

Brief Report

Cite this article: McQueen A, Charles C, Staten J, *et al.* Social needs are associated with greater anticipated needs during an emergency and desire for help in emergency preparedness planning. *Disaster Med Public Health Prep.* 17(e279), 1–5. doi: <https://doi.org/10.1017/dmp.2022.208>.


Keywords:

emergency preparedness; health-care disparities; minority health; needs assessment; health care

Corresponding author:

Amy McQueen,
Email: amcqueen@wustl.edu

Social Needs Are Associated With Greater Anticipated Needs During an Emergency and Desire for Help in Emergency Preparedness Planning

Amy McQueen PhD^{1,2} , Cindy Charles MPH¹, Jennifer Staten MPH¹, Darrell J. Broussard MBA³, Rachel E. Smith RN, MS³, Niko Verdecias DrPh¹ and Matthew W. Kreuter PhD¹

¹Health Communication Research Lab, Brown School, Washington University in St. Louis, MO, USA; ²Division of General Medical Sciences, School of Medicine, Washington University in St. Louis, MO, USA and ³Louisiana Healthcare Connections, Baton Rouge, LA, USA

Abstract

Objective: Most emergency preparedness planning seeks to identify vulnerable population subgroups; however, focusing on chronic conditions alone may ignore other important characteristics such as location and poverty. Social needs were examined as correlates of anticipated needs and desire for assistance during an emergency.

Methods: A retrospective, secondary analysis was conducted using assessments of 8280 adult Medicaid beneficiaries in Louisiana, linked with medical ($n = 7936$) and pharmacy claims ($n = 7473$).

Results: The sample was 73% female; 47% Black; 34% White; mean age 41 y. Many had at least 1 chronic condition (75.9%), prescription (90.3%), and social need (45.2%). Across assessments, many reported food (40%), housing (34%), and transportation (33%) needs. However, far more people anticipated social needs during an emergency than in the next month. Having social needs increased the odds of anticipating any need (odds ratio [OR] = 1.5, 1.44–1.56) and desire for assistance during an emergency, even after controlling for significant covariates including older age, race, geographic region, Medicaid plan type, and prescriptions. Chronic conditions were significantly correlated with all anticipated needs in bivariate analyses, but only modestly associated (OR = 1.03, 1.01–1.06) with anticipated medication needs in multivariable analyses.

Conclusions: Identifying individuals with social needs, independent of their chronic disease status, will benefit emergency preparedness outreach efforts.

Natural disasters have been associated with greater risk of morbidity and mortality among chronically ill patients.¹ Studies conducted after natural disasters document both immediate and long-term health consequences. Fewer deaths during natural disasters are due to injury or acute events; more are due to indirect effects and exacerbation of chronic illness.² People with chronic illnesses may be less prepared for and/or less able to withstand disruptions to their usual care and end up in the emergency room or hospital as a result.

Emergency preparedness plans (EPP) encourage states and local governments to develop action plans to anticipate emergencies. These plans, such as the Community Assessment for Public Health Emergency Response (CASPER), assess a community's needs during an evacuation and what communication and other response efforts are needed. Such plans facilitate official responses to an emergency, protect individuals in fragile health states, and prevent communities from being as heavily impacted.³ Households differ in their preparedness behaviors (if any); some focus on stockpiling resources and others make plans for communication and action.⁴ Understanding what needs people anticipate during an emergency and what assistance for EPP they desire is useful for informing population-level EPP.

EPP have focused on the elderly or people with chronic conditions. However, individuals with social needs such as food insecurity and trouble paying for necessities would also benefit from EPP. However, people who have trouble getting enough food to eat are also less likely to have set aside emergency supplies of food and water. Furthermore, people with fewer financial resources may live in homes or neighborhoods less prepared for natural disasters such as the flooding or high winds associated with hurricanes.

This study analyzed data reported by Medicaid beneficiaries to their health plan to examine what factors are associated with individuals' anticipated needs during an emergency and desire for emergency preparedness. We hypothesized that social needs would be positively associated

with both outcomes. Results will inform future outreach, resource allocation, and emergency preparedness for vulnerable patients.

Methods

Data Sources

University members of the research team worked closely with Centene Corporation and Louisiana Healthcare Connections (LHCC) to obtain all necessary approvals and secure data access to the limited identifiers data (service dates only, no other protected health information [PHI]) stored at the health plan. Data sharing and research procedures were approved by Institutional Review Boards for Washington University in St. Louis and Louisiana Department of Health and Human Services. All analyses were completed using SAS statistical software version 9.4 (Cary, NC) and a virtual desktop interface using data from different sources stored in the health plan's enterprise data warehouse. Primary data for this study were obtained from self-report assessments of members conducted by LHCC staff by phone. Administrative medical and pharmacy claims data were used to identify member characteristics (eg, demographics, chronic conditions, medications) that may be associated with anticipated needs during an emergency.

Measures

EPP assessment: Questions ask where respondents would go in the event of an emergency (eg, out-of-town friend or relative) and whether assistance would be needed in the event of an evacuation with (mark all that apply): transportation, lodging, medications, medical supplies, and food. Respondents were also asked whether they wanted LHCC to assist them with registering for a special needs shelter in Louisiana or a border state, pre-applying for disaster food stamps, or mailing them an emergency preparedness packet for important phone numbers, copies of Medicaid cards, and health plan information. Respondents also indicated whether or not they were aware that, during a declared state of emergency, the State allows up to a 30-d prescription medication refill.

Social Determinants of Health (SDOH) assessment: LHCC adopted and administered social needs questions developed for and used in several previous studies, including a pilot survey the 2 organizations conducted.^{5,6} Ten items assessed the likelihood that each participant's personal safety, housing, food, transportation, childcare (if applicable), and various financial needs would be met in the next month. 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. Responses were dichotomized as unlikely or unsafe versus likely or safe; then, a sum score was created to reflect total unmet social needs.

Covariates: The Elixhauser Comorbidity Index (ECI)⁷ provides a sum score of 30 chronic conditions, each defined as the presence or absence of a diagnosis in 1 or more inpatient claims or 2 or more outpatient claims associated with relevant International Classification of Diseases (ICD-10) codes.^{8,9} Higher scores reflect greater comorbidity. The number of unique drug types prescribed in the 12 months before completing the SDOH assessment was calculated by counting the number of unique product names in pharmacy claims data. Although count measures will capture multiple prescriptions being taken for a single disease type, this measure did not adjust for prescribing interval, which might over-estimate total medication burden over the 12-mo period. Demographic variables

available included age, sex, race, Medicaid plan type (ie, expansion, Temporary Assistance for Needy Families [TANF], Supplemental Security Income [SSI], behavioral health only), and 3-digit zip codes used to categorize members by region: New Orleans (701), coastal (700, 703, 705, 706) versus inland regions.

Data Analyses

Retrospective, secondary analyses of previously collected data were conducted. Descriptive statistics for covariates and needs reported in the SDOH and EPP assessments were examined. Bivariate and multivariable logistic regression analyses were conducted to examine associations with anticipated needs during an emergency and desire for making preparations. Adjusted odds ratios and 95% confidence intervals are presented for all variables included in the multivariable analyses reported in tables.

Analysis Sample

Adult members who completed the SDOH assessment between July 10, 2018, and June 28, 2019, were identified ($N=10,275$). Of those, 8280 members had EPP data within 12 mo of completing the SDOH. Their self-report data were then linked to administrative medical claims ($n=7936$) and pharmacy claims ($n=7473$) within 12 mo of completing their SDOH assessment. Anyone without claims was included in analyses as having no conditions or prescriptions, although we acknowledge that patients always have the option to purchase prescriptions out-of-pocket or with secondary insurance without notifying the health plan.

Results

The analysis sample was comprised of mostly females (73%), Black (47%) or White (34%) race, with an average age of 41 (SD = 14.7; range 18-75 y). The sample was composed of 1645 (19.9%) people who receive Medicaid through the TANF program, 207 (2.5%) for behavioral health only, 4576 (55.3%) are covered by Medicaid Expansion, and 1852 (22.4%) by SSI; all mutually exclusive groups. The average number of chronic conditions was 2.7 (SD = 2.5; range 0-16); 75.9% had at least 1. The average number of unique prescriptions was 11.5 (SD = 9.4; range 0-59); 90.3% had at least 1. There were 672 (8.2%) people from New Orleans, LA, 3389 (41.1%) from coastal areas, and 4183 (50.7%) from inland Louisiana.

The average number of social needs was 1.1 (SD = 1.4; range 0-9); 45.2% had at least 1 social need. Far more people anticipated having unmet needs during an emergency than in the next month. For example, 2% reported a food need on the SDOH assessment, whereas 34% reported it on the EPP assessment, and 4% reported it on both assessments.

Table 1 shows consistent associations between total social needs and all anticipated needs during an emergency, even after controlling for all other variables in the models. Other significant covariates consistently associated with all anticipated needs included older age, Black versus White race, Medicaid coverage due to disability compared with TANF, and having a greater number of prescriptions. Other covariates such as Medicaid coverage for behavioral health only was associated with increased odds of anticipated needs for transportation, medications, and medical supplies during an emergency. Residents of New Orleans anticipated greater transportation and medication needs during an emergency compared with other coastal or more northern residents. **Table 1** shows that after controlling for all other variables

Table 1. Multivariable logistic regression analyses of social needs associated with anticipated needs during an emergency

Anticipated Needs During an Emergency (outcomes)													
Covariates	N	Food		Transportation		Lodging		Medications		Medical Supplies		Any need	
		OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Total social needs	8,280	1.43	1.38, 1.48	1.52	1.46, 1.57	1.41	1.37, 1.46	1.38	1.34, 1.43	1.35	1.31, 1.40	1.50	1.44, 1.56
Age (Mean=41.1, SD=14.7)	8,280	1.01	1.01, 1.01	1.01	1.01, 1.02	1.01	1.01, 1.02	1.02	1.01, 1.02	1.01	1.00, 1.02	1.01	1.01, 1.02
Sex													
Male (ref)	2,268												
Female	6,012	1.07	(0.96, 1.20)	1.10	0.97, 1.23	0.96	0.86, 1.08	0.86	0.77, 0.97	0.93	0.83, 1.05	0.99	0.88, 1.10
Race													
White (ref)	2,821												
Black	3,887	1.67	1.50, 1.90	1.96	1.74, 2.21	1.29	1.15, 1.44	1.43	1.28, 1.60	1.60	1.42, 1.81	1.59	1.43, 1.77
Other	195	1.11	0.80, 1.54	0.79	0.53, 1.19	0.84	0.59, 1.19	0.95	0.66, 1.35	0.97	0.65, 1.45	1.13	0.83, 1.53
Unknown	1,377	1.21	1.05, 1.39	1.32	1.13, 1.54	1.10	0.96, 1.28	1.16	1.00, 1.34	1.26	1.08, 1.48	1.27	1.11, 1.46
Medicaid coverage type													
TANF (ref)	1,645												
Behavioral Health only	207	1.26	0.92, 1.74	1.81	1.30, 2.52	1.34	0.97, 1.86	1.90	1.37, 2.62	1.89	1.35, 2.65	1.48	1.07, 2.06
Medicaid Expansion	4,576	0.98	0.86, 1.11	0.89	0.77, 1.03	1.03	0.89, 1.18	1.04	0.91, 1.20	0.98	0.84, 1.14	0.94	0.83, 1.07
SSI Disability	1,852	1.25	1.06, 1.48	1.58	1.33, 1.89	1.32	1.11, 1.56	1.42	1.20, 1.69	1.43	1.19, 1.72	1.33	1.13, 1.57
Total chronic conditions	8,280	1.00	0.98, 1.03	1.00	0.98, 1.03	1.00	0.98, 1.03	1.03	1.01, 1.06	1.01	0.98, 1.04	1.02	0.99, 1.05
Total unique prescriptions	8,280	1.01	1.00, 1.01	1.00	1.00, 1.01	1.01	1.00, 1.01	1.01	1.00, 1.02	1.01	1.01, 1.02	1.01	1.00, 1.01
Louisiana area													
New Orleans (ref)	672												
Coastal	3,389	0.84	0.71, 1.01	0.76	0.63, 0.91	0.85	0.71, 1.02	0.73	0.61, 0.88	0.82	0.68, 1.00	0.72	0.60, 0.86
Inland	4,183	0.91	0.77, 1.09	0.86	0.72, 1.03	0.88	0.74, 1.05	0.76	0.64, 0.91	0.90	0.75, 1.09	0.76	0.64, 0.91

Legend. Ref=Referent group; TANF = Temporary Assistance for Needy Families; SSI = Supplemental Security Income; AOR = Adjusted Odds Ratio; CI = 95% confidence interval; bolded text p <.05

Table 2. Multivariable logistic regression analyses of social needs associated with emergency preparedness planning needs

Covariates	N	Emergency Preparedness Planning (outcomes)									
		Wants help with registration for special needs shelter		Wants help with Disaster Food Stamps application		Unaware of disaster prescription refill		Needs an emergency preparedness packet		Has no one to stay with during an evacuation	
		AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI	AOR	95% CI
Total social needs	8,280	1.23	1.19, 1.28	1.15	1.11, 1.19	1.10	1.07, 1.14	1.19	1.15, 1.23	1.14	1.10, 1.18
Age	8,280	1.02	1.01, 1.02	1.01	1.01, 1.01	1.01	1.00, 1.01	1.00	0.99, 1.00	1.02	1.01, 1.02
Sex											
Male (ref)	2,268										
Female	6,012	0.89	0.78, 1.01	0.91	0.81, 1.03	0.98	0.88, 1.09	1.11	0.99, 1.23	0.82	0.73, 0.92
Race											
White (ref)	2,821										
Black	3,887	1.74	1.53, 1.99	1.27	1.13, 1.43	0.67	0.61, 0.75	0.96	0.86, 1.06	0.93	0.83, 1.04
Other	195	1.02	0.66, 1.57	1.34	0.96, 1.86	1.08	0.78, 1.48	0.99	0.73, 1.35	1.08	0.77, 1.52
Unknown	1,377	1.20	1.00, 1.43	1.10	0.94, 1.27	0.91	0.79, 1.04	1.09	0.95, 1.25	0.99	0.86, 1.15
Medicaid coverage type											
TANF (ref)	1,645										
Behavioral Health	207	1.47	1.03, 2.09	0.94	0.66, 1.33	0.63	0.46, 0.85	0.94	0.68, 1.30	1.38	0.99, 1.91
Medicaid Expansion	4,576	0.82	0.69, 0.97	1.11	0.96, 1.28	1.09	0.96, 1.23	1.16	1.02, 1.31	0.96	0.83, 1.11
SSI Disability	1,852	1.27	1.04, 1.55	0.94	0.79, 1.13	0.75	0.64, 0.88	1.00	0.85, 1.18	1.09	0.91, 1.30
Total chronic conditions	8,280	1.00	0.97, 1.03	1.01	0.98, 1.04	0.99	0.97, 1.02	1.00	0.98, 1.03	1.02	1.00, 1.05
Total unique prescriptions	8,280	1.00	0.99, 1.01	0.99	0.98, 1.00	0.99	0.99, 1.00	0.99	0.98, 1.00	1.00	0.99, 1.01
Louisiana Region											
New Orleans (ref)	672										
Coastal	3,389	0.85	0.69, 1.04	0.83	0.69, 1.00	0.87	0.73, 1.04	0.92	0.77, 1.10	1.59	1.28, 1.97
Inland	4,183	0.87	0.72, 1.06	0.78	0.65, 0.94	0.92	0.77, 1.10	1.05	0.89, 1.25	2.10	1.70, 2.59

Legend. Ref=Referent group; TANF = Temporary Assistance for Needy Families; SSI = Supplemental Security Income; AOR = Adjusted Odds Ratio; CI = 95% confidence interval; bolded text p <.05.

in the model, chronic conditions were not significantly associated with anticipated needs during an emergency except for medications. Of note, in bivariate analyses, chronic conditions were positively associated with all anticipated needs during an emergency (Supplemental Table).

Table 2 shows consistent associations between total social needs and all EPP outcomes, while controlling for all other variables. Older age was also associated with most EPP outcomes. Blacks versus Whites were more likely to want help with registering for a shelter or disaster food stamps, but less likely to be unaware of disaster prescription refills. EPP needs varied by type of Medicaid program (Table 2). For example, compared with TANF members, members with only behavioral health coverage or SSI disability were more likely to want help registering for a shelter and less likely to need information about disaster prescription refills. Members in Medicaid Expansion programs were less likely to want help with shelter registrations, but more likely to want an EPP packet. Females and people living around New Orleans were less likely to report having no one to stay with during an evacuation. Total prescriptions was not associated with any EPP outcomes and chronic conditions was only positively associated with reporting having no one to stay with during an evacuation.

Limitations

Analyses did not control for the temporal ordering of assessments, so causal interpretations are not possible. In addition, assessments were not completed by all Medicaid beneficiaries, so sampling bias

likely exists. Thus, results of this study may not generalize to all health plan members or all Medicaid beneficiaries in the United States. However, the sample provided adequate power for detecting associations with social needs reported in anticipation of a future emergency.

Discussion

Although Medicaid beneficiaries anticipated greater needs for food, housing, and transportation during an emergency than in the next month, total social needs were consistently and positively associated with all emergency needs assessed and were a better predictor of EPP needs than chronic conditions when controlling for all model variables.

Health systems and communities seek to enhance EPP to reduce unnecessary and preventable illness and emergency department use. However, focusing on subgroups of patients based on the number and/or severity of their chronic conditions alone may limit the total impact of EPP and SDOH efforts, and overlook opportunities for improving population health. As decisions are made for resource allocation for EPP, health plans may seek to expand their focus and outreach to include members with unmet social needs or develop specific community partnerships to proactively address anticipated needs during an emergency in this vulnerable subgroup.

Among this sample of Medicaid beneficiaries, race remained a significant predictor of needs and desire for assistance with pre-registration for shelter and food stamps during an emergency,

illustrating a consistent racial disparity despite controlling for other factors. Similarly, individuals with behavioral health care coverage only or Medicaid coverage due to disability were also consistently more likely to report anticipated needs during an emergency. These results highlight important subgroup differences among Medicaid beneficiaries and their ability to cope during an emergency that warrant different interventions preemptively or early in an emergency. Similarly, geographic differences observed in this study may identify differences in resources or access during emergencies. For example, despite the predominantly urban environment around the city of New Orleans, residents in that region were more likely to report transportation and medication barriers, and a greater desire for establishing emergency food stamps benefits. In contrast, possibly due to the long history of hurricanes affecting New Orleans and the more recent history of mass evacuations in advance of storms, residents of the region reported less need for having someone to stay with during an evacuation.

Conclusions

Study results show a consistent positive association between anticipated social needs in the next month and during an emergency, even after controlling for chronic conditions. Thus, social needs are an important risk factor that can identify subgroups for outreach and EPP efforts independent of chronic conditions. Health-care organizations that assess and address social needs should consider how those data can also be used to provide EPP and assistance during and following emergencies.

Supplementary material. The supplementary material for this article can be found at <https://doi.org/10.1017/dmp.2022.208>.

Funding statement. This research was supported by a grant from the National Institute for Diabetes and Digestive and Kidney Diseases, 1R01DK115916-01. We thank the Centene Center for Health Transformation collaborators at Centene Corp. for their additional support of this study.

Conflicts of Interest. None.

References

1. **Tomio J, Sato H.** Emergency and disaster preparedness for chronically ill patients: a review of recommendations. *Open Access Emerg Med.* 2014;6:69-79.
2. **McKinney N, Houser C, Meyer-Arendt K.** Direct and indirect mortality in Florida during the 2004 hurricane season. *Int J Biometeorol.* 2011;55:533-546.
3. **Centers for Disease Control and Prevention (CDC).** *Community Assessment for Public Health Emergency Response (CASPER) Toolkit.* 3rd ed. CDC; 2019.
4. **Zamboni LM, Martin EG.** Association of US households' disaster preparedness with socioeconomic characteristics, composition, and region. *JAMA Netw Open.* 2020;3(4):e206881.
5. **McQueen A, Kreuter MW, Herrick CJ, et al.** Associations among social needs, health and healthcare utilization, and desire for navigation services among US Medicaid beneficiaries with type 2 diabetes. *Health Soc Care Community.* 2022;30(3):1035-1044.
6. **McQueen A, Li L, Herrick CJ, et al.** Social needs, chronic conditions, and health care utilization among Medicaid beneficiaries. *Popul Health Manag.* 2021;24(6):681-690.
7. **Elixhauser A, Steiner C, Harris DR, et al.** Comorbidity measures for use with administrative data. *Med Care.* 1998;36(1):8-27.
8. **Quan H, Sundararajan V, Halfon P, et al.** Coding algorithms for defining comorbidities in ICD-9-CM and ICD-10 administrative data. *Med Care.* 2005;43(11):1130-1139.
9. **Centers for Medicare and Medicaid Services.** Chronic conditions data warehouse. Condition categories. Accessed December 3, 2019. <https://www2.ccwdata.org/web/guest/condition-categories>