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Evaluating the feasibility and acceptability of a safety protocol to mitigate SARS-CoV-2 transmission risks when participating in full-capacity live mass events: a cross-sectional survey and interview-based study

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Evaluating the feasibility and acceptability of a safety protocol to mitigate SARS-CoV-2 transmission risks when participating in full-capacity live mass events: a cross-sectional survey and interview-based study

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Abstract

Objectives: To investigate the feasibility and acceptability of a novel COVID-19 safety protocol combining professionally witnessed home-based videoed pre-event testing and a data-driven risk assessment model that was implemented at Standon Calling Festival in July 2021.

Design: Observational study using a sequential explanatory mixed-methods design.

Setting: Standon Calling Festival, Hertfordshire, England.

Participants: 1,093 survey respondents who attended Standon Calling Festival in July 2021, 11 of whom were interviewed.

Results: Respondents reported that the videoed lateral flow test (LFT) was straightforward, non-intrusive, inexpensive and improved the ability to self-test. Participants felt safe at the event knowing that everyone had followed a robust testing protocol to mitigate the spread of COVID-19. Participants reported that medically certified home-based testing has the potential for use in other health spheres, although over-reliance on test results alone may create a false sense of security.

Conclusions: Our study showed that a protocol that combines professionally witnessed home-based videoed pre-event testing is highly acceptable and feasible, and it can inform decision making and support the safe reopening of live mass events at full capacity. Although COVID-19 is now considered endemic in the UK, this protocol can be of value for other countries where the live events industry remains heavily impacted. Risk-modelling should be tested and evaluated at future events to further increase the robustness of this protocol.

Key Words: COVID-19; live events management; safety protocol; medically certified testing; risk mitigation.

Strengths and limitations

- This was the first study evaluating the feasibility and acceptability of a COVID-19 safety protocol for the safe reopening of live mass events at full capacity.
- We used a sequential explanatory mixed-methods design, whereby quantitative findings from an online questionnaire informed the collection of contextual data from interviews and one focus group discussion.
- We surveyed 1,093 respondents who previously attended a mass live event, and surfaced assumptions from 11 participants to explore barriers and drivers for routine adoption of witnessed rapid lateral flow testing.
- We were unable to evaluate the utility of risk-modelling as a decision tool because the event had already been given permission to go ahead, however it was successfully conducted in real-time, and its projections reflected the number of COVID-19 cases measured by Test and Trace.

Introduction

As part of the public health response to limit the spread of COVID-19, live events were suspended in the United Kingdom (UK) for several months since the first national lockdown in March. The lockdown negatively impacted the country's economy and the mental health of individuals, calling for the deployment of innovative strategies to help reopen live events safely while enabling venues to operate at near or full capacity [1, 2].

Under the auspices of the UK government's Events Research Programme (ERP), a small number of legally permitted live events took place during lockdown between April and July 2021, with the aim of investigating the risk of COVID-19 transmission to inform the reopening of live mass events. Attendees were required to show proof of a negative lateral flow test (LFT), double vaccination, or natural immunity when entering the venue [3]. Findings showed that COVID-19 transmission was in line with or below community level at most events [4]. However, risk of transmission was highest at outdoor unseated events and may have been influenced by individual behaviour before and during the event, vaccination coverage, event size and duration, as well as the prevalence of COVID-19 at the time of the event, suggesting that findings from the ERP may not be generalisable to all live events.

To account for contextual differences between events, and to further increase the effectiveness and usefulness of pre-event testing for safe reopening of live events at full capacity, the CAPACITY protocol combined mass pre-event LFT testing and a data-driven risk assessment model based on levels of immunity (vaccination status) in the event population [1, 5]. The premise was that at-home, professionally verified LFT testing, combined with ticket validation and real-time risk modelling of transmission at the event would catch asymptomatic infected ticket holders before travelling to the event, and support public health authorities to make informed, data-driven decisions around the overall safety of the event. During ticket purchase, customers completed a risk questionnaire and purchased a LFT to be taken within 48 hours of entering the venue. The test was videoed and validated by a professionally trained testing control officer based on the assessment of the sample collection method. The test result was linked to a QR code that would generate a go/no-go signal to attend the event. The risk prediction model would estimate the number of infectious people at the event, their infectivity, and the risk of transmission at the event, based on parameters such as community background prevalence, characteristics of the venue and of the audience attending the event, including their vaccination status. By providing event-specific risk estimates, this protocol had the potential to inform ticketholders, event organisers, public health authorities and health systems to guide decision making as to whether the live event should go ahead as planned [6].

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The CAPACITY protocol was trialled in July 2021 at Standon Calling Festival (SCF), an independent boutique music festival that takes place annually in Hertfordshire. Although SCF was cancelled in Summer 2020, the festival resumed in Summer 2021 at full capacity (~15,000 people), in part because the proposed CAPACITY safety protocol helped to assuage concerns around event safety at the time, and was therefore the first event to be held outside of the ERP [7, 8].

The aim of our study was to investigate the views and perceptions of attendees at SCF on the feasibility and acceptability of the CAPACITY protocol using a mixed-methods design.

Methods

Study design

We adopted a sequential explanatory mixed methods design, whereby quantitative data collection and analysis were followed by the collection and analysis of contextual data [9]. In the first phase of the study, we collected quantitative data through an online questionnaire. The analysis of quantitative data informed the second phase of the study, during which we collected and analysed data from in-depth semi-structured interviews and a focus group discussion to further explore and expand the quantitative findings from the first phase of the study.

Quantitative methodology

Participants

Adults who attended SCF in July 2021 and gave permission to be contacted by the research team during ticket purchase were eligible to participate in the survey and were contacted via email (n=4,726). The survey was voluntary, and participants were free to decide whether they wanted to take part.

Data collection

Participants were surveyed anonymously in the first two weeks of November 2021 through an online questionnaire to capture their views and experiences regarding the safety protocol put in place at SCF to minimise the spread and exposure to COVID-19. Members of the study team beta-tested the survey for usability and technical functionality prior to distribution. The survey was distributed on 3 November 2021 via web-link on the Qualtrics platform, with one reminder sent the following week.

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3 The online survey comprised of 17 total items organised in five different blocks. The first
4 captured the sociodemographic characteristics of participants, including age, gender, and
5 ethnicity, as well as their COVID-19 vaccine status and frequency of COVID-19 testing at
6 home before the event. The second block of questions captured participant feedback on
7 pre-event videoed COVID-19 testing, focusing on the convenience of the procedure, data
8 security, intrusiveness, cost, and its impact on their confidence to self-test correctly. The
9 third block investigated the experience and sense of safety of participants at the event,
10 and the extent to which they adopted other protective measures against COVID-19. The
11 last two set of questions sought to determine if respondents tested positive to COVID-19
12 within two weeks after attending the event, explored general views on pre-event safety
13 measures, and whether respondents would recommend videoed testing for future events.
14 The survey included multiple choice, Likert 5-point scale, and yes/no questions.
15 Participants were asked to give consent at the start of the survey and were free to change
16 their response up until the point of submitting the survey. All data was stored on a
17 password encrypted database which only the study team had access to.
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24 **Data analysis**

25 Sociodemographic characteristics of respondents and responses to survey questions
26 were analysed using routine descriptive statistical methods with STATA/SE 17.0.
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31 **Qualitative methodology**

32 **Participants**

33 Interviewees were randomly selected among survey respondents who voluntarily
34 provided their contact details to be approached for a follow-up interview. Potential
35 interviewees were contacted via email. All participants who agreed to be interviewed were
36 asked to complete a consent form before the interview, and all gave verbal consent at the
37 start of the interview.
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42 **Data collection**

43 Semi-structured personal interviews and a focus group discussion were conducted
44 through Microsoft Teams between December 2021 and January 2022 by two
45 researchers. Thematic saturation was achieved after seven in depth personal interviews
46 and one focus group discussion with 4 participants (n=11 total participants), each lasting
47 between thirty and sixty minutes. Interviews were recorded, auto-transcribed, manually
48 checked, and pseudonymised. The research team developed an interview guide with
49 open-ended questions that was informed by findings from the online questionnaire,
50 seeking to further explore the experience of participants at SCF, to capture the enablers
51 and barriers to participate in COVID-secure live events, and to investigate attitudes and
52 perceptions on pre-event safety measures and medically certified home-based testing.
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Data analysis

Interview transcripts were analysed inductively through thematic analysis by manually identifying codes and subsequently through the formation of themes. Two researchers reviewed the transcripts and agreed on the emergent themes, that were further discussed with the research team. Once emergent themes were categorised and considered in context, quotes from transcripts reflecting key themes were captured.

Ethics

The study received ethical approval from the Imperial College London Ethics Committee (ICREC 21IC6705). The survey was anonymous, and respondents were not asked to provide personal details unless they voluntarily expressed to be contacted for a follow-up interview. Participants were asked to give written and oral consent before the start of interviews. Participants were free to withdraw from the survey or interview at any time. A lottery to receive free tickets to the next SCF was provided by the event organisers as an inducement for ticket holders to participate in the evaluation. Interview data was pseudonymised.

Patient and Public Involvement

No patient was involved in this study.

Results

A total of 1,093 respondents completed the survey, and contextual data was collected by interviewing 11 participants. Results from the survey and interviews are reported in the following sections.

Survey

Results from the survey were reported using the CHERRIES Checklist [10]. A total of 1,093 participants completed the survey out of the 4,726 that were contacted (response rate 23.1%). Characteristics of survey respondents are summarised in **Table 1**, and survey results are reported in **Supplemental Table S1**.

Table 1: sample size and characteristics of respondents of the survey.

	N	%
Total	1093	100.0
Gender		
Female	711	65.5
Male	374	34.5

Age		
15-24	122	11.3
25-39	290	26.7
40-54	483	44.6
≥55	186	17.4
Ethnicity		
White	1030	95.5
Mixed/multiple ethnic groups	28	2.6
Asian/Asian British	8	0.7
Black/African/Caribbean/Black British	2	0.2
Other	11	1.0
COVID-19 vaccine status before the event		
Fully vaccinated (2 doses)	832	76.2
Partially vaccinated (1 dose)	220	20.2
Not vaccinated	41	3.6
Routine COVID-19 testing at home before the event		
At least once a week	504	46.2
Not regularly	457	41.8
Never	131	12.0

Overall, most respondents agreed or strongly agreed that videoed pre-event testing was convenient (81.0 %, **Figure 1**) and not intrusive (82.8%), and about three-quarters of respondents agreed or strongly agreed that the cost of the test was reasonable (73.6%). A significant proportion of respondents agreed or strongly agreed that they were not concerned with the security of their data (72.6%), and about three-quarters of respondents agreed or strongly agreed that they felt confident in their results knowing that the pre-event testing was videoed (76.2%).

Nearly half the respondents (45.0%) felt that having completed a videoed LFT increased their confidence to self-test correctly. Less than 1% of respondents (0.4%) felt they were still not confident to self-test correctly.

Most respondents agreed or strongly agreed that knowing that everyone at the event had been tested made them feel safer (85.5%, **Figure 1**). The large majority disagreed or strongly disagreed that pre-event testing interfered with how much fun they had at the event (93.7%).

About half of respondents reported having regularly washed their hands during the event (51.2%), making it the most common form of prevention against COVID-19. One-third of respondents reported having socially distanced to some extent (33.4%), although only a small proportion reported having maintained social distancing at most times during the event (8.1%). More than half of respondents reported not having worn a face mask or covering at all throughout the event (54.7%).

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4 Almost all respondents reported not having tested positive for COVID-19 within two weeks
5 of attendance to SCF (1,053 respondents, 95.5%). Only 38 respondents (3.5%) tested
6 positive for COVID-19 within two weeks of attendance to the event.
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10 Most respondents agreed or strongly agreed that pre-event testing reduces the risk of
11 catching COVID-19 (87.1%, **Figure 1**), however nearly all respondents (97.5%) agreed
12 or strongly agreed that it cannot reduce the risk to zero. A significant proportion of
13 respondents agreed or strongly agreed that other events should adopt videoed testing at
14 home (76.4%). About a third of respondents agreed that they would have valued to
15 receive a personal risk score of catching COVID-19 at the event (35.6%), while another
16 third was neutral about this (34.8%). The majority of respondents (89.4%) agreed or
17 strongly agreed that home-based testing was preferred to at-the-door testing.
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21 Most respondents (93.7%) reported that the requirement of at-home videoed rapid testing
22 would not influence their decision to attend future events.
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26 Interviews

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28 By interviewing a subset of survey respondents, we were able to further explore the
29 findings from the online questionnaire. The characteristics of interviewees are
30 summarised in **Table 2**.
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33 Although the risk modelling was successfully conducted in real-time and its projections
34 were largely in line with the number of COVID-19 cases that emerged from SCF as
35 measured by Test and Trace, it was not used at the event because permission for it to go
36 ahead had already been granted. Therefore, we were unable to interview public health
37 authorities to assess the utility of the risk modelling as a go/no-go decision tool.
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41 Three main themes emerged from the data: overall impressions of respondents on the
42 safety protocol, particularly on its feasibility, acceptability, and the learning associated
43 with it; experience of respondents at the event, including the impact of the safety protocol
44 on their sense of safety, and the use of other protective measures against COVID-19;
45 general views on the value and relevance of pre-event safety procedures and on
46 medically certified home-based testing.
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51 **Table 2: sample size and characteristics of interviewees**

	N (%)	%
Total	11	100.0
Gender		

	Female	6	54.5
	Male	5	45.4
Age			
	15-24	2	18.2
	25-39	1	9.1
	40-54	1	9.1
	≥55	7	63.6
Ethnicity			
	White	9	81.8
	Mixed/multiple ethnic groups	1	9.1
	Other	1	9.1

Overall impressions on the safety protocol

All respondents were positively impressed with the safety protocol. They agreed that it was feasible, efficient and straightforward, and they could not identify major drawbacks.

“I was really impressed. It was cheap. It was easy. ... It worked really well, I was very pleased with it from start to finish. And at the time I thought it was a great idea. ... I can't think of a drawback from the testing process.” (P7, age 55)

For many respondents, this was the first event they were able to attend since the beginning of the COVID-19 pandemic, and therefore found this procedure acceptable for the festival to take place. None of the participants reported concerns regarding the intrusiveness of the test or the way personal data was handled. Respondents agreed that the cost of the test was marginal with respect to the overall price of the ticket, and therefore accessible, even for families or large group bookings. Some participants in the older age groups feared to experience technological difficulties while carrying out the videoed test. Nevertheless, they were willing to do it and were able to successfully complete the procedure.

Although the safety protocol implied that videoed self-tests were reviewed by a professional, one respondent had doubts that all videos were being checked, given the large amount of festival attendees and the short time window between the test submission and the start of the festival. However, another respondent believed that there was someone manually checking the videos given that test results were not made available immediately.

“The fact that you had to give it in, but the time scales were such that you wouldn't necessarily get replies at certain points made me believe that there was a real person watching them all. ... And that gave me a reassurance.” (P2, age 53)

We asked participants about the impact of videoed testing on their confidence in self-testing. The majority did not notice any change in confidence in their self-testing technique

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3 after carrying out a videoed test, since they were used to testing regularly before attending
4 the event. However, one respondent said that the videoed aspect of it might have had a
5 positive impact on her self-testing technique:
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7 “The animation person was doing it and then you kind of follow, so you know you're
8 doing the right thing and it probably did influence my tests afterwards because I'd
9 seen that and it was in my memory.” (P3, age 28)
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11 12 **Experience at the event**

13 Respondents believed that the protocol helped to minimise the spread of COVID-19. This
14 contributed to create a feeling of safety and reassurance among participants at the event.

15 “I was very aware of the fact that nothing was going to stop a certain amount of
16 infections taking place, but it minimized, and that to me was the main point. ... I
17 felt much safer there, I felt much happier.” (P1, age 57)
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21 Several respondents stressed that they felt safer at the event knowing that everybody
22 had been tested and that the protocol implied people had to strictly follow a set of
23 instructions to be able to attend the event.

24 “The general belief and understanding that this was a COVID free zone was partly
25 reinforced by the fact that I believe that everyone had been properly screened and
26 proven to be COVID free within the days before entering the venue, and the
27 videoed testing supported that.” (P7, age 55)
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32 Some respondents attributed the added sense of safety to the robustness to videoed
33 testing, which to many seemed harder to forge compared to other testing protocols, for
34 example those that require to upload a picture of the test result.
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38 When asked about other preventive measures against COVID-19 adopted at the event,
39 most respondents agreed that it did not feel necessary to wear a mask or to socially
40 distance given that everyone had been tested, and that the event was outdoors. However,
41 they all reported using hand sanitiser throughout the festival.
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44 **General views on pre-event safety procedures and medically certified home-based** 45 **testing**

46 We asked respondents whether they would recommend this safety protocol for future
47 events. While the majority agreed that videoed testing was very relevant at the time of
48 SCF, they thought it may not be as necessary moving forward, given the difference of the
49 current circumstances compared to last Summer, including the availability of vaccines
50 and the increased frequency in self-testing among the general population.
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52 “I thought it's perfect for last Summer, but ... I think we're way past now this kind
53 of filming people to do an LFT ... Last summer we didn't really understand the
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disease to the same way that we do now, and loads of people weren't vaccinated. Now, everyone has had the opportunity to be vaccinated. ... I don't feel like we should be protecting people to the same extent because people should be protecting themselves.” (P9, age 46)

Participants were also asked whether they would find it useful to receive a personalised COVID-19 risk score before attending an event, calculated based on their vaccine status, that of other attendees, and the characteristics of the venue. While some would find it useful, the majority thought that a high-risk score would not stop them from going to an event. This may be because people would have taken other precautions or made their own considerations about the consequences and losses involved.

We asked respondents about their views on the potential of medically certified home-based testing for other diseases, such as flu, diabetes or HIV. The majority of respondents agreed that home-based testing could be useful, as long as tests are easy to carry out and people have the right skills and confidence to do them.

“I think home testing is a wonderful step forward. ... Most people would really appreciate being able to do those things at home ... as long as it's an easy process and you have confidence in the process and confidence in your ability to do it so that the result is accurate.” (P1, age 57)

Other participants stressed that having the opportunity to test for everything may become excessive and lead to negative consequences, resulting in people not taking sufficient responsibility, ignoring social norms, and even in the worsening of health outcomes.

“I think also there's the danger of promoting a false sense of security through test for too many things, so people then take no notice of the normal nor the social norms. Another thing that reduced the rate of flu last winter was the fact that we were socially isolating, washing our hands and doing all the other things, so you know perhaps it's almost a reason for not testing for flu, you know, make sure that people take responsibility.” (P10, age 71)

Discussion

The aim of our study was to explore the views and perceptions of individuals who attended SCF in July 2021 in relation to the safety protocol that was implemented to minimise transmission of COVID-19 at the event. Our findings show that the protocol was highly acceptable, accessible, feasible, and reliable. Participants agreed that videoed testing was straightforward, not intrusive, and inexpensive, and it did not negatively impact their experience at the event. Videoed testing was helpful to improve the ability to self-test, and increased confidence in test results. Additionally, by interviewing a subgroup of

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3 survey respondents we found that participants felt safe at the event knowing that
4 everyone had followed a robust testing protocol that contributed to minimise the spread
5 of COVID-19, and did not feel it was necessary to follow additional safety measures at
6 the event such as social distancing or mask wearing. Some respondents mentioned that
7 although videoed testing was very relevant at the time of SCF, it may not be as necessary
8 for future events given significant improvements in the COVID-19 pandemic in the UK
9 since last Summer. Participants also reported that having access to personalised risk
10 scores would not extensively influence their decision to attend an event. Most
11 respondents agreed that medically certified home-based testing has the potential to be
12 used for other diseases if tests are easy to carry out and patients feel confident enough
13 to do and interpret them. However, the ability to test excessively might negatively impact
14 individual responsibility and people's respect of social norms.
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20 Home-based self-testing is widely used in healthcare. Studies have shown that self-
21 testing for chronic disease management, such as diabetes, or diagnostics, such as HIV,
22 is highly accepted among patients. Most patients can easily perform these tests, obtain
23 accurate results, and correctly interpret them [11-14]. There are several advantages
24 associated with home-based self-testing, including reduced costs of care, increased
25 availability and uptake, and patient empowerment [13, 15]. Concerns with self-testing are
26 often associated with user errors in performance or interpretation of results, leading
27 patients to report the wrong outcome and change their behaviour accordingly [12, 14, 16].
28 This can be avoided by ensuring that self-tests are simple and easy to use, and that
29 patients are provided with better instructions to carry out and interpret tests correctly [17].
30 Our findings show that professionally witnessed home-based videoed testing is feasible
31 and reliable and has potential to be implemented in other health spheres to increase
32 confidence among patients in disease self-management and further support correct
33 interpretation of results.
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40 Although the majority of respondents believed that the CAPACITY protocol was very
41 relevant at the time of SCF, it may not be as useful for the current UK context given that,
42 at the time of writing, all restrictions in relation to COVID-19 are close to being lifted [18].
43 However, this safety protocol may be relevant in countries where the live event industry
44 has been heavily affected by the recent rise in COVID-19 infections associated with the
45 Omicron variant. For example, several live events have been cancelled in Australia [19],
46 while in New Zealand they are currently capped at 100 people, who have to prove they
47 have been vaccinated in order to gain entry to the event [20]. In these contexts, the
48 CAPACITY protocol may be a useful strategy to support the safe reopening of live mass
49 events at full capacity, while minimising transmission of COVID-19.
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54 **Limitations**

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3 Our study was the first to evaluate the feasibility and acceptability of a safety protocol that
4 involves professionally witnessed home-based videoed pre-event testing to minimise
5 COVID-19 transmission and support the safe reopening of live mass events at full
6 capacity. Our findings, however, have some limitations. The survey and interviews were
7 conducted several months after the event took place, therefore the study may be subject
8 to recall bias. Although our study sample was largely representative of the event
9 population, interviewees were a small, self-selected subset of survey respondents. It is
10 plausible that individuals who agreed to be interviewed may have had greater awareness
11 of and interest in the research topic compared with those who did not participate, which
12 may be an indication of selection bias. However, interviews were transcribed and coded
13 to maintain reliability. Further, the way in which participants responded to the safety
14 protocol may have been influenced by the audience composition, given that SCF is a
15 family-friendly, boutique festival. Lastly, although the risk modelling successfully
16 predicted the number of COVID-19 cases arising from the event in real-time as measured
17 by Test and Trace, we were unable to evaluate the utility of risk-modelling as a go/no-go
18 decision tool because it was a fast-moving environment and the event had already been
19 given permission to go ahead. However, operationally the modelling was possible and
20 has potential to support decision making at future events.
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28 **Conclusion**

29 Our study has shown that a safety protocol involving professionally witnessed home-
30 based videoed pre-event testing for COVID-19 can support the safe reopening of live
31 mass events at full capacity and is highly acceptable and feasible. While it may not
32 necessarily be relevant for the current UK context, it can be useful for other countries
33 where live events are currently suspended or are taking place at reduced capacity due to
34 high numbers of COVID-19 infections. Risk modelling has the potential to further increase
35 the robustness of this protocol and should be tested and evaluated at future events.
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40 **Ethics**

41 The study received ethical approval from the Imperial College London Ethics Committee
42 (ICREC 21IC6705). The survey was anonymous, and respondents were not asked to
43 provide personal details unless they voluntarily expressed to be contacted for a follow-up
44 interview. Participants were asked to give written and oral consent before the start of
45 interviews. Participants were free to withdraw from the survey or interview at any time
46 however a lottery to receive free tickets to the 2022 SCF was provided by the event
47 organisers as an inducement for ticket holders to participate in the evaluation. Interview
48 data was pseudonymised. The interviews were transcribed with the principle of anonymity
49 in mind and transcriptions were not outsourced, therefore no confidentiality agreements
50 were required. All data generated or analysed during this study are included in this
51 published article.
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Consent

Consent to enter the study was sought from each participant only after a full explanation of the study was given, documentation was offered, and time allowed for consideration. The right of the participant to refuse to participate without giving reasons was respected. All participants were free to withdraw at any time and without giving reasons. Participants were notified on the plans for publication and were reminded that all their data was pseudonymised.

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Data sharing statement: No further data are available.

Competing interests: JK is currently Director of Health Optimisation at the Center for Health and Human Performance (London, UK), and co-founder and Medical Director of CERTIFIC.

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Disclaimer

The views expressed in this publication are those of the authors and not necessarily those of the NIHR or the Department of Health and Social Care.

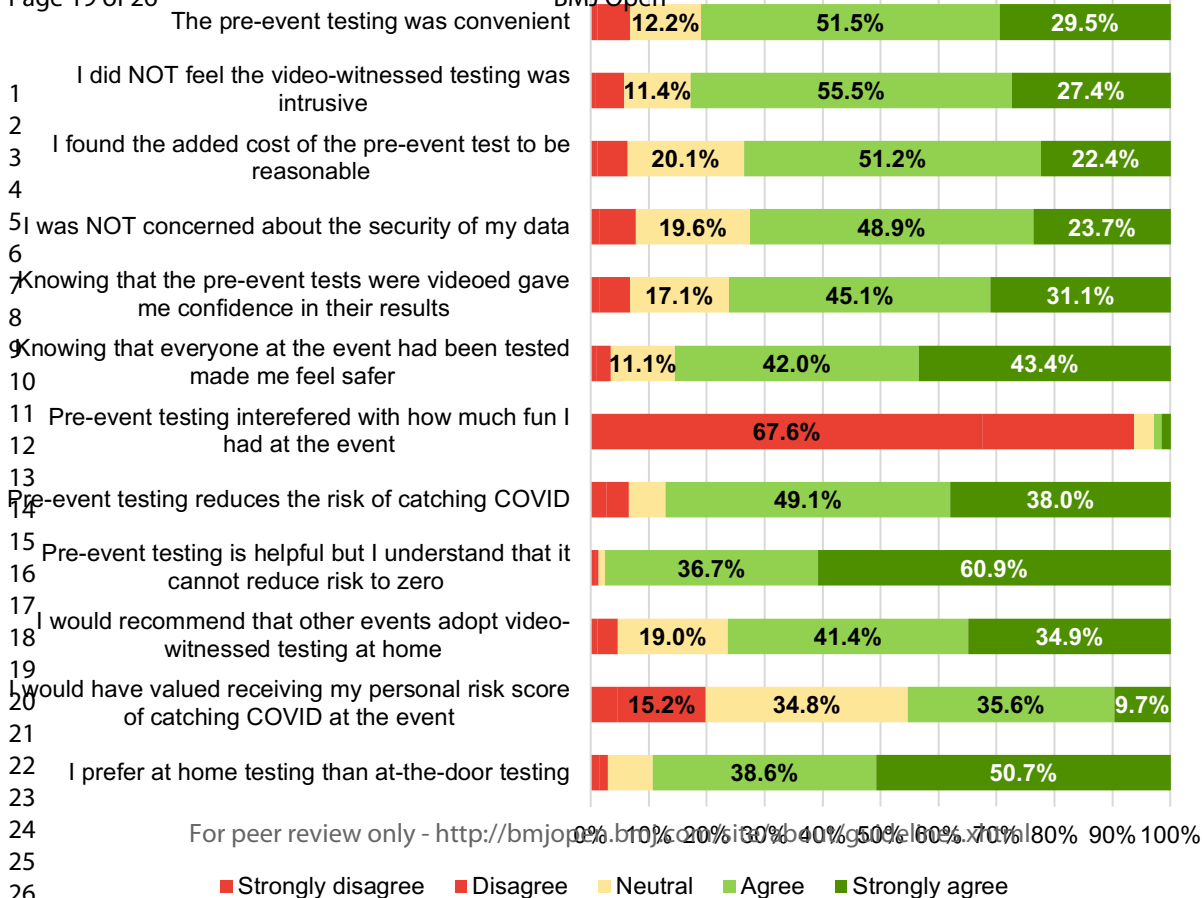
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Figure legends

Figure 1: percentage of respondents who agreed or disagreed with various statements about videoed pre-event COVID-19 testing, safety and experience (n=1,093).



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Strongly disagree Disagree Neutral Agree Strongly agree

Supplemental material

Supplemental Table S1: survey results.

	N	%
Total	1093	100.0
How confident do you feel to correctly complete the LFT yourself or on others in the future after completing videoed testing on the CERTIFIC App or Web portal?		
Very confident - the app has made me more confident to self-test correctly	492	45.0
No difference - this was exactly the same as what I always did	598	54.7
Not confident - I am still not confident to self-test correctly	3	0.3
To what extent do you agree or disagree with the following statements?		
<i>Pre-event testing reduces the risk of catching COVID</i>		
Strongly disagree	31	2.8
Disagree	42	3.8
Neutral	70	6.4
Agree	536	49.0
Strongly agree	415	38.0
<i>The pre-event testing with CERTIFIC was convenient</i>		
Strongly disagree	12	1.1
Disagree	62	5.7
Neutral	133	12.2
Agree	563	51.5
Strongly agree	322	29.5
<i>I prefer home based testing than at-the-door testing</i>		
Strongly disagree	16	1.5
Disagree	16	1.5
Neutral	84	7.7
Agree	422	38.6
Strongly agree	554	50.7
<i>Knowing that everyone at the event had been tested made me feel safer</i>		
Strongly disagree	11	1.0
Disagree	26	2.4
Neutral	121	11.1
Agree	460	42.1
Strongly agree	474	43.4
<i>Pre-event testing is helpful but I understand that it cannot reduce risk to zero</i>		
Strongly disagree	8	0.7
Disagree	7	0.6
Neutral	13	1.2
Agree	401	36.7
Strongly agree	665	60.8
<i>Knowing that the pre-event tests were videoed gave me confidence in their results</i>		

1			
2			
3	Strongly disagree	16	1.5
4	Disagree	57	5.2
5	Neutral	187	17.1
6	Agree	493	45.1
7	Strongly agree	340	31.1
8			
9	<i>Pre-event testing interfered with how much fun I had at the event</i>		
10	Strongly disagree	739	67.6
11	Disagree	285	26.1
12	Neutral	38	3.5
13	Agree	14	1.3
14	Strongly agree	16	1.5
15			
16	<i>I would recommend that other events adopt video-witnessed testing at home</i>		
17	Strongly disagree	12	1.1
18	Disagree	39	3.6
19	Neutral	208	19.0
20	Agree	453	41.4
21	Strongly agree	381	34.9
22			
23	<i>I found the added cost of the pre-event test to be reasonable</i>		
24	Strongly disagree	12	1.1
25	Disagree	57	5.2
26	Neutral	220	20.1
27	Agree	560	51.2
28	Strongly agree	245	22.4
29			
30	<i>I was NOT concerned about the security of my data</i>		
31	Strongly disagree	16	1.5
32	Disagree	69	6.3
33	Neutral	214	19.6
34	Agree	534	48.9
35	Strongly agree	259	23.7
36			
37	<i>I did NOT feel the video-witnessed testing was intrusive</i>		
38	Strongly disagree	8	0.7
39	Disagree	56	5.1
40	Neutral	125	11.4
41	Agree	607	55.5
42	Strongly agree	298	27.3
43			
44	<i>I would have valued receiving my personal risk score of catching COVID at the event</i>		
45	Strongly disagree	49	4.5
46	Disagree	165	15.1
47	Neutral	380	34.8
48	Agree	393	36.0
49	Strongly agree	105	9.6
50			
51	Have you tested positive for COVID since attending Standon Calling?		
52	No – I did not test positive for COVID within the first 2 weeks of participating in SCF	1055	96.5
53			
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3	Yes – I tested positive for COVID within 2 weeks of		
4	participating in SCF	38	3.5
5	How did you access the CERTIFIC platform?		
6	App for Apple (iOS)	709	64.9
7	App for Android/Google	303	27.7
8	Web-based	80	7.3
9	Other	1	0.1
10			
11	Please tell us your views about using the CERTIFIC App (please tick all that apply)		
12	The app was relatively easy to use	987	90.3
13	The procedure was not very time consuming	648	59.3
14	I felt my data was safeguarded	399	36.5
15	I still have the app on my phone	387	35.4
16	I would recommend using the CERTIFIC app for this purpose		
17	to my friends and family	565	51.7
18			
19	To what extent did you wear a mask, maintained social distancing and/or washed your hands		
20	during the event?		
21	<i>I consistently wore a face mask/face covering</i>		
22	Not at all	598	54.7
23	Not really	228	20.9
24	To some extent	225	20.6
25	Yes, mostly	42	3.8
26			
27	<i>I maintained social distancing</i>		
28	Not at all	322	29.5
29	Not really	317	29.0
30	To some extent	365	33.4
31	Yes, mostly	89	8.1
32			
33	<i>I maintained regular hand washing</i>		
34	Not at all	47	4.3
35	Not really	128	11.7
36	To some extent	359	32.8
37	Yes, mostly	560	51.2
38			
39	How many people (other than yourself) did you attend the event with?		
40	I went alone	9	0.8
41	+1	203	18.6
42	+2	107	9.8
43	+3 or more	774	70.8
44			
45	If at-home, videoed, rapid testing is required to be completed in a similar fashion for future		
46	events, would you still attend those events?		
47	Yes – it makes no difference to my decision to attend	1023	93.6
48	Unsure if it will influence my decision to attend	67	6.1
49	No – I will not sign up to attend future events if rapid testing		
50	was required	3	0.3
51			

Checklist for Reporting Results of Internet E-Surveys (CHERRIES)

Checklist Item	Explanation	Page Number
Describe survey design	A total of 1,093 participants completed the survey out of the 4,726 that were contacted (response rate 23.1%).	7
IRB approval	The study received ethical approval from the Imperial College London Ethics Committee (ICREC 211C6705).	7
Informed consent	Consent to enter the study was sought from each participant only after a full explanation of the study was given, documentation was offered, and time allowed for consideration. The right of the participant to refuse to participate without giving reasons was respected. All participants were free to withdraw at any time and without giving reasons. Participants were notified on the plans for publication and were reminded that all their data was pseudonymised.	15
Data protection	All data was stored on a password encrypted database which only the study team had access to.	6
Development and testing	Members of the study team beta-tested the survey for usability and technical functionality of the electronic questionnaire before fielding the questionnaire.	5
Open survey versus closed survey	The online survey comprised of 17 total items organised in five different blocks.	6
Contact mode	Adults who attended SCF in July 2021 and gave permission to be contacted by the research team during ticket purchase were eligible to participate in the survey and were contacted via email.	5
Advertising the survey	NA	NA
Web/E-mail	The online survey comprised of 17 total items organised in five different blocks.	6
Context	The survey was distributed via web-link on the Qualtrics platform.	5
Mandatory/voluntary	The survey was voluntary, and participants were free to decide whether they wanted to take part.	5
Incentives	NA	NA
Time/Date	Participants were surveyed anonymously in the first two weeks of November 2021 through an online questionnaire to capture their views and experiences regarding SCF.	5
Randomization of items or questionnaires	NA	NA
Adaptive questioning	NA	NA
Number of Items	The online survey comprised of 17 total items organised in five different blocks.	6

Number of screens (pages)	NA	NA
Completeness check	NA	NA
Review step	Participants were free to change their answers until the point of submitting the survey.	6
Unique site visitor	NA	NA
View rate (Ratio of unique survey visitors/unique site visitors)	NA	NA
Participation rate (Ratio of unique visitors who agreed to participate/unique first survey page visitors)	NA	NA
Completion rate (Ratio of users who finished the survey/users who agreed to participate)	NA	NA
Cookies used	NA	NA
IP check	NA	NA
Log file analysis	NA	NA
Registration	NA	NA
Handling of incomplete questionnaires	NA	NA
Questionnaires submitted with an atypical timestamp	NA	NA
Statistical correction	NA	NA

This checklist has been modified from Eysenbach G. Improving the quality of Web surveys: the Checklist for Reporting Results of Internet E-Surveys (CHERRIES). J Med Internet Res. 2004 Sep 29;6(3):e34 [erratum in J Med Internet Res. 2012; 14(1): e8.]. Article available at <https://www.jmir.org/2004/3/e34/>; erratum available <https://www.jmir.org/2012/1/e8/>. Copyright ©Gunther Eysenbach. Originally published in the [Journal of Medical Internet Research](#), 29.9.2004 and 04.01.2012.

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COREQ (CONsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
<i>Personal characteristics</i>			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
<i>Relationship with participants</i>			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
<i>Theoretical framework</i>			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
<i>Participant selection</i>			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
<i>Setting</i>			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
<i>Data collection</i>			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat interviews carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the interview or focus group?	
Duration	21	What was the duration of the interviews or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
<i>Data analysis</i>			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
<i>Reporting</i>			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

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BMJ Open

Evaluating the feasibility and acceptability of a safety protocol to mitigate SARS-CoV-2 transmission risks when participating in full-capacity live mass events: a cross-sectional survey and interview-based study

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Primary Subject Heading:	Public health
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Evaluating the feasibility and acceptability of a safety protocol to mitigate SARS-CoV-2 transmission risks when participating in full-capacity live mass events: a cross-sectional survey and interview-based study

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Word count: 3998

Abstract

Objective: Investigate the feasibility and acceptability of a novel COVID-19 safety protocol combining professionally witnessed home-based videoed pre-event testing and a data-driven risk assessment model that was piloted at the Standon Calling Festival in July 2021.

Design: Observational study using a sequential explanatory mixed-methods design involving a survey, personal interviews and group discussions with a cross section of participants.

Setting: Standon Calling Festival, Hertfordshire, England.

Participants: 4,726 adults who attended Standon Calling and consented to participate in the study.

Results: Nearly a quarter (23.1%; 1,093) attendees (Female 65%, Male 35%) responded to the post-event survey. Eleven participants were interviewed before thematic saturation was reached. The majority (81.0%) of respondents found the at-home testing protocol convenient and of reasonable cost (73.6%). Confidence in the test result was enhanced due to professional-supported videoing (76.2%) whereas 72.6% had confidence in the security of the data. Videoed self-testing helped 45.0% of respondents to feel more confident in their lateral flow testing technique. The majority (85.5%) felt safer at the event and 93.7% agreed that the protocol did not interfere with their enjoyment of the event. Themes generated from interviews showed that the protocol could be applied to other disease areas and events, but there were concerns that over-reliance on test results alone could lead some people to have a false sense of security around the safety of the live event.

Conclusions: Our study showed that a protocol that combines professionally witnessed home-based videoed pre-event testing is highly acceptable and feasible, and it can inform decision making and support the safe reopening of live mass events at full capacity. Although COVID-19 is now considered endemic in the UK, this protocol can be of value for other countries where the live events industry remains heavily impacted. Risk-modelling should be tested and evaluated at future events to further increase the robustness of this protocol.

Key Words: COVID-19; live events management; safety protocol; medically certified testing; risk mitigation.

Strengths and limitations

- This was the first study evaluating the feasibility and acceptability of a COVID-19 safety protocol for the safe reopening of live mass events at full capacity.
- We used a sequential explanatory mixed-methods design, whereby quantitative findings from an online questionnaire informed the collection of contextual data from interviews and one focus group discussion.
- We surveyed 1,093 respondents who had attended the mass live event, and surfaced assumptions from 11 participants to explore barriers and drivers for routine adoption of witnessed rapid lateral flow testing.
- We were unable to evaluate the utility of risk-modelling as a decision tool because the event had already been given permission to go ahead, however it was successfully conducted in real-time, and its projections reflected the number of COVID-19 cases measured by Test and Trace.

Introduction

As part of the public health response to limit the spread of COVID-19, live events were suspended in the United Kingdom (UK) for several months since the first national lockdown in March. The lockdown negatively impacted the country's economy and the mental health of individuals, calling for the deployment of innovative strategies to help reopen live events safely while enabling venues to operate at near or full capacity [1, 2].

Under the auspices of the UK government's Events Research Programme (ERP), a small number of legally permitted live events took place during lockdown between April and July 2021, with the aim of investigating the risk of COVID-19 transmission to inform the reopening of live mass events. Attendees were required to show proof of a negative lateral flow test (LFT), double vaccination, or natural immunity when entering the venue [3]. Findings showed that COVID-19 transmission was in line with or below community level at most events [4]. However, risk of transmission was highest at outdoor unseated events and may have been influenced by individual behaviour before and during the event, vaccination coverage, event size and duration, as well as the prevalence of COVID-19 at the time of the event, suggesting that findings from the ERP may not be generalisable to all live events.

To account for contextual differences between events, and to further increase the effectiveness and usefulness of pre-event testing for safe reopening of live events at full capacity, the CAPACITY protocol combined mass pre-event LFT testing and a data-driven risk assessment model based on levels of immunity (vaccination status) in the event population [1, 5]. The premise was that at-home, professionally verified LFT testing, combined with ticket validation and real-time risk modelling of transmission at the event would catch asymptomatic infected ticket holders before travelling to the event, and support public health authorities to make informed, data-driven decisions around the overall safety of the event. During ticket purchase, customers completed a risk questionnaire and purchased a LFT to be taken within 48 hours of entering the venue. The test was videoed and validated by a professionally trained testing control officer based on the assessment of the sample collection method. The test result was linked to a QR code that would generate a go/no-go signal to attend the event. The risk prediction model would estimate the number of infectious people at the event, their infectivity, and the risk of transmission at the event, based on parameters such as community background prevalence, characteristics of the venue and of the audience attending the event, including their vaccination status. By providing event-specific risk estimates, this protocol had the potential to inform ticketholders, event organisers, public health authorities and health systems to guide decision making as to whether the live event should go ahead as planned [6].

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4 The CAPACITY protocol was trialled in July 2021 at Standon Calling Festival (SCF), an
5 independent boutique music festival that takes place annually in Hertfordshire. Although
6 SCF was cancelled in Summer 2020, the festival resumed in Summer 2021 at full capacity
7 (~15,000 people), in part because the proposed CAPACITY safety protocol helped to
8 assuage concerns around event safety at the time, and was therefore the first event to be
9 held outside of the ERP [7, 8].
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14 The aim of our study was to investigate the views and perceptions of attendees at SCF
15 on the feasibility and acceptability of the CAPACITY protocol using a mixed-methods
16 design.
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21 **Methods**

22 **Study design**

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24 We adopted a sequential explanatory mixed methods design, whereby quantitative data
25 collection and analysis were followed by the collection and analysis of contextual,
26 qualitative data [9]. In the first phase of the study, we collected quantitative data through
27 an online questionnaire. The analysis of quantitative data informed the second phase of
28 the study, during which we collected and analysed data from in-depth semi-structured
29 interviews and a focus group discussion to further explore and expand the quantitative
30 findings from the first phase of the study.
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36 **Quantitative methodology**

37 **Participants**

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39 Adults who attended SCF in July 2021 and gave permission to be contacted by the
40 research team during ticket purchase were eligible to participate in the survey and were
41 contacted via email (n=4,726). The survey was voluntary, and participants were free to
42 decide whether they wanted to take part.
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46 **Data collection**

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48 Participants were surveyed anonymously in the first two weeks of November 2021
49 through an online questionnaire to capture their views and experiences regarding the
50 safety protocol put in place at SCF to minimise the spread and exposure to COVID-19.
51 The survey was developed in collaboration with CERTIFIC and Standon Calling event
52 organisers, including input from the Patient and Public Involvement group of the NW
53 London Applied Research Collaborative, ensuring that questions were clear and in plain
54 English. The survey was validated following two rounds of beta testing by members of the
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3 study team who also tested the usability and technical functionality prior to distribution.
4 The survey was distributed on 3 November 2021 via web-link on the Qualtrics platform,
5 with one reminder sent the following week. The full survey is included in **Supplementary**
6 **File 1**.
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10 The online survey comprised of 17 total items organised in five different blocks. The first
11 captured the sociodemographic characteristics of participants, including age, gender, and
12 ethnicity, as well as their COVID-19 vaccine status and frequency of COVID-19 testing at
13 home before the event. The second block of questions captured participant feedback on
14 pre-event videoed COVID-19 testing, focusing on the convenience of the procedure, data
15 security, intrusiveness, cost, and its impact on their confidence to self-test correctly. The
16 third block investigated the experience and sense of safety of participants at the event,
17 and the extent to which they adopted other protective measures against COVID-19. The
18 last two set of questions sought to determine if respondents tested positive to COVID-19
19 within two weeks after attending the event, explored general views on pre-event safety
20 measures, and whether respondents would recommend videoed testing for future events.
21 The survey included multiple choice, Likert 5-point scale, and yes/no questions.
22 Participants were asked to give consent at the start of the survey and were free to change
23 their response up until the point of submitting the survey. All data was stored on a
24 password encrypted database which only the study team had access to.
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31 **Data analysis**

32 Sociodemographic characteristics of respondents and responses to survey questions
33 were analysed using routine descriptive statistical methods with STATA/SE 17.0.
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38 **Qualitative methodology**

39 **Participants**

40 Interviewees were randomly selected among survey respondents who voluntarily
41 provided their contact details to be approached for a follow-up interview. Potential
42 interviewees were contacted via email. All participants who agreed to be interviewed
43 were asked to complete a consent form before the interview, and all gave verbal consent
44 at the start of the interview.
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49 **Data collection**

50 Semi-structured personal interviews and a focus group discussion were conducted
51 through Microsoft Teams between December 2021 and January 2022 by two
52 researchers. The research team developed an interview guide with open-ended questions
53 that was informed by findings from the online questionnaire, seeking to further explore
54 the experience of participants at SCF, to capture the enablers and barriers to participate
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3 in COVID-secure live events, and to investigate attitudes and perceptions on pre-event
4 safety measures and medically certified home-based testing. The semi-structured
5 interview guide is included in **Supplementary File 2**. Thematic saturation was achieved
6 after seven in depth personal interviews and one focus group discussion with 4
7 participants (n=11 total participants), each lasting between thirty and sixty minutes.
8 Interviews were recorded, auto-transcribed, manually checked, and pseudonymised.
9

12 **Data analysis**

13 Interview transcripts were analysed inductively through thematic analysis by manually
14 identifying codes and subsequently through the formation of themes. Two researchers
15 reviewed the transcripts and agreed on the emergent themes, that were further discussed
16 with the research team. Once emergent themes were categorised and considered in
17 context, quotes from transcripts reflecting key themes were captured.
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21 **Ethics**

22 The study received ethical approval from the Imperial College London Ethics Committee
23 (ICREC 21IC6705). The survey was anonymous, and respondents were not asked to
24 provide personal details unless they voluntarily expressed to be contacted for a follow-up
25 interview. Participants were asked to give written and oral consent before the start of
26 interviews. Participants were free to withdraw from the survey or interview at any time. A
27 lottery to receive free tickets to the next SCF was provided by the event organisers as an
28 inducement for ticket holders to participate in the evaluation. Interview data was
29 pseudonymised.
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35 **Patient and Public Involvement**

36 No patient was involved in this study.
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42 **Results**

43 A total of 1,093 respondents completed the survey, and contextual data was collected by
44 interviewing 11 participants. Results from the survey and interviews are reported in the
45 following sections.
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50 **Survey**

51 Results from the survey were reported using the CHERRIES Checklist [10]. A total of
52 1,093 participants completed the survey out of the 4,726 that were contacted (response
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rate 23.1%). Characteristics of survey respondents are summarised in **Table 1**, and survey results are reported in **Supplemental Table S1**.

Table 1: sample size and characteristics of respondents of the survey.

	N	%
Total	1093	100.0
Gender		
Female	711	65.5
Male	374	34.5
Age		
15-24	122	11.3
25-39	290	26.7
40-54	483	44.6
≥55	186	17.4
Ethnicity		
White	1030	95.5
Mixed/multiple ethnic groups	28	2.6
Asian/Asian British	8	0.7
Black/African/Caribbean/Black British	2	0.2
Other	11	1.0
COVID-19 vaccine status before the event		
Fully vaccinated (2 doses)	832	76.2
Partially vaccinated (1 dose)	220	20.2
Not vaccinated	41	3.6
Routine COVID-19 testing at home before the event		
At least once a week	504	46.2
Not regularly	457	41.8
Never	131	12.0

Overall, most respondents agreed or strongly agreed that videoed pre-event testing was convenient (81.0 %, **Figure 1**) and not intrusive (82.8%), and about three-quarters of respondents agreed or strongly agreed that the cost of the test was reasonable (73.6%). A significant proportion of respondents agreed or strongly agreed that they were not concerned with the security of their data (72.6%), and about three-quarters of respondents agreed or strongly agreed that they felt confident in their results knowing that the pre-event testing was videoed (76.2%).

Nearly half the respondents (45.0%) felt that having completed a videoed LFT increased their confidence to self-test correctly. Less than 1% of respondents (0.4%) felt they were still not confident to self-test correctly.

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3 Most respondents agreed or strongly agreed that knowing that everyone at the event had
4 been tested made them feel safer (85.5%, **Figure 1**). The large majority disagreed or
5 strongly disagreed that pre-event testing interfered with how much fun they had at the
6 event (93.7%).
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9
10 About half of respondents reported having regularly washed their hands during the event
11 (51.2%), making it the most common form of prevention against COVID-19. One-third of
12 respondents reported having socially distanced to some extent (33.4%), although only a
13 small proportion reported having maintained social distancing at most times during the
14 event (8.1%). More than half of respondents reported not having worn a face mask or
15 covering at all throughout the event (54.7%).
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19 Almost all respondents reported not having tested positive for COVID-19 within two weeks
20 of attendance to SCF (1,053 respondents, 95.5%). Only 38 respondents (3.5%) tested
21 positive for COVID-19 within two weeks of attendance to the event.
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23

24 Most respondents agreed or strongly agreed that pre-event testing reduces the risk of
25 catching COVID-19 (87.1%, **Figure 1**), however nearly all respondents (97.5%) agreed
26 or strongly agreed that it cannot reduce the risk to zero. A significant proportion of
27 respondents agreed or strongly agreed that other events should adopt videoed testing at
28 home (76.4%). About a third of respondents agreed that they would have valued to
29 receive a personal risk score of catching COVID-19 at the event (35.6%), while another
30 third was neutral about this (34.8%). The majority of respondents (89.4%) agreed or
31 strongly agreed that home-based testing was preferred to at-the-door testing.
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36 Most respondents (93.7%) reported that the requirement of at-home videoed rapid testing
37 would not influence their decision to attend future events.
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41 Interviews

42 By interviewing a subset of survey respondents, we were able to further explore the
43 findings from the online questionnaire. The characteristics of interviewees are
44 summarised in **Table 2**.
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48 Although the risk modelling was successfully conducted in real-time and its projections
49 were largely in line with the number of COVID-19 cases that emerged from SCF as
50 measured by Test and Trace, it was not used at the event because permission for it to go
51 ahead had already been granted. Therefore, we were unable to interview public health
52 authorities to assess the utility of the risk modelling as a go/no-go decision tool.
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Three main themes emerged from the data: overall impressions of respondents on the safety protocol, particularly on its feasibility, acceptability, and the learning associated with it; experience of respondents at the event, including the impact of the safety protocol on their sense of safety, and the use of other protective measures against COVID-19; general views on the value and relevance of pre-event safety procedures and on medically certified home-based testing.

Table 2: Sample size and characteristics of interviewees

Table 3: Sample size and characteristics of interviewees

	N (%)	%
Total	11	100.0
Gender		
Female	6	54.5
Male	5	45.4
Age		
15-24	2	18.2
25-39	1	9.1
40-54	1	9.1
≥55	7	63.6
Ethnicity		
White	9	81.8
Mixed/multiple ethnic groups	1	9.1
Other	1	9.1

Overall impressions on the safety protocol

All respondents were positively impressed with the safety protocol. They agreed that it was feasible, efficient and straightforward, and they could not identify major drawbacks.

“I was really impressed. It was cheap. It was easy. ... It worked really well, I was very pleased with it from start to finish. And at the time I thought it was a great idea. ... I can't think of a drawback from the testing process.” (P7, age 55)

For many respondents, this was the first event they were able to attend since the beginning of the COVID-19 pandemic, and therefore found this procedure acceptable for the festival to take place. None of the participants reported concerns regarding the intrusiveness of the test or the way personal data was handled. Respondents agreed that the cost of the test was marginal with respect to the overall price of the ticket, and therefore accessible, even for families or large group bookings. Some participants in the older age groups feared to experience technological difficulties while carrying out the

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3 videoed test. Nevertheless, they were willing to do it and were able to successfully
4 complete the procedure.
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7 Although the safety protocol implied that videoed self-tests were reviewed by a
8 professional, one respondent had doubts that all videos were being checked, given the
9 large amount of festival attendees and the short time window between the test submission
10 and the start of the festival. However, another respondent believed that there was
11 someone manually checking the videos given that test results were not made available
12 immediately.
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16 *“The fact that you had to give it in, but the time scales were such that you wouldn't*
17 *necessarily get replies at certain points made me believe that there was a real*
18 *person watching them all. ... And that gave me a reassurance.” (P2, age 53)*
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22 We asked participants about the impact of videoed testing on their confidence in self-
23 testing. The majority did not notice any change in confidence in their self-testing technique
24 after carrying out a videoed test, since they were used to testing regularly before attending
25 the event. However, one respondent said that the videoed aspect of it might have had a
26 positive impact on her self-testing technique:
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30 *“The animation person was doing it and then you kind of follow, so you know you're*
31 *doing the right thing and it probably did influence my tests afterwards because I'd*
32 *seen that and it was in my memory.” (P3, age 28)*
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36 **Experience at the event**

37 Respondents believed that the protocol helped to minimise the spread of COVID-19. This
38 contributed to create a feeling of safety and reassurance among participants at the event.
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42 *“I was very aware of the fact that nothing was going to stop a certain amount of*
43 *infections taking place, but it minimized, and that to me was the main point. ... I*
44 *felt much safer there, I felt much happier.” (P1, age 57)*
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47 Several respondents stressed that they felt safer at the event knowing that everybody
48 had been tested and that the protocol implied people had to strictly follow a set of
49 instructions to be able to attend the event.
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52 *“The general belief and understanding that this was a COVID free zone was partly*
53 *reinforced by the fact that I believe that everyone had been properly screened and*
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3 *proven to be COVID free within the days before entering the venue, and the*
4 *videoed testing supported that.” (P7, age 55)*
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7 Some respondents attributed the added sense of safety to the robustness to videoed
8 testing, which to many seemed harder to forge compared to other testing protocols, for
9 example those that require to upload a picture of the test result.
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12 When asked about other preventive measures against COVID-19 adopted at the event,
13 most respondents agreed that it did not feel necessary to wear a mask or to socially
14 distance given that everyone had been tested, and that the event was outdoors. However,
15 they all reported using hand sanitiser throughout the festival.
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19 20 **General views on pre-event safety procedures and medically certified home-based** 21 **testing** 22

23 We asked respondents whether they would recommend this safety protocol for future
24 events. While the majority agreed that videoed testing was very relevant at the time of
25 SCF, they thought it may not be as necessary moving forward, given the difference of the
26 current circumstances compared to last Summer, including the availability of vaccines
27 and the increased frequency in self-testing among the general population.
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31 *“I thought it's perfect for last Summer, but ... I think we're way past now this kind*
32 *of filming people to do an LFT ... Last summer we didn't really understand the*
33 *disease to the same way that we do now, and loads of people weren't vaccinated.*
34 *Now, everyone has had the opportunity to be vaccinated. ... I don't feel like we*
35 *should be protecting people to the same extent because people should be*
36 *protecting themselves.” (P9, age 46)*
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40 Participants were also asked whether they would find it useful to receive a personalised
41 COVID-19 risk score before attending an event, calculated based on their vaccine status,
42 that of other attendees, and the characteristics of the venue. While some would find it
43 useful, the majority thought that a high-risk score would not stop them from going to an
44 event. This may be because people would have taken other precautions or made their
45 own considerations about the consequences and losses involved.
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49 We asked respondents about their views on the potential of medically certified home-
50 based testing for other diseases, such as flu, diabetes or HIV. The majority of respondents
51 agreed that home-based testing could be useful, as long as tests are easy to carry out
52 and people have the right skills and confidence to do them.
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“I think home testing is a wonderful step forward. ... Most people would really appreciate being able to do those things at home ... as long as it's an easy process and you have confidence in the process and confidence in your ability to do it so that the result is accurate.” (P1, age 57)

Other participants stressed that having the opportunity to test for everything may become excessive and lead to negative consequences, resulting in people not taking sufficient responsibility, ignoring social norms, and even in the worsening of health outcomes.

“I think also there's the danger of promoting a false sense of security through test for too many things, so people then take no notice of the normal nor the social norms. Another thing that reduced the rate of flu last winter was the fact that we were socially isolating, washing our hands and doing all the other things, so you know perhaps it's almost a reason for not testing for flu, you know, make sure that people take responsibility.” (P10, age 71)

Discussion

The aim of our study was to explore the views and perceptions of individuals who attended SCF in July 2021 in relation to the safety protocol that was implemented to minimise transmission of COVID-19 at the event. Our findings show that the protocol was highly acceptable, accessible, feasible, and reliable. Participants agreed that videoed testing was straightforward, not intrusive, and inexpensive, and it did not negatively impact their experience at the event. Videoed testing was helpful to improve the ability to self-test, and increased confidence in test results. Additionally, by interviewing a subgroup of survey respondents we found that participants felt safe at the event knowing that everyone had followed a robust testing protocol that contributed to minimise the spread of COVID-19 and did not feel it was necessary to follow additional safety measures at the event such as social distancing or mask wearing. The protocol of at-home, professionally validated self-testing linked to ticketing, won the Full Production Award at the UK Events Management Awards in December 2022, with judges saying:

“Delivering live festivals on the back of a pandemic and in the midst of a pingdemic was a truly challenging set of circumstances. Achieving success was a considerable feat and is one which set parameters within which other festivals could operate. Standon Calling 2021 was a risk but definitely one worth taking!”

(<https://eventproductionawards.com/eventproductionawards2022/en/page/2022-winners>)

In this evaluation, some respondents mentioned that although videoed testing was very relevant at the time of SCF, it may not be as necessary for future events given significant

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3 improvements in the COVID-19 pandemic in the UK since last Summer. Participants also
4 reported that having access to personalised risk scores would not extensively influence
5 their decision to attend an event. Most respondents agreed that medically certified home-
6 based testing has the potential to be used for other diseases if tests are easy to carry out
7 and patients feel confident enough to do and interpret them. However, the ability to test
8 excessively might negatively impact individual responsibility and people's respect of
9 social norms.
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14 Home-based self-testing is widely used in healthcare. Studies have shown that self-
15 testing for chronic disease management, such as diabetes, or diagnostics, such as HIV,
16 is highly accepted among patients. Most patients can easily perform these tests, obtain
17 accurate results, and correctly interpret them [11-14]. There are several advantages
18 associated with home-based self-testing, including reduced costs of care, increased
19 availability and uptake, and patient empowerment [13, 15]. Concerns with self-testing are
20 often associated with user errors in performance or interpretation of results, leading
21 patients to report the wrong outcome and change their behaviour accordingly [12, 14, 16].
22 This can be avoided by ensuring that self-tests are simple and easy to use, and that
23 patients are provided with better instructions to carry out and interpret tests correctly [17].
24 Our findings show that professionally witnessed home-based videoed testing is feasible
25 and reliable and has potential to be implemented in other health spheres to increase
26 confidence among patients in disease self-management and further support correct
27 interpretation of results.
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34 Although the majority of respondents believed that the CAPACITY protocol was very
35 relevant at the time of SCF, it may not be as useful for the current UK context given that,
36 at the time of writing, all restrictions in relation to COVID-19 are close to being lifted [18].
37 However, this safety protocol may be relevant in countries where the live event industry
38 has been heavily affected by the recent rise in COVID-19 infections associated with the
39 Omicron variant. For example, several live events have been cancelled in Australia [19],
40 while in New Zealand they are currently capped at 100 people, who have to prove they
41 have been vaccinated in order to gain entry to the event [20]. In these contexts, the
42 CAPACITY protocol may be a useful strategy to support the safe reopening of live mass
43 events at full capacity, while minimising transmission of COVID-19.
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48 **Limitations**

49 Our study was the first to evaluate the feasibility and acceptability of a safety protocol that
50 involves professionally witnessed home-based videoed pre-event testing to minimise
51 COVID-19 transmission and support the safe reopening of live mass events at full
52 capacity. Our findings, however, have some limitations.
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3 The survey and interviews were conducted several months after the event took place,
4 therefore the study may be subject to both recall and/or selection bias. Although our study
5 sample was largely representative of the event population, interviewees were a small,
6 self-selected subset of survey respondents. It is plausible that individuals who agreed to
7 be interviewed may have had greater awareness of and interest in the research topic
8 compared with those who did not participate, which may be an indication of selection bias.
9 Although it is not possible to predict how selection bias might have influenced the findings
10 of the research, if survey respondents were more likely to be those that were interested
11 in technology and novel innovations, or capable of responding to the electronic survey,
12 then it may have led to a spuriously positive assessment of the protocol.
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18 Further, the way in which participants responded to the safety protocol may have been
19 influenced by the audience composition, given that SCF is a family-friendly, boutique
20 festival. The study is of only one event, in a specific context, that is characterised by
21 attracting families, often with young children. The attendees that responded to the survey
22 were predominantly aged 40-54 (45%), of white ethnicity (95%) and female (65%) and
23 this reflected the characteristics of the attendees at the event as a whole. Although the
24 numbers were too small for direct comparison, the interviewees were also largely of the
25 same age, gender and ethnicity. However, we acknowledge the possibility that attendees
26 at other types of events might have a different experience of the protocol. For example, it
27 is possible that attendees at an opera, a cinema, or a heavy metal rock concert, would
28 have different views of at-home, professionally videoed lateral flow testing. It was not
29 possible to compare the experience of the protocol in other settings and we were not able
30 to assess the generalisability of the survey and interview findings, as this was the only
31 live event to use the CAPACITY protocol, and the first live event to be held outside of the
32 Events Research Programme. However, there were no themes or responses that
33 suggested that the protocol was either so inconvenient, unpalatable or ineffective, that
34 other events, of a ticketed nature, could not consider using it. Clearly, the public health
35 imperative, which in this case was the COVID pandemic, needs to exist to justify the use
36 of the protocol.
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44 Lastly, although the risk modelling successfully predicted the number of COVID-19 cases
45 arising from the event in real-time as measured by Test and Trace, we were unable to
46 evaluate the utility of risk-modelling as a go/no-go decision tool because it was a fast-
47 moving environment and the event had already been given permission to go ahead.
48 However, operationally the modelling was possible and has potential to support decision
49 making at future events.
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53 **Conclusion**

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3 Our study has shown that a safety protocol involving professionally witnessed home-
4 based videoed pre-event testing for COVID-19 can support the safe reopening of live
5 mass events at full capacity and is highly acceptable and feasible. While it may not
6 necessarily be relevant for the current UK context, it can be useful for other countries
7 where live events are currently suspended or are taking place at reduced capacity due to
8 high numbers of COVID-19 infections. Risk modelling has the potential to further increase
9 the robustness of this protocol and should be tested and evaluated at future events.
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14 15 **Ethics**

16 The study received ethical approval from the Imperial College London Ethics Committee
17 (ICREC 21IC6705). The survey was anonymous, and respondents were not asked to
18 provide personal details unless they voluntarily expressed to be contacted for a follow-up
19 interview. Participants were asked to give written and oral consent before the start of
20 interviews. Participants were free to withdraw from the survey or interview at any time
21 however a lottery to receive free tickets to the 2022 SCF was provided by the event
22 organisers as an inducement for ticket holders to participate in the evaluation. Interview
23 data was pseudonymised. The interviews were transcribed with the principle of anonymity
24 in mind and transcriptions were not outsourced, therefore no confidentiality agreements
25 were required. All data generated or analysed during this study are included in this
26 published article.
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32 33 **Consent**

34 Consent to enter the study was sought from each participant only after a full explanation
35 of the study was given, documentation was offered, and time allowed for consideration.
36 The right of the participant to refuse to participate without giving reasons was respected.
37 All participants were free to withdraw at any time and without giving reasons. Participants
38 were notified on the plans for publication and were reminded that all their data was
39 pseudonymised.
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43 44 **Funding**

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49 those of the NHS or the NIHR or the Department of Health and Social Care.
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52 **Author Contributions:** All authors provided substantial contributions to the conception
53 design, acquisition and interpretation of study data and approved the final version of the
54 paper. MH, AEO and JK took the lead in planning the study with support from co-authors.
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3 GD and AA carried out interviews and data analysis, with support from MH, AEO and JK.
4 MH is the guarantor.
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7 **Data sharing statement:** No further data are available.
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9

10 **Competing interests:** JK is currently Director of Health Optimisation at the Center for
11 Health and Human Performance (London, UK), and co-founder and Medical Director of
12 CERTIFIC.
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18 London NIHR Applied Research Collaboration and the Imperial NIHR Biomedical
19 Research Centre.
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22 **Disclaimer**

23 The views expressed in this publication are those of the authors and not necessarily those
24 of the NIHR or the Department of Health and Social Care.
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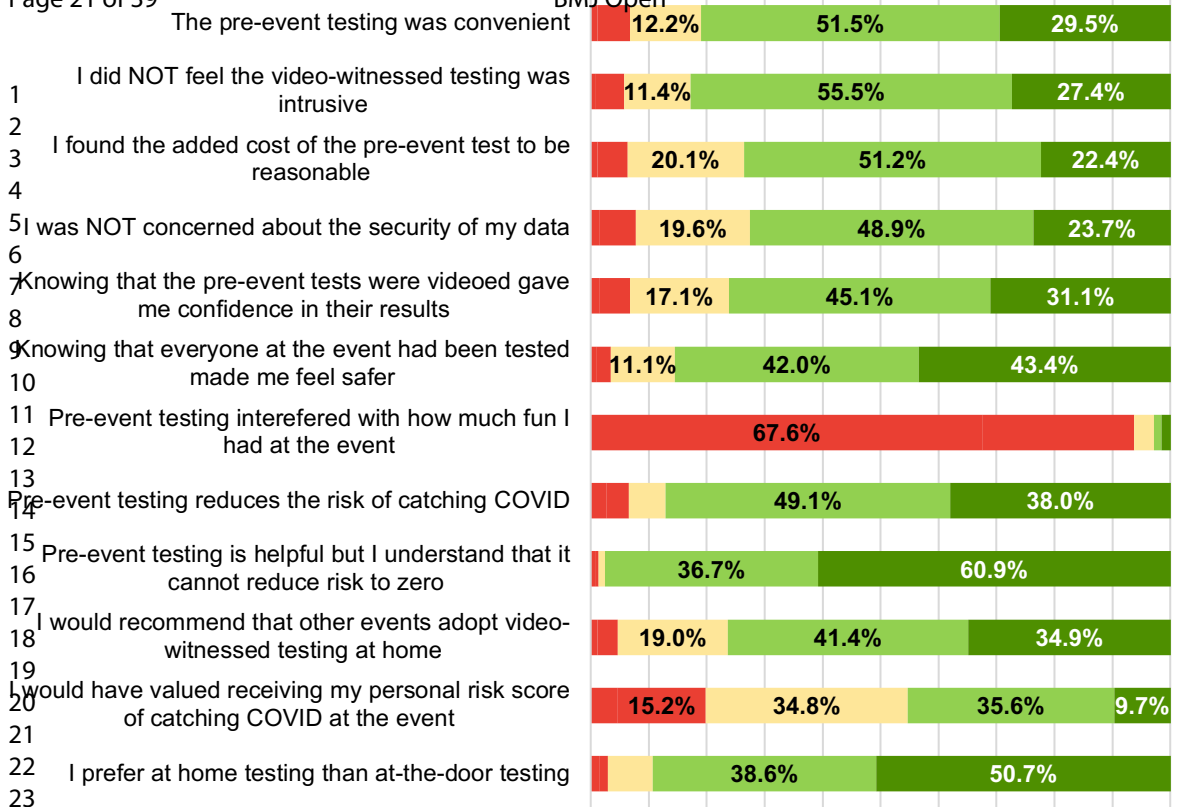
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11 Figure legends

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14 **Figure 1:** percentage of respondents who agreed or disagreed with various statements
15 about videoed pre-event COVID-19 testing, safety and experience (n=1,093).
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Strongly disagree Disagree Neutral Agree Strongly agree

STANDON-CALLING's IMPERIAL COLLEGE POST-EVENT RESEARCH eSurvey Export

Q1

Researchers at the Department of Primary Care & Public Health, Imperial College London are inviting you to participate in a study related to the Standon Calling live event (22-25 July 2021) which you attended.

At the event, you provided consent to be contacted by the research team so that they might learn about your experience of purchasing a ticket and the event itself. Standon Calling involved pre-event home based COVID-19 tests and questionnaires. Through this short (10 minutes) electronic survey we would like to learn about your perspectives of those processes and their impact on your experience at the festival.

Please take a moment to review the [Participant Information Sheet](#) to learn more about the study.

Q2 Please confirm that you consent to participate in this survey

- Yes, I consent to contribute to the research (1)
 - No, thank you. I prefer not to contribute to the research (2)
-

Q3 Prior to purchasing your ticket to the Standon Calling live event, did you routinely do rapid lateral flow tests at home for COVID?

- Yes - I've done testing at home, at least once a week (1)
- Yes - I have done a few tests in the past, but not regularly (2)
- No - I've never routinely done rapid tests (3)

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Q4 Having completed your videoed lateral flow test on the CERTIFIC App or Web portal, do you feel more confident that you would be able to correctly do the test on yourself or on others in the future?

- Yes - the app has made me more confident to self-test correctly (1)
 - No Difference - this was exactly the same as what I always did (2)
 - No - I am still not confident to self-test correctly (3)
-

For peer review only

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3 Q5

4 **To what extent do you agree or disagree with the following statements?**
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For peer review only

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	Strongly disagree (1)	Disagree (2)	Neutral (3)	Agree (4)	Strongly agree (5)
Pre-event testing reduces the risk of catching COVID (9)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The pre-event testing with CERTIFIC was convenient (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I prefer home based testing than at-the-door testing (10)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Knowing that everyone at the event had been tested made me feel safer (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pre-event testing is helpful but I understand that it cannot reduce risk to zero (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Knowing that the pre-event tests were videoed gave me confidence in their results (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Pre-event testing interfered with how much fun I had at the event (14)

I would recommend that other events adopt video-witnessed testing at home (15)

I found the added cost of the pre-event test to be reasonable (16)

I was NOT concerned about the security of my data (17)

I did NOT feel the video-witnessed testing was intrusive (18)

I would have valued receiving my personal risk score of catching COVID at the event (19)

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
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For peer review only

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3 **Q6 Have you tested positive for COVID since attending Standon Calling?**
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- 5
6 No- I did not test positive for COVID within the first 2 weeks of participating in Standon
7 Calling (1)
8
9 Yes- I tested positive for COVID within 2 weeks of participating in Standon Calling (2)
10
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14 **Q7 How did you access the CERTIFIC platform?**
15

- 16
17 App for Apple (IOS) (1)
18
19 App for Android / Google (2)
20
21 Web-based (4)
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23 Other (5)
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29 **Q8 Please tell us your views about using the CERTIFIC App (please tick all that apply)**
30

- 31
32 The app was relatively easy to use (2)
33
34 The procedure was not very time consuming (4)
35
36 I felt my data was safeguarded (3)
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38 I still have the app on my phone (5)
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41 I would recommend using the CERTIFIC app for this purpose to my friends &
42 family (6)
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3 **Q9 To what extent did you wear a mask, maintained social distancing and/or washed**
4 **your hands during the Standon Calling event?**

	Not at all (1)	Not really (4)	To some extent (2)	Yes, mostly (3)
I consistently wore a face mask / face covering (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I maintained social distancing (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I maintained regular hand washing (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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26 **Q10 How many people (other than yourself) did you attend the event with?**

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29 I went alone (4)
- 30
31 +1 (1)
- 32
33 +2 (2)
- 34
35 +3 or more (3)

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41 **Q11 Please tell us about your vaccine status prior to attending the event (choose one**
42 **that applies):**

- 43
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45 I was not vaccinated against COVID (1)
- 46
47 I had already received 1 dose (partially vaccinated) (2)
- 48
49 I had already received 2 doses (fully vaccinated) (3)

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3 **Q12 If at-home, videoed, rapid testing is required to be completed in a similar fashion for**
4 **future events, would you still attend those events?**
5

- 6
7 Yes- it makes no difference to my decision to attend (1)
8
9 Unsure if it will influence my decision to attend (2)
10
11
12 No- I will not sign up to attend future events if rapid testing was required (3)
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17 **Q13 What is your gender?**
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20 Male (1)
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22 Female (2)
23
24 Other (please specify) (3)
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26 _____
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31 **Q14 How old are you? (in years)**
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33 _____
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38 **Q15 What is your ethnicity?**
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41 White (1)
42
43 Mixed/multiple ethnic groups (2)
44
45 Asian/Asian British (3)
46
47 Black/African/Caribbean/Black British (4)
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49 Other (please specify): (5)
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3 **Q16 Thank you for taking the time to answer our survey.**
4

5
6 Researchers from Imperial College London are looking to interview up to 30 participants (via
7 telephone, Skype or Microsoft Teams) to learn more about the specific themes raised in this
8 survey. Interviews will last 25-35 minutes and may be done through video-conferencing such as
9 Zoom or MS Teams. Please provide your name & contact details (below) if this interests you.
10 We are happy to answer any questions on the study and can fix a suitable time and date for an
11 interview. Thank you.
12

13
14 Name: (1) _____
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16 E-mail: (2) _____
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18 Mobile number: (3) _____
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24 **Q17** As a thank you for completing this valuable public health questionnaire, we are offering one
25 person the chance to win 4x Weekend Tickets for Standon Calling 2022 with luxury boutique
26 camping worth over £1000. To be in with a chance of winning, please enter the same email
27 address that you used to register on the Certific video test app in the box below.
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CAPACITY UK

Interview Crib Sheet

Brief overview

What is the purpose of the interview

How long it will be for

Ethics approval

Right to withdraw consent at any time

Check received PIS prior to interview

Answer any question

Audio recorded etc but anonymised

Overall Experience

- What was your overall experience of the Standon Calling event and specifically the pre-event safety protocol -
 - pre-event questionnaires
 - Probes – time taken, understanding of questions, format of survey
 - What worked? What didn't work?
 - home-based testing
 - Probes –
 - Previous testing – frequency, confidence in testing
 - Effort and cost –satisfaction with cost and time taken
 - Privacy – views of videoing, data security
 - What worked? What didn't work?
 - Standon Calling Event
 - Probes –
 - Impact of the safety protocol on the event experience
 - Sense of whether COVID secure
 - COVID safety measures e.g. hand washing, social distancing
 - What worked? What didn't work?

Video testing

- How did you feel about using video to demonstrate how you took the sample and the test result to a clinician?
 - Probe –
 - Privacy

Computational Modelling with rapid Antigen testing, to Predict and Acceptably minimise COVID-19 Impact and Transmission risk, for economical reopening of the Live Events Industry in the UK (CAPACITY UK)

v0.1 15/03/2021 Page 1 of 2

- Intrusiveness
- Convenience
- Technology issues
- What do you think is the purpose of video testing?
- What is the benefit of video testing everyone at the event?
- How confident were you in self-testing prior to the event?
- In what way has being videoed changed the way you do LFTs at home?

Safety protocol

- The safety protocol at the event involved the home testing and the pre and post-test isolation. How would you describe your experience of the safety protocol as a whole?
 - How did you feel about the pre and post-test isolation?
 - Did you adhere to it? Do you think others adhered to it?
 - Would you recommend this pathway be used in other events in the future?
 - What other types of events, like parties, or smaller gatherings, or routine events like offices and schools, do you think this could work well for?
 - What are the benefits to this type of safety protocol?
 - What are the disadvantages to this type of safety protocol?
 - Do you think people 'mis-take' self tests or don't do them really thoroughly for any reason?
 - Did you have a group booking? What issues were there with respect to this safety protocol as a group?
 - To what extent do you think people doing their own medically certified home-based tests, even for other issues such as flu, HIV, diabetes, might be useful?

Personal risk score

- Based on your own vaccine status, the vaccine status of everyone else at the event and the characteristics of the venue, your individual risk of catching COVID at the event could have been provided to you on your mobile phone
 - What do you think of that?
 - Would you have found it useful?
 - How would you have used that information?
 - Can you describe what level of risk you would have been comfortable with?

Supplemental material

Supplemental Table S1: survey results.

	N	%
Total	1093	100.0
How confident do you feel to correctly complete the LFT yourself or on others in the future after completing videoed testing on the CERTIFIC App or Web portal?		
Very confident - the app has made me more confident to self-test correctly	492	45.0
No difference - this was exactly the same as what I always did	598	54.7
Not confident - I am still not confident to self-test correctly	3	0.3
To what extent do you agree or disagree with the following statements?		
<i>Pre-event testing reduces the risk of catching COVID</i>		
Strongly disagree	31	2.8
Disagree	42	3.8
Neutral	70	6.4
Agree	536	49.0
Strongly agree	415	38.0
<i>The pre-event testing with CERTIFIC was convenient</i>		
Strongly disagree	12	1.1
Disagree	62	5.7
Neutral	133	12.2
Agree	563	51.5
Strongly agree	322	29.5
<i>I prefer home based testing than at-the-door testing</i>		
Strongly disagree	16	1.5
Disagree	16	1.5
Neutral	84	7.7
Agree	422	38.6
Strongly agree	554	50.7
<i>Knowing that everyone at the event had been tested made me feel safer</i>		
Strongly disagree	11	1.0
Disagree	26	2.4
Neutral	121	11.1
Agree	460	42.1
Strongly agree	474	43.4
<i>Pre-event testing is helpful but I understand that it cannot reduce risk to zero</i>		
Strongly disagree	8	0.7
Disagree	7	0.6
Neutral	13	1.2
Agree	401	36.7
Strongly agree	665	60.8
<i>Knowing that the pre-event tests were videoed gave me confidence in their results</i>		

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3	Strongly disagree	16	1.5
4	Disagree	57	5.2
5	Neutral	187	17.1
6	Agree	493	45.1
7	Strongly agree	340	31.1
8			
9	<i>Pre-event testing interfered with how much fun I had at the event</i>		
10	Strongly disagree	739	67.6
11	Disagree	285	26.1
12	Neutral	38	3.5
13	Agree	14	1.3
14	Strongly agree	16	1.5
15			
16	<i>I would recommend that other events adopt video-witnessed testing at home</i>		
17	Strongly disagree	12	1.1
18	Disagree	39	3.6
19	Neutral	208	19.0
20	Agree	453	41.4
21	Strongly agree	381	34.9
22			
23	<i>I found the added cost of the pre-event test to be reasonable</i>		
24	Strongly disagree	12	1.1
25	Disagree	57	5.2
26	Neutral	220	20.1
27	Agree	560	51.2
28	Strongly agree	245	22.4
29			
30	<i>I was NOT concerned about the security of my data</i>		
31	Strongly disagree	16	1.5
32	Disagree	69	6.3
33	Neutral	214	19.6
34	Agree	534	48.9
35	Strongly agree	259	23.7
36			
37	<i>I did NOT feel the video-witnessed testing was intrusive</i>		
38	Strongly disagree	8	0.7
39	Disagree	56	5.1
40	Neutral	125	11.4
41	Agree	607	55.5
42	Strongly agree	298	27.3
43			
44	<i>I would have valued receiving my personal risk score of catching COVID at the event</i>		
45	Strongly disagree	49	4.5
46	Disagree	165	15.1
47	Neutral	380	34.8
48	Agree	393	36.0
49	Strongly agree	105	9.6
50			
51	Have you tested positive for COVID since attending Standon Calling?		
52	No – I did not test positive for COVID within the first 2 weeks of participating in SCF	1055	96.5
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Yes – I tested positive for COVID within 2 weeks of participating in SCF	38	3.5
How did you access the CERTIFIC platform?		
App for Apple (iOS)	709	64.9
App for Android/Google	303	27.7
Web-based	80	7.3
Other	1	0.1
Please tell us your views about using the CERTIFIC App (please tick all that apply)		
The app was relatively easy to use	987	90.3
The procedure was not very time consuming	648	59.3
I felt my data was safeguarded	399	36.5
I still have the app on my phone	387	35.4
I would recommend using the CERTIFIC app for this purpose to my friends and family	565	51.7
To what extent did you wear a mask, maintained social distancing and/or washed your hands during the event?		
<i>I consistently wore a face mask/face covering</i>		
Not at all	598	54.7
Not really	228	20.9
To some extent	225	20.6
Yes, mostly	42	3.8
<i>I maintained social distancing</i>		
Not at all	322	29.5
Not really	317	29.0
To some extent	365	33.4
Yes, mostly	89	8.1
<i>I maintained regular hand washing</i>		
Not at all	47	4.3
Not really	128	11.7
To some extent	359	32.8
Yes, mostly	560	51.2
How many people (other than yourself) did you attend the event with?		
I went alone	9	0.8
+1	203	18.6
+2	107	9.8
+3 or more	774	70.8
If at-home, videoed, rapid testing is required to be completed in a similar fashion for future events, would you still attend those events?		
Yes – it makes no difference to my decision to attend	1023	93.6
Unsure if it will influence my decision to attend	67	6.1
No – I will not sign up to attend future events if rapid testing was required	3	0.3

COREQ (CONsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
<i>Personal characteristics</i>			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
<i>Relationship with participants</i>			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
<i>Theoretical framework</i>			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
<i>Participant selection</i>			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
<i>Setting</i>			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
<i>Data collection</i>			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat interviews carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the interview or focus group?	
Duration	21	What was the duration of the interviews or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
<i>Data analysis</i>			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
<i>Reporting</i>			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

Once you have completed this checklist, please save a copy and upload it as part of your submission. DO NOT include this checklist as part of the main manuscript document. It must be uploaded as a separate file.

Checklist for Reporting Results of Internet E-Surveys (CHERRIES)

Checklist Item	Explanation	Page Number
Describe survey design	A total of 1,093 participants completed the survey out of the 4,726 that were contacted (response rate 23.1%).	7
IRB approval	The study received ethical approval from the Imperial College London Ethics Committee (ICREC 211C6705).	7
Informed consent	Consent to enter the study was sought from each participant only after a full explanation of the study was given, documentation was offered, and time allowed for consideration. The right of the participant to refuse to participate without giving reasons was respected. All participants were free to withdraw at any time and without giving reasons. Participants were notified on the plans for publication and were reminded that all their data was pseudonymised.	15
Data protection	All data was stored on a password encrypted database which only the study team had access to.	6
Development and testing	Members of the study team beta-tested the survey for usability and technical functionality of the electronic questionnaire before fielding the questionnaire.	5
Open survey versus closed survey	The online survey comprised of 17 total items organised in five different blocks.	6
Contact mode	Adults who attended SCF in July 2021 and gave permission to be contacted by the research team during ticket purchase were eligible to participate in the survey and were contacted via email.	5
Advertising the survey	NA	NA
Web/E-mail	The online survey comprised of 17 total items organised in five different blocks.	6
Context	The survey was distributed via web-link on the Qualtrics platform.	5
Mandatory/voluntary	The survey was voluntary, and participants were free to decide whether they wanted to take part.	5
Incentives	NA	NA
Time/Date	Participants were surveyed anonymously in the first two weeks of November 2021 through an online questionnaire to capture their views and experiences regarding SCF.	5
Randomization of items or questionnaires	NA	NA
Adaptive questioning	NA	NA
Number of Items	The online survey comprised of 17 total items organised in five different blocks.	6

Number of screens (pages)	NA	NA
Completeness check	NA	NA
Review step	Participants were free to change their answers until the point of submitting the survey.	6
Unique site visitor	NA	NA
View rate (Ratio of unique survey visitors/unique site visitors)	NA	NA
Participation rate (Ratio of unique visitors who agreed to participate/unique first survey page visitors)	NA	NA
Completion rate (Ratio of users who finished the survey/users who agreed to participate)	NA	NA
Cookies used	NA	NA
IP check	NA	NA
Log file analysis	NA	NA
Registration	NA	NA
Handling of incomplete questionnaires	NA	NA
Questionnaires submitted with an atypical timestamp	NA	NA
Statistical correction	NA	NA

This checklist has been modified from Eysenbach G. Improving the quality of Web surveys: the Checklist for Reporting Results of Internet E-Surveys (CHERRIES). J Med Internet Res. 2004 Sep 29;6(3):e34 [erratum in J Med Internet Res. 2012; 14(1): e8.]. Article available at <https://www.jmir.org/2004/3/e34/>; erratum available <https://www.jmir.org/2012/1/e8/>. Copyright ©Gunther Eysenbach. Originally published in the [Journal of Medical Internet Research](#), 29.9.2004 and 04.01.2012.

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5 Research, is properly cited.
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