COVID-19 Transmission in US Child Care Programs

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abstract

OBJECTIVES: Central to the debate over school and child care reopening is whether children are efficient coronavirus disease 2019 (COVID-19) transmitters and are likely to increase community spread when programs reopen. We compared COVID-19 outcomes in child care providers who continued to provide direct in-person child care during the first 3 months of the US COVID-19 pandemic with outcomes in those who did not.

METHODS: Data were obtained from US child care providers (N = 57 335) reporting whether they had ever tested positive or been hospitalized for COVID-19 (n = 427 cases) along with their degree of exposure to child care. Background transmission rates were controlled statistically, and other demographic, programmatic, and community variables were explored as potential confounders. Logistic regression analysis was used in both unmatched and propensity score–matched case-control analyses.

RESULTS: No association was found between exposure to child care and COVID-19 in both unmatched (odds ratio [OR], 1.06; 95% confidence interval [CI], 0.82–1.38) and matched (OR, 0.94; 95% CI, 0.73–1.21) analyses. In matched analysis, being a home-based provider (as opposed to a center-based provider) was associated with COVID-19 (OR, 1.59; 95% CI, 1.14–2.23) but revealed no interaction with exposure.

CONCLUSIONS: Within the context of considerable infection mitigation efforts in US child care programs, exposure to child care during the early months of the US pandemic was not associated with an elevated risk for COVID-19 transmission to providers. These findings must be interpreted only within the context of background transmission rates and the considerable infection mitigation efforts implemented in child care programs.

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WHAT'S KNOWN ON THIS SUBJECT: Although often limited by small samples and conducted when child transmission opportunities were limited, studies have revealed that young children are less likely to transmit coronavirus disease 2019 (COVID-19). There are no published studies of COVID-19 transmission in child care.

WHAT THIS STUDY ADDS: Within the context of considerable infection mitigation efforts in US child care programs, exposure to child care during the early months of the US pandemic was not associated with elevated risk for COVID-19 transmission to providers.

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The coronavirus disease 2019 (COVID-19) pandemic has had an unprecedented impact on child care and schools. Within 1 week of the World Health Organization's declaration of a pandemic, 107 countries had implemented national school closures.[1] Within 3 weeks, the number had grown to 194 countries, impacting 91% of the world's school-aged children.[2] When schools closed in the United States, so did many child care programs, demonstrated by the loss of >35% of jobs in the child care industry between February and April 2020.[3] These school and child care closures have been controversial regarding their benefits versus their costs. Precautionary closure of child care programs was reasonable, given considerable evidence that these programs may be significant vectors for viral spread.[4] However, several studies have indicated that school and child care closures may have had little impact on slowing the spread of COVID-19.[1,5,6] Furthermore, child care and school closures may result in several negative consequences, such as child care providers' loss of jobs and wages, parents' inability to return to work, and children's diminished educational, social, and nutritional opportunities.[7]

Pediatricians are key informers to parents about safety issues regarding child care and school attendance during the pandemic. Central to the debate over child care and school reopening is the uncertainty regarding whether children are efficient transmitters of COVID-19. Although there is a relatively low risk of multisystem inflammatory syndrome in children, children appear to be far less likely than adults to be infected with COVID-19 and more likely to be asymptomatic or paucisymptomatic.[8] On the other hand, because viral loads may be similar in symptomatic and asymptomatic carriers of COVID-19, including children,[9,10] there may be a high risk for transmission to other children and adults through asymptomatic children in settings serving large numbers of children, such as child care and schools. Unfortunately, most studies examining pediatric transmission risk were limited by small sample sizes of children and were conducted during widespread child care and school closures, when child transmission opportunities were greatly limited.[11]

In this study, we compare COVID-19 rates in child care providers who continued providing child care during the first 3 months of the COVID-19 pandemic with rates in those who did not, controlling for key individual, programmatic, and community characteristics that may have motivated closure decisions. We conducted a large-scale multistate canvass of the US child care workforce to identify a sufficient number of cases given the cumulative incidence of ~0.8% in the US adult population during the first 3 months of the US outbreak. This is the first known study to estimate directly COVID-19 transmission within child care programs while addressing current research limitations by focusing on transmission opportunity through children actively participating in out-of-home programs and therefore not shielded from COVID-19.[12]

METHODS

Sample and Procedures

To provide a wide canvassing of child care providers, Qualtrics[13] survey links were e-mailed to individuals beginning May 22, 2020, followed by 3 rounds of reminders until the survey closed on June 8, 2020. The participant recall period for program practices was 8 weeks (from April 1 to the median survey administration date of May 27). Survey links were e-mailed to potential respondents through a variety of contact lists consisting mostly of individuals associated with the child care industry. These lists are maintained by 2 large national child care organizations (Child Care Aware of America and National Association for the Education of Young Children) as well as through various state child care workforce registries coordinated by the National Workforce Registry Alliance. Of the 41 state registries coordinated by the National Workforce Registry Alliance, 28 states agreed to participate in this study, 11 were unable to secure permissions quickly enough to participate, and 2 declined.

Data were included from participants who self-identified as child care providers, consented to the study, satisfied inclusion criteria (worked prepandemic as child care providers in direct contact with children), and provided all data necessary to determine both the COVID-19 outcome and child care exposure. The research protocol was approved by the Yale University Institutional Review Board, and all participants indicated their informed consent electronically at the beginning of the survey. Participants were offered entry into a raffle to select 20 winners of a $500 gift card (Table 1).

Variables

Outcome

The key outcome was whether the respondent reported having COVID-19. A value of 1 (case) was assigned if the respondent indicated that they had either (1) tested positive for COVID-19 at least once or (2) been hospitalized for COVID-19. A value of 0 (noncase) was assigned if neither of these conditions was true.

Exposure

Respondents were asked whether their program closed near the beginning of the pandemic (either as required by government or voluntarily), whether the program reopened, and whether the program

TABLE 1 Descriptive Statistics for All Variables for Cases, Noncases in the Logistic Regression Analysis, and Matched Controls in the Case-Control Analysis

	Cases (n = 427)	Noncases (n = 56 908)	Matched Controls (n = 21 350)
Exposure, %			
No	52.2	49.1	51.9
Yes	47.8	50.9	48.1
Race and/or ethnicity, %[a]			
American Indian or Alaskan native	4.6	1.9	2.0
Asian American	2.1	3.5	3.7
African American or Black	23.4	14.7	14.8
Native Hawaiian or other Pacific Islander	0.9	0.5	0.5
White	54.3	72.1	71.7
Prefer to not answer (race)	18.7	9.6	9.6
Hispanic, Latinx, or Spanish origin	34.2	18.6	18.2
Prefer to not answer (ethnicity)	2.8	2.1	2.1
Gender, %			
Female	96.0	97.0	97.0
Male	3.3	2.3	2.3
Nonbinary	0.0	0.2	0.2
Prefer to not answer	0.7	0.5	0.5
Age, y, mean (SD)	45.71 (12.49)	45.97 (12.30)	46.19 (12.31)
Child care type, %			
Center based[b]	65.8	71.4	72.2
Family based or home based	34.2	28.6	27.8
Director or owner of center-based care, %			
No	78.7	73.4	74.2
Yes	21.3	26.6	25.8
Personal COVID-19 health precautions, mean (SD)			
Masks, hand-washing, and/or distancing, 0–3	2.86 (0.40)	2.77 (0.52)	2.80 (0.49)
Avoiding social interactions, 0–3	2.34 (0.89)	2.11 (1.04)	2.13 (1.03)
Avoiding high-risk situations and travel, 0–4	2.64 (0.74)	2.71 (0.67)	2.71 (0.66)
County COVID-19 cumulative death rate, %[c]			
Low (0–0.0561 deaths per 1000)	24.6	33.6	31.2
Moderate (0.0564–0.2180 deaths per 1000)	24.1	34.2	33.0
High (0.2184–13.5248 deaths per 1000)	51.3	32.3	35.8
County household median income, %[c]			
Low ($13 242–$54 976)	27.6	33.6	32.4
Moderate ($54 979–$65 010)	36.3	32.3	33.8
High ($65 027–$136 268)	36.1	34.2	33.8

[a] Race and/or ethnicity options were "check all that apply"; resulting proportions may not add to 100%.

[b] Center-based child care included (1) for-profit centers (32.5%), (2) nonprofit centers (27.4%), (3) school-based centers (16.7%), (4) Head Start centers (13.9%), (5) drop-in centers (2.0%), and (6) other centers (7.4%).

[c] County-level data were trichotomized into proportionally equal thirds.

closed at any time because of a suspected or confirmed case of COVID-19. Exposure was coded as either 1 (exposed to child care during the pandemic) or 0 (not exposed to child care during the pandemic). A value of 1 was assigned if the respondent indicated that during the pandemic, their program remained open, closed but reopened, or closed because of a suspected or confirmed case of COVID-19. A value of 0 was assigned if the respondent indicated that their program was closed during the pandemic or if the respondent indicated that during the pandemic, they either did not report to work or only worked remotely. Child care providers working in open child care programs responded to a series of questions regarding typical group sizes and various infectious disease–mitigating strategies their program may have employed during April 2020 (Table 2).

Confounders

All other variables in Table 1 were included as potential confounders. County-level variables were computed for each respondent's county on the basis of their child care program's reported zip code or (if the program zip code was not provided) the internet protocol address from which the online survey was completed. COVID-19 cumulative death rates were calculated as of May 27, 2020 (the survey median administration date), as a more reliable proxy for community infection rates relative to test-dependent case rates.[14] County-level household median income was obtained from the most recent American Community Survey.[15] County-level variables were trichotomized into proportionally equal thirds.

TABLE 2 Infection-Control Efforts Reported in Open Child Care Programs During April 2020 (N = 20 550)

	Reporting Each Effort Every Day, %		
	Once Daily	Twice Daily	Thrice Daily
Screening			
Child symptom screening	78.4	40.7	—
Child temperature checks	76.1	33.3	—
Staff symptom screening	73.9	35.4	—
Staff temperature checks	69.3	28.3	—
Disinfecting			
All indoor surfaces	90.2	73.9	56.5
All doorknobs, bathroom fixtures, handles	90.3	71.1	54.3
All toys, books, classroom materials	81.7	55.2	39.6
No child-accessible items that are hard to disinfect	75.0	—	—
Hand hygiene			
All children washed hands frequently	92.7	—	—
All staff washed hands frequently	90.2	—	—
Masks and personal protective equipment			
All children (≥2 y old) wore facial masks	11.8	—	—
All adults wore facial masks	35.2	—	—
All adults wore aprons and/or changed clothes before work	61.7	—	—
All adults wore gloves when handling children	33.2	—	—
Cohorting			
No mixing of children between child groups	53.6	—	—
No sharing of items between child groups	67.3	—	—
Social distancing			
Seating or cots ≥6 ft apart	68.0	—	—
Staggered arrival and departure times	51.2	—	—
All children curbside drop-off and/or pickup	78.8	—	—
All child belongings separated	85.8	—	—
No eating family style or sharing food	49.4	—	—

Percentages indicate the proportion of providers reporting that a specific infection-control effort was employed either every day or (for some efforts) twice or thrice daily. —, not applicable.

Given research revealing the importance of nonpharmaceutical interventions in reducing severe acute respiratory syndrome coronavirus 2 transmission,[16] personal COVID-19 health precautions were measured across 3 factors. Personal COVID-19 health precautions were measured by using a 10-item dichotomized (yes or no) checklist of whether the provider followed common health recommendations during their nonwork life. A principal component analysis yielded an interpretable 3-factor solution, accounting for 54.21% of the total variance. Factor 1 was avoiding social interactions, factor 2 was avoiding high-risk situations and travel, and factor 3 was wearing masks, hand-washing, and distancing (scored 0–3, 0–4, and 0–3, respectively). See Table 3 for items and factor loadings.

RESULTS

Participants

A total of 94 390 survey links were accessed by individuals who self-identified as child care providers across all 50 US states, the District of Columbia, and Puerto Rico. Of these individuals, 82 741 satisfied inclusion criteria and consented to the study, and 57 335 (69.3%) chose to participate by providing data necessary to determine both the COVID-19 outcome and child care exposure. See Table 1 for sample descriptive data. The smallest numbers of respondents were obtained from South Dakota (n = 29), Delaware (n = 67), and Utah (n = 69), and the largest numbers were obtained from California (n = 9189), Florida (n = 5232), and Ohio (n = 5076). See Table 4 for a comparison of the analytic sample demographics versus national estimates for child care providers.

Of the respondents, 30.1% accessed the surveys via an unique link e-mailed by the researchers and 69.9% accessed the surveys via an anonymous link e-mailed by one of the various state child care workforce registries. An indicator for the unique versus anonymous link was not significant when entered as a covariate in the full logistic regression model (point estimate, 0.93; 95% confidence interval [CI], 0.69–1.25; P = .62). Also, tests of selective participation revealed only negligible differences across gender, race, and ethnicity ($|\varphi_{(c)}|$ ranging from 0.01 to 0.04), with the exception of age with nonparticipants (mean = 42.07; SD = 12.89) younger than participants (mean = 45.97; SD = 12.31; $P < .001$; d = 0.31).

Child Care Conditions During the COVID-19 Pandemic

Approximately half of respondents (51.4%) reported that their child care

TABLE 3 Personal COVID-19 Health Precautions: Principal Component Analysis With Factor Loadings

	Factor 1	Factor 2	Factor 3
Items			
Asked family and friends not to visit	0.79	—	—
Avoided extended family and friends even if not symptomatic	0.77	—	—
Avoided eating outside of home	0.55	—	—
Avoided close contact with people who were sick	—	0.79	—
Avoided traveling to high COVID-19–infection places	—	0.71	—
Avoided social events they would normally attend	—	0.52	—
Canceled business trips, social trips, vacations	—	0.47	—
Tried to maintain at least 6 ft from others when outside home	—	—	0.75
Wore facial covering or mask almost always when outside home	—	—	0.60
Frequently washed or sanitized hands when outside home	—	—	0.57
Factor statistics			
Eigen value	3.36	1.06	0.99
% variance accounted (from rotated sums of squared loadings)	22.0	18.8	13.4
Cronbach's α	0.75	0.86	0.82

Factor loadings are from Kaiser-normalized varimax rotation, suppressing <0.45. —, not applicable.

program closed near the beginning of the COVID-19 pandemic and remained closed until the time of the survey. Of the 48.6% employed in child care programs that either did not close or reopened during the pandemic, 8.6% reported that their program later closed because of a confirmed or suspected case of COVID-19.

Respondents reported that child care programs that remained open during the early months of the pandemic were operating with smaller-than-typical group sizes and with considerable degrees of infection mitigation efforts in place. Child group sizes across all open programs were on average smaller than what is typical for US child care (center-based programs: mean = 7.57, SD = 4.94; home-based programs: mean = 5.62, SD = 3.20). Most children (81.1%) served in these open programs were <6 years old. See Table 5 for details. Respondents reported high rates (>90%) of frequent staff and child hand-washing and daily disinfecting of indoor surfaces and fixtures. Most respondents reported surface and fixture disinfecting at least 3 times daily. Symptom screening, cohorting (not mixing children and items between child groups), and social distancing measures were also employed frequently. Far fewer respondents reported daily mask wearing of staff (35.2%) or children ≥2 years old (11.8%). See Table 2 for details.

Outcome

To assess the robustness of the findings, we analyzed results using binary logistic regression analysis in 2 different approaches: (1) an unmatched analysis predicting case versus noncase, controlling for covariates, and (2) a case-controlled approach using propensity score–matching.

In the unmatched analysis, we predicted case (n = 427; 0.7%) versus noncase (n = 56 908; 99.3%), controlling for all variables listed in Table 1 and indicators for the state where the child care program was located. Results indicated no association between COVID-19 outcome and exposure to child care

TABLE 4 Comparison of Total Analytic Sample Versus National Estimates of Child Care Provider Demographics and County-Level Descriptions

	Total Analytic Sample	National Estimates
Age, mean, y	45.97	38.70
Men, %	2.3	6.5
Race and/or ethnicity, %		
American Indian or Alaskan native	2.0	0.8
Asian American	3.5	3.9
African American or Black	14.7	15.1
White	72.0	69.9
Hispanic	18.7	22.0
County COVID-19 deaths per 1000, mean	0.34	0.30
County household median income, mean $	64 362	63 179

Age, gender, and race and/or ethnicity comparisons are between the total analytic sample (N = 57 335) and national child care provider estimates based on the 2018 American Community Survey (ACS). ACS data are weighted national averages for individuals with an occupation of child care workers (occupation code 4600) between the ages of 18 and 65. For the ACS, Asian American includes Chinese, Japanese, and other Asian or Pacific Islander; Hispanic includes Mexican, Puerto Rican, Cuban, or other. County COVID-19 deaths per 1000 are the mean deaths per 1000 individuals for the counties of survey respondents versus the US national average. County household median income for survey respondents is the mean of the median annual household income of the counties of the survey respondents constructed by using the 2018 5-year ACS data. County household median income for the national child care provider estimate is the mean median income for the county in 2018 reported by the US Census.

TABLE 5 Percentage of Children by Age Served by Respondents Open During the Pandemic

	All Providers	Center-Based Providers	Home-Based Providers
Infants (<1 y)	8.3	8.2	8.3
Toddlers (1–2 y)	29.7	30.6	29.4
Preschool-aged children (3–5 y)	43.1	50.5	40.0
School-aged children (≥6 y)	18.9	10.8	22.3

(odds ratio [OR], 1.06; 95% CI, 0.82–1.38; P = .66) (Table 6). COVID-19 was associated with high levels of county-level cumulative per capita COVID-19 deaths (OR, 1.60; 95% CI, 1.19–2.15; P = .002). Among covariates, race and ethnicity were associated with COVID-19, specifically being American Indian or Alaskan native (OR, 2.37; 95% CI, 1.46–3.86; P = .001), Latinx (OR, 2.13; 95% CI, 1.63–2.77; P < .001), or African American (OR, 1.97; 95% CI, 1.53–2.53; P < .001). Personal COVID-19 health precautions were also associated with COVID-19; specifically, avoiding high-risk situations and travel was a protective factor (OR, 0.72; 95% CI, 0.62–0.84; P < .001). Avoiding social interactions, such as family gatherings and restaurants, was a risk factor (OR, 1.27; 95% CI, 1.13–1.44; P = .001), perhaps because

TABLE 6 Adjusted Logistic Regression Unmatched Analysis Predicting Cases (n = 427) Versus Noncases (n = 56 908)

	OR	95% Wald CI	P
Exposure to child care			
No	Reference	Reference	Reference
Yes	1.06	0.82–1.38	.66
Race and/or ethnicity			
White	Reference	Reference	Reference
American Indian or Alaskan native	2.37	1.46–3.86	.001
Asian American	0.83	0.42–1.64	.60
African American or Black	1.97	1.53–2.53	<.001
Native Hawaiian or other Pacific Islander	1.86	0.65–5.29	.25
Prefer not to answer (race)	1.59	1.17–2.16	.003
Hispanic	2.13	1.63–2.77	<.001
Prefer not to answer (ethnicity)	1.31	0.69–2.50	.41
Gender[a]			
Female	Reference	Reference	Reference
Male	1.60	0.93–2.75	.09
Prefer not to answer	0.97	0.29–3.23	.98
Age	1.00	0.99–1.01	.78
Child care type			
Center based	Reference	Reference	Reference
Family based or home based	1.25	0.87–1.80	.22
Director or owner (of center-based care)			
No	Reference	Reference	Reference
Yes	0.95	0.72–1.25	.73
Personal COVID-19 health precautions			
Masks, hand-washing, and/or distancing	1.16	0.90–1.50	.24
Avoiding social interactions	1.27	1.13–1.44	.001
Avoiding high-risk situations and travel	0.72	0.62–0.84	<.001
County COVID-19 cumulative deaths			
Low	Reference	Reference	Reference
Moderate	1.13	0.83–1.54	.45
High	1.60	1.19–2.15	.002
County median household income			
Low	Reference	Reference	Reference
Moderate	1.26	0.96–1.65	.10
High	1.03	0.76–1.41	.84
Interaction effects			
Exposure × child care type	0.85	0.54–1.34	.49

The state where the child care program was located (all 50 states, plus the District of Columbia and Puerto Rico) was entered in the logistic regression analysis but is not reflected in the table.

[a] No survey respondents self-identified as nonbinary, so we dropped this value from analysis.

opportunities to attend these were dependent on local transmission rates and business closures. To assess whether covariates significantly moderated the relationship between exposure and outcome, interaction terms for each covariate with exposure were entered into the model, and none reached significance (P values ranging from .09 to .96). A sensitivity analysis was employed to determine if results would differ when directors were removed from the sample. ORs for exposure were similar between the full sample (OR, 1.06; 95% CI, 0.82–1.38; P = .66) and with directors removed (OR, 1.08; 95% CI, 0.79–1.49; P = .62).

In the matched case-control analysis, we further tested the association between exposure to child care and COVID-19 outcome using propensity scores for exposure. We matched controls to cases using 1:50 random matching without replacement with a caliper width set to 0.2 × SD of the logit function.[17] Values used in the propensity score included age, race, ethnicity, gender, director status, county-level COVID-19 death rate, county-level median household income, personal COVID-19 health precaution measures (3 continuous variables), and indicator variables for the state where the child care program was located. Results similarly were not indicative of an association between COVID-19 and exposure to child care (OR, 0.94; 95% CI, 0.73–1.21; P = .64). As opposed to the nonmatched analysis, being a home-based child care provider was associated with a COVID-19 outcome (OR, 1.59; 95% CI, 1.14–2.23; $P <$ .01) but revealed no interaction with exposure (Table 7).

DISCUSSION

This is the first large-scale study of COVID-19 transmission in child care programs. In the study, we used a large sample of US child care providers, and results were robust to different analytic approaches and to various tests of exposure interaction effects. Overall, we found no evidence of child care being a significant contributor to COVID-19 transmission to adults. This finding is consistent with previous studies revealing a lack of association between school closures and transmission rates.[6,18–20]

COVID-19 outcome rates were higher among those who identified as American Indian or Alaskan native, African American or Black, or Latinx as well as those working in counties with high COVID-19 death rates. Conversely, avoiding situations with high risk of infection (eg, people who are sick, traveling to high infection areas, social events) was a protective factor. None of these covariates, however, interacted with exposure to child care, suggesting a lack of association between child care exposure and COVID-19 outcome regardless of these other factors.

These findings must be interpreted within the context of infection mitigation practices within US child care programs during the early months of the COVID-19 pandemic. Child care providers reported small group sizes, averaging ∼8 children per group in centers and 6 children in home-based programs. Also, respondents reported high rates (>90%) of both frequent hand-washing and daily disinfecting of indoor surfaces and fixtures, and most respondents reported surface and fixture disinfecting at least 3 times daily. Symptom screening, cohorting, and social distancing measures were also frequently employed. Although it is unclear whether any of these mitigation efforts significantly reduced transmission, there is no way to know whether these findings would hold in the absence of these infection mitigation efforts. Likewise, these results should not be applied to kindergarten to 12th-grade schools or universities, where students and contexts vary significantly from child care.

Even after adjusting for other variables, community-level transmission remained a significant predictor of child care providers testing positive or being hospitalized for COVID-19, highlighting the importance of reopening child care programs only when background transmission rates are low and decreasing (eg, the World Health Organization threshold of <5% positivity for at least 14 days).[21] Although this study provides evidence that child care may pose a negligible threat to community transmission, communities may pose a considerable threat to child care when background transmission rates are high.[22] Conversely, when background transmission rates are low and managed, transmission within child care programs implementing reasonable infection mitigation efforts may be rare.[23]

Although in our study we focused only on adults as the COVID-19 transmission end point (potentially from children to adults and adults to adults), it is also important to acknowledge the possible transmissions of COVID-19 from adults to children and children to children, which were not measured in our study. Children represent 9.3% of all COVID-19 cases in the United States (as of August 20, 2020),[24] and it is evident that adults are more likely to transmit the virus to children than children are to adults.[12] Because of this likelihood, child care workers should wear face coverings to protect children in child care programs and prevent potential transmission. Furthermore, protective measures against COVID-19 in child care programs are needed because the spread of COVID-19 from child care workers to children may lead to children's family members, including those most vulnerable to the virus (eg, the elderly and individuals with underlying medical conditions)

TABLE 7 Adjusted Case-Controlled Conditional Logistic Regression Analysis Predicting Cases (n = 427) Versus Matched Controls (n = 21 350)

	OR	95% CI	*P*
Exposure to child care	0.94	0.73–1.21	.64
Child care type (family or home based)	1.59	1.14–2.23	<.01
Interaction (child care type × exposure)	0.82	0.53–1.26	.37

Cases were propensity score–matched to controls by using 1:50 random matching without replacement with a caliper width of 0.2 × SD of the logit function. Values used in the propensity score included age, race, ethnicity, sex, director status, county-level COVID-19 death rate, county-level median household income, personal COVID-19 health precaution measures (3 continuous variables), and state where child care program was located (indicator variables).

contracting COVID-19 from their children or grandchildren.[16,25,26]

As a limitation, the sample is not fully representative. Although the ORs were close to 1, it is important to acknowledge the relatively large CIs. Variations in state contexts and policies were controlled statistically, but important policy-level variables may not have been adequately controlled. These data were obtained during spring, and fall 2020 transmission dynamics may be different. This study depends on known infection, but it is possible that some providers had asymptomatic infection. Therefore, current case counts are probably underestimates, and results could change if asymptomatic cases were known and counted. Finally, reliance on self-reported test results may bias findings toward the null; however, the large sample size should allow for detection of even small effects.

CONCLUSIONS

Exposure to child care during the early months of the US COVID-19 pandemic was not associated with elevated odds for COVID-19 among child care workers. These findings, however, must be interpreted within the context of both community transmission rates and child care infection mitigation efforts.

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ABBREVIATIONS

CI: confidence interval
COVID-19: coronavirus disease 2019
OR: odds ratio

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