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# Envisioning a Social-Health Information Exchange as a Platform to Support a Patient-Centered Medical Neighborhood: A Feasibility Study

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**BACKGROUND:** Social determinants directly contribute to poorer health, and coordination between healthcare and community-based resources is pivotal to addressing these needs. However, our healthcare system remains poorly equipped to address social determinants of health. The potential of health information technology to bridge this gap across the delivery of healthcare and social services remains unrealized.

**OBJECTIVE, DESIGN, AND PARTICIPANTS:** We conducted in-depth, in-person interviews with 50 healthcare and social service providers to determine the feasibility of a social-health information exchange (S-HIE) in an urban safety-net setting in Dallas County, Texas. After completion of interviews, we conducted a town hall meeting to identify desired functionalities for a S-HIE.

**APPROACH:** We conducted thematic analysis of interview responses using the constant comparative method to explore perceptions about current communication and coordination across sectors, and barriers and enablers to S-HIE implementation. We sought participant confirmation of findings and conducted a forced-rank vote during the town hall to prioritize potential S-HIE functionalities.

**KEY RESULTS:** We found that healthcare and social service providers perceived a need for improved information sharing, communication, and care coordination across sectors and were enthusiastic about the potential of a S-HIE, but shared many technical, legal, and ethical concerns around cross-sector information sharing. Desired technical S-HIE functionalities encompassed fairly simple transactional operations such as the ability to view basic demographic information, visit and referral data, and medical history from both healthcare and social service settings.

**CONCLUSIONS:** A S-HIE is an innovative and feasible approach to enabling better linkages between healthcare and social service providers. However, to develop S-HIEs in communities across the country, policy interventions are needed to standardize regulatory requirements, to foster increased IT capability and uptake among social service agencies, and to align healthcare and social

service priorities to enable dissemination and broader adoption of this and similar IT initiatives.

**KEY WORDS:** health information technology; health care delivery; vulnerable populations; underserved populations; community-based participatory research.

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## INTRODUCTION

There is an increasing public awareness that unmet social needs directly contribute to poorer health.<sup>1-3</sup> A national poll showed that 85 % of physicians believe that unmet social needs directly lead to worse health care for Americans; that social needs are as important to address as medical needs; and that these needs are important to all Americans, not just low-income individuals.<sup>4</sup> A growing body of literature strongly supports the concept that social needs such as employment, food security, and stable housing are inextricably linked to health, and that unmet social needs may be associated with disorganized and excessive use of healthcare resources, leading to high healthcare costs.<sup>5-7</sup> Coordination between clinical and community-based resources is pivotal to addressing social needs and to improving self-care and prevention of chronic medical conditions.<sup>8-11</sup>

Though innovative primary care models have called for improving coordination between healthcare providers and community organizations to better meet social needs, our healthcare system remains poorly equipped to address social health determinants.<sup>4,11,12</sup> The Chronic Care Model calls for increasing linkages between health organizations and community-based organizations, and considers community linkage one of six fundamental pillars of chronic care.<sup>13</sup> The Patient-Centered Medical Home standards call for the provision of self-care support to patients, including linkages to community resources.<sup>14</sup> The Patient-Centered Medical Neighborhood and Accountable Health Communities models explicitly include community and social service organizations

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within a geographic focus as key stakeholders in meeting a patient's healthcare needs.<sup>12,15</sup> Even where efforts to implement these models have been promising, the development of community linkages has been particularly challenging and varies widely among clinical practices.<sup>16–18</sup>

The potential of health information technology (IT) to effectively bridge this gap across the delivery of healthcare and social services remains unrealized.<sup>19,20</sup> The Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 allocated \$548 million for the development of health information exchanges (HIEs), with the aim of building an IT infrastructure to support coordinated, interdisciplinary team-based care.<sup>21</sup> To date, there have been few initiatives to leverage this vast IT infrastructure to connect community resources to healthcare providers towards more effectively addressing social determinants. The Beacon Community program, an initiative sponsored by the Office of the National Coordinator for Health IT, provided \$250 million from 2010 to 2013, to 17 exemplar community-oriented HIE initiatives to build and strengthen community health IT infrastructure and exchange<sup>22</sup>; however, none of these initiatives broadly involved social service organizations. In this qualitative study, we investigated the feasibility of a proposed web-based IT infrastructure—which we termed a social-health information exchange (S-HIE) for its conceptual similarity to an HIE—to enable improved information sharing, communication and care coordination between a safety-net health system and community social service providers.

## METHODS

**Research Setting.** This qualitative study was part of a quality improvement initiative based at the Parkland Health and Hospital System (Parkland) in Dallas County, Texas. Parkland is an integrated urban safety-net county health system that provides over \$500 million of uncompensated care annually. The health system is comprised of one 744-bed hospital and level 1 trauma center, which is the sole public hospital in Dallas County; 11 primary care clinics, 11 school-based clinics; a fleet of homeless outreach mobile units; and a jail health division. The health system is linked by a commercial electronic health record (EHR) system, except for the homeless outreach program and jail health, both of which operate on separate, stand-alone EHR systems.

Many of Parkland's patients struggle with unaddressed social health determinants, such as homelessness, poverty, food insecurity, and social isolation, in addition to medical needs. There is no formal protocol among healthcare providers to identify needs outside of medical concerns—individuals either self-identify these needs or they may be incidentally recognized by providers. If social needs are identified, individuals are referred ad hoc to one of more than 400 social

service and/or community-based organizations in Dallas County. While most have no formal affiliation with Parkland, they provide a broad array of social support services to a large proportion of individuals cared for by Parkland. These organizations vary in size, scope and IT capability. Referrals to these groups are made by Parkland case managers and social workers via time-intensive and resource-intensive methods, such as postal mail, facsimile and/or telephone.

**Data Collection and Analysis.** We conducted an exploratory qualitative study using a community-based participatory research approach, with semi-structured interviews and a community-wide town hall meeting for participant feedback to investigate feasibility, barriers, and enablers to implementing a community-wide S-HIE. Interviews were conducted with healthcare providers at Parkland and social service providers in Dallas County from October 2010 to May 2011, using purposeful sampling to maximize heterogeneity in represented settings and organizations. Social service providers were recruited from a subgroup of organizations identified by Parkland healthcare providers most frequently providing services to individuals receiving health care from Parkland. These included, but were not limited to, groups providing shelter and housing assistance, emergency financial assistance, child and family services, drug and alcohol rehabilitation, food assistance and senior activity centers. We initially contacted participants by e-mail and employed a snowball approach to recruit subsequent participants. We recruited participants until reaching thematic saturation (i.e., no further new themes emerged from our interviews).

Our interview framework addressed the following topics: perceived value of information transfer between healthcare and social service providers; perception of the current state of communication and information transfer between healthcare and social service providers; whether a web-based IT solution to any perceived communication gap would offer benefit beyond standard means of communication (telephone, facsimile, e-mail, postal mail); specific clinical conditions or scenarios in which a S-HIE could be leveraged to improve care; and barriers and enablers to adoption of a S-HIE. Each interview was conducted in person by one to three authors (OKN, CVC, ANM or HS) and lasted 60 to 90 minutes. Each interviewer recorded handwritten abbreviated field notes of interview responses while conducting interviews, and expanded field notes into full reports within 24 hours. We conducted data analysis and collection simultaneously so that analytical insights could inform ongoing data collection. Two authors (OKN and CVC) separately read and coded data, using the constant comparative method.<sup>23</sup> Disagreements were resolved by discussion and mutual consensus.

After completing interviews, we held a town hall meeting in May 2011—with both healthcare and social service providers—to present our findings for participant confirmation and to elicit further feedback on desired functionalities for the S-

HIE. We conducted a forced-rank vote to identify which of 20 potential S-HIE functionalities identified by interview respondents were thought to be most helpful to enabling community-wide care coordination between healthcare and social service providers. Attendees were given a total of seven votes, which they could allocate according to their preference (e.g., all seven votes could either be given to one high priority functionality or divided up between desired functionalities).

This study was approved by the institutional review board at the University of Texas Southwestern Medical Center.

## RESULTS

### Interview Results

We interviewed 50 participants (20 healthcare and 30 social service providers, 98 % response rate, Table 1) and identified 12 themes across four categories around perceived needs, enthusiasm and perceived potential value, social service-specific barriers, and healthcare-specific barriers to implementing an S-HIE (Table 2). Respondents universally recognized shared goals between healthcare and social service providers. Despite this, they noted there was a lack of existing infrastructure to enable communication and care coordination across sectors. Both clinical and social service providers were enthusiastic about the potential of a S-HIE to improve coordination, but had concerns around the logistics of

**Table 1. Characteristics of Interview Participants**

	n (%)
Health care providers (N=20)	
Position	
Medical director or division chief	9 (45)
Non-physician director or manager	7 (35)
Front-line staff	4 (20)
Specialties and clinical settings*	
Primary care†	10 (50)
Emergency and inpatient medicine‡	6 (30)
Case management/social work	7 (35)
Psychiatry/behavioral health	3 (15)
Women and infants' health	2 (10)
Social service providers (N=30)	
Position	
Executive leadership	15 (50)
Program director or manager	11 (37)
Front-line staff	4 (13)
Types of services provided by organization*	
Emergency assistance§	14 (43)
Food assistance	6 (20)
Housing assistance or shelter	6 (20)
Senior services	5 (17)
Child and family services	2 (7)
Other¶	8 (27)

\* Categories are not mutually exclusive

† Internal medicine, family medicine, pediatrics, geriatrics, and homeless outreach

‡ Emergency department, jail health, inpatient medical services

§ A broad array of emergency services including food, clothing, and financial assistance

|| Explicitly self-identified primary service as food assistance and/or had a food pantry

¶ Crisis management, drug and alcohol rehabilitation, counseling or other service not otherwise specified

**Table 2. Identified Themes Around S-HIE Implementation**

Category	Theme
Perceived need for S-HIE	Health-related issues are an impediment to reaching the social service goal of self-sufficiency. Social service providers may be the primary source of support for vulnerable individuals struggling to manage chronic illness. Unmet social needs are an impediment to effective chronic disease management. Better communication between social service and healthcare providers is needed.
Shared enthusiasm for potential value of S-HIE	A S-HIE could improve cross sector communication, coordination, and efficiency. S-HIE data could help demonstrate positive outcomes and impact of social services on health outcomes.
Social service-specific barriers	Potential redundancy and inefficient workflows due to lack of interoperability between S-HIE and existing information systems. Limited IT capability among smaller social service groups. Uncertainty about adequate training to ensure privacy and appropriate use of S-HIE data. Uncertainty about accountability and risk in case of an information security breach.
Healthcare-specific barriers	Seamlessness and interoperability. Perceived potential for misuse of S-HIE data.

implementation and use, including: redundancy with existing systems; IT capability; seamlessness; interoperability and data privacy. Despite these challenges, respondents expressed the opinion that a S-HIE would be valuable if it could enable a searchable database of available services, longitudinal tracking of referrals, and serve as a central repository of demographic information.

### Collective Recognition Across Social Service and Healthcare Providers of Complementary Goals, Functions, and Unmet Needs

**Health-Related Issues Are an Impediment to Reaching the Social Service Goal of Self-Sufficiency.** Social service providers saw their overarching goal as helping individuals to achieve self-sufficiency, but noted that medical issues were among the most significant impediments to self-sufficiency, since many clients were financially insolvent due to medical crises. These crises were perceived as potentially preventable, as they were often precipitated by low health literacy and limited access to care (i.e., not understanding how to take medications or being unable to afford them). Though social service providers were able to sometimes provide episodic emergency financial assistance, they felt otherwise poorly equipped to address the underlying health-related causes of clients' financial difficulties.



***Social Service Providers May Be the Primary Source of Support for Vulnerable Individuals Struggling to Manage Chronic Illness.*** Despite feeling poorly equipped, social service providers perceived that their relationships and proximity to vulnerable individuals put them in a unique position to be able to effectively assist with navigating health-related issues. Many identified themselves as the primary source of social support for individuals who were otherwise isolated in the community. Although the provision of specific health-related services was outside of the scope of most organizations, social service providers reported that they were still often approached by individuals for advice on a variety of health-related issues such as assistance making and keeping medical appointments; or assistance with taking prescription medications.

Social service providers expressed that having a few key pieces of health-related information would empower them to assist clients with basic health-related issues: knowing a client's primary care provider, medication regimen, and chronic and emergent health issues. Because their clients often had low health literacy, it was frequently not feasible to obtain this information from those individuals requesting assistance with health-related issues.

***Unmet Social Needs Are an Impediment to Effective Chronic Disease Management.*** Conversely, healthcare providers acknowledged that unmet social needs often had immediate and profound effects on health, particularly on chronic disease management—for example, patients who did not have a place to live often lacked the means to take their medications. Providers felt that they had limited ability to address these needs from within the healthcare setting. Specifically, healthcare providers noted that existing case management and social work staff were already 'stretched thin,' leading to insufficient time to ascertain social needs and to identify which individuals were the 'neediest.' This led to addressing social needs in an ad hoc rather than deliberate, comprehensive, and systematic manner. Additionally, healthcare providers noted that high turnover of community organizations providing social services made it difficult to keep a current knowledge base of these resources. Consequently, lack of up-to-date information—on available services, resources, contacts and eligibility requirements—markedly limited their ability to make appropriate referrals. Together, these factors led to healthcare providers' perception that they were only able to 'control the [immediate] chaos' rather than engage in meaningful long-term planning to effectively address social needs.

***Better Communication Between Social Service and Healthcare Providers Is Needed.*** A number of healthcare providers perceived that social service providers in the community were potentially better positioned to gather information about social needs of their shared population. At the same time, the lack of an existing infrastructure for ongoing communication, follow-up and coordination of services made it

difficult for providers to meaningfully engage with their social service counterparts. Social service providers shared the perception that healthcare providers could benefit from information that social service organizations may have gathered or observed about their clients. Similarly, social service providers also saw value in having access to relevant medical information that would help them better serve their clients.

## **Enthusiasm for the Potential Value of Social-Health Information Exchange**

***A S-HIE Could Improve Cross Sector Communication, Coordination, and Efficiency.*** Both social service and healthcare providers were enthusiastic about the potential of an S-HIE to bridge gaps in needed information, align care efforts and enable community-wide care coordination. Both groups envisioned that a S-HIE would enable direct provider-to-provider communication across sectors, enable the ability to search for and identify available services and community resources, and create a shared longitudinal care record for individuals. Additionally, providers anticipated a potential for improved efficiency through decreasing the redundancy of referrals and duplication of efforts by providers across different agencies; improving efficient allocation of limited community resources; and improving the timeliness of referrals to better meet the needs of patients/clients.

***S-HIE Data Could Demonstrate Positive Outcomes and Impact of Social Services.*** Social service leaders hoped that data collection via the S-HIE would enable them to demonstrate an association between social service provision and positive healthcare outcomes (i.e., reduced hospitalizations; improved chronic disease management). Most social service data collection efforts focused on assessing 'outputs' (e.g., number of individuals served) for regulatory reporting requirements, rather than 'outcomes' (i.e., number of individuals moving towards self-sufficiency via gaining employment). Outcomes assessment would enable ongoing program evaluation and improvement, and strengthen applications for program support and funding. Social service leaders also hoped that S-HIE participation would help build relationships with healthcare personnel equipped with skills to meaningfully assess outcomes data, since most organizations lacked expertise in this area.

This overall enthusiasm was tempered by several concerns around barriers to S-HIE feasibility among both social service and healthcare providers.

## **Perceived Potential Barriers to S-HIE Feasibility Among Social Service Providers**

***Potential Redundancy and Inefficient Workflows Due to Lack of Interoperability Between S-HIE and Existing Information Systems.*** Disparate reporting requirements and mandated use of specific information systems often resulted in

organizations using multiple systems that were not interoperable and did not fit into organizational workflows. Consequently, front-line staff would gather and record information on paper at the point-of-care, and then manually enter this information separately into one or more computerized systems. Redundant data entry was the norm rather than the exception, particularly at larger organizations with multiple programs supported by diverse funding agencies. Lack of seamless integration of a S-HIE into existing workflows and IT infrastructure could worsen redundancy, which would be a significant obstacle to implementation and use.

**Limited IT Capability Among Smaller Social Service Groups.** Social service providers at smaller organizations were concerned about their ability to meaningfully use a S-HIE since they had limited or no technical infrastructure, training, or staff. They also worried that they would be unable to adopt and implement a S-HIE without significant external resources, and whether they would be able to keep up with day-to-day maintenance and troubleshooting.

**Uncertainty About Adequate Training to Ensure Privacy and Appropriate Use of S-HIE Data.** Social service providers noted that, traditionally, their staff did not collect or use protected health information; as such, they would require adequate training to appropriately use S-HIE data. Many organizations also reported that they relied heavily on low-paid or unpaid volunteers as front-line workers; consequently, this led to high turnover of workers with varying levels of training and expertise. Some respondents worried that an untrained volunteer might inappropriately disclose sensitive medical information, or misuse available medical data to inappropriately deny services. Overall, these concerns were not considered insurmountable to S-HIE implementation and use; several respondents suggested that building in graded levels of access as well as targeted training for various personnel could be a potential solution.

**Uncertainty About Accountability and Risk in Case of an Information Security Breach.** Leaders at social service organizations perceived that while healthcare providers had specific laws and regulations to protect them [e.g., the Health Insurance Portability and Accountability Act (HIPAA)], and resources such as attorneys and insurance policies to defend and protect against damages, social service organizations had no such regulations or resources in case of a lawsuit. They identified risk mitigation as a major area of concern to be resolved prior to further development of a S-HIE.

### Perceived Potential Barriers to S-HIE Feasibility Among Healthcare Providers

**Seamlessness and Interoperability.** The majority of settings within Parkland are linked by a common EHR, with the

notable exception of the jail health and homeless outreach programs. Because those systems require a separate login process, providers reported they were functionally inaccessible due to the ‘hassle.’ Many providers alluded to this specific scenario to highlight that no matter the potential value of a S-HIE, seamlessness and interoperability with existing health system IT resources would be crucial to ensure that an S-HIE could and would actually be used across key settings.

**Perceived Potential for Misuse of S-HIE Data.** Healthcare providers shared their social service counterparts’ concern for the potential misuse of S-HIE data. Specifically, healthcare providers were concerned about the ability to limit medical record access to prevent misuse of information, particularly: 1) misinterpretation of medical data leading to inappropriate withholding of services, or 2) intentional withholding of services to populations with certain diagnoses (e.g., individuals with a history of substance abuse would be denied shelter or reported to police as potential criminals). Further, health providers were also concerned that individuals might be coerced into sharing sensitive information through the use of ‘blanket’ informed consents to access social services. These consents must be signed by individuals to receive shelter, food or other services and may require agreeing to other interventions unrelated to the service that is immediately requested (e.g., consents could be used to require individuals to share personal information via S-HIE in order to access services). Although these concerns were not considered insurmountable to implementation and use of a S-HIE, respondents cautioned that careful attention should be paid to considering what data elements should be shared, developing strategies to obtain

**Table 3. Characteristics of Town Hall Participants and Organizations**

Town Hall participants (N=39)	n (%)
Position	
Executive leadership	6 (15)
Manager	28 (72)
Front-line staff	4 (10)
Not reported	1 (2)
Types of services provided by organization*	
Health care <sup>†</sup>	19 (49)
Emergency assistance <sup>‡</sup>	18 (46)
Food assistance <sup>§</sup>	19 (49)
Housing assistance or shelter	12 (31)
Senior services	13 (33)
Child and family services	17 (44)
Other <sup>  </sup>	26 (67)

\* Categories are not mutually exclusive

<sup>†</sup> Primary care, inpatient care and home health

<sup>‡</sup> Includes a broad array of emergency services including food, clothing, and financial assistance

<sup>§</sup> Explicitly self-identified primary service as food assistance and/or had a food pantry

<sup>||</sup> Crisis management, drug and alcohol rehabilitation, counseling or other service not otherwise specified

informed consent, and managing access to data and training of S-HIE users.

**Town Hall Meeting Results**

**Desired Functionalities for a Social-Health Information Exchange.** A total of 39 participants representing Parkland and 13 social service organizations attended the town hall meeting (Table 3) to review interview findings, and provide further input into S-HIE design and development. Participants confirmed our interview findings and further emphasized that concerns about IT capability and resources as well as information privacy, security, and risk mitigation were the highest priority areas to be addressed in the next stages of S-HIE planning. Regarding technical functionalities, we identified 20 different potential S-HIE functionalities from our interviews (Table 4). Town hall

participants voted on these functionalities and prioritized the following as the top seven desired functionalities and data elements: 1) ability to view and update current patient/client demographic information, including full name, address, ethnicity, age, income, contact information, household information, and education; 2) ability to view and update standard eligibility documents, such as identification cards or drivers' licenses, proof of residence and proof of income required to apply for and receive services; 3) ability to view current patient/client health insurance coverage/assistance; 4) ability to search for and identify available assistance programs in order to inform and target referrals; 5) ability to view past and current specific social service referrals and resources arranged by other healthcare or social service providers; 6) ability to view current medical history including medical conditions, medications, social history, and allergies; and 7) ability to track and view encounter data from other agencies such as shelters,

**Table 4. Suggested Social-Health Information Exchange (S-HIE) Functionalities**

Category	Functionality	Description	Votes, n (%) <sup>*</sup>
Background information	Demographic information †	Ability to view and update current patient/client demographic information (i.e., full name, address, race/ethnicity, age, income, contact/household information, and education)	20 (7)
	Standard documents †	Ability to view and update standard patient/client documentation required by agencies to initiate service, such as social security card, identification, proof of residence and proof of income	18 (7)
	Insurance coverage/assistance †	Ability to view and update current patient/client insurance coverage or insurance assistance enrollment such as Medicare, Medicaid, social security disability insurance	16 (6)
Service eligibility	Functional assessments	Ability to view and update functional assessment information collected by health or social service providers, such as mobility, literacy and activities of daily living assessments to inform appropriate service recommendations	8 (3)
	Service requirements	View-only access to documentation and eligibility requirements to access services from health system and social service agencies	10 (4)
	Service identification †	Ability to search for and identify available coverage/assistance programs for which patient/client is eligible, in order to inform inter-agency referrals	24 (9)
Service history	Social services referrals †	View-only access to past and current referrals and resources (e.g., home care, shelter, etc.) arranged by health system or social service provider on behalf of patient/client	22 (8)
	Social services enrollment	Ability to view and update all current/active social service program enrollments across multiple community organizations and social service agencies	10 (4)
	Medical history †	Ability to view and update current or relevant medical history from health system or social service agency, such as medical conditions, social history, and allergies	20 (7)
	Medication prescription	Ability to view and update current medical prescriptions	14 (5)
Service planning, coordination, and delivery	Provider assignments	View-only access to health system or social service provider name who has worked with or is working with a patient/client	13 (5)
	Patient discharge	View-only access to health system discharge plan information, such as planned discharge date, patient instructions, prescriptions, follow-up appointments, and post-discharge medical procedures and/or equipment or other special needs	14 (5)
	Service request/referral	Ability to request appointment or referral services from health system or social service agencies on behalf of the patient/client	11 (4)
	Appointments	Ability to view and/or receive notifications regarding patient/client's current and upcoming medical and/or social services appointments	10 (4)
	Client tracking †	Ability to view and/or receive notifications regarding patient/client intake and/or encounter data from health system or social service settings	27 (10)
	Surveillance/quarantine	Ability to receive notifications if a patient/client needs to be placed under surveillance and/or quarantine for a serious medical condition	3 (1)
	Dietary requirements	Ability to view and receive notification of patient/client's medical condition requiring dietary restrictions and view suggested dietary plans	7 (3)
Research and reporting	Research study participation	Enable participation in inter-agency and cross-sector longitudinal service impact and outcomes studies	5 (2)
	Research data	Enable access to de-identified aggregated community-level data for use in general research or community needs assessments	8 (3)
	Reporting assistance	Enable access and aggregation of data to meet third-party reporting requirements	11 (4)

<sup>\*</sup> Total number of potential votes=273 (seven votes each × 39 participants). Two votes were not accounted for.

<sup>†</sup> One of seven top functionalities as determined by forced rank vote at town hall meeting

hospitals, jails or other service agencies and receive automated client intake notifications.

Though participants perceived many potential direct benefits of information exchange, they noted that having a functional and robust IT infrastructure alone was unlikely to ensure successful S-HIE implementation. They noted that in addition to addressing the priority areas identified above, the creation and maintenance of trusting relationships between organizations, fostered through face-to-face networking opportunities such as town hall meetings, would also be key to achieving successful community-wide uptake and use of the S-HIE.

## DISCUSSION

In this qualitative study, we investigated the potential for a S-HIE to enable improved information sharing, communication, and care coordination between safety-net healthcare providers and social service providers caring for a shared population. We found that providers shared the perception that activities across their sectors were aligned in purpose, that existing communication channels were inadequate to enable coordination, and that a S-HIE would be valuable in bridging communication gaps and enabling improved coordination across sectors. There was a great deal of optimism for the transformative potential of a S-HIE. However, this optimism was tempered by concerns around redundancy, lack of seamlessness and interoperability with existing IT systems; limited existing IT capability and resources for training and maintenance; liability for security breaches; and concerns for potential coercion and misuse of shared data. Desired initial functionalities of a S-HIE encompassed fairly simple transactional operations.

New models of primary care delivery, such as the patient-centered medical neighborhood, increasingly embrace a more holistic, community-based model of health and highlight the importance of addressing social determinants, but do not provide guidance for an infrastructure to systematically address these issues in a sustainable and longitudinal fashion. To the best of our knowledge, this is the first study to systematically explore the feasibility of creating an IT infrastructure that achieves improved coordination and potential integration across the healthcare and social services sectors. Though partnerships between healthcare systems and social services are proliferating, most use human networks of dedicated, trained personnel to coordinate care across sectors. Leveraging an IT infrastructure would potentially enhance the efficiency of such networks. For example, HealthLeads is an innovative clinic-based program that allows healthcare providers to ‘prescribe’ resources to meet social needs (i.e., food, transportation).<sup>24</sup> A health clinic provider must identify an unmet need and write a physical ‘prescription’ for resources to meet this need; the prescription is given to the patient, who brings it to a trained volunteer, who applies his or her personal knowledge to refer patients to available community resources. A S-HIE could enhance this

type of interfacing between health care and social services by enabling simplification and automation of parts of the referral process. This would lead to more efficient matching of patients/clients to available resources, and also to the creation of a longitudinal record of care, thus enabling continuous quality improvement, and rigorous and systematic assessment of the effect of such partnerships on health and community outcomes.

Our findings suggest that an operational technical infrastructure for the S-HIE is a necessary first step, but is ultimately insufficient to ensure sustained adoption and use across sectors. Policy innovation in concert with technological advancement will be necessary if addressing social determinants is a healthcare priority. Barriers to S-HIE adoption, such as redundant data entry due to onerous and disparate regulatory requirements for funding, could be addressed by policy support for standardizing requirements for social service agencies. Strong governance and IT policies are needed to foster increased IT capability and uptake among community partners, to promote common data sharing structures, and to provide clearer regulations to facilitate fluid information exchange between healthcare and social service providers.<sup>25</sup> Finally, new financing models and financial incentives that overtly foster partnership and align incentives between health systems and social service agencies will be key to ensuring the sustainability of the S-HIE and other initiatives similarly seeking to build effective cross-sector partnerships.<sup>26</sup> Lack of universal standards for interoperability and limited financial incentives have similarly been barriers to wider adoption of traditional HIEs.<sup>27,28</sup> S-HIE implementation will particularly need to focus on developing robust governance mechanisms in order to overcome these barriers. Further, to avoid exacerbating issues of redundancy and interoperability, S-HIEs should aim to integrate with regional HIE efforts where possible, though national HIE uptake currently remains limited.<sup>28</sup>

Our study had several limitations. First, it was conducted in a single county health system with an integrated EHR. Other health safety-net providers are likely to face additional challenges related to linking disparate IT platforms across different healthcare settings, further compounding the challenges of varying IT capabilities within social service settings. Second, we did not elicit perspectives from patient/client stakeholders due to resource constraints. This is an important additional perspective for future studies, particularly to explore and address concerns around privacy and potential misuse of sensitive information. Third, not all interview participants were able to attend the town hall meeting, and some town hall participants were not interviewees due to our town hall recruitment strategy (open invitation). However, we received confirmation and strong consensus from town hall participants for our interview findings.

## CONCLUSIONS

In conclusion, a social-health information exchange is an innovative and potentially feasible approach to bridging the



divide between the healthcare and social services sectors in Dallas County. To enable development and adoption of S-HIEs in communities across the country, concomitant policy interventions are needed to standardize regulatory requirements, foster increased IT capability and uptake among social service agencies, and to align healthcare and social service priorities. We envision the S-HIE as the IT backbone for implementation of alternate care delivery models such as patient-centered medical neighborhoods<sup>12</sup> and accountable health communities,<sup>15</sup> to optimize use of limited resources towards improving community health.

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REFERENCES

1. **World Health Organization CoSDoH.** Closing the Gap in a Generation: Health Equity Through Action on the Social Determinants of Health. Geneva: WHO; 2008.
2. **Bradley EH, Elkins BR, Herrin J, Elbel B.** Health and social services expenditures: associations with health outcomes. *BMJ Qual Saf.* 2011;20(10):826-31.
3. Centers for Disease Control and Prevention. CDC health disparities and inequalities report—United States 2013.
4. Robert Wood Johnson Foundation. Health Care’s Blind Side: The Overlooked Connection Between Social Needs and Good Health. 2011.
5. **Kushel MB, Gupta R, Gee L, Haas JS.** Housing instability and food insecurity as barriers to health care among low-income Americans. *J Gen Intern Med.* 2006;21(1):71-7.
6. Frequent Users of Health Services Initiative. Summary Report of Evaluation Findings: A Dollars and Sense Strategy to Reducing Frequent Use of Hospital Services. October 2008.
7. **Hwang SW, Henderson MJ.** Health Care Utilization in Homeless People: Translating Research into Policy and Practice. 2010. AHRQ Contract No. 10002.

8. **Etz RS, Cohen DJ, Woolf SH, Holtrop JS, Donahue KE, Isaacson NF, et al.** Bridging primary care practices and communities to promote healthy behaviors. *Am J Prev Med.* 2008;35(5 Suppl):S390-7.
9. **Dymek C, Johnson M, Mardon R, Hassell S, Carpenter D, McGinnis P, et al.** Clinical-Community Relationship Measures (CCRM) Atlas. Agency for Healthcare Research and Quality, 2013. AHRQ Publication No. 13-0041-EF.
10. **Isham GJ, Zimmerman DJ, Kindig DA, Hornseth GW.** HealthPartners adopts community business model to deepen focus on nonclinical factors of health outcomes. *Health Aff.* 2013;32(8):1446-52.
11. National Council on Aging. MD Link: Partnering physicians with community-based organizations. A toolkit to help physicians educate their colleagues on collaborating with community-based organizations that serve older adults. 2005.
12. Agency for Healthcare Research and Quality. Coordinating Care in the Medical Neighborhood: Critical Components and Available Mechanisms. 2011 Contract No. 11-0064.
13. **Bodenheimer T, Wagner EH, Grumbach K.** Improving primary care for patients with chronic illness. *JAMA.* 2002;288(14):1775-9.
14. National Committee for Quality Assurance. Standards and Guidelines for NCQA’s Patient-Centered Medical Home (PCMH) 2011. Washington, DC: 2011.
15. **Magnan S, Fisher E, Kindig D, Isham G, Wood D, Eustis M, et al.** Achieving accountability for health and health care. *Minn Med.* 2012;95(11):37-9.
16. **Pearson ML, Wu S, Schaefer J, Bonomi AE, Shortell SM, Mendel PJ, et al.** Assessing the implementation of the chronic care model in quality improvement collaboratives. *Health Serv Res.* 2005;40(4):978-96.
17. **Coleman K, Austin BT, Brach C, Wagner EH.** Evidence on the Chronic Care Model in the new millennium. *Health Aff.* 2009;28(1):75-85.
18. **Porterfield DS, Hinnant LW, Kane H, Horne J, McAleer K, Roussel A.** Linkages between clinical practices and community organizations for prevention: a literature review and environmental scan. *Am J Public Health.* 2012;102(Suppl 3):S375-82.
19. **Fernandopulle R, Patel N.** How the electronic health record did not measure up to the demands of our medical home practice. *Health Aff.* 2010;29(4):622-8.
20. **Bates DW, Bitton A.** The future of health information technology in the patient-centered medical home. *Health Aff.* 2010;29(4):614-21.
21. **Kuperman GJ.** Health-information exchange: why are we doing it, and what are we doing? *J Am Med Inform Assoc.* 2011;18(5):678-82.
22. Office of the National Coordinator for Health Information Technology. Beacon Community Program. Available from: <http://www.healthit.gov/policy-researchers-implementers/beacon-community-program>. Accessed 20 Jun 2014.
23. **Glaser BG.** The constant comparative method of qualitative analysis. *Soc Probl.* 1965;12(4):436-45.
24. Health Leads. A New Vision for Healthcare in America. Available from: <http://www.healthleadsusa.org/>. Accessed 20 Jun 2014.
25. **Eggleston EM, Finkelstein JA.** Finding the role of health care in population health. *JAMA.* 2014.
26. **Shortell SM.** Bridging the divide between health and health care. *JAMA.* 2013;309(11):1121-2.
27. California HealthCare Foundation. Ten Years In: Charting the Progress of Health Information Exchange in the U.S. February 2014. Available at: <http://www.chcf.org/publications/2014/02/ten-years-charting-hie>. Accessed 20 Jun 2014.
28. **Adler-Milstein J, Bates DW, Jha AK.** Operational health information exchanges show substantial growth, but long-term funding remains a concern. *Health Aff.* 2013;32(8):1486-92.