# Disparities in Unmet Health Care Needs Among US Children During the COVID-19 Pandemic

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## ABSTRACT

**PURPOSE** The COVID-19 pandemic disrupted pediatric health care in the United States, and this disruption layered on existing barriers to health care. We sought to characterize disparities in unmet pediatric health care needs during this period.

**METHODS** We analyzed data from Wave 1 (October through November 2020) and Wave 2 (March through May 2021) of the COVID Experiences Survey, a national longitudinal survey delivered online or via telephone to parents of children aged 5 through 12 years using a probability-based sample representative of the US household population. We examined 3 indicators of unmet pediatric health care needs as outcomes: forgone care and forgone well-child visits during fall 2020 through spring 2021, and no well-child visit in the past year as of spring 2021. Multivariate models examined relationships of child-, parent-, household-, and county-level characteristics with these indicators, adjusting for child's age, sex, and race/ethnicity.

**RESULTS** On the basis of parent report, 16.3% of children aged 5 through 12 years had forgone care, 10.9% had forgone well-child visits, and 30.1% had no well-child visit in the past year. Adjusted analyses identified disparities in indicators of pediatric health care access by characteristics at the level of the child (eg, race/ethnicity, existing health conditions, mode of school instruction), parent (eg, childcare challenges), household (eg, income), and county (eg, urban-rural classification, availability of primary care physicians). Both child and parent experiences of racism were also associated with specific indicators of unmet health care needs.

**CONCLUSIONS** Our findings highlight the need for continued research examining unmet health care needs and for continued efforts to optimize the clinical experience to be culturally inclusive.

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## INTRODUCTION

The COVID-19 pandemic disrupted pediatric health care in the United States through temporary closures of medical offices, cancellation of appointments or transitions to telehealth, and changes in individuals' propensity to seek health care. This disruption layered on existing barriers to health care, such as lack of insurance and prior experiences with health care discrimination, and might have exacerbated previously identified disparities in access to health care and receipt of recommended services.[1-7]

For children aged 3 years through adolescence, American Academy of Pediatrics (AAP) guidelines recommend yearly well-child visits, although children with specific developmental, psychosocial, and chronic disease needs might require more frequent visits.[8] Before the pandemic, data from the Medical Expenditure Panel Survey (MEPS) indicated that only 62.3% of children ages 0 to 18 years were adherent to well-child visits during 2016-2017.[9] Studies conducted during the COVID-19 pandemic also highlight unmet health care needs among children and adolescents, from declining rates of childhood immunizations and well-child visits to reduced access to a range of health services.[10-16]

There is a continued need to characterize the impact of the pandemic on unmet pediatric health care needs, including forgone health care (ie, care that was perceived to be needed but not received) and receipt of well-child visits. Specifically, understanding disparities in unmet health care needs by child-, parent-, household-, and county-level characteristics may help identify intervention targets and priority populations to improve access to care during similar public health emergencies.

*Conflicts of interest: Benjamin Lopman reports personal fees from Epidemiologic Research and Methods and Hillevax. The other authors report none.*

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# METHODS

## Study Sample

We analyzed data from the COVID Experiences Survey (CovEx), a national longitudinal survey, offered in English only, delivered online or via telephone to parents of children aged 5 through 12 years. Participants were recruited from the AmeriSpeak panel of the National Opinion Research Center (NORC). This panel is a probability-based panel designed to be representative of the US household population. It consists of more than 40,000 households across all 50 states, recruited through random sampling.[17]

We used 48 sampling strata based on age, race/ethnicity, education, and gender to select the CovEx sample. The first wave of CovEx was administered from October 8 to November 13, 2020 (1,561 parents participated). All Wave 1 participants were recontacted to participate in Wave 2, which was administered from March 24 to May 7, 2021 (1,287 parents participated; 82% follow-up rate).

This study was approved by NORC's institutional review board and was consistent with applicable federal law and Centers for Disease Control and Prevention (CDC) policy. It was guided by Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for observational research.[18]

## Measures

The primary outcomes of interest were 3 indicators of unmet health care needs: forgone health care of any type during fall 2020 through spring 2021 (hereafter referred to as forgone care), forgone vaccinations or well-child visits during the same period (hereafter referred to as forgone well-child visits), and no well-child visit or vaccine-related visit from the start of the COVID-19 pandemic through approximately spring 2021 (hereafter referred to as no well-child visits). Types of forgone care (eg, sick-child visit, immunizations) and reasons for forgoing this care (eg, afraid of catching COVID-19, difficulty in making an appointment) were also assessed; participants could use an open-text box to specify additional types and reasons. Table 1 summarizes the indicators and constructs related to unmet health care needs that were assessed.

A number of factors theorized to be associated with unmet health care needs across the social ecology were identified, informed by a review of the literature on health care experiences of children before and during the pandemic.[2-5,19-23] At the child level, we examined demographics, health insurance coverage, experiences of racial discrimination, existing health conditions, and mode of school instruction. At the parent level, we examined demographics of the parent who participated in the survey and parental experiences of racial discrimination, which

**Table 1. Indicators and Constructs of Unmet Health Care Needs**

| Indicator/Construct | Question | Definition/Response Options | Data Source |
|---|---|---|---|
| Forgone care | Since [month of first survey] 2020, were any health care services, including medical check-up, well- or sick-child visit, or vaccination appointment for [child name] delayed, missed, or not scheduled for any reason?[a] | Coded according to parent response: yes or no | CovEx Wave 2 |
| Type of care forgone | What health services were delayed, missed, or not scheduled? | Sick-child visit; treatment for injury; well-child check-up or sports physical; immunizations; visit concerning child's development or health in general; mental or behavioral health services; speech therapy, occupational therapy, or physical therapy; substance use treatment; treatment for ongoing illness[b] | CovEx Wave 2 |
| Reason for forgoing care | Did any of the following reasons contribute to [child name] not receiving needed health services? | I could not pay; I did not have health insurance for my child; I did not know where to go; I had no transportation; I thought the problem would go away; I found it hard to make an appointment; I was afraid of what the doctor would say or do; I was afraid of catching COVID-19; I couldn't find a clinic that was open[b] | CovEx Wave 2 |
| Forgone vaccinations or well-child visits | What health services were delayed, missed, or not scheduled?[a] | Coded as yes if parent endorsed forgone well-child check-up or sports physical or immunizations | CovEx Wave 2 |
| No well-child visit or vaccine-related visit | Wave 1: Did [child name] receive the following types of care?<br>Wave 2: Has [child name] received any of the following health care services since [month of first wave] 2020? | Coded as yes if parent did not endorse "in-person well-child visit (including to receive vaccines/immunizations)" at both Wave 1 and Wave 2 | CovEx Wave 1 and Wave 2 |

CovEx = COVID Experiences Survey.

[a] Recall period was approximately 6 months.
[b] Parents could write in additional responses.

were measured using a modified version of the Everyday Discrimination Scale; we explored 2 coding schemes—frequency based (possible range of scores 5-20) and situation based (possible range of scores 0-5)—according to prior literature.[24] Higher scores represent a higher frequency of racial discrimination experienced and a greater number of different situations of racial discrimination experienced, respectively. Household factors included household income and challenges with obtaining childcare. We examined 6 county-level indicators: ratio of population to primary care physicians, urbanicity, residential segregation, percent of children in poverty, percent of children uninsured, and percent of inpatient beds occupied on March 26, 2021 (ie, the midpoint of the Wave 2 survey administration window). These indicators were selected as they captured underlying constructs of interest: health care availability, structural racism, poverty, and health care strain during the COVID-19 pandemic. Supplemental Table 1 provides a complete overview of these measures.

**Table 2. Indicators of Unmet Health Care Needs by Child-, Parent-, Household-, and County-Level Characteristics**

| Characteristic[a] | Overall Sample | Forgone Care, No. (%) or Median (IQR)[b] | | | Forgone Vaccinations or Well-Child Visits, No. (%) or Median (IQR)[b] | | |
|---|---|---|---|---|---|---|---|
| | | Yes | No | *P* Value[c] | Yes | No | *P* Value[c] |
| **Total children** | 1,287 | 214 (16.3) | 1,068 (83.7) | … | 134 (10.9) | 1,148 (89.1) | … |
| **Child level** | | | | | | | |
| Age group | | | | .29 | | | .27 |
| 5-8 years | 557 (43.1) | 93 (14.9) | 461 (85.1) | | 60 (9.6) | 494 (90.4) | |
| 9-12 years | 729 (56.9) | 121 (17.5) | 606 (82.5) | | 74 (11.9) | 653 (88.1) | |
| Sex | | | | .19 | | | .86 |
| Male | 672 (50.6) | 118 (18.0) | 551 (82.0) | | 71 (11.1) | 598 (88.9) | |
| Female | 613 (49.4) | 95 (14.6) | 516 (85.4) | | 62 (10.7) | 549 (89.3) | |
| Race/ethnicity | | | | .05 | | | .006 |
| Non-Hispanic White | 795 (52.1) | 108 (13.2) | 685 (86.8) | | 63 (8.0) | 730 (92.0) | |
| Non-Hispanic Black | 129 (10.3) | 22 (14.8) | 106 (85.2) | | 13 (8.7) | 115 (91.3) | |
| Hispanic | 202 (26.3) | 46 (21.0) | 155 (79.0) | | 30 (14.3) | 171 (85.7) | |
| Non-Hispanic other race or multiracial | 153 (11.3) | 37 (21.6) | 116 (78.4) | | 28 (19.0) | 125 (81.0) | |
| Existing emotional, mental, developmental, behavioral condition | | | | < .001 | | | .05 |
| Yes | 274 (21.8) | 80 (28.0) | 193 (72.0) | | 41 (15.3) | 232 (84.7) | |
| No | 1,008 (78.2) | 132 (13.0) | 873 (87.0) | | 92 (9.7) | 913 (90.3) | |
| Existing physical condition | | | | < .001 | | | .02 |
| Yes | 154 (11.3) | 56 (34.4) | 98 (65.6) | | 29 (17.5) | 125 (82.5) | |
| No | 1,126 (88.7) | 156 (13.9) | 966 (86.1) | | 104 (10.0) | 1,018 (90.0) | |
| Child covered by health insurance | | | | .47 | | | .25 |
| Yes | 1,217 (94.6) | 204 (16.7) | 1,010 (83.3) | | NR[d] | 1,085 (88.7) | |
| No | 60 (5.4) | 10 (12.9) | 49 (87.1) | | NR[d] | 54 (93.5) | |
| Experienced racism | | | | < .001 | | | .001 |
| Yes | 80 (6.2) | 30 (43.3) | 50 (56.7) | | 16 (25.2) | 64 (74.8) | |
| No | 1,203 (93.8) | 183 (14.5) | 1,017 (85.5) | | 118 (10.0) | 1,082 (90.0) | |
| Mode of school instruction | | | | .03 | | | .03 |
| In-person full time or hybrid[e] | 697 (51.7) | 100 (13.1) | 596 (86.9) | | 60 (8.2) | 636 (91.8) | |
| Virtual full time | 457 (39.7) | 87 (19.4) | 367 (80.6) | | 56 (13.2) | 398 (86.8) | |
| Other | 129 (8.5) | 27 (21.8) | 102 (78.2) | | 18 (16.5) | 111 (83.5) | |

IQR = interquartile range; NR = not reported.

[a] See Supplemental Table 1 for details regarding measures, survey questions, data sources, and operationalization for characteristics.
[b] Unweighted numbers and weighted percents for categorical characteristics, and medians and interquartile ranges for continuous characteristics.
[c] *P* values from $\chi^2$ tests with Rao and Scott second-order correction for categorical characteristics and from Wilcoxon rank-sum tests for continuous characteristics.
[d] Suppressed because the unweighted count was ≤5, which could lead to disclosure risks. Accompanying cells are also suppressed to prevent back calculations.
[e] Combination of in-person part time and virtual part time.
[f] For the parent who completed the survey.
[g] Possible range of scores is 5-20. Higher scores represent a higher frequency of racial discrimination experienced.
[h] Possible range of scores is 0-5. Higher scores represent a greater number of different situations of racial discrimination experienced.

Note: See Table 1 for indicator definitions.

### Statistical Analysis

Analyses were conducted with R version 4.1.2 (R Foundation for Statistical Computing), using the "survey" package to account for the complex survey design.[25] We present unweighted numbers and prevalences of indicators of unmet health care needs, types of and reasons for health care forgone, and potential correlates of forgone care at the level of the child, parent, household, and county for the total sample. Unweighted numbers and prevalences or medians and interquartile ranges of characteristics by indicators of unmet health care needs are presented. To test for differences, we conducted $\chi^2$ tests with Rao and Scott second-order correction for categorical characteristics and Wilcoxon rank-sum tests for continuous characteristics. Separate weighted logistic regression models using predicted marginal standardization were fit to examine associations between each selected independent variable and each of the 3 indicators of unmet health care needs while adjusting for age, sex, and race/ethnicity of the child. Adjusted prevalence ratios (APRs) and 95% CIs are presented.

| No Well-Child or Vaccine-Related Visit, No. (%) or Median (IQR)[b] | | |
|---|---|---|
| Yes | No | *P* Value[c] |
| 382 (30.1) | 900 (69.9) | ... |
| | | .07 |
| 154 (26.9) | 398 (73.1) | |
| 228 (32.7) | 501 (67.3) | |
| | | .58 |
| 205 (30.8) | 464 (69.2) | |
| 176 (29.3) | 435 (70.7) | |
| | | .81 |
| 236 (30.6) | 556 (69.4) | |
| 39 (32.1) | 88 (67.9) | |
| 60 (29.6) | 142 (70.4) | |
| 45 (26.3) | 108 (73.7) | |
| | | .004 |
| 60 (21.2) | 213 (78.8) | |
| 320 (32.5) | 684 (67.5) | |
| | | .01 |
| 34 (19.6) | 119 (80.4) | |
| 347 (31.5) | 775 (68.5) | |
| | | .06 |
| 347 (28.7) | 867 (71.3) | |
| 30 (48.7) | 29 (51.3) | |
| | | .92 |
| 24 (30.8) | 55 (69.2) | |
| 358 (30.1) | 842 (69.9) | |
| | | .04 |
| 201 (30.2) | 494 (69.8) | |
| 129 (27.3) | 326 (72.7) | |
| 52 (43.2) | 77 (56.8) | |

*continues*

## RESULTS

According to parent report, 16.3% of children aged 5 through 12 years had forgone care, 10.9% had a forgone well-child visit, and 30.1% had no well-child visit during the pandemic period studied (Table 2). The 2 most reported types of forgone care were well-child check-ups (10.4%) and vaccinations (3.2%), and the 2 most reported reasons for forgone care were being afraid of catching COVID-19 (38.0%) and finding it difficult to make an appointment (18.6%) (Table 3).

After adjustment for child's age, sex, and race/ethnicity, several differences in indicators of unmet health care needs remained (Table 4). Hispanic children and non-Hispanic children of other race or multiple races were 1.6 (95% CI, 1.1-2.3) and 1.7 (95% CI, 1.1-2.6) times more likely to experience forgone care and 1.8 (95% CI, 1.1-2.9) and 2.4 (95% CI, 1.5-3.9) times more likely to experience a forgone well-child visit than non-Hispanic White children. Children with an existing emotional, mental, developmental, or behavioral condition were 2.1 (95% CI, 1.5-2.8) times more likely to experience forgone care and 0.6 (95% CI, 0.5-0.9) times as likely to have had no well-child visit compared with peers without such conditions. Indicators of unmet health care needs also varied by presence of preexisting physical conditions. Those who experienced racism were 2.7 (95% CI, 2.0-3.6) and 2.1 (95% CI, 1.3-3.5) times more likely to experience forgone care and a forgone well-child visit, respectively, compared with counterparts who did not experience racism. Children attending school either in person or through some hybrid format were 0.7 (95% CI, 0.5-1.0) times as likely to have forgone care than peers attending full-time virtual school.

Hispanic parents were 0.6 (95% CI, 0.4-0.9) times as likely to report no well-child or vaccine-related visit compared with non-Hispanic White parents. Those who experienced childcare challenges often or sometimes were almost twice as likely to report forgone care and forgone well-child visits (95% CI, 1.4-2.5 and 1.1-2.4, respectively) and 0.7 times as likely to report no well-child or vaccine-related visits (95% CI, 0.6-0.9). Households with an income of $30,000 to $60,000 and of $60,000 to $100,000 were 1.4 (95% CI, 1.1-1.8 and 1.1-1.9, respectively) times more likely to report their child had no well-child visit than households with an income exceeding $100,000. There appeared to generally be a relationship between a higher ratio of population to primary care

**Table 2. Indicators of Unmet Health Care Needs by Child-, Parent-, Household-, and County-Level Characteristics** *(continued)*

| Characteristic[a] | Overall Sample | Forgone Care, No. (%) or Median (IQR)[b] | | | Forgone Vaccinations or Well-Child Visits, No. (%) or Median (IQR)[b] | | |
|---|---|---|---|---|---|---|---|
| | | Yes | No | *P* Value[c] | Yes | No | *P* Value[c] |
| **Parent[f] or household level** | | | | | | | |
| Age group | | | | .12 | | | .37 |
| 18-29 years | 84 (8.8) | 22 (24.4) | 61 (75.6) | | NR[d] | 70 (85.5) | |
| 30-44 years | 904 (68.1) | 144 (14.6) | 756 (85.4) | | 92 (9.6) | 808 (90.4) | |
| 45-59 years | 258 (21.4) | 40 (17.6) | 218 (82.4) | | 25 (13.5) | 233 (86.5) | |
| ≥60 years | 41 (1.7) | 8 (27.8) | 33 (72.2) | | NR[d] | 37 (86.5) | |
| Sex | | | | .17 | | | .99 |
| Male | 429 (44.6) | 58 (14.5) | 370 (85.5) | | 40 (10.9) | 388 (89.1) | |
| Female | 858 (55.4) | 156 (17.8) | 698 (82.2) | | 94 (10.9) | 760 (89.1) | |
| Race/ethnicity | | | | .16 | | | .04 |
| Non-Hispanic White | 886 (55.2) | 126 (13.8) | 758 (86.2) | | 78 (8.6) | 806 (91.4) | |
| Non-Hispanic Black | 128 (11.3) | 23 (16.2) | 104 (83.8) | | 14 (9.0) | 113 (91.0) | |
| Hispanic | 145 (23.1) | 33 (20.2) | 111 (79.8) | | 19 (14.1) | 125 (85.9) | |
| Non-Hispanic other race or multiracial | 128 (10.4) | 32 (21.3) | 95 (78.7) | | 23 (18.2) | 104 (81.8) | |
| Racial discrimination: frequency-based coding[g] | 5.0 (5.0-9.0) | 7.0 (5.0-12.0) | 5.0 (5.0-7.0) | <.001 | 8.0 (5.0-11.0) | 5.0 (5.0-8.0) | <.001 |
| Racial discrimination: situation-based coding[h] | 0.0 (0.0-3.0) | 2.0 (0.0-5.0) | 0.0 (0.0-2.0) | <.001 | 2.0 (0.0-5.0) | 0.0 (0.0-2.0) | <.001 |
| Experienced childcare challenges | | | | <.001 | | | .009 |
| Often/sometimes | 418 (31.2) | 107 (24.4) | 309 (75.6) | | 69 (15.3) | 347 (84.7) | |
| Rarely/never | 867 (68.8) | 107 (12.7) | 757 (87.3) | | 65 (8.9) | 799 (91.1) | |
| Household income | | | | .29 | | | .57 |
| <$30,000 | 239 (23.2) | 51 (17.8) | 187 (82.2) | | 29 (10.1) | 209 (89.9) | |
| $30,000 to <$60,000 | 327 (27.3) | 63 (19.4) | 261 (80.6) | | 38 (13.3) | 286 (86.7) | |
| $60,000 to <$100,000 | 366 (23.3) | 47 (13.0) | 319 (87.0) | | 27 (8.7) | 339 (91.3) | |
| >$100,000 | 355 (26.1) | 53 (14.8) | 301 (85.2) | | 40 (11.2) | 314 (88.8) | |
| **County level** | | | | | | | |
| Ratio of population to primary care physicians | 1,375.4 (1,079.0-1,943.4) | 1,374.6 (1,111.6-1,909.5) | 1,375.4 (1,078.9-1,943.3) | .83 | 1,354.7 (1,084.7-1,946.8) | 1,377.3 (1,079.0-1,939.3) | .95 |
| Urban-rural classification | | | | .27 | | | .08 |
| Urban | 406 (33.0) | 74 (17.2) | 330 (82.8) | | 44 (11.8) | 360 (88.2) | |
| Suburban | 581 (44.6) | 95 (17.4) | 483 (82.6) | | 65 (12.4) | 513 (87.6) | |
| Rural | 300 (22.4) | 45 (12.9) | 255 (87.1) | | 25 (6.6) | 275 (93.4) | |
| Residential segregation – Black:White index | 52.3 (45.3-62.3) | 50.9 (44.4-58.7) | 52.3 (45.4-62.7) | .28 | 53.1 (45.3-58.7) | 52.3 (45.2-62.4) | .87 |
| Percent of people younger than age 18 years in poverty | 15.6 (10.8-20.1) | 16.3 (10.9-19.9) | 15.4 (10.8-20.1) | .70 | 16.0 (10.8-18.5) | 15.6 (10.9-20.1) | .35 |
| Percent of children younger than age 19 years without health insurance | 4.6 (3.5-7.1) | 4.5 (3.4-7.1) | 4.7 (3.5-7.1) | .36 | 4.4 (3.4-6.5) | 4.7 (3.5-7.2) | .25 |
| Percent of inpatient beds occupied | 72.0 (60.0-80.0) | 72.5 (64.0-79.0) | 72.0 (60.0-80.0) | .68 | 74.0 (66.6-79.0) | 72.0 (60.0-80.0) | .21 |

IQR = interquartile range; NR = not reported.

[a] See **Supplemental Table 1** for details regarding measures, survey questions, data sources, and operationalization for characteristics.
[b] Unweighted numbers and weighted percents for categorical characteristics, and medians and interquartile ranges for continuous characteristics.
[c] *P* values from $\chi^2$ tests with Rao and Scott second-order correction for categorical characteristics and from Wilcoxon rank-sum tests for continuous characteristics.
[d] Suppressed because the unweighted count was ≤5, which could lead to disclosure risks. Accompanying cells are also suppressed to prevent back calculations.
[e] Combination of in-person part time and virtual part time.
[f] For the parent who completed the survey.
[g] Possible range of scores is 5-20. Higher scores represent a higher frequency of racial discrimination experienced.
[h] Possible range of scores is 0-5. Higher scores represent a greater number of different situations of racial discrimination experienced.

Note: See Table 1 for indicator definitions.

| No Well-Child or Vaccine-Related Visit, No. (%) or Median (IQR)[b] | | |
|---|---|---|
| Yes | No | *P* Value[c] |
| | | .39 |
| 24 (24.3) | 57 (75.7) | |
| 271 (29.9) | 631 (70.1) | |
| 77 (33.9) | 181 (66.1) | |
| 10 (20.0) | 31 (80.0) | |
| | | .31 |
| 137 (31.7) | 290 (68.3) | |
| 245 (28.9) | 610 (71.1) | |
| | | .37 |
| 268 (32.5) | 616 (67.5) | |
| 38 (31.9) | 88 (68.1) | |
| 37 (25.3) | 107 (74.7) | |
| 39 (26.1) | 89 (73.9) | |
| 5.0 (5.0-9.0) | 5.0 (5.0-8.0) | .34 |
| 0.0 (0.0-3.0) | 0.0 (0.0-2.7) | .29 |
| | | < .001 |
| 104 (23.3) | 312 (76.7) | |
| 278 (33.3) | 586 (66.7) | |
| | | .10 |
| 78 (30.1) | 159 (69.9) | |
| 102 (33.0) | 224 (67.0) | |
| 124 (33.7) | 241 (66.3) | |
| 78 (23.9) | 276 (76.1) | |
| 1,437.3 (1,144.9-2,059.5) | 1,354.3 (1,049.0-1,877.4) | .007 |
| | | .002 |
| 117 (32.0) | 288 (68.0) | |
| 152 (23.6) | 428 (76.4) | |
| 113 (40.2) | 184 (59.8) | |
| 52.3 (44.5-64.0) | 52.3 (45.4-60.4) | .92 |
| 15.8 (10.9-20.5) | 15.6 (10.7-19.9) | .37 |
| 4.6 (3.5-7.1) | 4.6 (3.5-7.2) | .70 |
| 70.0 (57.0-79.0) | 73.0 (61.0-80.0) | .05 |

physicians (ie, fewer such physicians serving the county) and no well-child visit. Children living in rural counties were 1.7 (95% CI, 1.3-2.2) times more likely to have had no well-child visit and 0.6 (95% CI, 0.4-0.9) times as likely to have experienced forgone well-child visits compared with peers living in suburban counties. Those living in counties in the first or second quartile of percent of inpatient beds occupied (ie, lower occupancy) were 1.4 times more likely (95% CI, 1.0-2.0 and 1.0-1.9, respectively) to have had no-well child visit than counterparts in the fourth quartile.

Parental experiences of racial discrimination according to both the frequency-based and the situation-based coding schemes were associated with forgone care and forgone well-child visits (Figure 1 and Supplemental Table 2). For example, with frequency-based coding, children of parents who reported not experiencing any racism had a model-adjusted prevalence of 11.8% of forgone care, whereas children of parents who reported experiencing racism at the highest frequency across situations had a model-adjusted prevalence of 70.3% of forgone care.

## DISCUSSION

### Findings in Context

Our findings underscore the magnitude of unmet health care needs among children during the COVID-19 pandemic. Of

**Table 3. Types of and Reasons for Forgone Health Care**

| Measure | Children, No. (%) |
|---|---|
| Types of health care forgone[a] | |
| Well-child check-up or sports physical | 125 (10.4) |
| Vaccinations | 36 (3.2) |
| Sick-child visit | 27 (2.3) |
| Mental or behavioral health services | 29 (1.8) |
| Visit concerning child's development | 25 (1.8) |
| Speech, occupational, or physical therapy | 19 (1.0) |
| Treatment for ongoing illness | 14 (0.8) |
| Reasons for forgoing health care[b] | |
| I was afraid of catching COVID-19 | 78 (38.0) |
| I found it hard to make an appointment | 41 (18.6) |
| I had no transportation | 16 (7.5) |
| I did not know where to go | 13 (7.4) |
| I couldn't find a clinic that was open | 16 (6.9) |
| I could not pay | 17 (6.7) |
| I did not have health insurance for my child | 10 (5.5) |
| I thought the problem would go away | 10 (3.6) |
| I was afraid of what the doctor would say or do | 6 (2.6) |

[a] Reported for the entire study population of 1,287 children. Types of health care forgone were not mutually exclusive; respondents could indicate multiple types.
[b] Reported for the subset of 214 children (16.3%) whose parents reported that the child had forgone care. Reasons for forgoing health care were not mutually exclusive; respondents could indicate multiple reasons.

Note: See Table 1 for definition of forgone care.

all the types of health care parents reported forgoing for their child, the most prevalent type was well-child visits, including those specifically related to vaccinations, aligning with numerous studies that have identified missed well-child visits and vaccinations among young children during the pandemic as a major public health concern.[10,15,26-28]

Moreover, several demographic differences in indicators of unmet health care needs were identified. Our finding that Hispanic children were more likely to experience forgone care, including forgone well-child visits, corroborate a broader body of literature on disparities in health care access and receipt among Hispanic populations.[29,30] Lack of health insurance and lower household income brackets being associated with not having a well-child visit and parents reporting insurance- and cost-related barriers as reasons for forgoing care affirm that affordability remains a key component of youth-friendly, accessible health care.[21,31]

In addition to affirming previously identified disparities, our findings suggest the pandemic may have also led to the development of new barriers and disparities in health care based on school format. Children attending school in-person either entirely or through some sort of hybrid model were less likely to have experienced forgone care than peers attending school entirely virtually. Depending on whether a school was open for in-person instruction, there may have been differences in the need for physicals for students to play on sports teams and actions that schools took to facilitate access to care (eg, providing referrals). Additionally, children who are attending school virtually might also have resided in communities where COVID-19–related cancellations of medical appointments and concerns about attending medical facilities were more common.

Parents' and children's experiences of racial discrimination were associated with specific indicators of unmet

**Table 4. Adjusted Associations of Child-, Parent-, Household-, and County-Level Characteristics With Indicators of Unmet Health Care Needs**

| Characteristic[a] | Forgone Care, APR (95% CI) | Forgone Vaccinations or Well-Child Visits, APR (95% CI) | No Well-Child Visit or Vaccine-Related Visit, APR (95% CI) |
|---|---|---|---|
| **Child level** | | | |
| Age group | | | |
| 5-8 years | Ref | Ref | Ref |
| 9-12 years | 1.2 (0.9-1.6) | 1.3 (0.9-1.9) | 1.2 (1.0-1.5) |
| Sex | | | |
| Male | Ref | Ref | Ref |
| Female | 0.8 (0.6-1.1) | 0.9 (0.6-1.4) | 1.0 (0.8-1.2) |
| Race/ethnicity | | | |
| Non-Hispanic White | Ref | Ref | Ref |
| Non-Hispanic Black | 1.1 (0.6-1.9) | 1.1 (0.5-2.2) | 1.1 (0.8-1.5) |
| Hispanic | 1.6 (1.1-2.3) | 1.8 (1.1-2.9) | 1.0 (0.7-1.4) |
| Non-Hispanic other race or multiracial | 1.7 (1.1-2.6) | 2.4 (1.5-3.9) | 0.9 (0.7-1.2) |
| Existing emotional, mental, developmental, behavioral condition | | | |
| Yes | 2.1 (1.5-2.8) | 1.5 (0.9-2.3) | 0.6 (0.5-0.9) |
| No | Ref | Ref | Ref |
| Existing physical condition | | | |
| Yes | 2.4 (1.6-3.5) | 1.6 (1.1-2.6) | 0.6 (0.4-0.9) |
| No | Ref | Ref | Ref |
| Child covered by health insurance | | | |
| Yes | 1.3 (0.6-2.7) | 1.7 (0.7-4.5) | 0.6 (0.4-0.9) |
| No | Ref | Ref | Ref |
| Experienced racism | | | |
| Yes | 2.7 (2.0-3.6) | 2.1 (1.3-3.5) | 1.0 (0.7-1.6) |
| No | Ref | Ref | Ref |
| Mode of school instruction | | | |
| In-person full time or hybrid | 0.7 (0.5-1.0) | 0.7 (0.5-1.0) | 1.1 (0.9-1.4) |
| Virtual full time | Ref | Ref | Ref |
| **Parent[b] and household level** | | | |
| Age group | | | |
| 18-29 years | 1.6 (1.0-2.6) | 1.5 (0.8-2.9) | 0.8 (0.5-1.3) |
| 30-44 years | Ref | Ref | Ref |
| 45-59 years | 1.2 (0.8-1.8) | 1.3 (0.8-2.2) | 1.1 (0.8-1.5) |
| ≥60 years | 1.9 (0.8-4.2) | 1.4 (0.4-4.9) | 0.6 (0.3-1.4) |
| Sex | | | |
| Male | 0.8 (0.6-1.1) | 1.0 (0.7-1.5) | 1.1 (0.9-1.3) |
| Female | Ref | Ref | Ref |
| Race/ethnicity | | | |
| Non-Hispanic White | Ref | Ref | Ref |
| Non-Hispanic Black | 1.2 (0.5-2.8) | 0.9 (0.3-2.2) | 0.8 (0.4-1.7) |
| Hispanic | 1.1 (0.6-1.8) | 1.2 (0.6-2.4) | 0.6 (0.4-0.9) |
| Non-Hispanic other race or multiracial | 1.3 (0.7-2.3) | 1.4 (0.7-2.8) | 0.8 (0.5-1.3) |
| Experienced childcare challenges | | | |
| Often/sometimes | 1.9 (1.4-2.5) | 1.6 (1.1-2.4) | 0.7 (0.6-0.9) |
| Rarely/never | Ref | Ref | Ref |

*continues*

**Table 4. Adjusted Associations of Child-, Parent-, Household-, and County-Level Characteristics With Indicators of Unmet Health Care Needs** *(continued)*

| Characteristic[a] | Forgone Care, APR (95% CI) | Forgone Vaccinations or Well-Child Visits, APR (95% CI) | No Well-Child Visit or Vaccine-Related Visit, APR (95% CI) |
|---|---|---|---|
| Household income | | | |
| < $30,000 | 1.2 (0.7-2.0) | 0.9 (0.4-1.8) | 1.3 (0.9-1.8) |
| $30,000 to < $60,000 | 1.3 (0.8-2.0) | 1.1 (0.7-1.9) | 1.4 (1.1-1.8) |
| $60,000 to < $100,000 | 0.9 (0.5-1.4) | 0.8 (0.4-1.5) | 1.4 (1.1-1.9) |
| ≥ $100,000 | Ref | Ref | Ref |
| **County level** | | | |
| Ratio of population to primary care physicians | | | |
| Q1 (greatest access) | Ref | Ref | Ref |
| Q2 | 1.1 (0.8-1.7) | 1.1 (0.7-1.7) | 1.3 (1.0-1.7) |
| Q3 | 1.0 (0.6-1.9) | 1.4 (0.7-2.7) | 1.4 (1.1-1.8) |
| Q4 (least access) | 1.3 (0.8-2.1) | 1.0 (0.4-2.5) | 1.3 (0.9-1.9) |
| Urban-rural classification | | | |
| Urban | 0.9 (0.6-1.3) | 0.9 (0.5-1.4) | 1.3 (1.0-1.8) |
| Suburban | Ref | Ref | Ref |
| Rural | 0.8 (0.6-1.1) | 0.6 (0.4-0.9) | 1.7 (1.3-2.2) |
| Residential segregation – Black:White index | | | |
| Q1 (least segregation) | 1.2 (0.7-2.0) | 1.2 (0.6-2.5) | 1.2 (0.8-1.7) |
| Q2 | 1.3 (0.9-1.9) | 1.2 (0.7-2.1) | 0.8 (0.6-1.1) |
| Q3 | 1.3 (0.9-1.9) | 1.4 (0.8-2.3) | 0.7 (0.5-0.9) |
| Q4 (most segregation) | Ref | Ref | Ref |
| Percent of people younger than age 18 years in poverty | | | |
| Q1 (least poverty) | Ref | Ref | Ref |
| Q2 | 1.2 (0.8-1.8) | 1.3 (0.8-2.0) | 0.9 (0.7-1.2) |
| Q3 | 1.2 (0.9-1.8) | 0.9 (0.6-1.6) | 1.0 (0.7-1.3) |
| Q4 (most poverty) | 0.9 (0.5-1.5) | 0.5 (0.2-1.2) | 1.2 (0.8-1.9) |
| Percent of children younger than age 19 years without health insurance | | | |
| Q1 (least uninsured) | Ref | Ref | Ref |
| Q2 | 0.8 (0.6-1.2) | 0.8 (0.5-1.3) | 1.0 (0.7-1.3) |
| Q3 | 0.8 (0.5-1.2) | 0.9 (0.5-1.7) | 1.1 (0.9-1.4) |
| Q4 (most uninsured) | 1.1 (0.7-1.7) | 0.8 (0.4-1.7) | 1.0 (0.7-1.4) |
| Percent of inpatient beds occupied | | | |
| Q1 (least occupancy) | 0.9 (0.4-1.8) | 0.7 (0.3-1.9) | 1.4 (1.0-2.0) |
| Q2 | 0.9 (0.5-1.5) | 0.6 (0.3-1.1) | 1.4 (1.0-1.9) |
| Q3 | 1.0 (0.7-1.6) | 0.9 (0.5-1.6) | 1.1 (0.8-1.5) |
| Q4 (greatest occupancy) | Ref | Ref | Ref |

APR = adjusted prevalence ratio; Q1 = quartile 1; Q2 = quartile 2; Q3 = quartile 3; Q4 = quartile 4.

[a] See **Supplemental Table 1** for details regarding measures, survey questions, data sources, and operationalization for all characteristics and indictors of unmet health care needs.
[b] For the parent who completed the survey.

Notes: We fit separate weighted logistic regression models using predicted marginal standardization to examine associations of each selected independent variable with each of the 3 indicators of unmet health care needs while adjusting for age, sex, and race/ethnicity of the child. See Table 1 for indicator definitions.

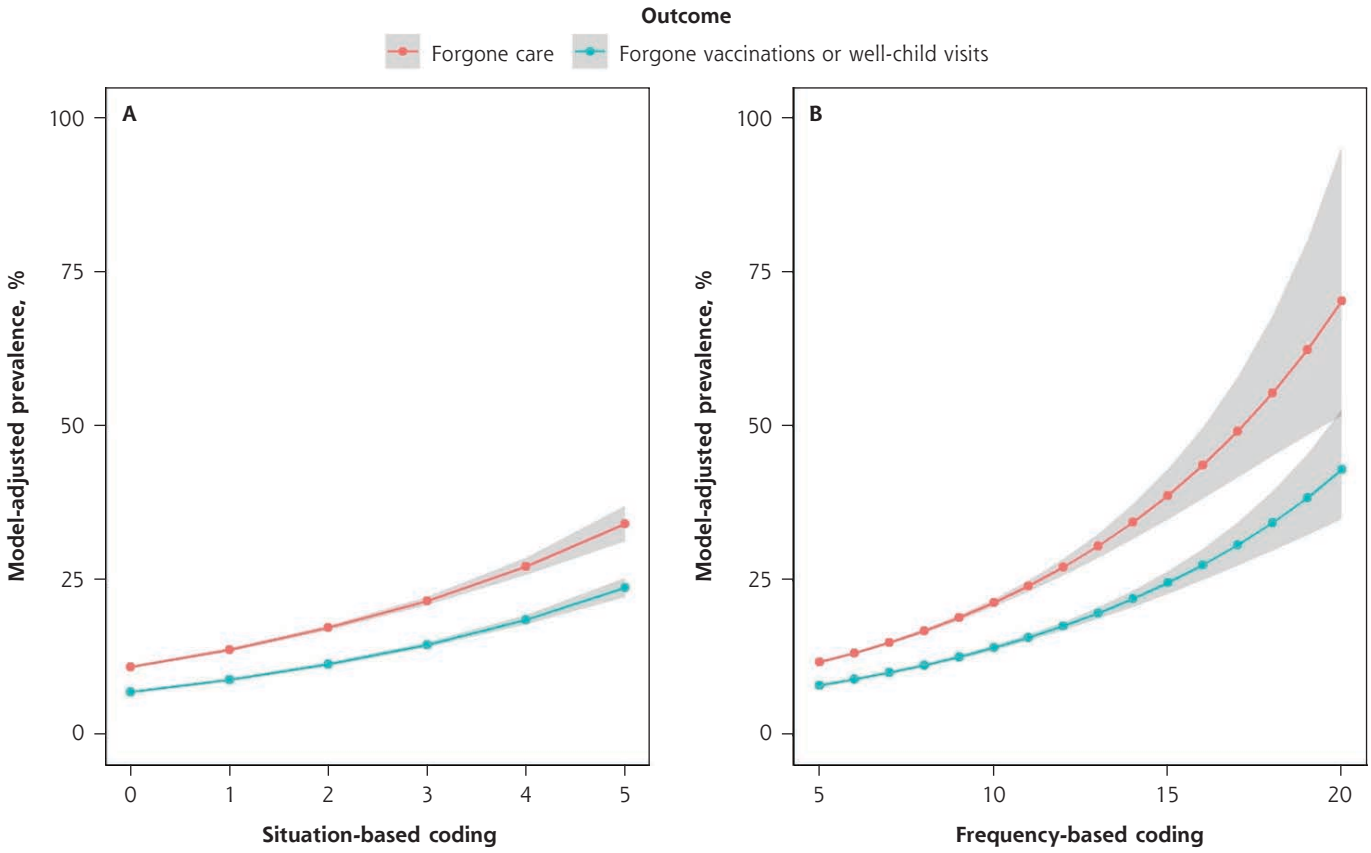
health care needs. These findings extend a growing body of literature documenting how racism affects health care delivery, access, and receipt.[32] Although we focused on how racism was linked with health care experiences during the pandemic, this relationship likely predates the pandemic and the implications of such extend well beyond it. A vast body of literature has linked racism at various levels (ie, interpersonal, structural) with adverse pediatric health outcomes.[33] In the context of health care, experiences of racism captured by the Everyday Discrimination Scale can erode trust in the health care system and lead to delayed or missed health care. Our study, along with recent statements from the CDC and AAP on addressing racism as a driver of health inequities,[23,34] provides impetus for continued work on documenting the impact of racism on health care and the development of interventions to eliminate racism and ameliorate its effects. Youth-serving clinicians can implement communication strategies that embody trust and work to create a culturally inclusive practice.[23,35]

We also found that children living in counties with a lower supply of primary care physicians and in rural counties were more likely to have not had a well-child visit. These findings indicate supply-side constraints on health care uptake, such as availability of health care professionals and suggest that such factors may be particularly important in periods of health care system strain and not equally distributed.

## Limitations

This study has 3 main limitations. First, small sample sizes for types of forgone health care beyond well-child visits and subgroups within the other/multiracial race/ethnicity category precluded more in-depth investigations of specific types of health care (eg, substance abuse treatment) and specific racial groups (eg, indigenous children), respectively. Second, we examined 2 time points during the COVID-19 pandemic; thus, direct comparisons with prepandemic experiences were not possible. Survey administration took place at an earlier phase of the pandemic when community transmission of the virus, access to COVID-19 vaccines, and

**Figure 1. Model-adjusted prevalence of forgone care experiences of children aged 5 to 12 years by parental experiences of racial discrimination.**




Notes: Marginal standardization was used to obtain the model-adjusted prevalence of forgone care by experiences of parental racial discrimination. Logistic regression models adjusted for child's age, sex, and race/ethnicity. Racial discrimination was measured using a modified version of the Everyday Discrimination Scale and coded using (A) situation-based coding (ie, number of different situations of discrimination ever experienced) and (B) frequency-based coding (ie, sum of responses indicating frequency of discrimination experienced across situations). See **Supplemental Table 1** for additional details about operationalization of measures. Gray bands depict 95% CIs. See Table 1 for definition of forgone care.

populations eligible for these vaccines differed from the current landscape, possibly limiting the generalizability of our findings to other time periods. Third, the survey was offered only in English and findings may not be generalizable to the US household population.

## Implications

Beyond this study, broader issues of measurement related to understanding unmet pediatric health care needs are important to acknowledge. Characterizing unmet health care needs likely warrants a broader set of measures that both capture receipt of recommended services (eg, recommendations for well-child visits) and acknowledge differences in children's underlying health care needs and their subjective experience of these needs. This distinction may explain some of the differences we found across examined indicators of unmet health care needs. For example, in this study, children with an existing health condition were more likely to experience forgone care, but they were less likely to have had no well-child visit than children without these conditions. This may be because children with existing conditions possibly have more intensive health care needs requiring more frequent visits and, simultaneously, may also be more cautious in visiting medical care facilities because of health conditions that place them at greater risk for severe COVID-19–related outcomes.

Taken together, our findings underscore the magnitude of children's unmet health care needs during the COVID-19 pandemic and, considering continued disparities, the need for multilevel interventions across clinical and community settings to improve access to and delivery of pediatric health services during future public health emergencies.

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**Key words:** pediatrics; children's health; racism; health care disparities; COVID-19; survey; access to primary care; health services accessibility; barriers; preventive care; vaccination; health services needs; unmet need; public health; vulnerable populations

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**Supplemental materials**

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