Social Needs, Chronic Conditions, and Health Care Utilization among Medicaid Beneficiaries

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Abstract

Health care organizations are increasingly assessing patients' social needs (eg, food, utilities, transportation) using various measures and methods. Prior studies have assessed social needs at the point of care and many studies have focused on correlates of 1 specific need (eg, food). This comprehensive study examined multiple social needs and medical and pharmacy claims data. Medicaid beneficiaries in Louisiana (n = 10,275) completed a self-report assessment of 10 social needs during July 2018 to June 2019. Chronic health conditions, unique medications, and health care utilization were coded from claims data. The sample was predominantly female (72%), Black (45%) or White (32%), had a mean age of 42 years, and at least 1 social need (55%). In bivariate analyses, having greater social needs was associated with greater comorbidity across conditions, and each social need was consistently associated with mental health and substance use disorders. In multivariable logistic analyses, having ≥2 social needs was positively associated with emergency department (ED) visits (OR = 1.39, CI = 1.23 – 1.57) and negatively associated with wellness visits (OR = 0.87, CI = 0.77 – 0.98), inpatient visits (OR = 0.87, CI = 0.76 – 0.99), and 30-day rehospitalization (OR = 0.66, CI = 0.50 – 0.87). Findings highlight the greater concomitant risk of social needs, mental health, and substance use. Admission policies may reduce the impact of social needs on hospitalization. Chronic disease management programs offered by health plans may benefit from systematically assessing and addressing social needs outside point-of-care interactions to impact health outcomes and ED utilization. Behavioral health care management programs would benefit from integrating interventions for multiple social needs.

Keywords: Medicaid, low-income population, health status disparities, chronic disease, patient care

Introduction

HEALTH CARE ORGANIZATIONS have begun to explore how to capture social determinants of health (SDOH) from patients by using different measures.[1] Most measures focus on social needs such as food, housing, utilities, transportation, and physical safety. Such measures then inform "social prescriptions" or "linkage" interventions that connect individuals with community organizations to address individual social needs.[2,3]

Several conceptual models and frameworks have been proposed that explain the mechanisms for how social needs negatively impact health outcomes: through increased stress and competing demands for resources, which affects adherence to medication and physician visits,[4,5] and through health behaviors, physiologic functioning, and psychosocial factors.[6–10] When needs such as food, shelter, safety, and money for necessities are unmet, fulfilling them supersedes addressing other life challenges, including modifying unhealthy behaviors.[11,12] Previous studies have shown that social needs can increase psychological stress, sleep disturbances, and physical and mental health problems,[13–15] and reduce the likelihood of engaging in health-promoting behaviors, which may explain higher rates of emergency department (ED) use and hospitalization.[16–18]

Although many previous studies have focused on a particular social need (eg, food insecurity), this approach ignores other concomitant needs (eg, paying for utilities,

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transportation). Thus, a growing number of studies are examining multiple social needs and their cumulative impact on health-related outcomes.[19–22] Examining multiple needs may identify clusters or patterns in the needs and/or outcomes experienced by subgroups of patients. Examining multiple needs also allows for the evaluation of a dose-response or cumulative relationship between social needs and health outcomes.

Efficiently identifying patients with social needs is a challenge for meeting population health management goals. Underreporting and biased reporting are known problems across all data sources. Until more systematic data recording is standard practice, researchers are accessing various data sources to estimate the relationship between social needs and health. Previous studies have used national survey data,[17,23] social needs screenings administered at the point of care,[24–26] notes in electronic health records (EHRs),[27] or EHR data linked to other administrative and scheduling data.[28] To extend previous studies, the present study examined 10 patient-reported social needs of Medicaid beneficiaries seeking medical care across the state of Louisiana, linked to their medical and pharmacy claims data.

The primary objectives of this comprehensive study were to describe: (1) the number and type of social needs reported, (2) their variability across demographic subgroups, and (3) their associations with chronic conditions, number of medications, and health care utilization among a sample of adult Medicaid beneficiaries in Louisiana. It was hypothesized that having more social needs would be associated with more chronic diseases and health care utilization. Mixed findings in the literature regarding associations between sex and age with social needs did not support specific hypotheses in this study.

Methods

Target population and setting

When this study began in 2018, Louisiana Healthcare Connections (LHCC) was the largest Medicaid managed care plan in the state with a network of more than 11,000 providers and 196 hospitals providing health coverage to 479,817 members. Of all LHCC members, nearly half (48%) were adults aged 18–75 years; of those, 65% were female, and most were Black (45%) or White (33%), with 21% of members having missing data for race. Adult Medicaid beneficiaries were covered through State Expansion (58%), Temporary Assistance for Needy Families (TANF; 23%), Supplemental Security Income, non-duals only (SSI; 10%), or behavioral health only (9%) plans. Eligibility for these coverage types is determined by age, income, and health conditions, and follows the mandatory and optional eligibility policies of the state and federal government.

Analysis sample

A nonrandom sample of adult LHCC members (18–75 years old) who completed an SDOH self-report assessment as part of LHCC's standard service and outreach from the health plan between July 10, 2018, and June 28, 2019, were eligible for analysis (N = 10,275). Members could be screened for SDOH while completing new member packets, if requesting assistance or service, as part of outreach calls after an ED or hospital visit, and when being screened for chronic conditions or offered services. Claims data were limited to the 12 months prior to the date each member completed the SDOH assessment. Of the 10,267 with complete SDOH data, 9826 (96%) members had at least 1 medical claim and 9239 (90%) had at least 1 pharmacy claim in the prior 12 months. Anyone without claims was included in analyses as having no conditions, prescriptions, and health care utilization.

Measures by data source

Data for this study were obtained from 4 LHCC sources: (1) self-report member assessments, (2) inpatient calendar, (3) medical claims, and (4) pharmacy claims.

Self-report assessments. As part of standard service, LHCC staff make outreach telephone calls to members to complete assessments. Assessments also may be completed during routine interactions between members and LHCC staff if the assessments have not already been completed within the past 90 days.

SDOH assessment. LHCC adopted and administered the same social needs questions developed for and used in prior Washington University studies, including a pilot survey among 109 LHCC Medicaid members with type 2 diabetes.[29–31] Ten items assessed the likelihood that each participant's personal safety, housing, food, transportation, child care (if applicable), and various financial needs would be met in the next month (Table 1). Response options ranged from 1 = *very unlikely* to 4 = *very likely*. One item measured neighborhood safety and response options ranged from 1 = *very safe* to 4 = *very unsafe*. One item assessing space in the home included 3 response options: *not enough*

TABLE 1. NUMBER AND TYPE OF UNMET SOCIAL NEEDS REPORTED BY MEDICAID BENEFICIARIES (N = 10,267)

Unmet needs	% or M (SD)
Total number (sum)	M = 1.10 (SD = 1.41)
Percent with 0, 1, ≥2 unmet needs	44.7% 28.5% 26.8%
Not enough money to deal with unexpected expenses	45.7%
Trouble finding or paying for childcare if you need it	40.9%[a]
Not enough money for necessities such as food, shelter, and clothing	13.7%
Unable to pay for utilities such as gas, water, and electricity	11.4%
Not enough space for everyone in your home	9.5%
No reliable transportation	8.7%
Unsafe neighborhood	6.3%
Not sure self and others in your home will not get enough to eat	5.6%
No place to stay	3.3%
Someone will threaten to hurt you physically	3.2%

[a]Only 579 respondents needed childcare of the 3954 who had children younger than age 18 years living at home and 237 reported trouble finding or paying for childcare.

M, mean; SD, standard deviation.

space, about the right amount, too much space. To create dichotomous needs variables, needs were considered met when they were very unlikely to unlikely to arise in the next month, or when neighborhoods were rated as very safe or safe or when participants had about the right amount or too much space; all other responses identified unmet needs. The total unmet needs score was a sum (0–10) of the dichotomous unmet needs. Also reported are categories of the sum score, such as 0, 1, ≥2 social needs.

Administrative claims data. Administrative data are collected by LHCC for the purpose of reimbursement and differ from clinical care data recorded by providers in patients' medical records. International Classification of Diseases, Tenth Revision (ICD-10) codes were used to identify diagnoses, whereas Current Procedural Terminology (CPT) or procedure codes were used to identify outpatient procedures or services.

Medical claims

Chronic conditions. Presence of a diagnosis was defined as having ≥1 inpatient claims or ≥2 outpatient claims associated with relevant ICD-10 codes.[32,33] For each of the 30 chronic conditions in the Elixhauser Comorbidity Index (ECI),[34] dichotomous variables were created indicating presence or absence of each diagnosis in the medical claims for each patient in the 12 months prior to completing the SDOH assessment. A sum score of the 30 conditions for a continuous measure also was created. Although not included in the ECI, diagnoses for tobacco dependence were documented in the same way. The ECI includes obesity and substance use, which like tobacco use, may be related to lifestyle factors and health behaviors affected by social needs.

Wellness visit (none, any) in the 12 months prior to completing the SDOH assessment was calculated from any preventive medicine services CPT codes 99381-99397.

ED utilization in the 12 months prior to completing the SDOH assessment was calculated by counting the number of unique ED service claim dates.

Hospitalization in the 12 months prior to completing the SDOH assessment was calculated by counting the number of unique visits based on a managed inpatient calendar linked to inpatient authorizations and claims data. Although the identification of inpatient visits may include both planned and unplanned hospitalizations, those related to pregnancy and childbirth were specifically excluded. For people with an inpatient visit, length of stay was coded as 1–2 days reflecting shorter inpatient stays compared with >2 days to reflect longer stays. For people with an inpatient visit, any vs. no rehospitalization within 30 days was coded by comparing the unique admission dates determined for hospitalization. Similarly, for people with an inpatient visit, admission dates for hospital and ED visits were compared to code those who had any vs. no hospitalizations that originated in the ED within 1–2 days prior to hospitalization admission dates. Such hospitalizations may better identify unplanned inpatient visits.

Pharmacy claims. The number of unique drug types prescribed in the 12 months prior to completing the SDOH assessment was calculated by counting the number of unique product names. Similarly, the number of unique drug prescribers was created using the National Provider Identifier. Although count measures will capture multiple prescriptions being taken for a single disease type, these measures did not adjust for prescribing interval, which might overestimate total medication burden over the 12-month period.

Data acquisition and analysis

University members of the research team worked closely with LHCC to obtain all necessary approvals and secure access to the health plan's limited data sets. The study also was approved by Institutional Review Boards of Washington University and the Louisiana Department of Health and Human Services. All analyses were completed using SAS version 9.4 (SAS Institute Inc., Cary, NC) and a virtual desktop interface.

Descriptive statistics were used to characterize the social needs of the adult Medicaid population as well as their demographics, health conditions, and health care utilization. Bivariate analyses were used to examine associations with the number and type of social needs. Group differences were compared using chi-square tests or logistic regression for categorical outcome variables, and analysis of variance with Tukey post hoc analyses for continuous outcome variables to determine significant differences within categories of social needs. Multivariable logistic regression analyses were conducted to examine social needs' influence on dichotomous health care utilization outcomes (any vs. none) after controlling for participants' age, sex, race (White, Black, other, unknown), having a child at home, Medicaid eligibility groups, and sum ECI. Nonsignificant demographic covariates and utilization outcomes in bivariate analyses ($P > .05$) were not included in multivariable analyses.

Results

To address the first study objective, Table 1 reports the number and type of social needs reported by the analysis sample of adult Medicaid beneficiaries. More than half the sample (55%) reported at least 1 social need (mean = 1.1). The most common needs reported were not having enough money to deal with unexpected expenses, trouble finding or paying for childcare among those who had children at home and needed childcare, not enough money for necessities, and unable to pay for utilities (Table 1).

The second objective was to explore differences in social needs by demographic subgroups. The analysis sample was predominantly female (72%), Black (45%) or White (32%), and had a mean age of 42 years (Table 2). Members who were older, male, Black, did not have children living at home, or received Medicaid through SSI Disability reported more social needs. Members eligible through Medicaid expansion had greater social needs than those with Medicaid through TANF. There were no differences in social needs between members based on whether or not they had medical claims in the past year. Supplementary Table S1 (available with the article online) shows bivariate associations of individual social needs by demographics, Medicaid eligibility groups, and utilization outcomes.

The third objective was to examine patterns of associations of social needs with chronic conditions, medications,

TABLE 2. SAMPLE CHARACTERISTICS AND THEIR ASSOCIATIONS WITH UNMET SOCIAL NEEDS

					Unmet social needs				
	Total N	M (SD)	0	M (SD)	1	M (SD)	2+	M (SD)	F P value
Age Mean (SD)	10267	41.7 (14.8)	4586	39.1 (15.4)	2927	43.6 (14.5)	2754	43.9 (13.6)	<.0001
	Total N	%	0	%	1	%	2+	%	χ² P value
Sex									<.0001
Male	2887	28.1	1176	40.7	830	28.8	881	31.5	
Female	7380	71.9	3410	46.2	2097	28.4	1873	25.4	
Race									<.0001
Black	4650	45.3	2008	43.2	1314	28.3	1328	28.6	
White	3290	32.0	1567	47.6	973	29.6	750	22.8	
Other	215	2.1	110	51.2	62	28.8	43	20.0	
Unknown	2112	20.6	901	42.7	578	27.4	633	30.0	
Children at home									.0011
Yes	3954	38.5	1850	46.8	1110	28.1	994	25.1	
No	6310	61.5	2736	43.4	1815	28.8	1759	27.9	
Medicaid eligibility									<.0001
Medicaid expansion	5668	55.2	2495	44.0	1635	28.9	1538	27.1	
TANF	2054	20.0	1094	53.3	489	23.8	471	22.9	
SSI non dual	2248	21.9	861	38.3	710	31.6	677	30.1	
Behavioral health only	297	2.9	136	45.8	93	31.3	68	22.9	
History with health plan									.2866
Any claims past 12 mos	9826	95.7	4373	44.5	2808	28.6	2645	26.9	
No claims past 12 mos	441	4.3	213	48.3	119	27.0	109	24.7	

M, mean; mos, months; SD, standard deviation; SSI, Supplemental Security Income; TANF, Temporary Assistance for Needy Families.

and health care utilization. Members who had prescriptions for a greater number of unique drug types or had a larger number of physicians writing their prescriptions reported greater social needs (Table 3). Post hoc tests showed that the significant differences in medications and conditions were between having no social needs and having any social needs; no incremental differences were observed between 1 and ≥2 needs.

Although not all individual chronic conditions were associated with having greater social needs, many were (Table 3). Consistent associations were found between having social needs and metabolic, cardiac, and pulmonary conditions including diabetes, hypertension, obesity, congestive heart failure, cardiac arrhythmias, and chronic pulmonary disease. Renal failure, pulmonary circulation disorder, and valvular disease were not associated with having social needs. Greater social needs also were consistently positively associated with mental health and substance abuse conditions including depression, psychoses, alcohol abuse, drug abuse, and tobacco dependence.

Table 4 illustrates the pattern of bivariate associations between individual social needs and specific chronic conditions. The top 3 most prevalent chronic conditions from the ECI in this sample are reported, plus tobacco dependence. Two social needs – not having money for unexpected expenses and rating one's neighborhood as unsafe – were associated with each of the 4 selected conditions. All social needs (except childcare needs, which applied to only a small subset of the sample) were consistently positively associated with depression and tobacco dependence, whereas differences emerged for the 2 physical health conditions (ie, diabetes, hypertension). Housing instability (16.5%) vs. no

instability (26.2%) was inversely related to having diabetes, but positively and more strongly associated with depression and tobacco dependence (Table 4). Some of the largest differences were found among smokers, who had greater food, housing, and personal safety needs.

Social needs were significantly associated with health care utilization in bivariate analysis; however, having ≥2 social needs was associated with more ED visits, inpatient visits, and inpatient visits that started in the ED, but fewer wellness visits and 30-day rehospitalization (Supplementary Table S2). There was no difference in social needs when comparing short (1–2 days) vs. longer (>2 days) hospital stays.

Table 5 shows the independent association of social needs with utilization outcomes, even after controlling for demographics, Medicaid eligibility groups, and chronic conditions. Adjusted odds of having a wellness visit were lower among those with ≥2 more social needs, whereas the odds of having ED visits were greater for those with any social needs. Those with ≥2 social needs had lower odds of having inpatient visits and rehospitalization within 30 days. Supplementary Table S1 shows that in bivariate analyses of individual social needs, most individual social needs were consistently and positively associated with ED visits, whereas fewer of the individual social needs were significantly positively associated with inpatient visits and inpatient visits preceded by an ED visit. Only transportation needs were negatively associated with rehospitalization within 30 days.

Discussion

This study used a unique data linkage of patient-reported data regarding social needs with administrative claims data

					Unmet social needs				
	N	M (SD)	0	M (SD)	1	M (SD)	2+	M (SD)	F P value
Sum Prescriptions	10267	11.63 (9.65)	4586	10.37 (9.02)	2927	12.52 (9.95)	2754	12.77 (10.10)	<.0001
Number of Unique Prescribers	10267	4.48 (3.65)	4586	4.10 (3.41)	2927	4.68 (3.67)	2754	4.90 (3.93)	<.0001
Sum ECI	10267	2.80 (2.63)	4586	2.42 (2.56)	2927	3.06 (2.69)	2754	3.18 (2.58)	<.0001
	N	%	0	%	1	%	2+	%	χ^2 P value
Cardiovascular Diseases									
Congestive heart failure									.0109
Yes	821	8.00	326	39.7	259	31.6	236	28.8	
No	9446	92.0	4260	45.1	2668	28.2	2518	26.7	
Cardiac arrhythmias									<.0001
Yes	1605	15.6	626	39.0	496	30.9	483	30.1	
No	8662	84.4	3960	45.7	2431	28.1	2271	26.2	
Hypertension									<.0001
Yes	4816	46.9	1870	38.8	1511	31.4	1435	29.8	
No	5451	53.1	2716	49.8	1416	26.0	1319	24.2	
Endocrine/Metabolic Disorders									
Diabetes Type 1 & 2 without complications									<.0001
Yes	2320	22.6	916	39.5	734	31.6	670	28.9	
No	7947	77.4	3670	46.2	2193	27.6	2084	26.2	
Diabetes Type 1 & 2 with complications									<.0001
Yes	1981	19.3	796	40.2	646	32.6	539	27.2	
No	8286	80.7	3790	45.7	2281	27.5	2215	26.7	
Obesity									.0046
Yes	1761	17.2	725	41.2	541	30.7	495	28.1	
No	8506	82.9	3861	45.4	2386	28.1	2259	26.6	
Fluid and electrolyte disorders									.0018
Yes	1436	14.0	584	40.7	421	29.3	431	30.0	
No	8831	86.0	4002	45.3	2506	28.4	2323	26.3	
Hypothyroidism									.0094
Yes	781	7.6	345	44.2	255	32.7	181	23.2	
No	9486	92.4	4241	44.7	2672	28.2	2573	27.1	
Other chronic conditions[a]									
Neurological disorders									<.0001
Yes	707	6.9	265	37.5	241	34.1	201	28.4	
No	9560	93.1	4321	45.2	2686	28.1	2553	26.7	
Chronic pulmonary disease									<.0001
Yes	1986	19.3	732	36.9	633	31.9	621	31.3	
No	8281	80.7	3854	46.5	2294	27.7	2133	25.8	
Liver disease									.0007
Yes	795	7.7	304	38.2	248	31.2	243	30.6	
No	9472	92.3	4282	45.2	2679	28.3	2511	26.5	
Chronic peptic ulcer disease									.0310
Yes	122	1.2	41	33.6	38	31.2	43	35.3	
No	10145	98.8	4545	44.8	2889	28.5	2711	26.7	
HIV/AIDS									<.0001
Yes	337	3.3	113	33.5	97	28.8	127	37.7	
No	9930	96.7	4473	45.1	2830	28.5	2627	26.5	
Rheumatoid arthritis/collagen vascular diseases									.0022
Yes	304	3.0	106	34.9	100	32.9	98	32.2	
No	9963	97.0	4480	45.0	2827	28.4	2656	26.7	

(*continued*)

TABLE 3. (CONTINUED)

	N	%	0	%	1	%	2+	%	χ^2 P value
Psychiatric and Substance Use Disorders									
Psychoses									<.0001
Yes	708	6.9	216	30.5	212	29.9	280	39.6	
No	9559	93.1	4370	45.7	2715	28.4	2474	25.9	
Depression									<.0001
Yes	2555	24.9	877	34.3	794	31.1	884	34.6	
No	7712	75.1	3709	48.1	2133	27.7	1870	24.3	
Alcohol abuse									<.0001
Yes	617	6.0	201	32.6	173	28.0	243	39.4	
No	9650	94.0	4385	45.4	2754	28.5	2511	26.0	
Drug abuse									<.0001
Yes	1112	10.8	351	31.6	307	27.6	454	40.8	
No	9155	89.2	4235	46.3	2620	28.6	2300	25.1	
Tobacco dependence[b]									<.0001
Yes	2488	24.3	918	36.9	736	29.6	834	33.5	
No	7779	75.8	3668	47.2	2191	28.2	1920	24.7	

[a]Hematologic and oncologic diagnoses in the ECI, including lymphoma, metastatic cancer, solid tumor without metastasis, blood loss anemia, deficiency anemias, coagulation deficiency, and weight loss, were not significantly associated with social needs and were removed from the table. Additionally, peripheral vascular disease, valvular disease, pulmonary circulation disorder, renal failure, and paralysis were not significantly associated with social needs and were removed from the table.

[b]Not included in the ECI.

ECI, Elixhauser Comorbidity Index; M, mean; SD, standard deviation.

TABLE 4. BIVARIATE ASSOCIATIONS BETWEEN TYPE OF SOCIAL NEED AND THE TOP 3 ELIXHAUSER COMORBIDITY INDEX CONDITIONS PLUS TOBACCO DEPENDENCE

		Diabetes, type I & II			Hypertension			Depression			Tobacco dependence		
	N	Yes (%)	No (%)	χ^2 P=	Yes (%)	No (%)	χ^2 P=	Yes (%)	No (%)	χ^2 P=	Yes (%)	No (%)	χ^2 P=
Enough food				.5537			.0063			<.0001			<.0001
Need	572	24.8	75.2		52.5	47.5		33.0	67.0		35.5	64.5	
No Need	9695	25.9	74.1		46.6	53.4		24.4	75.6		23.6	76.4	
Pay utilities				.5015			.0002			<.0001			<.0001
Need	1169	26.7	73.3		52.1	47.9		32.8	67.2		30.9	69.1	
No Need	9098	25.8	74.2		46.2	53.8		23.9	76.1		23.4	76.6	
Necessities				.6276			<.0001			<.0001			<.0001
Need	1405	26.4	73.6		53.2	46.8		33.5	66.5		32.1	67.9	
No Need	8882	25.8	74.2		45.9	54.1		23.5	76.5		23.0	77.0	
Unexpected expenses				<.0001			<.0001			<.0001			<.0001
Need	4692	29.8	70.2		54.3	45.7		30.5	69.5		28.1	71.9	
No Need	5575	22.6	77.5		40.7	59.3		20.1	79.9		21.0	79.0	
Childcare				.6472			.6472			.6277			.8762
Need	237	6.3	93.7		19.8	80.2		20.3	79.8		21.1	78.9	
No Need	342	62.5	58.8		19.9	80.1		21.9	78.1		21.6	78.4	
Enough space in home				.2707			.0894			<.0001			.0159
Need	979	24.4	75.6		44.3	55.7		31.3	68.7		27.4	72.6	
No Need	9288	26.0	74.0		47.2	52.8		24.2	75.8		23.9	76.1	
Housing stability				<.0001			.3925			<.0001			<.0001
Need	334	16.5	83.5		47.0	53.0		41.3	58.7		40.7	59.3	
No Need	9933	26.2	73.8		44.6	55.4		24.3	75.7		23.7	76.3	
Reliable transportation				.5249			<.0001			<.0001			<.0001
Need	889	26.8	73.2		54.0	46.0		33.3	66.7		36.3	63.7	
No Need	9378	25.8	74.2		46.2	53.8		24.1	75.9		23.1	76.9	
Neighborhood safety				.0028			.0020			.0202			.0061
Need	648	30.9	69.1		52.8	47.2		28.7	71.3		28.7	71.3	
No Need	9619	25.5	74.5		46.5	53.5		24.6	75.4		23.9	76.1	
Personal harm				.0007			.2633			.0003			<.0001
Need	326	17.8	82.2		43.9	56.1		33.4	66.6		33.7	66.3	
No Need	9941	26.1	73.9		47.0	53.0		24.6	75.4		23.9	76.1	

TABLE 5. MULTIVARIABLE LOGISTIC REGRESSION RESULTS EXAMINING THE ASSOCIATION OF SOCIAL NEEDS
WITH DICHOTOMOUS UTILIZATION OUTCOMES CONTROLLING FOR DEMOGRAPHICS AND COMORBIDITY

Covariates	Wellness visit	ED visit	Inpatient visit	ED-inpatient visits	30 day rehospitalization
Age	**0.99 (0.99–0.99)**	**0.97 (0.96 - 0.97)**	1.00 (1.00 – 1.01)	0.99 (0.98 – 1.00)	**0.97 (0.96 – 0.98)**
Sex: Male (1) vs Female (0)	**0.41 (0.36–0.46)**	**0.89 (0.79 - 0.99)**	**1.92 (1.71 – 2.16)**	1.22 (0.99 – 1.50)	**1.45 (1.15 – 1.82)**
Race					
White (referent)	1.00	1.00	1.00	1.00	1.00
Black	1.01 (0.91–1.12)	**1.24 (1.11 – 1.38)**	0.95 (0.84 – 1.08)	1.13 (0.89 – 1.42)	0.80 (0.62 – 1.05)
Other	0.90 (0.65–1.26)	0.80 (0.59 – 1.08)	0.72 (0.44 – 1.17)	2.60 (0.76 – 8.94)	0.64 (0.20 – 2.03)
Unknown	0.94 (0.82–1.07)	1.12 (0.98 – 1.28)	**1.35 (1.16 – 1.56)**	1.12 (0.87 – 1.46)	1.14 (0.85 – 1.51)
Child at home:	1.06 (0.95–1.17)	**1.41 (1.26 – 1.58)**	1.08 (0.94 – 1.24)	1.09 (0.85 – 1.41)	0.95 (0.72 – 1.26)
Medicaid eligibility groups					
TANF (referent)	1.00	1.00	1.00	1.00	1.00
Expansion	1.11 (0.98–1.26)	**1.29 (1.13 – 1.47)**	**1.22 (1.02 – 1.47)**	1.16 (0.82 – 1.64)	1.02 (0.67 – 1.55)
SSI	1.16 (0.98–1.37)	1.18 (0.99 - 1.41)	1.05 (0.85 – 1.30)	1.32 (0.90 – 1.93)	1.19 (0.76 – 1.86)
Behavioral health only	**0.34 (0.22–0.55)**	**0.19 (0.13 – 0.28)**	**0.56 (0.35 – 0.91)**	0.46 (0.20 – 1.04)	1.24 (0.47 – 3.28)
Sum Elixhauser Comorbidity Index	**1.07 (1.05–1.09)**	**1.69 (1.64 – 1.74)**	**1.65 (1.61 – 1.70)**	**1.18 (1.13 – 1.23)**	**1.37 (1.31 – 1.44)**
Social Needs					
0	1.00	1.00	1.00	1.00	1.00
1	0.94 (0.84–1.05)	**1.17 (1.04 – 1.31)**	0.97 (0.85 – 1.10)	0.91 (0.72 – 1.14)	0.85 (0.66 – 1.10)
≥2	**0.87 (0.77–0.98)**	**1.39 (1.23 – 1.57)**	**0.87 (0.76 – 0.99)**	1.23 (0.96 – 1.58)	**0.66 (0.50 – 0.87)**

Bolded text indicates statistical significance ($P < .05$).
ED, emergency department; SSI, Supplemental Security Income; TANF, Temporary Assistance for Needy Families.

for a statewide sample of Medicaid beneficiaries to provide valuable new insights about multiple social needs and a range of health outcomes. In addition to observing associations with an increased number of social needs in total, this study also found that certain social needs had different patterns of association with chronic conditions, which may inform social needs screening and intervention efforts across chronic disease management programs. This study found that social needs were related to fewer wellness visits and more ED visits, but were not related to hospitalization, which may illustrate differences in how admissions are determined (self-referral vs. physician ordered).

Whether examining individual social needs or an accumulation of multiple social needs, this study found consistent significant associations: social needs were greater among Medicaid beneficiaries with a history of substance abuse, tobacco dependence, and mental health disorders.

Such conditions are associated with psychosocial stress, and symptom management is improved by intensive lifestyle intervention, which may be impractical when social needs are predominant.[35] For example, key tasks such as self-monitoring, medication adherence, and dietary and physical activity behaviors needed to manage certain conditions are more difficult in the face of competing priorities such as social needs.[36]

Across a range of chronic physical conditions, this study found many positive associations with level of social needs, which is consistent with a previous study using clinic notes and billing information.[28] However, several exceptions were observed. For example, hypothyroidism was associated with lower social needs in this population. This may be evident because hypothyroidism is a condition that is easily treated with a generic medication and is most often related to au-

toimmunity or surgical removal of the thyroid, conditions that are not expected to be worsened by lifestyle or stress. Perhaps surprisingly, there was no association between social needs and renal failure, but this likely is related to the relatively small numbers of individuals with this condition in the data. Additionally, the most severely affected individuals with renal failure, those with end-stage renal disease on dialysis, qualify for Medicare, and dual eligibles were not included in the study population.

Even though level of social needs was consistently related to many chronic conditions, differences emerged when examining individual social needs for specific conditions. Although not having money for unexpected expenses was consistently associated with multiple health conditions, social needs related to food, utilities, and necessities were not associated with having diabetes. Future multivariable or stratified analyses may better elucidate the relationships between social needs and health outcomes among patients with diabetes and other comorbid conditions, which are certainly affected by age as well. Both diabetes and hypertension often require adherence to multiple medications, are often comorbid with each other, and are associated with other medical conditions including depression. Management of diabetes in particular is associated with high costs, and trade-offs between medication use and social needs may be complicated.[37,38] It is possible that Medicaid beneficiaries with diabetes in this sample were already receiving support from assistance programs (eg, needymeds.org) or care management services, which may impact their social needs.

There is a growing interest in the role of social needs in health care utilization. Medicaid beneficiaries with social needs and children at home were less likely to have preventive wellness visits, which may reflect challenges in

scheduling and adhering to planned primary care visits and/or preference for seeing a physician only after a health problem is experienced. In past research, food insecurity in a national survey population (most had private health insurance) was associated with ED visits and inpatient admissions.[39] However, another study found significant associations of food insecurity with ED visits and pharmaceutical utilization, but not inpatient admissions.[40] Housing insecurity in a national sample of safety net patients with diabetes was positively associated with a composite measure of ED visits and inpatient admissions.[23] Bivariate analyses in the present study showed consistent associations between individual social needs and ED visits, but not as many individual social needs were related to inpatient admissions, even those that started in the ED. Pregnancy-related hospital admissions were excluded, but future analyses should specifically examine disease-related or unplanned admissions as they are likely to be more related to social needs than elective procedures requiring hospitalization.

Limitations

All data collection methods for identifying social needs have potential problems with underreporting or underrecording of unmet needs. Self-report data are no different and present study results likely underestimate the total number and type of needs experienced by members. Outreach efforts will not engage all members and response bias likely exists. Thus, the present study results may not generalize to all members of the health plan or all Medicaid beneficiaries in the United States. However, the sample provides adequate power to detect even small effects of social needs on study outcomes. The decision to examine claims for a 12-month period vs. all available years of claims data may have reduced the total number and type of medical conditions and visits experienced by study participants, especially among individuals who cycle in and out of Medicaid coverage or health plan membership. Although the temporal ordering does not allow for making causal claims about the effects of social needs and health conditions and health outcomes on each other, a substantial number of significant associations were found between social needs and chronic conditions, health care utilization, and characteristics of the sample.

Conclusion

This study involved a large team of university researchers and health plan collaborators to create a novel database linking patients' self-reported social needs assessment data with objective medical and pharmacy claims data representing patients' use of health care services irrespective of specific physicians or clinic sites across the state of Louisiana. Although a small percent of the total health plan population completed this novel social needs assessment, the sample includes members with a range of social needs, medical conditions, utilization rates, and demographics. This linked data set provided a unique opportunity to examine the broad influence of social needs across health-related outcomes.

Future research should examine multiple needs simultaneously to determine consistent associations between individual or clusters of social needs with specific health outcomes to inform targeted intervention efforts. Additionally, future analyses may determine the relative influence of different social needs on specific health outcomes. Expanding the focus to specific health outcomes such as medication adherence, rehospitalization for certain conditions, and use of preventive services, will be useful for further elucidating the effect of social needs on health broadly. Such research is necessary to strengthen conceptual models and inform future interventions to ameliorate the negative impact of social needs on health. Immediate applications of these results include the expansion of social needs interventions in chronic disease management programs, especially care management for patients with mental health and substance use disorders. Health plans have a unique opportunity to support population health through systematic outreach to screen for social needs outside the point of care, then provide referrals to social services, application support for assistance programs, care coordination to increase preventive care and decrease emergency care, and follow-up to close gaps.

Authors' Contributions

All authors contributed to the writing, reviewing, and revising of the manuscript content. Drs. McQueen, Herrick, and Kreuter contributed to the study design and interpretation of results. Ms. Li conducted all data management and data analyses. Mr. Broussard and Ms. Smith contributed to data collection, data sharing, and interpretation. Drs. Verdecias and Brown contributed to defining measures and interpreting results.

Author Disclosure Statement

Mr. Broussard and Ms. Smith are employed by Louisiana Healthcare Connections. The authors declare no other personal or financial conflicts of interest.

Supplementary Material

Supplementary Table S1
Supplementary Table S2

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