ORIGINAL RESEARCH

Factors Associated with Patient Engagement in a Health and Social Needs Case Management Program

Christine H. Lo, MPH, Margae J. Knox, PhD, MPH, Elizabeth A. Hernandez, MS, and Amanda L. Brewster, PhD

Introduction: **Many patients offered case management services to address their health and social needs choose not to engage. Factors that drive engagement remain unclear. We sought to understand patient characteristics associated with engagement in a social needs case management program and variability by case manager.**

Methods: **Between August 2017 and February 2021, 43,347 Medicaid beneficiaries with an elevated risk of hospital or emergency department use were offered case management in Contra Costa County, California. Results were analyzed in 2022 using descriptive statistics and multilevel logistic regression models to examine 1) associations between patient engagement and patient characteristics and 2) variation in engagement attributable to case managers. Engagement was defined as responding to case manager outreach and documentation of at least 1 topic to mutually address. A sensitivity analysis was performed by stratifying the pre-COVID-19 and COVID-19 cohorts.**

Results: **A total of 16,811 (39%) of eligible patients engaged. Adjusted analyses indicate associations between higher patient engagement and female gender, age 40 and over, Black/African American race, Hispanic/Latino ethnicity, history of homelessness, and a medical history of certain chronic conditions and depressive disorder. The intraclass correlation coefficient indicates that 6% of the variation in engagement was explained at the case manager level.**

Conclusions: **Medicaid patients with a history of housing instability and specific medical conditions were more likely to enroll in case management services, consistent with prior evidence that patients with greater need are more receptive to assistance. Case managers accounted for a small percentage of variation in patient engagement. (J Am Board Fam Med 2024;37:418–426.)**

Keywords: **California, Case Management, Logistic Regression, Medicaid, Patient Engagement, Population Health, Risk Factors, Social Determinants of Health**

Introduction

In recent years, health plans have increasingly directed their efforts toward addressing social determinants of health (SDOH). There is growing recognition that addressing patients' social needs may improve health.[1] Medicaid agencies and Medicaid Managed Care Organizations (MMCOs) have pioneered many early efforts aimed at assisting patients with health-related social needs.[2] In a 2022 nationally representative survey of MMCOs, 90% of health plans offered programs to support patients experiencing homelessness or housing instability and 67% offered assistance to patients with substance use disorders.[3] 85% of health plans screened patients for SDOH.[3] As of August 2023, the Centers for Medicare and Medicaid Services (CMS) approved Section 1115 waivers for 19 states with SDOH-related provisions and an additional 12 states have pending SDOH requests.[4] Anticipated requirements in 2024, as outlined by

This article was externally peer reviewed.
Submitted 24 October 2023; revised 7 January 2024; accepted 17 January 2024.

From the University of California, Berkeley School of Public Health; Berkeley, CA (CHL, MJK, ALB); Contra Costa County Health Services Department, Martinez, CA (EAH).

Funding: Christine H. Lo and Margae J. Knox were supported by the Agency for Healthcare Research and Quality (AHRQ) Ruth L. Kirschstein National Research Service Award (T32HS022241). All work is the authors' own.
Conflict of interest: None.

Corresponding author: Christine H. Lo, MPH, 2121 Berkeley Way West, Berkeley, CA 94720 (E-mail: christine.lo@berkeley.edu).

CMS, indicate a heightened focus on addressing SDOH. This includes mandatory social needs screening requirements for health plans reporting to the Inpatient Quality Reporting (IQR) program.[5]

Despite the increasing attention on screening for SDOH, a significant proportion of patients who screen positive for social risks decline services for identified social needs. These services may encompass coaching, help with scheduling medical appointments, and referrals to community resources. Recent literature shows that patient interest in receiving assistance to address social needs varies widely, with patient interest rates as low as 3% and rarely exceeding 60%.[6–8] Patient-reported reasons for declining assistance include not perceiving the need for assistance, finding the offered help irrelevant to their needs, and facing competing priorities, previous negative experiences, stigma, and access challenges.[9–11]

Although valuable studies have begun to explore this topic, factors that drive the variability in engagement rates remain unclear. We examined whether patient characteristics and case manager variability were associated with patient engagement in Contra Costa County's Whole Person Care (WPC) pilot, one of the largest interdisciplinary health and social needs case management programs studied to date.[12–14] Factors previously found to be associated with patient activation include higher socio-economic status, White race, non-Hispanic/Latino ethnicity, and absence of depression and chronic conditions.[15–16] This was assessed through the Patient Activation Measure (PAM), which evaluates people's capacity and inclination to assume the responsibility of managing their health and health care use.[17] However, studies examining patients' interest in receiving social needs assistance reveal a different pattern, indicating that individuals with lower income, belonging to racial and ethnic minority groups, and having at least 1 chronic condition are more inclined.[18–20] We hypothesize that our findings will closely align with observations from other social needs assistance studies, given the similarity in populations and the type of services offered.

Methods

Study Population

Contra Costa County's WPC pilot, led by Contra Costa Health, was funded through the Section 1115 Medicaid waiver. It is one of the most extensive health and social needs case management initiatives studied to date,[12–14] characterized by broad population criteria and comprehensive coverage of various social needs. Between August 2017 and February 2021, Contra Costa County's WPC pilot offered 43,347 Medicaid beneficiaries case management services, with new enrollments occurring on a monthly basis. Patients were identified through a risk model that predicted a person's propensity for avoidable hospital and emergency department use. The model incorporated 91 variables including sociodemographics, medical history, and social risk indicators. Data were collected from health care, mental health, substance use, housing, and detention services. For more information about the risk model, see Brown et al and its supplemental appendix.[12] Patients who were predicted to have an elevated risk of hospital or emergency department use were stratified into 2 risk tiers and offered case management services. A patient's risk tier often determined the type of case manager assigned and mode of interaction, whether telephonic or in-person. All patients were at least 18 years of age, enrolled in Medicaid, and not already engaged in another case management program.

A total of 128 case managers, employed through Contra Costa County's WPC pilot, were tasked with reaching out to identified patients. Tier 1 patients, considered at higher risk, were offered in-person case management and were typically matched to specialized case managers (eg, nurses, social workers, and housing specialists), whereas tier 2 patients, considered at lower risk, were offered telephonic case management and were typically matched to community health workers. All newly enrolled patients received a program welcome letter with their case manager's name and contact information along with information about program services and benefits. Case managers then made two contact attempts in the first week of a patient's enrollment, using contact records available in the electronic health record including phone, e-mail, and the electronic health record portal. For tier 1 patients, case managers could contact other care team members to initiate a warm handoff, for example, after an upcoming medical appointment. Case managers made an additional outreach attempt each week during the second and third weeks of enrollment. If still unable to reach the patient, the case manager mailed a notice asking

the patient to contact the case manager within 30 days otherwise the patient would be disenrolled due to lack of engagement.

Case managers connected patients with services tailored to their needs, which included assistance with housing, food, transportation, and medical care coordination. Though case managers represented a diverse range of skill sets, including community health workers, registered nurses, substance abuse counselors, social workers, mental health care specialists, and housing stability specialists, each worked to holistically address patient needs. They were also encouraged to consult with their case manager colleagues across disciplines. After an initial assessment, patients could also be rematched with a case manager who could better address their specific needs. Case managers utilized Epic for recording and tracking activities, monitoring progress, and communicating with care teams. For additional details about the program design and patient goal topics, see Brown et al. and its supplemental appendix.[12]

Measures

Dependent Variable

Engagement was measured by the acceptance of case management services, whether through in-person or telephonic outreach. Upon expressing interest in the case management program, patients underwent an initial assessment of their needs conducted by case managers using motivational interviewing techniques. Together, patients with their case managers identified at least 1 topic to mutually address. Topics included dental, food, housing, health transportation, vision, utilities, insurance, behavioral health, employment, finances, legal, and education.[12] Most patients identified both health care and social needs topics as goals.[12] Subsequently, patients and case managers collaboratively created a patient-centered care plan, formalizing the patient's acceptance of services. The program duration was 12 months, and patients were eligible for enrollment multiple times if they failed to engage previously or met eligibility criteria again. For the purpose of this study, we restricted the data to patients' first interaction with Contra Costa County's WPC pilot.

Independent Variables

Patient-level covariates included sociodemographic factors such as race, age, sex, and marital status, in addition to relevant medical history. The selection of variables was informed by prior studies indicating that these patient sociodemographic factors along with medical history could have an impact on patient activation.[15–16] Although housing status and behavioral health acuity are typically not variables included in existing models, they bear significance for this analysis, which examines a health and social needs case management program aimed at providing assistance to some of the most economically disadvantaged and medically vulnerable populations. Housing status is based on electronic health record documentation. Behavioral health acuity is an indication of the severity of a mental health disorder based on a standard, state-approved clinical tool, and patients with moderate-severe acuity are eligible for specific specialty mental health services.[21]

To create a nonredundant list of medical conditions, we eliminated highly correlated conditions with a tetrachoric correlation coefficient greater than 0.45. For instance, patients experiencing chronic obstructive pulmonary disease (COPD) were often found to also have respiratory failure. This process generated a final list of medical conditions that was concise yet represented key conditions while avoiding statistical collinearity. The remaining medical conditions analyzed are presented with other patient sociodemographics in Table 1.

To examine the degree to which case managers influenced engagement, patients were organized into clusters based on their initial case manager assignment. To enhance the reliability of this analysis, case managers overseeing fewer than 40 patients during the study period and their respective patients were excluded.[22] By implementing these criteria, we aimed to ensure a robust examination of the relationship between case managers and patient engagement rates.

Statistical Analysis

Descriptive statistics were used to describe the sociodemographic and clinical characteristics of the population. A 2-level random intercept hierarchical logit model with patients (level 1) clustered within case managers (level 2) was used to estimate the association of patient characteristics with engagement in the health and social needs case management program and the degree to which case manager variability was associated with patient engagement. Patient-level covariates were controlled for in the model; there

Table 1. Sociodemographic and Clinical Characteristics of the Study Population

Factors	Total (n = 43,347)		Engaged (n = 16,811, 39%)		Not Engaged (n = 26,536, 61%)	
Sociodemographics						
Gender						
Women	25,796	60%	10,707	64%	15,089	57%
Men	17,549	40%	6,104	36%	11,445	43%
Age, years (mean [SD])	43	16	45	16	41	16
Age, years						
Under 40	21,674	50%	7,266	43%	14,408	54%
40 to 59	14,145	33%	6,135	36%	8,010	30%
60+	7528	17%	3,410	20%	4,118	16%
Race/Ethnicity						
White	11,845	27%	4,198	25%	7,647	29%
Hispanic/Latino	13,896	32%	5,877	35%	8,019	30%
Asian/Pacific Islander	4,389	10%	1,627	10%	2,762	10%
Black/African American	9,288	21%	3,655	22%	5,633	21%
Other	3,929	9%	1,454	9%	2,475	9%
Language						
English	34,007	78%	12,410	74%	21,597	81%
Spanish	6,645	15%	3,335	20%	3,310	12%
Other/Unknown	2,695	6%	1,066	6%	1,629	6%
Marital Status						
Attached	10,212	24%	4,457	27%	5,755	22%
Previously Attached	6,743	16%	3,138	19%	3,605	14%
Single	24,813	57%	8,926	53%	15,887	60%
Unknown	1,579	4%	290	2%	1,289	5%
History of Homelessness	1,783	4%	792	5%	991	4%
Risk Tier						
1 - Higher	10,778	25%	3,955	24%	6,823	26%
2 - Lower	32,569	75%	12,856	76%	19,713	74%
Behavioral Acuity Level						
Stable	34,932	81%	13,066	78%	21,866	82%
Mild - Moderate	5,265	12%	2,427	14%	2,838	11%
Moderate - Severe	3,150	7%	1,318	8%	1,832	7%
Medical History						
AOD Dependence	8,666	20%	3,198	19%	5,468	20%
Cancer	1,974	4%	921	5%	1,053	4%
Chronic Pain	12,975	29%	5,991	35%	6,984	26%
COPD	2,754	6%	1,197	7%	1,557	6%
Depressive Disorder	12,387	28%	5,467	32%	6,920	26%
Developmental Disorder	3,576	8%	1,417	8%	2,159	8%
Diabetes	7,481	17%	3,431	20%	4,050	15%
Disability	6,749	15%	2,906	17%	3,843	14%
Liver Failure	1,948	4%	868	5%	1,080	4%

Abbreviations: AOD, alcohol and other drugs; COPD, chronic obstructive pulmonary disease; SD, standard deviation.

were no additional case manager-level covariates. All analyses were done using Stata, version 17.

Considering the study period spans COVID-19 and the potential significance of COVID-19 in influencing patient engagement, we investigated the impact of the pandemic on patient engagement by conducting a sensitivity analysis using data from enrollments in February 2020, the onset of the pandemic, through February 2021, 13 months post-onset.

Research procedures were approved by the Contra Costa Regional Medical Center and Health Centers Institutional Review Committee. Data are not publicly available to protect potentially sensitive information. For data inquiries, please contact the corresponding author.

Results

A total of 39% of patients engaged with a case manager. Table 1 displays the sociodemographic and clinical attributes of the study population. Majority of the patients were female (60%), English speaking (78%), and in the lower risk tier (75%). The average patient age was 43 (S.D. 16). The most prevalent medical conditions in this population were chronic pain (29%), depressive disorder (28%), and alcohol and other drug (AOD) dependence (20%).

In adjusted analyses, patient characteristics that were associated with higher levels of patient engagement included female gender (adjusted

Table 2. Association Between Patient Characteristics and Engagement

Variable	Est. Odds Ratio	95% CI
Sociodemographics		
Gender (reference group, Man)		
Woman	**1.24****	1.19 - 1.29
Age, years (reference group, 18 to 39)		
40 to 59	**1.29****	1.22 - 1.36
60+	**1.26****	1.18 - 1.36
Race (reference group, White)		
Asian/Pacific Islander	**1.09***	1.00 - 1.18
Black/African American	**1.38****	1.30 - 1.46
Hispanic/Latino	**1.24****	1.16 - 1.32
Other	**1.16****	1.07 - 1.26
Language (reference group, English)		
Spanish	**1.47****	1.37 - 1.58
Other	1.06	0.96 - 1.16
Marital Status (reference group, Attached)		
Previously Attached	1.04	0.97 - 1.11
Single	**0.85****	0.81 - 0.90
Unknown	**0.39****	0.34 - 0.45
History of Homelessness	**1.17****	1.05 - 1.30
Risk Tier (reference group, 1 - Higher Risk)		
2 - Lower Risk	**1.15****	1.06 - 1.25
Behavioral Acuity Level (reference group, Stable)		
Mild - Moderate	**1.40****	1.31 - 1.50
Moderate - Severe	**1.21****	1.11 - 1.32
Medical History		
AOD Dependence	0.94	0.89 - 1.00
Cancer	**1.18****	1.07 - 1.30
Chronic Pain	**1.32****	1.26 - 1.38
COPD	1.06	0.97 - 1.15
Depressive Disorder	**1.18****	1.13 - 1.24
Developmental Disorder	1.04	0.97 - 1.12
Diabetes	**1.16****	1.09 - 1.23
Disability	**1.15****	1.08 - 1.22
Liver Failure	**1.13***	1.02 - 1.25
Random intercept	0.28	0.24 - 0.33
Variance of random intercept	0.22	0.17 - 0.29
Intra-class correlation coefficient	0.06	

Boldface indicates statistical significance (*$P < .05$, **$P < .01$).
Abbreviations: AOD, alcohol and other drugs; COPD, chronic obstructive pulmonary disease; CI, confidence interval.

odds ratio [aOR]: 1.24, 95% confidence interval [CI]: 1.19 to 1.29), age 40 and more than (aOR: 1.29, CI: 1.22 to 1.36 for ages 40 to 59 and aOR: 1.26, CI: 1.18 to 1.36 for ages 60+) compared with ages 18 to 39, Black/African American (aOR: 1.38, CI: 1.30 to 1.46) race compared with White, Hispanic/Latino (aOR: 1.24, CI: 1.16 to 1.32) ethnicity compared with White, Spanish as a primary language (aOR: 1.47, CI: 1.37 to 1.58) compared with English, history of homelessness (aOR: 1.15, CI: 1.05 to 1.30), mild to moderate behavioral health acuity level (aOR: 1.4, CI: 1.31 to 1.50) compared with stable, and a medical history for conditions such as chronic pain (aOR: 1.32, CI: 1.26 to 1.38), depressive disorder (aOR: 1.18, CI: 1.13 to 1.24), cancer (aOR: 1.18, CI: 1.07 to 1.30), and diabetes (aOR: 1.15, CI: 1.09 to 1.23) [Table 2].

The intraclass correlation coefficient, at 0.064, indicates minimal clustering at the case manager level. 128 case managers were employed in this case management program. Telephonic community health workers, which represented the largest discipline of case managers (41 out of 128) and carried larger panels of lowerrisk (tier 2) patients, conducted outreach to the majority of the patients (66%). Other disciplines included registered nurses (31 out of 128), social workers (16 out of 128), substance abuse counselors (13 out of 128), mental health specialists (12 out of 128), in-person community health workers (10 out of 128), and housing stability specialists (5 out of 128) [Table 3]. Engagement rates for case managers ranged between 14 to 67%.

The COVID-19 cohort (enrolled February 2020 through February 2021) exhibited similarities to the prepandemic cohort, although there was a notable decrease in patient engagement from the lower risk tier compared with the higher risk tier (Appendix Table A1). This trend is likely attributable to program modifications due to challenges and needs during COVID-19 such as suspended in-person outreach during shelter-in-place periods and temporary reassignment of some staff to contact tracing and other prevention efforts. Although eligibility remained unchanged during the COVID-19 cohort and more than 90% of enrollees still received at least 1 outreach call during that period,[14] engagement may have been impacted by reduced case manager continuity and lower capacity to follow up with nonengaging patients.

Table 3. Case Manager Characteristics

Case Manager Type	Count	Patients Assigned	Percent of Total Patients
Community Health Worker, Telephonic	41	28,620	66%
Registered Nurse	31	5,093	12%
Social Worker	16	2,818	7%
Substance Abuse Counselor	13	1,975	5%
Mental Health Care Specialist	12	1,645	4%
Community Health Worker, In-Person	10	2,080	5%
Housing Stability Specialist	5	1,116	3%

Discussion

This study aimed to identify factors that predicted increased engagement in a health and social needs case management program. Despite facing substantial health challenges and potential access barriers, we observed that patients with higher levels of medical need and within underserved communities were more receptive to assistance. These findings are consistent with existing research that examined patients' interest in receiving social needs assistance.[18–20] However, they contrast with patient activation literature, which often suggests that people with chronic conditions or depression is associated with lower activation, particularly for racial and ethnic minority groups.[15–16] Results from a 2017 systematic review, examining literature using the PAM, underscore the limited research on patient activation among racially and ethnically diverse, low socioeconomic status, and multimorbid patients in the US.[23] This may contribute to the disparate results observed in our study.

In this study, 39% of patients in this case management program engaged. Few studies have examined engagement rates when patients are offered health and social needs case management without self-selection or screening tools. Such evidence is important because offering case management assistance before assessing for social risks might lead to increased interest.[19] Further, screening tools, which are often not validated, might not fully capture a patient's desire for social needs assistance.[24–26]

Little variation in engagement was attributable to case managers in this program. Case manager variability accounted for only 6% of the variation in

engagement observed in the study. It is essential to acknowledge that Contra Costa County's WPC pilot employed their case managers and provided consistent and standardized training for all case managers. Different staffing models in other case management programs could yield different results. For instance, programs contracting with multiple community-based organizations, each with distinct training protocols, may contribute to greater variation. As a result, the 6% observed in this study might not be representative of all case management programs. Further research should explore various case management models to gain a better understanding of the extent to which standard protocols may decrease engagement variation across case management staff and how variation across staff relates to overall engagement.

Limitations

One limitation in this study is the definition of engagement, which is when patients signify acceptance of services by completing an initial assessment and developing a care plan with a case manager. Existing literature indicates that only a subset of patients who initially agree to social needs assistance actually follow through with referrals, making this measure inadequate for measuring the extent of social needs case management services utilized.[24,27–29] However, it is important to note that the process of accepting this case management service involved more engagement compared with some of the studies mentioned – that is, engagement required patients to actively participate in developing a thoughtful care plan in collaboration with their case manager. Further research aimed at understanding the factors that influence patients to follow through with recommended services would provide valuable insights for improving program implementation.

Given the program's method of assigning case managers to patients and conducting outreach, discerning engagement variability by case manager type was challenging due to potential confounding factors. As a result, our study does not provide insights into the variability of engagement based on case manager types.

The characteristics of this study population may differ from those of other case management programs. Contra Costa County's WPC pilot offered services to more than 40,000 patients, roughly 25% of Medicaid beneficiaries in Contra Costa County, which suggests that their eligibility criteria may be less stringent compared with other programs that target top percentages of high utilizers. Thus the findings from this study may not be generalizable across all case management programs. Engagement rates should be interpreted with consideration of the population's specific attributes. Low engagement is not always an indication of poor program implementation or outreach.

Conclusions

Engagement rates in health and social needs case management programs reflect the medical and social burden of the population, a factor that is influenced by the selection process for the program. Patients with higher levels of need are more likely to engage when presented with the opportunity. Case manager variability had minimal impact on engagement rates in this study, suggesting that variation in engagement is predominantly driven by patient and other unmeasured factors.

The authors are grateful to the Contra Costa County Health Services Department and the practice team, especially the case managers, and patients who made this work possible.

To see this article online, please go to: http://jabfm.org/content/37/3/418.full.

References

1. National Academies of Sciences, Engineering, and Medicine. Integrating social care into the delivery of health care: moving upstream to improve the nation's health. Washington, DC: The National Academies Press. Available at: https://doi.org/10.17226/25467. Published 2019. Accessed October 6, 2023.
2. Beyond Health Care: The role of social determinants in promoting health and health equity. Kaiser Family Foundation website. Available at: https://www.kff.org/racial-equity-and-health-policy/issue-brief/beyond-health-care-the-role-of-social-determinants-in-promoting-health-and-health-equity/. Published May 10, 2018. Accessed December 24, 2023.
3. Institute for Medicaid Innovation. 2022 Annual Medicaid MCO survey fact sheets. Available at: https://medicaidinnovation.org/wp-content/uploads/2023/03/IMI-2022-Annual_Medicaid_MCO_Survey-All_Fact_Sheets.pdf. Published 2023. Accessed July 28, 2023.
4. Medicaid Waiver Tracker: Approved and pending section 1115 Waivers by State. Kaiser Family Foundation website. Available at: https://www.kff.org/medicaid/issue-brief/medicaid-waiver-tracker-approved-and-pending-section-1115-waivers-by-state/#

Table3. Updated September 26, 2023. Accessed September 28, 2023.
5. Fact Sheet FY 2024 Hospital Inpatient Prospective Payment System (IPPS) and Long-Term Care Hospital Prospective Payment System (LTCH PPS) final rule—CMS-1785 and CMS-1788-F Fact Sheet. CMS.gov Centers for Medicare & Medicaid Services. Available at: https://www.cms.gov/newsroom/fact-sheets/fy-2024-hospital-inpatient-prospective-payment-system-ipps-and-long-term-care-hospital-prospective-0. Published August 1, 2023. Accessed December 24, 2023.
6. Fichtenberg CM, De Marchis EH, Gottlieb LM. Understanding patients' interest in healthcare-based social assistance programs. Am J Prev Med 2022;63:S109–S115.
7. Martel M, Klein L, Hager K, Cutts D. Emergency department experience with novel electronic medical record order for referral to food resources. WestJEM 2018;19:232–7.
8. Tong ST, Liaw WR, Kashiri PL, et al. Clinician experiences with screening for social needs in primary care. J Am Board Fam Med Med 2018;31:351–63.
9. Cohen AJ, Isaacson N, Torby M, Smith A, Zhang G, et al. Motivators, barriers, and preferences to engagement with offered social care assistance among people with diabetes: a mixed methods study. Am J Prev Med 2022;63:S152–S163.
10. Pfeiffer EJ, De Paula CL, Flores WO, et al. Barriers to patients' acceptance of social care interventions in clinic settings. Am J Prev Med 2022;63:S116–S121.
11. Sandhu S, Lian T, Smeltz L, et al. Patient barriers to accessing referred resources for unmet social needs. J Am Board Fam Med 2022;35:793–802.
12. Brown DM, Hernandez EA, Levin S, et al. Effect of social needs case management on hospital use among adult Medicaid beneficiaries: a randomized study. Ann Intern Med 2022;175:1109–17.
13. Fleming MD, Guo C, Knox M, et al. Impact of social needs case management on use of medical and behavioral health services: secondary analysis of a randomized controlled trial. Ann Intern Med 2023;176:1139–41.
14. Knox M, Hernandez EA, Brown DM, et al. Greater COVID-19 vaccine uptake among enrollees offered health and social needs case management: results from a randomized trial. Health Serv Res 2023;1–13.
15. Hibbard JH, Cunningham PJ. How engaged are consumers in their health and health care, and why does it matter? Res Brief 2008;1–9.
16. Kirkland E, Schumann SO, Schreiner A, et al. Patient demographic and clinic type are associated with patient engagement within a remote monitoring program. Telemed J E Health 2021;27:843–50.
17. Hibbard JH, Stockard J, Mahoney ER, Tusler M. Development of the Patient Activation Measure (PAM): conceptualizing and measuring activation in patients and consumers. Health Serv Res 2004;39:1005–26.
18. Cullen D, Attridge M, Fein JA. Food for thought: a qualitative evaluation of caregiver preferences for food insecurity screening and resource referral. Acad Pediatr 2020;20.
19. De Marchis EH, Hessler D, Fichtenberg C, et al. Assessment of social risk factors and interest in receiving health care–based social assistance among adult patients and adult caregivers of pediatric patients. JAMA Netw Open 2020;3:e2021201.
20. Gruß I, Varga A, Brooks N, Gold R, Banegas MP. Patient interest in receiving assistance with self-reported social risks. J Am Board Fam Med 2021;34:914–24.
21. Medi-Cal Managed Care Health Plan Responsibilities for Outpatient Mental Health Services. State of California Department of Health Care Services website. Available at: https://www.dhcs.ca.gov/formsandpubs/Documents/MMCDAPLsandPolicyLetters/APL2017/APL17-018.pdf. Published October 27, 2017. Accessed January 5, 2023.
22. Fung V, Schmittdiel JA, Fireman B, et al. Meaningful variation in performance: a systematic literature review. Med Care 2010;48:140–8.
23. Napoles TM, Burke NJ, Shim JK, et al. Assessing patient activation among high-need, high-cost patients in urban safety net care settings. J Urban Health 2017;94:803–13.
24. De Marchis EH, Alderwick H, Gottlieb LM. Do patients want help addressing social risks? J Am Board Fam Med 2020;33:170–5.
25. Henrikson NB, Blasi PR, Dorsey CN, et al. Psychometric and pragmatic properties of social risk screening tools: a systematic review. Am J Prev Med 2019;57:S13–S24.
26. Sokol RL, Mehdipanah R, Bess K, et al. When families do not request help: assessing a social determinants of health screening tool in practice. J Pediatr Health Care 2021;35:471–8.
27. Bottino CJ, Rhodes ET, Kreatsoulas C, et al. Food insecurity screening in pediatric primary care: can offering referrals help identify families in need? Acad Pediatr 2017;17:497–503.
28. Garg A, Sarkar S, Marino M, et al. Linking urban families to community resources in the context of pediatric primary care. Patient Educ Couns 2010;79:251–4.
29. Schickedanz A, Sharp A, Hu YR, et al. Impact of social needs navigation on utilization among high utilizers in a large integrated health system: a quasi-experimental study. J Gen Intern Med 2019;34:2382–9.

Appendix

Table A1. Association Between Patient Characteristics and Engagement Before and During COVID-19

	Before COVID-19		COVID-19	
	n = 31,441		n = 11,904	
Variable	Est. Odds Ratio	95% CI	Est. Odds Ratio	95% CI
Sociodemographics				
Gender (reference group, Man)				
Woman	**1.21****	1.15 - 1.27	**1.25****	1.15 - 1.36
Age, years (reference group, 18 to 39)				
40 to 59	**1.28****	1.21 - 1.36	**1.28****	1.16 - 1.41
60+	**1.28****	1.18 - 1.39	**1.18***	1.03 - 1.35
Race (reference group, White)				
Asian/Pacific Islander	**1.12***	1.02 - 1.24	0.94	0.81 - 1.09
Black/African American	**1.38****	1.29 - 1.47	**1.23***	1.08 - 1.39
Hispanic/Latino	**1.26****	1.17 - 1.35	1.12	0.99 - 1.26
Other	**1.20****	1.1 - 1.32	1.03	0.88 - 1.20
Language (reference group, English)				
Spanish	**1.54****	1.42 - 1.67	**1.57****	1.38 - 1.78
Other	1.04	0.92 - 1.16	1.11	0.93 - 1.33
Marital Status (reference group, Attached)				
Previously Attached	1.04	0.96 - 1.12	1.03	0.90 - 1.19
Single	**0.86****	0.81 - 0.92	**0.90****	0.81 - 1.00
Unknown	**0.37****	0.31 - 0.44	**0.46****	0.37 - 0.59
History of Homelessness	**1.29****	1.15 - 1.44	**1.48****	1.18 - 1.87
Risk Tier (reference group, 1 - higher risk)				
2, lower risk	**1.48****	1.40 - 1.57	**0.74****	0.67 - 0.81
Behavioral Acuity Level (reference group, Stable)				
Mild - Moderate	**1.40****	1.29 - 1.51	**1.38****	1.22 - 1.55
Moderate - Severe	**1.20****	1.10 - 1.32	**1.27****	1.07 - 1.50
Medical History				
AOD Dependence	1.01	0.95 - 1.08	**0.8****	0.70 - 0.90
Cancer	**1.20****	1.07 - 1.33	1.08	0.89 - 1.31
Chronic Pain	**1.32****	1.25 - 1.39	**1.29****	1.18 - 1.41
COPD	1.04	0.95 - 1.15	1.04	0.84 - 1.27
Depressive Disorder	**1.19****	1.13 - 1.26	**1.12***	1.02 - 1.24
Developmental Disorder	1.06	0.98 - 1.16	0.99	0.86- 1.14
Diabetes	**1.12****	1.05 - 1.19	**1.21****	1.08 - 1.36
Disability	**1.14****	1.07 - 1.22	1.07	0.94 - 1.22
Liver Failure	**1.17****	1.05 - 1.30	1.07	0.85 - 1.34

Boldface indicates statistical significance (*$P < .05$, **$P < .01$).
Abbreviations: AOD, alcohol and other drugs; COPD, chronic obstructive pulmonary disease; CI, confidence interval.