

# What is the association between income loss during the COVID-19 pandemic and children's dental care?



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## ABSTRACT

**Background.** The degree to which children experience unmet need for dental care during the COVID-19 pandemic and its association with pandemic-related household job or income loss are unknown.

**Methods.** The authors performed a cross-sectional household survey of 348 families in Pittsburgh, Pennsylvania, from June 25 through July 2, 2020. Unmet need for child dental care and pandemic-related household job or income loss were assessed using caregiver self-report.

**Results.** Caregivers reported that the greatest unmet child health care need during the COVID-19 pandemic was dental care (16%), followed by medical care for a well visit or vaccination (5%). Approximately 40% of caregivers reported job loss or a decrease in household income due to the COVID-19 pandemic. The authors found a significant association between the probability of unmet child dental care and pandemic-related household job or income loss ( $P = .022$ ). Losing a job or experiencing a decrease in income due to the COVID-19 pandemic was associated with unmet child dental care (relative risk, 1.77; 95% confidence interval, 1.08 to 2.88).

**Conclusions.** In this sample, 3 times as many households reported unmet dental care for a child compared with unmet medical care. Unmet child dental care was more common in households where pandemic-related job or income loss occurred.

**Practical Implications.** If unmet dental care continues as a result of the COVID-19 pandemic, nontraditional strategies for delivering dental care can be considered to improve access to dental care for children, such as teledentistry and oral health prevention services in primary care settings.

**Key Words.** Dental care; pandemics; child; socioeconomic factors.

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Access to dental care has been an ongoing challenge for US children, even before the COVID-19 pandemic.<sup>1-3</sup> Caries is the most common chronic disease among US youth<sup>4</sup> with a national prevalence of 45% in children ages 2 through 19.<sup>4</sup> With decreased access to dental care, potential sequelae of unidentified or untreated child caries include pain, infection, and poor academic performance.<sup>1-3,5</sup> Decreased access to dental care can also lead to increased emergency department visits for acute dental pain<sup>6-8</sup> and serious life-threatening events.<sup>9</sup>

To prevent caries in children, professional organizations such as the American Academy of Pediatrics,<sup>10</sup> American Academy of Pediatric Dentistry,<sup>11</sup> and American Dental Association<sup>12</sup> advocate for a dental home to be established no later than 12 months of age. Early dental visits are cost-effective,<sup>13</sup> and state Medicaid programs have a federal mandate to cover the cost of child dental care within the Early and Periodic Screening, Diagnostic, and Treatment benefit.<sup>14</sup>

However, even with the support of professional organizations and public insurance, many families describe challenges to accessing dental care for their children. Cost remains the major barrier to receiving dental care that leads to unmet dental care needs.<sup>15</sup> Although access to child dental care has grown for families with public insurance since the early 2000s, inequitable access continues to be linked to socioeconomic status.<sup>16-18</sup> Additional barriers include difficulty finding a willing dental provider,<sup>19-21</sup> transportation,<sup>22,23</sup> and geographic proximity to dental providers.<sup>24,25</sup>

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During the COVID-19 pandemic, the Centers for Disease Control and Prevention (CDC) issued guidance for providing dental care, which “recommended that dental settings should prioritize urgent and emergency visits and delay elective visits and procedures to protect staff and preserve personal protective equipment and patient care supplies.”<sup>26</sup> In addition, the CDC recommended infection prevention and control practices during the COVID-19 pandemic, such as screening patients for signs and symptoms of COVID-19, physical distancing within the dental office, and following disinfection procedures.<sup>26,27</sup> These recommendations were put forth to decrease the risk of transmitting SARS-CoV-2 during dental treatment and were supported by the American Dental Association, state dental societies, and departments of public health. Dental practices complied with CDC recommendations and reported a decrease in patient care, with more than 95% of dental practices closing completely or opening only for emergency care by the end of April 2020.<sup>28</sup> Since then, gradual reopening has occurred nationally, with 30% of offices open in early May 2020, 65% open in mid-May 2020, and 97% open in mid-June 2020.<sup>28</sup> Although dental practices may have been “open,” almost 64% were seeing lower patient volume than usual according to a survey in mid-June 2020.<sup>28</sup> In addition, dental practices that are open may be experiencing a backlog of dental visits, resulting in delayed visits for patients seeking dental care.

Before the COVID-19 pandemic, dental care was the greatest unmet health care need among children in the United States.<sup>29,30</sup> The aim of this study was to determine the degree to which children in the study population were reported to have unmet need for dental care during the COVID-19 pandemic and whether that reported unmet need was associated with pandemic-related household job or income loss given access barriers associated with loss of employer-provided dental insurance and income. In this cross-sectional study, we did not assess whether there was a change in unmet dental care needs due to the pandemic; rather, we sought to report the level of unmet dental care needs descriptively at 1 point in time. We hypothesized that dental care would be the greatest unmet child health care need, consistent with literature before the pandemic.<sup>29,30</sup> In addition, we hypothesized that families reporting household job loss or decreased income related to COVID-19 would have higher rates of unmet child dental care needs than families not reporting job loss or decreased income.

## METHODS

In April 2020, a partnership of pediatricians, child health researchers, and public health and social service organizations developed a repeated cross-sectional survey, the Family Strengths Survey (FSS),<sup>31</sup> as part of an ongoing academic-community collaborative called “The Pittsburgh Study.” The goal of the FSS was to understand the experiences of families in western Pennsylvania week by week during the COVID-19 pandemic with the recruitment and data collection procedures described in a previously published article.<sup>32</sup> The FSS used an opt-in nonprobability design to recruit adults living in western Pennsylvania with children younger than 18 years living in their household by means of LISTSERVS, social media posts, local newspapers, radio coverage, and texts and e-mails. Consistent with American Association for Public Opinion Research reporting guidelines for survey recruitment using an opt-in nonprobability panel, the participation rate was not reported because the sampling frame was unknown.<sup>33,34</sup> Participants were asked to complete the FSS weekly using an online Qualtrics survey tool or by phone in English or Spanish. They completed the online Qualtrics survey or phone survey anonymously with the option of opting into the chance to win a \$100 gift card distributed weekly. Core survey questions were included in this weekly repeated cross-sectional study. Supplemental questions were added to the survey each week on a 1-time basis in response to emerging concerns. This cross-sectional analysis focused on questions added on a 1-time basis during the week of June 25 through July 2, 2020, approximately 3 months after the pandemic started, which elicited responses from caregivers about unmet child health care needs over the prior 3 months. The University of Pittsburgh Institutional Review Board deemed this project exempt.

The dependent variable, unmet child dental care, was measured using questions from the 2019 National Survey of Children’s Health.<sup>35</sup> The caregiver reported whether dental care was needed and not received by a child in the household. Survey respondents were asked “During the past 3 months, was there any time when this child needed health care but it was not received? By health care, we mean medical care, as well as other kinds of care like dental care, vision care, and mental health services.”<sup>35</sup> If the caregiver answered positively, he or she was asked, “Which types of care

### ABBREVIATION KEY

- CDC:** Centers for Disease Control and Prevention.
- FSS:** Family Strengths Survey.

were not received? Check all that apply” with the following 7 options: Medical Care for a child’s illness or problem, Medical Care for a check-up or well check or shots, Dental Care, Vision Care, Hearing Care, Mental Health Services, and Other.<sup>35</sup> This question, as replicated from the National Survey of Children’s Health, does not specify the reason for unmet dental care. Unmet dental care was a binary variable defined as a positive response to selecting “Dental Care.”

Demographic variables for the caregiver responding to the survey were age (3-level categorical variable: 18-29 years, 30-44 years,  $\geq$  45 years); gender (3-level categorical variable: male, female, different identity/prefer not to answer); and race or ethnicity (5-level categorical variable: Hispanic; non-Hispanic White; non-Hispanic Black or African American; non-Hispanic Asian or Pacific Islander, biracial, multiple races or other race; prefer not to answer). Household descriptive variables were number of adults in the household (count), number of children in the household (count), and income before the COVID-19 pandemic (3-level categorical variable:  $<$  \$50,000, \$50,000-\$74,999,  $\geq$  \$75,000). Household job loss or decrease in income due to the COVID-19 pandemic was a binary variable defined by the caregiver’s positive response to the question, “Have you or another adult in your household lost your job or experienced a decrease in income because of the COVID pandemic?”

Descriptive statistics and graphics were used to explore the distribution of sociodemographic characteristics of the sample, including the relative risk of experiencing unmet child dental care if a household experienced job loss or decrease in income due to the COVID-19 pandemic. All analyses were conducted using STATA 15 (StataCorp).

## RESULTS

In this cross-sectional household survey in western Pennsylvania, 86% of caregivers identified as non-Hispanic White, 66% reported a household prepandemic income of \$75,000 or greater, and the mean family composition was 2 parents and 3 children (Table 1). Approximately 40% (138 of 348, 95% CI, 35% to 45%) of caregivers in the study reported a job loss or decrease in household income due to the COVID-19 pandemic.

Of the 348 families who participated in the survey during the week June 25 through July 2, 2020, caregivers reported that the greatest unmet child health care need during the past 3 months during the COVID-19 pandemic was “Dental Care” ( $n = 54$ , 16%, 95% CI, 12% to 20%), followed by “Medical Care for a check-up or well check or shots” ( $n = 18$ , 5%, 95% CI, 3% to 8%), “Mental Health Services” ( $n = 12$ , 3%, 95% CI, 2% to 6%), “Vision Care” ( $n = 9$ , 3%, 95% CI, 1% to 5%), “Medical Care for a child’s illness or problem” ( $n = 8$ , 2%, 95% CI, 1% to 4%), “Other” ( $n = 6$ , 2%, 95% CI, 1% to 4%), and “Hearing Care” ( $n = 2$ , 1%, 95% CI, 0% to 2%) (Figure). In our sample, caregivers reported that a child in their household needed dental care more than 3 times as often as a child in their household needed medical care for a well visit or vaccination (Figure). We did not find that families without unmet child dental care were different than those with unmet child dental care ( $P > .19$ ) except for 1 characteristic: household job loss or decrease in income due to the COVID-19 pandemic ( $P = .022$ ) (Tables 1 and 2).

The risk of experiencing unmet child dental care in a household that experienced job loss or decrease in income due to the COVID-19 pandemic was 21% (29 of 138) compared with 12% in a household that did not experience job loss or decrease in income due to the COVID-19 pandemic (25 of 210). Losing a job or experiencing a decrease in income due to the COVID-19 pandemic was associated with a greater risk of experiencing unmet child dental care (relative risk, 1.77, 95% CI, 1.08 to 2.88).

## DISCUSSION

We found a significant association between caregiver-reported unmet child dental care and job loss or decreased income in the household due to the COVID-19 pandemic. Similar to before the COVID-19 pandemic,<sup>29,30</sup> unmet dental care was the greatest unmet child health care need. In our sample, unmet child dental care was more common than unmet medical care with a prevalence of 16% and considerably higher than the national prevalence of unmet child dental care among youth aged 1 through 17 years old (2%) before the pandemic.<sup>36</sup>

Before the COVID-19 pandemic, more people in the United States reported financial barriers to receiving dental care than any other type of health care.<sup>15</sup> Financial barriers to dental care are now magnified during a time of job loss and decreased household income during the COVID-19

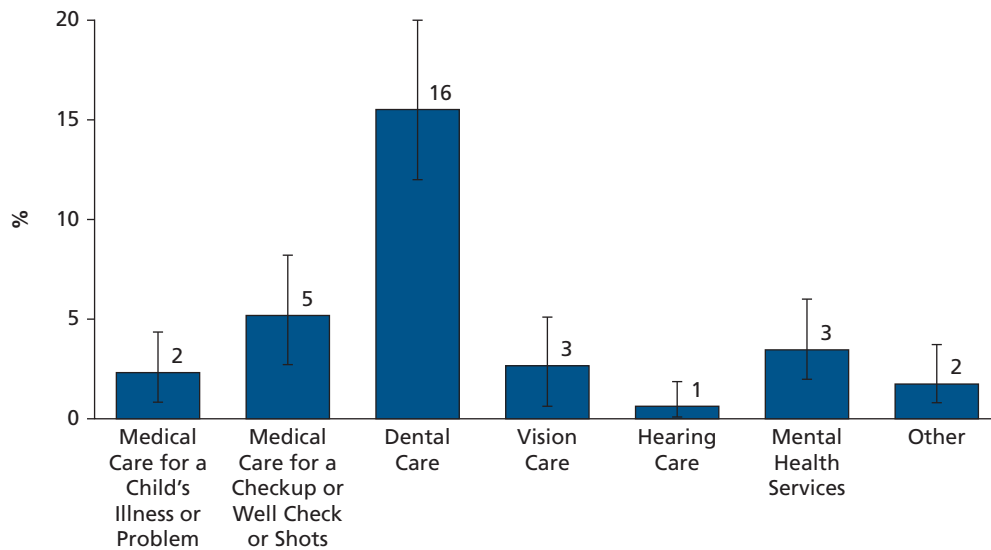
**Table 1.** Characteristics of households in The Pittsburgh Study's Family Strengths Survey from June 25, 2020, through July 2, 2020, by unmet or no unmet child dental care (n = 348).\*

DEMOGRAPHICS	UNMET CHILD DENTAL CARE <sup>†</sup> (n = 54) <sup>‡</sup>	NO UNMET CHILD DENTAL CARE (n = 294)	P VALUE <sup>§</sup>
<b>Caregiver Characteristics</b>			
Age, y (No. [%])			.43
18-29	3 (5.6)	9 (3.1)	
30-44	38 (70.4)	205 (69.7)	
≥ 45	13 (24.1)	75 (25.2)	
Missing	0 (0.0)	5 (1.7)	
Gender, No. (%)			.98
Male	5 (9.3)	25 (8.5)	
Female	48 (88.9)	263 (89.5)	
Different identity/prefer not to answer	1 (1.8)	6 (2.0)	
Race/Ethnicity, No. (%)			.19
Hispanic	0 (0.0%)	14 (4.8)	
Non-Hispanic White	52 (96.3)	249 (84.7)	
Non-Hispanic Black or African American	0 (0.0)	13 (4.4)	
Non-Hispanic Asian or Pacific Islander, biracial, multiple races or other race	1 (1.9)	11 (3.7)	
Prefer not to answer/Missing	1 (1.9)	7 (2.4)	
<b>Household Characteristics</b>			
Household composition (mean [standard deviation] number; range) <sup>¶</sup>			
Adults	1.9 (0.7; 1-6)	2.1 (1.2; 1-20)	.21
Children	3.1 (1.1; 2-6)	3.0 (1.1; 1-12)	.87
Household income before COVID-19 pandemic, \$ (no. [%])			.84
< 50,000	10 (18.5)	50 (17.0)	
50,000-74,999	8 (14.8)	37 (12.6)	
≥ 75,000	34 (63.0)	197 (67.0)	
Missing	2 (3.7)	10 (3.4)	
Household job loss or decrease in income due to COVID-19 pandemic, no. (%) <sup>¶</sup>			.02
Yes	29 (53.7)	109 (37.1)	
No	25 (46.3)	185 (62.9)	

\* Due to rounding, percentages may not add to exactly 100%. † Unmet child dental care was defined as caregiver-reported needed dental care that was not received by a child in the household. ‡ N: Number of participants in stratum. § P values are for  $\chi^2$  tests or t tests comparing unmet child dental care and no unmet child dental care groups. For the  $\chi^2$  test, "don't know" and "missing" values were excluded and categories were combined if the expected count for a particular cell was < 5 to satisfy the test's assumptions. ¶ Defined by the caregiver's positive response to the question, "Have you or another adult in your household lost your job or experienced a decrease in income because of the COVID pandemic?"

pandemic. These results are supported by a poll conducted by National Public Radio, Robert Wood Johnson Foundation, and Harvard T. H. Chan School of Public Health, which found that more than one-half of the 3,500 US households surveyed reported serious financial problems during the COVID-19 pandemic.<sup>37</sup>

Although we do not know the specific reasons for unmet dental care, it is possible that the high levels of unmet dental care need could reflect routine preventive care or greater need for treatment resulting from caries. The national and independent nonprofit organization FAIR Health found that caries rose from the fifth- to the fourth-most common dental-related diagnosis in hospital emergency departments from January and February 2020 through March and April 2020.<sup>38</sup> They also found that dental care service use for those with private insurance fell 76% in March 2020 and 81% in April 2020 compared with the same months in the previous year for children 14 and younger.<sup>38</sup> The



**TYPE OF UNMET CHILD HEALTH CARE IN THE LAST THREE MONTHS**

**Figure.** Percentage of households reporting unmet child health care in the past 3 months in the Pittsburgh Study's Family Strengths Survey from June 25, 2020, through July 2, 2020 (N = 348). Error bars indicate 95% confidence intervals.

**Table 2.** Unmet child dental care\* by household job loss or decrease in income due to the COVID-19 pandemic† (n = 348).

HOUSEHOLD JOB LOSS OR DECREASE IN INCOME DUE TO THE COVID-19 PANDEMIC	UNMET CHILD DENTAL CARE		
	Yes	No	Total
Yes	29	109	138
No	25	185	210
Total	54	294	348

\* Defined as caregiver-reported needed dental care that was not received by a child in the household. † Defined by the caregiver's positive response to the question, "Have you or another adult in your household lost your job or experienced a decrease in income because of the COVID pandemic?" Losing a job or experiencing a decrease in income due to the COVID-19 pandemic was associated with a greater risk of experiencing unmet child dental care (relative risk, 1.77, 95% CI, 1.08 to 2.88).

COVID-19 pandemic has also resulted in limited access to comprehensive dental treatment under general anesthesia for children,<sup>39,40</sup> which could result in unmet dental care needs.

Our findings highlight the impact of the COVID-19 pandemic for all families in the study, whether they receive care through private or public dental health care system.<sup>1-3,16,41</sup> In the private dental care delivery system, private dental practices serve approximately two-thirds of the US population and are financed by employer-provided commercial dental benefits with high out-of-pocket dental health care expenses compared with overall out-of-pocket health spending.<sup>1-3,16,41</sup> In the public dental care delivery system, the dental safety net system including federally qualified health centers, school-based health centers, and academic dental institutions strives to cover dental care for the remaining one-third of the US population who may be underserved due to income, lack of dental insurance, rural location, and systematic disadvantage due to race, ethnicity, and immigration status.<sup>2,3,41</sup> There was no difference in pandemic-related job loss or loss of income across the different levels of household income (data not shown), so the acute change of the COVID-19 pandemic affected unmet dental care needs for children across the entire study population.

For families in the private dental health care system, changing family financial circumstances may have rendered high out-of-pocket dental health care expenses no longer affordable, resulting in unmet child dental care. Therefore our results call attention to the consequences of financing oral health care services through employee-sponsored dental insurance and fee-for-service care. A

restructuring of the oral health delivery system would be needed to promote oral health even in times of changing financial situations, such as a pandemic.

In light of the financial barriers to child dental care for households that access dental care through the dental safety net system, the Centers for Medicare & Medicaid Services is continuing to bolster the second tier of the dental health care system with a continuation of the Oral Health Initiative, which helps states provide access to dental and oral health care services for children enrolled in Medicaid and the Children's Health Insurance Program.<sup>42</sup>

For both the private and public dental health care systems, there are opportunities to improve access to dental care for US children, including teledentistry,<sup>43-46</sup> a focus on caries prevention strategies including topical fluoride and sealants,<sup>47</sup> and minimally invasive dental care services that do not generate aerosols.<sup>48</sup> These evidence-based strategies offer opportunities to enhance care in general, but specifically during the COVID-19 pandemic in which physical distancing and avoidance of aerosolizing procedures are important.

In addition, there are a myriad interprofessional opportunities to promote child oral health by engaging nondental health professionals including physicians, social workers, dietitian nutritionists, and community health workers to educate families about child oral health knowledge and prevention practices.<sup>44,49</sup> With less unmet child medical care than dental care in our sample, the delivery of preventive oral health care services during medical visits<sup>49-53</sup> may be a strategy for overcoming the barriers to child preventive dental care during the pandemic.

Finally, we can combat the increased need for child dental care by focusing on preventing caries in children. The COVID-19 pandemic is a call to action to reinvigorate our efforts in primary prevention for oral health, with a particular focus on solutions that promote oral health for all people in the United States regardless of employment or income.<sup>54,55</sup>

### Limitations

This study had several limitations. Our results may be subject to reporting bias and measurement error owing to the use of self-reported data and lack of specificity on unmet dental care. For example, unmet dental care could be for a dental prophylaxis or an untreated and emergent dental trauma. The results also may not be generalizable, particularly because this study was a convenience sample composed of mostly white families with high incomes. Finally, this study is cross-sectional, which does not allow for causal inference between income and unmet child dental care.

### CONCLUSIONS

Three months into the COVID-19 pandemic, we found that dental care was the greatest unmet health care need among children, with more households reporting unmet child dental care than unmet child medical care in our sample. In addition, unmet child dental care was more common in households where pandemic-related job or income loss occurred. If unmet dental care continues as a result of the COVID-19 pandemic, nontraditional strategies for delivering dental care may need to be considered to improve access to dental care for US children, such as teledentistry and oral health prevention services delivered in primary care settings. An investment in dental public health efforts is also needed to decrease the burden of dental disease and potentially decrease the level of unmet dental care among US children during the COVID-19 pandemic. Finally, the COVID-19 pandemic has stressed the financial system that supports the delivery of dental care services, revealing that changes are required to support access to dental care during times of changing financial situations. ■

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