Seroprevalence of SARS-CoV-2 Among Skilled Nursing Facility Residents and Staff Members — Los Angeles County, August–September 2020

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Article Summary:

Among 24 nursing facilities in Los Angeles County, 42% of residents and 25% of staff had evidence of current/past SARS-CoV-2 infection. Approximately 58% of these residents and 79% of these staff did not have documentation of previously having COVID-19.

Abstract

Background

The prevalence of current/past coronavirus disease 2019 (COVID-19) in skilled nursing facility (SNF) residents is unknown because of asymptomatic infection and constrained testing capacity early in the pandemic. We conducted a seroprevalence survey (SPS) to determine a more comprehensive prevalence of past COVID-19 in Los Angeles County SNF residents and staff members.

Methods

We recruited participants from 24 facilities; participants were requested to submit a nasopharyngeal (NP) swab for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) PCR testing and serum for detection of SARS-CoV-2 antibodies. All participants were cross-referenced with our surveillance database to identify persons with prior positive SARS-CoV-2 results.

Results

From August 18 to September 24, 2020, we enrolled 3,305 participants (1,340 residents and 1,965 staff members). Among 856 residents providing serum, 362 (42%) had current/past SARS-CoV-2 infection. Of the 346 serology positive residents, 199 (58%) did not have a documented prior positive SARS-CoV-2 PCR result. Among 1,806 staff members providing serum, 454 (25%) had current/past SARS-CoV-2 infection. Of the 447 serology positive staff members, 353 (79%) did not have a documented prior positive SARS-CoV-2 PCR result.

Conclusions

Past testing practices and policies missed a substantial number of SARS-CoV-2 infections in SNF residents and staff members.

Key words

COVID-19; SARS-CoV-2; Seroprevalence; Skilled nursing facilities

Introduction

As of January 19, 2021, over 24.2 million cases of coronavirus disease 2019 (COVID-19) have been reported in the United States, including approximately 401,000 deaths [1]. Although less than 1% of the U.S. population resides in long-term care facilities, 40% of COVID-19—associated deaths have occurred among long-term care facility residents [2]. In Los Angeles County (LAC), the nation's most populous county, there are 38,242 licensed beds in 381 nursing homes. The first COVID-19 outbreak in a LAC nursing home was reported on March 18, 2020. During March 18–November 2, 2020, the LAC Department of Public Health (DPH) investigated 533 COVID-19 outbreaks in 328 nursing homes and identified 11,137 residents and 7,360 staff members with COVID-19. The average number of new nursing home outbreaks reported per week declined from 42 in April to 12 during October. The number of nursing home residents testing positive for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes COVID-19, declined from a peak of 822 residents in the week of April 26–May 2, 2020 to 59 residents in the week of October 25–31, 2020. The size of nursing home outbreaks declined from an average of 32 residents with COVID-19 in outbreaks opened during April 26–May 2 to 17 in outbreaks opened during October 25–31.

The reasons for the decline in the number and size of COVID-19 outbreaks in nursing homes are likely multifactorial. Recognition of the role of asymptomatic transmission led to the implementation of universal masking policies in nursing homes [3,4,5]. Introduction and transmission of SARS-CoV-2 in nursing homes was further reduced through improved infection control procedures, such as isolating SARS-CoV-2 infected residents in physically separated "red-zones" and placing newly admitted residents in quarantine. Regulations

requiring weekly surveillance testing for SARS-CoV-2 in nursing home staff and residents potentially resulted in earlier detection and containment of COVID-19 outbreaks [6]. It is unknown how much of the decline in COVID-19 cases and outbreaks in nursing homes is attributable to immunity among staff and residents who had recovered from infection acquired during prior outbreaks at their facilities.

Early in the pandemic, SARS-CoV-2 testing was available only through the DPH Public Health Laboratory (PHL). Before the recognition of asymptomatic transmission, SARS-CoV-2 testing was only offered for the first person in a nursing home who developed symptoms; other residents and staff subsequently experiencing respiratory symptoms in the facility were presumed to have COVID-19 and isolated accordingly. Even after commercial SARS-CoV-2 tests became available in late March and April, many nursing homes did not have timely access to testing because community demand exceeded the available testing capacity. Therefore, it is likely that many nursing home residents and staff had undiagnosed COVID-19. We aimed to conduct a seroprevalence survey to obtain a more comprehensive estimate of the prevalence of exposure to SARS-CoV-2 among residents and staff in Los Angeles County nursing homes.

Methods

COVID-19 Surveillance

The LAC DPH conducts surveillance for approximately 10 million residents in 86 cities excluding Long Beach and Pasadena, which have independent health departments. Healthcare providers in LAC are mandated to report to DPH all confirmed COVID-19 cases and clinical laboratories are mandated to report all SARS-CoV-2 diagnostic test results (positive, negative, indeterminate, and inconclusive). Staff from DPH attempt to interview all persons reported with COVID-19 to identify risk factors, close contacts, and exposure settings with a potential for an outbreak (e.g., nursing home). All outbreaks are assigned to DPH field teams, comprising physicians and nurses, for further investigation and management. All case reports and investigation data are entered into Integrated Reporting Investigation and Surveillance System (IRIS), DPH's central surveillance database.

Since June 2020, DPH has required SNF operators to conduct weekly surveillance testing of 25% of directly employed staff and 10% of residents by using a SARS-CoV-2 polymerase chain reaction (PCR) test. If a staff member or resident is diagnosed with COVID-19, then the SNF is required to conduct outbreak testing of all staff and residents weekly until no new positive test results are detected on two consecutive rounds of testing. Facility staff members and residents with a positive SARS-CoV-2 PCR test result are exempt from regular testing requirements for 90 days from the date of specimen collection. A COVID-19 outbreak in a SNF is defined as the occurrence of a single facility-acquired laboratory-confirmed case of COVID-19 in a resident; an outbreak is considered over if no cases are detected for 14 days.

Study Population

There are 315 freestanding SNFs in LAC, excluding facilities that are a distinct part of a hospital and those in the cities of Long Beach and Pasadena. To conduct this study, DPH collaborated with a SNF operator that manages 24 (8%) facilities across 14 cities in LAC. We will refer to all 24 facilities as SNFs, though they provide a mix of skilled and unskilled nursing home services. The participating SNFs had a median licensed bed capacity of 97 (first quartile [Q1]–third quartile [Q3]: 49–300), median resident census on the date of study enrollment of 67 (Q1–Q3: 43–265), and median staff census of 98 (Q1–Q3: 71–449) (Table 1). By comparison, the median licensed bed capacity among all 315 SNFs in LAC was 99 beds (Q1–Q3: 62–124). At the end of our study period on September 24, 2020, there were a total of 38,242 licensed bed across all 315 SNFs and 28,315 (74%) beds were occupied (unpublished data from LAC Health Facilities Inspection Division).

Data Collection

From August 18 to September 24, 2020, DPH nursing teams were deployed to obtain from residents and staff at the 24 SNFs nasopharyngeal (NP) swab specimen for SARS-CoV-2 PCR testing and serum for detection of IgG antibodies against SARS-CoV-2. Demographic information on all potential staff and resident participants was collected in advance for pre-registration with DPH PHL and printing of laboratory requisition forms. Testing for SARS-CoV-2 by PCR was offered to all staff and residents who had not tested positive within the previous 90 days. Serologic testing was offered to all staff and residents who submitted a NP swab specimen and to persons who were excluded from PCR testing because they had previously tested positive for SARS-CoV-2. Specimen were packed in cold packs and shipped via courier to PHL for processing. Informed verbal consent was obtained from all

participants; persons who did not have capacity to provide verbal consent were excluded from participation.

Laboratory Methods

For SARS-CoV-2 testing, PHL utilized the Hologic Panther Fusion SARS-CoV2, Hologic Panther TMA SARS-COV2, or CDC 2019 nCOV reverse-transcription PCR assays. Serum or plasma samples were used by PHL for serologic testing. All sera were tested by using two distinct automated chemiluminescent immunoassays as part of orthogonal algorithm to improve specificity and positive predictive value: the Abbott SARS-CoV2 assay (conducted on the Abbott i1000SR instrument that tests for IgG antibody against nucleoprotein), and the Diasorin SARS-CoV2 assay (conducted on the Diasorin Liaison XL instrument that tests for IgG antibody against spike protein) [7]. Participants were categorized as seropositive if either test yielded a positive result.

Data Management

All participants' demographic information and laboratory test results were stored in PHL's laboratory information system, Sunquest Information Systems. To obtain the results of any prior SARS-CoV-2 PCR tests conducted for study participants, we cross-referenced study participants demographic information with IRIS by using a deterministic matching process based on first name, last name, a composite variable composed of the first 3 letters of first and last name, and a name flip along with DOB. To obtain the history of prior COVID-19 outbreaks in each participating SNF, we reviewed the IRIS outbreak investigation reports for each facility to determine the dates of the first and last reported cases, cumulative counts of resident and staff cases, and bed capacity.

Statistical Analysis

Characteristics of PCR-positive and PCR-negative groups, and seropositive and seronegative groups, were compared using Pearson's chi-squared tests and Fisher's exact test for categorical variables. All statistical analyses were conducted using SAS 9.4 software.

Human Subjects Research Concerns

This project was reviewed and approved by the LAC Institutional Review Board (IRB).

Results

From August 18 to September 24, 2020, we enrolled 3,305 participants from 24 SNFs. All SNFs had a COVID-19 outbreak prior to the date of the seroprevalence survey (SPS). The median duration of the outbreak in SNFs, as measured by the interval between the first reported resident case and the last resident case prior to the date of the SPS, was 106 days (Q1–Q3: 72.5–139.75); the median interval between the date of the last case and the date of the seroprevalence survey was 40 days (Q1–Q3: 15–64.25) (Supplementary Table). Among the 1,340 resident participants, 704 (53%) provided both NP swab and serum specimen, 484 (36%) provided NP swab alone, and 152 (11%) provided serum specimen alone. Among the 1,965 staff member participants, 1,674 (85%) provided both NP swab and serum specimen, 159 (8%) provided NP swab alone, and 132 (7%) provided serum specimen alone.

Of the 1,188 residents who submitted an NP swab, 608 (51%) were male and the median age was 72 years (Q1–Q3: 63–83 years; Table 1). Of the 856 residents who submitted serum for serologic testing, 440 (51%) were male and the median age was 72 years (Q1–Q3: 63–83 years). Of the 1,833 staff members who submitted an NP swab, 533 (29%) were male and the

median age was 45 years (Q1–Q3: 32–55 years). Of the 1,806 staff members who submitted serum for serologic testing, 523 (29%) were male and the median age was 45 years (Q1–Q3: 33–55 years). There were no significant differences by sex or age between participants with and without a positive SARS-CoV-2 PCR result and between participants with and without positive SARS-CoV-2 antibodies.

Among the 856 residents who provided serum, 346 (40%) had detectable SARS-CoV-2 antibodies (Table 2). An additional 2 (<1%) serology negative residents had a positive SARS-CoV-2 PCR result on the seroprevalence survey and 14 (2%) serology negative residents had a documented prior SARS-CoV-2 PCR result in the DPH surveillance database (data not shown in tables), which yielded a total of 362 (42%) residents with evidence of current or past SARS-CoV-2 infection. Of the 346 residents who were SARS-CoV-2 serology positive, 199 (58%) did not have a documented prior positive SARS-CoV-2 PCR result >2 weeks prior to the SPS date (Table 3).

Among 1,806 staff members who provided serum, 454 (25%) had evidence of current or past SARS-CoV-2 infection. Among the 454 staff members with current or past infection, 447 (98%) had detectable SARS-CoV-2 antibodies, 4 (1%) had a positive SARS-CoV-2 PCR result on the seroprevalence survey, and 3 (1%) had a documented prior SARS-CoV-2 PCR result in the DPH surveillance database. Of the 447 staff members who were SARS-CoV-2 serology positive, 353 (79%) did not have a documented prior positive SARS-CoV-2 PCR result. The 2,650 resident and staff participants who had prior SARS-CoV-2 PCR test results had been tested a median of 4 times (Q1–Q3: 2–6).

Of the 793 participants with a positive serologic test, 241 (30%) had documentation of a prior positive SARS-CoV-2 PCR test result; first positive SARS-CoV-2 PCR test was a median of 104 days (Q1–Q3: 87–125) prior to the date of the SPS (Figure 1). Of the 1,869 participants with a negative serologic test, 17 (1%) had a prior positive SARS-CoV-2 PCR test result; the first positive SARS-CoV-2 PCR test was a median of 101 days (Q1–Q3: 84–118) prior to the date of the SPS.

Discussion

We conducted a seroprevalence survey at 24 LAC SNFs to determine more comprehensively the prevalence of current and past SARS-CoV-2 infection. The majority of resident and staff study participants had COVID-19 that was not detected by past testing policies and practices. The results indicate that past COVID-19 outbreaks in SNFs were potentially larger than previously recognized based on counting persons with positive test results alone. It is likely that the large number of persons in SNFs with undiagnosed COVID-19 complicated efforts to control past outbreaks. Undiagnosed COVID-19 in staff members could have resulted in hidden introduction at some of these SNFs. Undetected COVID-19 in residents could have contributed to unrecognized transmission within facilities. The recent declines in the number of COVID-19 cases and outbreaks in SNFs could be partly attributable to the substantial proportion of residents and staff with immunity to SARS-CoV-2. Conversely, SNFs might experience an increase in the number of COVID-19 cases as their proportion of new susceptible residents and staff increases over time. Therefore, continued rigorous adherence to infection control procedures by SNF staff will be needed to prevent and control COVID-19 outbreaks.

A greater proportion of residents were seropositive for SARS-CoV-2 compared with staff. The exact reasons for why residents appear to be at increased risk for COVID-19 compared with staff are not known. It is likely that staff members benefited from having access to personal protective equipment (PPE) to reduce their risk of infection within SNFs. Although residents are encouraged to wear a face covering at all times, adherence to this recommendation is unclear and non-medical face coverings are not intended to protect against infection. The majority of residents in our study resided in multi-occupancy rooms, which is typical of most nursing facilities in the United States. Therefore, in addition to their own personal risk for acquiring COVID-19, residents could have the added risk of infection based on their roommate's exposures (e.g., visits from friends and family). Although all SNFs in LAC now conduct daily symptoms screening for respiratory illness and have physically separated "red zones" to isolate residents with COVID-19, residents still remain at increased risk for infection from a roommate or staff member who might have asymptomatic/undetected COVID-19 [8].

Our results allow us to estimate the relative risk for having COVID-19 among SNF residents compared with the general LA County population. There have been two assessments of the seroprevalence of SARS-CoV-2 in the LAC general population to date. A community seroprevalence study conducted in April 2020 identified that 35 (4.1%) of 865 participants were seropositive of SARS-CoV-2 [9]. Another study assessed SARS-CoV-2 seropositivity among 790 LAC university students during April 29–May 8, 2020 and demonstrated a seroprevalence of 4.0% [10]. By comparison, SNF residents and staff in our study conducted approximately four months after the community studies were 10- and 6-times more likely, respectively, to have evidence of past SARS-CoV-2 infection. Of note, the seropositivity rate among SNF staff in our study also exceeded the rate reported among healthcare personnel at a large academic medical center in LAC during May 26–June 5, 2020 (approximately 8%) [11]. Another seroprevalence study conducted among hospital and

SNF healthcare workers in Rhode Island during July 17–August 28, 2020 identified a seropositivity rate of 3.1% (95% CI 2.7%–3.5%) among hospital personnel and 13.1% (95% CI 11.5%–14.9%) among nursing home personnel; the lower seropositivity rate compared with our study could result from differences in community transmission (i.e., risk for staff exposure) and in the types of healthcare workers who participated in the study (i.e., intensity of direct patient contact) [12]

Our study has limitations. First, we enrolled a convenience sample of participants from 24 SNFs, which means our results are likely not representative of all 315 SNFs in LAC. Although our results cannot be generalized to all 315 freestanding SNFs within DPH jurisdiction, the characteristics of residents and the infection control practices at the participating SNFs are typical of other centers in LAC. Second, the concentration of antibodies against SARS-CoV-2 decline over time, so participants whose concentration fell below level of detection would have been misclassified as SARS-CoV-2 unexposed [13]. In our study, 8.7% of residents and 3.1% of staff who had a documented prior positive PCR result were seronegative for SARS-CoV-2. Further, residents who were infected might have left the facility and replaced by new residents who were not exposed to the previous outbreaks in the facility, which would also reduce our ascertainment of the prevalence of past infection at the facility. Finally, our deterministic matching algorithm could have missed prior PCR results if their name did not exactly match what was provided for enrollment in the study and PCR results for persons whose address was outside LA County (the results would have been reported to that jurisdiction).

Our study provides a more comprehensive estimate of the prevalence of exposure to SARS-CoV-2 among SNF residents and staff. These results provide context for assessing the effectiveness of past policies and programs for preventing and controlling COVID-19 in SNFs. Our results can also inform

the design of studies to assess the effectiveness of COVID-19 vaccines in preventing infection and outbreaks in SNFs. We demonstrated that a substantial proportion of SNF staff members and residents were potentially unaware of their past infection status. Thus, misclassifying unvaccinated persons with unknown infection as susceptible might reduce the observed effectiveness of the vaccine. Incorporating an orthogonal serologic testing strategy with high test specificity (i.e., >99.5%) to minimize the potential for false positive results could improve classification of persons with evidence of past infection [7]. Although a positive qualitative SARS-CoV-2 antibody test result does not provide a good correlate for protection from subsequent infection, such tests could help investigators understand the potential misclassification of immune status in VE studies [7].

Conclusions

We demonstrated that past testing practices/policies missed a substantial number of SARS-CoV-2 infections in SNF residents and staff members. Our results could inform vaccine roll-out strategies, interpretation of trends in COVID-19 incidence in SNFs by adjusting the denominator for nonsusceptible persons, and the design of potential vaccine effectiveness studies because nonvaccinated persons could be misclassified as susceptible.

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Conflict of Interest Disclosures

All authors have completed the ICMJE Form for Disclosure of Potential Conflicts of Interest. No disclosures were reported.

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Table 1. Demographic Characteristics of Staff and Residents at the 24 Skilled Nursing Facilities Participating in Seroprevalence Study — Los Angeles County, August–September, 2020.[a]

Characteristics	Total tested by PCR N	PCR positive n (%)	PCR negative n (%)	*P*	Total tested by serology N	Serology positive n (%)	Serology negative n (%)	*P*
Residents								
Total	1,188				856			
Sex[b]				0.75[c]				0.19[c]

Male	608	12 (2)	596 (98)		440	187 (43)	253 (58)	
Female	579	10 (2)	569 (98)		415	158 (38)	257 (62)	
Age								
Age Group				0.36[d]				0.89[c]
18-44 years	20	1 (5)	19 (95)		18	8 (44)	10 (56)	
45-64 years	309	6 (2)	303 (98)		226	89 (39)	137 (61)	
≥ 65 years	859	15 (2)	844 (98)		612	249 (41)	363 (59)	
Staff								
Total	1833				1806			
Sex[e]				0.95[c]				0.66[c]
Male	533	6 (1)	527 (99)		523	133 (25)	390 (75)	
Female	1296	15 (1)	1281 (99)		1280	313 (24)	967 (76)	
Age								
Age Group				0.31[d]				0.17[c]

17-44 years	897	14 (2)	883 (98)		875	224 (26)	651 (74)	
45-64 years	842	7 (1)	835 (99)		836	207 (25)	629 (75)	
≥ 65 years	94	1 (1)	93 (99)		95	16 (17)	79 (83)	

Abbreviation: PCR, polymerase chain reaction

[a] Percentages may not total 100 because of rounding.

[b] Statistical analysis excludes 1 resident with unknown sex.

[c] *P* value calculated using Pearson's chi-squared test.

[d] *P* value calculated using Fisher's exact test.

[e] Statistical analysis excludes 4 staff with unknown sex.

Table 2. Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) PCR and Anti-SARS-CoV-2 Serology Test Results Among Staff and Residents at the 24 Skilled Nursing Facilities (SNFs) Participating in Seroprevalence Study — Los Angeles County, August–September, 2020.

SNF	Residents				Staff			
	Tested by PCR, N	PCR positive, n (%)	Tested by serology, N	Serology positive,[a] n (%)	Tested by PCR, N	PCR positive, n (%)	Tested by serology, N	Serology positive,[a] n (%)
A	39	13 (33)	19	6 (32)	59	2 (3)	58	7 (12)
B	70	1 (1)	52	41 (79)	113	2 (2)	122	37 (30)
C	51	0 (0)	39	22 (56)	93	1 (1)	110	47 (43)
D	52	0 (0)	45	3 (7)	54	0 (0)	54	11 (20)
E	36	0 (0)	24	15 (63)	41	1 (2)	33	20 (61)
F	47	0 (0)	38	21 (55)	71	0 (0)	80	27 (34)
G	62	0 (0)	53	4 (8)	118	0 (0)	116	9 (8)
H	64	1 (2)	38	8 (21)	67	1 (1)	68	13 (19)

I	29	2 (7)	26	12 (46)	71	0 (0)	70	18 (26)
J	48	0 (0)	37	9 (24)	75	0 (0)	75	6 (8)
K	40	0 (0)	23	7 (30)	25	0 (0)	28	4 (14)
L	40	0 (0)	29	2 (7)	77	0 (0)	78	8 (10)
M	11	1 (9)	9	5 (56)	40	3 (8)	44	16 (36)
N	35	0 (0)	29	15 (52)	43	1 (2)	44	17 (39)
O	55	0 (0)	37	8 (22)	110	2 (2)	58	12 (21)
P	55	0 (0)	41	28 (68)	82	1 (1)	83	41 (49)
Q	45	0 (0)	44	14 (32)	72	0 (0)	90	23 (26)
R	39	0 (0)	31	11 (35)	58	0 (0)	62	13 (21)
S	174	2 (1)	102	60 (59)	253	5 (2)	227	48 (21)
T	22	0 (0)	23	9 (39)	25	0 (0)	28	8 (29)
U	38	0 (0)	29	7 (24)	63	0 (0)	71	12 (17)
V	27	0 (0)	17	0 (0)	64	1 (2)	61	15 (25)

W	60	2 (3)	36	23 (64)	87	1 (1)	74	20 (27)
X	49	0 (0)	35	16 (46)	72	1 (1)	72	15 (21)
Total	1188	22 (2)	856	346 (40)	1833	22 (1)	1806	447 (25)

Abbreviation: PCR, polymerase chain reaction

[a] The Los Angeles County Public Health Laboratory (PHL) performs an orthogonal algorithm whereby specimens that are positive are confirmed using a secondary test. Both the Abbott SARS-CoV2 assay and Diasorin SARS-CoV2 assay were used for each serological specimen. Participants were categorized as seropositive if either test yielded a positive result.

Table 3. Correlating Results of Prior SARS-CoV-2 PCR Results[a] with Serologic Results from Seroprevalence Survey Conducted Among Residents and Staff in 24 Skilled Nursing Facility Residents and Staff — Los Angeles County, August–September, 2020.[b]

	PCR positive, n (%)	PCR negative, n (%)	No PCR record, n (%)	Total
Residents				
Serology positive[c]	147 (42)	150 (43)	49 (14)	346
Serology negative	14 (3)	426 (84)	70 (14)	510
Total	161	576	119	856
Staff				
Serology positive[c]	94 (21)	212 (47)	141 (32)	447
Serology negative	3 (0.2)	1046 (77)	310 (23)	1359

Total	97	1258	451	1806

Abbreviations: PCR, polymerase chain reaction; SARS-CoV-2, Severe Acute Respiratory Syndrome Coronavirus 2

[a] Participant's prior PCR results were obtained from the Los Angeles County Department of Public Health surveillance database (Integrated Reporting Investigation and Surveillance System, IRIS); PCR results <2 prior to seroprevalence survey were exclude.

[b] Percentages may not total 100 because of rounding.

[c] The Los Angeles County Public Health Laboratory (PHL) performs an orthogonal algorithm whereby specimens that are positive are confirmed using a secondary test. Both the Abbott SARS-CoV2 assay and Diasorin SARS-CoV2 assay were used for each serological specimen. Participants were categorized as seropositive if either test yielded a positive result.

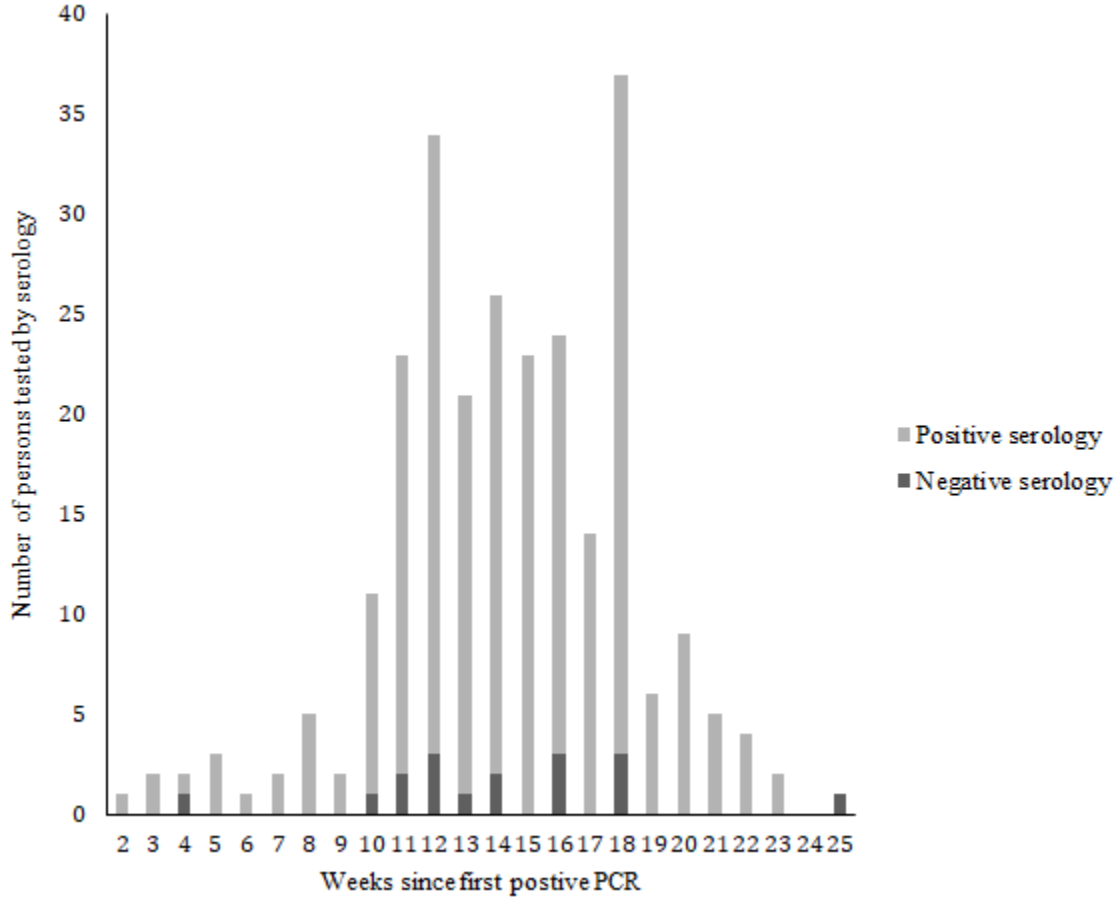
Figure 1. Time Interval Between First Prior Positive PCR Test Result[a] and Date of Seroprevalence Survey[b] Among Residents and Staff in 24 Participating Skilled Nursing Facilities — Los Angeles County, August–September, 2020 (N = 258).

Shown are the intervals of time (in weeks) elapsed since the first positive SARS-CoV-2 PCR test result and date of seroprevalence study (SPS) for all participants who had both a history of a positive PCR and a serology specimen obtained on SPS date. This shows that for those with a positive serology result (n = 241), the median time interval between positive PCR test date and positive serology date was 14 weeks (Q1–Q3: 12–17). For those with a negative serology result (n = 17), the median time elapsed between the positive PCR test and negative serology test was 14 weeks (Q1–Q3: 12–16).

[a] Participant's prior PCR results were obtained from the Los Angeles County Department of Public Health surveillance database (Integrated Reporting Investigation and Surveillance System, IRIS); PCR results <2 prior to seroprevalence survey were exclude.

[b] The Los Angeles County Public Health Laboratory (PHL) performs an orthogonal algorithm whereby specimens that are positive are confirmed using a secondary test. Both the Abbott SARS-CoV2 assay and Diasorin SARS-CoV2 assay were used for each serological specimen. Participants were categorized as seropositive if either test yielded a positive result.

Figure 1


Number of persons tested by serology
0
5
10
15
20
25
30
35
40
2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
Weeks since first postive PCR
Positive serology
Negative serology