

Kristen Figas, EdS; Theodoros Giannouchos, PhD, MS; Elizabeth Crouch, PhD

- Rural and urban children and adolescents had similar lifetime prevalence of anxiety prior to and during the COVID-19 pandemic, but the prevalence of anxiety amongst urban children and adolescents increased during the pandemic, whereas the prevalence of anxiety amongst rural children and adolescents remained stable.
- Rural children and adolescents, compared to urban children and adolescents, had a higher lifetime prevalence of depression prior to the COVID-19 pandemic, but the prevalence of depression did not increase during the first year of the pandemic for urban or rural children and adolescents.
- While rural children and adolescents had a higher lifetime prevalence of behavioral problems prior to the COVID-19 pandemic, the prevalence of behavioral problems amongst urban but not rural children and adolescents increased over time. Additionally, rural children and adolescents experienced more severe behavioral problems than urban children and adolescents prior to the pandemic.

Rural-Urban Differences in Child and Adolescent Mental Health Prior to and During the COVID-19 Pandemic: Results from the National Survey of Children's Health

BACKGROUND

Prior to the COVID-19 pandemic, it was estimated that one out of every six children and adolescents had been diagnosed with a mental health condition,¹ and recent research suggests that the rate of mental health conditions among these individuals has been rising.² The closure of schools and resulting interruption of critical sources of social support in response to the COVID-19 pandemic has stoked fears of unprecedented levels of loneliness, anxiety, and depression.³ Evidence from the early stages of the pandemic suggested broadly declining mental health among children and adolescents. Alongside rising anxiety, depression, and substance use,^{4,6} there has been a sharp increase in child and adolescent mental-health related emergency department visits and mental health-related insurance claims.⁶ Moreover, the pandemic's impact on mental health has not been evenly distributed. Research suggests particularly deleterious outcomes amongst low income and racially and ethnically minoritized children and adolescents.⁷ We use the term "minoritized" to refer to groups that have historically been marginalized by society and government institutions.

While the recent U.S. Surgeon General's advisory on child and adolescent mental health⁸ highlights a number of subgroups hypothesized to be at greater risk of mental health challenges during the pandemic, including rural youth, little is known about how the pandemic has interacted with geography to differentially impact mental health outcomes for urban and rural children and adolescents. This study fills a critical gap by comparing rural-urban estimates of mental health

conditions to evaluate the relationship between the COVID-19 pandemic and child and adolescent mental health. In this policy brief, we analyze data from a large, national sample of children and adolescents to examine similarities and differences between rural and urban mental health outcomes prior to and during the COVID-19 pandemic and to propose priorities for policy and program development.

METHODS

Data were drawn from the 2018-2019 and 2020 public use National Survey of Children’s Health (NSCH). The NSCH is an online and mail survey of U.S. households with children and adolescents ages 0-17 years; parents or guardians answered questions regarding the child’s physical and emotional health.⁹ Congruent with the language used in the NSCH, we utilize the term child(ren) to refer to both children and adolescents throughout the remainder of this brief. The 2018 data were collected between June 2018 and January 2019. The 2019 data were collected between June 2019 and January 2020. The 2020 data were collected between July 2020 and January 2021. Thus, the 2018-2019 data reflect pre-COVID conditions, while the 2020 data reflect conditions during the first year of the COVID-19 pandemic. To examine differences between pre-COVID conditions and conditions during the pandemic, combined data from 2018 and 2019 were compared with data from 2020.

A total of 102,740 survey responses were collected including 30,530 surveys in 2018, 29,433 surveys in 2019, and 42,777 surveys in 2020. Our sample was limited to cases with geographic information (63,874) and complete responses to the variables of interest (57,887) which reflects children 3-17 years of age (since mental health questions began at age 3).¹⁰⁻¹¹ In total, we compared 32,923 children from 2018-2019 with 24,964 children from 2020.

Youth mental health was measured via questions from the Emotional and Mental Health module assessing whether parents had been told by a doctor that their child had anxiety, depression, or conduct problems; whether their child currently was experiencing any of those problems; and the severity of current symptoms. Table 1, below, includes the precise NSCH questions used to assess each content area.

Table 1: NSCH Questions Assessing Youth Mental Health

Youth Mental Health	<ol style="list-style-type: none"> 1. Has a doctor or other healthcare provider EVER told you that this child has anxiety problems? 2. If yes, does the child CURRENTLY have the condition? 3. If yes, what is the severity? 4. Has a doctor or other healthcare provider EVER told you that this child has depression problems? 5. If yes, does the child CURRENTLY have the condition? 6. If yes, is it Mild, Moderate, or Severe? 7. Has a doctor or other healthcare provider EVER told you that this child has behavioral or conduct problems? 8. If yes, does the child CURRENTLY have the condition? 9. If yes, is it Mild, Moderate, or Severe?
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FINDINGS

Survey Participant Characteristics

The majority of children sampled resided in an urban area (91.4%) and came from a household with two parents who were married (64.9%) at the time of the surveys (see Table 1). Most caregiver respondents spoke English as their primary language (13.5% had a primary language other than English) and had at least some college education (73.6%). More than one in six children (17.4%) lived in households with income below the federal poverty level although the proportion of the sample living below the federal poverty line was smaller in 2020 than 2018-2019 (18.4% in 2018-2019 vs. 16.4% in 2020; $p = .018$). Slightly more than half of the children sampled were male (51.1%) and non-Hispanic white (50.7%). Children between ages 10 and 14 comprised the greatest subset of the sample (28.9%), followed by children aged 3-4 years (27.1%), children aged 5-9 years (27.4%), and youth aged 15-17 years (16.6%). Nearly one fifth of the children had special needs (19.9%). For these child-level variables, no significant demographic differences were observed between 2018-2019 and 2020.

In terms of healthcare, more than half of the children received care from a professional considered to be their personal doctor or nurse (56.2%) with the remainder receiving care from more than one person (17.9%) or not having a regular healthcare provider (25.9%). Most families had private health insurance coverage (62.5%) and an additional one-third (32.1%) had public health insurance coverage; however, only one in six children (16.9%) had health insurance that covered their mental health needs. A significantly greater proportion of children had insurance that consistently covered their mental health needs in 2020 than in 2018-2019 (7.8% in 2018-2019 vs. 25.8% in 2020, $p < .001$). Additional demographic data disaggregated by survey time period are included in Table A-1 in the Appendix.

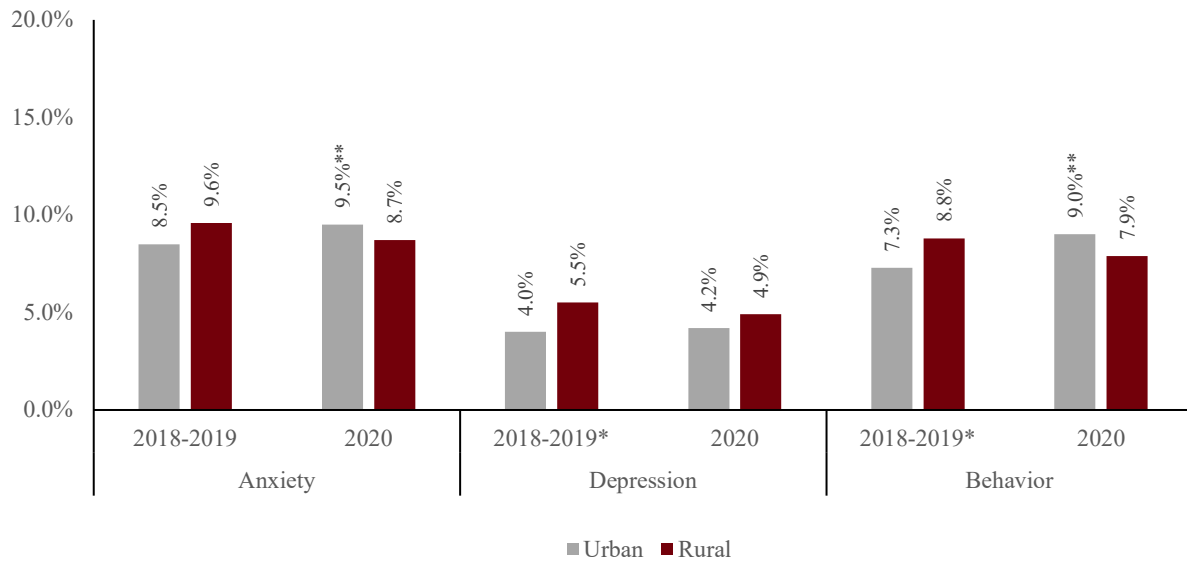
Lifetime Prevalence of Child and Adolescent Mental Health Conditions

Rural and urban children experienced similar levels of anxiety prior to and during the COVID-19 pandemic. The percentage of urban children who have ever had anxiety increased during the pandemic (8.5% in 2018-2019 vs. 9.5% in 2020, $p = .0385$); however, the same increase was not observed in rural children (Figure 1).

Relative to urban children, rural children had a higher lifetime prevalence of depression prior to the COVID-19 pandemic (5.5% rural vs. 4.0% urban, $p = .018$) but not during the pandemic (Figure 1). The prevalence of depression did not increase significantly during the pandemic for rural or urban children.

Compared to urban children, rural children had a higher lifetime prevalence of behavioral or conduct problems prior to the pandemic (8.8% rural vs. 7.3% urban, $p = .015$) but not during the pandemic (Figure 1). The percentage of urban children who have ever had behavioral or conduct problems increased during the pandemic (7.3% in 2018-2019 vs. 9.0% in 2020, $p < .001$) while the percentage of rural children with behavioral problems did not change significantly over time.

Figure 1. Prevalence of Child and Adolescent Mental Health Conditions Prior to and During the COVID-19 Pandemic



*statistically significant urban-rural
 **statistically significant within location across time

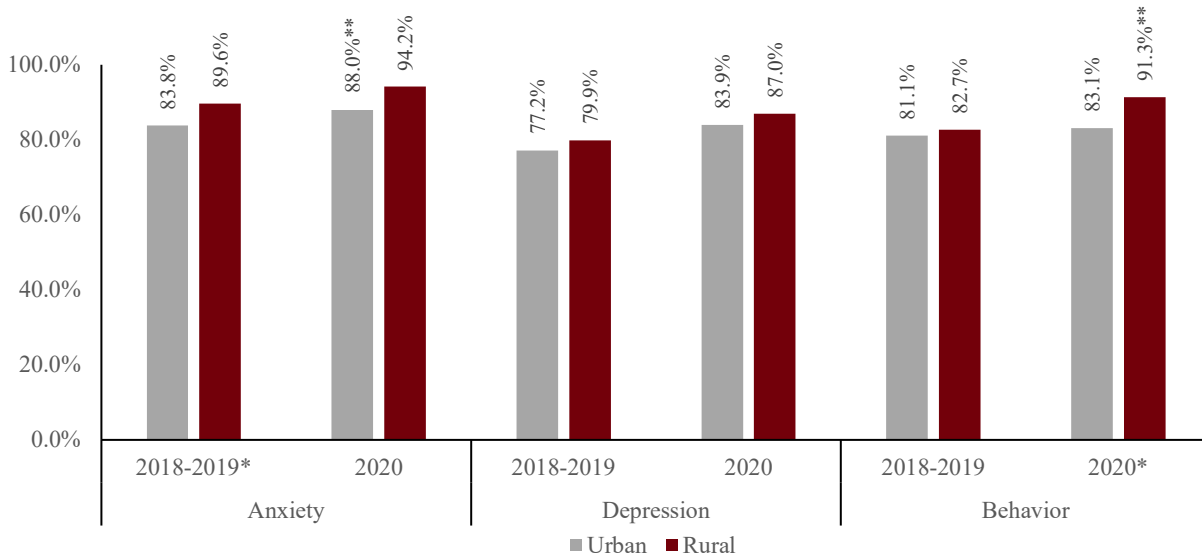
Current Prevalence of Child and Adolescent Mental Health Conditions

Of the children who have ever had anxiety, a higher percentage of rural children were reported to have anxiety prior to the pandemic (89.6% rural vs. 83.8% urban, $p = .001$). A similar but nonsignificant pattern was observed during the pandemic (Figure 2). During the pandemic, current anxiety increased in urban children (83.8% in 2018-2019 vs. 88.0% in 2020, $p = .003$). Current anxiety also increased in rural children albeit not significantly.

Of the children who have ever had behavioral or conduct problems, a greater percentage of rural children experienced behavioral or conduct problems during the pandemic (91.3% urban vs. 83.1% rural, $p = .01$) but not prior to the pandemic (Figure 2). Rural children experienced an increase in current behavioral problems during the pandemic (82.7% in 2018-2019 vs. 91.3% in 2020, $p = .047$) whereas urban children did not.

No urban-rural differences were observed in current prevalence of depression either before or during the pandemic (Figure 2).

Figure 2. Percentage of Children with a Mental Health Condition Who Had Current Symptoms Prior to and During the COVID-19 Pandemic



*statistically significant urban-rural
 **statistically significant within location across time

Severity of Child and Adolescent Mental Health Symptoms

No differences in the severity of anxiety or depression were observed between urban and rural children prior to or during the pandemic (Table 2). Similarly, neither urban nor rural youth experienced a meaningful change in severity of symptoms in response to the pandemic.

On the other hand, the severity of behavioral problems differed between urban and rural children (Table 2). Prior to the pandemic, a higher percentage of rural children were reported to have severe behavioral problems (18.1% rural vs. 11.5% urban, $p = .006$). However, no differences between urban and rural youth were observed during the pandemic. Additionally, the severity of behavioral problems did not change significantly across time for either group.

Table 2. Severity of Child and Adolescent Mental Health Symptoms Prior to and During the COVID-19 Pandemic

		Anxiety		Depression		Behavior	
		2018-2019	2020	2018-2019	2020	2018-2019	2020
Urban	Mild	49.3%	47.9%	44.2%	42.7%	43.9%	44.8%
	Moderate	41.8%	42.7%	44.7%	46.9%	44.6%	45.0%
	Severe	8.9%	9.5%	11.2%	10.4%	11.5%*	10.2%
Rural	Mild	41.9%	48.8%	61.3%	66.9%	36.9%	45.2%
	Moderate	48.5%	43.6%	35.0%	26.4%	45.0%	36.1%
	Severe	9.6%	7.6%	3.7%	6.8%	18.1%*	18.6%

*statistically significant urban-rural

CONCLUSIONS

Considering recent evidence of declining child and adolescent mental health, it is important to examine differences in prevalence of childhood mental health conditions by setting and across time to better understand the changing needs of youth and to adapt policies and initiatives to the current climate. This study investigated urban-rural differences in the prevalence of childhood mental health conditions prior to and during the COVID-19 pandemic. Overall, our findings suggest that rural children experienced greater mental health concerns prior to the pandemic, but urban children suffered greater declines in mental health in response to the pandemic.



Compared to their urban counterparts, rural children had a higher prevalence of anxiety, depression, and behavioral problems. Prior to the pandemic, rural children had more severe behavioral problems than urban children although these between-group differences levelled out during the pandemic. Extending recent research on the adverse effects of COVID-19 on mental health,^{4,7} we found evidence that the prevalence of childhood anxiety and behavioral problems increased during the pandemic for urban but not rural children. In contrast, neither urban nor rural youth experienced an increase in depression during the first year of the pandemic, contradicting previous findings.⁵

Considering previous literature suggesting increased risk for mental health challenges and increased exposure to adverse childhood experiences (ACEs) amongst rural children,¹²⁻¹³ we found that the pandemic has more severely impacted the mental health of urban children. These findings offer important insights into more targeted initiatives for the ongoing youth mental health crisis. Most notably, these findings can inform decisions regarding how to mobilize and allocate limited mental health resources toward the youth at greatest risk for adverse developmental outcomes. Although the most recent data indicate urban and rural youth are experiencing similar rates of anxiety, depression, and behavioral problems, the upward trend amongst urban youth warrants special attention and continued monitoring. Future research examining differences by rurality as well as socioeconomic status, developmental period, gender, and race/ethnicity would be advantageous for further tailoring policy decisions and prevention and intervention programming.

The somewhat contradictory findings from early studies of the impact of COVID-19 on youth mental health also highlight the need to improve mental health screening to accurately evaluate the impact of the pandemic on youth mental health and to facilitate early identification and intervention. Indeed, a recent letter jointly issued by six governmental agencies highlighted the need to expand mental health screening in school, community, and virtual settings.¹⁴ Widespread screening is a vast undertaking and will require substantial funding for adequate staffing and screening instruments, as well as top-down support to communicate the importance of screening and promote sustainability.

Finally, it should be noted that the data presented herein reflect preliminary findings from the first year of the COVID-19 pandemic. It is likely that the effects of the pandemic on youth mental health are not yet fully realized. As well, the National Survey of Children's Health's survey sample has an urban representation that is disproportionately high relative to share of the total U.S. population. Future research should continue to monitor disaggregated youth mental health outcomes over subsequent years of the pandemic to examine possible differences in cumulative

effects and identify underlying risk and protective factors for urban and rural youth to inform real-time adjustments to policies, infrastructure, and prevention and intervention initiatives.

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APPENDIX

Measures

Residence was classified using 2013 Rural Urban Commuting Area (RUCA) codes which measures rurality at the census tract level.¹⁵ The use of RUCA rather than county allowed for inclusion of rural areas in large urban counties which cover many areas of the West. This study did not use the FORHP definition which adjusts for some larger area census tracts.

Race and ethnicity were self-reported by the parent and classified as non-Hispanic white, Non-Hispanic Black, Hispanic, and “Other” racial groups.

Nine total questions measured various aspects of youth mental health. The same three questions (assessing lifetime prevalence, current experience, and severity of symptoms) were posed for anxiety, depression, and behavioral problems (see Table 1).

Analysis

Sociodemographic and socioeconomic characteristics of the sample were analyzed via descriptive statistics with bivariate analyses employed to examine differences across urban and rural youth. Descriptive statistics and bivariate analyses were likewise used to estimate the unadjusted associations, frequencies, and proportions. Appropriate survey sampling weights, cluster, and strata were used as instructed by the NSCH. Values $p < 0.05$ were considered statistically significant.

Table A-1. Characteristics of Children ages 3 – 17, National Survey of Children’s Health in Total and Stratified by Survey Year

Characteristic	All	2018-19	2020	P-value
	%	%	%	
<i>Characteristics of Child</i>				
Sex of Child				0.884
Male	51.1	51.6	51.4	
Female	48.9	48.4	48.6	
Age of Child				0.921
3 to 4 years old	27.1	33.4	26.9	
5 to 9 years old	27.4	27.1	27.6	
10 to 14 years old	28.9	28.8	28.9	
15 to 17 years old	16.6	16.7	16.6	
Race/Ethnicity of Child				0.886
Non-Hispanic White	50.7	50.8	50.7	
Non-Hispanic Black	13.1	13.3	12.9	
Hispanic	25.1	25.0	5.2	
NH Other	11.1	10.9	11.2	
Special Health Care Needs				0.159
Yes	19.9	19.5	20.3	
Personal Doctor/Nurse				0.235
Yes, one person	56.2	56.2	56.2	
Yes, more than one person	17.9	18.4	17.4	
No	25.9	25.4	26.4	
Health Insurance				0.335
Public	32.1	32.4	31.9	
Private	62.5	62.6	62.4	
Public and Private	4.8	4.6	5.2	
Not Insured/ Unspecified	0.6	0.4	0.5	
Mental Health Coverage				<.001
Always	16.9	7.8	25.8	
Usually	7.6	5.1	10.1	
Sometimes	3.3	2.8	3.8	
Never	2.2	2.7	1.7	
Child doesn’t use mental health services	70.0	81.7	58.5	
<i>Characteristics of Parent/Household</i>				
Area of Residence				0.335
Urban	91.4	91.3	91.5	
Rural	8.6	8.7	8.5	
Primary Language				0.283
Not English	13.5	13.1	13.9	
Guardian Education				0.410
Less than high school or high school	26.4	26.0	26.7	
Some college or more	73.6	74.0	73.3	
Family Structure				0.059

Two parents, currently married	64.9	64.8	65.0	
Two parents, not currently married	8.3	8.6	7.9	
Single parent	21.9	21.2	22.5	
Other	4.9	5.3	4.6	
Poverty/Income Level				0.018
0-99% Federal Poverty Level	17.4	18.4	16.4	
100%-199% Federal Poverty Level	21.0	21.0	21.1	
200%-399% Federal Poverty Level	28.7	27.9	29.5	
400% Federal Poverty Level or above	32.9	32.8	33.1	

Bolded p-values represent statistical significance at $p < 0.05$

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