

Supply and Utilization of Pediatric Subspecialists in the United States

AUTHORS: Kristin N. Ray, MD,^a Debra L. Bogen, MD,^a Marnie Bertolet, PhD,^b Christopher B. Forrest, MD, PhD,^c and Ateev Mehrotra, MD, MPH^{d,e}

^aChildren's Hospital of Pittsburgh, University of Pittsburgh School of Medicine, Pittsburgh, Pennsylvania; ^bUniversity of Pittsburgh Graduate School of Public Health, Pittsburgh, Pennsylvania;

^cChildren's Hospital of Philadelphia, University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania; ^dHarvard Medical School, Boston, Massachusetts; and ^eRAND Corporation, Boston, Massachusetts

KEY WORDS

subspecialty supply, subspecialty need, access to care, utilization, children with special health care needs

ABBREVIATIONS

CSHCN—children with special health care needs

ED—emergency department

NCHS—National Center for Health Statistics

NS-CSHCN—National Survey of Children With Special Health Care Needs

PSSQ—pediatric subspecialty supply quintile

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Address correspondence to Kristin N. Ray, MD, Children's Hospital Office Building, 3414 5th Ave, 3rd floor, Pittsburgh, PA 15213.

E-mail: kristin.ray@chp.edu

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WHAT'S KNOWN ON THIS SUBJECT: There is wide variation in pediatric subspecialty supply in the United States. The impact of this variation in supply on utilization and child and family disease burden is not known.



WHAT THIS STUDY ADDS: Among children with special health care needs, living in a county with lower subspecialty supply was associated with lower perceived need for subspecialty care, lower subspecialty utilization, and no meaningful differences in examined measures of child and family disease burden.

abstract



OBJECTIVE: The wide geographic variation in pediatric subspecialty supply in the United States has been a source of concern. Whether children in areas with decreased supply receive less subspecialty care or have worse outcomes has not been adequately evaluated. Among children with special health care needs, we examined the association between pediatric subspecialty supply and subspecialty utilization, need, child disease burden, and family disease burden.

METHODS: We measured pediatric subspecialist supply as pediatric subspecialists per capita in each residential county. By using the 2009–2010 National Survey of Children With Special Health Care Needs and controlling for many potential confounders, we examined the association between quintile of pediatric subspecialty supply and parent-reported subspecialty utilization, perceived subspecialty need, and child and family disease burden.

RESULTS: County-level pediatric subspecialty supply ranged from a median of 0 (lowest quintile) to 59 (highest quintile) per 100 000 children. In adjusted results, compared with children in the highest quintile, children in the lowest quintile of supply were 4.8% less likely to report ambulatory subspecialty visits ($P < .001$), 5.3% less likely to perceive subspecialty care needs ($P < .001$), and 2.3% more likely to report emergency department visits ($P = .018$). There were no meaningful differences between pediatric subspecialty supply quintiles for other measures of child or family disease burden.

CONCLUSIONS: Children living in counties with the lowest supply of pediatric subspecialists had both decreased perceived need for subspecialty care and decreased utilization of subspecialists. However, the differences in supply were not associated with meaningful differences in child or family disease burden. *Pediatrics* 2014;133:1061–1069

There are geographic inequalities in the distribution of pediatric subspecialists in the United States^{1–5} and Canada.⁶ In the United States, 10% to 30% of children must travel >80 miles to access many pediatric subspecialists, including endocrinology, pulmonary, gastroenterology, nephrology, and developmental pediatrics.⁷ One-quarter of children live >1 hour from the closest pediatric surgical subspecialist.⁴ Pediatric subspecialty care is more limited in communities that are rural, poor, or in Western mountain states.³ Increased training has not improved the maldistribution across the United States.⁸ To address these inequalities in supply, there have been calls to change the training and recruitment of pediatric subspecialists.²

Although inequalities in pediatric subspecialty supply are well documented, little is known about the impact of these inequalities on subspecialty utilization and child health. Children living in states with fewer pediatric subspecialists are more likely have more parent-reported unmet need for subspecialty care,⁵ and decreased subspecialty access has also been associated with fewer discretionary subspecialty referrals.⁹ Although these studies suggest that parent- and physician-perceived need for outpatient referral may be influenced by subspecialty supply, previous work has not evaluated the influence of local subspecialty supply on actual subspecialty utilization or child and family disease burden (such as missed school days or family financial burden). Given these uncertainties, the American Academy of Pediatrics has called for further research on the health consequences of the variation in pediatric subspecialty supply.^{1,10}

To address this knowledge gap, we used nationally representative data to compare pediatric subspecialty utilization and disease burden among children with special health care needs (CSHCN)

stratified by county pediatric subspecialty supply. We hypothesized that children in counties with lower subspecialty supply would have decreased subspecialty utilization and increased child and family disease burden.

METHODS

National Survey of Children With Special Health Care Needs

The 2009–2010 National Survey of Children With Special Health Care Needs (NS-CSHCN)¹¹ was conducted by the Centers for Disease Control and Prevention's National Center for Health Statistics (NCHS) State and Local Area Integrated Telephone Survey Programs. Interviewees were sampled from the Centers for Disease Control and Prevention's National Immunization Survey, and CSHCN were identified by using the CSHCN screener.¹² At least 750 interviews were completed in each state, and population weights allowed for national estimates.¹³ We used the NCHS's multiple imputation data files, which provide 5 estimated values for variables with larger than anticipated missingness.¹⁴

Measures of Utilization, Need, Child Disease Burden, Family Disease Burden, and Barriers to Care

Subspecialty utilization was captured by parent report of any subspecialist visit in the previous year. Parents also reported perceived need for subspecialty care and whether their child had received all needed subspecialty care. To capture child and family health burden, we chose measures within the NS-CSHCN on the basis of hypothesized relationships between selected measures and subspecialty access. Child disease burden measures were ≥ 1 emergency department (ED) visit, ≥ 4 missed school days, and frequent functional limitations. Family disease burden measures were as follows: family financial burden related to child's condition, ≥ 11 hours of care

provided weekly by family, change in family work due to child's condition, and not receiving needed medical information. Barriers were parent-reported reasons for not receiving needed subspecialty care. The Supplemental Information provides details on question text and coding decisions.

Measuring Subspecialty Supply

We determined the number of pediatric subspecialists per 100 000 children (<18 years old) for each US county by using the 2010 Area Resource File¹⁵ and 2010 Census.¹⁶ Pediatric medical subspecialists whose predominant activity was patient care were included. Pediatric surgical specialist counts were not available in the Area Resource File and were not included. Pediatric mental health providers were not counted because they are excluded from the NS-CSHCN subspecialty utilization item. The county quotients of pediatric specialists per pediatric population were rank ordered, and counties were grouped into quintiles of pediatric subspecialty supply, such that each quintile contained ~20% of the US pediatric population. These 5 pediatric subspecialty supply quintiles (PSSQs) are subsequently referred to as highest, high, intermediate, low, and lowest PSSQ (lowest supply).

We recognize the limitations in physician supply data.^{17–19} We used the Area Resource File to count pediatric-focused specialists such as pediatric neurologists and dermatologists in addition to American Board of Pediatrics–certified pediatric subspecialists. Because of known imprecision in counting and locating physicians,^{17–20} we used quintiles of supply to examine relative supply rather than specific counts.

Among 40 242 NS-CSHCN respondents, county identifiers were missing for 2991 (7.4%). We assigned 2878 (7.2%) respondents to counties on the basis of

predominant county for zip code.²¹ The remaining 113 respondents (0.3%) could not be assigned to a county and were excluded from analysis.

Additional Covariates

We controlled for the following potential confounders: race/ethnicity, child age, insurance status, poverty level, parent education, parent primary language, other household children, having a usual provider and usual source of care, receiving care coordination, and receiving preventive care.^{5,22–27} We controlled for 13 medical conditions or groups of conditions. Down syndrome, developmental delay, muscular dystrophy, and intellectual disability were grouped as “developmental diagnoses.” We also controlled for available mental health diagnoses because of potential impact on medical subspecialty utilization. We did not include rural-urban status in our primary model because of potential collinearity with subspecialty supply.

Analyses

In adjusted analysis, we created multivariable logistic regression models for each measure of utilization, need, and child and family disease burden. The unit of analysis was survey respondent (weighted by sampling weights), and the primary predictor was PSSQ. All covariates listed above were included. We used predictive margins²⁸ to translate adjusted odds ratios into adjusted risk differences. Tests for trend were performed by examining the significance of PSSQ as a continuous variable in logistic regression models. Barriers to care among those with unmet subspecialty need were examined by using unadjusted descriptive statistics. Respondents with missing measures of utilization, need, or disease burden were omitted from the regression model for that measure (0% to 2% for most measures, and 3.8% for hours

spent providing care; see Supplemental Information). Respondents with missing geographic data (0.3%) or missing covariate values in the multiple imputation files (0.2%) were also omitted from regression models.

In sensitivity analysis, we first examined CSHCN <5 years old, because younger children might be less likely to be referred to adult subspecialists and therefore potentially be more sensitive to pediatric-specific subspecialty supply. Second, we examined 2 disease-specific cohorts: children with asthma and children with migraines. These diagnoses were chosen because they were common and also allowed examination of additional disease-specific measures: “difficulty with breathing” and “difficulty with pain,” respectively. Of note, 80% of CSHCN with asthma and 91% of CSHCN with migraines reported additional chronic conditions. Third, we examined total subspecialty supply (pediatric and adult subspecialists) instead of PSSQ as an alternative measure of local subspecialty supply because adult subspecialists may also provide specialty care to children. Fourth, we used rural-urban status (using 2003 Rural-Urban Continuum Codes²⁹) instead of PSSQ as a measure of access on the basis of previous work associating rural-urban status with differences in access and acute care utilization.^{30–36} Finally, we examined pediatric subspecialty supply deciles to explore whether quintiles provided adequate discrimination.

Analysis was performed by using Stata/SE 12.1 (StataCorp, College Station, TX). All analyses accounted for population weights, complex survey design, and multiply imputed variables. Because county and zip code are restricted variables, data were analyzed on site at the NCHS Research Data Center. This study was granted exempt status by the University of Pittsburgh Institutional Review Board.

RESULTS

PSSQs

The median supply of pediatric subspecialists per 100 000 children was 59 subspecialists (range: 39–903) in the highest PSSQ, compared with 0 subspecialists (range: 0–4) in the lowest PSSQ (Table 1). Across 3148 counties, 66% of counties (containing 15% of the pediatric population) had no pediatric subspecialists.

Comparison of CSHCN Across PSSQs

Our sample included 40 129 CSHCN, representing 11 064 893 children nationally after applying sample weights. Across the 5 PSSQs there were notable differences in 5 socioeconomic characteristics between CSHCN: race/ethnicity, insurance, family poverty, parent education, and primary language (Table 1). For example, 13% of CSHCN were black in the lowest PSSQ compared with 24% in the highest PSSQ ($P < .001$). CSHCN in the lowest PSSQ were less likely to have received preventive care in the previous year compared with other PSSQs but reported similar rates of having a usual provider and having a usual source of care.

There was a similar prevalence of the 13 chronic medical diagnoses among CSHCN across PSSQs (Table 2). The exceptions were higher rates of the following diagnoses in the lowest PSSQs: migraines, heart problems, arthritis, and allergies. For example, arthritis was reported among 3.8% of CSHCN in the lowest PSSQ, compared with 2.3% of CSHCN in the highest PSSQ ($P < .001$). Additionally, mental health diagnoses were more common in the lowest PSSQ (41%) compared with the highest PSSQ (38%) ($P < .001$).

Utilization, Perceived Need, and Unmet Need

Compared with CSHCN in the highest PSSQ, CSHCN in the lowest PSSQ had

TABLE 1 Unadjusted Comparisons of Child, Family, and Primary Care Variables Between CSHCN by Quintile of Pediatric Subspecialty Supply

	PSSQ					P
	Highest	High	Intermediate	Low	Lowest	
Weighted <i>n</i>	2 419 071	2 032 561	2 168 060	2 162 037	2 283 165	
Total CSHCN population, %	21.9	18.4	19.6	19.5	20.6	
Pediatric subspecialty supply						
Pediatric subspecialists per 100 000 children for counties in quintile, median (range)	59 (39–903)	31 (24–39)	16 (12–24)	8 (4–12)	0 (0–4)	
Child variables						
Age						
0–2 years	7.6	8.1	6.5	6.5	7.1	NS
3–4 years	8.5	7.8	8.4	7.8	8.6	NS
5–9 years	28.5	29.2	29.7	30.9	29.6	NS
10–14 years	33.2	34.3	35.9	33.6	35.7	NS
15–17 years	22.1	20.7	19.6	21.2	18.9	.011
Race/ethnicity						
Non-Hispanic white	54.9	46.8	61.5	62.4	70.1	<.001
Non-Hispanic black	23.6	17.7	12.7	13.0	13.1	<.001
Hispanic	13.3	25.5	17.6	17.6	10.7	<.001
Other	8.2	9.9	8.3	6.9	6.1	<.001
Insurance ^a						
Any private insurance	63.3	61.0	61.8	62.4	51.6	<.001
Only public insurance	30.1	28.4	27.8	28.0	38.7	<.001
Uninsured or underinsured	6.5	10.6	10.4	9.5	9.6	.002
Family variables						
Poverty level						
<100% FPL	21.8	20.3	21.7	20.4	27.6	<.001
100%–199% FPL	17.8	20.3	20.4	22.9	27.3	<.001
200%–399% FPL	25.6	27.5	29.4	30.4	29.3	<.001
≥400% FPL	34.8	31.9	28.5	26.3	15.8	<.001
Parent educational level						
Less than high school	10.1	12.4	10.7	9.4	12.6	NS
High school	16.6	16.6	19.9	20.7	26.0	<.001
Started college	73.3	71.0	69.4	69.9	61.4	<.001
Primary language: non-English	5.8	12.3	7.0	6.0	3.5	<.001
Number of children in Household						
1	27.9	27.2	25.7	25.3	25.5	.006
2	40.0	39.0	40.3	40.6	38.7	NS
≥3	32.1	33.8	34.0	34.1	35.8	.012
Primary care variables						
Have a usual source of well and sick care	81.4	81.3	81.8	82.0	81.4	NS
Have a usual provider	92.9	93.0	92.8	92.6	92.1	NS
Have a provider who coordinates care	14.7	15.5	15.4	15.5	17.3	.023
Received preventive care in past year	93.0	89.8	90.6	90.4	88.0	<.001

Values are unadjusted weighted percentages within each quintile unless otherwise indicated. Percentages represent percentages of CSHCN with the indicated characteristic within each PSSQ. Summed values may exceed 100% due to rounding. FPL, federal poverty level; NS, not significant ($P > .05$).

^a Insurance data not available on 63 respondents (0.2%); results shown for those with insurance data.

4.8% lower adjusted risk difference (47.4% vs 42.6%; $P = .0002$) of any subspecialty visit in the previous year (Table 3), along with a 5.3% lower adjusted risk difference of perceived need for subspecialty care (49.6% vs 44.3%; $P < .0001$). Among CSHCN with

perceived need for subspecialty care, CSHCN in the lowest PSSQ had a 2.0% lower adjusted risk difference of unmet need compared with CSHCN in the highest PSSQ (7.8% vs 9.8%; $P = .011$; Fig 1A). See Supplemental Information Tables 4–6 for the full

models from which these estimates were computed.

Child and Family Disease Burden

In the lowest PSSQ, 2.3% more children experienced an ED visit compared with those in the highest PSSQ (41.1% vs 38.8%; $P = .018$) (Table 3). Families of CSHCN in the lowest PSSQ were 1.8% less likely than those in the highest PSSQ to report decreased work due to their child's illness (23.2% vs 25.0%; $P = .03$). For the remaining measures of child and family disease burden, no significant differences were observed (Fig 1 B and C).

Sensitivity Analyses

Among CSHCN <5 years old ($n = 5318$), those in the lowest PSSQ had a 13% lower adjusted risk of any subspecialty visit ($P = .001$) and a 13% lower adjusted risk of perceived need for subspecialty care ($P = .001$) compared with the highest PSSQ. No significant differences in perceived unmet need or child or family disease burden were observed among this subpopulation.

Among CSHCN with asthma ($n = 13\,090$), results were qualitatively similar to the main results. Among CSHCN with migraines ($n = 3596$), those in the lowest PSSQ had a 6% higher adjusted risk of an ED visit ($P = .008$) and a 6% higher adjusted risk of family financial burden ($P = .03$) with no other significant differences. Neither cohort had significant differences in the additional disease-specific measures (difficulty with breathing among children with asthma, difficulty with pain among children with migraines).

Results of sensitivity analyses using alternative measures of subspecialty supply (total subspecialty supply and rural-urban status) were qualitatively similar to our main results. Across the 3148 counties, pediatric subspecialty supply showed moderately high correlation with total subspecialty supply (Spearman's $\rho = 0.65$) and slightly lower correlation with rural-urban status

TABLE 2 CSHCN With Specific Chronic Medical Conditions by PSSQ

	PSSQ					<i>P</i>
	Highest	High	Intermediate	Low	Lowest	
Weighted <i>n</i>	2 419 071	2 032 561	2 168 060	2 162 037	2 283 165	
Total CSHCN population, %	21.9	18.4	19.6	19.5	20.6	
Chronic medical conditions						
Asthma	34.8	36.9	34.8	35.4	34.1	NS
Diabetes	1.8	1.3	1.9	1.7	1.8	NS
Epilepsy or seizure disorder	2.8	3.6	3.0	2.9	3.3	NS
Migraines or frequent headaches	9.0	8.9	9.6	10.4	11.0	.003
Head injury, concussion, or traumatic brain injury	1.4	1.6	1.3	1.1	1.8	NS
Heart problem	2.7	2.8	2.7	3.1	3.6	.043
Blood problem	1.7	1.7	1.1	1.5	1.5	NS
Cystic fibrosis	0.2	0.2	0.6	0.1	0.4	NS
Cerebral palsy	1.3	1.4	1.6	1.9	1.8	NS
Developmental diagnoses	16.6	18.6	17.7	18.2	17.4	NS
Arthritis or other joint problems	2.3	2.5	3.3	2.8	3.8	<.001
Allergies	45.4	49.1	47.8	49.4	50.6	<.001
Autism or autism spectrum disorder	7.1	8.4	7.7	8.1	6.6	NS
Mental health	38.1	34.9	41.3	39.6	40.9	<.001

Values are unadjusted weighted percentages within each quintile unless otherwise indicated. Percentages represent percentage with the listed diagnosis of the population of CSHCN in each PSSQ. Children may have multiple diagnoses, so columns may exceed 100%. NS, not significant ($P > .05$).

TABLE 3 Utilization, Perceived Need, and Child and Family Disease Burden During the Previous Year Among CSHCN by Quintile of Pediatric Subspecialty Supply

	PSSQ					<i>P</i>
	Highest	High	Intermediate	Low	Lowest	
Utilization						
Any subspecialty utilization	47.4	46.4	46.0	45.2	42.6	.0002
Perceived need						
Need subspecialty care	49.6	49.0	47.6	46.9	44.3	<.0001
Unmet need for subspecialty care	9.8	11.3	9.2	8.5	7.8	.011
Child disease burden						
Missed ≥ 4 school days	50.3	51.7	53.1	50.5	50.2	NS
Any ED visits	38.8	38.4	40.2	40.8	41.1	.018
Frequent functional limitations	25.2	26.5	24.1	25.8	23.6	NS
Family disease burden						
Family financial burden	20.9	22.8	21.6	21.6	20.8	NS
Reduced parent work	25.0	26.6	25.8	24.6	23.2	.03
≥ 11 hours providing care	12.3	14.0	13.0	12.6	13.7	NS
Inadequate information received	17.0	19.0	18.1	17.3	16.9	NS

Values are adjusted percentages among the weighted CSHCN population, obtained using the method of predictive margins. Our logistic regression models adjusted for age, race/ethnicity, insurance, poverty, parent education, primary language, other household children, chronic medical conditions, mental health condition, having usual provider and usual source of care, receiving care coordination, and receiving preventive care. NS, not significant ($P > .05$).

(Spearman's $\rho = 0.45$). The use of deciles of supply resulted in qualitatively similar results to quintiles of supply.

Reasons for Unmet Need

When unmet need for subspecialty care was reported (Fig 2), parents of CSHCN in the lowest PSSQ most commonly reported lack of provider in area or

transportation concerns (35%). In contrast, parents in the highest PSSQ most commonly reported lack of appointments or lack of convenient appointments (24%). Cost was next most commonly identified in the highest and lowest PSSQs. The lack of insurance and "did not go/forgot appointment" were more commonly reported in the highest PSSQ.

DISCUSSION

Despite concerns about geographic variation in pediatric subspecialty supply, this is the first study to examine whether differences in supply are associated with differences in subspecialty utilization or disease burden. In our adjusted results, compared with CSHCN in the highest PSSQ, CSHCN in the lowest PSSQ were 5.3% less likely to perceive need for subspecialty care and 4.8% less likely to see a subspecialist. Our findings are consistent with similarly decreased perceived need for subspecialty care among CSHCN in rural compared with urban areas,²² although previous work examining subspecialty utilization by rural-urban status has shown mixed results.^{23,37} Despite these differences in perceived need and utilization, we observed no large differences in child or family disease burden. Given that there are no pediatric subspecialists in most of the lowest PSSQ counties, our results suggest that many children travel outside of their county for subspecialty care, but surprisingly, families in the lowest PSSQ did not report more financial burden and were less likely to report impact on work. Overall, our study reveals a small decrease in subspecialty utilization in areas with decreased pediatric subspecialty supply, which is paralleled by decreased perceived need. The lack of substantial associated child or family disease burden raises questions about the clinical relevance of these differences.

There are several potential interpretations for our finding of increased perceived need and utilization in the areas of highest subspecialty supply in the absence of a substantial impact on child or family disease burden. One explanation could be supplier-induced demand, where increased subspecialty supply generates demand in excess of actual need.^{38,39} The lack of differences in disease burden may indicate that

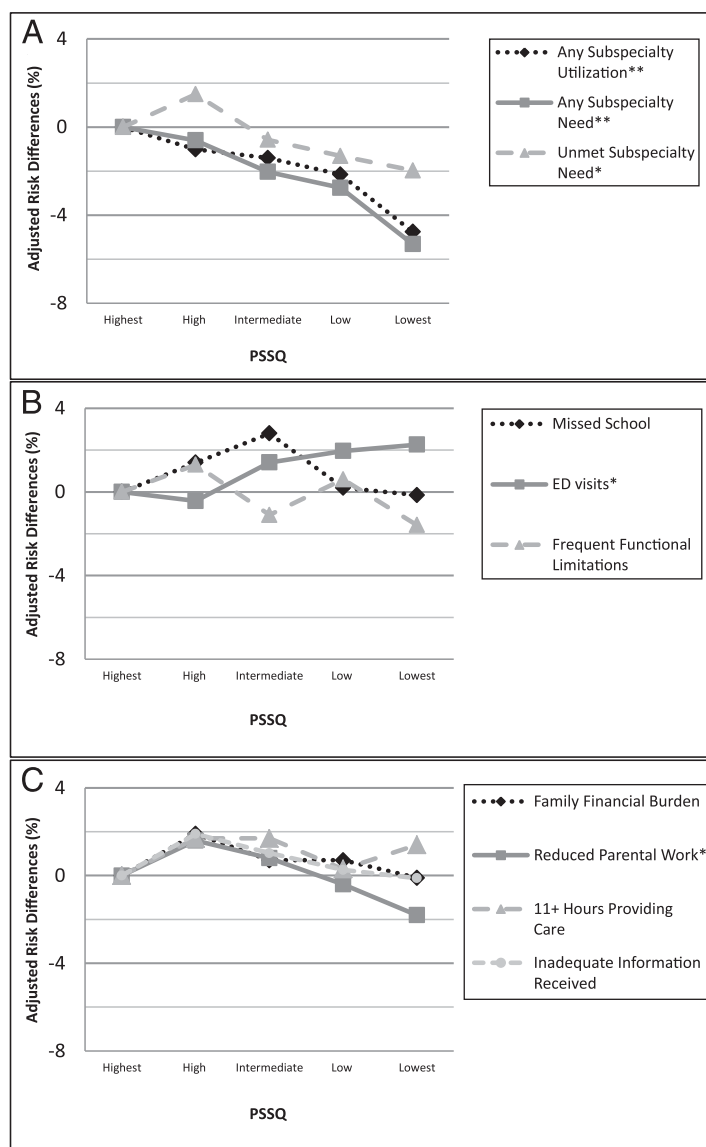


FIGURE 1

Adjusted risk differences among children with special health care needs during the previous year by PSSQ for subspecialty utilization, need, and unmet need (A); child disease burden (B); and family disease burden (C). Models adjusted for variables listed in Table 3. * $P < .05$, ** $P < .001$.

children's actual medical needs are being met to a similar degree across all regions, and that increased utilization in areas of highest supply represents unnecessary overutilization. Another related explanation is that the scope of practice for general pediatricians may vary with accessibility of subspecialty care. Previous work has estimated that as many as 40% of specialty visits could be managed in primary care,⁴⁰ that generalists are more willing to co-manage chronic illnesses than sub-

specialists recognize,^{41,42} and that general pediatricians with lower subspecialty access report greater comfort addressing subspecialty care needs.⁴³ These findings support the possibility that different generalist scope of practice due to different subspecialty supply could account for the small observed difference in utilization without adversely impacting disease burden.

At the population level, our results do not identify clinically significant amounts of foregone subspecialty care in lower

supply areas. However, it is worth noting that we examined a heterogeneous group of children with varying medical conditions and needs. Although we did not observe a clinical effect across the entire population, some children within this population may still benefit from increased access to subspecialty care. For example, we did observe a 2.3% increase in ED visits among CSHCN in the lowest supply quintile, which hints that there may be subpopulations for which decreased access is associated with foregone care, unmet need, and adverse health consequences. Our sensitivity analyses focusing on children with asthma and migraines were consistent with overall findings. However, these analyses were limited due to the large number of children with multiple chronic diagnoses and the lack of subspecialty-specific utilization or disease-specific outcomes. Future work examining disease-specific utilization and outcomes among children with specific diagnoses¹⁷ or health needs⁴⁴ may be valuable in identifying consequences of variation in subspecialty access that are not apparent in our current analysis.

Although unmet need and disease burden were similar regardless of local subspecialty supply, the primary barriers to subspecialty care did differ by local subspecialty supply. Specifically, parents reporting unmet need for subspecialty care in areas with low supply most often reported geographic and transportation barriers, whereas those with unmet need in areas with high supply most often reported financial and scheduling barriers. Across all areas, then, opportunities exist to improve the systems through which CSHCN access subspecialty care by addressing geographic, scheduling, and financial barriers. Technology-based interventions such as Internet triage systems,⁴⁵ telephone consultations systems,⁴⁶ and telemedicine^{47,48} offer opportunities not only to deliver subspecialty care across

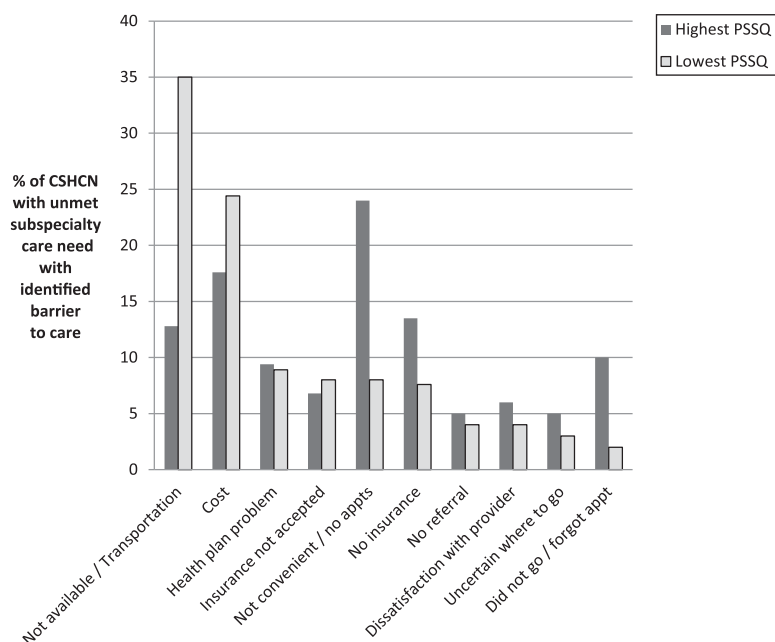


FIGURE 2

Unadjusted percentages of CSHCN with unmet need for subspecialty care in the highest and lowest PSSQ whose caregivers identified the listed barriers to subspecialty care. appt, appointment.

geographic barriers (addressing the primary barrier in low-supply areas) but also to improve appointment triage and comanagement and reduce unnecessary visits (addressing the primary barrier in high-supply areas). Additionally, educational efforts to build generalists' capacity for common subspecialty referrals may also shift referral thresholds, reduce demand on subspecialists, and increase appointment availability.⁴⁹ Given our finding that unmet need for subspecialty care was similar across all PSSQs, further exploration of multifaceted approaches to improving the generalist-subspecialist interface appear to be indicated, rather than focusing specifically on local supply differences.

Limitations

The NS-CSHCN is a cross-sectional, parent-reported survey, which limits

our ability to determine causality and raises the potential for parent recall biases. Our measure of supply included multiple pediatric subspecialists, and our measure of utilization counted any subspecialist rather than disease-specific subspecialists. We did not have data on additional factors that could moderate the effective local subspecialty supply, such as outreach/satellite clinics or telemedicine availability. Additionally, limitations exist generally in the measurement of subspecialty supply,^{17–20} prompting us to examine relative density of providers rather than specific numerical counts. We examined county-level supply because no standardized market area exists for ambulatory pediatric subspecialty care. Also, we focused on any subspecialty utilization rather than quantity, quality, or timeliness of use. These more sensitive

measures of utilization might identify greater differences in utilization across quintiles but would still be coupled with the same minimal differences in disease burden measures. Also, our study population included CSHCN with multiple chronic diagnoses and varied medical needs; although we attempted to examine more homogeneous cohorts in sub-analyses of children with asthma and migraines, >80% of both of these cohorts had ≥ 1 additional diagnosis. Focusing on children with specific diagnoses¹⁷ or medical needs⁴⁴ may be valuable in future studies. Within such disease-specific analyses, examination of objective disease-specific outcomes would be valuable, which was limited in our analysis due to lack of available data and reliance on parent report. Additionally, we examined utilization, need, and disease burden within the past year; it is worth considering that pediatric subspecialty supply may have a greater impact on more long-term outcomes. Finally, it is important to note that our study examined ambulatory utilization and potentially ambulatory care-sensitive measures of disease burden and does not pertain to the impact of access to subspecialty care among hospitalized children.

Conclusions

Large differences exist in pediatric subspecialty supply across the United States. Living in the lowest PSSQ was associated with 5.3% fewer CSHCN perceiving a need for subspecialty care and 4.8% fewer CSHCN having seen a subspecialist in the past year. Despite these associations between supply and perceived need and utilization, population-level disease burden did not differ significantly across PSSQs.

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EGG WARS: *For many years we raised chickens. The chickens had free range of the yard and large area in the back of the barn. While we usually ate the eggs, during peak production we would sometimes bring a few dozen eggs each week to sell at the local market. At that time, we did not have to label how much space they had to roam. As reported in The New York Times (Business: March 3, 2014), times have clearly changed.*

In 2008, Californians voted to impose new standards for hen housing. The standards, which go into effect Jan 1, 2015, require 116 square inches of space for each bird. The industry standard, however, is 67 square inches. That would not be a huge issue except that the California Legislature also required eggs imported from other states to be produced under the California standards. That has producers in other states crying foul.

While some egg producers are supportive of the California initiative as it supports animal welfare, others feel strongly that Californians are unduly restricting free trade and agricultural practices. The issue has spilled over into the courts. The attorney general of at least one state has filed a lawsuit to block the California egg rules, and attorney generals from three other states are contemplating joining the lawsuit. Some suspect that the case will go all the way to the Supreme Court. Until that happens, California egg producers have been busy building bigger cages. While fewer chickens are in each enclosure and those chickens tend to eat more, fewer of the chickens die and they are more productive so the overall cost to upgrade the housing is predicted to be quite low. Still, several farmers in California have quit the business and producers predict a shortage of eggs in California in 2015. I am not sure what the final results will be but maybe the next time I visit my sister in San Francisco, I will bring a few dozen carefully wrapped Vermont eggs with me.

Noted by WVR, MD

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