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Establishing a Regional Health System and Community-Based Organization Social Care Coordination Network: An Application of Geospatial Analysis

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Abstract

INTRODUCTION: Adverse social determinants of health have been shown to be associated with a greater chance of developing chronic conditions. Although there has been increased focus on screening for health-related social needs (HRSNs) in health care delivery systems, it is seldom examined if the provision of needed services to address HRSNs is sufficiently available in communities where patients reside.

METHODS: The authors used geospatial analysis to determine how well a newly formed health system and community-based organizations (CBOs) social care coordination network covered the areas in which a high number of patients experiencing HRSNs live. Geospatial clusters (hotspots) were constructed for Kaiser Permanente Northwest members experiencing any of the following 4 HRSNs: transportation needs, housing instability, food insecurity, or financial strain. Next, a geospatial polygon was calculated indicating whether a member could reach a social care provider within 30 minutes of travel time.

RESULTS: A total of 185,535 Kaiser Permanente Northwest members completed a HRSN screener between April 2022 and April 2023. Overall, the authors found that among Kaiser Permanente Northwest members experiencing any of the 4 HRSNs, 97% to 98% of them were within 30 minutes of a social care provider. A small percentage of members who lived greater than 30 minutes to a social care provider were primarily located in rural areas.

DISCUSSION AND CONCLUSION: This study demonstrates the importance of health system and community-based organization partnerships and investment in community resources to develop social care coordination networks, as well as how patient-level HRSN can be used to assess the coverage and representativeness of the network.

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Introduction

Social determinants of health, the conditions in which people are born, grow, work, live, and age,[1] account for 50% to 60% of health outcomes.[2] More specifically, adverse social determinants of health at the community and individual level (eg, deprived neighborhoods, housing instability, food insecurity) have been shown to be highly associated with an increased chance for chronic diseases such as diabetes, cardiovascular disease, and cancer, as well as increased health care utilization and costs.[2–5] Over the last decade, there have been increasing efforts in the US health care sector to identify and address adverse social determinants of health, particularly at the patient level, often referred to as health-related social needs (HRSNs).[6] The Centers for Medicare & Medicaid Services' Accountable Health Communities (AHC) demonstration project established the feasibility of implementing social needs screening and navigation services for over 1 million Medicare and Medicaid beneficiaries across the US.[7] The AHC model was associated with a large reduction in emergency department visits[8]; however, almost two-thirds of beneficiaries did not have any HRSN addressed, even after receiving navigation support.[7,9] Consequently, a major lesson learned from the AHC model demonstration project is the importance of alignment within health system and community-based partnerships; that is, investing and establishing coordinated social care resources to better meet patients' HRSNs.[6]

In 2019, Kaiser Permanente, in partnership with Unite Us, launched Thrive Local, a community-wide network that integrates clinical and social care via a technology platform.[10] Thrive Local consists of 3 key components: 1) a resource directory of social care resources within the health system's service area that is updated on a regular basis; 2) a referral platform that enables users to coordinate comprehensive medical and nonmedical/social care services via electronic referrals; and 3) a Community Network of community-based organizations (CBOs) and social care providers that agree to accept referrals and assist patients with identified HRSNs. Although Thrive Local has been launched in each of the 8 Kaiser Permanente regions, this paper focuses on the Thrive Local network in the Kaiser Permanente Northwest region. Efforts to build the Thrive Local network in the Northwest (also known as Connect Oregon) was primarily led by the Kaiser Permanente Northwest Community Health team, who oversees investments in the total health of the entire Northwest service region, and also fosters community partnerships and collaborations. More specifically, the Kaiser Permanente Northwest Community Health team utilized a community-based participatory approach via convenings, training sessions, focus groups, and grants to engage CBOs across Oregon and southwest Washington in the development and refinement of the Thrive Local network, as well as establishing care coordination workflows. Kaiser Permanente Northwest Thrive Local was designed to facilitate bi-directional, close-looped referrals between Kaiser Permanente Northwest and CBOs/social care providers, as well as between CBOs/social care providers. There was particular effort to make sure organizations that assisted patients with food, housing, transportation, and financial hardships were included in developing the platform and, eventually, joining the Community Network.

An integral part of meeting patients where they are and providing comprehensive, holistic care is having a network of practitioners and providers (medical and social) readily accessible and available to provide resource support. If medical and social care are not available in the community in which the patient resides, HRSNs and medical needs can go unaddressed, which may further exacerbate health inequities. From the launch in 2020, it was not clear the extent to which CBOs and social care providers were available in the areas in which there is the greatest HRSNs among Kaiser Permanente Northwest members (ie, patients). The purpose of this observational study was to use geospatial analysis to examine how well the Kaiser Permanente Northwest Thrive Local Community Network, to date, covers the areas of Oregon and southwest Washington in which a high number of Kaiser Permanente Northwest members are experiencing HRSNs and/or who are living in deprived neighborhoods.

Materials and Methods

Kaiser Permanente Northwest provides health care services to over 620,000 enrolled members living in Oregon and southwest Washington. Using the Kaiser Permanente Northwest electronic health record, data on Kaiser Permanente Northwest members who completed a 4-item HRSN screener between April 2022 to April 2023 were extracted. Patients were screened for HRSNs during clinical encounters, as well as via self-screening using the electronic health record patient portal. In addition to HRSN screener responses, sociodemographic characteristics and home addresses were extracted and then geocoded

for each Kaiser Permanente Northwest member. The social vulnerability index (SVI) score was calculated for each member and included in the analysis.[11] We also obtained a list of CBOs that were part of the Kaiser Permanente Northwest Thrive Local Community Network who were actively accepting referrals to provide social care, along with their addresses. This work was approved by the Institutional Review Board of Kaiser Permanente Northwest (Portland, OR).

Geospatial Analysis

In order to identify geospatial clusters of statistically significant groupings of members experiencing needs, members were grouped together by need category ("transportation," "housing," "food," or "financial" need) and US Census tract. Once identified, these tracts allowed the authors to locate and map areas experiencing the most concentrated need, as well as measure and compare sociodemographics to the greater study area. The process of grouping members by tract involved creating a latitude/longitude coordinate pair from each member's home address; these coordinates were subsequently geospatially joined to US Census tract geospatial data, creating a tract identifier from which the members could be aggregated by.[12] Moran's I, a common measure of geospatial autocorrelation, was employed to determine statistically significant clusters of tracts with members experiencing a specific need (x).[13] Once these clusters (or, "hotspots") were determined for each need category, access was determined in a separate analysis by calculating a geospatial polygon indicating locations that could reach CBOs providing services for category x within 30 minutes with a vehicle along the street network ("service areas"). Members experiencing need x were then joined to these service areas to determine what percent of members in this cohort were being adequately served by the current CBOs.

Results

A total of 185,535 Kaiser Permanente Northwest members completed the HRSN screener between April 2022 and April 2023. Table 1 presents the sociodemographics of these members. The majority of Kaiser Permanente Northwest members that completed the HRSN screener were women (61%), non-Hispanic White (75%), had English as primary language (96%), had commercial insurance (56%), and had a mean age of 52 years.

Age, mean y (SD)	52 (18.44)
Female, n (%)	113,654 (61.26)
Race/Ethnicity, n (%)	
Asian or Asian American	8751 (4.72)
Black or African American	5088 (2.74)
Native Hawaiian or Pacific Islander	816 (0.44)
Hispanic/Latinx	13,285 (7.16)
Native American or Alaska Native	721 (0.39)
White, non-Hispanic	138,952 (74.89)
Multiple races	6461 (3.48)
Unknown	11,461 (6.18)
Primary language, n (%)	
Chinese	516 (0.28)
English	178,712 (96.32)
Russian	314 (0.17)
Spanish	2245 (1.21)
Vietnamese	484 (0.26)
Other	1224 (0.66)
Unknown	2040 (1.10)
Medical coverage type, n (%)	
Dual Medicare/Medicaid	1546 (0.83)
Medicaid	14,442 (7.78)
Medicare	52,923 (28.52)
Commercial	104,780 (56.47)
Other	127 (0.07)
Unknown	11,717 (6.32)

Table 1: Sociodemographics of Kaiser Permanente Northwest members who completed health-related social needs screener (N = 185,535)

Figure 1 displays the areas within the Kaiser Permanente Northwest coverage area where a high number of Kaiser Permanente Northwest members are experiencing HRSNs (ie, food insecurity, lack of transportation, housing instability, and financial hardship), also referred to as "hotspots." These hotspots are overlayed with the SVI with percentiles closer to 100 indicating greater social vulnerability in the area. The overall mean SVI for the Kaiser Permanente Northwest coverage area was 0.49 or 49th percentile nationwide. However, mean SVIs for HRSN hotspots ranged from 59th percentile (lack of transportation) to 74th percentile (food insecurity).

To date, there are 616 CBOs/social care providers on the Kaiser Permanente Northwest Thrive Local platform that are accepting community resource referrals. Some CBOs had programs that addressed multiple HRSN categories. There were 117 CBOs that addressed food insecurity, 109 that addressed housing

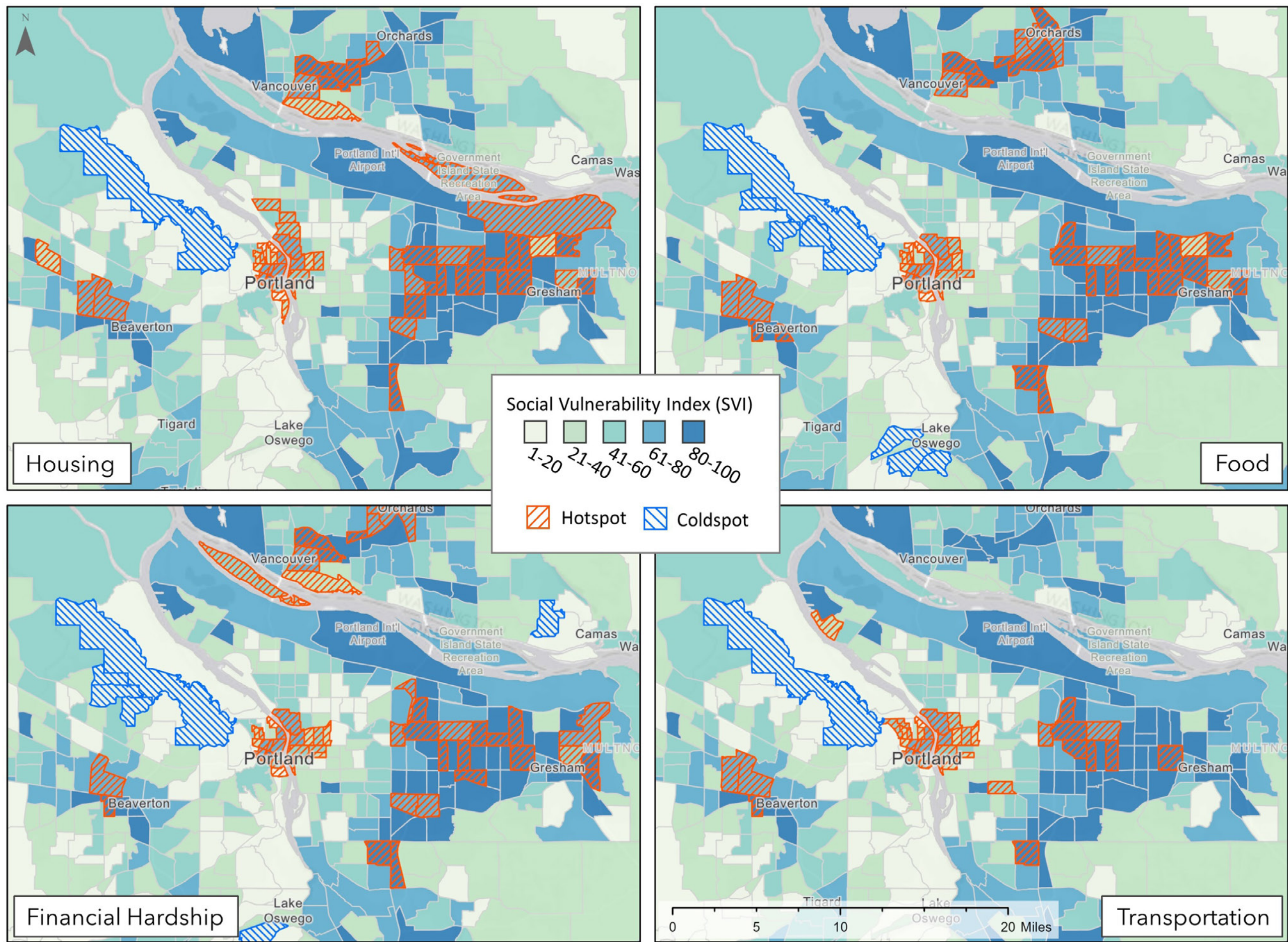

Figure 1: Geomapping of member-level health-related social needs overlayed with social vulnerability index. Source: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community. Used with permission.

instability, 93 that addressed transportation needs, and 43 that addressed financial hardships. Figure 2 displays the HRSN hotspots with an overlay of the CBOs that address that specific HRSN in that area. For Kaiser Permanente Northwest members experiencing housing instability, 98% (n = 13,175) were within 30 minutes of travel time to a CBO that provided housing assistance. Furthermore, 98% (n = 18,908) of Kaiser Permanente Northwest members experiencing food insecurity were within 30 minutes of travel time to a CBO that provided food assistance. Transportation (n = 7785 [98%]) and financial hardships (n = 26,294 [97%]) had similar results. It should be noted that there was a small percentage of Kaiser Permanente Northwest members who were experiencing a HRSN but lived greater than 30 minutes of travel time to a CBO/social care provider that could address that need (n = 1010 [3.3%] financial hardship; n = 232 [2.6%] transportation; n = 380 [2.4%] housing instability; and n = 450 [2%] food insecurity).

Discussion

In this study, the authors aimed to understand the extent to which a newly established regional social care coordination network in Oregon and southwest Washington covered areas in which there was the greatest prevalence of HRSNs among Kaiser Permanente Northwest members. Findings from the geospatial analysis indicated that the Kaiser Permanente Northwest Thrive Local Community Network provided good coverage for members experiencing HRSNs. Over 90% of members were within 30 minutes of a Community Network CBO/social care provider for each HRSN category (ie, food, transportation, housing, and financial). The small

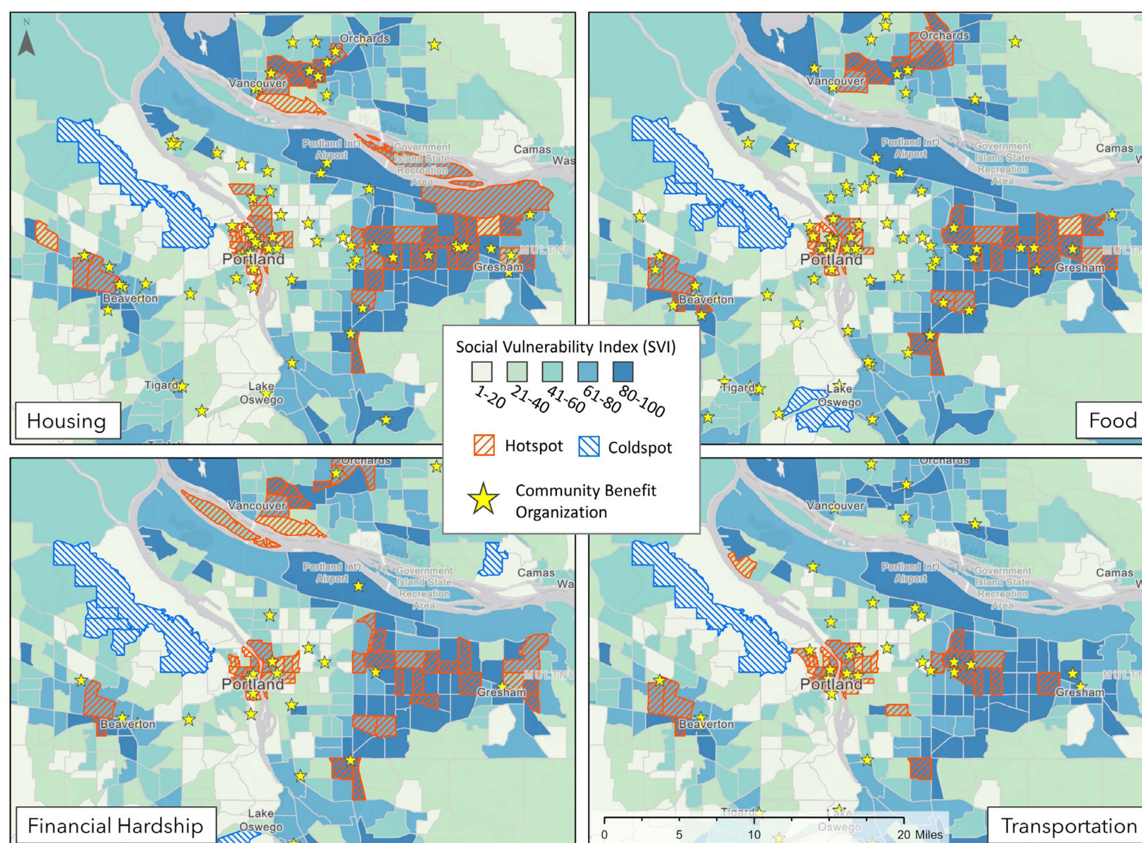

Figure 2: Geomapping of member-level health-related social needs overlayed with community resource referral network sites. Source: Esri, HERE, Garmin, © OpenStreetMap contributors, and the GIS user community. Used with permission.

percentage of members who lived greater than 30 minutes to a social care provider were primarily located in rural areas. Thus, it may be beneficial to use patient-level HRSN information to inform new CBO partnerships as the Community Network continues to expand in both urban and rural areas.

Members experiencing HRSNs tended to live in more socially vulnerable areas in Oregon and southwest Washington. But this overlap was not exact as there were some transportation and financial hardship hotspots that were in slightly less vulnerable areas. This finding is similar to a previous study that demonstrated that patient- and community-level social risks data are not equivalent and among a network of community health centers, the accuracy of community-level data to identify patients with HRSNs was only 48%.[14]

The Kaiser Permanente Northwest Thrive Local Community Network via the Unite Us platform is very similar to other community resource directories and referral platforms that have been established across the US (eg, 211 and Aunt Bertha).[15] Community resource referral directories and platforms are a valuable tool to health care systems in terms of identifying resources in the community and connecting patients to services.[15,16] Previous studies have evaluated community resource referral platforms and representativeness based on the SVI or neighborhood deprivation index.[17,18] This study adds to this literature by also utilizing patient-level HRSN data to determine the representativeness and coverage of a community resource referral platform.

Limitations

There are some limitations to this study. The authors used 30 minutes of travel time as a proxy to determine Community Network coverage of members experiencing HRSNs. Use of this approach does not acknowledge that a number of the CBOs/social care providers can be reached online or by phone. Therefore, accessibility to social care providers may be even greater throughout Oregon and southwest

Washington. Furthermore, the authors did not examine the capacity of CBOs/social care providers in the Community Network to meet patient-level HRSNs. However, only CBOs/social care providers that were currently accepting HRSN referrals from Kaiser Permanente Northwest were included in the geospatial analysis, which assumes they had capacity to meet patient HRSNs. Also, only one-third of Kaiser Permanente Northwest members completed the HRSN screener; however, based on demographics, Kaiser Permanente Northwest members with HRSN data are representative of the larger Kaiser Permanente Northwest member population. Lastly, the authors did not examine actual use of the platform as it was considered beyond the scope of this study. Future studies will examine utilization of the Kaiser Permanente Northwest Thrive Local Community Network platform, status of referrals including closure, and the effect on HRSN resolution and, subsequently, health outcomes.

Conclusion

The relationship between HRSNs and health care utilization and health outcomes have been well-established. As regulatory organizations (ie, The Centers for Medicare & Medicaid Services, The Joint Commission, National Committee for Quality Assurance) requires social risk screening and navigation to services, there is a need for tools such as community resource referral platforms to facilitate social care coordination and promote health equity. This study demonstrates the importance of health system and CBO partnerships and investment in community resources to develop social care coordination networks and referral platforms, as well as how patient-level HRSN data can be used to assess the coverage and representativeness of the network. As the Kaiser Permanente Northwest Thrive Local Community Network (also referred to as Connect Oregon https://orhealthleadershipcouncil.org/connect-oregon-cie/) continues to expand across the state of Oregon and southwest Washington, future studies will be needed to examine utilization, HRSN resolution, and health outcomes.

Data-Sharing Statement

Underlying data are not available.

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