Associations between social risks and primary care utilization among medically complex veterans

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Abstract

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Importance: Social risks lead to poor health outcomes, especially for medically complex patients. Primary care may modify outcomes, but patients with social risks face barriers to accessing primary care.

Objective: To study associations between social risks and primary care utilization among medically complex patients.

Design: Prospective cohort study among respondents to a 2018 mailed survey collecting information on social risks, followed up to two years after survey completion.

Setting: Veterans Affairs (VA) health care system, in which primary care is delivered through a Patient-Aligned Care Team including the primary care provider (PCP), registered nurse, clinical pharmacist, and social worker.

Participants: Survey was mailed to a nationally representative sample of 10,000 VA primary care patients with high (≥75th percentile) one-year risk of hospitalization or death.

Exposures: Survey-based measures of low social support, not having a family member/friend who gets involved in your health care, unemployment, transportation problem, food insecurity, medication insecurity, financial strain, low medical literacy, less than high school graduate, and ≥1 social risk.

Main outcomes and measures: Electronic health record-based number of PCP encounters, number of primary care team encounters (PCP, nurse, clinical pharmacist, and social worker), and ≥1 vs. 0 social work encounters in the two years after survey completion. Negative binomial regression models were used for PCP and primary care team utilization. Logistic regression models were used for social work utilization.

Results: Among 4,680 respondents, mean age was 70.3 (SD 11.5), 93.7% were male, 71.8% White non-Hispanic, and 15.8% Black non-Hispanic. In fully adjusted models, unemployment was associated with fewer PCP and primary care team encounters, and low medical literacy was associated with fewer primary care team encounters. Among those with ≥1 social risk, 18.4% had ≥1 social work encounter. Low social support, transportation problem, and low medical literacy were associated with higher odds of ≥1 social work encounter.

Conclusions: There were minimal disparities in PCP and primary care team utilization among medically complex Veterans with and without social risks. However, social work use was low, despite its central role in addressing social risks. More work is needed to understand barriers to social work utilization.

Introduction

Social risks – defined by the US Preventive Services Task Force (USPSTF) as individual-level social and economic conditions shaped by broader social, economic, and structural determinants[1] – significantly impact health and underlie many health inequities in the US population.[2–4] Medically complex patients are particularly vulnerable to the health effects of social risks.[5–7] Policies at community, state, and federal levels are necessary to address broader social determinants of health.[8] However, the growing evidence on health impact, support from professional organizations[9–13], and trends in payment[14] have led many health care delivery systems to screen for and address individual-level social risks[8,15–18], which often occurs in primary care.[13]

Primary care is well-positioned to identify social risks given its role in prevention and longitudinal relationship with patients. The USPSTF, which provides evidence-based recommendations on primary care screening, has been working to evaluate the potential for incorporating social risks into future recommendations.[1] Furthermore, primary care providers (PCPs) may act on screening information by adjusting care to account for identified needs or assisting in modifying the social risk through referrals to other resources.[12] Primary care is particularly suited to address social risks in the Patient-Centered Medical Home model in which team-based care and coordination/referrals across the broader health care system and community services are key functions.[19,20]

Patients with social risks face numerous financial and non-financial barriers to accessing care; the impact and reach of primary care-based social risk screening and interventions will be limited if affected patients are never seen in this setting.[21,22] Therefore, it is important to understand how and to what extent socially and economically vulnerable patients use primary care. Several studies have examined the association between social risks and primary care utilization.[23–33] However, these studies have investigated one or a few social risks in a population defined by a specific medical condition. Furthermore, prior studies have defined primary care utilization as encounters with the PCP alone. To

our knowledge, no study has investigated associations between multiple patient-reported social risks and primary care utilization in a general, medically complex population, while exploring primary care utilization across the interprofessional team in the Patient-Centered Medical Home model.

We aimed to study the associations between social risks and primary care utilization across the interprofessional team among US Veterans Affairs (VA) health care system patients at high-risk for hospitalization and death, using data collected in a survey of social, economic, behavioral, and psychological factors conducted by the VA Office of Primary Care in 2018.

Methods

Study design and population

A mailed survey collecting information on 22 social, behavioral, economic, and psychological determinants of health was sent on April 16, 2018 to a nationally representative stratified random sample of 10,000 Veterans at high risk for hospitalization and death in the next year (based on VA's Care Assessment Needs Score ≥ 75th percentile).[34] Eligible Veterans had at least one outpatient VA encounter between 3/18/2017 and 3/20/2018. The survey was mailed with a cover letter, $2 bill incentive, prepaid return envelope, and 1-800 telephone number or return postcard to opt-out. Veterans who did not respond or opt out within six weeks were mailed a second survey, cover letter, and pre-paid envelope. Additional survey design details have been previously reported.[35] Clinical and demographic characteristics as well as health care system encounters were obtained from the electronic health record. We conducted a prospective cohort study to investigate associations between survey-based social risks and subsequent number of primary care encounters in the two years after survey completion. This evaluation was reviewed and designated as non-research quality improvement by the VA Office of Primary Care and the Durham VA Medical Center institutional review board and therefore did not require participant informed consent.

Social risk measures

Among the 22 measures included in the survey, nine were selected *a priori* to be examined as exposures in this study. Measures were selected if they 1) met the USPSTF definition of a social risk, based on consensus among the study team;[1] 2) were associated with adverse health outcomes and/or hospitalizations or emergency department visits, based on prior analyses of survey data and reports from the USPSTF and National Academy of Medicine;[1,13,35] and 3) are actionable in primary care, as determined by the USPSTF or National Academy of Medicine.[1,13]

Final selected social risk measures included two types of social resources (social support and having a family member/friend who gets involved in your health care), five types of material resources (employment, transportation, food insecurity, medication insecurity, and financial strain), and two types of personal resources (medical literacy and education). All nine of these social risks met the criteria above, except for medication insecurity which was not addressed by the USPSTF or National Academy of Medicine in their reports. However, medication insecurity was included due to consensus among the study team that it meets the definition of a social risk, is associated with health outcomes, and is actionable in primary care.[36]

Each social risk was operationalized as a dichotomous variable, with the deficit value used as the predictor in our analyses. For example, social support was dichotomized as low vs high, and low social support was the exposure of interest. Finally, the presence of one or more social risks across all nine social risks was examined as a separate exposure. Additional details about the social risk survey measures and their specification for this study are provided in the Supplement (eTable 1).

Outcomes

Based on the Patient-Centered Medical Home model, primary care in the VA health care system is delivered through a Patient Aligned Care Team (PACT), which includes a PCP, registered nurse, licensed practical nurse or medical assistant, and administrative clerk as well as clinical pharmacists and social workers embedded in clinic.[37,38] As patients receive clinical care across members of the interprofessional team, we sought to examine primary care utilization beyond encounters with the PCP alone. Furthermore, as social workers have particular expertise in addressing social risks, utilization of their services in primary care was of particular interest.[39] Therefore, we examined primary care utilization in three ways: 1) a continuous outcome, specified as the number of encounters with the PCP, 2) a continuous outcome, specified as the number of encounters with any clinical member of the PACT team (including PCP, nurse, clinical pharmacist, and social worker), and 3) a dichotomous outcome, specified as one or more vs. zero encounters with the primary care-based social worker. For the PCP utilization outcome, only face-to-face encounters were included in order to examine and interpret the most comprehensive, traditional modality of care. For the primary care team and social work utilization outcomes, face-to-face, telephone, and video encounters were included to capture the range of care modalities used across the interprofessional team.

Numbers of encounters in the VA were based on the electronic health record and extracted from the VA's Corporate Data Warehouse. The follow-up period was two years after survey completion for each respondent, from 4/26/18 to 6/20/20.

Covariates

We extracted electronic health record-based demographic and clinical characteristics including age, gender, race/ethnicity, marital status, rurality, VA priority status, housing instability, and comorbid conditions. Rurality was defined based on Rural Urban Community Area using geocoded patient enrollment data.[40] VA priority status refers to the enrollment categorization of Veterans into one of

eight groups based on factors including service-connected disability rating, income, and recent military service.[41] Housing instability was defined based on VA Managerial Cost Accounting Stop Codes reflecting utilization of VA homeless services and diagnosis code Z59.0.[42]

We looked for 47 chronic physical and mental health conditions derived from the Agency for Healthcare Research and Quality Clinical Classification Software and VA's Women's Health Evaluation Initiative in Yoon et al. 2018.[43–45] Presence of each condition was based on identifying at least one outpatient encounter with the relevant International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10) code in the year prior to the survey.

Finally, we examined responses to two additional survey-based measures: typical location of care (mostly at the VA vs not) and functional limitations (requiring any vs no help on one or more activities of daily living) (eTable 1).

Statistical analysis

We describe demographic, clinical, and social risk characteristics of survey respondents using means and standard deviations for continuous variables and percentages for categorical variables. Among survey respondents, we fit multivariable negative binomial regression models to examine the association between each social risk and 1) the number of PCP encounters, and 2) the number of primary care team encounters in the two years after survey completion. We fit multivariable logistic regression models to examine the association between each social risk and having one or more social work encounters in the two years after survey completion.

For each of the three outcomes, we fit partially and fully adjusted models. Partially adjusted models examined each of the nine social risks and presence of one or more social risks separately. Fully adjusted models included all nine social risks. Both partially and fully adjusted models included age,

gender, race/ethnicity, rurality, typical location of care (VA vs not), and functional status (one or more vs zero functional limitations). All logistic regression models for the social work utilization outcome were additionally adjusted for follow-up time.

Although age, gender, race/ethnicity, and rurality are sometimes considered social risks themselves, they are typically proxies for social and economic experiences that are partially – but not completely – captured by the social risks in our study.[46–48] For example, race/ethnicity is a proxy for the effects of individual and structural racism, which both indirectly and directly affect health care utilization through other social risks (e.g., financial strain or transportation barriers) and discriminatory interactions with the health care system, respectively.[49,50] Therefore, these demographic characteristics are conceptualized as confounders in our analyses. Typical location of care was included as a precision variable affecting VA primary care utilization. Functional status was also considered a precision variable to further distinguish higher medical need – potentially leading to higher primary care utilization – in this already medically complex study population.[51]

We assessed differences in demographic and clinical characteristics between respondents and non-respondents and then accounted for survey non-response bias through a non-response propensity score. All models included a composite weight that integrated the inverse probability of selection and non-response. Statistical analyses were conducted using Stata statistical software version 17 (StataCorp, LLC). Stata's survey command was used to account for survey design and weighting. All reported p-values are two-sided using an alpha=0.05. This study follows the Strengthening the Reporting of Observational Studies in Epidemiology and the American Association for Public Opinion Research reporting guidelines.[52,53]

Results

Study cohort characteristics

There were 4,685 respondents to the survey (response rate 46.9%). Five respondents were excluded from our study based on a date of death in the electronic health record prior to the survey return date (eFigure 1). Among the 4,680 Veterans in the study cohort, mean age was 70.3 (SD 11.5), 93.7% were male, 71.8% were White non-Hispanic, 15.8% were Black non-Hispanic, and 37.0% lived in a rural location (Table 1). The mean number of chronic conditions was 6.6 (SD 2.7) and 63.9% had at least one functional limitation.

Among the social resources-related survey measures, 53.4% of respondents had low social support and 24.8% had no family member or friend to help with health care (Table 1). Among the material resources measures, 2.2% were unemployed (and looking for work), 40.3% were experiencing financial strain, 20.5% had food insecurity, 12.1% had medication insecurity, and 18.5% had a transportation problem. Among the personal resources, 10.6% had low medical literacy and 9.3% were less than a high school graduate. Finally, 79.5% of respondents had one or more social risks across all survey-based measures.

Descriptive statistics on differences between respondents and non-respondents and logistic regression models on the probability of non-response used to construct propensity score weights are reported in the supplement (eTable 2). Briefly, compared to non-respondents, respondents to the survey were older and more likely to be married, White non-Hispanic, live in a rural location, and have 6 or more chronic conditions. Respondents were less likely to have a history of housing instability, mental health diagnosis, or an emergency department visit in the last year.

Primary care utilization

The mean number of PCP encounters was 4.7 (SD 3.3) in the two years after survey completion among all survey respondents (Table 2). Those with one or more social risks and those without any

social risks had the same mean number of PCP encounters of 4.7 (SD 3.3 and 3.1, respectively). The mean number of primary care team encounters was 12.6 (SD 13.6) among all respondents. Those with one or more social risks had an average of 12.5 PACT encounters (SD 13.0), while those without any social risks had an average of 12.6 PACT encounters (SD 13.6). Across all survey respondents, 17.6% had at least one social work encounter. In those with one or more social risks, 18.4% had at least one social work encounter while 14.4% of those without any social risks had at least one social work encounter. Among those with each of the nine social risks examined, the mean number of PCP encounters ranged from 3.7 to 5.0, mean number of primary care team encounters ranged from 9.9 to 15.6, and percentage with at least one social work encounter ranged from 16.8 to 29.7.

In partially adjusted negative binomial regression models, unemployment was associated with 22% fewer PCP encounters (IRR 0.78, 95% CI 0.67 to 0.90; $p < 0.005$) (Table 3). In the fully adjusted models, unemployment remained significantly associated with number of PCP encounters, with a similar effect size (IRR 0.77, 95% CI 0.65 to 0.91). All other social risks, including having one or more social risks, were not associated with number of PCP encounters in either the partially or fully adjusted models.

In negative binomial regression models for number of primary care team encounters, unemployment was associated with 20% fewer encounters in the partially adjusted model (IRR 0.80, 95% CI 0.65 to 0.98; $p = 0.03$) and 25% fewer encounters in the fully adjusted model (IRR 0.75, 95% CI 0.60 to 0.95; $p = 0.02$). Low medical literacy was associated with 18% more primary care team encounters in the partially adjusted model (IRR 1.18, 95% CI 1.06 to 1.32; $p < 0.005$) and 18% more primary care team encounters in the fully adjusted model (IRR 1.18, 95% 1.05 to 1.33; $p < 0.005$). All other social risks as well as having one or more social risks were not associated with number of primary care team encounters in either the partially or fully adjusted models.

In partially adjusted logistic regression models for social work utilization, low social support was associated with a 23% higher odds of having at least one social work encounter (OR 1.23, 95% CI 1.02 to

1.50; p = 0.03). Financial strain was associated with a 36% higher odds (OR 1.36, 95% CI 1.13 to 1.63; p < 0.005), food insecurity with a 45% higher odds (OR 1.45, 95% CI 1.16 to 1.81; p < 0.005), transportation problem with a 61% higher odds (OR 1.61, 95% CI 1.31 to 1.99; p < 0.005), and low medical literacy with an 82% higher odds (OR 1.82, 95% CI 1.41 to 2.37; p < 0.005) of having at least one social work encounter. Having one or more social risks was also associated with a higher odds of having at least one social work encounter in the partially adjusted model (OR 1.50, 95% CI 1.18 to 1.90; p < 0.005). In the fully adjusted logistic regression model, low social support, transportation problem, and low medical literacy remained significantly associated with a higher odds of having at least one social work encounter.

Discussion

The minimal observed disparities in PCP and PACT utilization by social risk may be partly due to service delivery characteristics that are specific to the VA health care system. The VA health care system has implemented multiple reforms and programs over more than two decades to bolster primary care access[54,55], including primary care and mental health care integration[56], the patient-centered medical home model[37], home-based primary care[57], and care coordination programs.[58] Additionally, the VA has been at the forefront of screening and interventions to address several social risks, including programs for veterans experiencing housing instability, criminal justice system involvement, unemployment, and educational needs.[59] These features and services may mitigate the barriers posed by social risks to PCP and PACT utilization.

Although several social risks were associated with social work utilization, less than a quarter of Veterans with any given social risk (except low medical literacy) had one or more social work encounters in the following two years. This low utilization was surprising, given that social workers have a central role in assessing and addressing social risks.[39] In the VA health care system, social workers' standard

comprehensive assessment of patients includes several social risks (e.g., social support, housing, transportation, education, employment, and finances).[38] Few studies have examined social work utilization among Veterans – primarily in the context of intervention outcomes and/or select populations[60–62] – but limited qualitative evidence suggests that social workers in primary care are undertilized.[63]

There are several possible explanations for our findings. First, social work care is referral-based in the VA health care system (often from the primary care team). The primary care team may not refer patients to social work if the social risk is never identified in the first place. Among the social risks examined in this study, food insecurity is screened for within the VA health care system[59]; identification of other social risks would depend on patient-volunteered information and/or the practices of individual providers who face well-documented time- and resource-related barriers to social risk assessment.[18,64,65] Second, the primary care team may identify the social risk but decide to address it directly. Third, the primary care team may perceive that a social work referral is not indicated. Fourth, social work availability may be a barrier to referral. Although the VA's PACT model specifies one social worker per two primary care teams, staffing has been inconsistent across facilities.[66] Fifth, we did not examine social work encounters outside of primary care (e.g., specialty clinics or emergency department); Veterans with social risks may be served in other settings. Finally, even if the social work referral is made, patients with social risks may face barriers to scheduling and attending these appointments. More research is needed to understand the contributions of these possible explanations to low social work utilization, particularly since social work is strongly positioned not only to assess and address social risks but also to improve associated downstream health and utilization outcomes like hospitalizations and ED visits.[66–69]

Our study has several limitations. First, the study cohort was limited to VA patients at high one-year risk of hospitalization or death, so results may not generalize to other Veterans or non-Veterans.

Second, respondents to the survey differed from non-respondents across several characteristics; primary care utilization may be different between the two groups, although the inclusion of a propensity score weight for probability of response attempted to account for this. Third, these results only apply to VA health care system utilization; non-VA encounters were not available to us. Fourth, since Veterans required a mailing address to participate in this study, individuals experiencing homelessness are underrepresented and this information was not collected in the survey. Fifth, we did not include social work encounters outside of primary care since our research question was focused on primary care utilization; as a result, social work utilization may be underestimated. Key strengths of our study include use of patient-reported social risks not typically found in the electronic health record and examination of multiple primary care utilization outcomes across the interprofessional team.

Conclusions

We found minimal disparities in PCP and primary care team utilization among medically complex Veterans with and without social risks, suggesting that primary-care based social risk screening and intervention programs have the potential to reach affected Veterans. However, although several social risks were associated with higher likelihood of a primary care-based social work encounter, social work use was uniformly low. Given that social work is a critical service to address social risks within the health care system, more work is needed to understand barriers to utilization.

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Table 1. Demographic, clinical, and social risk characteristics of study cohort.

Characteristic	**n (%)**
Survey respondents in study cohort	4,680 (100)
Demographic and clinical characteristics	
Age	70.3 (11.5)[a]
Male gender	4,386 (93.7)
Married	2418 (51.7)
Race[b]	
White non-Hispanic	3,361 (71.8)
Black non-Hispanic	741 (15.8)
Hispanic	203 (4.3)
Other	103 (2.2)
Rural	1,731 (37.0)
Number of chronic conditions	6.6 (2.7)[a]
≥ 1 mental health condition	1,887 (40.3)
≥ 1 functional limitation	2,990 (63.9)
Care mostly at VA	3,810 (81.4)
VA Priority Group	
Priority 7-8	529 (11.3)
Priority 5 (low income)	1,227 (26.2)
Priority 1-4 (high disability)	2,217 (47.4)
Priority 2-3-6 (low/moderate disability)	707 (15.1)
Housing instability	253 (5.4)
Survey-based social risks	
Social resources	
Low social support	2,500 (53.4)
No family/friend help w/health care	1,161 (24.8)
Material resources	
Unemployed	102 (2.2)
Financial strain	1,884 (40.3)
Food insecure	960 (20.5)
Medication insecure	568 (12.1)
Transportation problem	867 (18.5)
Personal resources	
Low medical literacy	495 (10.6)
Less than high school graduate	436 (9.3)
≥ 1 survey-based social risk	3,721 (79.5)

[a]Mean (SD)

[b]Percentages do not add to 100 due to missing values.

Table 2. Primary care encounters during the two years after survey completion by social risk.

Social risk	Primary care provider encounters, mean (SD)[a]	PACT encounters, mean (SD)[b]	≥ 1 social work encounters, n (%)[c]
Social resources			
Lower social support	4.7 (3.1)	12.2 (12.0)	456 (18.2)
Higher low social support	4.8 (3.4)	12.9 (14.4)	297 (15.8)
No family/friend help w/health care	4.7 (3.0)	11.9 (11.8)	195 (16.8)
Family/friend help w/health care	4.8 (3.3)	12.9 (14.2)	595 (17.7)
Material resources			
Unemployed[d]	3.7 (2.4)	9.9 (9.3)	21 (20.6)
Not unemployed[d]	4.7 (3.3)	12.7 (13.7)	783 (17.4)
Financial strain	4.7 (3.3)	12.8 (13.4)	367 (19.5)
No financial strain	4.7 (3.2)	12.5 (13.9)	423 (15.8)
Food insecure	4.6 (3.0)	11.8 (10.8)	189 (19.7)
Not food insecure	4.8 (3.3)	12.8 (14.3)	572 (16.6)
Medication insecure	4.5 (2.8)	11.5 (10.8)	105 (18.5)
Not medication insecure	4.8 (3.3)	12.8 (14.0)	686 (17.3)
Transportation problem	4.7 (3.2)	13.3 (15.1)	200 (23.1)
No Transportation problem	4.7 (3.3)	12.5 (13.3)	578 (15.9)
Personal resources			
Low medical literacy	4.9 (4.1)	15.6 (19.9)	147 (29.7)
Higher medical literacy	4.7 (3.1)	12.3 (12.7)	664 (16.1)
Less than high school graduate	5.0 (3.9)	14.1 (17.3)	91 (20.9)
High school graduate or more	4.7 (3.2)	12.5 (13.2)	721 (17.2)
≥ 1 social risk	4.7 (3.3)	12.7 (13.8)	686 (18.4)
No social risks	4.7 (3.1)	12.5 (13.0)	138 (14.4)
Total study cohort	4.7 (3.3)	12.6 (13.6)	824 (17.6)

[a]Includes face-to-face encounters only.
[b]PACT = patient-aligned care team. Includes encounters with any clinical member of the interprofessional primary care team (primary care provider, nurse, clinical pharmacist, and social worker) and any modality (face-to-face, telephone, and video).
[c]Includes face-to-face, telephone, and video encounters.
[d]Unemployed defined as those looking for work or laid off. Not unemployed Includes those who are unemployed but not looking for work, employed full- or part-time, retired, disabled, and student.

Table 3. Association between social risks and number of primary care encounters in the 2 years following survey completion.

	Primary care provider encounters[a]				PACT encounters[b]				≥ 1 social work encounter[c]			
	Partially adjusted[d,f,g]		Fully adjusted[d,f,h]		Partially adjusted[d,f,g]		Fully adjusted[d,f,h]		Partially adjusted[e,f,g]		Fully adjusted[e,f,h]	
	Incident rate ratio (95% CI)	p-value[i]	Incident rate ratio (95% CI)	p-value[i]	Incident rate ratio (95% CI)	p-value[i]	Incident rate ratio (95% CI)	p-value[i]	Odds ratio (95% CI)	p-value[i]	Odds ratio (95% CI)	p-value[i]
Social resources[j]												
Low social support	1.01 (0.96, 1.06)	0.72	1.02 (0.97, 1.07)	0.43	0.98 (0.92, 1.05)	0.64	1.00 (0.93, 1.07)	0.99	1.23 (1.02, 1.50)	**0.03**	1.31 (1.06, 1.63)	**0.01**
No family/friend help w/health care	0.99 (0.94, 1.05)	0.76	0.98 (0.93, 1.04)	0.53	0.98 (0.91, 1.06)	0.62	0.98 (0.90, 1.06)	0.54	1.06 (0.86, 1.32)	0.59	0.96 (0.75, 1.22)	0.72
Material resources												
Unemployed	0.78 (0.67, 0.90)	**< 0.005**	0.77 (0.65, 0.91)	**< 0.005**	0.80 (0.65, 0.98)	**0.03**	0.75 (0.60, 0.95)	**0.02**	1.43 (0.77, 2.66)	0.25	1.35 (0.66, 2.76)	0.41
Financial strain	1.02 (0.98, 1.07)	0.32	1.04 (0.98, 1.10)	0.19	1.05 (0.99, 1.13)	0.12	1.06 (0.98, 1.14)	0.14	1.36 (1.13, 1.63)	**< 0.005**	1.13 (0.90, 1.42)	0.28
Food insecurity	1.00 (0.94, 1.06)	0.94	1.00 (0.93, 1.08)	1.00	0.99 (0.91, 1.08)	0.88	0.98 (0.88, 1.08)	0.66	1.45 (1.16, 1.81)	**< 0.005**	1.25 (0.94, 1.68)	0.13
Medication insecurity	0.97 (0.90, 1.04)	0.38	0.97 (0.90, 1.05)	0.49	0.93 (0.85, 1.02)	0.11	0.94 (0.85, 1.04)	0.25	1.10 (0.83, 1.45)	0.51	0.89 (0.64, 1.24)	0.51
Transportation problem	1.00 (0.94, 1.06)	0.94	1.01 (0.94, 1.08)	0.83	1.06 (0.98, 1.15)	0.16	1.06 (0.97, 1.17)	0.21	1.61 (1.31, 1.99)	**< 0.005**	1.42 (1.10, 1.83)	**0.01**
Personal resources												
Low medical literacy	1.07 (0.98, 1.16)	0.12	1.05 (0.96, 1.14)	0.31	1.18 (1.06, 1.32)	**< 0.005**	1.18 (1.05, 1.33)	**< 0.005**	1.82 (1.41, 2.37)	**< 0.005**	1.95 (1.45, 2.61)	**< 0.005**
Less than high school graduate	1.00 (0.93, 1.07)	0.97	0.97 (0.90, 1.05)	0.49	1.02 (0.92, 1.14)	0.66	1.00 (0.89, 1.13)	0.99	1.00 (0.76, 1.33)	0.97	0.85 (0.62, 1.17)	0.32
≥ 1 social risk	1.00 (0.95, 1.06)	0.88	--	--	1.00 (0.93, 1.08)	0.98	--	--	1.50 (1.18, 1.90)	**< 0.005**	--	--

[a]Includes face-to-face encounters only.

[b]PACT = patient-aligned care team. Includes encounters with any member of the interprofessional primary care team (primary care provider, nurse, clinical pharmacist, and social worker) and any modality (face-to-face, telephone, and video).

[c]Includes face-to-face, telephone, and video encounters.

[d]Negative binomial regression with offset = 2 years following survey completion.

[e]Logistic regression with additional adjustment for follow-up time.

[f]All models include composite weight that accounts for survey sampling and predictors of non-response.

[g]Adjusted for age, gender, rural residence, race/ethnicity, typical location of care (VA vs not), and presence of any functional limitation.

[h]Adjusted for all covariates in partially adjusted model as well as all social risks.

[i]Bolded p-values are statistically significant at 0.05 level.

[j]All social risks are dichotomous variables, with reference category being the absence of that social risk.