Toward Addressing Social Determinants of Health: A Health Care System Strategy

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ABSTRACT

Objectives: In the US, there is growing recognition that social factors (eg, financial hardship, food insecurity, housing instability) influence individual and population health. This has led to increased efforts to address these social determinants of health (SDH) within the delivery system. Yet, limited information exists about the strategies health care systems employ to identify and address SDH. Kaiser Permanente Northwest (KPNW) is an integrated health care delivery system that has implemented a comprehensive approach toward addressing its patients' SDH. This article describes the tools and processes used at KPNW for identifying and addressing SDH.

Methods: Tools included use of electronic health record-based data elements, International Classification of Diseases, Tenth Revision social diagnostic codes (Z codes), and the development of novel workflows via nonclinical patient navigators to address patients' SDH through community resource referrals. Between March 31, 2016, and March 25, 2018, KPNW patient navigators screened patients with SDH.

Results: Patient navigators screened 11,273 patients with SDH, identifying and documenting 47,911 SDH in the electronic health record . During the same 2-year period, 18,284 community resource referrals were made for 7494 patients.

Conclusion: The novel electronic health record-based tools developed by KPNW have led to standardized, measurable, and actionable SDH data being used to tailor and target specific resources to meet the identified needs of our patients. By disseminating information about these efforts at KPNW, we aim to help build an evidence basis of different approaches for addressing SDH within the health care system as well as defining opportunities to improve care efficiency for patients with SDH.

INTRODUCTION

In the US, there is growing recognition that social, economic, and behavioral factors (eg, financial hardship, food insecurity, housing instability, transportation) influence individual and population health, and may account for 40% to 90% of health outcomes.[1-6] These social, economic, and behavioral factors, commonly known as *social determinants of health* (SDH), are defined as circumstances in which people are born, live, learn, work, play, worship, and age, as well as the health systems they utilize.[7] Evidence indicates that unmet SDH influence individuals' ability to attain their full health potential, leading them to consume more health care services or require more intensive health care than those without SDH.[8,9] National policies such as the Health Information Technology for Economic and Clinical Health (HITECH) Act[10] and the Patient Protection and Affordable Care Act (ACA),[11] in addition to new care delivery and payment models (eg, Accountable Care Organizations, the State Innovation Models Initiative), have placed increased emphasis on identifying patients' SDH and integrating these data into the electronic health record (EHR) as a critical first step toward addressing SDH within the health care system.[12-14] Consequently, US health care systems have increasingly implemented efforts to integrate SDH data into EHRs as part of addressing SDH to improve the quality of care and population health.[11,15-17]

Addressing SDH in a health system, however, is fundamentally different from treating medical problems. Although health care systems are well equipped to treat disease,[18] they often lack the necessary tools and strategies to identify, document, and track SDH in EHRs systematically. This task will require standardized, measurable, and actionable SDH data. Furthermore, health systems must develop strategic workflows and partnerships with referral agencies that have the resources and expertise to address identified SDH.[19] Successful integration of SDH data into EHRs may enable more effective care management and treatment strategies for patients, facilitate more effective population health approaches, and inform new treatments and interventions as pathways linking SDH to disease processes are discovered.[14,17] Despite the promise of this work, however, there is limited information about the strategies employed by health care systems to identify and address SDH.[15]

To address the existing knowledge gap, this article describes an approach to identifying and addressing SDH among patients in a health care system. Specifically, we provide a "map" outlining the documentation of SDH in the EHR (Kaiser Permanente [KP] HealthConnect using Epic, Epic Systems Corp, Verona, WI), using the International Classification of Diseases, Tenth Revision (ICD-10) Z codes. As noted by Gottlieb and colleagues,[17] the use of ICD-10 codes aligns with the US Department of Health and Human Services' 2015 mandate for ICD-10 EHR documentation. It provides the potential for coding and billing on SDH in a clinical setting. We also describe the tools and processes used for making and tracking referrals to community resources. By providing this overview of a real-world health care system experience, we hope

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to inform the development of effective and actionable strategies to identify and address SDH in clinical settings that will improve the health of patients and communities.

METHODS
Setting and Process for Identifying Social Determinants of Health

KP Northwest (KPNW) is an integrated health care delivery system, operating in 34 medical offices and 2 hospitals, and providing health care to more than 600,000 members in Oregon and Southwest Washington. KPNW has implemented a comprehensive approach for addressing the SDH of its patients. Specifically, KPNW has trained staff across clinical and operational departments to assess and to identify SDH in the clinical setting. There are multiple points in the health care encounter when health care staff initially identify patients' SDH: 1) a nonclinical staff member interacts with a patient during the health care visit but outside the clinical encounter (eg, a registration/check-in representative who learns that a patient has a transportation need); 2) a clinical staff member identifies a patient with SDH as part of the clinical encounter (eg, a nurse learns that a patient is currently homeless and unable to pay for

Table 1. Social determinants of health (SDH) data collected in the EHR, corresponding ICD-10 Z codes, and examples of use[a]	
SDH domain (code)	Example of situation to use Z code
Social	
Caregiver stress (Z63.8)	Caregiver for child, adult, or senior with complex medical, social, physical, and behavioral needs
Family stress (Z63.8)	Social, economic, medical stressors affecting family and/or home environment
Insufficient social insurance or welfare support (Z59.7)	Lack of insurance, uninsured, or underinsured; needing SSI/SSDI or public assistance
Need assistance with community resources (Z74.8)	For general resources, when there is not a specific Z code for need
Unavailability or inaccessibility of other helping agencies (Z75.4)	Lack of community resources, ineligible for community resources, no capacity
Social isolation (Z62.4)	Lack of or limited availability of family, friends, community groups, or agencies to provide routine social support; member spends most of time alone (in home or facility)
Problems related to other legal circumstances (Z62.5)	Health-harming legal issues (guardianship or custody issues, renter's rights, employment rights, problems with income or public benefits, legal status, disability)
Problems related to release from prison (Z62.5)	Transition to work, access to health services, housing
Economic	
Financial problem (Z59.9)	Financial worries; difficulty paying for basic needs: Food, clothing, medical care, utility, rent, bills, at risk of debt, etc
Food insecurity (Z59.4)	Worry about finding affordable food; food stamps running out; lack of fresh fruits and vegetables available
Homelessness (Z59.0)	Camping, sleeping in shelter, couch surfing, etc
Housing or economic circumstance (Z59.9)	At risk of homelessness: Inability to pay rent, inability to find affordable or permanent housing, rent increases, etc
Inadequate material resources (Z59.9)	Lack of transportation, clothing, computer, phone, housing/hygiene goods, school supplies, working appliances, basic goods
Intentional underdosing of medication due to financial stressors (Z91.120)	Not taking medications, not filling prescriptions, intentionally underdosing medications, etc because of financial strain
Unemployment (Z56.0)	Unemployed, unable to find work, underemployed
Low income (Z59.6)	Not enough money to pay for necessities, has just enough to make ends meet, poverty line and under
Environmental	
Fall risk (Z91.81)	Does not want to use devices to help with walking, unsteady gait, poor housing conditions (hoarding, deteriorating floors, throw rugs)
Stressful work schedule (Z56.3)	Working multiple jobs, physically strenuous jobs, night shifts, long shifts, etc
Foster care status (Z62.21)	Child, adult, or senior living in foster care
Problem related to social environment (Z62.9)	Living alone, living in clutter (hoarding), dangerous or health-harming environment
Health education	
Dental well-care counseling (Z71.89)	Educating members on dental care benefit (Medicaid) and access to free or low-cost dental services
Referral to county mental health agency (Z68.81)	Educating members on community mental health organization, helping members schedule visit
Illiteracy and low-level literacy (Z55.0)	Educating members on how to navigate KP; helping member with follow-up instructions, education, etc
Nutrition and exercise counseling (Z71.3)	Educating members on low-cost gyms, KP Silver&Fit (exercise and healthy-aging program), community centers, community cooking classes, farmers markets

EHR = electronic health record; ICD-10 = International Classification of Diseases, Tenth Revision; KP = Kaiser Permanente; SSI/SSDI = Supplemental Security Income/Social Security Disability Income.

his/her prescribed medication); or 3) a patient is assessed for SDH proactively, as part of an initial assessment for care management or as part of a targeted outreach for patients who may be at risk of having social barriers to care. For example, the latter scenario might include patients who have "bounced back" to the Emergency Department (ED) twice within 5 days who will receive a proactive outreach call from a patient navigator to assess issues such as lack of transportation or inability to pay for medications.

At KPNW, nonclinical patient navigators play an integral role on the health care team, engaging with patients to identify and address patients' SDH. Patient navigators are part of interdisciplinary care teams, where they work alongside nurses, social workers, behavioral health specialists, clinicians, and other health care staff to help patients connect with needed resources. Patient navigators are nonclinically licensed health care staff members who are frontline public health workers. Most patient navigators at KPNW have a bachelor's or graduate degree in public health, social work, community health, and/or other social science/humanities (eg, anthropology). Patient navigators are trained in motivational interviewing, trauma-informed care, and mental health first aid, among other specialties. All KPNW patient navigators obtain state (ie, Oregon Health Authority) and federal training and certification as Certified Application Counselors to help patients look for health insurance coverage options (eg, Medicaid, Children's Health Insurance Program, or the Health Insurance Marketplace) and complete eligibility and enrollment forms.[20] Additionally, many patient navigators are certified community health workers. KPNW patient navigators represent diverse cultural backgrounds, with more than 7 languages spoken across the team, including English, Mandarin Chinese, Spanish, Russian, and multiple African languages.

Referrals to patient navigators for SDH follow-up most often occur through either direct contact (by phone or in person) or an EHR-based notification from the referring nonclinical

Figure 1. Social determinants of health (SDH) SmartSet in Kaiser Permanente HealthConnect electronic health record.[a]

[a] Screenshot shows 2 of 4 SDH domains included in the Kaiser Permanente Northwest SmartSet as provided in Table 1.

or clinical staff member. These referrals come from staff members in various roles (eg, membership services, social work, preregistration) and departments in the health care system (eg, primary care, emergency, other specialty care). On receiving the SDH referral, the patient navigator engages the patient by phone, by email, or in person when possible. In many instances, the patient navigator can meet with the patient on the same day, during a clinical encounter. When same-day contact is not possible, the patient navigator contacts the patient by phone or email within 48 hours of the SDH referral. Once in contact with the patient, the patient navigator uses a standardized and vetted social needs assessment called Your Current Life Situation (available online at: www.thepermanentejournal.org/2018/18-095-App.pdf) to fully understand, identify, and prioritize SDH. Additionally, patient navigators educate and inform patients about KPNW-specific resources (eg, KPNW Medical Financial Assistance Program) and community resources available to meet the identified SDH, and coordinate with patients to help facilitate connections to resources.

International Classification of Diseases, Tenth Revision Z Codes

Identified SDH are documented in the EHR using a taxonomy of approximately 24 ICD-10 Z codes (Table 1). Table 1 presents the ICD-10 Z codes grouped into 4 overarching SDH domains—social, economic, environmental, and health education—and example scenarios of when each Z code may be used to identify a patient's SDH. The ICD-10 Z codes (Z00-Z99) are referred to as "factors influencing health status and contact with health services" and may be used to identify reasons for a health care encounter, to identify first-listed or principal diagnosis (only certain Z codes), and to provide useful information on the circumstances that could affect a patient's health care and treatment.[20] The SDH SmartSet (described in the next section) used by KPNW helps facilitate quick data entry to support clinical flow. The Z code, on the other hand, enables extraction of SDH data from the EHR for use in clinical (eg, quality assurance), operational, (eg, reporting), and research (eg, empirical studies) purposes.

Often, more than 1 Z code is entered into the EHR because patients can have

multiple unmet SDH that are inter-related. A patient who is homeless, for example, may also have financial problems, lack material resources, and be food insecure. In such a scenario, the use of multiple Z codes allows us to identify co-occurring social risk factors. Patient navigators strive to prioritize and address SDH on the basis of patient preferences, as well as perceived level of need, opportunity for acute intervention, and availability of resources.

Community Resource Referrals

To address the identified SDH of patients, KPNW has developed SDH SmartSets in the EHR for community resource referral and for tracking. Epic defines the *SmartSet* as "a group of orders and other elements, such as notes, chief complaints, SmartGroup Panels, and levels of service, that are commonly used together to document a specific type of visit."[21] The KPNW SDH SmartSets were developed by KP Information Technology, clinical and operational stakeholders, and others (eg, Epic Systems Corp). More information about the KPNW SDH SmartSets is available on request. The KPNW patient navigators use the SDH SmartSets to identify SDH (Figure 1) and to make a referral for a patient to a targeted community resource or resources (Figure 2) in an effort to help meet the patient's SDH. The KPNW Community Resource Referral SmartSet is generated with a list of more than 200 resources, both internal (ie, resources offered at KPNW, such as the Medical Financial Assistance Program) and external (ie, a community-based organization). Examples of the Community Resource Referral SmartSet are shown for food insecurity (Code Z59.4; Figure 2, top panel) and homelessness (Z59.0) or housing or economic circumstance (Z59.9; Figure 2 bottom panel). As shown in Figure 2, the Community Resource Referral SmartSet associates the identified SDH with 1 or more specific resources and provides the opportunity to prioritize the patient need as routine or immediate. New resources can be added or removed from the resource list as appropriate.
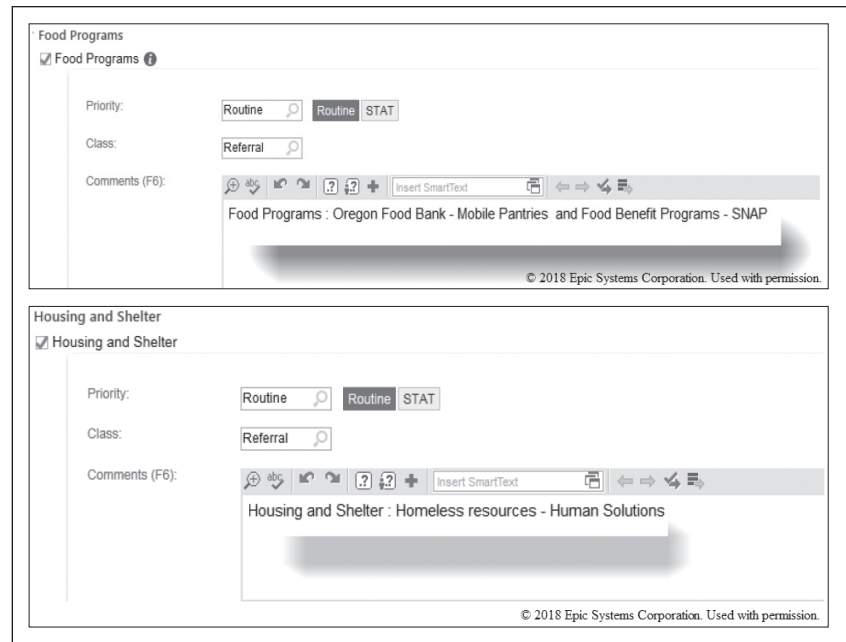

Figure 2. Social determinants of health Community Resource Referral SmartSet in Kaiser Permanente HealthConnect electronic health record.[a]

[a] Screenshot in top panel shows an example of a community resource referral for food insecurity (International Statistical Classification of Diseases, Tenth Revision [ICD-10] Code Z59.4). Bottom panel shows an example of community resource referral for homelessness (ICD-10 Code Z59.0) or housing or economic circumstance (ICD-10 Code Z59.9).
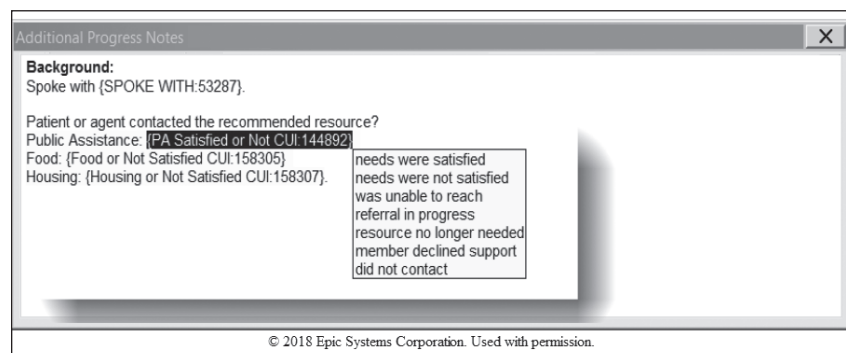

Figure 3. Social determinants of health (SDH) Community Resource Summary Progress Notes SmartSet in Kaiser Permanente HealthConnect electronic health record.[a]

[a] Information documented in this SmartSet includes the health care staff member with whom the patient spoke, the list of SDH, and the status of each referral.

The third component is the SDH Community Resource Summary Progress Notes SmartSet (Figure 3), which provides a comprehensive overview of recommendations for resources and health care services for the patient, the health care staff member that collected initial information about the patient's SDH, referrals to other health care staff members, the timeline for next patient contact, the focus areas for next contact, and background for the baseline referral. This information is essential for comprehensive documentation of a patient's SDH and creates actionable data that can be retrieved and reviewed by any KPNW patient navigator, at any point throughout the patient experience.

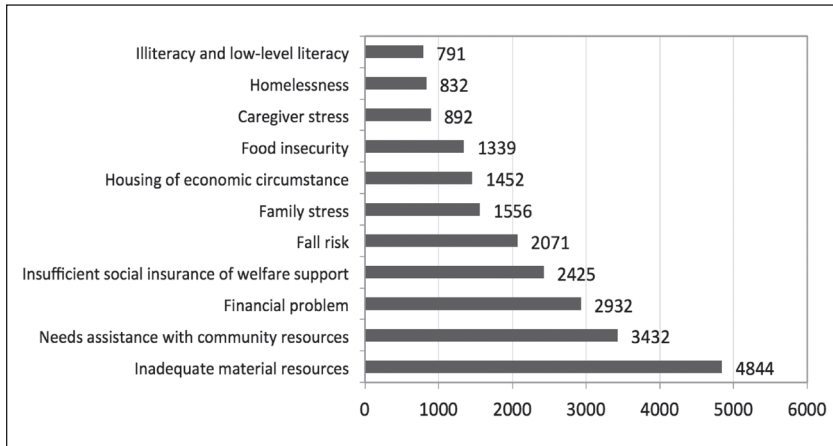A key feature of this SmartSet is the ability to track the status of each

Figure 4. Most commonly identified social determinants of health (SDH) among Kaiser Permanente Northwest (KPNW) patients.[a]

[a] Top International Classification of Diseases, Tenth Revision Z codes identified among 11,273 KPNW patients between March 31, 2016, and March 25, 2018. Numbers shown represent the number of times that each Z code was documented in the electronic health record. This is not an exhaustive list of SDH identified in KPNW patients.
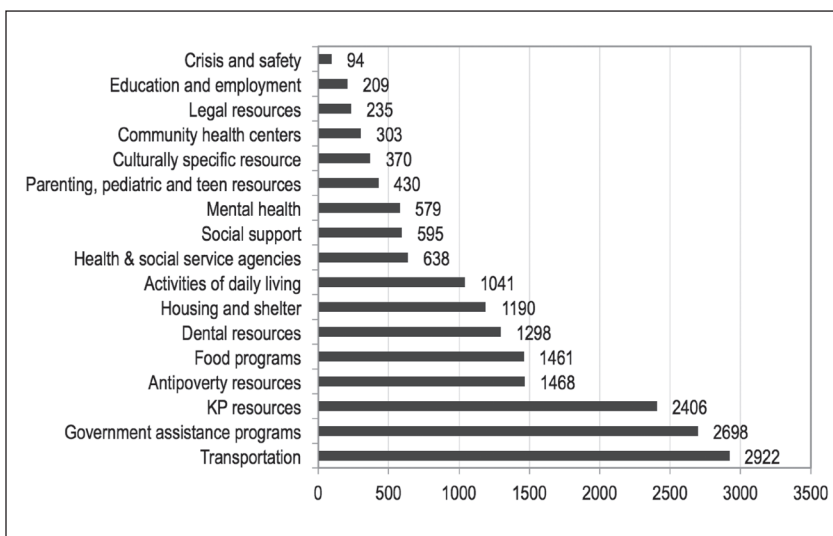

Figure 5. Most common categories of community resource referrals made for Kaiser Permanente (KP) Northwest (KPNW) patients.[a]

[a] Top community resource referrals, by category, made by KPNW patient navigators between March 31, 2016, and March 25, 2018. This is not an exhaustive list because patient navigators made nearly 18,300 referrals during this time frame. Numbers shown represent the number of times that each category of community resource referral was made in the electronic health record.

RESULTS

Identified Social Determinants of Health and Community Resource Referrals

Between March 31, 2016, and March 25, 2018, KPNW patient navigators screened 11,273 patients with SDH. They identified and documented 47,911 SDH in the EHR. Among the 11,273 patients, 28% had Medicare, 24% had a commercial health plan, 22% had Medicaid, and 26% were non-KP members. As shown in Figure 4, the most commonly identified SDH included inadequate material resources, needing assistance with community resources, financial problems, and inadequate social insurance or welfare support, among several others. Of note, these SDH data include information documented in the EHR problem list, diagnoses that are associated with referrals, and encounter-level data.

During the same period, patient navigators made 18,284 unique community resource referrals for 7494 patients (approximately 66% of the 11,273 patients identified with SDH). Accordingly, some patients received multiple referrals for different SDH (ie, transportation, food, utility assistance) or received multiple referrals for different agencies for the same SDH. Figure 5 shows the most common community resource referral categories (not individual agencies).

Patient Example

A KPNW patient navigator received an SDH referral from a KPNW staff member about a patient who was undergoing cancer treatment and was uninsured (Z59.7) and had transportation needs (Z59.9). The patient navigator contacted the patient by phone to understand the specific SDH needs. During the initial discussion, the patient navigator discussed and prioritized the patient's needs, deciding that the first steps would be to attempt to get the patient re-enrolled in Medicaid (ie, Oregon Health Plan). The patient navigator helped by calling the state Medicaid program and advocating for the patient, as part of the patient's health care team, and was successful in getting health insurance reinstated through Medicaid as well as setting up the transportation benefit for the patient.

community resource referral (Figure 3). The tracking tool allows patient navigators and other staff members to track the status of SDH referrals over time by documenting the results of follow-up contact between the patient and the patient navigator (typically by phone or in person during a subsequent health care visit), which are then pulled into an automated weekly report for review. Furthermore, the tracking SmartSet provides an opportunity to document patient preferences about declining support for their SDH. Without this integration, health systems are at risk of putting patients through unintended harm by screening for social needs without knowledge about whether the patient wants resource support, as well as the extent to which the patient has received (or not received) the referred resource or resources over time.

This alleviated the patient's stress associated with not having health insurance coverage and transportation to cancer treatment. This work enabled the patient to focus on getting to appointments and completing treatment.

DISCUSSION

This article highlights the KPNW approach for identifying and addressing patients' SDH. The novel EHR-based tools developed by KPNW have led to use of standardized, measurable, and actionable SDH data to tailor and target specific resources to meet the identified needs of our patients. Between 2016 and 2018, KPNW patient navigators screened 11,273 patients for SDH, identifying and documenting 47,911 SDH, and making nearly 18,300 SDH referrals. By disseminating information about these efforts at KPNW, we are building an evidence basis of different approaches for addressing SDH within the health care system, as well as defining opportunities to improve care efficiency for patients with SDH.

Impact on Medical Care

Importantly, collecting and documenting SDH data in the EHR, where it is clear and visible for clinicians, enables KP to adapt care on the basis of this information. If a clinician is aware that a patient is homeless and needs a medication that requires refrigeration, for example, the clinician may change or augment the clinical prescription to a medication that does not require refrigeration.

Briar Ertz-Berger, MD, MPH, an emergency medicine physician in KPNW, gives another example of how SDH data enables her to provide more holistic care (Briar Ertz-Berger, MD, MPH, personal communication, 2018 April)[a]: *"When I see a frail and elderly person in my emergency room who has had a fall, I look on the problem list to see if they are food insecure. I not only ask them about their pain, I ask them if they have difficulty buying enough food to eat or cook for themselves. I, now, not only can make a referral to physical therapy or a fracture clinic, I can make a referral to [patient] navigators to ensure the patient has food, transportation, caregiver support, etc."*

Considerations of the Approach to Social Determinants of Health

Although there are many strengths to KPNW's approach to addressing SDH, there are certain considerations and challenges that must be acknowledged. A key challenge in these efforts has been developing effective workflows for referring members with identified SDH to appropriate community resources and tracking the progress of such referrals to ensure needs are addressed. The KPNW approach relies on patient navigators to recontact patients (primarily through follow-up phone calls) to determine whether they were able to access the community resources to which they were referred, which requires a great deal of resources. Every week KPNW patient navigators screen hundreds of patients and make hundreds of new community resource referrals. Accordingly, tracking the outcome of all community resource referrals becomes challenging for a team of approximately 30 patient navigators. Approximately 23% of the 18,284 community resource referrals resulted in the patients' identified SDH being satisfied, partially satisfied, or in progress (ie, SDH need was resolved). Most follow-up data on community resource referrals is unknown because of the overwhelming burden on patient navigators to track the progress of the referrals as well as barriers such as patients not returning calls or not having a working phone or the means to follow-up after the referral has been made. Anecdotally, KPNW patient navigators have observed increased SDH resolution among patients who are enrolled in care management, case management, or similar programs that provide more "touch points" or opportunities for interaction between the patient and patient navigator within the health care setting to check on the status of the patient's referrals and needs. However, this also underscores an opportunity to collect data, both quantitative and qualitative, to learn about the information needs, barriers, and facilitators of the SDH community resource referral process from the perspectives of the community organizations that serve as the resources, patients who receive the referrals, and

health care team members who make the referrals. Such work may inform the development of workflows to assess the impact of both community referrals and community connections, emphasize the value vs volume of community referrals, and foster partnerships that could lead to the development of bidirectional communication channels between stakeholders to track the resolution of identified SDH.

KPNW developed a risk stratification system to prioritize community resource referral follow-up. Patient navigators consider several factors, including the patient's number of unmet needs, the patient's health care use patterns (ie, heavy ED use in the past 3 months), prior success of connecting the patient to community resources, patient's self-reported confidence following-up with community resource referrals, and the patient's social support. Nevertheless, even with such a system in place, some patients who need more aggressive follow-up and support are still missed. To address this issue, KP is currently working to create a Social Services Resource Locator (SSRL). The SSRL will be a shared enterprise tool deployed at the hyperlocal level to connect patients to community resources that effectively address their SDH needs. Initially, the SSRL will 1) provide a consistent approach to connect patients to community resources, 2) confirm that patients' SDH needs have been addressed, 3) incorporate information on the progress of community resource referral into ongoing care plans, and 4) collect data to track community resource referral trends across community partners and KP Regions. The SSRL will provide automated bidirectional communication between KP and the community agencies, help prioritize follow-up on the basis of real-time data of which patients have and have not connected with their resources, and facilitate closed-loop referrals.

Recognizing patients' most pressing SDH and making appropriate community resource referrals to help address those needs is a critical element of many of KP's strategies for addressing SDH. KPNW has been a leader in this effort and is the voice for why we need a scalable and interoperable solution across

KP Regions. We have an opportunity with the SSRL to make more efficient and effective community resource referrals, such as making a referral to a single community-based organization that can address multiple needs rather than a "shotgun" approach of multiple referrals to various community organizations. The SSRL is a novel tool that will enable our health care system and care teams to address the SDH of our patients and the communities we serve.

Other strategies may also be employed by health care systems in their efforts to assess and intervene on SDH. Identifying priority populations or subgroups for SDH assessment may help with issues related to staff capacity (ie, patient navigator-to-patient ratio) and ensure that the patient workload is manageable. For instance, patient navigators may focus on assessing SDH on high-cost/high-utilizer populations or patients seen in the ED who are uninsured. At KPNW, individuals who receive medical care and are found to be uninsured are screened for eligibility for Medicaid or medical financial assistance programs and enrolled immediately, when possible, by patient navigators. Moreover, establishing strategic, cross-sectoral partnerships with community organizations that offer different types of services is an approach that may facilitate the provision of a broad range of resources to help patients and limit the burden on the health care system or on any single organization.[19,22] KP has a history of developing partnerships with community organizations to help address SDH.[23] Last, establishing clear communication lines and workflows across health care staff roles (eg, patient navigators, social workers, financial counselors) to address specific SDH may help facilitate quicker connections to resources for patients.[19]

CONCLUSION

Reducing the burden of patients' SDH at the individual and population levels requires a culture of health within communities to develop and to maintain strong connections between health care systems and community-based organizations that address such needs.[15,24-26] Developing successful, efficient approaches to making and maintaining these connections could bolster the community's capacity to fulfill patients' SDH and could foster future work that generates evidence that resolution of SDH affects downstream health care use, costs, and health disparities. As clinicians at an integrated health system committed to total health, we at KP cannot expect our patients to manage their health or to engage in behavior change if they do not have enough basic resources to eat healthfully, pay bills, or manage their daily responsibilities.

The KPNW approach to SDH is designed to help KP better understand the nonmedical social factors that have an impact on health outcomes and to address them with a standardized, reliable connection to nonmedical resources in the community. We hope this effort will help align care delivery, community health, research and evaluation, information technology, marketing and business strategy, and other assets of our organization to invest social, economic, and health capital in the organizations and agencies that best meet the needs of the patients and communities we serve. ❖

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Ten Yards Behind

What's important to recognize is that in the US today, tens of millions of kids start life on an uneven playing field. Imagine having to try to run a race if you started ten yards behind everyone else, hadn't eaten breakfast that morning, or maybe even dinner the night before, had slept in your third homeless shelter that month and didn't have shoes that fit right. Catching up would be really, really hard. With almost 32 million American kids living in low-income families, that means four out of ten runners are starting far back.

— Chelsea Clinton, b 1980, Board member of the Clinton Foundation and the Clinton Global Initiative