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Statewide Evaluation of SARS-CoV-2 Diagnoses and Sexual Orientation and Gender Identity

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Abstract

Objective: Understanding and identifying disparities in COVID-19 testing outcomes can help allocate resources to where they are most needed. The objective of this study was to estimate the association between lesbian, gay, bisexual, transgender, and queer (LGBTQ+) identity and SARS-CoV-2 test positivity.

Methods: Data were from the Rhode Island SARS-CoV-2 surveillance database and included tests scheduled from June 8, 2020, through January 15, 2021. We used multivariable generalized estimating equations accounting for repeat testing to estimate the odds of receiving a positive test result for SARS-CoV-2 by LGBTQ+ identity and race/ethnicity, adjusting for sociodemographic and temporal confounders.

Results: In multivariable analysis of 232 025 tests, LGBTQ+ people had lower odds of receiving a positive test result than cisgender heterosexual people (5.4% vs 8.7%; adjusted odds ratio [aOR] = 0.63; 95% CI, 0.59-0.68). Compared with cisgender heterosexual White people, LGBTQ+ White people were significantly less likely (aOR = 0.67; 95% CI, 0.61-0.73) and cisgender heterosexual people of color were significantly more likely (aOR = 1.71; 95% CI, 1.64-1.78) to receive a positive test result. LGBTQ+ people of color had similar test positivity (aOR = 0.90; 95% CI, 0.79-1.02) as cisgender heterosexual White people. People in sexual minority groups were significantly less likely than heterosexual people to receive a positive test result, but we found no significant differences in test results among cisgender, transgender, and gender nonconforming people.

Conclusions: LGBTQ+ people may be less likely than heterosexual people to receive a positive test result for SARS-CoV-2, potentially related to protective health practices and greater social isolation. Addressing racial and ethnic disparities among both LGBTQ+ people and cisgender heterosexual people should be a priority of the public health workforce.

Keywords
COVID-19, SARS-CoV-2, LGBTQ+

SARS-CoV-2, which causes COVID-19, has led to substantial morbidity and mortality in the United States,[1] with substantial disparities by race, ethnicity, and socioeconomic status.[2] Despite repeated widespread community calls for data collection,[3-5] data on the impact of the COVID-19 pandemic on the lesbian, gay, bisexual, transgender, and queer (LGBTQ+) communities are scant.[5,6] Evidence indicates that the disproportionate economic impact of COVID-19[7-10] and underlying health disparities, such as high smoking rates, among LGBTQ+ people could drive a disproportionate health impact of COVID-19.[11-17]

As of June 2021, only 3 states have attempted to collect LGBTQ+ data on COVID-19 testing.[6] These attempts have not all been successful, despite passing legislation on data collection. For example, California experienced structural barriers in health laboratory data systems that stymied its

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LGBTQ+ data collection.[18] No state has thus far published any outcome information from its data collection. To partially fill this data gap, we evaluated population-based surveillance data from Rhode Island to estimate the association between sexual orientation and gender identity (SOGI) and SARS-CoV-2 test positivity among adults.

Methods

We reviewed surveillance data from the Rhode Island Department of Health (RIDOH) online portal, where people self-schedule or have physicians or contact tracers schedule them for a COVID-19 test at 1 of multiple sites throughout the state. The study sample included adults aged ≥18 years with a test scheduled from June 8, 2020, through January 15, 2021.

Demographic questions pertaining to SOGI included, "What sex were you assigned at birth?", "What is your gender identity?", and "What is your sexual orientation?" We defined people as transgender if they selected "trans man" or "trans woman" as their gender identity or if their selected gender identity differed from their reported sex assigned at birth. We used SOGI information to create an LGBTQ+ category, with people identifying as transgender, gender nonbinary/nonconforming, other gender, asexual, bisexual, gay/lesbian, queer, or other sexual orientation defined as LGBTQ+ and those reporting to be both cisgender and heterosexual defined as not LGBTQ+. Information on individual income and educational attainment was not available; as such, we used median annual household income by zip code tabulation area (ZCTA) obtained from the 2019 American Community Survey[19] as a proxy for individual socioeconomic status. To account for geographic factors, we classified individuals' town of residence as either urban or rural based on definitions from the Office of Primary Care and Rural Health at RIDOH.[20] We used self-reported occupation information to classify people as essential workers, nonessential/unemployed workers, and unknown employment type. We define those working in restaurants, childcare or education, health care, congregate care, grocery/retail, or government as essential workers, and those working in personal services, other industry, or unemployed as nonessential/unemployed workers.

We compared sociodemographic characteristics and results of tests among LGBTQ+ people compared with cisgender heterosexual people using Pearson χ^2 tests, with $P < .05$ considered significant. To account for repeated measurements for the same people, we used multivariable generalized estimating equations (GEEs) to estimate the odds of receiving a positive test result for SARS-CoV-2 by SOGI, adjusting for age, race and ethnicity, employment type, median annual household income of ZCTA of residence, type of town, and month of test. We modeled SOGI in 2 ways: (1) using the combined LGBTQ+ variable and (2) separately assessing sexual orientation and gender identity as 2 distinct constructs. We adjusted for key sociodemographic and temporal potential confounders given their a priori hypothesized association with SOGI and test positivity.

In addition, to measure the intersection between race and ethnicity and SOGI, we created a combined race and ethnicity and SOGI variable with the following classifications: cisgender heterosexual White, LGBTQ+ White, cisgender heterosexual person of color, and LGBTQ+ person of color. Similarly, we conducted additional analyses on the relationship between sex assigned at birth and sexual orientation among cisgender people. We created a combined sexual orientation and sex assigned at birth variable with the following classifications: lesbian/gay/bisexual/queer/other (LGBQ+) cisgender female, LGBQ+ cisgender male, heterosexual cisgender female, and heterosexual cisgender male. In both the analysis of race and ethnicity and SOGI and that of sex assigned at birth and SOGI, we fit multivariable GEEs to estimate the odds of receiving a positive test result for SARS-CoV-2 by subgroup, adjusting for confounders.

Lastly, to assess potential biases due to differing reasons for tests and repeat tests among people, we conducted several sensitivity analyses. Sensitivity analyses included analyses stratified by symptom status, analysis restricted to individual's first test conducted through the portal, and analysis counting 1 summary test outcome per person, where individuals were classified as "ever testing positive" or "never testing positive" during the study period. In addition, we analyzed the impact of missing SOGI data by considering all tests missing SOGI information to be (1) among LGBTQ+ people or (2) among cisgender heterosexual people. The RIDOH Institutional Review Board classified this study as exempt.

Results

During the study period, 280 240 SARS-CoV-2 tests among 168 574 adults aged ≥18 years were scheduled and completed through state testing sites. Excluding 931 (0.3%) invalid or inconclusive tests left 279 309 tests among 168 341 people in the final sample. Of the 279 309 total tests, 20 510 (7.3%) were among LGBTQ+ people, 211 515 (75.7%) were among cisgender heterosexual people, and 47 284 (16.9%) were among people who could not be categorized because of missing information on sexual orientation, gender identity, or both. The 47 284 tests with unknown SOGI information were among 28 857 unique people.

Tests conducted among LGBTQ+ people and cisgender heterosexual people differed significantly by characteristics assessed, including age, race and ethnicity, employment, type of town, and median annual household income of ZCTA (all $P < .001$) (Table 1). Generally, tests among LGBTQ+ people were more likely than tests among cisgender heterosexual people to be among younger people, among bar/restaurant and grocery/retail occupations, and among those residing in lower income and urban areas. SARS-CoV-2 tests among cisgender heterosexual people were more likely to be

Table 1. Characteristics of people presenting for SARS-CoV-2 testing through the Rhode Island Department of Health appointment portal, June 8, 2020–January 15, 2021[a]

Characteristics	Total	LGBTQ+	Cisgender and heterosexual people	Don't know or missing	*P* value[b]
No. (% of total)	279 309 (100.0)	20 510 (8.8)[c]	211 515 (91.2)[c]	47 284 (NA)	NA
Total tested, no.	168 341	11 183	128 301	28 857	
Age, y					<.001
18-34	107 563 (38.5)	12 158 (59.3)	79 247 (37.5)	16 158 (34.2)	
35-49	70 547 (25.2)	4509 (22.0)	52 656 (24.9)	13 292 (28.1)	
50-64	68 655 (24.6)	2864 (14.0)	53 404 (25.2)	12 387 (26.2)	
≥65	32 634 (11.7)	979 (4.8)	26 208 (12.4)	5447 (11.5)	
Sex assigned at birth					<.001
Female	159 440 (57.1)	11 856 (57.8)	120 976 (57.2)	26 608 (56.3)	
Male	110 213 (39.5)	6843 (33.4)	90 230 (42.7)	13 140 (27.8)	
Other	1462 (0.5)	1312 (6.4)	33 (<0.1)	117 (0.2)	
Unknown/missing	8194 (2.9)	499 (2.4)	276 (0.1)	7419 (15.7)	
Gender identity					NA
Cisgender	248 989 (89.1)	16 105 (78.5)	211 515 (100.0)	21 369 (45.2)	
Gender nonbinary or nonconforming	1180 (0.4)	1180 (5.8)	0	0	
Transgender	714 (0.3)	714 (3.5)	0	0	
Other	1691 (0.6)	1691 (8.2)	0	0	
Unknown/missing	26 735 (9.6)	820 (4.0)	0	25 915 (54.8)	
Sexual orientation					NA
Asexual	401 (0.1)	401 (2.0)	0	0	
Bisexual	4525 (1.6)	4525 (22.1)	0	0	
Gay or lesbian	7923 (2.8)	7923 (38.6)	0	0	
Heterosexual	219 364 (78.5)	512 (2.5)	211 515 (100.0)	7337 (15.5)	
Queer	2566 (0.9)	2566 (12.5)	0	0	
Other	4257 (1.5)	4257 (20.8)	0	0	
Unknown/missing	40 273 (14.4)	326 (1.6)	0	39 974 (84.5)	
Race and ethnicity					<.001
Hispanic/Latinx	33 479 (12.0)	2440 (11.9)	22 851 (10.8)	8188 (17.3)	
Non-Hispanic Asian	6192 (2.2)	484 (2.4)	5097 (2.4)	611 (1.3)	
Non-Hispanic African American or Black	8496 (3.0)	636 (3.1)	6912 (3.3)	948 (2.0)	
Non-Hispanic White	201 173 (72.0)	13 292 (64.8)	167 057 (79.0)	20 824 (44.0)	
Non-Hispanic Other[d]	7369 (2.6)	1130 (5.5)	4929 (2.3)	1310 (2.8)	
Unknown/missing	22 600 (8.1)	2528 (12.3)	4669 (2.2)	15 403 (32.6)	
Occupation					<.001
Bar or restaurant	11 338 (4.1)	1365 (6.7)	8851 (4.2)	1122 (2.4)	
Childcare or education	26 851 (9.6)	2406 (11.7)	21 238 (10.0)	3207 (6.8)	
Congregate care	3417 (1.2)	320 (1.6)	2662 (1.3)	435 (0.9)	
First responder or health care	31 252 (11.2)	2370 (11.6)	25 871 (12.2)	3011 (6.4)	
Government	8397 (3.0)	590 (2.9)	6970 (3.3)	837 (1.8)	
Grocery or retail	13 783 (4.9)	1475 (7.2)	10 950 (5.2)	1358 (2.9)	
Manufacturing	12 683 (4.5)	640 (3.1)	10 996 (5.2)	1047 (2.2)	
Personal services	4126 (1.5)	414 (2.0)	3197 (1.5)	515 (1.1)	
Other	89 087 (31.9)	6141 (29.9)	74 062 (35.0)	8883 (18.8)	
Unemployed	30 414 (10.9)	2264 (11.0)	24 850 (11.7)	3300 (7.0)	
Unknown	47 961 (17.2)	2525 (12.3)	21 868 (10.3)	23 569 (49.8)	
Median annual household income of ZCTA, $					<.001
<40 000	9807 (3.5)	1370 (6.7)	6728 (3.2)	1709 (3.6)	
40 000-69 999	94 180 (33.7)	8206 (40.0)	70 524 (33.3)	15 450 (32.7)	
70 000-99 999	125 386 (44.9)	8287 (40.4)	95 479 (45.1)	21 620 (45.7)	
≥100 000	29 303 (10.5)	1258 (6.1)	23 964 (11.3)	4081 (8.6)	
Unknown	20 633 (7.4)	1389 (6.8)	14 820 (7.0)	4424 (9.4)	

(continued)

Table 1. (continued)

Characteristics	Total	LGBTQ+	Cisgender and heterosexual people	Don't know or missing	*P* value[b]
Symptom status					<.001
Asymptomatic	220 419 (78.9)	16 839 (82.1)	170 894 (80.8)	32 685 (69.1)	
Symptomatic	58 331 (20.9)	3642 (17.8)	40 453 (19.1)	14 237 (30.1)	
Unknown	559 (0.2)	29 (0.1)	168 (0.1)	362 (0.8)	
Town type					<.001
Urban	219 099 (78.4)	17 329 (84.5)	165 368 (78.2)	36 402 (77.0)	
Rural	40 801 (14.6)	1895 (9.2)	32 321 (15.3)	6585 (13.9)	
Unknown	19 409 (6.9)	1286 (6.3)	13 826 (6.5)	4297 (9.1)	
Self-reported contact with case					<.001
Yes	94 355 (33.8)	5889 (28.7)	70 474 (33.3)	17 990 (38.0)	
No	184 395 (66.0)	14 592 (71.1)	140 873 (66.6)	28 932 (61.2)	
Unknown	559 (0.2)	29 (0.1)	168 (0.1)	362 (0.8)	
Month of test					<.001
June 2020	5169 (1.9)	589 (2.9)	3509 (1.7)	1071 (2.3)	
July 2020	8334 (3.0)	651 (3.2)	5900 (2.8)	1783 (3.8)	
August 2020	12 496 (4.5)	1003 (4.9)	9855 (4.7)	1638 (3.5)	
September 2020	11 790 (4.2)	1210 (5.9)	8562 (4.0)	2018 (4.3)	
October 2020	18 050 (6.5)	1558 (7.6)	11 759 (5.6)	4733 (10.0)	
November 2020	42 286 (15.1)	3067 (15.0)	29 509 (14.0)	9710 (20.5)	
December 2020	113 575 (40.7)	7954 (38.8)	89 049 (42.1)	16 572 (35.0)	
January 2021	67 609 (24.2)	4478 (21.8)	53 372 (25.2)	9759 (20.6)	
SARS-CoV-2 test result					<.001
Negative	256 474 (91.8)	19 394 (94.6)	193 130 (91.3)	43 950 (92.9)	
Positive	22 835 (8.2)	1116 (5.4)	18 385 (8.7)	3334 (7.1)	

Abbreviations: LGBTQ+, lesbian, gay, bisexual, transgender, and queer; NA, not applicable; ZCTA, zip code tabulation area.
[a] All values are number (percentage) unless otherwise indicated.
[b] *P* values obtained from Pearson χ^2 tests compare LGBTQ+ people with cisgender/heterosexual people, with $P < .05$ considered significant.
[c] Percentages based on a denominator of 232 025, which excludes 47 284 with unknown or missing data.
[d] Other race includes Asian, American Indian/Alaska Native, Native Hawaiian/Other Pacific Islander, other race, and >1 race.

positive (8.7%) than tests among LGBTQ+ people (5.4%). In multivariable GEE analyses adjusting for age, sex assigned at birth, race and ethnicity, employment, town type, socioeconomic status, and month of test, LGBTQ+ people were significantly less likely to have a positive test result than cisgender heterosexual people (adjusted odds ratio [aOR] = 0.62; 95% CI, 0.58-0.67) (Table 2).

When modeling sexual orientation and gender identity as separate constructs, sexual orientation was significantly associated with test outcomes; bisexual (aOR = 0.70; 95% CI, 0.61-0.81), gay or lesbian (aOR = 0.62; 95% CI, 0.56-0.69), queer (aOR = 0.43; 95% CI, 0.33-0.56), and "other" (aOR = 0.64; 95% CI, 0.55-0.74) people were significantly less likely to receive a positive test result than heterosexual people (Table 3). Differences based on gender identity were generally not significant; however, those reporting "other" gender identity (aOR = 0.63; 95% CI, 0.45-0.89) were significantly less likely to receive a positive test result than cisgender people.

Analysis of test outcomes by SOGI and race and ethnicity found test positivity rates were lowest among LGBTQ+ White people (4.9%), followed by cisgender heterosexual White people (7.4%), LGBTQ+ people of color (7.5%), and cisgender heterosexual people of color (14.1%). In the multivariable GEEs adjusting for potential confounders, compared with cisgender heterosexual White people, LGBTQ+ White people were significantly less likely to receive a positive SARS-CoV-2 test result (aOR = 0.67; 95% CI, 0.61-0.73), whereas cisgender heterosexual people of color (aOR = 1.71; 95% CI, 1.64-1.78) were more likely to receive a positive test result (Table 2). We found no significant difference in test positivity between LGBTQ+ people of color (aOR = 0.90; 95% CI, 0.79-1.02) and cisgender heterosexual White people. A comparison of LGBTQ+ people of color and cisgender heterosexual people of color revealed LGBTQ+ people of color were significantly less likely to receive a positive test result (aOR = 0.53; 95% CI, 0.46-0.60).

Analysis of test outcomes by sexual orientation and sex assigned at birth among cisgender people revealed test positivity was lowest among LGBQ+ males (5.6%), followed by LGBQ+ females (5.7%), heterosexual females (8.0%), and heterosexual males (9.7%). Compared with heterosexual females, LGBQ+ males (aOR = 0.67; 95% CI, 0.61-0.78) and LGBQ+ females (aOR = 0.70; 95% CI, 0.64-0.77) were

Table 2. Relationship between sexual orientation and gender identity and positive test result for SARS-CoV-2 infection, in the overall population and within race and ethnicity and sex assigned at birth subgroups, among adults presenting for testing through the Rhode Island Department of Health appointment portal, June 8, 2020–January 15, 2021[a]

	SARS-CoV-2 positivity	
Model	**Percent positive**	**aOR (95% CI)**
Overall population[b]		
Cisgender heterosexual	8.7	1 [Reference]
LGBTQ+	5.4	0.62 (0.58-0.67)
Race and ethnicity subgroups[c]		
Cisgender heterosexual White	7.4	1 [Reference]
Cisgender heterosexual person of color	14.1	1.71 (1.64-1.78)
LGBTQ+ White	4.9	0.67 (0.61-0.73)
LGBTQ+ person of color	7.5	0.90 (0.79-1.02)
Sex assigned at birth subgroups[d]		
Cisgender heterosexual male	9.7	1.26 (1.21-1.30)
Cisgender LGBQ+ male	5.6	0.67 (0.61-0.78)
Cisgender heterosexual female	8.0	1 [Reference]
Cisgender LGBQ+ female	5.7	0.70 (0.64-0.77)

Abbreviations: aOR, adjusted odds ratio; LGBTQ+, lesbian, gay, bisexual, transgender, and queer; LGBQ+, lesbian, gay, bisexual, and queer; ZCTA, zip code tabulation area.
[a] Data are from 3 multivariable logistic regression models.
[b] Model adjusts for age, sex assigned at birth, race and ethnicity, employment status, median annual household income of ZCTA, type of town, and month of test.
[c] Model adjusts for age, sex assigned at birth, employment status, median annual household income of ZCTA, type of town, and month of test.
[d] Model adjusts for age, race and ethnicity, employment status, median annual household income of ZCTA, type of town, and month of test.

significantly less likely and heterosexual males were significantly more likely (aOR = 1.26; 95% CI, 1.21-1.30) to receive a positive test result (Table 2).

In sensitivity analyses assessing the impact of missing data and reasons for tests, results were similar to the original model. Among asymptomatic, symptomatic, first tests scheduled through the portal, and analyses with 1 summary test outcome per person (ie, ever vs never receiving a positive test result), LGBTQ+ people were significantly less likely than cisgender heterosexual people to receive a positive test result. In addition, results were similar when considering tests missing SOGI information to be either all among LGBTQ+ people or all among cisgender heterosexual people.

Discussion

To our knowledge, this study is among the first statewide studies of SARS-CoV-2 test positivity in the LGBTQ+ population. We found that, in Rhode Island, SARS-CoV-2 tests among people in sexual minority (LGBQ+) groups were less likely to be positive than tests among heterosexual people, accounting for potential sociodemographic confounders and month of testing. We found no significant differences in test results among cisgender, transgender, and gender nonconforming people. Comparisons based on race and

Table 3. Characteristics associated with receiving a positive test result for SARS-CoV-2 infection, among adults presenting for testing through the Rhode Island Department of Health appointment portal, June 8, 2020–January 15, 2021

	SARS-CoV-2 positivity	
Characteristic	**OR (95% CI)**	**aOR (95% CI)**
Gender identity		
Cisgender	1 [Reference]	
Gender nonbinary or nonconforming	0.43 (0.32-0.58)	0.95 (0.65-1.39)
Transgender	0.64 (0.47-0.88)	0.94 (0.65-1.36)
Other	0.43 (0.34-0.55)	0.63 (0.45-0.89)
Unknown/missing	0.93 (0.72-1.20)	0.95 (0.88-1.02)
Sexual orientation		
Bisexual	0.64 (0.56-0.72)	0.70 (0.61-0.81)
Gay or lesbian	0.60 (0.55-0.66)	0.62 (0.56-0.69)
Heterosexual	1 [Reference]	
Queer	0.37 (0.30-0.46)	0.43 (0.33-0.56)
Other	0.72 (0.64-0.81)	0.64 (0.55-0.74)
Unknown/missing	0.37 (0.20-0.67)	0.42 (0.39-0.45)
Age, y		
18-34	1.12 (1.06-1.18)	1.23 (1.16-1.30)
35-49	1.16 (1.10-1.22)	1.19 (1.12-1.25)
50-64	1.17 (1.11-1.23)	1.24 (1.17-1.31)
≥65	1 [Reference]	
Sex assigned at birth		
Female	1 [Reference]	
Male	1.24 (1.20-1.28)	1.27 (0.87-1.68)
Other	0.55 (0.42-0.71)	1.05 (0.76-1.46)
Race and ethnicity		
Hispanic or Latinx	2.49 (2.39-2.58)	1.82 (1.74-1.89)
Non-Hispanic Asian	1.29 (1.18-1.42)	1.33 (1.18-1.48)
Non-Hispanic African American or Black	1.71 (1.59-1.84)	1.45 (1.36-1.58)
Non-Hispanic White	1 [Reference]	
Non-Hispanic Other	1.17 (1.07-1.28)	1.11 (1.01-1.21)
Unknown/missing	0.96 (0.88-1.06)	0.89 (0.82-0.96)
Employment		
Essential worker	0.93 (0.90-0.96)	0.92 (0.89-0.95)
Nonessential worker	1 [Reference]	
Unknown status	1.75 (1.69-1.81)	3.16 (3.01-3.31)
Median annual household income of ZCTA, $		
<40 000	1.99 (1.82-2.17)	1.67 (1.52-1.84)
40 000-69 999	1.80 (1.70-1.91)	1.61 (1.51-1.72)
70 000-99 999	1.40 (1.32-1.48)	1.29 (1.22-1.37)
≥100 000	1 [Reference]	
Unknown	1.42 (1.31-1.53)	1.41 (1.23-1.60)
Type of town		
Urban	1.24 (1.19-1.29)	0.95 (0.90-1.00)
Rural	1 [Reference]	
Unknown	0.94 (0.90-1.00)	0.94 (0.83-1.07)
Month of test		
June 2020	1 [Reference]	
July 2020	1.03 (0.83-1.29)	0.78 (0.63-0.98)
August 2020	0.48 (0.38-0.60)	0.50 (0.40-0.63)
September 2020	0.36 (0.28-0.47)	0.36 (0.28-0.46)
October 2020	1.28 (1.06-1.56)	1.06 (0.87-1.29)
November 2020	3.46 (2.90-4.13)	3.30 (2.75-3.96)
December 2020	3.48 (2.93-4.15)	3.95 (3.30-4.73)
January 2021	2.77 (2.32-3.30)	3.27 (2.72-3.92)

Abbreviations: aOR, adjusted odds ratio; OR, odds ratio; ZCTA, zip code tabulation area.

ethnicity, sexual orientation, and gender identity found that LGBTQ+ White people had the lowest test positivity rate (4.9%), LGBTQ+ people of color and cisgender heterosexual White people had similar test positivity rates (7.4%-7.5%), and cisgender heterosexual people of color had the highest test positivity rate (14.1%).

Lower test positivity among LGBTQ+ people may be due to multiple factors. National survey research indicates that LGBTQ+ people are more likely to be fearful of COVID-19, practice social distancing, and wear face masks than cisgender heterosexual people.[21] These behavioral factors would put LGBTQ+ people at lower risk of contracting SARS-CoV-2, may lead them to seek more routine testing, and, therefore, yield a higher frequency of negative test results. Also, LGBTQ+ people have been found to be at increased risk of social isolation,[22,23] a factor that, although harmful to health in general, can be protective during a pandemic. In addition, early in the pandemic, RIDOH initiated a Crush COVID media campaign, parts of which were tailored to LGBTQ+ people, which may have led to increased testing in this population. LGBTQ+ people's ongoing management of another epidemic, HIV, in Rhode Island[24] and the United States more broadly[25] may also make them somewhat more cognizant of preventive health measures.

Importantly, racial and ethnic disparities in risk of SARS-CoV-2 infection that have been well-documented across the United States[1,2] are also evident in the LGBTQ+ population of Rhode Island. Specifically, LGBTQ+ people of color had roughly 1.5 times higher test positivity rates than LGBTQ+ White people (7.5% vs 4.9%), which is similar to the disparity observed among cisgender heterosexual people (14.1% among people of color vs 7.4% among White people). This finding highlights the importance of providing resources and supports to LGBTQ+ people of color to prevent and mitigate the health, social, and economic impacts of COVID-19.

Limitations

Our study had several limitations. First, we included only tests scheduled through the state portal, because this portal was the only population for which SOGI information was collected routinely. The state portal accounted for only 12% of the total tests conducted in Rhode Island during the study period. These tests may differ from tests scheduled through other means, such as those at physicians' offices and pharmacies, which may limit the generalizability of our results. To help understand this potential bias, we also reviewed case investigation data from all positive test results reported to RIDOH during the study period and found, overall, 2363 known cases among LGBTQ+ people and 46 108 known cases among cisgender heterosexual people (SOGI data were missing for an additional 27 352 cases). Based on population data from the 2019 Rhode Island Behavioral Risk Factor Surveillance System,[26] the total number of COVID-19 cases per group equates to an estimated rate of 422 cases per 10 000 LGBTQ+ people and 630 cases per 10 000 cisgender heterosexual people, suggesting that bias based on method of test scheduling may be minimal. However, our study was limited to data from June 2020 onward; because there is a disproportionate representation of LGBTQ+ people in frontline industries at high risk of contracting COVID-19,[27] LGBTQ+ people may have been disproportionately infected before the study period.

Second, 17% of tests scheduled through the portal were missing SOGI information and were excluded from analysis, which could have biased results. However, among those with nonmissing SOGI information in our sample, 8.2% identified as LGBTQ+, which is comparable to the statewide estimate of 8.7% obtained from the Rhode Island Behavioral Risk Factor Surveillance System.[26] In addition, our findings remained consistent when considering the 2 extremes of all tests excluded due to missing SOGI information being among LGBTQ+ people or among cisgender heterosexual people, suggesting this bias was minimal. Nonetheless, SOGI data are based on self-report and may be prone to response bias, particularly an underestimation of LGBTQ+ people.

Third, people must be tested to be diagnosed with SARS-CoV-2. Certain groups may be wary of testing or unable to get tested, which could decrease the estimated prevalence of infection.[28,29]

Lastly, some unmeasured factors may be associated with SOGI and test positivity (eg, housing status, household size, presence of children in the home) that we could not account for in our analysis. We did not have individual measures of socioeconomic status and had to rely on the income of ZCTA as a proxy of socioeconomic status, which is less precise. Although we adjusted for various sociodemographic and temporal potential confounders (age, sex assigned at birth, race and ethnicity, employment, town type, socioeconomic status of ZCTA, and month of test), our results may be subject to residual confounding.

Nonetheless, to our knowledge, this is the first study that used population-based SARS-CoV-2 surveillance data to estimate the association between SOGI and SARS-CoV-2 test positivity. Collection of SOGI in public health surveillance data should be a priority, so that states can monitor for and respond rapidly to emerging health disparities and direct resources where they are most needed.

Conclusion

Our study using statewide SARS-CoV-2 testing surveillance data in Rhode Island suggests that test positivity rates are lower among people in sexual minority groups than among heterosexual people. However, more rigorous research is needed to further understand COVID-19–related morbidity, mortality, and testing and vaccination rates in sexual and gender minority populations, particularly given concern that LGBTQ+ people may be at increased risk of complications if infected.[11] Moreover, racial and ethnic disparities in SARS-CoV-2 test positivity were evident among both LGBTQ+

people and cisgender heterosexual people, with people of color consistently having higher test positivity rates. Additional research is warranted on the intersection of race and ethnicity and SOGI, particularly how sexual and gender minority people of color may be impacted by COVID-19. State and local health departments should prioritize collection of SOGI information as a part of routine public health surveillance to facilitate rapid, targeted response to emerging disparities.

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