

Audit of NZ COVID Tracer QR poster display and use in Dunedin

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ABSTRACT

AIMS: To assess how well the NZ COVID Tracer QR (Quick Response) code poster is displayed by Dunedin businesses and other venues in which groups of people gather indoors, and to calculate the proportions of visitors to those venues who scan the QR code poster.

METHODS: We randomly selected 10 cafes, 10 restaurants, 10 bars, five churches, and five supermarkets and visited them at their busiest times. We evaluated the display of QR code posters using a six-item assessment tool that was based on guidance provided to businesses and services by the Ministry of Health, and we counted the number of people who entered each venue during a one-hour period and the number who scanned the QR code poster.

RESULTS: All six criteria for displaying QR code posters were met at half of the hospitality venues, four of five churches, and all supermarkets. Scanning proportions were low at all venues (median 10.2%), and at 12 (30%) no visitors scanned; eight of these venues were bars.

CONCLUSION: This audit provides a snapshot of the display and scanning of QR code posters in a city with no managed isolation and quarantine facilities and where no COVID-19 cases have been detected for 10 months.

Effective contact tracing and quarantine/isolation form one of the four pillars of New Zealand's COVID-19 elimination strategy.¹ The speed with which contacts of newly diagnosed cases of COVID-19 are identified, tested, and quarantined/isolated is a critical determinant of how effective contact tracing is in preventing onward transmission of the virus. Following the recommendations of a rapid audit in April 2020 of COVID-19 contact tracing,² the Ministry of Health adopted a series of COVID-19 disease indicators, including a target that at least 80% of contacts should be quarantined/isolated within 96 hours of exposure to a case.³

To identify contacts, contact tracers need to establish where a case has been in the preceding weeks and who they have seen. Taking such a history takes time and a case's recall of their movements during the relevant time period may be incomplete,

especially if they are feeling very unwell. In response to these challenges, the Ministry of Health launched the NZ COVID Tracer smartphone app and NZ COVID Tracer QR (Quick Response) code posters in May 2020 to help everyone residing in New Zealand to keep a digital diary of places they visit.⁴ By using the app to scan the QR code posters, individuals can keep a private record of their movements that can subsequently be shared with contact tracers should they later be diagnosed with COVID-19 or identified as a contact of a case.⁵ Moreover, an alert can be sent to app users with advice about what they need to do if it transpires they visited a particular venue at the same time as a case,⁶ further accelerating the process of quarantining/isolating contacts. All businesses and services, unless exempt, are required to display NZ COVID Tracer QR code posters at all of their venues.⁷ In addition, while some other groups and events are

not legally obliged to display posters, they are encouraged to do so (eg, voluntary or not-for-profit sporting, recreational, social, or cultural activities; faith-based gatherings; community club activities; private events and gatherings).

However, this digital initiative to facilitate the timely identification, testing, and quarantine/isolation of contacts can only achieve its intended aim if venues display QR code posters appropriately and if visitors to those venues scan the posters. The Ministry of Health has provided guidance about the display of QR code posters,⁸ but there are anecdotal reports that posters are not always displayed in ways that encourage or permit visitors to scan. Moreover, high-level summary data compiled by the Ministry of Health reveal that use of the NZ COVID Tracer app varies: the total number of daily scans of QR code posters tends to increase whenever cases of COVID-19 have been detected in the community and subsequently decrease once there appear to be no further cases.⁹ Provisional monthly results from the New Zealand Health Survey also show that scanning and other record-keeping varies over time; for example, 45.6% of 782 respondents in September 2020 reported that they had recorded, in a diary or app, the places they had been and who they were with 'every time' over the past seven days, as compared with 27.5% of 711 respondents in January 2021.¹⁰ Both these data sources provide a useful overview of the degree of QR code poster scanning that is occurring nationally, but they do not provide information about the proportions of visitors to particular types of venues who scan. While there have been some informal accounts in the media of scanning proportions in settings such as shopping centres,¹¹ no formal investigations of individual scanning behaviour at specific venues have been published. We therefore initiated an audit to explore both the display and scanning of QR code posters at different types of venues in our city. The specific aims of the audit were two-fold: (i) to assess how well the NZ COVID Tracer QR code poster is displayed by selected Dunedin businesses and other venues in which groups of people gather indoors, and (ii) to calculate the proportions of visitors to those venues who scan the NZ COVID Tracer QR code poster.

Methods

Type and selection of venues

We chose to investigate QR code poster display and scanning at the types of indoor venues where people were likely to spend a sustained period of time and where visitors and workers were likely to be talking, shouting, or singing in close proximity to others, as such venues have a higher potential for virus transmission. The types of venues of interest were therefore cafes, restaurants, bars, and churches. We also included supermarkets because they provide an essential service at all COVID-19 Alert Levels and there is a lot of public interest in their safety.

For the three types of hospitality venues, we created separate sampling frames that included the venues listed under the 'Cafes', 'Restaurants', and 'Breweries and bars' sections on the Ōtepoti/Dunedin New Zealand official website.¹² We used Google maps to identify churches and supermarkets. Hospitality venues, churches, and supermarkets that were not situated within the North, Central, and South Dunedin areas were excluded from their respective sampling frames. After numbering the venues in each category, we used a random number generator to randomly select 10 cafes, 10 restaurants, 10 bars, five churches, and five supermarkets. Due to practical constraints (eg, the short time frame available for data collection for this project and the fact that church services are mostly held on Sundays and service times at one church frequently clash with service times at other churches), only five churches were selected, and only five supermarkets were chosen as there were fewer than 10 in the sampling areas.

Assessment tool for evaluating display of QR code posters

Using the 'Tips for how to display your NZ COVID Tracer poster' developed by the Ministry of Health for businesses and services,⁸ we developed a six-item assessment tool to evaluate how well QR code posters were being displayed. The six criteria were: (i) poster printed on A4 paper and not cropped, (ii) poster placed in a prominent position near the main entrance, (iii) poster not on sliding or revolving doors, (iv) poster placed about 130cm above the

ground (to the top of the poster), (v) unobstructed access to poster, and (vi) poster not in an area of high glare. For the first criterion, we did not require the poster to be printed in colour, as this was simply an 'if possible' recommendation.

Data collection

All data were collected between 20 January and 14 February 2021, except the data for one church, which were collected on 21 February. We visited each selected venue once to assess how the QR code posters were being displayed and to count the number of people who entered the venue over the course of an hour and whether they scanned the QR code poster. Each person (except children) who entered the venue via the main entrance was counted; this included individual members of couples and groups. An effort was made to appear inconspicuous—for example, we used a counting app that could be used discreetly and at some venues we purchased food or drink or sat in a car outside the venue (eg, churches) in a position that provided a clear view of the entrance. For safety reasons, data collectors at bars were always accompanied by another person.

We visited hospitality venues and supermarkets within an hour of their busiest times according to the contemporaneous 'Popular Times' graphs on Google; for the few venues for which there were no Popular Times recorded, we visited at what were peak times for other venues in the same category. The observation period for churches began 30 minutes before the service began.

All data collectors entered their observation data into a common spreadsheet.

Analysis

We conducted simple descriptive analyses and in this paper report numbers and proportions (percentages). Scanning numbers and proportions are reported for individual venues, and ranges and medians are reported for each venue type and for all venues combined.

Ethical approval

At the planning stage, the audit was discussed with the Manager of the University of Otago Human Ethics Committee (Health), who advised that formal ethical approval was not required.

However, as recommended, we carried University of Otago identification cards so we could identify ourselves if questioned by members of the public or by workers at the venues visited.

Results

The results of the audit of the QR code poster display are shown in Table 1. Five out of 10 of the cafes, restaurants, and bars met all six display criteria. Supermarkets and churches performed better, with all five supermarkets and four of five churches meeting the six criteria. Overall, at seven (17.5%) of the 40 venues the poster was not printed on A4 paper and/or was cropped, at four (10%) the poster was not placed in a prominent position near the main entrance, at one (2.5%) the poster was attached to sliding or revolving doors, at two (5%) it was not displayed at the recommended height, at four (10%) access to the poster was obstructed, and at two (5%) it was in a position of high glare at the time of the visit and the data collectors' attempts to scan were unsuccessful.

The total number of visitors to each venue during the one-hour observation period and the proportions who scanned the QR code poster are shown in Table 2, along with the date and time of the visit. At 12 (30%) of the venues, none of the visitors scanned; eight of these venues were bars. Overall, the proportions scanning at cafes ranged from 0 to 47.4% (median 21.5%). The corresponding figures for the other venues were 0 to 50% (median 10.2%) at restaurants, 0 to 16.7% (median 0%) at bars, 0 to 24.0% (median 4.4%) at churches, and 10.8 to 31.1% (median 14.1%) at supermarkets. Across all 40 venues, the range was 0 to 50% (median 10.2%).

Discussion

In this systematic audit of the display and scanning of QR code posters in Dunedin, we found that only half of the randomly selected hospitality venues were displaying the posters in full accordance with the guidance provided by the Ministry of Health. In contrast, all supermarkets were displaying posters as recommended, as were four of five churches. We observed low levels of QR code poster scanning at all

Table 1: Display of NZ COVID Tracer QR code posters at randomly selected cafes, bars, restaurants, churches, and supermarkets.

Venue	Display criteria*						Total score
	A4 and not cropped	Prominent and near main entrance	Not on sliding or revolving doors	130cm off ground	Unobstructed access	Not in area of high glare	
Cafes							
1	0	1	1	1	1	1	5
2	0	1	1	0	1	1	4
3	1	0	1	1	1	1	5
4	1	1	1	1	1	1	6
5	1	1	1	1	1	1	6
6	1	1	1	1	1	1	6
7	1	0	1	1	1	1	5
8	1	1	1	1	0	1	5
9	1	1	1	1	1	1	6
10	1	1	1	1	1	1	6
Restaurants							
1	1	1	1	1	1	1	6
2	1	1	1	1	1	1	6
3	1	1	1	1	1	1	6
4	1	1	1	1	0	1	5
5	0	1	1	1	1	1	5
6	1	1	1	1	0	1	5
7	0	1	1	1	1	1	5
8	1	0	1	1	1	1	5
9	1	1	1	1	1	1	6
10	1	1	1	1	1	1	6
Bars							
1	0	1	1	1	1	1	5
2	1	1	1	1	1	1	6
3	1	1	1	1	1	1	6
4	1	1	1	1	0	0	4
5	0	1	1	1	1	1	5
6	1	0	1	0	1	1	4
7	0	1	1	1	1	1	5
8	1	1	1	1	1	1	6
9	1	1	1	1	1	1	6
10	1	1	1	1	1	1	6

Table 1: Display of NZ COVID Tracer QR code posters at randomly selected cafes, bars, restaurants, churches, and supermarkets (continued).

Venue	Display criteria*						Total score
	A4 and not cropped	Prominent and near main entrance	Not on sliding or revolving doors	130cm off ground	Unobstructed access	Not in area of high glare	
Churches							
1	1	1	1	1	1	1	6
2	1	1	1	1	1	1	6
3	1	1	0	1	1	0	4
4	1	1	1	1	1	1	6
5	1	1	1	1	1	1	6
Supermarkets							
1	1	1	1	1	1	1	6
2	1	1	1	1	1	1	6
3	1	1	1	1	1	1	6
4	1	1	1	1	1	1	6
5	1	1	1	1	1	1	6

* 1 point assigned for every criterion met.

Table 2: Numbers and proportions of visitors to randomly selected cafes, bars, restaurants, churches, and supermarkets who scanned NZ COVID Tracer QR code posters.

Venue	Observation date (2021)	Start time*	Total number of visitors	Number (%) who scanned
Cafes				
1	20 January	1230	45	11 (24.4)
2	25 January	1001	27	5 (18.5)
3	25 January	1100	11	3 (27.3)
4	25 January	1220	24	7 (29.2)
5	26 January	1125	32	5 (15.6)
6	26 January	1235	19	9 (47.4)
7	27 January	1100	11	0
8	28 January	1246	44	1 (2.3)
9	29 January	1233	21	3 (14.3)
10	30 January	1145	27	10 (37.0)

Table 2: Numbers and proportions of visitors to randomly selected cafes, bars, restaurants, churches, and supermarkets who scanned NZ COVID Tracer QR code posters (continued).

Venue	Observation date (2021)	Start time*	Total number of visitors	Number (%) who scanned
Restaurants				
1	22 January	1858	32	5 (15.6)
2	25 January	1309	38	5 (13.2)
3	25 January	1830	74	9 (12.2)
4	28 January	1135	34	3 (8.8)
5	29 January	1840	10	0
6	29 January	2055	2	1 (50.0)
7	29 January	2215	20	2 (10.0)
8	31 January	1850	4	0
9	12 February	1830	29	3 (10.3)
10	13 February	1835	16	1 (6.3)
Bars				
1	22 January	1755	22	0
2	22 January	1910	14	0
3	22 January	1912	26	0
4	22 January	2035	20	0
5	26 January	1740	22	0
6	28 January	1800	6	1 (16.7)
7	29 January	1910	30	3 (10.0)
8	1 February	1650	12	0
9	1 February	1800	8	0
10	9 February	1835	26	0
Churches				
1	24 January	0907	170	16 (9.4)
2	31 January	0930	50	12 (24.0)
3	31 January	0930	41	1 (2.4)
4	14 February	1030	136	6 (4.4)
5	21 February	0935	37	0
Supermarkets				
1	20 January	1400	337	70 (20.8)
2	27 January	1500	537	58 (10.8)
3	27 January	1625	546	77 (14.1)
4	27 January	1830	236	33 (14.0)
5	2 February	1023	90	28 (31.1)

* Time (24 hour) that 1 hour observation period began.

of the selected venues, despite the Ministry of Health's 'Make summer unstoppable' campaign¹³ and frequent pleas from the Director-General of Health and the COVID-19 Response Minister for everyone to play their part and scan.

Our findings in relation to the display of QR code posters show that, although some venues are doing well, there is room for improvement at others. Fortunately, these are simple fixes that should not involve much effort on the part of venues and would remove one of the barriers to scanning. Although primarily the responsibility of the venues, visitors to those places can also play a role by providing feedback about any difficulties they experience in relation to scanning.

The low proportions of people who scanned QR code posters on entering the observed venues are concerning. First, if a non-scanning visitor to a venue was subsequently diagnosed with COVID-19, they might fail, or take some time, to recall that they had visited the venue or when they had visited, thereby hindering effective contact tracing and increasing the risk of onward community transmission. Second, even if a venue was rapidly identified as a 'location of interest', non-scanners who had visited at the same time as a case would learn of this later than those who had scanned, because the non-scanners would not receive a digital alert. Third, the particular attributes of the types of venues we observed mean that the potential for virus transmission is high if a yet-to-be identified case visited those places. For example, bars are often crowded and the behaviour of visitors may be adversely affected by alcohol—yet none of the visitors to eight of the 10 bars scanned during the observation periods. These are also the types of venue that are likely to be visited by members of the very large student population that returned to Dunedin following the data collection period, as well as people visiting the city to attend sporting and other large events. Churches have been associated with large clusters,¹⁴ and they are often attended by people who are at higher risk of severe outcomes if infected with SARS-CoV-2 (eg, older people).¹⁵

This audit has several strengths and limitations. We randomly selected public venues with a higher potential for virus

transmission, visited them at busy times, took a standardised approach to data collection, and made an effort to be inconspicuous so we did not influence people's intended behaviour. We were interested in the display and scanning of QR code posters, so we did not collect information about the number of people who signed in on paper registers or kept their own paper diaries—hence the proportions of people who could produce a record of where they had been for contact tracing purposes may be somewhat higher than is reflected in the scanning proportions. Those proportions might also be slightly higher for a second reason—we counted individuals, yet for some older couples it appeared that one person scanned on behalf of themselves and their partner. In the interests of remaining inconspicuous, the data collectors did not carry measuring tapes, so it is possible that only those situations in which QR code posters were placed in particularly high or low positions were identified.

The aims of our audit were simply to observe what was happening at randomly selected venues, so we did not approach visitors to collect demographic data or to enquire why they did or did not scan, or whether observed scanning behaviour had successfully resulted in the creation of a digital record. Hence we cannot comment on whether some groups of people were less likely to scan than others. Nor can we report on people's reasons for not scanning, although there are several potential explanations. First, some visitors may not have had access to the NZ COVID Tracer smartphone app. For example, according to 2018 Census data, 8.2% of households in Dunedin (for which data were available) did not have access to a mobile phone,¹⁶ and the proportions of households and individuals who did not have access to a smartphone are likely to be even higher. Moreover, not everyone who owns a smartphone will have access to the app, because it is not compatible with older devices. This raises a disturbing paradox: digital solutions to facilitate contact tracing may be less likely to reach groups who are most at risk of severe COVID-19 outcomes, such as older people, those on low incomes, and those with comorbidities, including Māori and Pasifika.^{15,17}

Complacency is another potential explanation for why such high proportions of visitors to the observed venues did not scan. The last confirmed and probable COVID-19 cases in the Southern District Health Board region were reported on 15 and 17 April 2020,¹⁸ and we have heard various people assert that there is no need to scan because there are no COVID-19 cases and no managed isolation and quarantine (MIQ) facilities in our region. It is notable that most venues were observed following the announcements on 24 and 27 January regarding the community cases of COVID-19 in Northland and Auckland among people who had recently left a MIQ facility.^{19,20} Ministry of Health data reveal that the total number of scans at a national level increased markedly following these announcements.⁹ However, in the absence of earlier local data, it is impossible to know whether the low proportions we observed in Dunedin during the same period were actually an 'improvement' on previous proportions, or conversely whether there was no change in scanning proportions because people perceived that the local risk associated with the North Island cases was very low. All but one of the venues (Church 5) were also observed before it was announced on the afternoon of 14 February that there were three community cases in Auckland and the subsequent move, in our region, to Alert Level 2 for a 72-hour period.^{21,22} Beliefs that Dunedin is somehow safe from COVID-19 are worrying as they ignore the mobile nature of the population in New Zealand; for example, University of Otago students from Auckland were permitted to travel to Dunedin while Auckland was still at Alert Level 3, and thousands of students from all over the country recently arrived in Dunedin in time for the large social events associated with Orientation Week.^{23,24}

Conclusions

Our audit has provided a snapshot of the display and scanning of NZ COVID Tracer QR code posters in a centre with no MIQ facilities and no cases of COVID-19 in the past 10 months. It provides additional information to complement the Ministry of Health's national summary data regarding the total number of daily scans of QR code posters and the self-reported data from participants in the New Zealand Health Survey.

Despite the recent arrival of the Pfizer COVID-19 vaccine in New Zealand and the initiation of the COVID-19 Immunisation Programme among border workers and their vaccinators, contact tracing will continue to be an important pillar of New Zealand's elimination strategy for some time to come. Consideration should be given to undertaking audits of the display of QR code posters and scanning proportions at venues in other centres throughout the country, including centres in which there are MIQ facilities and/or there have been recent community cases, as well as those which have had neither. Scanning proportions at the same venues could also be monitored over time. Finally, it may be useful to collect demographic data about those who do not scan and explore reasons for not scanning, in order to identify and address modifiable barriers.

Author contributions

LP and AS are joint first authors. LP conceived and supervised the work. AS was the project manager. All authors contributed to the study design and to the interpretation of the findings. MH randomly selected the venues. YH, ES, FB, KS, MH, RS collected the data. KS analysed the data. LP wrote the first draft of the manuscript. All other authors reviewed the first draft and approved the final version.

Competing interests:

Nil.

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