

# Rapid thematic analysis of community social and online media in response to mass asymptomatic COVID-19 testing in Liverpool, England

Charlotte Robin (✉ [charlotte.robin@phe.gov.uk](mailto:charlotte.robin@phe.gov.uk))

Public Health England

Charles Symons

Public Health England

Holly Carter

Public Health England

---

## Research Article

**Keywords:** COVID-19, asymptomatic testing, social media, attitudes, behavioural science

**Posted Date:** April 9th, 2021

**DOI:** <https://doi.org/10.21203/rs.3.rs-370851/v1>

**License:**   This work is licensed under a Creative Commons Attribution 4.0 International License. [Read Full License](#)

---

# Abstract

**Background** Mass asymptomatic testing for COVID-19 was piloted for the first time in the UK in Liverpool. There was an urgent need to rapidly evaluate acceptance of asymptomatic testing, specifically identifying barriers and motivators to taking part.

**Methods** As part of the wider evaluation, we conducted a rapid thematic analysis of local narratives media and social media to provide insights from people unlikely to engage in testing or other standard evaluation techniques. Three publicly available sources of community narratives were identified; the comments section of a local online newspaper, the city council Facebook page and Twitter. Data were collected between 2 and 8 November. Data were analysed using an inductive thematic approach.

**Results** Key barriers were accessibility, including site access and concerns over queuing. Queues were also highlighted as a concern due to risk of transmission. Consequences of testing, including an increase in cases leading to further restrictions and financial impact of the requirement to self-isolation were also identified as barriers. In addition, a lack of trust in authorities and the test (including test accuracy and purpose of testing) was identified. Lack of trust was particularly apparent in those with a strong sense of collective identity with the city of Liverpool, which led to a feeling of marginalisation and feeling like test subjects. However, this sense of identity with Liverpool had a dual role and also acted a motivator to engage in testing and encourage others to do so; for this group being part of a pilot was seen as a positive experience and an opportunity to demonstrate the city could successfully manage the virus.

**Conclusions** Our analysis highlights the importance of promoting honest and open communication to encourage and harness existing community identities to enhance the legitimacy of asymptomatic testing as a policy. In addition, adequate and accessible financial support needs to be in place prior to the implementation of community asymptomatic testing to mitigate any concerns surrounding financial hardship. Rapid thematic analysis of social media is a pragmatic method to gather insights from communities around acceptability of public health interventions, such as mass testing or vaccination uptake.

## Background

As part of the United Kingdom's response to COVID-19, in September 2020 the government announced a large-scale expansion of the national testing programme, with the intention of regular testing of the entire UK population on a weekly basis, regardless of symptoms [1]. This strategy is known as "Operation Moonshot" and involved using lateral flow antigen tests, which aim to provide results within 30 minutes.

To pilot the operationalisation and effectiveness of mass testing, Liverpool City was offered asymptomatic testing for everyone who lived or worked in the city. The pilot was a collaboration between NHS Test & Trace, Liverpool City Council, NHS Liverpool Clinical Commissioning Group, the Army (8 Engineer Brigade), Cheshire & Merseyside Health & Care Partnership and Liverpool Charity and Voluntary Services.

In the UK, a survey of behavioural intentions around testing found that 80% of people surveyed would be willing to take a test as part of a mass asymptomatic testing programme [2], however a separate survey showed that only 40% of people surveyed would be willing to be tested on a weekly basis [3]. A significant increase in testing capacity rolled out in Leicester as part of a hyper-local testing initiative in response to continuing restrictions in June/July 2020, saw testing uptake as low as 10–12% [4]. This is in stark contrast to a pilot in Slovakia, where 97% of eligible people took

part in mass testing, identifying 38,000 new cases within two days [5]. The Liverpool pilot is the first time mass asymptomatic testing has been attempted in the UK.

There are limited data available on intention to test and what barriers might exist, particularly in the context of mass asymptomatic testing. Surveys on testing intentions have identified potential barriers including site access, reliability of the test, and inconvenience, however these surveys were undertaken prior to the implementation of the pilot in Liverpool therefore may not necessarily reflect behavioural intentions in the local community. There was an urgent need to rapidly gather local insights in the Liverpool city community, to inform ongoing engagement and communication strategies to increase uptake with the pilot.

An evaluation of the Liverpool pilot, known as MAST (mass, asymptomatic, serial testing) was led by The University of Liverpool with NHS Test and Trace, Public Health England (PHE), the Joint Biosecurity Centre (JBC) and Office for National Statistics (ONS). The behavioural responses focused on uptake, acceptance, motivators for accessing or declining testing, responses to negative and positive results and public trust, understanding and cooperation [6]. During the pilot, 25% of residents took part in testing using the lateral flow tests, which identified 897 positive individuals.

## Methods

### Aim

As part of the wider evaluation work undertaken by the Evaluation Steering Group, we conducted a rapid thematic analysis of local narratives from local community media and social media sites in Liverpool. The aims of this analysis were: to provide insights into local narratives surrounding MAST, particularly from people who may not engage in testing or other standard evaluation techniques such as surveys and interviews; to inform a broader understanding of public test seeking behaviours, including facilitators and barriers to accessing testing; to optimise management of mass testing as part of the national COVID-19 response.

### Population

Liverpool is a city in the North West of England, with a population of around 500,000. The average age of the population is 37.6 years [7] and in 2019 it was ranked the third most deprived local authority area in England based on the overall Indices of Multiple Deprivation score [8]. In week 41 2020 (5 to 11 October), just before the end of a national lockdown and prior to the implementation of a new tiering system for COVID-19 restrictions, Liverpool had one of the highest rates of COVID-19 in England (659 per 100 000)[9] and was the first area of England to be placed under very high alert (Tier 3) restrictions on 14 October 2020.

### Sampling

Data were collected from publicly accessible sources of community narratives, including social and online media sites, such as online comments sections from a local online newspaper, the Liverpool City Council (LCC) Facebook page and Twitter. Sampling captured comments posted from 2 to 8 November 2020, to cover the period before and during the first week of the pilot. All publicly accessible comments on identified posts or articles were copied and pasted to text documents for coding.

The following search string was used to search Twitter to identify Tweets with the hashtags, #liverpooltesting and/or #masstesting between 3 and 8 November 2020 sent in the Liverpool area:

```
near:liverpool (#liverpooltesting OR #masstesting) until:2020-11-08 since:2020-11-03
```

The search included replies to Tweets (which may not necessarily have originated in or near Liverpool) and tweets containing links. In addition to the hashtag search outlined above, all replies to two Tweets announcing the mass testing pilot (one from the local newspaper and one from Liverpool City Council) before 00:00 on 8 November 2020 were collected. Tweets from official accounts, e.g. Liverpool City Council and news media sources, were not included in Twitter data collection.

## **Analysis**

Data were depersonalised by removing any identifiable data (including names and locations) and imported into NVivo or Microsoft Word for rapid thematic analysis. Data were then analysed using the framework approach, a type of thematic analysis that is commonly used in research that has implications for policy [10]. An inductive approach was used to develop the initial framework and then a coding framework was developed from the initial framework and used to capture key themes of interest. Data were categorised into two broad themes of interest (facilitators to testing and barriers to testing), each of which was then divided into relevant sub-themes.

## **Results**

### **Facilitators to getting tested**

For those motivated to get tested, key drivers were: a desire to protect the community; a belief that mass testing could help the city return to normality; and a belief that testing would be (or experience that testing was) convenient and efficient.

### **Protecting the community**

Wanting to protect their community was a key motivator for those who engaged with the testing programme. This included a motivation to protect their loved ones, which in turn would have wider implications for public health.

### **Twitter 7.11.20**

*I will be taking part in #MassTesting #Liverpool to break the chain of transmission and protect the people I love.*

There was also a wider understanding of community, beyond immediate family and friends. For example, people wanted to protect vulnerable people, both within their family and elsewhere. Within this, they fulfilled a sense of duty and felt by engaging with the asymptomatic testing they were contributing to saving lives.

### **Facebook 5.11.20**

*Protecting or vulnerable is most important. With regular testing, we can get tested on a Friday after work, if negative go see, spend time with vulnerable loved ones, and then return to work and school etc, repeat until necessary.*

### **Facebook 7.11.20**

*I actually got tested so I can be sure I'm not a carrier infecting others! It's a bit insulting to assume every person from Liverpool is just getting tested so they don't have to work.*

### **Return to normality**

Tied in with wanting to protect the community was the anticipation of being able to return to "normal". There was an understanding that pulling together as a community would not only help protect others and save lives, but would also

help the city recover quicker, specifically reducing the number of cases and entering a lower tier following the national lockdown.

### **Facebook 6.11.20**

*It's important we get this testing and tracing working effectively so that we can go back to "normal" life. People need to recognise their own responsibility though and self-isolate when appropriate.*

### **Twitter 2.11.20**

*Just get yourself tested, and then we can all start to think about getting back to normal. You can't be anti-lockdown and anti-testing.*

### **Online newspaper 3.11.20**

*If it saves lives and gets this city back to some semblance of normality then I am all for it.*

### **Positive experience**

Among commenters who did get tested, some discussed positive experiences of the testing process itself. These positive experiences were noted throughout the testing process, including ordering tests or booking test slots:

### **Facebook 6.11.20**

*Booked online last night, all done by 8.32 this morning.*

### **Online newspaper 7.11.20**

*Ordered home delivery so I don't have to wait in long lines. Very convenient. Entire family being tested.*

Positive experiences were also shared for the time spent at the test site, specifically how organised the process was:

### **Twitter 7.11.20**

*Arrived at the test centre, got tested, and received results through all within one hour. Well done to all the Army and NHS staff involved.*

In addition, the kindness of the staff working at the test centres was noted as part of their positive experience of the end-to-end test experience:

### **Twitter 7.11.20**

*Superb organisation at Liverpool Airport #COVID19 #Liverpooltesting centre ... took my parents too. Staff extremely kind & considerate with them both. Good job everyone*

### **Shared social identity with others in Liverpool and with authorities**

There is a strong sense of social identity associated with the city of Liverpool; the city is who people are and where they belong. Where people identified with others in the city, as well as with authorities managing the response, shared identity operated not only as an individual motivator to get tested, but also to encourage others to do the same. There was a sense of wanting to come together as a community, not only to help the city but also the rest of the country.

Rather than seeing this as a sacrifice on behalf of the rest of the country, it was seen as an opportunity to demonstrate that Liverpool can successfully manage the virus, setting an example for everyone else.

### **Online newspaper 3.11.20**

*Let's support them. What I have always loved about Liverpool is the community spirit, warmth and the way we pull together in a crisis. Labour voter here. If it works it will have positive effects not just in Liverpool but across the whole country. All eyes are on us. Let's show the country that Liverpool can beat covid 19, and they can too.*

### **Facebook 6.11.20**

*Really great to see such a huge positive response to this - together we will do this. Well done Liverpool [thumbs up emoji].*

Rather than viewing being chosen as the city to pilot testing as negative, the feeling of social identity and an emotional connection with the city helped people understand the pilot as an opportunity and privilege for the city, for example being the first place out of lockdown or into a lower tier following the end of the national lockdown.

### **Online newspaper 3.11.20**

*We are the test bunnies, but this isn't a negative thing, in fact, if we get this sorted, we'll be the first back to normal.*

### **Barriers To Getting Tested**

Analysis of the data highlighted several barriers to people getting tested. The key barriers identified were confusion about the overall pilot; practical barriers to testing; concern over the risk of transmission; and lack of trust in the mass testing programme, and in government response generally.

#### **Practical barriers**

A key practical barrier to getting tested was inconvenience associated with attending testing sites. Various factors associated with inconvenience were identified, including long queues at testing sites, and poor organisation of the testing process.

### **Facebook 6.11.20**

*3 1/2 hour wait at Wavertree even though I booked! Didn't bother waiting, won't bother again! [angry face emoji].*

In addition, there was frustration that the booking system did not help to reduce queue length on attending the testing site – those who experienced long queues despite advanced booking were less motivated to try again. In some cases, people shared their negative experiences on social media, for example around queues, disorganisation or delays in getting results; this may have influenced others' decisions in regards to getting a test.

### **Facebook 6.11.20**

*I wouldn't bother booking, having a time slot doesn't make any difference, you have to queue up with everyone else, it's a joke.*

*[In response] Might not bother at all then if it's not organised.*

Another practical barrier to getting tested related to concerns about the consequences of someone testing positive. For example, some individuals raised lack of compensation if required to self-isolate as the result of a positive test as a reason for not getting tested.

### **Facebook 4.11.20**

*...they will never help us all. I won't be getting tested unless I'm unwell as I don't get paid for being off and not entitled to those payments. I am sure lots won't.*

### **Risk of transmission**

As well as long queues being a barrier to accessing testing because of the inconvenience, they also contributed to concerns over the risk of transmission. For some, the risk of catching Covid while queuing resulted in them not wanting to get tested.

### **Facebook 6.11.20**

*I just wouldn't do that wait in a queue like that it's pathetic and more to the point riskier.*

*In some cases, commenters who had participated in testing reported lack of distancing at test sites, with symptomatic people having to queue alongside asymptomatic people.*

### **Twitter 6.11.20**

*Being at the testing site today it would seem that there are two 'sites' in the same car park (one for invited people with symptoms and one for asymptomatic people who booked a test) and I was in a single queue of both groups mixed because of no direction from staff or signs.*

### **Uncertainty around accessing testing**

The uncertainty surrounding the pilot, particularly in the first few days of launch, led to questions being raised in local narratives. These were predominantly related to access to testing, how to book, where the test sites were, whether there were separate sites for asymptomatic testing and who would be conducting the tests.

### **Facebook 7.11.20**

*Are there drive through ones for people with no symptoms?*

### **Facebook 7.11.20**

*Will the army be doing the tests?*

Uncertainty around how to access testing sometimes resulted in people attending the wrong test centres and having the wrong test, or being unable to book tests at all.

### **Facebook 7.11.20**

*I'm confused...I can't get a test because I am not showing symptoms and I haven't been asked to get tested. I thought the idea was that you were testing EVERYONE in Liverpool, regardless of whether they have symptoms or not...*

### **Facebook 6.11.20**

*Well I went wrong one. Still had test but the normal one. I have to make sure I do the right one next time [eye roll, laughing face emoji].*

### **Uncertainty around purpose of testing**

There was also confusion surrounding the purpose of mass testing and how it would help the overall Covid response.

### **Online newspaper 6.11.20**

*Don't see the point you could get tested today and all clear and then catch it tomorrow.*

### **Online newspaper 6.11.20**

*How does a Covid test help you get better from the virus? We are in Lockdown so we are all isolating anyway.*

Other drivers for not getting tested were concern about the use of mass testing for surveillance or DNA gathering;

### **Facebook 7.11.20**

*Can Liverpool City Council explain why they are taking peoples DNA. That's what the test is isn't it?*

In addition, there was the perception that there was no practical purpose for getting tested because there would be no individual benefit to knowing your disease status, particularly if asymptomatic:

### **Online newspaper 3.11.20**

*What's the point? They can't cure it!!!*

### **Trust**

In addition to the more passive barriers outlined above, there was a motivation to actively avoid participation in mass testing, sometimes expressed alongside a discouragement to others or criticism of fellow residents who had been or were planning to get tested. A key factor motivating people to not get tested was lack of trust. This included lack of trust in the accuracy of the test and lack of trust in stakeholders involved in the delivery of mass testing, such as national and local government, scientists and Test and Trace.

### **Online newspaper 6.11.20**

*The tests are not accurate & not fit for purpose, giving up to 85% false positives, they do not isolate Covid, so what's the point in getting tested, just doesn't make sense to me?*

### **Twitter 2.11.20**

*I won't be getting tested or using the so-called NHS app whilst Serco are involved.*

## **Twitter 2.11.20**

*Forced tests today, forced vaccines tomorrow.*

Those who displayed low trust in the mass testing process, and in government response generally, highlighted potential adverse consequences of mass testing for Liverpool. These potential consequences focused on two main concerns; coercion by the state during mass testing and further restrictions following mass testing due to the rise in the number of known cases. The latter concern was related to the aforementioned lack of trust in the accuracy of the test, with commentators predicting an anticipated high number of false positive cases (sometimes referred to as a "casedemic") that would lead to further restrictions in Liverpool only, including a prolonged lockdown.\

### **Twitter 3.11.20**

*More tests = More False Positives*

*More false positives = More False 'cases'*

*More cases = More lockdown restrictions*

*More lockdowns = More power to the government*

*More government power = Less rights & less liberty for the UK people*

## *STOP GETTING TESTED*

### *Shared social identity with others in Liverpool, but not with authorities*

Analysis highlighted how social identity can have a dual role in understanding responses to testing. For those who identified with authorities managing the response, as well as with others in the city, this operated as a facilitator to getting tested (as described above). However, for those who did not trust the government response, and for whom there was no shared identity with authorities, shared identity with others in the city contributed to motivations not to get tested. In this instance, people felt that mass testing was something being imposed on them, rather than something they could engage with as a community.

### **Online newspaper 7.11.20**

*Surprise Surprise, we are just one big test case.*

This led to a sense of marginalisation; local communities felt disconnected from those making the decisions, particularly central government. Feeling disenfranchised from local and central government resulted in discussions around ulterior motives, highlighting a breakdown in trust between the local community in Liverpool and those in power.

### **Facebook 6.11.20**

*Do you really think they want Liverpool out of tier 3?? If they wanted anyone out of tier 3 Liverpool would be bottom of the pile.*

In addition, the role of social identity in local narratives around testing resulted in some members of the community not wanting to conform with what others were doing. For this group, people who were participating in testing were viewed negatively; they had lost their identity and become “other” and therefore outsiders in the local community, which resulted in criticism for “conforming”.

### **Online newspaper 6.11.20**

*'Obedient biodrones' couldn't agree more. Same as the police.*

Social identity also played a part in concern over “outsiders” coming to the city to deliver the testing programme and highlighted a lack of trust in central government.

### **Online newspaper 5.11.20**

*The Army are here for two reasons. 1. So the government won't have to pay health workers, and 2. To intimidate people, esp [sic] if they go door to door like they did in Birmingham recently. A lot of people would be less likely to refuse a soldier in uniform.*

## **Discussion**

Findings from this study have implications for the management of mass testing in future, both in terms of practical management of setting up and running testing sites, and communication with members of communities in which mass testing will be provided.

Findings showed that one of the key motivators to engaging with the pilot in Liverpool was a strong sense of community identity and belonging; both with city residents and local authorities. However, when a strong sense of identity was not shared with authorities (for example, where local and central government were not seen as trusted organisations), community identity acted as barrier to engagement with testing. Furthermore, it actively motivated

people to disengage from the pilot. To ensure that shared community identity acts as a facilitator rather than a barrier, it is important that members of the community identify with the authorities managing the testing, as well as identifying with each other. This is in line with previous research which emphasises that shared identity is a crucial part of promoting community resilience in response to mass disasters and emergencies [11] and can provide a basis for understanding the relationship between communities and authorities [12]. Harnessing and working with existing shared identities, such as the identity shared by Liverpool city residents, can help build and maintain trust in authorities and the information they provide [12]. Authorities should communicate openly and honestly, and demonstrate respect for public needs, in order to enhance legitimacy of the response and facilitate the development of shared identity between communities and authorities, subsequently promoting increased adherence to recommended behaviours, for example mass testing [13, 14].

Identity also plays a role in the sense of responsibility duty that was frequently cited by Liverpool residents for reasons why they were engaging in testing. This response is not unique to Liverpool residents; in a recent survey of university students taking part in asymptomatic testing, the majority of students stated they took part in testing because they wanted to protect others (91%) and because it was the right thing to do (82%). A smaller proportion (63%) also stated they took part to help fight the virus [15]. Return to normality was also identified as a key motivator to engage in testing. This has also been identified elsewhere, for example in the pilot in Slovakia a relaxation of restrictions was offered as an incentive to participate and increased willingness to take part in the pilot.

However, it is not enough that people are willing to take part in mass testing; they must also be able to do so. Our analysis of local narratives in Liverpool identified several structural barriers, which made it more challenging to access testing, even for those willing to engage in the pilot. These were primarily access to testing sites and queues, for example not wanting to spend time traveling to a test site or waiting in a queue. In a survey carried out in September 2020 (prior to the start of the pilot), for those who would probably or definitely not take part, just over half (52%) cited inability to access the test site as the primary reason [2]. Clear guidance about how to access testing and test sites would help negate concerns over access, for example dedicated websites or booking systems for asymptomatic testing where applicable, maps of where testing sites are located, including directions for how to access them (for example bus routes, nearest available public car park) and clear signage at the site.

In addition to being identified as an access barrier, queues were also cited as a barrier due to concern over risk of transmission. This was particularly early on in the pilot, where there was confusion between how to access asymptomatic testing opposed to the symptomatic testing that the community had become accustomed to. Requesting people to queue in proximity to others is contra to the basic public health guidance on protective behaviours that has become the pervasive narrative throughout the pandemic response; social distancing. To address concerns about being unable to social distance while waiting for testing, communicating what measures have been put in place to ensure safe queuing is an essential part of the communications for asymptomatic testing.

Financial concerns around the requirement to self-isolate if a test was positive were also highlighted as a barrier to testing. Several people stated that they would be reluctant to take a test because they would not receive any financial support and would therefore struggle to self-isolate if they received a positive result. It is essential that everyone required to self-isolate has the financial support to do so without encountering financial hardship, in order to improve adherence both to self-isolation [16, 17] and to related behaviours (e.g. testing), and to mitigate adverse effects on mental health [18]. It is essential that people are aware of support available to them if they are self-isolating (e.g. financial support scheme for people required to self-isolate), as this will remove some of the financial barriers associated with undergoing mass testing.

It is currently unclear the extent to which mass asymptomatic testing had an impact on cases or hospitalisation in Liverpool. Up to 9 December 2020 a quarter of the city's residents engaged in the pilot and took a lateral flow test. During this time, nearly 900 people were identified as positive [6]. Interestingly, the uptake of testing in Liverpool was considerably lower than a similar pilot in Slovakia, where nearly all eligible people engaged in testing [5]. This highlights the importance of evaluating acceptance of asymptomatic testing, specifically identifying barriers and motivators to undergoing mass testing. The work presented here could therefore provide valuable insights into barriers and facilitators to mass testing which could be used to inform the way in which these processes are managed in future and could potentially increase uptake with mass testing programmes.

## **Recommendations**

Based on the findings presented here, we suggest that in order to promote good uptake of mass testing, authorities should: communicate openly and honestly with communities, particularly about the nature and purpose of mass testing; provide clear instructions around practical aspects of testing (e.g. details of site locations, how to access testing); listen to and address public concerns; engage with communities in order to understand their experiences and ensure that communities know that their views are being taken into account (e.g. where community engagement is taking place and being used to inform the response, this should be communicated).

## **Limitations**

While analysis of social media data and other online media can facilitate access to the perspectives of those who do not choose to participate in other types of research, there is the potential that the demographic composition of digital media users may differ from that of the wider population [19]. The first limitation of this study is therefore that we only collected the perspectives of people who opted to publish their thoughts online, consequently the sample may not be representative of the wider population.

The pragmatic thematic analysis of a targeted sample of social and online media sites presented in this paper was carried out to provide rapid insights into public perceptions of mass testing. A second limitation of the study is therefore that the rapid nature of the research meant that there was no time to carry out checks of interrater reliability. We recommend that future studies employ web scraping tools to capture a greater quantity of data, and that checks of interrater reliability are carried out wherever possible. Whilst every effort was taken to increase the likelihood that comments collected in the dataset were all expressed by Liverpool residents, there is no guarantee that the dataset was entirely limited to Liverpool residents.

## **Conclusion**

This study has highlighted several key barriers and facilitators to engaging in asymptomatic testing in residents in Liverpool city, including concerns over access, risk of transmission and financial hardship. These structural barriers are amenable to mitigation and should be considered when rolling out similar testing programmes elsewhere. We also identified psychosocial barriers, including lack of trust in authorities, which was associated with a sense of marginalisation and disengagement with the testing programme. This emphasises the importance of recognising and engaging with local community identity when implementing asymptomatic testing programmes. We suggest that future implementation of mass testing programmes should include honest and open communication to encourage and harness existing community identities, thereby enhancing the legitimacy of asymptomatic testing as a policy. In addition, adequate and accessible financial support needs to be in place prior to the implementation of community asymptomatic testing to mitigate any concerns surrounding financial hardship. Rapid thematic analysis of digital

media is a pragmatic method to gather insights from communities around acceptability of public health interventions, such as mass testing or vaccination uptake.

## Declarations

### *Ethics approval*

In line with British Psychological Society (BPS) guidelines [20] for conducting internet-mediated research this research did not require ethical approval because: only publicly available data (comments posted in response to public Facebook or twitter posts, or as comments in relation to stories posted in online media) were used. The Public Health England (PHE) Research Ethics and Governance Group (REGG) were consulted and confirmed that ethical approval was not required for this research.

### *Consent to participate*

Not applicable – no identifiable participant data are included in the study.

### *Availability of data and materials*

Available on request from corresponding author.

### *Competing interests*

None declared.

### *Funding*

This study received no funding.

### *Authors' contributions*

All authors conceived the study and contributed to the study design. CR and CS analysed and interpreted the data and drafted the manuscript. All authors reviewed the manuscript and approved the content.

### *Acknowledgements*

The authors would like to acknowledge all those involved in the evaluation of the asymptomatic testing pilot in Liverpool including colleagues at University of Liverpool, Department of Health and Social Care, NHS Test and Trace, Joint Biosecurity Centre, Cabinet Office and Office of National Statistics. We would also like to extend our gratitude to Liverpool City Council and residents in the Liverpool City Region.

Charlotte Robin and Holly Carter are affiliated to the National Institute for Health Research Health Protection Research Unit (NIHR HPRU) in Behavioural Science and Evaluation at University of Bristol, in partnership with Public Health England (PHE). Charlotte Robin is also affiliated to the NIHR HPRU Emerging and Zoonotic Infections at University of Liverpool in partnership with PHE, in collaboration with Liverpool School of Tropical Medicine and The University of Oxford, and the NIHR HPRU in Gastrointestinal Infections at University of Liverpool in partnership with PHE, in collaboration with University of Warwick. Charlotte Robin and Holly Carter are based at PHE. The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR, the Department of Health or Public Health England.

## References

1. Iacobucci, G. and Coombes, R. (2020) 'Covid-19: Government plans to spend £100bn on expanding testing to 10 million a day', *BMJ (Clinical research ed.)*, 370, p. m3520. doi: 10.1136/bmj.m3520.
2. Behavioural Insights Team. (2020). Testing support for mass testing.
3. Department of Health and Social Care. (2020). Primary Research Summary Findings; OC&C Learnings.
4. Whole City Testing: Ideas to Boost Compliance. Behavioural Insights Team (2020)
5. Behavioural Insights Team. (2020) How Slovakia tested 3.6 million people for COVID-19 in a single weekend; Three lessons for the UK. Available online: <https://www.bi.team/blogs/how-slovakia-tested-3-6-million-people-for-covid-19-in-a-single-weekend/> [Accessed 18 January 2021].
6. University of Liverpool (2020) Liverpool Covid-19 Community Testing Pilot: Interim Evaluation Report. Available online: <https://www.liverpool.ac.uk/media/livacuk/coronavirus/Liverpool,Community,Testing,Pilot,Interim,Evaluation.pdf> [Accessed 18 January 2021].
7. Liverpool City Council (2019) Joint Strategic Needs Assessment: Our City. Available online: <https://liverpool.gov.uk/council/strategies-plans-and-policies/adult-services-and-health/joint-strategic-needs-assessment/our-city/> [Accessed 18 January 2021].
8. Liverpool City Council (2019) The Index of Multiple Deprivation 2019: a Liverpool analysis. Available online: <https://liverpool.gov.uk/media/1359213/imd-2019-liverpool-analysis-main-report.pdf> [Accessed 18 January 2021].
9. Liverpool City Council (2020) Liverpool COVID-19 Report: covering data from 05-11 October 2020. Available online: [https://liverpool.gov.uk/media/1359761/14102020\\_external.pdf](https://liverpool.gov.uk/media/1359761/14102020_external.pdf) [Accessed 24 March 2021].
10. Pope, C., Ziebland, S. and Mays, N. (2000) 'Analysing qualitative data', *British Medical Journal*, 320(January), pp. 114–116. doi: 10.1201/b19093.
11. Drury, J. et al. (2019) 'Facilitating collective psychosocial resilience in the public in emergencies: Twelve recommendations based on the social identity approach', *Frontiers in Public Health*, 7(JUN). doi: 10.3389/fpubh.2019.00141.
12. Carter, H., Drury, J. and Amlôt, R. (2018) 'Social Identity and Intergroup Relationships in the Management of Crowds during Mass Emergencies and Disasters: Recommendations for Emergency Planners and Responders', *Policing: A Journal of Policy and Practice*, pp. 1–14. doi: 10.1093/police/pay013.
13. Carter, H. et al. (2015) 'Applying Crowd Psychology to Develop Recommendations for the Management of Mass Decontamination', *Health Security*, 13(1), pp. 45–53. doi: 10.1089/hs.2014.0061.
14. Carter, H. et al. (2020) Keeping our distance, *The Psychologist*. Available at: <https://thepsychologist.bps.org.uk/keeping-our-distance> (Accessed: 4 December 2020).
15. COVID-19 Behavioural Science and Insights Unit. (Dec 2020). Durham Antigen LFD – Service Evaluation.
16. Smith, L. E. et al. (2020) 'Adherence to the test, trace and isolate system: results from a time series of 21 nationally representative surveys in the UK (the COVID-19 Rapid Survey of Adherence to Interventions and Responses [CORSAIR] study)', *medRxiv*. Cold Spring Harbor Laboratory Press, p. 2020.09.15.20191957. doi: 10.1101/2020.09.15.20191957.
17. West, R. et al. (2020) 'Applying principles of behaviour change to reduce SARS-CoV-2 transmission', *Nature Human Behaviour*. Springer US, 4(5), pp. 451–459. doi: 10.1038/s41562-020-0887-9.

18. Smith, L. E. et al. (2020) 'Factors associated with self-reported anxiety, depression, and general health during the UK lockdown; a cross-sectional survey', medRxiv, p. 2020.06.23.20137901. Available at: <https://www.medrxiv.org/content/10.1101/2020.06.23.20137901v1>.
19. Olteanu, A. et al. (2019) 'Social Data: Biases, Methodological Pitfalls, and Ethical Boundaries', *Frontiers in Big Data*. Frontiers Media SA, 2(13), p. 13. doi: 10.3389/fdata.2019.00013.
20. British Psychological Society. Ethics guidelines for internet-mediated research (2017) Available online: [www.bps.org.uk/publications/policy-and-guidelines/research-guidelines-policy-documents/research-guidelines-poli](http://www.bps.org.uk/publications/policy-and-guidelines/research-guidelines-policy-documents/research-guidelines-poli) [Accessed 18 January 2021].