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Improvements in Severe Acute Respiratory Syndrome Coronavirus 2 Testing Cascade in the United States: Data From Serial Cross-sectional Assessments

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Background. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) testing is critical for monitoring case counts, early detection and containment of infection, clinical management, and surveillance of variants. However, community-based data on the access, uptake, and barriers to testing have been lacking.

Methods. We conducted serial cross-sectional online surveys covering demographics, coronavirus disease 2019 symptoms, and experiences around SARS-CoV-2 diagnostic testing to characterize the SARS-CoV-2 testing cascade and associated barriers across 10 US states (California, Florida, Illinois, Maryland, Massachusetts, Nebraska, North Dakota, South Dakota, Texas, and Wisconsin), from July 2020 to February 2021.

Results. In February 2021, across 10 US states, 895 respondents (11%) reported wanting a diagnostic test in the prior 2 weeks, 63% of whom were tested, with limited variability across states. Almost all (97%) who were tested received their results; 56% received their results within 2 days. In Maryland, Florida, and Illinois, where serial data were available at 4 time points, 56% were tested the same day they wanted or needed a test in February 2021, compared with 28% in July 2020, and 45% received results the same day, compared with 17% in July 2020. Wanting a test was significantly more common among younger, nonwhite respondents and participants with a history of symptoms or exposure. Logistical challenges, including not knowing where to go, were the most frequently cited barriers.

Conclusions. There were significant improvements in access and turnaround times across US states, yet barriers to testing remained consistent across states, underscoring the importance of a continued focus on testing, even amidst mass vaccination campaigns.

Keywords. barriers; COVID-19; testing; trends; wait times.

Comprehensive severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) testing, coupled with early isolation of cases and contact tracing, remains critical to pandemic control [1]. Even with the ongoing wide-scale vaccination efforts in the United States and other countries, it remains critical, perhaps more so than in the past, that diagnostic testing is available and accessible, especially as nonpharmaceutical interventions, such as masking and physical distancing, are relaxed. Surveillance of SARS-CoV-2 in the United States and many countries globally is via passive monitoring of case counts. Diagnostic testing is also critical to early identification and containment of infection, particularly relevant with the emergence of more contagious and virulent variants, such as the delta variant, which that may still cause disease even in vaccinated persons, as is currently being observed in the United States and globally [2]. In addition, some of the most effective therapies against SARS-CoV-2, such as monoclonal antibodies and high-titer convalescent plasma, have been shown to be most efficacious early in the course of infection, highlighting the need for rapid turnaround times to enable early initiation of therapy [3].

Over the past year, testing access across the United States has been hampered by logistics, supply chain problems, and changing recommendations [4–6]. For example, on 24 August 2020, the Centers for Disease Control and Prevention recommended that asymptomatic persons not be tested even in the setting of potential exposure but reversed the recommendation on 18 September 2020 to reinforce testing for asymptomatic persons [6]. As the pandemic evolved, diagnostics also evolved with the introduction of point-of-care reverse-transcription polymerase chain reaction (RT-PCR) tests (eg, Abbott ID NOW and Cepheid GeneXpert) and rapid antigen tests, dramatically improving access and turnaround times. Most recently, many mass testing sites have either been shut down or replaced by mass vaccination sites. In this dynamic context, community-based data

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on testing uptake, turnaround times, and barriers remains critical to the public health response, particularly as educational institutions resume in-person instruction, businesses support increased capacity, and mask mandates are removed.

We describe the self-reported barriers and access to SARS-CoV-2 testing in February 2021 across 10 US states with varying SARS-CoV-2 epidemic trajectories (California, Florida, Illinois, Maryland, Massachusetts, North Dakota, South Dakota, Nebraska, Texas, and Wisconsin). Furthermore, in a subset of these states (Florida, Illinois, and Maryland) we used serial cross-sectional surveys to examine changes in the SARS-CoV-2 testing cascade between June 2020 and February 2021.

METHODS

Study Setting

We recruited participants from Florida, Illinois, and Maryland (approximately 1000 per state] for an online survey at 4 time points: waves 1 (15–31 July 2020), 2 (16 September to 15 October 2020), 3 (4–18 December 2020), and 4 (16–28 February 2021). Data from additional states—California, Massachusetts, North Dakota, South Dakota, Texas, and Wisconsin—were captured in survey waves 3 and 4. Data from a pilot wave in Maryland have been previously published [7] and are not included in these analyses because questions on testing were adapted based on responses received in the pilot wave, limiting the ability to compare responses with subsequent waves (Supplementary Figure 1).

States were selected to represent the diversity of the pandemic with respect to daily case counts and statewide orders on nonpharmaceutical interventions. At the time of these surveys, there were no systematic differences in testing availability across these states [8–10]; all had public and private options, including free testing that did not require a physician's order.

Study Sample

All participants were ≥18 years, provided consent, and resided in the study state. Participants were recruited using Dynata (https://www.dynata.com), one of the largest first-party global data platforms. Dynata maintains a database of potential participants who are randomized to specific surveys if they meet the demographic targets of the survey; in addition, participants could select a survey from a list of potential options (survey topic not provided). Participants received modest compensation for the completion of a survey from Dynata. Security checks and quality verifications include digital fingerprinting and spot-checking via third-party verification. To accrue demographically representative samples, we provided quotas for age, sex, race/ethnicity, and income based on the population composition of the states.

Survey Instrument

All participants completed a self-administered electronic survey that captured information on the following domains: demographics, symptoms of SARS-CoV-2 infection, history of prior SARS-CoV-2 infection, mobility, practice of nonpharmaceutical interventions, and experiences of SARS-CoV-2 testing (PCR, antigen, or antibody testing), ever and in the prior 2 weeks. Questions on testing covered reasons for wanting or needing a test, reasons for not being tested, the type of test received, wait times, quarantine behavior, test results, and hospitalization after positive results. In regard to wanting of needing a test, the survey asked, "In the past 2 weeks, have you wanted or needed a test for COVID-19 [coronavirus disease 2019]?" or "Have you ever wanted or needed a test for COVID-19?" For simplicity, going forward, we will classify participants responding "yes" to either of these questions as "wanting" a test. The same instrument was used across waves 1–4, and the survey was hosted using SurveyMonkey with in-built data skips, logic checks, and field restrictions to minimize errors.

Statistical Methods

For all analyses, we focused on SARS-CoV-2 diagnostic testing (RT-PCR) in the prior 2 weeks to minimize recall bias and reflect current testing access. Initial analyses focused on the most recent wave of data collection, in which 10 states were sampled from 16 to 28 February 2021. We used $\chi 2$ and Mann-Whitney tests to compare categorical and continuous variables, respectively, by testing behaviors. Logistic regression analysis was used to analyze associations with 2 outcomes: (1) self-report of wanting a SARS-CoV-2 test among all sampled and (2) receipt of a test among those who wanted a test. Variables were considered for inclusion in multivariable analyses if they were biologically of epidemiologically significant or associated in univariable analysis at $P < .10$; age, sex, and race/ethnicity were included regardless of statistical significance. Additional variables considered included household size, SARS-CoV-2 infection in a household member, education, annual household income, employment and essential worker status, self-reported exposure and/or symptoms, report of travel, urban-rural classification, and state. Residential zip code and the National Center for Health Statistics urban-rural classification scheme [11] were used for urban-rural classification. Additional analyses compared testing outcomes and testing barriers across the 4 waves of data collection. Two-proportion z tests were used to compare changes over waves.

Survey weights were applied to all analyses, using iterative proportional fitting to further reflect the composition of the study states with respect to age, sex, race/ethnicity, income, and education using the Census Bureau's American Community Survey [12]. Weighting variables were raked according to their marginal distributions, as well as by 2-way cross-classifications for each pair of demographic variables. Statistical analyses were carried out using Python (version 3.7.3) and R (version 3.5.1) software.

Ethical Clearances

This study was approved by the Johns Hopkins Bloomberg School of Public Health institutional review board.

RESULTS

Characteristics of February 2021 Study Sample Across 10 US States

Among 8029 persons sampled in the most recent survey wave 4 (February 2021) across 10 US states (Florida, Illinois, Maryland, California, Massachusetts, North Dakota, Nebraska, South Dakota, Texas, and Wisconsin), the median age was 45 (range, 41 [Texas] to 48 [Florida]) years, and 50% reported female sex across all states. Overall, 13% of respondents were non-Hispanic black, and 25% were Hispanic of any race. The proportion of black respondents was highest (30%) in Maryland, and California had the largest proportion of Hispanic respondents (40%). Of the respondents, 39% reported working outside the home. About 38% had either a high school education or less, and about a third (34%) had an annual household income below US $40 000. Detailed demographic characteristics by wave are provided in Supplementary Table 2.

SARS-CoV-2 Testing Cascade Across 10 US States in February 2021

In February 2021, 895 (11%) of 8029 participants across 10 states reported wanting a SARS-CoV-2 diagnostic test in the prior 2 weeks. The median age of participants wanting a test was 37 years (interquartile range, 20–48 years), and the majority (54%) were male; 40% self-identified as white, and 58% reported working outside the home (Table 1). The reasons cited for wanting a test (nonexclusive) were a positive or symptomatic household member (32%), symptoms (28%), close contact with a positive or symptomatic person (26%), desire to know one's status (25%), required for school or work (15%), and before (13%) or after (10%) travel.

In multivariable analyses, self-report of wanting a SARS-CoV-2 test in the prior 2 weeks was significantly more common among younger participants (adjusted odds ratio [AOR] per 5-year increase, 0.94 [95% confidence interval, .91–.97]), those with a positive household member (2.28 [1.70–3.07), those reporting exposure (5.62 [4.22–7.49]), symptoms (5.18 [3.83–7.01]), or both (34.8 [24.3–49.8]), those reporting recent travel (1.69 [1.33–2.15]), and self-identifying as black (1.71 [1.29–2.26]) or Asian/Pacific Islander (1.76 [1.23–2.50]). Compared with those working from home, wanting a test was significantly more common among those not working (AOR, 1.33 [95% confidence interval], 1.01–1.75) and among essential workers (AOR, 1.98 for healthcare and 1.70 for nonhealthcare workers) and was significantly less common among suburban (AOR, 0.82 [.67–.99]) and rural respondents (0.66 [.49–.89]) compared with urban respondents. There were no significant differences by sex or state (Supplementary Table 3).

Of 895 participants who wanted a test, 63% (559) were tested, with no significant differences by state (Figure 1). In

Table 1. Demographics, Barriers to Testing, and Wait Times Among Persons Who Reported Wanting a Diagnostic Test for Severe Acute Respiratory Syndrome Coronavirus 2 in the Prior 2 Weeks, by State, in the Most Recent Survey Wave (February 2021)[a]

	Respondents, %[b]									
Demographics, Barriers to Testing, and Wait Times	Overall (n = 8029)	CA (n = 1500)	FL (n = 1033)	IL (n = 1083	MA (n = 816)	MD (n = 749)	ND and SD (n = 249)	NE (n = 347)	TX (n = 1494)	WI (n = 758)
Wanted a test, no. (%)	895 (11)	181 (12)	118 (11)	118 (11)	98 (12)	79 (11)	12 (5)	31 (9)	178 (12)	80 (10)
Age, median (IQR), y	37 (20–48)	39 (28–50)	39 (29–48)	36 (23–50)	36 (24–50)	35 (25–50)	37 (32–47)	45 (23–46)	36 (26–45)	40 (30–60)
Household size, median (IQR), no.	3 (2–4)	3 (2–4)	3 (2–4)	3 (2–4)	2 (2–4)	3 (2–4)	4 (3–4)	3 (2–3)	3 (2–4)	3 (2–4)
Sex										
Female	46	43	55	40	52	45	40	79	39	37
Male	54	57	45	60	48	55	60	21	61	63
Race/ethnicity										
White	40	31	34	42	50	39	65	19	35	71
Black/African American	17	4	25	18	17	37	0	14	23	7
Hispanic/Latino	36	50	36	36	20	21	27	64	39	16
Asian/Pacific Islander	7	15	5	4	13	3	0	3	3	6
Other	0.5	0.5	0.5	0	0.5	0.5	8	1	0.5	1
Annual household income										
< $20 000	19	19	17	21	25	21	0	24	15	18
$20 000–$39 000	18	19	25	18	18	5	13	12	17	20
$40 000–$49 000	7	7	5	6	4	3	9	36	6	5

Table 1. Continued

	Respondents, %[b]									
Demographics, Barriers to Testing, and Wait Times	Overall (n = 8029)	CA (n = 1500)	FL (n = 1033)	IL (n = 1083	MA (n = 816)	MD (n = 749)	ND and SD (n = 249)	NE (n = 347)	TX (n = 1494)	WI (n = 758)
$50 000–$69 000	14	13	15	11	10	23	17	11	18	11
≥$70 000	43	42	38	50	44	48	62	17	44	45
Employment status,										
Employed, working outside the home	58	53	60	59	51	57	58	80	56	58
Employed, working from home	21	33	25	19	25	18	29	13	22	19
Unemployed	12	14	11	14	12	10	13	7	16	9
Retired	8	11	5	9	12	6	0	0	7	15
Reported travel for any purpose	37	36	48	35	29	33	48	15	37	43
Unable to be tested, no. (%)	336 (38)	69 (38)	43 (36)	48 (41)	28 (29)	30 (38)	4 (33)	10 (32)	81 (45)	23 (29)
Reasons for not being tested[c]										
Afraid to be tested	13	11	20	17	12	6	0	20	12	18
Did not know where to go	27	25	20	27	23	20	24	4	37	34
Testing center too far away	15	11	13	20	7	24	35	41	8	28
Could not obtain an order from a physician	16	12	21	13	13	31	41	0	17	2
Language barriers	6	7	9	1	3	9	0	4	6	3
Wait times or appointment availability	15	12	20	18	18	11	41	37	14	0
Did not have time to go for a test	20	12	10	25	25	26	0	13	23	30
Received a test, no. (%)	559 (63)	112 (62)	75 (66)	70 (59)	70 (71)	49 (62)	8 (67)	21 (68)	97 (55)	57 (71)
Time from wanting a test to being tested										
<1 d	56	53	58	58	52	49	75	67	57	51
1–2 d	24	29	25	24	31	18	45	24	15	27
3–5 d	10	7	5	13	13	12	13	3	19	7
6–7 d	6	8	8	2	2	12	12	0	5	10
>1 wk	4	4	4	4	2	9	0	6	5	5
Time from test to receipt of results										
<1 d	42	43	47	50	33	28	66	21	46	38
1–2 d	36	36	27	33	53	44	34	75	23	24
3–5 d	10	6	14	6	7	14	0	0	14	10
6–7 d	5	9	1	2	1	5	0	0	8	10
>1 wk	5	5	6	4	2	3	0	0	5	16
Had not received results by time of survey	3	2	5	6	4	6	0	4	5	2
Total time from wanting a test to receipt of results										
<1 d	30	33	35	34	22	25	53	6	34	30
1–2 d	26	19	16	30	39	20	22	72	18	15
3–5 d	18	20	25	9	21	16	25	9	17	17
6–7 d	7	8	6	14	3	10	0	4	6	8
>1 wk	16	18	13	7	11	23	0	5	20	28
Had not received results by time of survey	3	2	5	6	4	6	0	4	5	2

Abbreviations: CA, California; FL, Florida; IL, Illinois; IQR, interquartile range; MA, Massachusetts; MD, Maryland; ND, North Dakota; NE, Nebraska; SD, South Dakota; TX, Texas; WI, Wisconsin.

[a]Tests included polymerase chain reaction and antigen tests. All estimates incorporate survey weights.

[b]Data represent % of respondents unless otherwise specified.

[c]Respondents could select >1 reason for not being tested.

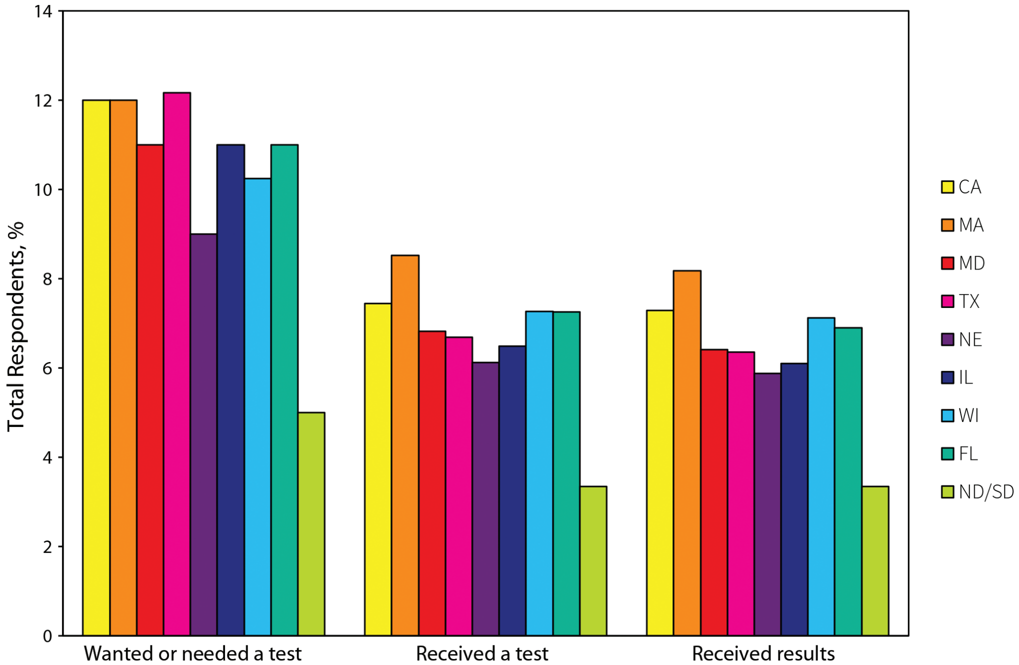

Figure 1. Severe acute respiratory syndrome coronavirus 2 testing cascade across 10 US states in December 2020 and February 2021. Abbreviations: CA, California; FL, Florida; IL, Illinois; MA, Massachusetts; MD, Maryland; ND/SD, North Dakota and South Dakota; NE, Nebraska; TX, Texas; WI, Wisconsin.

multivariable analyses, among those wanting a test, being tested was significantly more common among respondents with a household member testing positive (AOR, 1.94 [95% confidence interval, 1.25–3.01]), essential workers in healthcare (2.67 [1.56–4.56]), and those reporting recent travel (1.73 [1.15–2.62]). There were no significant differences by age, sex, race/ethnicity, urban-rural classification, symptoms/exposure, or state (Supplementary Table 4).

Wait Times and Barriers to Testing Across 10 US States in February 2021

Of the 559 participants who were tested in wave 4, 56% were tested the same day they wanted a test and 42% received their results the same day (Figure 2). Among the 336 who reported wanting a test but were not tested, the most frequently cited barrier was not knowing where to go (27%), followed by not having time (20%) and inability to obtain a physician's order (16%) (Table 1).

Temporal Trends Across Florida, Illinois, and Maryland, July 2020 to February 2021

We observed improvements in the proportion of respondents tested among those wanting a test across waves 1–4 (July 2020 to February 2021) in Florida, Illinois, and Maryland, increasing from 52% in July to 62% in February ($P < .01$) (Table 2). We also saw significantly improved wait times (Figure 3). The proportion of respondents tested the same day they wanted a test increased from 28% in July 2020 to 56% in February 2021, and the proportion who received results the same day they were tested increased from 17% to 45% (both $P < .01$). The total time from wanting a test to receiving results was ≤2 days for 56% of respondents in February 2021, compared with 23% in July 2020 ($P < .01$). Despite these improvements, 42% of respondents who wanted a test still waited ≥3 days from wanting a test to being tested and receiving results. While the proportion of respondents tested among those who wanted a test increased from July 2020 to February 2021, barriers remained relatively stable. The most commonly and consistently reported barrier was not knowing where to go (Table 2).

DISCUSSION

Of 8029 participants surveyed across 10 US states in February 2021, 11% reported wanting a SARS-CoV-2 test in the prior 2 weeks, 62% of whom were able to be tested with no significant differences by state. It was encouraging to see improvements from July 2020 to February 2021 in the 3 states (Florida, Illinois, and Maryland) where we had longitudinal data over the entire period. Specifically, we saw significant improvements in access to testing among those who wanted to be tested and striking decreases in turnaround time. Despite these improvements, barriers to testing access persisted over time and were relatively consistent across states.

Most striking in these data was the improved testing turnaround times and specifically the proportions receiving same-day testing and same-day results, which essentially doubled from July 2020 to February 2021. Across Maryland, Florida, and

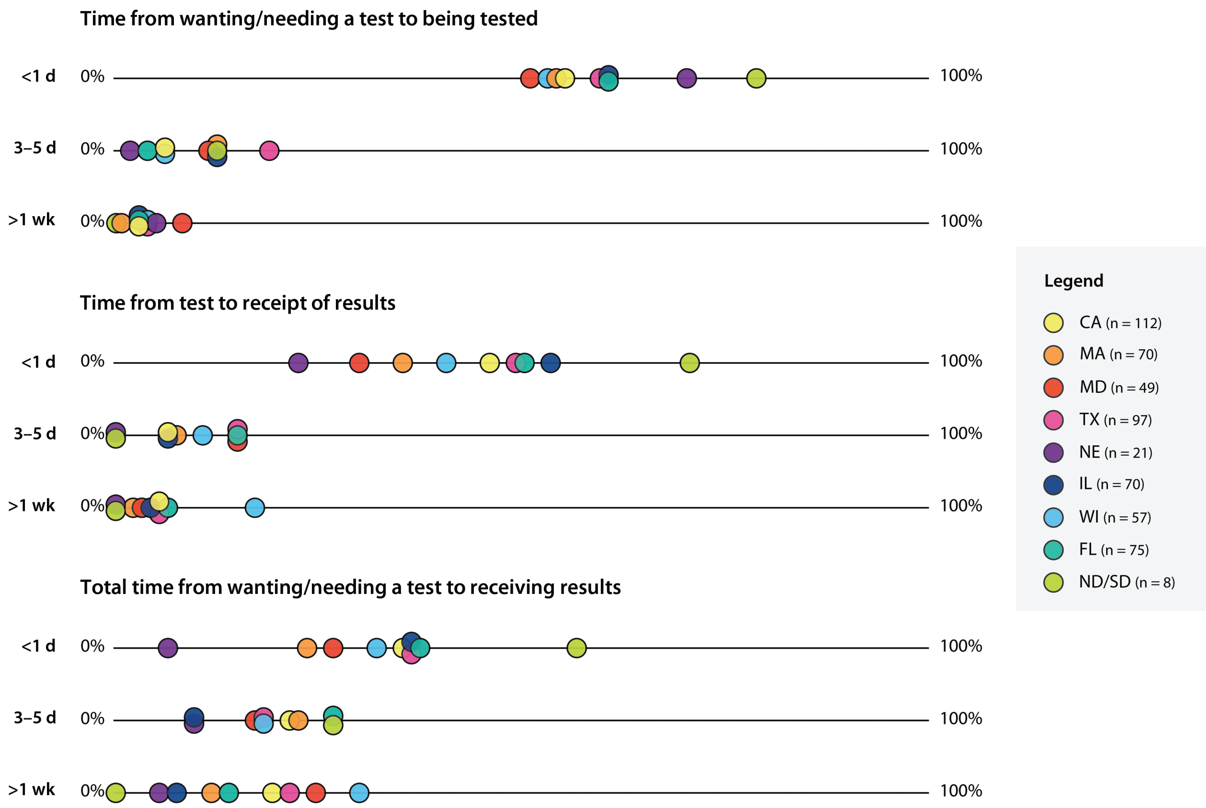

Figure 2. Wait times for severe acute respiratory syndrome coronavirus 2 testing in 10 US states in February 2021. Abbreviations: CA, California; FL, Florida; IL, Illinois; MA, Massachusetts; MD, Maryland; ND/SD, North Dakota and South Dakota; NE, Nebraska; TX, Texas; WI, Wisconsin.

Illinois, the proportion who received their results on the same day they wanted a test improved from 11% in July 2020 to 33% in February 2021. In contrast, those waiting >1 week declined from a high of 52% in September/October to 14% in February 2021. This likely reflects a combination of increased numbers of mass testing sites, as well as the introduction of point of care RT-PCR testing and rapid antigen testing.

Of equal importance, however, is that barriers to testing did not appreciably change over time from July 2020 to February 2021. For example, although a physician's order was not required for testing, 16% of respondents reported being turned away or were unable to be tested owing to lack of a physician's order. Logistical issues—including not knowing where to go and/or distance to a testing center and/or not having time to go for a test—were the most commonly cited barriers in February 2021. The conversion of mass testing sites into vaccination sites may further exacerbate access to testing, as has already been suggested by media reports [13, 14]. Furthermore, reports also suggest that some private practices have stopped testing for COVID-19, owing to low insurance reimbursements [15]. Therefore, it is likely given these changes, access to SARS-CoV-2 testing may have declined in the United States after the study period. Programs could leverage electronic platforms (eg, Google Display Network, Facebook, and Instagram) with the ability to deliver messaging targeted to an individuals' location thereby, informing the user of nearby testing sites and/or the importance of testing in zip codes with high case positivity.

As the vaccine rollout continues and case counts continue to decline, it is likely that the demands around testing may also decline. Yet, testing will remain critical for the foreseeable future. First, even with the dramatic success of the current vaccines, much remains unknown, including the durability of the vaccine-associated immune response and the efficacy against emerging variants [16]. This uncertainty—combined with the relaxing of nonpharmaceutical interventions, such as mask mandates—highlights the importance of ensuring continued access to testing services for pandemic control [17]. Second, the SARS-CoV-2 pandemic in most countries globally is monitored via passive surveillance using case counts and case positivity rates, both of which rely heavily on testing programs and data. Facilitating timely access to testing will ensure early detection of increasing case counts and/or variants of concern, allowing for early interventions to prevent nationwide and global surges. Third, novel therapeutic agents, such as monoclonal antibodies, require administration within days of infection for maximum efficacy, again reinforcing the need for timely and accessible testing [18, 19].

Table 2. Demographics, Barriers to Testing, and Wait Times Among Persons Who Reported Wanting or Needing a Diagnostic Test for Severe Acute Respiratory Syndrome Coronavirus 2 in the Prior 2 Weeks, Across Florida, Illinois, and Maryland During 4 Survey Waves[a]

	Respondents, %[b]			
Demographics, Barriers to Testing, and Wait Times	Wave 1: July 2020 (n = 3009)	Wave 2: September/October 2020 (n = 3074)	Wave 3: December 2020 (n = 2786)	Wave 4: February 2021 (n = 2865)
Wanted a test, no. (%)	469 (15)	310 (10)	382 (13)	315 (11)
Age, median (IQR), y	40 (25–56)	35 (26–49)	37 (24–51)	37 (25–48)
Household size, median (IQR), no.	2 (1–3)	2 (2–3)	2 (2–4)	3 (2–4)
Sex				
Female	48	46	55	47
Male	52	54	45	53
Race/ethnicity				
White	39	46	38	38
Black/African American	31	30	26	25
Hispanic/Latino	25	17	32	32
Asian/Pacific Islander	5	5	4	4
Other	1	2	1	1
Annual household income				
<$20 000	19	13	18	19
$20 000–$39 000	18	23	21	18
$40 000–$49 000	6	4	8	5
$50 000–$69 000	15	13	13	15
≥$70 000	42	47	41	42
Employment status				
Employed, working outside the home	42	55	50	61
Employed, working from home	27	29	25	21
Unemployed	16	6	14	12
Retired	15	9	11	6
Reported travel for any purpose	27	32	43	40
Unable to be tested, no. (%)	227 (48)	146 (47)	165 (43)	121 (38)
Reasons for not being tested[c]				
Afraid to be tested	12	21	16	15
Did not know where to go	32	36	30	23
Testing center too far away	15	20	14	20
Could not obtain an order from a physician	18	22	16	22
Language barriers	1	5	4	6
Wait times or appointment availability	17	12	27	19
Did not have time to go for a test	-	-	22	21
Other reasons[d]	23	12	15	9
Received a test, no. (%)	242 (52)	162 (53)	217 (57)	194 (62)
Time from wanting a test to being tested				
<1 d	28	31	49	56
1–2 d	33	14	28	23
3–5 d	20	32	14	9
6–7 d	13	15	6	7
>1 wk	5	7	3	5
Time from test to receipt of results				
<1 d	17	16	41	45
1–2 d	28	11	24	33
3–5 d	27	34	20	11
6–7 d	11	17	7	4
>1 wk	10	14	2	5
Had not received results by time of survey	6	8	7	3
Total time from wanting a test to receipt of results				
<1 d	11	9	26	33
1–2 d	12	8	19	23
3–5 d	19	14	20	17
6–7 d	14	9	14	11

Table 1. Continued

Demographics, Barriers to Testing, and Wait Times	Respondents, %[b]			
	Wave 1: July 2020 (n = 3009)	Wave 2: September/October 2020 (n = 3074)	Wave 3: December 2020 (n = 2786)	Wave 4: February 2021 (n = 2865)
>1 wk	38	52	15	14
Had not received results by time of survey	6	8	7	3

Abbreviation: IQR, interquartile range.

[a]Tests included polymerase chain reaction and antigen tests. All estimates incorporate survey weights.

[b]Data represent % of respondents unless otherwise specified.

[c]Respondents could select >1 reason for not being tested for survey waves 2–4. For survey wave 1, they selected the primary reason.

[d]For survey waves 2–4, participants were asked to specify other reasons, which were recoded where appropriate.

It is critical to continue to monitor uptake of testing and develop new messaging and strategies to improve testing in the current context. This is particularly important as case counts escalate owing to the emergence of novel variants, stressing the need for clear communication on how to access a SARS-CoV-2 diagnostic test. For example, the possibility of infection after vaccination needs to be communicated, especially the possibility of asymptomatic, mild, or moderate infections. While it is impossible not to feel optimistic about the "return to normal" given the direction the United States is going with the vaccine rollout, case count declines, and lifting of restrictions, it is prudent to not lose sight of core infectious disease principles. Active and/or passive surveillance of case counts is of paramount importance as are the basic principles of detection, contact tracing, and isolation.

There are limitations of online surveys; individuals need internet access to participate, so these surveys may underrepresent lower-income or less-educated individuals. However, in a constantly evolving pandemic where face-to-face data collection is nearly impossible, this approach allows for the rapid and safe collection of individual-level data across diverse geographies and demographics. If anything, we are likely overestimate access to testing. Moreover, care was taken to balance targets on state demographic characteristics, including the use of survey weights, and estimates of flu vaccine coverage were comparable coverage in to samples based on random digit dialing [7]. In addition, there is a possibility that respondents misclassified the type of test. Overall, however, these findings are in line with the scale-up of diagnostic testing in the United States and with evidence reported by other studies [5, 20, 21].

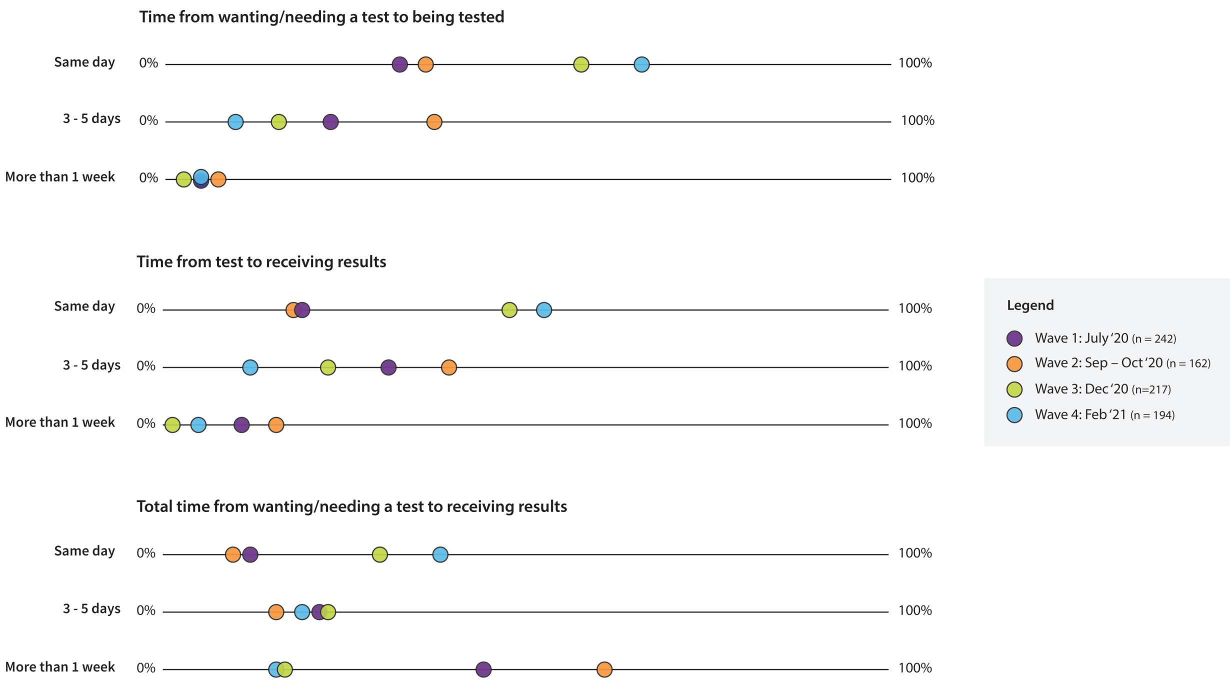

Figure 3. Wait times around severe acute respiratory syndrome coronavirus 2 testing in Florida, Illinois, and Maryland from July 2020 to February 2021.

These data highlight important improvements in access, uptake, and turnaround time of SARS-CoV-2 testing in the United States. Simultaneously, these data highlight persistent and common testing barriers across US states and underscore the importance of amplifying messaging and access to testing. Clear messaging on who, when, where, and how to be tested and continued access to testing are particularly important for monitoring variant spread and breakthrough infections (an early signal of vaccine durability) in the current context of relaxing mask mandates, increased mobility, and summer travel.

Supplementary Data

Supplementary materials are available at *Clinical Infectious Diseases* online. Consisting of data provided by the authors to benefit the reader, the posted materials are not copyedited and are the sole responsibility of the authors, so questions or comments should be addressed to the corresponding author.

Notes

Author contributions. S. J. C., S. H. M., and S. S. S. had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. Concept and design: S. J. C., A. W., S. H. M., and S. S. S. Acquisition, analysis, or interpretation of data: All authors. Drafting of the manuscript: S. J. C., A. W., S. H. M., and S. S. S. Critical revision of the manuscript for important intellectual content: All authors. Statistical analysis: S. J. C. Obtained funding: A. W. and S. H. M. Supervision: S. S. S.

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