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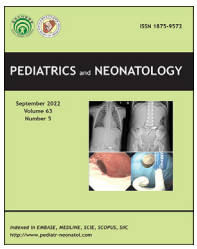

Original Article

Children's unmet need for mental health care within and outside metropolitan areas

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Abstract *Background:* Rural communities experience a lack of pediatric mental health providers. It is unclear if this leads to greater unmet needs for specialty mental health services among rural children.
Methods: Data from the 2016–2019 National Survey of Children's Health were used to identify children aged 6–17 years with a mental health condition. Caregiver-reported need and receipt of specialty mental health care for their child (met need, unmet need, or no need) was compared according to residence in a Metropolitan Statistical Area (MSA).
Results: The analysis included 13,021 children (14% living outside MSAs). Unmet need for mental health services was reported for 9% of children, with no difference by rural-urban residence ($p = 0.940$). Multivariable analysis confirmed this finding and identified urban children as less likely to have no need for mental health services, compared to rural children (relative risk ratio of no need vs. met need: 0.79; 95% confidence interval: 0.65, 0.95; $p = 0.015$).
Conclusion: Children with mental health conditions living in rural areas (outside MSAs) did not have higher rates of unmet needs for specialty mental health services, but they had lower rates of any caregiver-reported needs for such services. Further work is needed to examine caregivers' demand for pediatric specialty mental health services.
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1. Introduction

Approximately 20% of children in the United States experience mental health conditions (including attention deficit/hyperactivity disorder [ADHD], behavior problems, anxiety, and depression), yet only half of these children receive specialty mental health care.[1] Mental health disorders are a leading cause of child disability, and neglecting

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to adequately address these conditions may result in adverse outcomes that put significant burden on the individual, their family, and society.[2,3] In the US, children may receive care for their mental health conditions from non-specialist professionals, such as primary care physicians who are non-specialists with general training.[4] Alternately, children may receive mental health care from specialists such as psychologists, mental health social workers, or psychiatrists.[4]

Specialist involvement in the care of children with mental health conditions may be indicated when caring for children or adolescents with more than one mental health diagnosis, with mental health conditions interfering with the treatment of a medical condition, with behavior that prevents functioning in daily tasks, or when initial treatment in primary care settings does not lead to improvement.[5,6] In the US, there is a nationwide shortage of trained mental health care specialists, particularly in rural areas. According to the Health Resources and Services Administration (HRSA), 61% of locales with a mental health specialist shortage are either in rural or partially rural areas.[7] As such, a shortage of mental health care specialists can perpetuate the barriers that adolescents living in rural areas face, which may also include transportation barriers, difficulty scheduling visits, and other access issues associated with socioeconomic disadvantage.[8—10]

Consistent with these barriers to accessing mental health care in rural areas, only 7% of rural children as compared to 9% of urban children used mental health services in 2013.[11] However, among children who were diagnosed with anxiety, depression, or behavioral/conduct problem, rural vs. urban residence was not associated with use of specialty mental health care in the 2016 National Survey of Children's Health (NSCH).[12] Therefore, it is unclear if the inability to access specialty mental health services for children living in rural areas directly reflects greater unmet need for these services.[2] Needs for services develop when individuals expect a signicant benefit to their well-being from receiving the service.[13] When considering mental health care in rural areas, children and adolescents living in these communities may be more likely to seek mental health services from primary care providers or through telemedicine services.[6,7,14] Alternately, children and adolescents living in rural areas may be more likely to have undiagnosed mental health conditions, such that their caregivers may not perceive a need for specialist services.

Although the overall rate of unmet need for specialty mental health care among US children with mental health conditions has been estimated at nearly 50%,[15] disparities in these unmet needs between rural and urban youth have not been quantified. In this study, our primary aim was to use nationally representative data to determine whether residence within or outside a metropolitan area was associated with unmet need for specialty mental health services among children diagnosed with several common mental health conditions. Our secondary aim was to identify which diagnosed conditions and other child or family characteristics were associated with increased risk of unmet need for specialty mental health care.

2. Methods

Data for this study were obtained from the 2016—2019 NSCH, which is directed by the HRSA's Maternal and Child Health Bureau (MCHB). The NSCH is a nationally representative annual Web and mail survey collecting data on the health status and health care utilization of children ages 0—17 years. Detailed information on sampling and response rates is available in the survey technical documentation.[16] For this study, we analyzed data for children ages 6—17 years with at least one mental health condition plausibly requiring specialty mental health care.[15] Specifically, we included children who were diagnosed by a doctor or other health professional (per caregiver report) with anxiety, depression, ADHD, or conduct or behavioral problems,[12] and who still had that condition at the time of the survey. We excluded responses for which the variable on metropolitan area residence was suppressed for confidentiality, and cases with missing data on study outcomes or covariates. The IRB at our institution deemed analysis of deidentified NSCH data to not be human subjects research.

The primary outcome was unmet need for specialty mental health care.[15] Caregivers were asked if "During the past 12 months, this child [had] received any treatment or counseling from a mental health professional," with response options including yes (classified as met need); no, but the child needed to see a mental health professional (classified as unmet need); or no (classified as no need). In the survey questionnaire, "mental health professionals" were defined as psychiatrists, psychologists, psychiatric nurses, and clinical social workers, so the question excluded mental health care received from other professionals, such as primary care physicians. In a sensitivity analysis, we also included data from a separate question asking about types of care the child needed but did not receive over the past 12 months,[17] where "mental health" was one of the answer choices. Respondents who indicated needing but being unable to get mental health care for their child in the past 12 months were added to the "unmet need" group, regardless of their answer to the question above.

Our primary independent variable was a dichotomized measure of residence in a Metropolitan Statistical Area (MSA: counties with 50,000 or more residents, or urbanized areas with at least 100,000 residents), as determined by survey staff based on respondents' address.[18] In a further analysis, we subdivided respondents according to residence in a metropolitan principal city (MPC, the most urbanized), residence in an MSA but not in an MPC; residence outside an MSA but in a core-based statistical area (CBSA); and residence outside a CBSA (the least urbanized).[12] Inclusion of states and years in the primary (MSA vs. non-MSA) and secondary (4-category geography measure) analyses is summarized in Appendix Table 1.

Covariates for our study were identified based on previous studies examining health services use in the NSCH.[12,15,17] These included child age, child sex, child race and ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic or Latino, non-Hispanic other race/ethnicity), and caregiver-reported general health status of the child

(dichotomized as excellent or very good vs. good, fair, or poor), and insurance coverage (private coverage only, any public coverage, or no coverage). Family characteristics included family structure (child living with two parents; child living with mother only; any other family structure), highest level of education status of either caregiver (high school or less; some college; or 4-year college degree), respondent's mental health status (lowest of either caregiver, categorized as excellent or very good; good; or fair or poor), and annual family income as a percent of the Federal poverty level (FPL; <100% FPL, 100–199% FPL, 200–399% FPL, and ≥400% FPL).

Data were summarized using weighted means or proportions with 95% confidence intervals (CIs) and compared by MSA residence status using Wald tests. Because family income data were multiply imputed, statistical significance of bivariate comparisons for this variable was computed using unadjusted logistic regression.[19] In further analysis, we fit multivariable multinomial logistic regression models of need for specialty mental health care, with "met need" set as the reference category of the outcome variable. We repeated this analysis using alternative specifications of the mental health care measure and a more detailed categorization of respondents' residence, as described above. All analyses accounted for survey weights and the complex sampling design. All analyses of family income included multiply imputed data on this variable, based on imputations performed by NSCH staff. Data analysis was performed using Stata/SE 16.1 (College Station, TX: StataCorp, LP). $P < 0.05$ was considered statistically significant.

3. Results

The 2016–2019 NSCH included 94,369 children aged 6–17 years. We limited the sample to 20,048 children with at least one qualifying mental health diagnosis, of whom 6346 were excluded due to suppression of the MSA residence variable. After excluding a further 681 cases that were missing data on study covariates, we retained 13,021 children for the primary analysis. Exclusion of cases due to missing covariate data did not bias the analysis with respect to the primary outcome or exposure (Appendix Table 2). An unweighted cross-tabulation of MSA residence and use of specialty mental health care is shown in Appendix Table 3. The analytic sample included a total of 6447 children who had used specialty mental health care, compared to 3350 children who had used such care but were excluded from the analysis due to not having one of the qualifying conditions listed above.

Based on our analytic sample, 14% of children (95% CI: 13%, 14%) lived outside an MSA. The most common mental health conditions based on this sample were ADHD (weighted percentage: 56%), followed by anxiety (50%), behavioral or conduct problems (42%), and depression (23%). Prevalence of these conditions was similar to or higher outside MSAs as compared to within MSAs (Table 1). Unmet need for mental health care was reported for 9% of children (95% CI: 8%, 10%), whereas 47% (95% CI: 45%, 49%) of children with a mental health condition needed and received mental health services. Year-specific prevalence of unmet need ranged from 8% to 10%, with no discernible trend ($p = 0.644$ on unadjusted multinomial logistic regression). The prevalence of unmet need for specialty mental health care did not differ between children living within MSAs (9%; 95% CI: 7%, 10%) and children living outside MSAs (9%; 95% CI: 7%, 11%; $p = 0.940$). Children living in MSAs tended to have higher family income, were more likely to have private insurance coverage, and were more likely to live with a caregiver who had completed a college degree. Additionally, MSA residents included a higher proportion of Black and Hispanic children, compared to non-MSA residents, and a higher proportion of children living with two parents.

The primary multivariable model is shown in Table 2. MSA residence was not associated with the likelihood of having unmet needs for mental health care, as compared to having a met need (relative risk ratio [RRR]: 0.88, 95% CI: 0.65, 1.20; $p = 0.429$). However, children living in MSAs were less likely to have no need for mental health services, rather than having a met need, when compared to children living outside MSAs (RRR: 0.79; 95% CI: 0.65, 0.95; $p = 0.015$). Factors associated with decreased likelihood of unmet needs included older age, excellent or very good general health (of the child), and public as compared to private insurance. Meanwhile, children of caregivers who had fair or poor mental health were more likely to have unmet needs for specialty mental health services, compared to children of caregivers with excellent or very good mental health. Appendix Table 4 demonstrates that results were consistent when refitting this model while expanding our definition of unmet need to include any respondents who reported on a different question that they needed but could not get mental health services for their child in the past 12 months.

Finally, we examined a more detailed measure of geography in a subsample of 6760 children (Table 3). Based on this sample, 30% of children lived in an urban core, 53% lived in an MSA but outside the principal city, 10% lived in a CBSA, and 6% lived outside a CBSA. As in the main analysis, geography was not associated with reporting unmet rather than met need for specialty mental health care. Compared to children living in a principal city, those living in a CBSA (the second least urbanized geography) were significantly more likely to have no caregiver-reported need for specialty mental health care (RRR: 1.75; 95% CI: 1.21, 2.53; $p = 0.003$). In the subsample used for this analysis, better child health remained associated with decreased risk of unmet needs for mental health services, while worse caregiver mental health remained associated with increased risk of unmet needs.

4. Discussion

Rural communities experience a lack of specialty mental health providers, reduced availability of specialty mental health care, and reduced access to available providers.[20] Yet, we found that caregiver-reported unmet needs for specialty mental health care among children with several common mental health conditions were similar between children living within and outside MSAs. Meanwhile, children who lived outside MSAs were more likely to have no caregiver-reported need for specialty mental health care.

Addressing pediatric specialty mental health needs in rural areas may require examining not only the supply side (rural specialty mental health professional workforce) but also the demand side (caregivers' perception of children's needs for specialty mental health services). Future research is needed to better understand non-specialty sources of mental health care for rural youth (e.g., mental health services received in primary care settings) and explore rural-urban differences in perceptions of need for specialty mental health care among caregivers of children with diagnosed mental health or behavioral health conditions. Another direction for future work includes examining perceived need and use of specialty mental health services among children with no diagnosed mental health conditions or conditions other than those examined in our study.

Caregivers living in MSAs may have different expectations for treatment for their child's mental health conditions, more knowledge of nearby specialty providers, enhanced availability of specialist care, higher health literacy, and less stigma toward use of mental health care, resulting in increased perceived need for these services.[7,21–23] By

Table 1 Child and family characteristics according to MSA residence (N = 13,021).

Variable	Outside MSA (N = 2264)	Within MSA (N = 10,757)	P
	Weighted mean or proportion (95% CI)	Weighted mean or proportion (95% CI)	
Child characteristics			
Anxiety	0.49 (0.46, 0.52)	0.50 (0.48, 0.52)	0.685
Depression	0.26 (0.23, 0.29)	0.22 (0.21, 0.24)	0.044
ADHD	0.58 (0.55, 0.62)	0.56 (0.54, 0.58)	0.169
Behavioral or conduct problems	0.45 (0.42, 0.49)	0.41 (0.39, 0.43)	0.024
Use of specialty mental health care[a]			
Met need	0.44 (0.40, 0.47)	0.48 (0.46, 0.50)	0.040
Unmet need	0.09 (0.07, 0.11)	0.09 (0.07, 0.10)	0.940
No need	0.48 (0.44, 0.51)	0.44 (0.42, 0.46)	0.043
Age (years)	12.0 (11.8, 12.2)	12.1 (12.0, 12.2)	0.343
Male sex	0.60 (0.57, 0.64)	0.59 (0.57, 0.60)	0.324
Race/ethnicity			
Non-Hispanic White	0.75 (0.72, 0.78)	0.56 (0.54, 0.58)	<0.001
Non-Hispanic Black	0.10 (0.08, 0.12)	0.15 (0.13, 0.17)	0.004
Hispanic or Latino	0.08 (0.06, 0.11)	0.21 (0.19, 0.24)	<0.001
Other	0.07 (0.05, 0.08)	0.07 (0.07, 0.08)	0.3534
General health			
Good, fair, or poor	0.25 (0.23, 0.28)	0.25 (0.23, 0.27)	0.752
Excellent or very good	0.75 (0.72, 0.77)	0.75 (0.73, 0.77)	0.752
Health insurance			
Private only	0.35 (0.32, 0.38)	0.53 (0.51, 0.55)	<0.001
Public	0.58 (0.55, 0.61)	0.43 (0.41, 0.45)	<0.001
None	0.07 (0.06, 0.09)	0.04 (0.04, 0.06)	0.015
Family characteristics			
Household structure			
Two parents	0.60 (0.57, 0.63)	0.66 (0.64, 0.68)	0.002
Single mother	0.23 (0.20, 0.26)	0.23 (0.21, 0.24)	0.738
Other	0.17 (0.15, 0.19)	0.12 (0.11, 0.13)	<0.001
Caregiver education			
High school or less	0.31 (0.28, 0.34)	0.23 (0.20, 0.25)	<0.001
Some college	0.41 (0.38, 0.45)	0.30 (0.28, 0.31)	<0.001
College degree	0.27 (0.25, 0.30)	0.48 (0.46, 0.50)	<0.001
Caregiver mental health			
Excellent or very good	0.49 (0.46, 0.52)	0.52 (0.50, 0.54)	0.094
Good	0.35 (0.32, 0.39)	0.32 (0.30, 0.34)	0.072
Fair or poor	0.16 (0.14, 0.18)	0.16 (0.14, 0.18)	0.904
Family income			
<100% FPL	0.28 (0.25, 0.32)	0.21 (0.19, 0.23)	<0.001
100–199% FPL	0.28 (0.25, 0.32)	0.22 (0.20, 0.24)	0.001
200–399% FPL	0.29 (0.26, 0.32)	0.27 (0.25, 0.28)	0.172
≥400% FPL	0.14 (0.12, 0.17)	0.31 (0.29, 0.33)	<0.001

CI, confidence interval; FPL, Federal poverty level; MSA, metropolitan statistical area.
[a] Primary definition, based on single question about mental health care use in past 12 months.

Table 2 Multivariable multinomial logistic regression of specialty mental health service use in past 12 months (N = 13,021).

Variable	Unmet need vs. met need		No need vs. met need	
	RRR (95% CI)	P	RRR (95% CI)	P
Geography				
Outside MSA	Ref.		Ref.	
Within MSA	0.88 (0.65, 1.20)	0.429	0.79 (0.65, 0.95)	0.015
Child covariates				
Anxiety	0.56 (0.41, 0.77)	<0.001	0.28 (0.23, 0.34)	<0.001
Depression	0.62 (0.45, 0.87)	0.005	0.12 (0.23, 0.34)	<0.001
ADHD	0.51 (0.37, 0.70)	<0.001	0.57 (0.47, 0.69)	<0.001
Behavioral/conduct problems	0.95 (0.70, 1.28)	0.733	0.38 (0.32, 0.46)	<0.001
Age (years)	0.95 (0.91, 1.00)	0.033	0.99 (0.96, 1.01)	0.352
Male sex	1.01 (0.75, 1.36)	0.953	1.05 (0.88, 1.24)	0.622
Race/ethnicity				
Non-Hispanic White	Ref.		Ref.	
Non-Hispanic Black	1.42 (0.94, 2.13)	0.096	0.91 (0.69, 1.20)	0.497
Hispanic or Latino	1.10 (0.73, 1.65)	0.644	0.92 (0.70, 1.21)	0.564
Other	1.07 (0.73, 1.59)	0.719	0.93 (0.69, 1.27)	0.665
General health				
Good, fair, or poor	Ref.		Ref.	
Excellent or very good	0.72 (0.53, 0.97)	0.029	0.86 (0.68, 1.08)	0.184
Health insurance				
Private only	Ref.		Ref.	
Public	0.61 (0.43, 0.88)	0.008	0.68 (0.54, 0.86)	0.001
None	1.58 (0.86, 2.92)	0.143	1.13 (0.68, 1.87)	0.640
Family covariates				
Household structure				
Two parents	Ref.		Ref.	
Single mother	1.30 (0.93, 1.81)	0.124	0.72 (0.58, 0.90)	0.004
Other	0.92 (0.60, 1.41)	0.702	0.66 (0.50, 0.87)	0.003
Caregiver education				
High school or less	Ref.		Ref.	
Some college	1.14 (0.76, 1.73)	0.525	0.98 (0.75, 1.28)	0.888
College degree	0.85 (0.54, 1.35)	0.497	0.59 (0.44, 0.79)	<0.001
Caregiver mental health				
Excellent or very good	Ref.		Ref.	
Good	1.06 (0.77, 1.44)	0.718	0.89 (0.74, 1.07)	0.223
Fair or poor	1.70 (1.18, 2.46)	0.005	0.66 (0.51, 0.85)	0.001
Family income				
<100% FPL	Ref.		Ref.	
100–199% FPL	0.87 (0.53, 1.41)	0.563	0.88 (0.63, 1.23)	0.460
200–399% FPL	0.75 (0.47, 1.20)	0.234	0.88 (0.64, 1.23)	0.457
≥400% FPL	0.49 (0.53, 3.34)	0.544	0.58 (0.41, 0.82)	0.002

CI, confidence interval; FPL, Federal poverty level; MSA, metropolitan statistical area; RRR, relative risk ratio.

contrast, adults in rural areas exhibit more negative beliefs about seeking mental health services and have lower perceived need for pursuing these services for themselves.[24] Alternatively, rural-urban differences in reporting need for specialty mental health care could be associated with differences in receiving mental health care within primary care settings.[8,25] However, a recent study found that adolescents in urban areas were more likely to receive mental health services in a general medical setting (e.g., from a family medicine physican or pediatrician), as compared with adolescents living in rural areas.[26]

Apart from geographical factors, children were more likely to have unmet needs for specialty mental health care if they had caregivers with fair or poor mental health, if they (the child) had worse general health as rated by their caregivers, or if they lived in a family below the poverty line.[27] Caregiver mental health is closely linked with their child's mental health, and caregivers with poorer mental health are more likely to report unmet needs for mental health services for their child.[28,29] Finally, expanding the definition of unmet need to include children who needed specialty mental health services but could not get these services in the past 12 months (Appendix Table 1), we also found that unmet needs were more prevalent among children without insurance. This finding is similar to previous research linking insurance coverage to unmet needs for health care services.[30,31] However, children with public insurance were less likely to have unmet needs for specialty

Table 3 Multivariable multinomial logistic regression of specialty mental health service use in past 12 months, using detailed geographical measure (N = 6760).

Variable	Unmet need vs. met need		No need vs. met need	
	RRR (95% CI)	P	RRR (95% CI)	P
Geography				
MPC within MSA	Ref.		Ref.	
Within MSA, not MPC	0.84 (0.59, 1.20)	0.337	1.08 (0.83, 1.39)	0.571
Outside MSA, within CBSA	1.26 (0.79, 1.99)	0.334	1.75 (1.21, 2.53)	0.003
Outside CBSA	0.81 (0.49, 1.33)	0.401	1.12 (0.77, 1.64)	0.546
Child covariates				
Anxiety	0.76 (0.54, 1.08)	0.132	0.25 (0.20, 0.32)	<0.001
Depression	0.84 (0.58, 1.22)	0.353	0.12 (0.09, 0.165)	<0.001
ADHD	0.50 (0.35, 0.73)	<0.001	0.57 (0.45, 0.71)	<0.001
Behavioral/conduct problems	1.44 (1.02, 2.03)	0.038	0.34 (0.27, 0.43)	<0.001
Age (years)	0.99 (0.94, 1.05)	0.712	0.99 (0.96, 1.02	0.656
Male sex	1.03 (0.73, 1.47)	0.864	0.92 (0.74, 1.16)	0.489
Race/ethnicity				
Non-Hispanic White	Ref.		Ref.	
Non-Hispanic Black	1.56 (0.97, 2.49)	0.065	0.98 (0.68, 1.41)	0.905
Hispanic or Latino	1.04 (0.64, 1.67)	0.887	0.96 (0.67, 1.38)	0.819
Other	1.27 (0.81, 1.99)	0.292	0.94 (0.64, 1.36)	0.728
General health				
Good, fair, or poor	Ref.		Ref.	
Excellent or very good	0.65 (0.45, 0.92)	0.016	1.03 (0.77, 1.36)	0.853
Health insurance				
Private only	Ref.		Ref.	
Public	0.74 (0.50, 1.11)	0.149	0.67 (0.50, 0.89)	0.007
None	1.86 (0.93, 3.72)	0.077	1.022 (0.53, 1.95)	0.961
Family covariates				
Household structure				
Two parents	Ref.		Ref.	
Single mother	1.05 (0.71, 1.57)	0.797	0.76 (0.57, 1.02)	0.064
Other	0.96 (0.62, 1.49)	0.862	0.71 (0.51, 0.98)	0.037
Caregiver education				
High school or less	Ref.		Ref.	
Some college	1.21 (0.75, 1.97)	0.432	1.07 (0.77, 1.48)	0.702
College degree	1.10 (0.67, 1.81)	0.700	0.66 (0.47, 0.93)	0.019
Caregiver mental health				
Excellent or very good	Ref.		Ref.	
Good	0.90 (0.63, 1.29)	0.581	0.73 (0.58, 0.92)	0.008
Fair or poor	1.59 (1.03, 2.44)	0.036	0.64 (0.46, 0.90)	0.009
Family income				
<100% FPL	Ref.		Ref.	
100–199% FPL	0.86 (0.48, 1.53)	0.602	0.86 (0.57, 1.30)	0.469
200–399% FPL	0.84 (0.47, 1.49)	0.545	0.80 (0.55, 1.18)	0.265
≥400% FPL	0.48 (0.25, 0.96)	0.038	0.55 (0.37, 0.83)	0.004

CBSA, core-based statistical area; CI, confidence interval; FPL, Federal poverty level; MPC, metropolitan principal city; MSA, metropolitan statistical area; RRR, relative risk ratio.

mental health care than those with private insurance. This may be related to a lower perception of the need for specialist care among families whose children have public insurance, or a higher likelihood of receiving care in settings where mental health needs are addressed as part of primary care.

Existing initiatives to improve access to pediatric specialty mental health care in rural areas have generally taken one of two approaches. First, some initiatives, such as collaboration between on-site mental health specialists and pediatricians, have sought to support recruitment and retention of mental health specialists to work in rural communities.[32] Other interventions have sought to improve the capacity of rural primary care practices to offer mental health services, whether through offering telehealth services accessible from primary care clinics or through providing additional training to primary care physicians in diagnosing and managing mental health conditions.[33,34] Interventions of the latter type reflect confidence of primary care physicians in addressing mental health concerns

within their practice,[8,34] and, arguably, the greater feasibility of expanding services offered by existing primary care clinics as compared to establishment of new specialty clinics in areas with a shortage of specialty mental health care providers.

Our study is limited by several aspects of the data source and analytic approach. First, geographic data were partially suppressed in the public use file, resulting in limited generalizability to states for which MSA residence data were unavailable. However, this limitation is similar to prior studies examining rural-urban differences in the public-use NSCH files.[35] Furthermore, one prior study[12] with access to the full NSCH data set found no difference in the use of specialty mental health care (i.e., "met need") according to the 4-category classification of child residence, similar to our analysis in Table 3. Nevertheless, an important limitation of both that study and the present analysis was the focus on children with an existing diagnosis of mental health conditions, meaning that factors associated with underdiagnosis of mental health conditions in rural vs. urban areas were not addressed. We also could not assess whether children with diagnosed mental health conditions were receiving treatment for those conditions from primary care physicians, and what specific needs were not met in the "unmet needs" group. Lastly, the NSCH relied on caregiver report about a child's health conditions and health care utilization. As adolescents and caregivers may have differing views regarding the need for care,[36] this introduces a potential source of error due to the questions' subjectivity. Future research including both caregiver and youth perspectives would provide more definitive data on the presence of unmet need for specialty mental health care.

In sum, our study found no evidence of rural-urban differences in caregiver-reported unmet needs for specialty mental health services among children with one of several common mental health diagnoses. Children living outside MSAs had lower rates of "met need" (implying lower utilization of such services) and higher rates of "no need" for these services. These results call attention to the need to understand both the demand for pediatric specialty mental health services in rural areas (including addressing knowledge of mental health conditions and stigma around mental health treatment), as well as supply-side issues limiting the workforce of specialty mental health care providers in rural communities. Lower perceived need for specialty mental health care in rural areas may also support greater emphasis on integrating mental health services into rural primary care practices where children with mental health conditions may already be receiving care.

Declaration of competing interest

The authors declare that they have no conflict of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.pedneo.2022.03.018.