


Does Parental Report of Having a Medical Home Attenuate the Negative Association Between Unmet Basic Needs and Health for Low-Income Children?

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Abstract

Background. It is unknown whether the medical home reduces the impact of adverse social determinants on low-income child health. **Objective.** To examine whether the medical home attenuates the association between unmet basic needs and health for low-income children. **Design/Methods.** Secondary data analysis of the 2011-12 NSCH restricted to <200% FPL children (n = 26 974). Multivariable logistic regression modeled child health with unmet basic needs to examine the effect modification of the medical home. **Results.** Low-income children with unmet needs had lower odds of “excellent/very good” health compared to children without unmet needs, regardless of the medical home [aOR = 0.78 (0.61-0.99) vs aOR = 0.77 (0.63-0.94), P = .01], respectively]. The medical home did not modify the negative association between unmet basic needs and “excellent/very good” child health (P = .97). **Conclusion.** Having a medical home per parental report did not attenuate the negative relationship between unmet basic needs and low-income child health.

Keywords

unmet basic needs, medical home, child health, low-income children, social determinants of health

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Introduction

In the United States, 31.5 million children (or 42.9% of all children) live in households designated as low-income, that is, defined as <200% below Federal Poverty Level (FPL).¹ It is well established that living in poverty or near poverty conditions can lead to adverse child health and developmental outcomes that persist through adulthood.¹ Poverty and other environmental circumstances such as unmet basic needs (food or housing insecurity), deemed as adverse social determinates of health, are estimated to have at least twice the impact on health as access to or quality of healthcare.² It is also well established that low-income children disproportionately face detrimental social circumstances over those children not living in impoverished conditions, which further contributes to disparities in health outcomes.

The American Academy of Pediatrics (AAP) defines the medical home as a model of care that is “accessible,

family-centered, continuous, comprehensive, coordinated, compassionate, and culturally effective.”³ The medical home has been associated with beneficial health outcomes for the general pediatric population.⁴ It has also been implemented in pediatric practices throughout

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the U.S., including those that serve vulnerable low-income children. The concepts of comprehensive and coordinated care are particularly applicable to the care of vulnerable children. They may be used to address some of the unique barriers that these children and their families face when connecting to public benefits and additional social service resources within and outside the medical home.

However, despite AAP recommendations and public policy initiatives to implement the medical home model of care for low-income children, the question remains whether having a medical home as currently constituted reduces a primary driver of child health, namely adverse social determinants of health. This is particularly relevant given that the 2016 AAP policy statement, *Poverty and Child Health in the United States*, called for the medical home to address the needs of families living in poverty in an effort to address the resultant health inequities affecting low-income families.¹ Thus, this study seeks to examine whether parental report of having a medical home attenuates the known negative relationship between unmet basic needs and child health for low-income pediatric patients using nationally representative data. We hypothesize that the medical home will reduce the association between unmet basic needs and poor child health by the provision of high-quality care and comprehensive, coordinated care leading to greater receipt of community resources and less toxic stress exposure for low-income children.

Methods

Data Set

This was a secondary data analysis of the 2011-2012 National Survey of Children's Health (NSCH), which is a population-based survey directed by the Maternal and Child Health Bureau and conducted by the National Center for Health Statistics of the Centers for Disease Control and Prevention.^{5,6} The NSCH was conducted using random-digit dialing via the State and Local Area Integrated Telephone Survey mechanism over a 2-year time period, with data collection spanning February 2011 through June 2012.^{5,6} Households with children less than 18 years of age were randomly selected from each state across the country and the respondent was a parent/guardian who was familiar with the child's health and care utilization.

Study Population

A total of 95 677 interviews were completed for the 2011-2012 NSCH.^{5,6} We restricted our analysis to children

over 1 year of age, as we have previously done and consistent with Strickland et al's⁷ methods, since several survey items in this analysis involve a one-year recall period. Our study focused on low-income children, defined as living in families with incomes <200% of the FPL because of the disproportionate unmet basic needs that these impoverished families face. In addition, since we wanted to focus on examining the impact of parental report of having a medical home among children with a regular provider of care, we restricted our sample to children with a personal doctor or nurse. Based on these inclusion criteria, this study consisted of 26 974 subjects who had complete data on our study variables (Figure 1).

Unmet Basic Needs (Independent Variable)

The 2011-2012 NSCH surveyed for adverse childhood events (ACEs) to capture psychosocial risk factors that affected children. The items were created using the Behavioral Risk Factor Surveillance System (BRFSS) ACEs Module and a Technical Expert Panel.⁸ The ACE domains included unmet basic needs, parental divorce/separation, parental death, parental incarceration, victim of or witness to domestic violence, victim of or witness to neighborhood violence, household mental illness, and household substance abuse.

Our study defined the "unmet basic needs" ACE domain as our independent variable. In the assessment of this domain in the NSCH, respondents were asked the following question: "Since [CHILD'S NAME] was born, how often has it been very hard to get by on your family's income—to cover the basics like food or housing? Would you say very often, somewhat often, often, rarely, or never?" For our study, a response of "somewhat often" or "very often" for unmet basic needs was dichotomized to having an unmet basic need, and a response of "not very often" or "never" for unmet basic needs was dichotomized to not having unmet basic needs.

Child Health (Dependent Variable)

The determination of child health was based on parental response to the following NSCH question, "In general, how would you describe [child]'s health? Would you say [his/her] health is excellent, very good, good, fair, or poor?" We dichotomized these responses into 2 categories, excellent/very good or good/fair/poor consistent with NSCH protocol and prior studies.^{5,6,9,10} Overall, parental reports of child health have been previously demonstrated to be an acceptable proxy of child health status and is also associated with health services use.^{11,12}

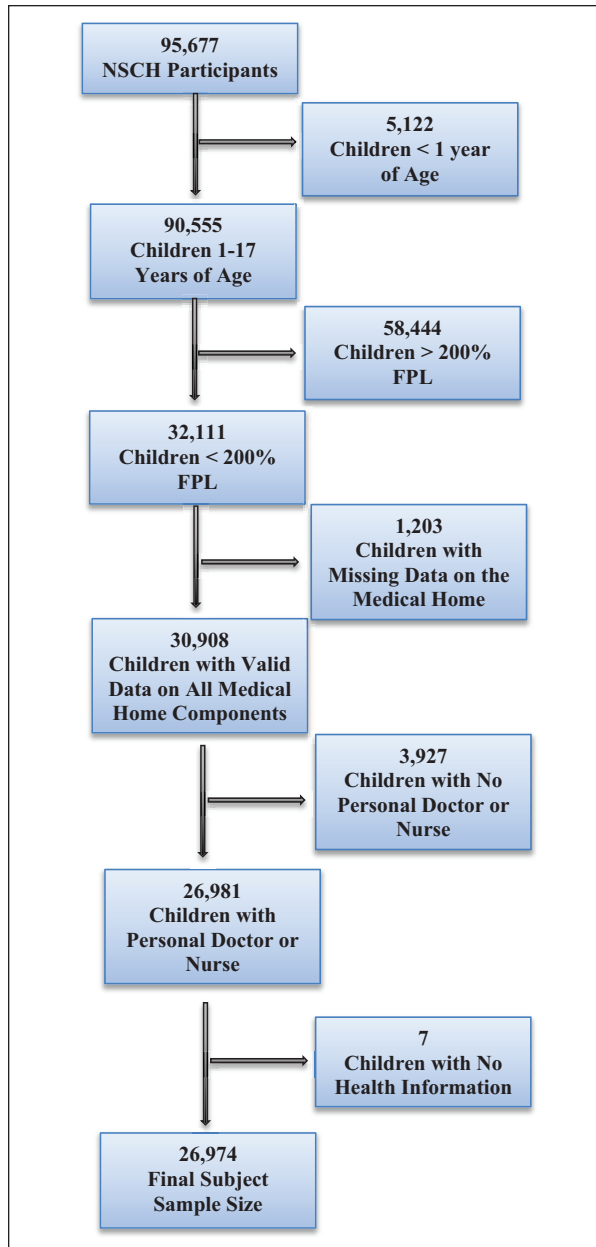


Figure 1. Flowchart of excluded subjects.

The Medical Home (Effect Modifier)

The NSCH measures 5 components of the medical home, which include having a personal doctor or nurse, having a usual source of care, having family-centered care, getting needed referrals, and having care coordination.⁸ These components are derived from the AAP-defined medical home concept.³ To determine a component's presence, dichotomous screening questions were used. Based on these responses, further ordinal scale questioning was used if necessary to elucidate

a component's presence. These ordinal responses were re-coded to numerical values to assess frequency of access (eg, never=0, sometimes=25, usually=75, or always=100). If the average of responses was "usually" or "always"—that is, if the numerical average was greater than 67%—then the component was considered present. Per NSCH protocol, parental report of having a medical home was only considered to exist if all 5 components determined to be necessary were present. If questions were purposefully skipped regarding referrals, care coordination, and family-centered care, the child was classified as having a medical home based on the responses to the remaining components; this is consistent with NSCH protocol and our prior work.¹³⁻¹⁷

The percentage of children that met the medical home criteria was calculated by dividing the number of children whose providers were reported to deliver all components of the medical home by the total number of children with valid data. Analysis excluded children with missing data.

Covariates

Covariates included variables that were of theoretical relevance or documented to be associated with access to the medical home. These variables include child's sex, child's age, primary language in household, perception of neighborhood safety, region, child's race/ethnicity, mother's education, total number of children in the home, family structure, child's health insurance coverage type, and CSHCN status.^{3,18-20}

Statistical Analysis

Univariate analysis of parental report of having unmet basic needs and a medical home were assessed. Bivariate analysis involving the χ^2 test of independence was performed to determine the association between parental report of having unmet basic needs and excellent/very good child health. Bivariate analysis of parental report of having a medical home and each respective covariate was assessed before constructing multivariable models.

To test the association between parental report of having unmet needs and excellent/very good child health, we created multivariable logistic regression models while controlling for covariates. We then introduced an interaction term between parental report of having unmet needs and presence of a medical home in order to measure the impact of the medical home on the relationship between reported unmet basic needs and child health. We compared the adjusted odds ratios between those with and without a parentally reported medical home and tested for the significance of the

relative ratio. This allowed us to examine the differential association of parental report of having unmet needs with child health by parental report of having a medical home.

The statistical analyses were performed using the SAS software version 9.2 (SAS Institute, Inc., Cary, NC). Survey-specific SAS procedures for weighting, clustering, and stratification in the survey design were also used (PROC SURVEYMEANS, PROC SURVEYFREQ and PROC SURVEYLOGISTIC). Adjusted odds ratios (aORs), 95% confidence intervals (CIs), and *P*-values were calculated for each of our models.

Ethical Approval and Informed Consent

The Boston University Medical Center Institutional Review Board determined that this retrospective study was not human subjects research as no PHI was collected, accessed, used, or distributed (H-37915). Thus, the collection, analysis, and publication of this anonymized data was deemed exempt from ethics approval and informed consent.

Results

Unadjusted Baseline Sociodemographic Characteristics of Study Sample, Stratified by Those With or Without a Medical Home

Of the 26 974 children included in the study, 42.9% of parents had self-reported unmet basic needs and 38.9% reported having access to a medical home for their children's medical care. The majority of children had health insurance, of which 69.8% had public insurance. Almost 40.0% of the children were non-Hispanic white; the next most common group was Hispanic (34.8%), followed by Non-Hispanic Black (18.4%) (Table 1).

Unadjusted and Adjusted Association Between Unmet Basic Needs and Baseline Sociodemographic Characteristics With Excellent/Very Good Health or Good/Fair/Poor Health

The presence of unmet basic needs was negatively associated with parental report of excellent/very good child health (40.8% vs 59.2% among children without unmet basic needs, *P* < .05, aOR=0.80 [95% CI 0.7-0.9]). Additionally, parental report of having a medical home was associated with excellent/very good health (53.9% vs 34.5% among children without a medical home, *P* < .05, aOR=1.4 [95% CI: 1.2-1.6]) (Table 2).

After adjusting for unmet needs and baseline sociodemographic characteristics, we found that Hispanic and non-Hispanic black families were significantly less likely to report excellent/very good health compared to non-Hispanic white families. We found similar significant associations for those families that did not speak English primarily in the home with only 19.2% reporting excellent/very good health (aOR=0.3 [95% CI 0.3-0.4]).

Differences in the Association of Unmet Basic Needs With Excellent/Very Good Child Health as Modified by Having a Medical Home

Low-income children with reported unmet basic needs had lower odds of excellent/very good child health compared with children without unmet needs, regardless of whether their parents reported having a medical home [children with both a medical home and unmet needs: aOR=0.78 (0.61-0.99) vs children without a medical home and with unmet needs: aOR=0.77 (0.63-0.94), *P* = .01]. Parental report of having a medical home did not significantly modify the negative association between unmet basic needs and excellent/very good child health (*P* = .97).

Discussion

We found that parental report of having a medical home did not attenuate the negative relationship between unmet basic needs and child health for low-income children. Our findings suggest that the AAP medical home concept, which was built upon fundamental tenets of primary care as currently constructed, may not be sufficient to attenuate the deleterious effects of unmet basic needs on low-income children's health. These novel findings have important clinical and public policy implications.

There are several possible explanations for why we found that parental report of having a medical home did not impact the association between unmet needs and child health. The AAP definition of the medical home includes principles paramount to the delivery of high-quality primary care, that is, accessible, family-centered, continuous, compassionate, and culturally-effective care. However, they cannot be achieved without addressing low-income families' adverse social determinants of health especially if families do not expect their pediatric practitioners to intervene on these needs. Increasing families' awareness that addressing unmet material needs is within the purview of pediatric care; however, few

Table 1. Unadjusted Baseline Sociodemographic Characteristics of Study Sample, Stratified by Those With or Without a Medical Home.

	Study sample (n=26 974)		No medical home (n=12 189)		Medical home (n=14 785)		OR (95% CI)
	%	SE	%	SE	%	SE	
Medical home	49.5	0.7					
Unmet basic needs							
Yes	42.9	0.7	46.7	1.0	38.9	0.9	1.0
No	57.1	0.7	53.3	1.0	61.1	0.9	0.7 (0.7-0.8)*
Age, years (mean, SD)	8.1	0.1	8.4	0.1	7.8	0.1	
1-5	32.2	0.6	30.0	0.9	34.5	0.9	1.0
6-11	35.8	0.7	36.5	0.9	35.1	0.9	1.2 (1.1-1.4)*
12-17	32.0	0.6	33.5	0.9	30.4	0.8	1.3 (1.1-1.4)*
Gender							
Male	51.6	0.7	52.0	1.0	51.2	0.9	1.0
Female	48.4	0.7	48.0	1.0	48.8	0.9	1.0 (0.9-1.1)
Race and ethnicity							
Non-Hispanic white	37.7	0.6	28.3	0.8	47.8	0.9	1.0
Hispanic	34.8	0.7	43.5	1.00	25.8	0.9	2.9 (2.5-3.3)*
Non-Hispanic black	18.4	0.5	19.3	0.7	17.4	0.7	1.9 (1.6-2.1)*
Multi-racial/other, non-Hispanic	8.9	0.3	8.7	0.5	9.0	0.5	1.6 (1.4-1.9)*
Primary language spoken in the home							
English	74.5	0.7	64.9	1.0	84.4	0.8	1.0
Any other language	25.5	0.7	35.1	1.0	15.7	0.8	2.9 (2.5-3.7)*
Region							
Northeast	14.6	0.4	15.3	0.6	13.9	0.6	1.0
Midwest	21.7	0.5	19.9	0.6	23.4	0.6	0.8 (0.7-0.9)*
South	41.1	0.7	40.2	0.9	42.4	0.9	0.8 (0.7-1.0)
West	22.4	0.7	24.7	1.0	20.3	0.8	1.1 (0.9-1.4)
Neighborhood is perceived as safe							
Yes	79.2	0.6	72.4	0.9	86.3	0.7	1.0
No	20.8	0.6	27.6	0.9	13.7	0.7	2.4 (2.1-2.8)*
Mother's education							
>High school	40.1	0.7	34.3	0.9	20.4	0.9	1.0
High school	32.4	0.7	31.3	0.9	33.6	0.9	1.3 (1.1-1.4)*
<High school	27.5	0.7	34.4	1.0	20.4	0.9	2.3 (2.0-2.7)*
Household income							
100% to 199% FPL	50.4	0.7	45.0	1.0	56.1	0.9	1.0
<100% FPL	49.6	0.7	55.0	1.0	43.9	0.9	1.6 (1.4-1.7)*
Type of health insurance coverage							
Private	24.0	0.6	20.7	0.8	27.2	0.8	1.0
Public	69.8	0.6	71.7	0.9	67.9	0.9	1.4 (1.2-1.6)*
Uninsured	6.2	0.4	7.5	0.6	4.8	0.5	2.0 (1.6-2.7)*
Number of children in the home							
1	19.4	0.4	19.5	0.6	19.2	0.6	1.0
2	32.8	0.6	33.9	0.9	31.8	0.8	1.1 (0.9-1.2)
3	29.2	0.6	28.4	0.9	30.0	0.9	0.9 (0.8-1.1)
4+	18.6	0.6	18.2	0.8	19.0	0.8	0.9 (0.8-1.1)
Family structure							
Two-parent (biological/adoptive)	52.4	0.7	51.1	1.0	53.6	0.9	1.0
Two-parent (step)	9.3	0.4	9.3	0.5	9.3	0.5	1.0 (0.9-1.2)
Single mother	30.8	0.6	32.2	0.9	29.5	0.8	1.2 (1.0-1.3)
Other	7.5	0.3	7.4	0.4	7.7	0.5	1.1 (0.9-1.3)
CSHCN status							
CSHCN	21.7	0.5	23.8	0.8	19.5	0.7	1.0
Non-CSHCN	78.3	0.5	76.2	0.8	80.5	0.7	0.8 (0.7-0.9)*

n are unweighted sample sizes. Percentages (%) are weighted to reflect population characteristics of children at the national and state levels. Abbreviations: OR, odds ratio; FPL, federal poverty level.

*Significant at $P < .05$.

Table 2. Unadjusted and Adjusted Association Between Unmet Needs and Baseline Sociodemographic Characteristics with Excellent/Very Good or Good/Fair/Poor Health.

	Excellent/ very good health (n=19893)		Good/fair/ poor health (n=5407)		Unadjusted and adjusted odds ratio for excellent/ very good health	
	%	SE	%	SE	OR (95% CI)	aOR (95% CI)
Unmet basic needs						
Not very often or never	59.2	0.7	52.0	1.4	1.0	1.0
Very or somewhat often	40.8	0.7	48.0	1.4	0.7 (0.7-0.9)*	0.8 (0.7-0.9)*
Medical home						
No	46.1	0.7	64.9	1.4	1.0	1.0
Yes	53.9	0.7	34.5	1.4	2.2 (1.9-2.5)*	1.4 (1.2-1.6)*
Age, years (mean, SD)						
1-5	8.8	0.1	7.9	0.1	1.0	1.0
6-11	33.7	0.7	27.6	1.3	1.0	1.0
12 to 17	35.5	0.7	36.9	1.4	0.8 (0.7-0.9)*	0.8 (0.7-1.0)
30.9	0.7	35.5	1.4	0.7 (0.6-0.8)*	0.7 (0.6-0.9)*	
Gender						
Male	50.8	0.7	54.2	1.4	1.0	1.0
Female	49.2	0.7	45.8	1.4	1.2 (1.0-1.3)	1.0 (0.9-1.2)
Race and ethnicity						
Non-Hispanic white	42.7	0.7	22.9	1.0	1.0	1.0
Hispanic	29.1	0.8	53.0	1.4	0.3 (0.3-0.3)*	0.6 (0.5-0.7)*
Non-Hispanic black	18.9	0.6	15.7	1.0	0.6 (0.5-0.7)*	0.6 (0.5-0.8)*
Multi-racial/other, non-Hispanic	9.4	0.4	7.5	0.6	0.7 (0.6-0.8)*	0.8 (0.6-1.0)
Primary language spoken in the home						
English	80.9	0.7	54.2	1.4	1.0	1.0
Any other language	19.2	0.7	45.8	1.4	0.3 (0.2-0.3)*	0.3 (0.3-0.4)*
Region						
Northeast	14.4	0.5	15.3	0.9	1.0	1.0
Midwest	22.6	0.5	18.7	0.9	1.3 (1.1-1.5)	0.9 (0.7-1.2)
South	42.2	0.7	38.2	1.3	1.2 (1.0-1.4)	1.0 (0.8-1.2)
West	20.8	0.7	27.9	1.5	0.8 (0.6-1.0)	0.9 (0.7-1.2)
Neighborhood is perceived as safe						
Yes	82.1	0.6	70.9	1.3	1.0	1.0
No	17.9	0.6	29.1	1.3	0.5 (0.5-0.6)*	0.7 (0.6-0.9)*
Mother's education						
>High school	44.4	0.8	26.6	1.2	1.0	1.0
High school	32.9	0.8	30.8	1.4	0.6 (0.6-0.8)*	0.8 (0.6-0.9)*
<High school	22.7	0.8	42.7	1.5	0.3 (0.3-0.4)*	0.6 (0.5-0.8)*
Household income						
100%-199% FPL	53.8	0.7	39.3	1.4	1.0	1.0
<100% FPL	46.2	0.7	60.7	1.4	0.6 (0.5-0.6)*	0.8 (0.7-1.0)
Type of health insurance coverage						
Private	26.7	0.7	15.1	1.0	1.0	1.0
Public	67.4	0.6	77.7	1.2	0.5 (0.3-0.6)*	0.7 (0.6-1.0)
Uninsured	5.9	0.4	7.2	0.8	0.5 (0.4-0.6)*	0.8 (0.6-1.0)
Number of children in the home						
1	19.4	0.5	19.4	1.0	1.0	1.0
2	33.2	0.7	31.8	1.2	1.0 (0.9-1.2)	1.4 (1.1-1.7)
3	29.2	0.7	29.1	1.4	1.0 (0.9-1.2)	1.2 (1.0-1.5)
4+	18.3	0.6	19.8	1.2	0.9 (0.8-1.0)	1.2 (0.9-1.5)

(continued)

Table 2. (continued)

	Excellent/ very good health (n = 19 893)		Good/fair/ poor health (n = 5407)		Unadjusted and adjusted odds ratio for excellent/ very good health	
	%	SE	%	SE	OR (95% CI)	aOR (95% CI)
Family structure						
Two-parent (biological/adoptive)	52.2	0.7	52.9	1.4	1.0	1.0
Two-parent (step)	9.6	0.4	8.3	0.7	1.1 (0.9-1.3)	1.2 (0.9-1.6)
Single mother	30.6	0.7	31.6	1.3	1.0 (0.9-1.1)	1.1 (0.9-1.3)
Other	7.6	0.4	7.2	0.6	1.2 (0.9-1.4)	0.3 (0.1-1.1)
CSHCN status						
CSHCN	16.9	0.5	37.2	1.3	1.0	1.0
Non-CSHCN	83.1	0.5	62.8	1.3	2.9 (2.6-3.3)*	4.3 (3.6-5.2)*

n are unweighted sample sizes. Percentages (%) are weighted to reflect population characteristics of children at the national and state levels.

Abbreviations: OR, odds ratio; aOR, adjusted odds ratio; FPL, federal poverty level.

*Significant at $P < .05$.

pediatricians routinely screen or address their families for unmet needs.²¹ Cited reasons include lack of personal expertise resulting in provider discomfort in addressing this matter, lack of time, lack of physician self-efficacy/training, or physician burnout (as is seen with serving low-income populations).^{2,22,23} There also could be difficulty addressing unmet basic needs due to an absence of co-located, or readily accessible, community-based resources in the medical home; prior work suggests that co-location increases the utilization of social services.²⁴ Further training pediatricians to inquire about their families' and patients' unmet social needs is necessary.

It is important for pediatricians to recognize adverse social determinants of health, such as unmet basic needs, as a modifiable condition even though structural barriers still exist. Addressing unmet basic needs within the context of pediatric primary care goes beyond just increasing screening and co-location of resources; it relies on access to public benefits and community-based resources that are outside of the medical system. Unfortunately, the social safety net system is fragile and underfunded thereby limiting the capacity to serve all families that are in need. Effectively addressing adverse social determinants of health for low-income children will require a larger investment in the safety-net system and better cross-communication and linkages between medical homes and social services.

These findings, nonetheless, support the need to adapt the current medical home model to better address the social determinants of health for low-income children given how these factors powerfully influence their health and development across the life course. In 2016, the AAP policy statement Poverty and Child Health in the United States called for the medical home to address the needs of families living in poverty in an effort to

address the resultant health inequities affecting low-income families.¹ Moving to a comprehensive, integrated "health neighborhood model" that allows for linkage of the medical home with community resources may help to better identify basic needs, facilitate care and referrals, and connect families in need with much needed social resources.²⁵ Further, increasing the identification of social determinants of health via family-centered screening tools that rely on family's desire for help could be encouraged through a re-structuring of EMR systems, as well as ensuring insurance payment and reimbursement for a provider's detection and interventions.²⁶ As Medicaid and other payers are shifting in some states to a value-based accountable care organization (ACO) payment model, there may be novel opportunities for the medical home to develop community partnerships that more effectively and systematically address their patients' unmet needs. The Outcomes from Addressing SDOH in Systems (OASIS) is a theoretical framework for researchers and clinicians to use as they examine and implement medical home SDOH interventions. The framework postulates that these types of interventions may improve children's outcomes by increasing families' connectivity to community resources thereby reducing unmet material needs and its associated exposure to toxic stress for poor children.²⁷

There are several limitations to this study. Although the NSCH is a robust data resource that not only contains data on child health and sociodemographic characteristics but also uniquely contains medical home data, the operationalization of the medical home definition is only one method of many that measure children's access to the medical home. It is based on parental perception instead of medical home certification that a practice achieved. Overall, the NSCH measurement of

the medical home has been used in more than 30 publications,^{3,15,28} and is included in the Department of Health and Human Services Healthy People 2020 Objectives, and endorsed by the National Quality Forum.^{29,30} Parental self-report was also used to measure the medical home, unmet basic needs, and child health variables. Thus, the data are susceptible to recall and social desirability biases. Because of the cross-sectional nature of this study, we are not able to assess causality or temporality between these associations.

Conclusion

We found in this nationally representative sample that the parental report of having a medical home did not attenuate the negative relationship between unmet basic needs and child health. Given the prevalence of unmet basic needs, the near universal access that low income families have to pediatric primary care, and the overwhelming detrimental impact that these unmet needs have on children, the medical home as defined by the AAP is not properly equipped as constituted to mitigate adverse social determinants of health. Therefore, the medical home model may need to explicitly and systematically address adverse social determinants of health and expand to a health neighborhood concept that partners with community resources and agencies. Augmenting and adapting the current medical home concept for low-income children may improve their present health and future health trajectory, and further advance their health equity in the United States.

Author Contributions

RW drafted the initial manuscript and approved the final manuscript as submitted. AW drafted the initial manuscript and approved the final manuscript as submitted. YT carried out the analyses, reviewed and revised the manuscript, and approved the final manuscript as submitted. WEL contributed to the design of the study, reviewed and revised the manuscript, and approved the final manuscript as submitted. AG conceptualized and designed the study, reviewed and revised the manuscript, and approved the final manuscript as submitted.

Authors' Note

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