through DTCC are self-isolating as a consequence, whilst contacts who test negative are exercising a certain level of caution in their day-to-day activities. In these ways, DTCC appears to have been useful in mitigating the potential spread of infection, without having a notable backfire effect.
3. Motivations for undertaking DTCC were the relative ease and perceived acceptability of LFD testing, confidence in the accuracy of LFD results and a desire to protect oneself and others.
4. Barriers included the availability of tests, confusion about the guidance (and in particular who the guidance applied to) and concerns that testing each day was wasteful.
5. While the results are not always consistent between different waves of ONS SIC, females were more likely to undertake DTCC than males. There was also generally higher uptake in the middle age group (35 to 54 years).

Question 3. ‘What impact did DTCC have on the transmission of COVID-19?’

The DTCC policy ran for just over 2 months between December 2021 and February 2022 and aimed to reduce COVID-19 transmission through increased case identification and consequently reduced onwards infections. In this chapter we aim to understand the impact of DTCC by analysing the number of COVID-positive cases that were detected through the daily LFD testing, both by data analysis and responses to surveys. By definition, the reduction of onward transmission is difficult to measure directly. Instead we use the findings from other parts of the evaluation to model the expected impact of DTCC on transmission compared to other policies.

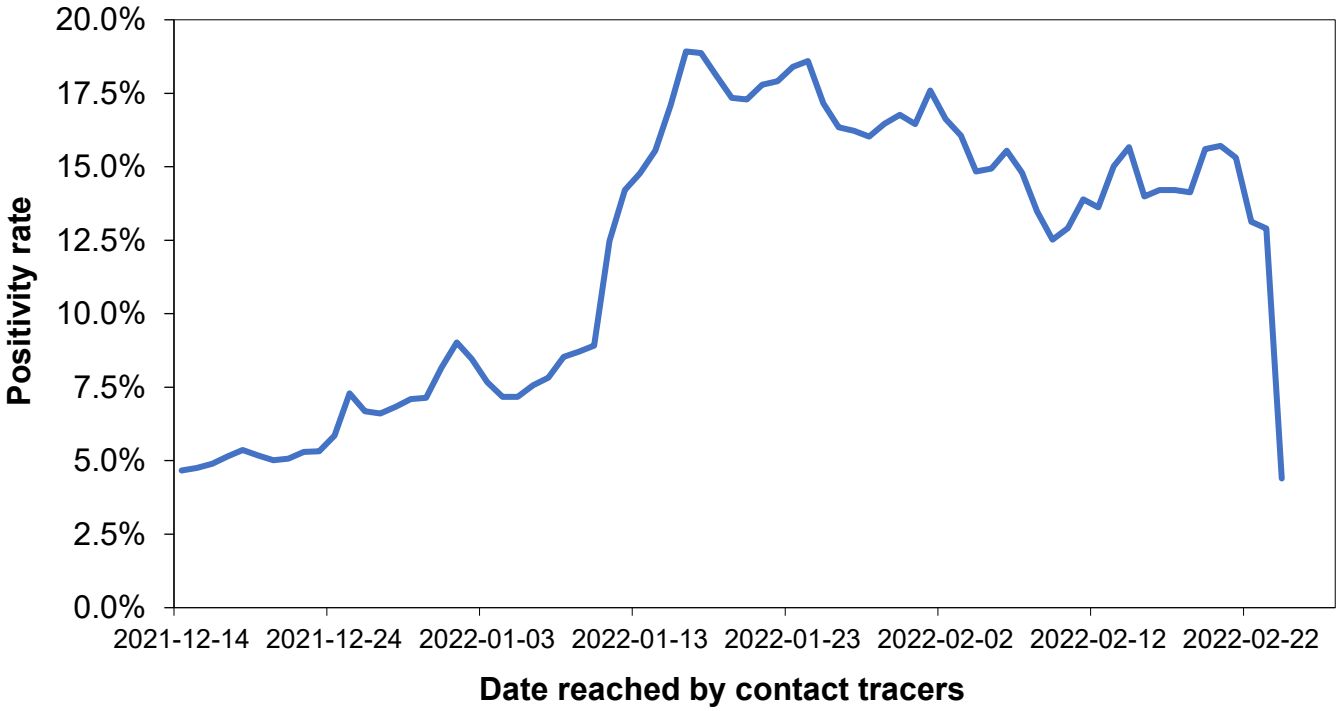
Number of COVID-19 cases detected through the DTCC policy

Data matching

The data matching considered all contacts that had been reported to the contact tracing service, and matched these to any LFDs taken in the subsequent 7 days. Between 14 December 2021 and 24 February 2022 a total of 7,441,268 contacts were identified. Over this time period 822,937 contacts reported at least one positive LFD in their contact window, an overall positivity rate of 11.1%.

The positivity varied substantially over the period in which the DTCC positivity was live. In the early weeks of the policy (late December to early January) positivity was relatively low, but increasing, from approximately 5% to 8%. In mid-January there was a sharp rise in positivity, up to almost 19% on 15 January. This may be a consequence of the improved availability of LFD tests to contacts if inability to test had restricted case finding in the early weeks of the policy, or from other factors such as an increase in transmission driven by the return of students to education settings and other social mixing during and after the Christmas holidays.

Figure 17. DTCC contact positivity, 14 December 2021 to 24 February 2022



Survey findings

Both the ONS SIC survey and VOTC survey give measures of how many of their respondents had tested positive for COVID-19. Note that in both surveys this included respondents who were testing for any reason, not just those who specified they had taken daily LFD tests. Therefore, it is possible that some cases may have been detected via other routes, for example, symptomatic PCR testing, rather that DTCC itself. However, both surveys indicate a high level of daily testing amongst respondents, so it would be reasonable to assume that daily testing had contributed to the case finding. Furthermore, the findings are useful in understanding the positivity rate in the contact populations during the DTCC policy.

In the ONS SIC around 14% of fully vaccinated contacts who had taken a test reported testing positive for COVID-19 (16% in wave 3, 13% in wave 4, and 12% in wave 5). The VOTC survey suggests a higher positivity rate, with 22% of fully vaccinated contacts that had taken a test since being identified as a contact testing positive in the period from 17 December to 19 January.

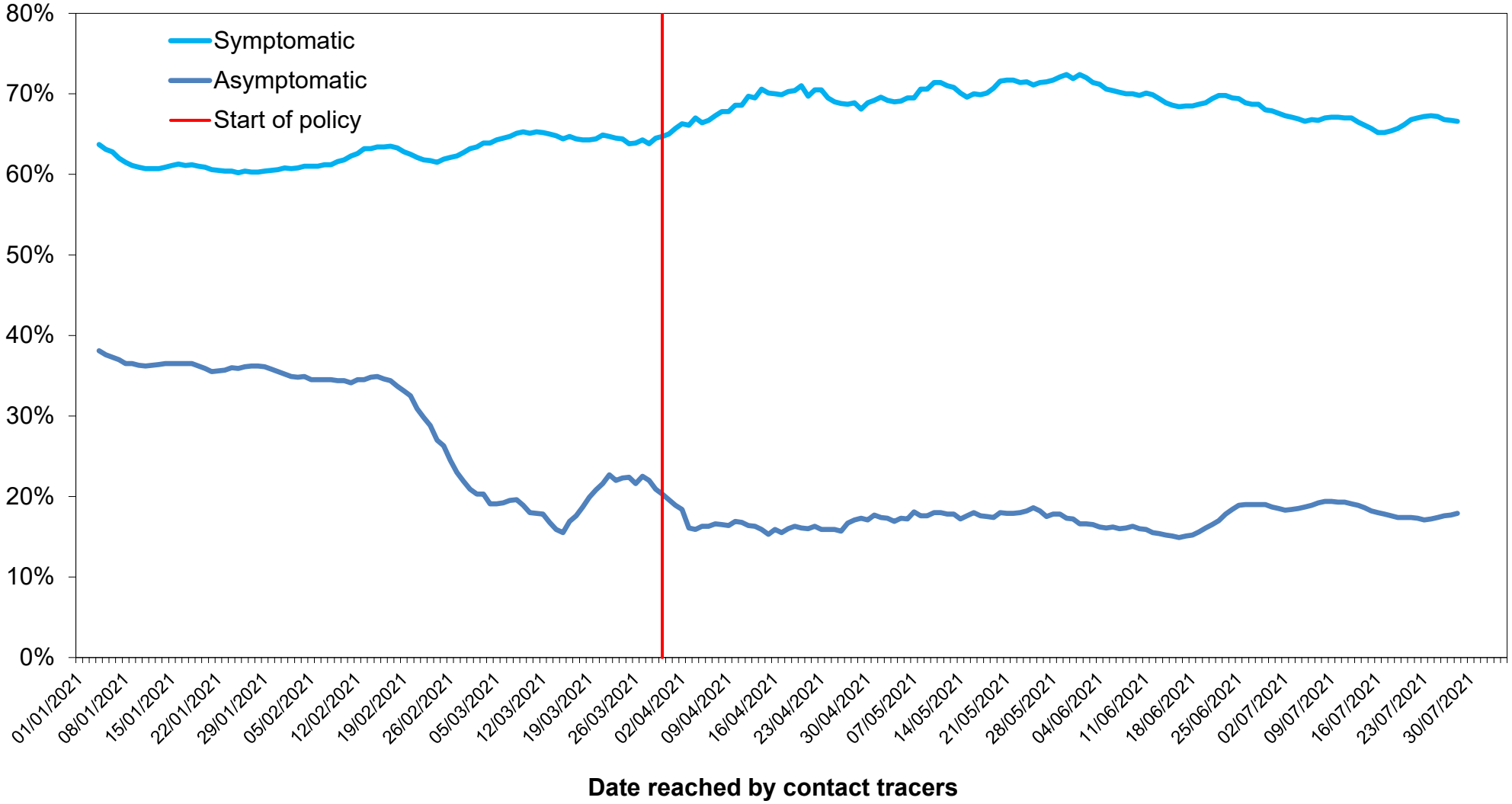
The discrepancy between the 2 surveys may be due to survey bias and the timing and mechanism of the survey methods. The VOTC survey in particular is self-selecting and non-representative, and given that it comes early in the isolation period may be skewed towards those people who had contracted COVID-19 and tested positive.

Comparing DTCC policy to other contact testing programmes

Figure 18 shows the asymptomatic positivity for close contacts testing with PCRs from January to July 2021 in England. From March onwards, the positivity was relatively consistent at just

under 20%. This suggests that, when performing at its best, DTCC was picking up cases at a similar rate to the PCR testing policy, but at other points fewer cases were being detected. Note that this is comparing data from 2 different stages of the pandemic, during which times overall case rates in the population would be different, different variants would have been prevalent and lockdown conditions would have been different. Therefore, the 2 periods should be compared with caution. It is also important to note that even if cases are detected at a similar rate by different policies, the nature by which these cases are detected is important. In particular, LFD testing in DTCC gives an instant result, so cases may be identified earlier than they would if the result of a PCR test had to be waited for.

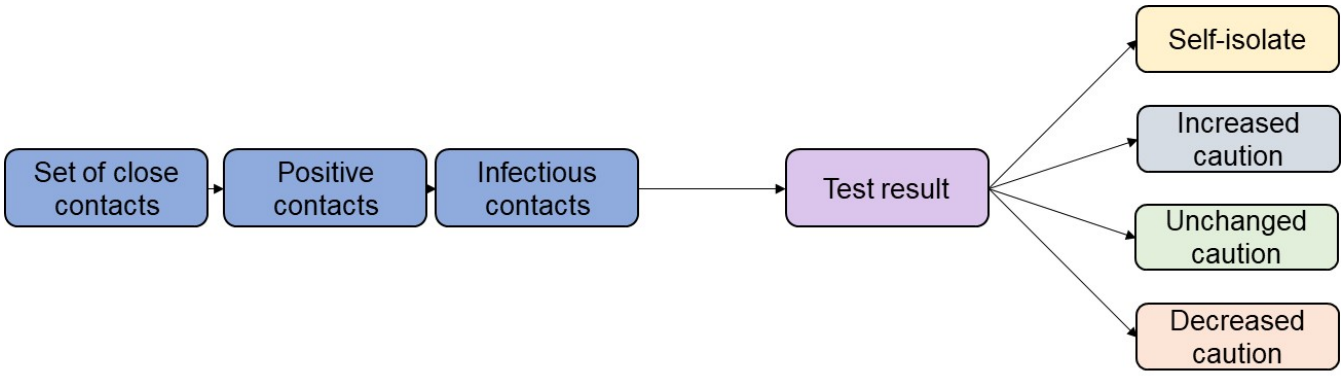
Figure 18. Positivity of asymptomatic and symptomatic contacts testing with PCR, as a 7-day rolling average, 1 January to 31 July 2021, England



DTCC transmission modelling

To explore the impact of the DTCC policy we have a developed a theoretical model that allows us to estimate the amount of onwards transmission of COVID-19 prevented by the DTCC policy, and compare this to the policy in place prior to DTCC (PCR testing of close contacts).
The model is based on a decision tree, and works by estimating the proportion of infected contacts on each day post contact that will have tested on either PCR or LFD, or will have no test result (that is, have not taken up the policy). A representation of the decision tree using in the model is shown in Figure 19.

Figure 19. Final simplified decision tree



Accessible text version of Figure 19

The decision tree moves through the following steps:

- set of close contacts
- positive contacts
- infectious contacts
- test result

Depending on the test result, one of the following actions is taken:

- self-isolate
- increased caution
- unchanged caution
- decreased caution

DTCC transmission modelling continued

The model parameters were based where possible on the wider findings from this evaluation, supplemented by further analysis of UKHSA data systems and wider literature reviews as necessary. The baseline model scenarios estimated a 2.5% relative effect size[15] of DTCC

[15] Relatively effect size is calculated as: 1 minus (onwards infections from DTCC divided by onwards infections from PCR testing of close contacts).

compared to PCR testing of close contacts (that is, a 2.5% reduction in onwards infections from the introduction of DTCC). In a context where contacts are not being asked to self-isolate, compared to a theoretical no testing scenario DTCC was estimated to lead to a 12.3% reduction in onwards infections. A main finding from a sensitivity analysis exploring the impact of the model inputs was that DTCC remains a more effective policy than PCR testing of close contacts (in terms of preventing onwards transmission) providing LFD sensitivity remains about approximately 60%.

Further information on the model design, input parameters and a sensitivity analysis investigating the relative impact of the various input parameters and how they interact are presented in a separate modelling report, which is published alongside this report.

Main findings

The main findings from this part of the evaluation were:

1. Consistent with other analyses conducted during the COVID-19 pandemic, data analysis and survey results from the time at which DTCC was a live policy suggests that positivity amongst close contacts is relatively high.
2. Modelling indicates that DTCC may reduce onwards infection from close contacts by 2.5% compared to the PCR testing of close contacts policy that was in place prior to the launch of DTCC. This suggests that, if the costs and capacities of the 2 testing policies were equal, DTCC would be the better policy to enact in order to achieve maximum reduction in disease transmission and best value for money.
3. Compared to a theoretical no testing scenario DTCC was estimated to lead a 12.3% reduction in onwards infections.

Discussion

This report presents results from a multi-faceted evaluation of the Daily Testing of Contacts of COVID-19 (DTCC) policy. DTCC took the form of non-mandatory guidance for vaccinated close-contacts and those aged 5 to 18 to test daily with lateral flow tests for 7 consecutive days or until 10 days since their contact with the confirmed COVID-19 case.

Implementation of DTCC was one the primary actions taken in response to the emergence of the Omicron variant of COVID-19 in late 2021. It was launched at a similar time to new guidance for COVID-19 cases whereby cases could release from self-isolation following 2 negative tests on consecutive days (initially days 6 and 7, and later days 5 and 6). These policies came at a relatively late stage in the COVID-19 pandemic, when vaccination rates were relatively high (meaning that the DTCC guidance would have applied to most adults), close contacts were not required to self-isolate, and COVID-19 remained high in the public consciousness.

Following the launch of DTCC the delivery of lateral flow tests and fulfilment fluctuated by channel, and there was evidence of unmet demand. Results from this evaluation indicate that the ordering of tests for DTCC contributed to the increase in demand for lateral flow tests, and thus the imbalance between supply and demand. However, DTCC was by no means the main driver – we estimate that it accounted for around one in 10 tests taken at the time. The emergence of the Omicron variant and concern about social interaction during the Christmas period also contributed to the sharp rise, as did the separate policy that encouraged COVID-19 cases to take lateral flow tests to ascertain whether they could release from self-isolation.

This competition for a limited resource is a reminder of the importance of working through the likely public health impact of different policies at different times. The interaction between different policies is also important, for example in this case the interaction between demands on separate PCR and LFD testing channels. The modelling approach set out in the report that accompanies this one, with a clear theory of change and detail on the assumptions made, provides an example of how this can be done.

The evidence from this evaluation points to an estimated uptake of DTCC of 50 to 60% by the target population. These are encouraging results and indicate that a high level of compliance with testing policies can be achieved within the general population with testing policies that are voluntary. However, it is important to note the particular circumstances during the pandemic in which the policy was implemented. Despite the difficulties that some faced in accessing tests, the supply was broadly plentiful and free. There was a high level of public concern about the emergence of the Omicron variant, especially in the run up to and during the Christmas period. Testing for COVID-19 using LFDs was, at that time, embedded in most people's everyday life.

These qualifications aside, there are similarities between the findings from the DTCC evaluation and those of a similar evaluation conducted by members of this team on the policy of PCR

testing of close contacts (in press). For PCR testing of close contacts, an uptake between 40 and 50% was consistently observed (throughout January to July 2021), which is comparable to the 50 to 60% uptake of DTCC estimated in this evaluation. Furthermore, both analyses saw evidence of higher uptake in female and the middle age groups (35 to 54 age group in DTCC, 40 to 60 age group in PCR testing of close contacts).

The applicability of these results to future scenarios should therefore be carefully considered. In particular, the requirement for users to pay for their own tests following the removal of the universal testing offer is likely to be a significant barrier to high uptake of testing.

The theoretical model that we developed to estimate the impact of DTCC relative to other contact testing policies incorporates various assumptions about the population being tested and their behaviour on the receipt of a test result. The model inevitably simplifies the complex interaction of factors determining the impact or otherwise of testing policies. However, models such as this can be useful in determining the likely relative impact of different policies, potentially in the planning phases prior to policy launch. This evidence, along with other factors such as the difference in costs between different types of tests and the infrastructure required to deliver those tests, can be used to weigh up the likely overall cost-benefit of different policies to inform future decision making.

The model suggests that that DTCC may reduce onwards infection from close contacts by 2.5% relative to PCR testing of close contacts under the same conditions. By way of benchmarking, the online price for 7 lateral flow tests from a major retailer was, on 7 September 2022, roughly a quarter of that for one PCR test (£14 versus £60). The actual price paid by health services will vary depending on the terms of the purchasing arrangement, but this gives an indicator of the relative cost of the 2 testing policies. This indicates that DTCC is likely the more cost-effective approach to testing: the public health impact is broadly similar – possibly a little greater for DTCC – and the cost is much less.

An important limitation of this evaluation has been our inability to measure the impact of DTCC directly. DTCC utilised existing mechanisms for the supply and delivery of lateral flow tests and the reporting of results, which meant that it was not possible to distinguish from UKHSA data systems which tests had been ordered or reported specifically for the purposes of DTCC. Furthermore, the results of lateral flow tests were known to have been under-reported, and this was further demonstrated in findings set out in this evaluation.

To compensate for this, many of the findings in this evaluation were drawn from surveys. These have given us valuable insight into the policy. But it is important to note that surveys can suffer from optimism bias and may not always reach a representative audience. This means that the findings are not as robust as they would have been had they been based on data relating directly to the tests people took to follow the guidance.

The widespread use of point-of-care, unsupervised LFD tests brings advantages of convenience and speed but means that public health authorities are incompletely sighted on

how tests are being used and what the results are. DTCC was implemented as an additional risk reduction measure – it was not an alternative to self-isolation. This means that the importance of being able to collect and analyse more complete data was less than, for example, daily contact testing as an alternative to mandatory self-isolation. For policies that replace (rather than are additional to) other risk reduction measures, it is essential to know that the adherence is such that the public health impact is comparable to the measures that it is replacing so that the risk of significant worsening of the public health response is managed. Much better data would be required to make this judgment. This point is crucial for the future consideration of any similar policy.

Overall this evaluation has shown that a DTCC-type approach may be cost-effective in some circumstances and could be considered in future public health responses. However the appropriateness of this type of policy would depend on the specific context such as the level of risk attached to infection, the relative cost against other policies and the availability of testing devices.

Annexe 1. Limitations with LFD self-reporting

A repeated theme throughout many of the surveys referenced in this report is the relatively low intention by users (either close contacts or other users of LFD tests) to report their LFD results. These findings are particularly important in the interpretation of the results for the data matching analysis, as this analysis relied on the test results being reported. Generally, the results of the data matching analysis suggest less uptake and following of the DTCC guidance than the various surveys. This is likely to be in part due to the under-reporting of tests, however it is difficult to quantify this exactly.

ONS SIC survey

For those who had undertaken DTCC less than half reported their LFTs 'often or always' across the 3 ONS SIC waves, with the data from wave 3 indicating that only 44% did so, with 42% and 45% for waves 4 and 5 respectively.[16]

There were some differences by age group, with younger ages tending to show less reporting than older adults. For example in wave 4 the 18 to 29 years age group had the lowest proportion of respondents reporting "often or always" (25%). The age group with the highest reporting was 60 to 69 years (62% often or always), with the level of reporting of lateral flow tests generally increasing as the age groups increased. A similar pattern was also seen in wave 5. While this does not indicate a difference in DTCC uptake between ages, it does demonstrate that any analysis should consider the impact of the difference in reporting rates when analysing the testing data linked to DTCC participants.

Voice of the Customer survey

The VOTC survey indicated that, through the lifespan of the DTCC policy, the average reporting of LFD tests declined. In December to January, 47% of contacts not self-isolating said that, on average, they report their LFD tests always or often, but this fell to 37% in January to February. This means that, if true, the increases seen in LFD reporting may be smaller than the actual increase in LFD tests taken in early 2022.

Public Perceptions Tracker

The Public Perception Tracker showed similar findings on the under reporting of tests, in that approximately 43% of the population reported their last test results to GOV.UK in January. This number had also been declining over time. While it is easy to speculate that people are not

[16] Coronavirus and behaviour of the vaccinated population after being in contact with a positive case in England

reporting their test results because they don’t have to and it is easy not to, it appears that one of the main reasons for not reporting all results is confusion around reporting requirements. Less than half (44%) of respondents in a survey from January indicated they know they should report all their results.

Annexe 2. Relationship between survey results and NPEx/CTAS matching analysis

The findings from this evaluation showed a large discrepancy on the estimated uptake of DTCC between data analysis from NHS Test and Trace systems and the results of various contact surveys. However, the data analysis is known to be limited by under-reporting of LFD tests (see Annexe 1). This annex attempts to estimate a more 'true' level of uptake using the results from the data analysis and the estimated levels of under-reporting, along with other impacting factors. From this we estimate that, when the pure data analysis suggests an uptake of 17.1%, the actual uptake count be in the region of 41.5% to 61.4%.

The ONS SIC survey ran fieldwork between 10 to 15 January 2022 for wave 3, aiming to reach most contacts 10 days after exposure. In this 70% of respondents said they were undertaking daily testing, of which 92% said they had taken all the required tests up to the date of interview. The NPEx/CTAS matching analysis was run for contacts reached by tracing services between the 3 January and 8 January 2022, to approximately match the period covered by the ONS survey wave 3. Over this period 785,196 contacts were identified, taking a total of 358,366 LFD tests. These were taken by 134,104 distinct contacts. Therefore, the proportion of contacts taking at least one test as part of DTCC was 17.1% (134,104 out of 785,196) a much lower proportion than suggested by the ONS study. However, this is not a like-for-like comparison for the following reasons:

- those in CTAS contain children aged 5 years and under who did not meet the requirements to take part in DTCC (7.9% from CTAS data)
- those in CTAS include unvaccinated contacts who should not have taken part in DTCC (17.7% of those aged 12 as of 1 January 2022[17])
- those in CTAS include individuals self-isolating, who therefore don't take part in DTCC (18.0% from ONS survey)
- the ONS survey can count individuals testing but not reporting those tests; these will not appear in NPEx

We can modify the denominator in our calculation of the proportion of contacts taking a test in the matching analysis above in line with these differences, to calculate an upper limit on the estimated uptake rate as follows:

- 785,196 contacts
    - 723,166 contacts above the age of 5 (62,030 (7.9%) contacts under the age of 5)
    - 595,165 contacts above the age of 5 and vaccinated (2+ doses) (assuming 17.7% of 723,166 unvaccinated)

[17] Coronavirus (COVID-19) in the UK

- 488,035 contacts above the age of 5 and vaccinated, not self-isolating (assuming 18% of the 595,165 choose to self-isolate)

Using the same numerator with this modified denominator would give:

- 134,104 out of 488,035 = 27% as an upper bound on the number of contacts taking and reporting LFD tests.

According to the ONS survey 35% of contacts never report tests and a further 21% intend to sometimes but not always report tests. Adjusting for this underreporting would give an upper bound on the uptake of DTCC of being between 41.5% and 61.4%.

Caveats

The numbers shown here are a strict upper bound, not an attempt to model the true number. We have modified the denominator in the equation, but not the numerator, on the assumption that nobody tests when they are not supposed to or instructed to, but this is unlikely to be correct.

The upper bound includes individuals who have taken different numbers of LFTs, including those who have taken one or 2 instead of the 7 tests advised by the policy. It is difficult to make a direct comparison with the ONS survey which asks individuals if they are taking part in DTCC without specifying a specific number of tests, and to know whether or not those reporting a single test have taken more without reporting them.

No attempt is made to account for survey bias in the ONS results, for example for a respondent being biased towards claiming they have reported tests more frequently than they have.

Personnel

Role	Personnel
Project lead	Stephen Finer
Contact testing programme	Nick Sharp
Evaluation and Social Research	Ashley Goddard, Toby Nonnenmacher, Jack Hulmes, Matt Barnard, Marcus Ward, Emily Wolstenholme
Customer, Communications and Innovation	Gill Hayes, Georgiana Brown, Rose Hadden, Cheryl Hart
Advanced Analytics	Luke Hounsome
Public Health and Clinical Oversight	Tom Fowler, Sarah Tunkel
Specialist advice for impact analysis	Tim Peto

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