TRUST, TESTING AND TRAVEL:

TECHNOLOGY USE, TRAVELLER KNOWLEDGE AND COMPLIANCE WITH COVID-19 HEALTH RULES

Prepared for Client: **one**world

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EXECUTIVE SUMMARY

This briefing note examines how passengers understand both the risks and opportunities related to air travel during the current Coronavirus pandemic. COVID-19 travel guidelines and restrictions have an important impact on passengers, both before and after taking a flight. To investigate how passengers evaluate risks and comply with public health rules, this study analyses data from a survey fielded by the **one**world alliance.

oneworld gathered two waves of passenger survey data as part of a COVID-19 testing programme. The programme involved three separate COVID-19 tests, one at departure, one at arrival into the UK, and a third one 3-5 days after the arrival, and was administered between November 2020 and March 2021. In this report, we analyse the data about passenger understanding of traveller health and safety, collected concurrently. In total, almost 600 passengers travelling between the US and the UK voluntarily joined the testing programme and completed a survey of their understanding of protocols designed to protect traveller health and safety.

This analysis:

1. Reviews the latest research on public understanding of travel rules.
2. Analyses descriptive statistics of the passenger survey data described above.

The study reveals that:

1. The vast majority (98%) of passengers surveyed were ready to comply with COVID-19 related travel requirements and health guidelines, including testing.

2. To a lesser extent, passengers would be willing to self-isolate (71%) if instructed as part of their COVID-19 test.

3. In this survey, willingness to self-isolate if instructed as part of a COVID-19 test did not vary significantly by age or gender.

4. The vast majority (99.7%) of passengers would prefer a comprehensive testing regime to avoid quarantine while travelling, and much smaller numbers were worried about test costing (22%). However, the study showed that tests should not be expensive.

1. CURRENT RESEARCH ON TESTING, TRAVEL AND COMPLIANCE DURING THE COVID-19 PANDEMIC

There have been many efforts to measure public understanding of health guidelines, particularly as they relate to the rules set by governments and public agencies with respect to minimising SARS-CoV-2 transmission. In this section, we discuss existing research focused mostly on the United Kingdom (UK) and the United States (US) into compliance with health guidelines and the interaction of information and trust during the COVID-19 pandemic.

This study analyses non-sensitive passenger data collected between November 2020 and March 2021. It seeks to provide an understanding of whether travellers are ready to comply with testing and self-isolation protocols offered to them as part of this trial. This was explored through analysis of the data provided by the client: an electronic survey of 598 air passengers who travelled between UK and US and voluntarily joined a testing programme that offered them three COVID-19 tests, before and after travelling. The aggregated anonymous outcomes of these tests were also analysed for Appendix 3. An online survey panel of volunteers came from the participant pool of the programme.

The restrictions on travel and other non-pharmaceutical interventions have negatively impacted the economy. In response to the challenges posed by the COVID-19 pandemic, the travel industry has tested protocols for the post-vaccination stage of economic recovery. These protocols aim to protect customers' health and safety, and help society adapt to a "new normal" (U.S. Travel Association, 2020). To test these travel protocols, it is important to understand individuals' perceptions of risk and safety in the COVID-19 climate, and whether the protocols can deliver high levels of compliance. While this is not a purely epidemiological study, it is key to explore the relationship between travel, public trust and compliance with health guidelines. Understanding myriad rules from the country of origin and the country of destination is a complex task. Different countries have different testing and self-isolation rules, and indeed different airports and transition points have different norms, rules and patterns of behaviour. People should understand the purpose of COVID-19 rules and restrictions. Otherwise, they might be less likely to adhere to them (Webster et al., 2020). Moreover, there are varied compliance patterns and some evidence that even when people understand the risks and rules for travel, they may not effectively see through the full set of testing and self-isolation instructions.

The rest of the report is structured in the following way. Section One reviews the most recent research into passenger understanding of the risks and opportunities in air travel in relation to COVID-19 restrictions and information trust.

Section Two offers quantitative measurements of passenger understanding and perception of COVID-19 restrictions: their readiness to comply with COVID-19 regulations following travelling, such as a requirement to self-isolate and undergo testing. We also discuss whether this readiness is linked to passenger age or gender and whether and how much they are willing to pay for testing.

The Methodological and Epistemological Appendices provide additional information on how the study was conducted and the results of the passenger test trial before and after travelling.

The ability to keep SARS-CoV-2 infection rates under control relies on how well people adhere to guidance for those who may have COVID-19 (Kucharski et al., 2020; The DELVE Initiative, 2020). One of the key elements of guidance issued worldwide is to self-isolate or quarantine: to remain at home for certain numbers of days if required. The policy conversation about the exact meaning of "self-isolation" varies from country to country. UK respondents may have been more likely to interpret self-isolation in the context of household members having to stay at home due to possible exposure to a potentially infected household member. US respondents may have been more likely to interpret self-isolation as a requirement to separate someone who is ill from others who are not ill, based on the definition that is official in the US (U.S. Department of Health & Human Services, 2017). Recently, the COVID-19 self-isolation requirements have increasingly also covered those people who arrive from foreign destinations, including air passengers.

Previous studies showed that the majority of people are ready to comply with government guidelines that help to manage the pandemic. When asked about their intention to self-isolate if they were to develop symptoms of COVID-19, around 70% of those surveyed in the UK said they would. However, this number has shown a slight decrease over time in the UK in spring-summer 2020 (Smith et al., 2020). In the US, 73% said they would definitely act on advice from a public health official to self-isolate if they had COVID-19 (McClain and Rainie, 2020: 25). In addition, the public has also generally been shown to be ready to comply with testing requirements to help to manage the COVID-19 pandemic. Fully 70% of those surveyed would take a test (Smith et al., 2020).

However, the study referenced above was conducted during the first stages of the pandemic, when self-isolation was designed to last for 14 days. It also showed that 75% of those with household COVID-19 symptoms had left home in the last 24 hours—despite the fact that the government required passengers to self-isolate (Smith et al., 2020). In a later study, only 18% said they had not left home since developing symptoms (Smith et al., 2020). Even after being alerted, compliance did not rise to the intended levels. Adherence could be especially low among some categories of people that were required to isolate (Vagnoni, 2020). Lower adherence levels were associated with having a dependent child, lower socio-economic status, greater hardship during the pandemic, being male, younger age groups and working in a key sector. In addition, Vagnoni reported that only 10% of all respondents required to stay home had not left it at all in the following 14 days. This shows that intention to self-isolate and factual behaviour can differ remarkably.

Despite large numbers of COVID-19-related studies, there is still only scant evidence evaluating protective measures for air travel, including those imposed either before or after a flight (Bielecki et al., 2020). One of the most recent systematic reviews of travelling during the COVID-19 pandemic concluded that "travel restrictions have only limited effect in containing infection, and the degree of impact depends on multiple factors ranging from the

extent and timing of the restrictions, the epidemic size, to virus transmissibility and travel patterns" (Bielecki et al., 2020).

Previous reviews also found that self-isolation may delay the introduction or re-introduction of a virus. However, the effect was small, and confidence in the results was low or very low (Nussbaumer-Streit et al., 2020). Nevertheless, systematic rapid tests pre-departure and on arrival, in combination with other approaches such as passengers' self-assessment, are named as a viable future strategy going forward (Bielecki et al., 2020).

2. PASSENGER SURVEY FINDINGS

Recovery for the travel industry is about more than health. To unlock travel and kick-start the global economy, it is important to understand whether travellers are ready to comply with testing regimes offered to them. This understanding is linked to travellers' trust in public health authorities and other relevant institutions. It is also related to how they perceived the offered rules of travel in the era of COVID-19.

Thus, a survey was arranged that asked passengers questions related to testing protocol and compliance. The survey data features the responses of 598 airline customers that were collected in two waves – between December 2020 and January 2021 and between February and March 2021. While the survey questions were consistent for all respondents, it is worth noting the ongoing policy conversation about the exact meaning of "self-isolation" and "quarantine." Further testing would be needed to understand how respondents interpreted the use of such terms. The survey included additional questions on testing outcomes. While not central to our research on public perception of travel health guidelines, we include a very basic analysis of these outcomes in the appendix for further information (see Appendix 3).

2.1. Passengers are Ready to Comply

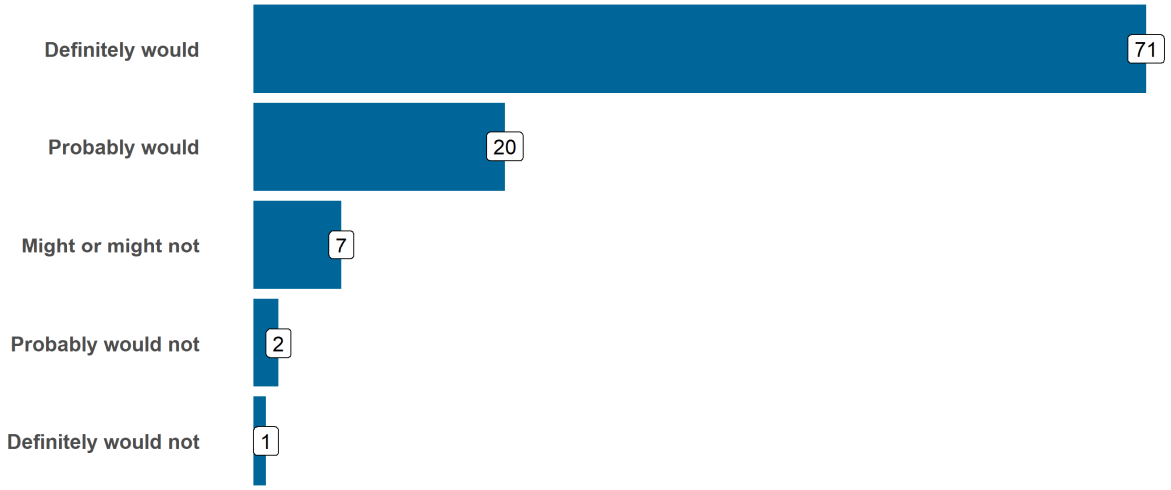
The majority of the passengers whose survey responses we analysed were ready to comply with health authorities' requirements, before or after travelling. As Figure 1 shows, they were willing to undergo a COVID-19 test as part of the travel process (98% of the surveyed passengers), to self-isolate (91% definitely or probably would self-isolate) following this test if required or to take a vaccine if available (89%). It is important to note that during the study period, the UK self-isolation requirements for travellers have changed several times. According to the government rules, passengers were not required to take COVID-19 tests at the beginning of the study; however, they were required to take COVID-19 tests by its end.

Figure 1. *% of passengers who say that they are…*
Vaccine Ready: Agree or strongly agree with the statement "I would like to get a vaccine against COVID-19 if it is available."
Test Ready: Agree or strongly agree with the statement "I am willing to undergo a COVID-19 test as part of the travel process."
Self-isolate: "How likely, if at all, would you be to self-isolate if instructed as part of your COVID-19 test?" "Probably or definitely would self-isolate" answers.

2.2. The Majority of Passengers would Self-Isolate

A disease control protocol that requires self-isolation only when passengers test positive might deliver high levels of compliance. We found that 71% of the surveyed passengers would definitely self-isolate if instructed as part of their COVID-19 test (Figure 2). In addition, 20% would probably self-isolate. These levels of passengers' intended compliance were similar to the levels observed across a broader population, which was around 70%, according to the early studies (McClain and Rainie, 2020; Smith et al., 2020). Only 10% remained uncertain regarding this requirement or would definitely not follow it (hereafter, this category is designated as "uncertain" about COVID-19 isolation protocol).

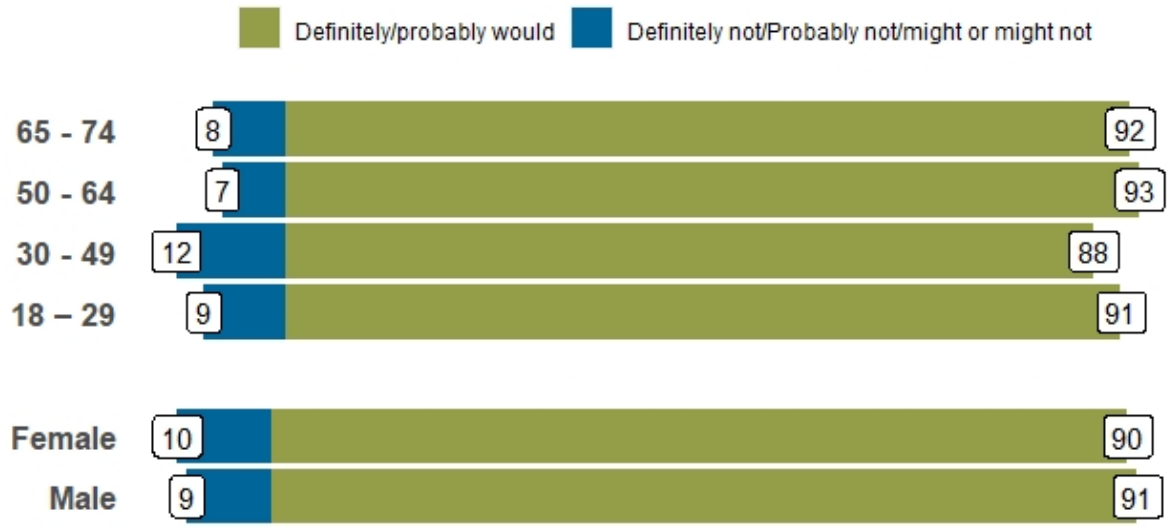
Figure 2. *"How likely, if at all, would you be to self-isolate if instructed as part of your COVID-19 test?", %* [see Appendix 2 for results to 1 decimal place]



2.3. The Majority Would Self-Isolate, Regardless of Age or Gender

Within this sample, there is very little difference between age groups or between men and women on whether they would self-isolate if instructed as part of their COVID-19 test. This is not entirely consistent with some earlier studies of a broader population that argue that younger males express lower adherence levels (Vagnoni, 2020). Further research that can include population sampling is needed to determine the statistical significance of our findings.

Figure 3. Age and gender characteristics of those answer the question, *"How likely, if at all, would you be to self-isolate if instructed as part of your COVID-19 test?", %*



2.4. Passengers Prefer Testing Over Self-Isolation

A disease control protocol that requires testing instead of self-isolation might provide a satisfactory experience that can improve compliance. Fully 99.7% of the participants were ready to undergo COVID-19 testing to avoid quarantine. Only 6% disagreed with the proposed protocol that would require all air passengers to undergo a number of COVID-19 tests to avoid self-isolation. The participants also showed enthusiasm for the proposed scheme of travelling that would combine several tests - 75% would definitely travel if required to take a test on arrival (Figure 4). This readiness to travel decreased slightly if travellers were offered several tests before and after travelling.

Figure 4. *I would definitely travel with the following requirement: taking a COVID-19 test…*
(Question: "If COVID-19 testing was required as an alternative to quarantine, how likely would you be to travel with each of the following requirements?"), %

Most surveyed passengers were ready to cover the costs of their testing, with 78% willing to pay for COVID-19 tests. However, among those who were ready to cover the costs, only 15% would be prepared to pay more than $100 for tests. The majority prepared to pay for tests priced at around $50 or cheaper. More than a third, 38%, of those who were uncertain whether they would follow self-isolation requirements were also not willing to pay for their COVID-19 test to travel. Younger passengers were marginally less ready to pay for a test than older categories, while females were marginally less ready for a COVID-19 vaccine in the future.

LIMITATIONS

First, the study found that the vast majority of passengers are willing to comply with COVID-19 related travel requirements. These levels of intended compliance were in line with those found in a broader population. However, as previous studies have shown, self-reporting an intention to comply does not necessarily mean that passengers would actually comply. Any policy decisions should take this possible discrepancy into account. Second, further research can include population sampling to determine the statistical significance of these findings. Third, there is a range of different COVID-19 tests available, and a test type and cost might

affect individuals' readiness to take it. Further research should control for a type of tests offered to a customer.

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While the data analysed here may be used by the funder and its partners, we did not have a role in collecting the data and are not participating in the analysis being led by other **one**world partners. We received a portion of this secondary data, **one**world determined the timescale, the involvement of other stakeholders, and the aims and objectives of the research.

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REFERENCES

Bielecki M, Patel D, Hinkelbein J, et al. (2020) Reprint of: Air travel and COVID-19 prevention in the pandemic and peri-pandemic period: A narrative review. *Travel Medicine and Infectious Disease* 38: 101939. DOI: 10.1016/j.tmaid.2020.101939.

Goel V, Bulir D, Propetis ED, et al. (2021) COVID-19 International Border Surveillance Cohort Study at Toronto's Pearson Airport. *medRxiv*. Cold Spring Harbor Laboratory Press: 2021.02.25.21252404. DOI: 10.1101/2021.02.25.21252404.

Kucharski AJ, Klepac P, Conlan AJK, et al. (2020) Effectiveness of isolation, testing, contact tracing, and physical distancing on reducing transmission of SARS-CoV-2 in different settings: a mathematical modelling study. *The Lancet Infectious Diseases* 20(10): 1151–1160. DOI: 10.1016/S1473-3099(20)30457-6.

McClain C and Rainie L (2020) *The Challenges of Contact Tracing as U.S. Battles COVID-19*. 30 October. Pew Research Centre. Available at: https://www.pewresearch.org/internet/2020/10/30/the-challenges-of-contact-tracing-as-u-s-battles-covid-19/ (accessed 12 March 2021).

Nussbaumer-Streit B, Mayr V, Dobrescu AI, et al. (2020) Quarantine alone or in combination with other public health measures to control COVID-19: a rapid review. *Cochrane Database of Systematic Reviews* 2020(4). DOI: 10.1002/14651858.CD013574.

Russell TW, Wu JT, Clifford S, et al. (2021) Effect of internationally imported cases on internal spread of COVID-19: a mathematical modelling study. *The Lancet Public Health* 6(1): e12–e20. DOI: 10.1016/S2468-2667(20)30263-2.

Smith LE, Potts HW, Amlôt R, et al. (2020) Adherence to the test, trace and isolate system: results from a time series of 21 nationally representative surveys in the UK (the COVID-19 Rapid Survey of Adherence to Interventions and Responses [CORSAIR] study). *medRxiv*. Cold Spring Harbor Laboratory Press: 2020.09.15.20191957. DOI: 10.1101/2020.09.15.20191957.

The DELVE Initiative (2020) Test, Trace, Isolate. The Royal Society. Available at: https://rs-delve.github.io/reports/2020/05/27/test-trace-isolate.html (accessed 12 March 2021).

U.S. Department of Health & Human Services (2017) *Quarantine and Isolation*. Available at: https://www.cdc.gov/quarantine/index.html (accessed 12 March 2021).

U.S. Travel Association (2020) *COVID-19 Travel Industry Research*. Text, 30 March. U.S. Travel Association. Available at: https://www.ustravel.org/toolkit/covid-19-travel-industry-research (accessed 12 March 2021).

Vagnoni C (2020) Test, Trace and Isolate: Behavioural aspects. Available at: https://post.parliament.uk/test-trace-and-isolate-behavioural-aspects/ (accessed 18 February 2021).

Webster RK, Brooks SK, Smith LE, et al. (2020) How to improve adherence with quarantine: Rapid review of the evidence. *medRxiv*. Cold Spring Harbor Laboratory Press: 2020.03.17.20037408. DOI: 10.1101/2020.03.17.20037408.

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APPENDIX 1: METHODOLOGY

Data in this report is drawn from the survey of passengers who participated in a COVID-19 testing programme that offered three COVID-19 tests before and after travelling (see Appendix 3 for testing outcomes analysis). The survey data features the responses of 598 out of 848 customers who took part in any stage of the testing programme and were invited to answer the survey questions. All of these respondents answered all the questions offered to them. Only participants older than 18 years old were allowed to participate. The response rate was 71%. The survey was conducted in two waves – between December 2020 and January 2021 and between February and March 2021. No customers were removed from the data due to straight-lining (giving identical or nearly identical answers to items in a battery of questions) or an extremely high rate of answering questions.

The survey data is unweighted and is drawn from a non-probability sample. Passengers self-selected themselves to participate in the survey based on the invitation sent by **one**world to every customer who took part in the COVID-19 testing programme. Hence, the survey data does not represent the entirety of the air passenger industry.

Further statistical analysis would allow us to say more about the confidence in the values presented. Figures 1 could include a binominal distribution analysis, and more sample population measures would allow for the estimation of confidence intervals. In future research, we can also compare the two waves of surveys to trace differences that may have emerged during the crisis period.

APPENDIX 2: SELECTED DETAILED TABLES

All figures are in %, n = 598

	Definitely would not	Probably would not	Might or might not	Probably would	Definitely would
How likely, if at all, would you be to self-isolate if instructed as part of your COVID-19 test?	0.7	1.7	7	19.6	71.1

How strongly do you agree or disagree with the following statements about COVID-19 testing as an alternative to quarantine?

	Strongly Disagree	Disagree	Agree	Strongly Agree
I am willing to undergo a COVID-19 test as part of the travel process	1	2	26	71
COVID-19 tests should be required for all passengers	1	5	35	59

	Yes	No
Would you be willing to pay for COVID-19 testing to avoid quarantine?	78	22

If COVID-19 testing was required as an alternative to quarantine, how likely would you be to travel with each of the following requirements (1="Definitely would not"; 5="Definitely would")?

	Definitely would not	Probably would not	Might or might not	Probably would	Definitely would	Mean
Taking a COVID-19 test at the airport on departure	1	3	7	17	72	4.56
Taking a COVID-19 test at the airport on arrival	1	2	6	18	75	4.64
Taking a COVID-19 test before departure and on arrival	1	1	5	25	68	4.60
Taking a COVID-19 test within 72 hours of travel somewhere other than airport prior to travel	1	2	8	21	68	4.54

How strongly do you agree or disagree with the following statements?

	Strongly Disagree	-2-	-3-	-4-	Strongly Agree	Mean
I trust my public health officials to determine the necessary requirements to protect me, my colleagues, and my family during the COVID-19 pandemic	4	7	22	35	31	3.82
I would like to get a vaccine against COVID-19 if it is available	2	1	8	11	78	4.63

	Less than $50	$50 - $99	$100 - $149	$150 - $199	$200 or more
How much would you be prepared to pay for the COVID-19 test if it becomes a mandatory requirement for travel?	53	36	8	2	1

	Male	Female	Prefer not to say
What is your gender?	49	50	1

	Under 18	18 – 29	30 - 49	50 - 64	65 - 74	75 and over	Prefer not to say
What is your age?	0	22	39	28	10	2	0

APPENDIX 3: TESTING OUTCOMES

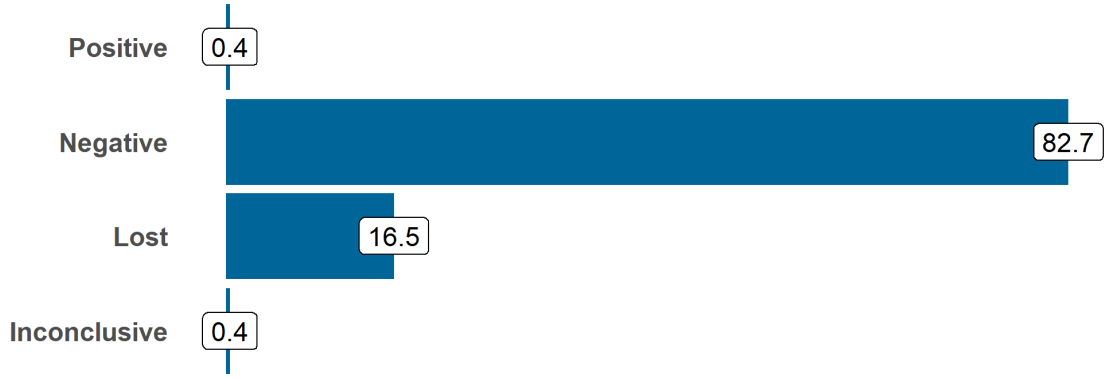
There are three main ways to establish infection with SARS-CoV-2: nucleic acid tests to detect the presence of RNA, either via (Polymerase Chain Reaction) PCR or Loop-mediated Isothermal Amplification (LAMP); antigen testing for the presence of a viral antigen, usually a surface protein; antibody tests to detect prior infection using ELISA or LFA assays. This study relied on LAMP for testing immediately on arrival and on usually more reliable PCR tests for at-home pre-departure and after arrival tests. The test trial was conducted in two waves: between November 2020 and January 2021 and between January and March 2021. In contrast to the survey data, testing outcomes data was analysed only for the first wave and only the results of tests based on the secondary data provided by the third parties.

Some customers did not complete all three tests required by the testing programme. The first wave results received were of 400 tests of customers who joined the trial and took the first, pre-departure COVID-19 test; 300 tests of those participated in the second stage that required taking a COVID-19 test on arrival; 284 tests of those who participated in the third stage – at home testing. The results of the testing process were the following: 1% of the passengers tested positive for COVID-19 before departure (Figure E1), none tested positive on arrival (Figure E2), and 0.4% tested positive at home after travelling. However, 17% of all test results for the third stage were not processed as expected due to instrument error (marked as "Lost" in Figure E3, see Sampling and Methods notes), and 3% of the pre-departure test outcomes were inconclusive, compromised or cancelled.

Figure E1. *Pre-departure test results (the first test), %*

Figure E2. *On arrival test results (the second test), %*

Figure E3. *At home test results (the third test), %*



These results were broadly consistent with previous testing programme trials in the aviation industry. In particular, a recent not peer-reviewed study of arriving in Canada international air passengers argued that a three-test testing regime showed that only 1% of all passenger tested positive for COVID-19 (Goel et al., 2021). Another study that relied on modelling rather than empirical data suggested that imported cases accounted for less than 1% of total incidence in 44 countries in September 2020. Nevertheless, in 125 countries, imported cases accounted for 10% of total incidence (Russell et al., 2021). The authors of that study concluded that many contextual factors can influence how many cases can be imported from abroad.

Sampling and Methods: Validity and Completeness

This trial was implemented at the height of the pandemic with a high demand for testing. The data providers developed a number of new and manual processes and protocols to implement and support this study. It was possible to process 84% of Test 3 specimens correctly. The remaining 17% of specimens were not processed as expected due to the following reasons: (i) test specimen lost in post/transit/handling process, (ii) results not recorded/provided to the participants by the test provider. In addition, we could not establish the dates when the participants took this test. It should have been taken at home within a certain time period upon arrival. This was because the data provider did not adequately report a key variable

related to this test. Moreover, the outcome of 1% of pre-departure test specimens was reported by the data provider 14 or more days after the test was taken. The data provider suggested that the reported time might not represent the actual time in these cases.