

Access to the Medical Home Among Children With and Without Special Health Care Needs

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abstract

OBJECTIVES: The medical home is central to providing quality health care for children. Access to the medical home has historically been tracked by using the National Survey of Children With Special Health Care Needs and the National Survey of Children's Health (NSCH). Between 2012 and 2015, the NSCH was redesigned, combining the 2 surveys into a single, annual assessment. In this study, we provide the latest estimates of medical home access among children in the United States.

METHODS: We used data from the 2016 NSCH ($N = 50\,212$). Medical home access was defined as a composite measure composed of 5 subcomponents (usual source of care, personal doctor or nurse, referral access, receipt of care coordination, and receipt of family-centered care) for 50 177 US children aged 0 to 17 years. We conducted bivariate analyses and logistic regression to examine the sociodemographic and health characteristics associated with reported attainment of the medical home composite measure and each subcomponent. Analyses were survey weighted.

RESULTS: In 2016, 43.2% of children with special health care needs (CSHCN) and 50.0% of non-CSHCN were reported to have access to a medical home. Attainment of the medical home composite measure varied significantly by sociodemographic characteristics among both CSHCN and non-CSHCN, as did attainment rates for each of the 5 subcomponents. The medical complexity of CSHCN was also associated with attainment rates of all outcomes.

CONCLUSIONS: The medical home incorporates elements of care considered necessary for providing comprehensive, quality care. Our results indicate that there is still room to improve access to the medical home among all children.



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Dr Lichstein conceptualized and designed the study, conducted all analyses, drafted the initial manuscript, and reviewed and revised the manuscript; Drs Ghandour and Mann conceptualized and designed the study, provided detailed feedback on analyses and findings, and critically reviewed and revised the manuscript; and all authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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WHAT'S KNOWN ON THIS SUBJECT: The medical home is widely considered a key component of care for all children. Medical home access has historically been tracked with 2 surveys. The National Survey of Children's Health was redesigned, combining the 2 surveys into a single annual assessment.

WHAT THIS STUDY ADDS: In this study, we present the latest estimates of medical home access and identify sociodemographic and health factors associated with access among children with and without special health care needs. Disparities in access persist with differences observed by special need status.

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The American Academy of Pediatrics defines a medical home as a model of primary health care that is accessible, family-centered, continuous, comprehensive, coordinated, compassionate, and culturally effective.¹ For >2 decades, the Health Resources and Services Administration's Maternal and Child Health Bureau (HRSA MCHB) has promoted this model as a key feature of care for children with special health care needs (CSHCN),^{2,3} defined as those children "who have or are at increased risk for a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond that required by children generally."⁴ The medical home is vital for the care of CSHCN because they use more health care services and have more unmet health needs than other children.^{5,6} In addition, the model is now considered a standard for ensuring the provision of quality health care for all children, and studies have shown that both children with and without special health care needs (SHCN) benefit from care consistent with this model.⁷⁻¹⁰

Since 2001, HRSA MCHB has tracked the proportion of children with access to a medical home through the HRSA MCHB-sponsored National Survey of Children With Special Health Care Needs (NS-CSHCN) and National Survey of Children's Health (NSCH). Both surveys incorporated the key components of the American Academy of Pediatrics definition of the medical home into survey items used to create a composite medical home measure based on parent- and/or caregiver-reported experiences and perceptions.¹¹ Between 2012 and 2015, HRSA MCHB redesigned the NSCH, combining the NSCH and NS-CSHCN into 1 survey and moving to an annual administration using an address-based sample and a self-administered, Web-based or paper

survey instrument.¹² The 2016 NSCH contains the first year of data from the redesigned survey.

Because of differences in survey sampling methodology and modes of administration, the 2016 NSCH represents a new set of baseline data for medical home access. In this article, we provide updated estimates of medical home access. Additionally, given the differences in need and use of health care services between CSHCN and non-CSHCN, we provide estimates separately for CSHCN and non-CSHCN as well as an examination of the sociodemographic and health factors associated with medical home access in each group.

METHODS

Data

We used data from the 2016 NSCH, a cross-sectional, nationally representative sample of noninstitutionalized children aged 0 to 17 years. The NSCH is funded and directed by HRSA MCHB and fielded by the US Census Bureau. It produces both national and state-level estimates of children's physical and emotional health as well as information on family, community, and health care-related factors that can impact children's health and well-being.

The new NSCH¹² retained the 2-phased data collection strategy with an adult (parent or caregiver) in each household knowledgeable about the child responding to the survey.¹³ A screener questionnaire was used to determine the number of eligible children residing at an address and if they qualified as CSHCN. For the second stage topical survey, data were collected on 1 randomly selected eligible child from each household. Data collection occurred from June 2016 to February 2017. Sampling weights were produced to account for nonresponse and to ensure that survey estimates

could be generalized to the noninstitutionalized population of US children aged 0 to 17 years. The overall weighted response rate for the survey was 40.7%, representing a final sample of 50 212 children. This study included 50 177 children with nonmissing medical home status (ie, <1% of children did not have valid responses to the medical home survey items). This study did not require institutional review board review because the data are publicly available.¹⁴

Variables

Outcomes

We examined the HRSA MCHB medical home composite measure, which includes the following 5 subcomponents: (1) having a usual source of care (USOC), (2) having a personal doctor or nurse (PDN), (3) receiving needed referrals (REFs), (4) receiving needed care coordination (CC), and (5) receiving family-centered care (FCC).¹¹

Two subcomponents, USOC and PDN, applied to all children in the sample. USOC was defined as parental or caregiver report of a child having a usual source of sick care exclusive of the hospital emergency department, and PDN was defined as parental or caregiver report of a child having ≥ 1 persons who are thought of as the child's PDN. The remaining 3 subcomponents were pertinent only for children whose parent or caregiver indicated the child needed the specified services. In other words, REF only applied to children reported to need referrals ($N = 9141$), CC only to children reported to need CC ($N = 27\,030$), and FCC only to children who had a visit with a health care professional in the past 12 months ($N = 44\,036$). The FCC subcomponent was defined by using 5 survey items assessing whether the child's doctor or other health care providers (1) spent enough time with the child, (2) listened carefully to the child, (3) showed

sensitivity to family values, (4) provided the specific information needed concerning the child, and (5) helped the family feel like a partner in the child's care. Parental and caregiver reports of "always" or "usually" to all 5 items qualified as meeting FCC. CC was defined as parental or caregiver responses of "usually" for getting needed help with CC and, when needed, of being "very satisfied" with the doctor's communication with other health care providers and with the school, child care provider, or special education. Children achieving all pertinent subcomponents were coded as having a medical home.

Independent Variables

We included 7 sociodemographic variables historically associated with medical home access,^{15–19} including child age (0–5, 6–11, and 12–17 years), sex (male or female), race and ethnicity (Hispanic, non-Hispanic white, non-Hispanic black, or non-Hispanic other), primary language spoken at home (English or any other language), insurance coverage at the time of the survey (uninsured, public insurance only, or private insurance), household income as a proportion of the federal poverty level (FPL) (<100%, 100%–199%, 200%–399%, and ≥400%), and household education (less than high school, high school, or more than high school). For CSHCN (identified by the 5-item CSHCN screener),²⁰ we also included a count of the number of qualifying SHCN screening items (1–5 inclusive) met. This variable was intended to capture the complexity of health care needs because we theorized that children who met more qualifiers (eg, medications, elevated service use, functional limitations, behavioral therapies, and special therapies) would require more services and/or types of services.

Statistical Analyses

All analyses were stratified by CSHCN status. We first conducted

bivariate analyses to examine the sociodemographic and health characteristics associated with outcomes using χ^2 tests with design-based F statistics. We then used logistic regression to assess the adjusted associations of sociodemographic and health characteristics with the outcomes. In regression analyses among CSHCN, we also controlled for the number of SHCN qualifiers.

We also conducted sensitivity analyses. For non-CSHCN, we ran the adjusted models with an additional variable, reported general health status (excellent or very good, good, or fair or poor), to examine the inclusion of a variable analogous to the number of SHCN qualifiers among CSHCN. Also, because we analyzed models for REF and CC only for children who were reported to need those services, we examined the sociodemographic factors associated with the probability of reporting the need for services.

All analyses were conducted by using complete case analysis and were weighted to be representative of noninstitutionalized children aged 0 to 17 years. Regression results are presented as average marginal effects (AMEs), which provide the absolute difference in the probability of a binary outcome occurring.^{21,22} FPL was multiply imputed for 18.56% of the sample because of item nonresponse.²³ We used public data files created by the US Census Bureau.¹⁴ All analyses were conducted by using Stata version 15 (Stata Corp, College Station, TX). Results are reported as significant if they have *P* values <.05.

RESULTS

Overall, 43.2% of CSHCN and 50.0% of non-CSHCN were reported by their parent or caregiver to have access to a medical home in 2016 (Table 1). Attainment rates for each of the 5 medical home

subcomponents were higher than for the medical home composite measure overall, ranging from 62.3% for the receipt of CC among CSHCN to 87.3% for the receipt of FCC among non-CSHCN. Attainment rates for USOC and PDN were higher among CSHCN than non-CSHCN (82.1% vs 79.1% and 79.3% vs 70.9%, respectively), whereas attainment rates were higher among non-CSHCN for the remainder of outcomes. The subcomponent with the highest attainment rate for both CSHCN and non-CSHCN was the receipt of FCC (82.6% and 87.3%).

Unadjusted Results

Medical Home

Among both CSHCN and non-CSHCN, rates of reported medical home attainment varied significantly by race and ethnicity, the primary language spoken at home, insurance coverage, household income, and household education (Table 1). For both groups, the rate of reported attainment was lowest among Hispanic children (36.3% and 36.1%), followed by non-Hispanic black children (38.9% and 40.2%), and it was highest among non-Hispanic white children (48.0% and 59.8%). Children living in households in which English was not the primary language and those that were uninsured at the time of the survey were less likely to have medical home access; rates of reported medical home attainment also increased with household income for both groups. Children residing in households in which at least 1 primary caregiver or parent had more than a high school education reported a higher prevalence of medical home access (47.5%) than those in homes with high school or less than high school education (34.6% for both). In addition, rates of reported medical home attainment among CSHCN decreased with increasing

TABLE 1 Prevalence of Access to a Medical Home and Its 5 Subcomponents According to Selected Sociodemographic Characteristics of GSHCN and Non-GSHCN in 2016

Covariates	Unweighted N		Had Medical Home Overall, % (SE)		Had USOC, % (SE)		Had PDN, % (SE)		Received Needed Referrals, % (SE)		Received Effective CC, % (SE)		Received FCC % (SE)	
	GSHCN	Non-GSHCN	GSHCN (N = 11 244)	Non-GSHCN (N = 38 335)	GSHCN (N = 11 329)	Non-GSHCN (N = 38 603)	GSHCN (N = 3959)	Non-GSHCN (N = 5182)	GSHCN (N = 8916)	Non-GSHCN (N = 18 114)	GSHCN (N = 10 727)	Non-GSHCN (N = 33 309)		
Total population	11 392	38 820	43.16 (1.00)	50.02 (0.57)	82.14 (0.96)	79.08 (0.53)	79.28 (0.96)	70.93 (0.56)	74.38 (1.74)	80.54 (1.46)	62.31 (1.12)	76.22 (0.72)	82.57 (0.98)	87.32 (0.46)
Sex														
Male	6432	19 301	42.59 (1.32)	50.20 (0.81)	81.90 (1.28)	79.27 (0.72)	79.39 (1.22)	70.74 (0.80)	71.81 (2.55)	81.48 (1.94)	62.30 (1.43)	76.29 (1.08)	82.37 (1.29)	87.71 (0.59)
Female	4960	19 519	43.95 (1.53)	49.84 (0.81)	82.48 (1.43)	78.89 (0.77)	79.13 (1.52)	71.12 (0.80)	77.95 (2.06)	79.51 (2.20)	62.32 (1.80)	76.14 (0.94)	82.85 (1.50)	86.95 (0.70)
Age, y														
0–5	1682	12 812	43.64 (2.66)	53.03 (0.97)	82.41 (2.45)	81.11 (0.91)	82.62 (2.11)	73.04 (0.92)	72.86 (4.61)	82.73 (2.13)	63.75 (2.58)	77.48 (1.22)	81.34 (2.55)	88.84 (0.63)
6–11	3848	11 162	41.87 (1.67)	48.81 (1.07)	81.53 (1.55)	80.83 (0.94)	76.99 (1.65)	69.93 (1.10)	76.26 (2.61)	81.23 (2.80)	59.38 (2.02)	73.73 (1.38)	83.53 (1.51)	85.76 (0.98)
12–17	5862	14 846	44.14 (1.37)	47.86 (0.93)	82.60 (1.39)	75.00 (0.90)	79.97 (1.38)	69.58 (0.90)	73.49 (2.37)	77.48 (2.71)	64.32 (1.49)	77.32 (1.14)	82.20 (1.47)	87.03 (0.78)
Race and ethnicity														
Hispanic	1203	4320	36.34 (2.91)	36.09 (1.48)	75.31 (2.88)	71.00 (1.58)	71.38 (3.05)	61.01 (1.65)	71.71 (4.53)	70.83 (4.19)	63.63 (3.06)	70.95 (2.19)	76.10 (2.65)	79.28 (1.57)
Non-Hispanic white	8110	27 207	47.95 (1.06)	59.75 (0.57)	86.78 (0.78)	85.46 (0.44)	84.00 (0.76)	76.86 (0.50)	78.33 (1.73)	86.95 (1.09)	61.32 (1.24)	79.34 (0.68)	86.56 (0.96)	91.90 (0.36)
Non-Hispanic black	808	2063	38.93 (2.75)	40.24 (1.79)	76.08 (3.14)	73.05 (1.62)	73.43 (2.84)	66.08 (1.79)	65.10 (5.84)	80.39 (3.97)	67.81 (3.24)	74.72 (2.44)	76.35 (3.57)	82.03 (1.48)
Non-Hispanic other	1271	5230	39.58 (2.62)	46.65 (1.43)	82.65 (2.07)	73.96 (1.39)	81.61 (1.92)	70.75 (1.33)	74.41 (4.17)	72.19 (5.34)	55.86 (2.65)	73.65 (1.68)	84.42 (1.90)	86.48 (0.92)
Primary language spoken at home														
English	10 933	35 754	44.95 (0.97)	53.73 (0.57)	83.58 (0.89)	81.49 (0.48)	81.36 (0.83)	73.40 (0.53)	74.81 (1.72)	84.47 (1.21)	62.30 (1.12)	78.06 (0.67)	84.22 (0.93)	89.10 (0.42)
Any other language	385	2763	27.85 (4.93)	30.80 (1.82)	71.14 (4.96)	66.16 (2.12)	59.08 (5.58)	58.52 (2.11)	70.47 (7.56)	60.51 (5.68)	61.68 (5.57)	63.67 (3.16)	61.93 (5.61)	74.83 (2.17)
Insurance coverage at time of survey														
Uninsured	326	1454	30.71 (5.19)	23.80 (2.10)	64.93 (4.85)	58.26 (2.93)	57.75 (5.28)	44.48 (2.89)	66.29 (11.27)	57.81 (12.19)	72.40 (5.54)	64.88 (4.58)	65.06 (6.44)	74.65 (3.47)
Any public	3576	7407	35.93 (1.64)	39.96 (1.18)	77.56 (1.68)	73.37 (1.13)	75.81 (1.68)	65.42 (1.20)	70.15 (2.88)	74.25 (2.67)	59.40 (1.98)	72.03 (1.59)	77.20 (1.72)	81.80 (1.06)

TABLE 1 Continued

Covariates	Unweighted N		Had Medical Home Overall, % (SE)		Had USOC, % (SE)		Had PDN, % (SE)		Received Needed Referrals, % (SE)		Received Effective CC, % (SE)		Received FCC % (SE)	
	CSHCN	Non-CSHCN	CSHCN (N = 11387)	Non-CSHCN (N = 38790)	CSHCN (N = 11244)	Non-CSHCN (N = 38335)	CSHCN (N = 11329)	Non-CSHCN (N = 38603)	CSHCN (N = 3959)	Non-CSHCN (N = 5182)	CSHCN (N = 8916)	Non-CSHCN (N = 18114)	CSHCN (N = 10727)	Non-CSHCN (N = 33309)
Private	7343	29360	52.11*** (1.09)	59.19*** (0.60)	89.29*** (0.71)	85.53*** (0.48)	85.36*** (0.75)	77.50*** (0.52)	80.74* (1.46)	86.78*** (1.36)	79.24*** (0.74)	89.49*** (0.69)	91.06*** (0.42)	
Household income as a proportion of the FPL, %														
<100	1377	3552	32.30*** (2.30)	36.78*** (1.64)	70.96*** (2.56)	67.56*** (1.70)	68.56*** (2.70)	60.95*** (1.84)	71.14* (3.82)	71.21*** (4.67)	72.43*** (2.30)	73.36*** (2.71)	81.29*** (1.57)	
100–200	1932	6071	39.30*** (2.42)	40.11*** (1.47)	81.55*** (2.18)	74.22*** (1.38)	78.01*** (2.32)	64.44*** (1.69)	69.05* (4.50)	74.49*** (3.90)	71.31*** (2.28)	78.60*** (2.73)	81.97*** (1.45)	
200–400	3402	12124	46.38*** (2.07)	53.10*** (1.04)	84.50*** (1.95)	81.53*** (0.98)	82.45*** (1.56)	72.76*** (0.93)	75.71* (3.15)	83.64*** (2.24)	76.76*** (1.25)	85.38*** (1.80)	88.23*** (0.82)	
≥400	4681	17073	53.74*** (1.46)	63.52*** (0.80)	90.81*** (1.27)	88.18*** (0.56)	87.48*** (0.97)	80.82*** (0.67)	82.16* (2.47)	88.78*** (1.18)	80.67*** (1.02)	91.03*** (1.03)	93.18*** (0.48)	
Household education														
Less than high school	251	845	34.58*** (5.25)	28.05*** (2.67)	65.63*** (5.15)	57.76*** (3.19)	63.32*** (5.31)	50.81*** (3.15)	63.03 (8.61)	62.18** (8.56)	72.82* (5.17)	74.24** (5.14)	73.98*** (3.71)	
High school	1440	4580	34.59*** (2.29)	37.16*** (1.45)	69.47*** (2.79)	70.12*** (1.43)	71.95*** (2.86)	62.06*** (1.54)	75.94 (3.88)	78.00** (3.92)	72.98 (2.20)	77.83** (2.74)	83.27*** (1.24)	
More than high school	9441	32458	47.54*** (1.05)	57.06*** (0.58)	88.55*** (0.81)	84.88*** (0.44)	84.20*** (0.73)	76.55*** (0.51)	76.43 (1.87)	83.80* (1.31)	76.86 (0.72)	85.32** (1.00)	89.57*** (0.43)	
No. of qualifiers for CSHCN														
1	5074	—	48.91*** (1.53)	—	79.40 (1.59)	—	77.46* (1.45)	—	82.71*** (2.28)	—	72.93** (1.73)	85.91*** (1.51)	—	
2	2465	—	46.12*** (2.31)	—	83.31 (1.97)	—	77.43* (2.25)	—	79.58*** (3.47)	—	63.98** (2.41)	85.62*** (1.78)	—	
3	1957	—	38.30*** (2.02)	—	85.47 (1.81)	—	82.90* (1.93)	—	70.66** (3.50)	—	56.65** (2.40)	82.22*** (2.13)	—	
4	1112	—	32.73*** (3.44)	—	83.14 (3.11)	—	78.99* (3.34)	—	65.83** (5.94)	—	49.98** (3.43)	69.55** (3.54)	—	
5	799	—	27.56*** (3.24)	—	85.51 (2.50)	—	87.82* (2.29)	—	58.76** (5.63)	—	39.21** (3.68)	74.39*** (3.84)	—	

SEs are reported in parentheses. SEs and P values were generated by using χ^2 tests with design-based F statistics. —, not applicable.

* P < .05;

** P < .01;

*** P < .001.

numbers of SHCN qualifiers (48.9% among children qualifying on 1 criterion versus 27.6% among those meeting 5 qualifying criteria). Among non-CSHCN, the rate of reported attainment decreased with increases in age group (53.0% among children aged 0–5 years versus 47.9% among adolescents aged 12–17).

Subcomponents

For reported USOC, PDN, and FCC, patterns generally mirrored those for the medical home composite with the following 2 exceptions: results for reported USOC among CSHCN did not vary significantly by the number of CSHCN qualifiers, and rates of reported PDN increased with increasing numbers of CSHCN qualifiers (77.5% among children qualifying on 1 criterion versus 87.8% among those meeting 5 qualifying criteria).

Among CSHCN, reported REF varied only by insurance coverage, household income, and the number of SHCN qualifiers. As with medical home access, rates of reported attainment were lowest among uninsured children and highest among children in households with incomes $\geq 400\%$ of the FPL, and they decreased with increasing numbers of CSHCN qualifiers. Results among non-CSHCN were similar to the medical home composite results except that child age was not significant.

Reported receipt of CC among CSHCN varied by insurance coverage, household education, and the number of CSHCN qualifiers. Rates of reported attainment were highest among children uninsured at the time of the survey (72.4% vs 59.4% among any public insurance and 63.8% among private) and among those in households reporting less than high school education (72.8% vs 65.6% with high school and 60.8% with more than high school). As with the medical home composite

results, rates of reported attainment of CC decreased with increasing numbers of SHCN qualifiers. Among non-CSHCN, reported attainment of CC varied only by race and ethnicity, primary language, insurance coverage, and household income; patterns were similar to those seen for the medical home composite.

Regression Results

Medical Home

As shown in Table 2, among CSHCN, meeting ≥ 3 qualifying criteria for SHCN, living in a household in which English was not the primary language (AME = -0.13 , $P = .019$), living in a household with an income $< 100\%$ of the FPL (AME = -0.11 , $P = .005$), and being privately insured (AME = 0.13 , $P = .026$) remained significantly associated with rates of reported medical home attainment after adjustment. In particular, compared with children with 1 qualifier for SHCN, those with 5 qualifiers were 21.0 percentage points ($P < .001$) less likely to have a reported medical home. Among non-CSHCN, all sociodemographic characteristics that were significant in the unadjusted analyses remained significant after adjustment. In sensitivity analyses, controlling for general health status among non-CSHCN did not significantly alter the results for any of the outcomes (results not shown).

Subcomponents

Among CSHCN, the number of SHCN qualifiers remained significantly associated with all 5 medical home subcomponents (see Table 3). Compared with children qualifying on 1 criterion, those qualifying on 5 criteria were more likely to have a reported USOC (AME = 0.065 , $P = .022$) and PDN (AME = 0.10 , $P < .001$) and were less likely to have reported REF (AME = -0.23 , $P < .001$), CC (AME = -0.33 , $P < .001$), and FCC (AME = -0.11 , $P = .006$).

Except for non-Hispanic black CSHCN (who were 7.3 percentage points more likely to have reported CC), race and ethnicity were not significant. Speaking any language other than English at home remained negatively associated with reported PDN rates and the receipt of FCC. Insurance coverage remained positively associated with reported USOC, PDN, and receipt of FCC rates; both children with private and public insurance were 11 to 12 percentage points less likely to have reported CC ($P = .023$ and $.038$, respectively). For both reported PDN and receipt of FCC rates, household income $< 100\%$ of the FPL remained negatively associated with attainment. More than high school education remained positively associated with reported USOC rates and negatively associated with reported CC (AME = -0.12 , $P = .020$). Sensitivity analyses revealed that parents or caregivers reporting more than high school education were 15.0 percentage points ($P = .012$) more likely to report a child needed CC.

Among non-CSHCN, results for USOC, PDN, and FCC were similar to those from the unadjusted analyses (Table 4). However, for REF, almost all variables lost significance in the adjusted analyses. In addition, for CC, race and ethnicity lost significance, and household education became significant; non-CSHCN in households with high school or more than high school education were 9.9 percentage points ($P = .008$) and 11.3 percentage points ($P = .001$) less likely to report attainment. As with CHSCN, sensitivity analyses revealed that parents or caregivers reporting more than high school education were more likely to report a need for CC (AME = 0.089 , $P = .012$).

DISCUSSION

Over the past 2 decades, the medical home model has become

TABLE 2 AMEs of Selected Sociodemographic Characteristics on Medical Home Among CSHCN and Non-CSHCN

Covariates	Marginal Effect (SE)	
	Had Medical Home (CSHCN)	Had Medical Home (Non-CSHCN)
Sex (reference = female)		
Male	0.007 (0.019)	−0.001 (0.011)
Age, y (reference = 0–5 y)		
6–11	−0.001 (0.032)	−0.032* (0.014)
12–17	−0.005 (0.030)	−0.041** (0.013)
Race and ethnicity (reference = non-Hispanic white)		
Hispanic	−0.027 (0.031)	−0.113*** (0.018)
Non-Hispanic black	0.005 (0.030)	−0.116*** (0.020)
Non-Hispanic other	−0.064* (0.028)	−0.097*** (0.016)
Primary language spoken at home (reference = English)		
Any other language	−0.126* (0.053)	−0.070** (0.023)
Insurance coverage at the time of survey (reference = uninsured)		
Any public	0.068 (0.059)	0.174*** (0.027)
Private	0.130* (0.058)	0.228*** (0.027)
Household income as a proportion of the FPL (reference = ≥400%), %		
<100	−0.112** (0.039)	−0.090*** (0.023)
100–200	−0.047 (0.031)	−0.107*** (0.019)
200–400	−0.050* (0.023)	−0.063*** (0.013)
Household education (reference = less than high school)		
High school	−0.037 (0.062)	−0.008 (0.037)
More than high school	0.001 (0.061)	0.091* (0.036)
No. of qualifiers for CSHCN (reference = 1)		
2	−0.011 (0.027)	—
3	−0.102*** (0.024)	—
4	−0.150*** (0.039)	—
5	−0.206*** (0.038)	—

SEs are reported in parentheses. —, not applicable.

* $P < .05$;

** $P < .01$;

*** $P < .001$.

widely accepted as an effective health care delivery model for all children. However, our results indicate that there is still room for improvement, given that only 43.2% of CSHCN and 50.0% of non-CSHCN were reported by their parents or caregivers to receive care that met all criteria for a medical home in 2016. These attainment rates serve as a new baseline from which we can track progress in medical home access and its subcomponents among CSHCN and non-CSHCN.

Historically, >90% of both CSHCN and non-CSHCN were reported by a parent or caregiver to have a USOC and a PDN, with lower reported rates for other medical home subcomponents, particularly receipt of FCC and CC.^{15–17,19} However, we found the highest

attainment for both groups was the receipt of FCC (82.6% and 87.3%). It is possible that these rates suggest that improvements have been made across the board in parent and caregiver perceptions of family engagement, although it will be important to see if these rates remain or change with future years of data. Despite higher overall rates, we still found important differences in attainment by language, household income, and insurance coverage. In particular, results for households in which English is not the primary language suggest a continued need for medical interpretation and translation services to improve the provision of FCC and to facilitate family-professional partnerships.^{18,24} In addition, we found that having a PDN was the subcomponent with

the lowest attainment rate among non-CSHCN (71%). One possibility is that non-CSHCN could be more likely to use large group, urgent care, or school-based practices in which they are less likely to see the same clinician each time. This is an important topic for future research in addition to examining whether having a PDN is critical for non-CSHCN who are generally healthy, especially if they have a USOC.

Our findings also underscore the continued importance of medical home access for all children. Nearly half of non-CSHCN and three-fourths of CSHCN needed some form of CC, yet both had low attainment rates for CC (62.3% and 76.2%, respectively). Effective CC has been linked to decreased unmet specialty care needs

TABLE 3 AMEs of Selected Sociodemographic Characteristics on 5 Medical Home Subcomponents Among CSHCN

Covariates	Marginal Effect (SE)				
	Had a USOC	Had a PDN	Received Needed Referrals	Received Effective CC	Received FCC
Sex (reference = female)					
Male	0.001 (0.017)	0.000 (0.017)	-0.028 (0.029)	0.024 (0.022)	0.010 (0.018)
Age, y (reference = 0–5 y)					
6–11	-0.003 (0.027)	-0.057* (0.025)	0.043 (0.046)	-0.046 (0.032)	0.025 (0.025)
12–17	-0.004 (0.027)	-0.044 (0.023)	0.001 (0.043)	-0.001 (0.029)	-0.004 (0.025)
Race and ethnicity (reference = non-Hispanic white)					
Hispanic	-0.043 (0.026)	-0.028 (0.026)	-0.028 (0.026)	0.031 (0.034)	-0.020 (0.027)
Non-Hispanic black	-0.014 (0.028)	-0.019 (0.024)	-0.019 (0.024)	0.073* (0.035)	-0.034 (0.029)
Non-Hispanic other	-0.024 (0.022)	-0.002 (0.021)	-0.002 (0.021)	-0.052 (0.036)	-0.005 (0.022)
Primary language spoken at home (reference = English)					
Any other language	-0.023 (0.042)	-0.129* (0.052)	0.005 (0.072)	-0.029 (0.060)	-0.155** (0.058)
Insurance coverage at the time of survey (reference = uninsured)					
Any public	0.100* (0.047)	0.121* (0.053)	0.06 (0.11)	-0.120* (0.053)	0.097 (0.056)
Private	0.147** (0.047)	0.138** (0.052)	0.11 (0.11)	-0.110* (0.053)	0.148** (0.056)
Household income as a proportion of the FPL (reference = $\geq 400\%$), %					
<100	-0.064 (0.036)	-0.090** (0.031)	-0.052 (0.052)	-0.069 (0.045)	-0.090** (0.032)
100–200	-0.017 (0.032)	-0.026 (0.028)	-0.074 (0.049)	-0.044 (0.034)	-0.055 (0.029)
200–400	-0.042 (0.030)	-0.033 (0.018)	-0.060 (0.037)	-0.018 (0.025)	-0.047* (0.022)
Household education (reference = less than high school)					
High school	0.001 (0.048)	0.023 (0.049)	0.102 (0.083)	-0.054 (0.055)	-0.005 (0.039)
More than high school	0.116* (0.046)	0.090 (0.047)	0.059 (0.082)	-0.122* (0.052)	-0.006 (0.038)
No. of qualifiers for CSHCN (reference = 1)					
2	0.046* (0.022)	0.019 (0.023)	-0.010 (0.037)	-0.089** (0.028)	-0.009 (0.021)
3	0.059* (0.023)	0.049* (0.022)	-0.110** (0.040)	-0.153*** (0.031)	-0.037 (0.024)
4	0.054 (0.035)	0.025 (0.031)	-0.143* (0.058)	-0.234*** (0.037)	-0.153*** (0.035)
5	0.065* (0.028)	0.103*** (0.026)	-0.227*** (0.060)	-0.328*** (0.040)	-0.110** (0.040)

SEs are reported in parentheses.

* $P < .05$;

** $P < .01$;

*** $P < .001$.

and other care outcomes.^{25,26} Our results reveal that sustained efforts to support effective CC are needed.

The factors associated with reported medical home attainment were not consistent between CSHCN and non-CSHCN. All sociodemographic characteristics except sex were significantly associated with reported medical home attainment among non-CSHCN. However, age, race and ethnicity, household income, and household education were not consistently associated with reported medical home attainment or related subcomponents among CSHCN. Because the concept of the medical home was first emphasized specifically for CSHCN,^{2,3} it is possible that the sustained

focus among this population has led to reductions in some sociodemographic disparities noted in previous analyses^{15,17} that have not yet been replicated among non-CSHCN. Additionally, among CSHCN, those with more complex needs were less likely to attain a medical home. It may be that as the number of SHCN qualifiers increases, the need for coordinated services provided by multiple care teams also increases, thereby increasing the potential for unmet care events and reduced medical home access.

One similarity between the results for CSHCN and non-CSCHN was the association between household education and reported receipt of effective CC. For both groups, children whose parents or caregivers reported more

than high school education were significantly less likely to report a receipt of CC. Although this was an unexpected finding, our sensitivity analyses indicated that parents and caregivers who reported more than high school education were more likely to report that their child needed CC in the first place. Our results may indicate parental and caregiver perceptions of need influence the perception of the receipt of CC. The results for insurance status and CC among CSHCN were also surprising, and future research is needed to better understand this relationship.

There are several limitations to this study. First, because data from the NSCH are based on parental and caregiver reports, there is potential

TABLE 4 AMEs of Selected Sociodemographic Characteristics on 5 Medical Home Subcomponents Among Non-CSHCN

Covariates	Marginal Effect (SE)				
	Had USOC	Had PDN	Received Needed Referrals	Received Effective CC	Received FCC
Sex (reference = female)					
Male	0.002 (0.010)	−0.005 (0.011)	0.020 (0.025)	0.001 (0.014)	0.0023 (0.0090)
Age, y (reference = 0–5 y)					
6–11	−0.002 (0.012)	−0.020 (0.014)	−0.016 (0.032)	−0.027 (0.018)	−0.027* (0.011)
12–17	−0.054*** (0.012)	−0.025* (0.013)	−0.055 (0.028)	−0.006 (0.017)	−0.015 (0.010)
Race and ethnicity (reference = non-Hispanic white)					
Hispanic	−0.051** (0.016)	−0.069*** (0.017)	−0.046 (0.042)	−0.034 (0.024)	−0.065*** (0.016)
Non-Hispanic black	−0.066*** (0.016)	−0.054** (0.019)	−0.014 (0.040)	−0.012 (0.027)	−0.060*** (0.014)
Non-Hispanic other	−0.096*** (0.015)	−0.046** (0.015)	−0.100** (0.038)	−0.034 (0.020)	−0.043*** (0.011)
Primary language spoken at home (reference = English)					
Any other language	−0.002 (0.018)	−0.008 (0.021)	−0.098 (0.051)	−0.146*** (0.033)	−0.051* (0.021)
Insurance coverage at the time of survey (reference = uninsured)					
Any public	0.114*** (0.029)	0.188*** (0.031)	0.070 (0.079)	0.099* (0.048)	0.069* (0.021)
Private	0.146*** (0.029)	0.216*** (0.031)	0.144 (0.078)	0.126** (0.048)	0.091** (0.030)
Household income as a proportion of the FPL (reference = ≥400%, %)					
<100	−0.081*** (0.020)	−0.070** (0.021)	−0.066 (0.050)	−0.051 (0.035)	−0.051** (0.017)
100–200	−0.063*** (0.016)	−0.079*** (0.020)	−0.047 (0.036)	−0.064* (0.028)	−0.069*** (0.015)
200–400	−0.048*** (0.012)	−0.058*** (0.012)	−0.034 (0.026)	−0.026 (0.018)	−0.042*** (0.010)
Household education (reference = less than high school)					
High school	0.053 (0.032)	0.027 (0.035)	0.036 (0.063)	−0.099** (0.037)	0.010 (0.029)
More than high school	0.132*** (0.030)	0.104** (0.033)	0.022 (0.058)	−0.113** (0.034)	0.022 (0.028)

SEs are reported in parentheses.

* $P < .05$;

** $P < .01$;

*** $P < .001$.

for bias due to a lack of knowledge or recall. However, the use of parental and caregiver reports for medical home attainment provides a valuable patient-family assessment of this national measure because parents and caregivers are integral parts of the medical home process. Second, the cross-sectional nature of the data limits our ability to interpret causality; all results from this study represent associations and not causal relationships. Third, there is the potential for bias in the results because of survey nonresponse; however, survey weights were used to attenuate the bias. Finally, although the medical home and its subcomponents were defined by using the same survey questions as those in the previous NSCH and

NS-CSHCN, differences in survey sampling methodology preclude direct comparisons and trend analyses with estimates from the previous surveys.

CONCLUSIONS

Results from this analysis of the 2016 NSCH reveal that half of non-CSHCN and less than half of CSHCN were reported to have received care consistent with the medical home model in 2016. We found that sociodemographic and health-related disparities in the attainment of the medical home and its subcomponents persist, although our results also indicate that the factors associated with access to a medical home are different for CSHCN and non-CSHCN.

ABBREVIATIONS

AME: average marginal effect

CC: care coordination

CSHCN: children with special health care needs

FCC: family-centered care

FPL: federal poverty level

HRSA MCHB: Health Resources and Services Administration's Maternal and Child Health Bureau

NSCH: National Survey of Children's Health

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

PDN: personal doctor or nurse

REF: receiving needed referral

SHCN: special health care needs

USOC: usual source of care

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