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Linking Community Resources in Diabetes Care: a Role for Technology?

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Abstract

Designing and implementing effective lifestyle modification strategies remains one of the great challenges in diabetes care. Historically, programs have focused on individual behavior change with little or no attempt to integrate change within the broader social framework or community context. However, these contextual factors have been shown to be associated with poor diabetes outcomes, particularly in low-income minority populations. Recent evidence suggests that one way to address these disparities is to match patient needs to existing community resources. Not only does this position patients to more quickly adapt behavior in a practical way, but this also refers patients back to their local communities where a support mechanism is in place to sustain healthy behavior. Technology offers a new and promising platform for connecting patients to meaningful resources (also referred to as “assets”). This paper summarizes several noteworthy innovations that use technology as a practical bridge between healthcare and community-based resources that promote diabetes self-care.

Keywords

Diabetes; Disparities; Lifestyle modification; Community resources; Community assets; Social determinants; Health services utilization; Community linkages; Health IT

Introduction

Researchers estimate that approximately 60 % of diabetes cases [1] and 30 % of diabetes complications [2, 3] can be prevented through lifestyle modification. These are not new findings, and comprehensive programs have been launched over the past decade to develop effective strategies for promoting healthy behavior. Community-based strategies have gained increasing attention and represent a promising area for development in chronic

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Compliance with Ethics Guidelines

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disease care [4•, 5, 6•]. In fact, the Chronic Care Model (CCM) recommends structural changes in six distinct areas, one emphasizing the mobilization of community resources [7]. However, recent systematic reviews of diabetes CCM interventions and diabetes internet interventions have noted the paucity of studies that link patients to community resources and have called for more work in this area to enhance patient-centered care for vulnerable populations [6•, 8•].

Accordingly, truly successful diabetes management and prevention programs will need to investigate this missing link between healthcare programming and local community context. When leveraged appropriately, linkages to community resources (e.g., farmer's markets, fitness centers, support groups) have been shown to improve outcomes in diabetes care [9], overcome health disparities [5, 10•], and reduce healthcare spending [4•]. All of these outcomes are critically relevant in current healthcare reform, making the development of effective methods increasingly urgent.

Technology is a promising vehicle for accomplishing these goals in a practical way. Its use in diabetes self-management has grown exponentially in recent years, particularly in areas of patient knowledge, self-monitoring, and personal health tracking. Many patients now have access to online portals to obtain educational material, mobile applications to record blood glucose measurements, and real-time feedback to monitor glycemic control over time [11]. The widespread application of these technologies affords health systems the potential to leverage community resources and reduce health disparities at an unprecedented level. One systematic review examined 16 studies employing health IT strategies to improve diabetes outcomes in minority patients [12]. In analyzing the system-centered challenges to program implementation, investigators noted a lack of health IT presence in community-level interventions and called for greater innovation in this area [12]. Indeed, technological applications that enhance linkages to local community resources may make diabetes programming more accessible, feasible, and culturally relevant in low-income neighborhoods already facing significant challenges to program adaptation and success.

As the diabetes epidemic continues to grow, multidisciplinary teams will be necessary for effective implementation of newly galvanized lifestyle strategies. Healthcare workers will need to embrace asset referral as a core competency, researchers and public health workers will need to design effective systems for surveying the local resource environment [13], and health IT will need to create novel strategies for integrating community resource data from the local environment into medical care workflows. These milestones are critical for the development of comprehensive programs that support healthy lifestyle choices. In this paper, we will discuss several noteworthy innovations that use technology as a vehicle for leveraging community assets in diabetes care. Though not a systematic review, we describe key studies being published and important projects being actively developed in the field at this time.

Conceptual Model

Our conceptual model, based on the Andersen Behavioral Model of Health Services Use [14, 15], has been adapted to illustrate key leveraging pathways for targeting community

resources and engendering behavior change (Fig. 1). To summarize briefly, healthcare systems and communities form a complex environment that drives health-determining characteristics for a given population. Central to this model is the dynamic interplay between population health characteristics and behavior. Downstream to health behaviors (e.g., lifestyle modification, diabetes self-management) are health outcomes (e.g., diabetes prevention and control) [15]. Traditionally, health services interventions have focused on directly influencing personal health practices at the health behavior level. However, the use of health services is an opportune contact point to redirect patients to the local resources that address both social determinants (Fig. 1, left) and patient needs (Fig. 1, right) to enable lifestyle modification. This is particularly true in low-income neighborhoods, where health-promoting resources are disproportionately limited compared to higher-income communities. Consequently, interventions that purposefully direct patients to the resources that *are* available can help patients more effectively navigate their local ecosystems in order to promote health.

Methods

We searched the PubMed and Ovid databases using combinations of the following keywords: community, community assets, community resources, community engagement, community health workers, integration, diabetes, chronic disease, chronic illness, technology, telemedicine, patient portal, m-health, mobile health, cellular phone, text messaging, behavioral prescription, exercise prescription, physical activity prescription, food prescription, and social prescription. We found many papers discussing technological interventions in diabetes care, but only included those specifically addressing community assets.

The terms “community asset” and “community resource” are used interchangeably. We also note that our conceptual model (Fig. 1) juxtaposes community resources between the “social determinants of health” (e.g., housing, food insecurity) and “needs” required for lifestyle modification (e.g., grocery stores for healthy diet, gyms for physical activity). We acknowledge that these are largely overlapping concepts and are often addressed in concert by the interventions discussed, rather than as distinctly separate entities.

We also use the terms “lifestyle modification” and “self-management” to describe separate but heavily overlapping strategies in diabetes care. While “lifestyle modification” is often used more broadly to describe patient activities that support both the prevention and control of diabetes (e.g., healthy dietary patterns, physical activity), “self-management” is often used to describe patient activities that support a comprehensive treatment plan (e.g., lifestyle modification plus glucose monitoring, medication adherence). We include interventions that target both strategies, with the understanding that “lifestyle modification” is heavily included in the framework of “self-management,” and both are privy to the influence of resource referral.

As such, though lifestyle modification is often more applicable to patients with type II diabetes, we also include type I diabetes as pertinent to this review. Patients with type I diabetes may not require the same weight loss or physical activity resources, but they do still

require significant community-based support and resources for self-management (e.g., dietary support, medication adherence). Additionally, those with type I diabetes tend to be younger and therefore may be more prone to engage with technological strategies.

Finally, various modes of technology will be discussed throughout this paper. As seen in our conceptual model (Fig. 1), technology creates a novel infrastructure for critical feedback triangulation between health systems and enabling assets. However, specific agents form the direct linkages responsible for leveraging these assets amidst a vast plethora of technological conduits. Therefore, we provide general definitions for the modes of technology used in the programs discussed (Appendix 1), but will categorize interventions by the functional health services agents linking patients to their local community.

Health Services Linkages to Community Assets

We describe a wide array of strategies using technology to leverage community assets in diabetes care, as well as suggestions for future directions. We have chosen to structure this review based on some of the agents referring patients to existing community-based resources: physicians, community health workers (CHWs), and social networks. These agents can be strategically leveraged as connectors and navigators in the complex local resource environment. In the last category, “integrated linkages,” the agents are automated and represent a modern fusion of health services linkages with the multi-technology platforms involved (see Appendix 2 for asset referral pathways; further detail will be described below).

Physician Linkages—Physicians are traditionally part of the front line for counseling patients on lifestyle modification and behavior change. Other healthcare professionals, such as nurses and diabetes educators, also play a critical role. However, recent evidence suggests that physicians—who are expected to give routine guidance on lifestyle modification during clinical encounters—often feel unequipped to address the patient needs required for change [16••]. For instance, a physician may feel confident in addressing a patient’s poor glycemic control by increasing mealtime insulin, but may feel helpless in addressing the unemployment that precedes poor medication adherence. In a report published by the Robert Wood Johnson Foundation, 85 % of physicians believed that patients’ social needs were important to addressing medical conditions, but only 20 % were confident in their capacity to address those needs [16••]. Some of the needs identified were directly related to lifestyle modification (Fig. 1, right, e.g., fitness programs, nutritional foods, and education), and others were related to the social determinants underlying poor health (Fig. 1, left, e.g., unemployment and housing assistance) [16••]. Despite widespread concern that these needs are affecting health outcomes, physicians encounter significant limitations to addressing them. Though other healthcare professionals undoubtedly play an enormous role in linking patients to assets, we have chosen to focus on physician linkages, given the unique challenges and prospective solutions in the field at this time.

With the rapid dissemination of electronic health records (EHR) and now widespread availability of electronic prescribing, several programs have taken advantage of this built technology to address those needs. One program, FoodRx, has developed collaborative

partnerships with Walgreens, local farmers' markets, and various health centers on the South Side of Chicago to create a "food prescription" program. Physicians taking part in this program can electronically prescribe vouchers for healthy food from various local vendors to underserved patients [17•]. Based on the premise that a physician's prescription serves as a powerful endorsement for motivating behavior change, FoodRx is an example of utilizing technology to broker the gap between physicians and local nutritional assets that support healthy eating. A recent qualitative study of the pilot program found high levels of patient and provider satisfaction. Anecdotally, patients were pleased to receive the prescriptions, and redemption rates were high with vouchers valued at \$10 or more. Additionally, the FoodRx program brought about positive changes to the organizational cultures and resources provided among community partners [17•]. Though a formal evaluation is still underway, preliminary evidence suggests great potential for FoodRx to help patients engage community resources and meet their dietary lifestyle modification goals.

Similarly, there has been significant interest in writing prescriptions for physical activity. The Green Prescription study, a randomized controlled trial performed in 1998, demonstrated improvements in physical activity over a 6-week period when patients were written "green prescriptions" for physical activity goals [18]. Since then, numerous studies have replicated this model and have demonstrated improved outcomes when physical activity is endorsed via provider prescription [19, 20]. In light of these findings, the South Side Diabetes Project has developed a program, ExerciseRx, to electronically prescribe community fitness resources to patients with obesity. The program is still in its early stages but has formed collaborative partnerships with the Chicago Park District to offer 6 months of free services at any of its 64 community-based locations [21•]. Physicians can e-prescribe an exercise voucher to any obese patient with a high-risk diagnosis (i.e., diabetes, hypertension, cardiovascular disease, and/or pulmonary disease), and locations offer a variety of resources, from indoor exercise equipment to group fitness classes [21•]. Particularly in low-income, low-access communities, this could be the critical link to successful implementation of "green prescription" programming. Though the technological interface is still being developed, ExerciseRx is a promising conduit for facilitating both provider endorsement of fitness goals at the health services level (Fig. 1, right) and access to the enabling resources necessary to achieve them at the population level (Fig. 1, left).

Community Health Worker Linkages—Increasingly, community health workers (CHWs) are being utilized to educate patients, help patients navigate the complicated healthcare system, and work with patients to set goals that individually tailor their care. We define CHW as a member of the patient's community being utilized in any of the aforementioned capacities but not formally trained as a clinical or healthcare professional. Community health workers have been shown to augment patient knowledge [22], improve clinical outcomes [23, 24], reduce disparities [25], and decrease costs [26] in diabetes care. One study even showed increased Medicaid savings when CHWs specifically matched patient needs to local resources [4•]. They are a natural broker between the use of health services and community-based services, and may be additionally effective when empowered with the use of health information technology (Fig. 1).

The Montana Diabetes Prevention Program (DPP) is a large demonstration project that uses community health workers to deliver diabetes lifestyle interventions in rural communities. A key component to the program is access to an on-site CHW that connects patients to local community resources. The program was launched in 2009 by the Montana Department of Health and developed in conjunction with local healthcare systems [27•]. Given the unique challenges of implementing an on-site intervention in Miles City, a remote town with geographic limitations to healthcare, the program piloted a telehealth intervention to deliver the same CHW intervention but via online portals to patients in this region. Participants in the telehealth arm were given instructions during a face-to-face intake visit, with ongoing support from a local telehealth coordinator. Community health workers were never present on-site in the telehealth arm but still created collaborative partnerships with local establishments to support lifestyle change. For instance, CHWs secured pool spaces at local hotels and indoor equipment at the local recreation center for patients enrolled in the study—all critical community assets to sustain realistic lifestyle change [27•]. As such, patients in the telehealth video conferencing arm were able to achieve similar diet, physical activity, and weight loss outcomes as patients receiving the intervention on-site [27•]. These findings suggest that telehealth programs, when developed in conjunction with local resources, are able to deliver effective diabetes care despite off-site access to health personnel.

City Health Works, based in East Harlem, NY, is a comprehensive CHW program that totes the tagline, “Unleashing sustainable behavior change.” Funded by a Centers for Medicare and Medicaid Innovation (CMMI) award, City Health Works recently launched a community health worker intervention using mobile decision-support applications to help patients manage their disease [28••]. The intervention targets patients with diabetes and hypertension in East Harlem and plans to expand to Dallas this year. Central to this program is a vast network of community partners that health workers can connect their patients to in “real time” through mobile support. Citywide fitness centers, yoga classes, cooking demonstrations, faith-based organizations, and health education classes are a few examples of the community resources offered by CHWs through the program [28••]. City Health Works began its pilot program in September 2013, and formal studies are still underway.

Social Network Linkages—Social networks have been heavily studied in describing behavior patterns among those with diabetes and obesity. Although some studies have linked social networks to unhealthy behaviors and poor health outcomes (e.g., the spread of obesity via social ties) [29], others have demonstrated that networks, when leveraged in health-promoting ways, can actually lead to greater self-efficacy and improved health outcomes [30–32]. Consequently, the widespread advent of social networking technologies now paves way for new opportunities in diabetes care. We define social networking as any online or mobile interface that gives patients the opportunity to make connections and share information with other users (e.g., social networking services or web forums). Though not immediately intuitive, social networking gives patients the unique opportunity to share knowledge about local resources that support successful lifestyle change. Indeed, most social networking tools are not specifically tailored to disseminate this knowledge, but they are well situated to target community-based assets moving forward. We discuss several

social networking programs that indirectly address community linkages, and suggest ways for making these linkages more overtly defined.

Web-based portals can enable social networking in diabetes self-management interventions. One team of investigators implemented the “My Diabetes Wellness Portal,” an interactive portal giving patients online access to self-management tools (e.g., glycemic tracking, educational materials, nutritional information) [33•]. Similarly, e-HealthyStrides is an electronic support program designed to deliver Diabetes Self- Management Education (DSME) from a patient’s home computer. Included in both interventions is a peer-to-peer social networking feature facilitating online discussions between program participants [34•]. These portals demonstrate the overall ease and feasibility of adding social networking to web-based interventions and also serve to inform future studies on how to structure forums to specifically address local resources. For instance, focus groups conducted after the Wellness Portal intervention period discovered that patients would have used web forum discussions more often if they were led by health workers (e.g., physicians or CHWs), on topics chosen by participants (e.g., discussion threads on community resources, home exercises, healthy cooking) [33•]. This is an interesting departure from the recent push for more patient-led initiatives. It appears that patients may actually desire more structured and guided web interventions, which could more advantageously use the social networking space to leverage health-promoting assets. Of note, additional structure and monitoring would also enable healthcare workers to engage patient feedback and prevent the spread of inaccurate or inappropriate information among networks. Indeed, social networking specifically purposed for peer-to-peer sharing of local resources would map virtual communities on to physical communities, facilitating more concrete linkages between healthcare programming and community-based care (Fig. 1).

Another example, TXT2BFiT, is a mobile phone-based program designed in Australia to enhance physical activity among young adults with obesity. Like most programs utilizing smartphone mobile applications, TXT2BFiT includes a constellation of features, including weight tracking, dietary recommendations, SMS reminders, and intermittent coaching calls. Novel to this program, however, is a community blog that enables participants to post comments or questions about their goals direct from their cellular phone [35•]. This real-time interaction not only connects young adults with similar health problems to one another but also enables information sharing at the level of modern social networking tools like Facebook or Twitter. If leveraged optimally, a patient’s need to exercise could be supported instantly with immediate options for physical activity in the local community, as well as community members who could engage with resources together. Overall, social networking tools are relatively new in diabetes prevention and management programs, but have significant potential to transform community resource referral by making options instantly accessible via mobile platforms. Again, more deliberate mechanisms that encourage users to post community resources and share their experiences could make mobile health interventions more relevant and effective— particularly among patient populations with limited knowledge regarding the health-promoting assets available to them.

Integrated Linkages—Physicians, community health workers, and social networks are all critical agents for connecting patients to community assets, but increasingly, health systems

are interested in constructing integrated technological processes that seamlessly connect patients to health information. By constructing these system-based processes, interventions are more efficient, reliable, and accessible to patients. In our conceptual model, the use of health services triggers automated linkages to enabling resources, which in turn facilitate changes in the personal health practices of patients via complex technological conduits (Fig. 1, Appendix 2).

My Diabetes Connect is a web-based program created in Birmingham, AL, that maintains a user-friendly database to help patients identify existing community resources in diabetes self-management and lifestyle modification. Patients can search for resources based on keyword, zip code, neighborhood, or resource category. The program is a joint venture between Cities for Life, a diabetes management program, and the University of Alabama's Diabetes Research and Training Center [8•]. By forming a multidisciplinary team with extensive web and tech support, MyDiabetesConnect is able to maintain a highly up-to-date and disease-relevant database of resources for healthy eating, physical activity, diabetes support, and healthcare. The website also has an "add a resource" function that allows community partners and members to contribute to updating the resource archives.

Similarly, the Southeastern Diabetes Initiative (SEDI) offers diabetes-specific listings for community resources that target diabetes care. As part of a Health Care Innovation Award (HCIA) led by the Informatics Department at Duke University, this project employs complex informatics systems to stratify diabetic populations and resources spatially by local neighborhood. Partnering with the Community Transformation Grant Project (CTG) and the Wellness Coalition in Cabarrus County, SEDI has created a multidisciplinary task force to harvest data from all electronic sources in each county, create an integrated data warehouse, and spatially organize the risk and asset assessments for a given population [36•]. This has led to creation of the Diabetes Resource Guide and Resource Cafe, available to patients on the Cabarrus Health Alliance website. Resources include the following: coping with diabetes, dental care, healthy lifestyle, nutrition, cooking, physical activity, food assistance, transportation, and housing [37]. Similar to the resources provided by the MyDiabetesConnect project in Birmingham, patients can navigate the website and determine which resources are relevant to helping them meet patient-centered goals in diabetes care. The formal evaluation of this project is underway, with a study completion date estimated for later this year.

While MyDiabetesConnect and SEDI are programs with systems in place to identify resources effectively and organize them for mass distribution, Health Leads is the first among several examples attempting to further hone and contextualize the resources being offered. Health Leads is a nonprofit organization that leverages multiple components of the clinical encounter to connect patients to community resources. With the tagline, "Better health, one connection at a time," Health Leads was founded in Boston, MA, and has now expanded to hospitals and health centers in Baltimore, Boston, San Francisco, Chicago, New York City, Providence, and Washington DC. Patients are first identified by clinic staff members as having social needs that affect their health. They are subsequently referred to a trained volunteer, who meets with the patient to discuss the specific needs identified. The volunteer then uses a sophisticated technology platform for resource referral, linked to a

geographic information system (GIS) with mapping and search engine capabilities [28•]. Though not diabetes specific, the resources targeted address the fundamental social determinants (Fig. 1, left) affecting health that have been linked to poor diabetes outcomes [10•]. Assistance with housing, education, healthy food availability, electricity, and employment are just a few examples of the social assets offered through Health Leads. A preliminary study published in 2012 showed that more than 10 % of families at a low-income urban health clinic were identified as having unmet social needs, and of those families, over 50 % were successfully connected to community resources (measured by direct contact with the appropriate service) via the Health Leads model [38•]. A more recent follow-up study published in 2014 showed that among children from low-income families, those engaging with the Health Leads program had higher patient satisfaction, stronger perception of the clinic as a medical home, and fewer avoidable hospitalizations [39•]. Indeed, these findings are convincing evidence that an aggressive and targeted approach to community resource referral has tremendous potential to impact patient care and health outcomes.

HelpSteps, another program based in Boston, MA, is also interested in aggressively targeting community resources to meet patient needs, but utilizes a more comprehensive technological interface to limit the staffing needs required to identify and refer patients. HelpSteps, similar to Health Leads, utilizes the clinic waiting room to engage patients with unmet social needs. However, rather than interfacing with a trained volunteer, patients are given a laptop or tablet to (1) screen for social needs and (2) offer immediate referral to community-based resources. The HelpSteps electronic program can either lead patients through a guided questionnaire to help them identify their needs or offer patients the option of skipping the questionnaire to search the database directly. At the end of the stepwise process, patients receive an automatically generated printout of tailored resources [28•]. Some of the services offered include income security, housing, domestic violence, nutrition, fitness, and mental health. A recent study of the HelpSteps intervention showed that among urban young adult patients ages 15 to 25 years old, electronic screening identified 76 % to have an unmet social need affecting their health [40•]. Among patients receiving a HelpSteps referral, 40 % contacted a community resource, of which 52 % resolved their main problem [41].

Finally, CommunityRx is an innovative, multifaceted program that attempts to combine a technologically streamlined approach with community-based information support and problem-specific tailoring of community resources. Utilizing a complex, geographically coded information system, 'HealtheRx prescriptions' are generated at each clinical encounter, directing patients to local community resources that address problems identified in the electronic health record (EHR) [42]. Unique to the CommunityRx model, all patients in qualifying zip codes are automatically given a HealtheRx prescription based on ICD9 codes rather than a physician- or survey-identified need. By offering resources to all patients, CommunityRx identifies populations rather than individuals who are at higher risk for having unmet needs. Moreover, resource referral based on ICD9 code identifies and categorizes resources that are effective among all patients with a specific diagnosis. For instance, community resources for healthy eating and physical fitness are automatically generated for any patient with a diabetes diagnosis, thus normalizing the need for nutritional

food and safe exercise spaces for all patients with diabetes. Patients are also offered additional support from a community health information specialist (CHIS), giving them the opportunity to interact with a live person if necessary. This intervention was designed as part of a Centers for Medicare and Medicaid Innovation (CMMI) Award, and formal evaluation of the intervention is underway. However, it shows tremendous potential as a model for community resource referral that combines the sophisticated technological platforms of Health Leads and HelpSteps, while brokering the focused disease-management goals of MyDiabetesConnect and SEDI.

Discussion

As healthcare continues to shift toward population health management, diabetes outcomes can be dramatically improved by leveraging the rising technological infrastructure to connect patients to community resources and provide seamless support for diabetes management. We have described several promising examples of strategies currently underway, and although not yet broadly implemented to scale, there is early evidence suggesting that these strategies may be cost-saving and effective [4•, 5, 38•, 39•, 40•, 41].

Many of the projects described are still in the early stages of design and implementation. However, we believe that these four leveraging pathways (healthcare workers, CHWs, social networks, and integrated platforms) hold the most potential for using technology to integrate community resource referral into routine health services utilization (Fig. 1). Currently, interventions that use CHWs and integrated platforms have the most preliminary evidence to support their application. The Montana DPP showed equal gains in behavioral outcomes (i.e., diet and physical activity goals) and clinical outcomes (i.e., weight goals) when CHWs paired remote telehealth coaching to local resource referral in patients with diabetes [27•]. Among integrated linkages, Health Leads and HelpSteps both provide preliminary evidence for effectively addressing social determinants and patient needs [38•, 39•, 40•, 41]. All integrated programs have plans to evaluate the cost-effectiveness of their interventions, but only Health Leads has demonstrated evidence of cost-effectiveness to date (i.e., reducing avoidable hospitalizations) [39•]. The Health Leads model has been widely disseminated across seven urban centers and continues to spread. The CommunityRx model, though still undergoing formal evaluation, has also been disseminated to additional health systems, with plans for implementation in Harlem, NY, and Dublin, Ireland. These preliminary results are compelling and suggest ample opportunity for ongoing development of technology-driven approaches in community asset referral.

Nonetheless, technology will not be an easy solution to the formidable challenges inherent to lifestyle modifications required for diabetes control [6•, 12, 43]. There are important potential barriers to the successful implementation and evaluation of programs that help patients make better use of the resources available to them. First, some critics argue that community-level interventions fall within the domain of public health and outside the financial jurisdiction of traditional healthcare entities. Undoubtedly, creating up-to-date, geographically relevant information catalogs can be labor intensive and time-consuming, raising concerns for excessive antecedent costs. Therefore, rigorous cost analyses of early

resource referral programs will be an essential next step to proving the sustainability and scalability of such interventions.

Second, the study design of diffuse, real-world technology interventions is often difficult. Sample sizes may be small, and randomization may not be feasible. Spillover effects (as patients share information about local resources with fellow patients and neighbors), while key to knowledge transfer and dissemination in practice, may contaminate comparison groups and make effects difficult to accurately measure. Finally, technological interventions are often comprised of multiple features deployed simultaneously, but may benefit from stepped trials that can test individual components apart from the whole. Consequently, the execution of novel and well-designed evaluations can be challenging. Without strong, widespread evidence to support the cost-savings and effectiveness of such interventions, health systems may be unwilling to invest the capital necessary to develop programs of their own.

However, as payment models move from traditional fee-for-service to value-based models under the Affordable Care Act (ACA), healthcare organizations may have increasing financial incentive to invest in these programs—particularly in socially disadvantaged, high-risk communities [44, 45]. Accountable care organizations (ACOs) and bundled payment models (e.g., capitation) will inevitably reward health systems for the population-based outcomes of their constituents [45, 46]. By referring valuable community-based assets to patients with chronic illness, health systems may simultaneously improve population-based outcomes and more strategically allocate limited healthcare dollars in prevention. Especially in low-income neighborhoods where high-quality resources are scarce yet necessary to enabling lifestyle modification, health systems now have greater motivation to collaborate with community partners to make substantive gains in value-based care. Therefore, evidence-based strategies are eminently relevant and timely in our current reform landscape, impelling meaningful expansion of literature in this field.

Conclusions

In an era when the prevalence of diabetes has grown to nearly 21 million people in the USA, with estimated costs of over \$174 billion annually [43], sober appraisal of our current intervention programs is essential to changing the unrelenting tide. Though a complex and ambitious undertaking, reforming health systems practices to engage community-based resources represents a strategic shift for sustaining lifestyle to meet patients' needs within local community settings, healthcare becomes better positioned to effect change at the most fundamental unit: daily life. In a disease impacted by basic patient decisions from grocery shopping to stress management, the pervasive use of technology affords us a novel opportunity for facilitating this shift. Particularly in low-income minority communities, strategies that help patients identify enabling resources may be paramount to reducing the wide, community-level disparities in diabetes care. This paper highlights several noteworthy innovations, which can enable physicians, health workers, researchers, community developers, and health departments to begin envisioning, designing, and implementing their own strategies to mobilize assets and improve health.

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