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MAPPING THE NAVIGATION SYSTEMS OF PENNSYLVANIA: OPPORTUNITIES FOR THE FUTURE

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EXECUTIVE SUMMARY AND RECOMMENDATIONS

When a vulnerable person needs help in Pennsylvania, they face a daunting task. They must navigate a fragmented and ever-changing landscape of benefits, services, and programs scattered across an array of providers. There are several steps necessary for an individual to receive help. First, they must identify a need and choose to seek help. Then they need to identify the benefit, program, or service that meets their need and the provider offering that service. They must determine if they are eligible to receive help. Next, they need to enroll in the benefit, program, or service – often requiring them to produce documentation and complete applications. Finally, they must persist in receiving the service. For some services or programs, this may entail multiple visits.

Throughout this process, individuals may experience internal or external barriers. Internal barriers include lack of trust in institutions; low self-efficacy; inadequate knowledge about benefits, services, programs, and providers; inadequate knowledge about obtaining documentation; internalized racism; and literacy challenges. External barriers include inaccurate or incomplete provider knowledge about benefits, services, programs, and providers; poor referral management; inadequate organizational capacity to follow-up; and structural and institutional racism.

Navigation systems are an emerging response to this problem. Navigation systems describe *organizational arrangements designed to support individuals in locating and obtaining valuable benefits, programs, and services.* Research on navigation has found that it can reduce costs of care and result in greater client wellness. Moreover, navigation benefits are most potent for at-risk and marginalized populations because they often manage a more complex set of co-occurring needs. These systems are designed with three core elements:

- human navigators who help individuals chart a path to receiving appropriate benefits, services, and programs;
- referral platforms that support referral processes (i.e., case management and community resource referral platforms);
- and the nature of the intervention, or where the navigation system intervenes during the help-seeking process (e.g., identifying needs, matching individuals with providers, enrollment, support when receiving help).

In the summer of 2021, The Heinz Endowments contracted with Social Impact Network Consulting to examine navigation systems' proliferation, designs, and implications in Pennsylvania. Based on interviews, they identified 20 independent navigation systems. Over fifty percent of these systems were created in the past three years. However, that number underplays the significance of changes to the navigation system market because all the healthcare and insurance-originated systems were created in the last five years. These navigation systems differ based on origin, design, and the outcomes they measure. This report outlines these systems' inherent advantages and disadvantages and identifies urgent opportunities to consider as these systems expand.

There are four navigation designs examined in this report: community connectors, demanded directories, healthcare developers, and system integrators (see Table 1). Navigation designs describe how human navigators, referral platforms, and the nature of the intervention combine. Their intersections describe the character of navigation systems better than any single element (e.g., referral platform adopted). The table on the following two pages summarizes the four designs.

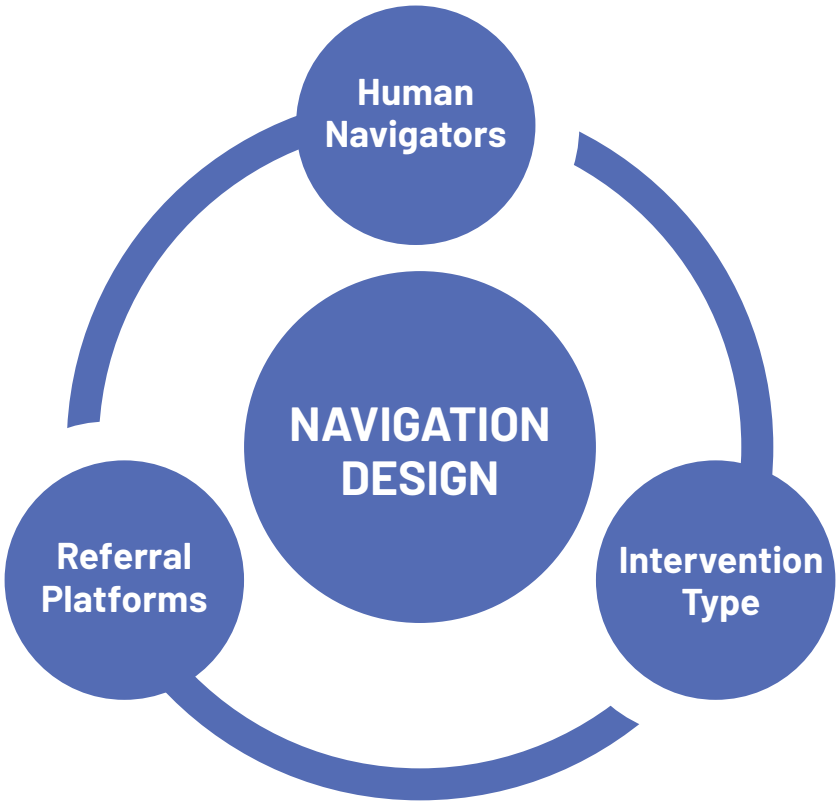


Table 1: Summary of Navigation Designs

TYPE	DESCRIPTION	TYPICAL ADVANTAGES	TYPICAL DISADVANTAGES	PENNSYLVANIA EXAMPLES
COMMUNITY CONNECTOR 	• Utilizes local, community-based navigation that prioritizes human navigators • Often takes a client-centered goals approach • Works with clients throughout the help-seeking process	• Possesses greater community trust than many institutions in marginalized and oppressed communities • Has context-specific, linguistic and cultural competencies	• Lacks technology and data systems necessary to track referrals and hold institutions accountable • Lacks internal evaluation capacity to refine processes over time	Community Care Hub Hello Baby Hill District Consensus Group Immigrant Services and Connections Macedonia FACE RentHelp Steel Smiling
DEMANDED DIRECTORY 	• Creates and maintains a complete, up-to-date directory of all the available programs and services in the community • Matches clients to the appropriate services • Human navigators are available via phone, messaging, or in-person office hours to help match clients to services	• Offers immediate, round-the-clock help • Collects and utilizes quality assurance metrics to ensure quality interactions with callers • Can address a high volume of clients	• Provides little support for the later stages in the help-seeking process • Lacks information about the outcomes of client referrals	AgeWell Pittsburgh PA 211[i] PAVet Connect

TYPE	DESCRIPTION	TYPICAL ADVANTAGES	TYPICAL DISADVANTAGES	PENNSYLVANIA EXAMPLES
HEALTHCARE DEVELOPER 	• Combines health information and human service needs to address the social determinants of health • Referrals are stored in the electronic medical record	• Has the most extensive data about how human service organizations reduce the cost of care • Can screen all patients for unreported human service needs	• All referrals originate from healthcare providers • Systems are not necessarily compatible with human service organizations' existing systems, and information about whether clients received services depends on providers' willingness to report using a separate system	Community Connection Project Highmark Aunt Bertha[ii] Neighborly PA
SYSTEM INTEGRATOR 	• Utilizes a closed network strategy and closed-loop referral platforms • Supports the client throughout the entire referral process and provides advanced analytics on referral outcomes	• Provides comprehensive support to clients throughout the help-seeking process • Uses advanced analytics to track the accuracy, efficiency, and outcomes of referrals to various organizations • No wrong door network allows clients to access services from any organization in-network	• Requires full network participation to work effectively • May neglect community-based efforts if they do not have the capacity to participate • May create a second shadow system if agencies elect not to use the platform	Allegheny LINK PA Serves Unite Pennsylvania

The emergence of this new field of navigation systems in Pennsylvania has the potential to make help-seeking less daunting for individuals. However, there are several concerning risks if the field is left unchecked.

- The Pennsylvania landscape is filled with siloed navigation systems that house unique resource directories, client data, and analytics. Only a handful of the twenty navigation systems in this research work together. System managers are often missing critical information about client needs and the outcomes of previous referrals. Each system engages in its own costly process of keeping the resource directory up to date, duplicating efforts. And clients bear costs too. They must decide which of the possible navigation systems they are eligible to use and which provides the right level of navigation support. For each navigation system they utilize, they must complete a new intake history. Poor experiences in any navigation system degrade trust in the whole field.

- Navigation systems have the potential to replicate structural and institutional racism. Most navigation systems operating at scale require a person to seek help from an institution to receive navigation support. Marginalized and oppressed communities (e.g., Black, Latin(x), veteran, and immigrant communities) are less likely to trust and seek help from institutions than their privileged counterparts. If navigation systems do not incorporate community-based organizations and bridge-builders, these systems will exacerbate health and economic inequity.

> Trusted, trained, and trauma-informed Black folks are ideal when it comes to supporting the wellness needs of their neighbors. They have a collection of lived experiences that can't be duplicated and deserve to be dignified. Black Community Mental Health Advocates are the missing piece to an ever-evolving engagement and treatment landscape.
>
> - JULIUS BOATWRIGHT, Steel Smiling

- Increasingly, institutions are investing in referral platforms to address navigation problems. Because each institution is creating its own navigation system, resources are being directed to more significant overhead. These funds are not often invested in the human service organizations providing the services, often taxing their capacity without aligning revenue streams to cover their increased costs.

Based on these findings, Social Impact Network Consulting makes the following recommendations:

01 None of the current navigation systems is the singular solution to improve the help-seeking process. The trust and relationships community connectors have with marginalized and oppressed communities needs to be paired with the accountability and innovation of system integrators. All navigation systems need the up-to-date directories and quality assurance processes mastered by demanded directories. And navigation that does not include referrals for medical care is incomplete. Through their regular screening of patients, healthcare developers offer the most comprehensive solution to identifying human service needs combined with medical needs. In short, each of these navigation systems holds critical assets that are not currently replicated in the other navigation systems.

Working in concert, holistic and effective navigation systems should include the following elements:

Human navigators

- **Community Resource Navigators and Health Workers:** Individuals who have trust and lived experience in marginalized and oppressed communities play a critical role in helping individuals identify needs and encouraging them to seek help. These individuals should be part of any navigation system that hopes to promote health and economic equity.
- **Coordinators:** These individuals can monitor system analytics and intervene in referrals that are slow to resolve, complex, or high-risk.
- **Managers:** They can evaluate provider performance and take corrective action in the case of poor performance. And they can identify unmet needs and inform system investments.

Referral platforms

- Platforms should use **closed-loop referrals** to support the entire help-seeking process. Closed-loop referrals document the status of requests without requiring clients to provide updates.
- Referral platforms must include **up-to-date resource directories.** Human resources dedicated to keeping the referral directory up to date are required. Navigation networks may elect to use support staff from the referral platform vendor, resource directory licensure from United Way 211, or invest in their own staff.
- Platforms should **support data interoperability and system integration.** They should include HL7 and SMART on FHIR APIs, the most common interoperability APIs for referral platforms.

02 Ideally, one network would be implemented that meets both doctors' and community-based social workers' needs; however, that is an unlikely scenario. Given that reality, navigation systems need to work in concert to avoid new silos that reduce the quality of care. The moment calls not for the adoption of a single technology platform but the development of data standards and the use of application programming interfaces (APIs) to coordinate existing technologies in Pennsylvania. Hospitals, health insurers, state governments, and statewide nonprofits need to come together to identify and adopt statewide standards. These standards and agreements should include resource directories and fields in client records. Ideally, data standards would be set by the Office of the National Coordination for Health Information and then adopted by the Centers for Medicare & Medicaid Services. However, in lieu of federal action, state leaders must create agreed-upon standards. The resource directory and client-data standards should be creative commons licensed to reduce the burden on taxpayers and community connectors.

In addition, navigation systems that serve the same local county should develop data-sharing agreements. These data-sharing agreements should use established client privacy standards (e.g., HIPAA, FERPA). They would reduce the duplication of effort when maintaining resource directories and allow clients to maintain their service history as they age into or qualify for other navigations systems.

Healthcare developers, system integrators, and philanthropy will need to pay the last mile costs to integrate referral platforms with the existing systems used by community-based providers. New investments will reduce the additional coordination costs otherwise borne by community organizations. And new financial models will be needed to ensure that referrals don't shift work to these organizations without providing revenue to sustain the work (e.g., address the wrong pockets problem).[iii]

Redesigning systems of care is complex work. But navigation systems that meet the needs of all people, especially marginalized and oppressed communities, are essential to addressing economic and health inequity and rising healthcare costs. The time for greater systems alignment is now for Pennsylvania.

INTRODUCTION AND GOALS

Affordable housing, employment, safety, mental and behavioral health, affordable legal services, transportation, income support, benefits navigation, education, and health – many organizations are dedicated to meeting these singular needs. However, increasingly health and human service agencies recognize that greater coordination is needed to meet clients' needs. For example, research on the social determinants of health finds that human services like affordable housing and income support significantly impact an individual's well-being and longevity.[iv] However, until recently, the healthcare and human service sectors have operated as independent bodies which rarely, if ever, intersected or collaborated.[v] Similarly, socio-cultural models suggest that problems, such as community violence and substance abuse, are intertwined with community and society problems. Because human needs are related, greater coordination among human service providers and healthcare providers is needed.

Navigation systems have emerged in the last decade to address these interdependent social issues. Navigation systems describe *organizational arrangements designed to support individuals in locating and obtaining valuable benefits, programs, and services.*

These systems are designed with three core elements:

- human navigators who help individuals chart a path to receiving appropriate benefits, services, and programs;
- referral platforms that both support referral processes and provide analytics on the outcomes;
- and the nature of the intervention, or where the navigation system intervenes during the help-seeking process (e.g., identifying needs, matching individuals with providers, enrollment, support when receiving help).

Routinely, news reports detail the importance of addressing social and economic needs to improve health outcomes and control costs,[vi] particularly in low-income populations. However, these systems originating from health care organizations, states, counties, municipalities, and human service nonprofits have created a dizzying array of technology platforms[vii] and network designs.[viii] This remarkable growth has led to overlapping systems that tax local community-based organizations and segment clients based on eligibility requirements.[ix] These trends are evident in Pennsylvania.

This report details the various navigation system designs in Pennsylvania. Its goals are three-fold.

1. Describe the common navigation designs in Pennsylvania and detail the advantages and disadvantages of each.
2. Identify the opportunities and challenges that the proliferation of these systems, including systems that serve specialized populations, create.
3. Detail the emerging best practices for navigation system analytics and determine outcomes, including the data requirements and areas for growth.

Previous research has identified networks relevant to the veterans in Pennsylvania[x] and reviewed the most common technology platform features.[xi] However, no study has addressed the navigation designs and how the technologies support those designs. Moreover, research to date has focused on a single client[xii] population (i.e., veterans, seniors), ignoring the interdependencies in systems where the same providers serve multiple client populations.

THE CASE FOR SYSTEMS ALIGNMENT IN HEALTH AND HUMAN SERVICES

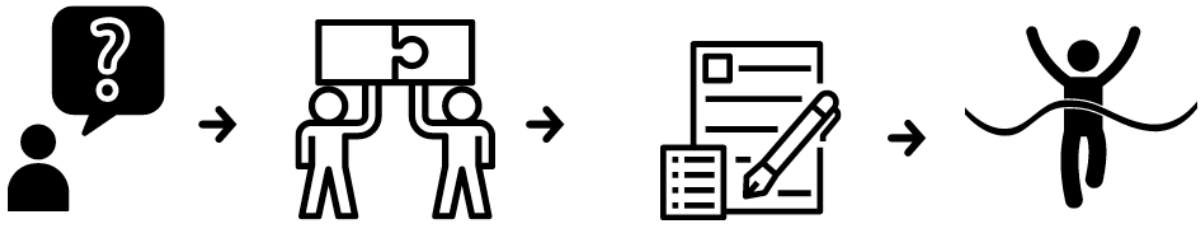
The social determinants of health—housing instability, food insecurity, transportation, education, utility needs, interpersonal violence, family needs, employment and income needs, and more—fall outside the current United States health care system. Yet, they often have a significant impact on an individual's well-being and longevity.[xiii] Moreover, human services are provided by multiple community-based organizations, requiring clients to navigate a complex organizational landscape. Patients in need often do not know how to access proper care, cannot follow through with proper care, or get the care they need but end up falling ill once again after returning to their previous social environment.[xiv]

CHALLENGES INDIVIDUALS FACE IN RECEIVING HELP

Individuals who need health and human services are faced with a fragmented system. Navigating the sea of providers with different eligibility criteria, hours of operation, and capacity to meet needs is challenging. From the perspective of the individual that needs help, there are several steps to receive help (see Figure 1).

First, an individual must identify that they have a need, or a set of needs, and be willing to seek help. Several factors can hamper this process. Individuals may have had negative experiences with institutions. These experiences may reduce the trust they have in institutions to

Figure 1. The Stages of the Help-Seeking Process



1 CLIENT IDENTIFIES NEED AND IS WILLING TO SEEK HELP

2 MATCH BETWEEN CLIENT NEED AND PROVIDER WHO CAN MEET THAT NEED

3 COMPLETES ENROLLMENT INCLUDING PROVIDING NECESSARY DOCUMENTATION

4 RECEIVES SERVICES

meet their needs. Additionally, individuals may have low self-efficacy or confidence that there is anything they can do to change their circumstances. Finally, individuals may have internalized racism,[xv] where they have come to accept messages of unworthiness, blame, or stigma. Their experiences of interpersonal racism may limit their willingness to accept help. Their fear of continued interpersonal or institutional discrimination leads to a greater distrust of institutions.

In the second step, individuals must identify which benefits, programs, or services (hereafter services) they are eligible to receive and find a provider. This step requires knowledge of a complex set of services, eligibility requirements, and providers. This information is constantly changing as organizations amend their services and governments amend their eligibility criteria. Many individuals lack this specialized knowledge – including individuals employed at health and human service agencies that may provide suggestions. Individuals may be referred to an organization where they do not qualify for services, that no longer offers a program, or that does not have the capacity to meet their needs. Marginalized and oppressed communities face structural, institutional, and internalized racism barriers. Structural racism[xvi] barriers include, but are not limited to:

- employment-dependent health insurance systems, limiting access to primary care,
- unequal distribution of wealth (e.g., household assets),
- residential segregation, coupled with inadequate infrastructure (e.g., services, transportation) and environmental hazards,
- and discriminatory incarceration.

Institutional racism[xvii] includes different quality communication about services and options based on client stereotypes, different referral rates based on stereotypes of cultural assumptions, and decisions made by providers about the appropriateness of services influenced by social determinants.

Third, a client must complete the enrollment process and submit documentation to receive services. Again, clients must have the ability to complete the enrollment process and locate the appropriate documentation to receive services. The process can be limited by both traditional and, in some cases, digital literacy challenges. Traditional and digital illiteracy[xviii] is associated with race, education, and socioeconomic status. Additionally, individuals may lack the knowledge of how to obtain the documentation needed to apply for services. Institutions often create this documentation, requiring individuals to know which institutions produce which documentation and navigate those institutions' processes for receiving documentation. Enrollment and documentation processes are also influenced by structural, institutional, and internalized racism.

Finally, the client receives services. They must have the resources (e.g., time, transportation, childcare) necessary to access the services. Unstable housing, employment, or social support can hamper clients' persistence in receiving help. These challenges are exacerbated by structural, institutional, and internalized racism.

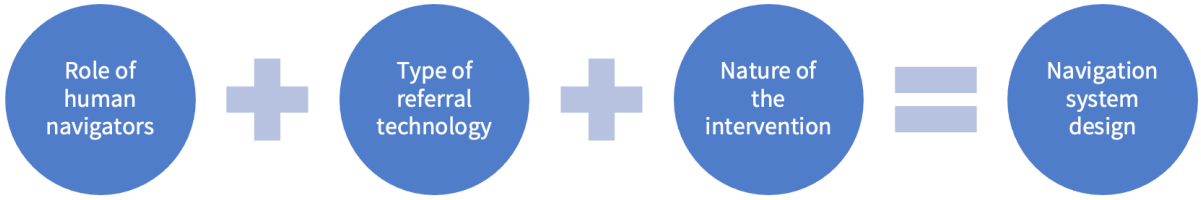
INTRODUCING
NAVIGATION SYSTEMS

Given the number of steps and challenges individuals experience in receiving help, many organizations have introduced navigation systems. Navigation systems may help individuals in any step of the overall process of receiving help. Some navigation systems specialize in one aspect of the overall help-seeking process (e.g., matching clients with programs), and others attempt to support the entire process.

Nascent research suggests that these navigations systems significantly improve client outcomes. For example, CommunityRx is a three-component health improvement innovation that connects clinics to communities.[xix] The three components of this platform include a youth workforce program named "MAPSCorps," community health information specialists, and an IT referral platform for community resource prescribing. Analyzing the results of implementing CommunityRx, the study found that collectively the three components provided more than eight million community resource referrals, significantly decreased knowledge gaps, and were found helpful by 83% of participants. Similarly, the Goods Smart Health app is a technological platform created for household registration, assessment, and health diagnosis.[xx] This case study, conducted in Kisii County, Kenya, followed the introduction and response to two mHealth initiatives implemented through the Goods Smart Health app: closed-loop referrals for maternal and child health and HIV self-testing. This technology increased the frequency of completed referrals and community health worker visits, and follow-up visits. These results indicate that navigation systems can be valuable in overcoming the obstacles and stigmatization often associated with help-seeking. Furthermore, the results highlight the possibility for increased and sustainable high-quality care for all in the community.

ELEMENTS OF NAVIGATION SYSTEM DESIGN

Figure 2. Elements of Navigation Design



Navigation systems differ depending on the role human navigators play, the technology's characteristics that support navigation, and the nature of the intervention (i.e., where the navigation system intervenes during the help-seeking process).

First, many navigation systems rely on human navigators to guide individuals to the appropriate services. These human navigators include, but are not limited to:

- call center operators,
- social workers,
- community health navigators/workers,
- community outreach advocates, and
- coordination center employees.

Some of these navigators are employees with specialized training. Others are local community members that receive training and, at times, a small stipend.

Second, navigation systems are often, but not always, supported by technology. The technology systems vary and include searchable resource directories, referring organization case management systems, and more complete referral platforms.

> The diversity of the ISAC staff is central to the program's success. The use of bilingual/bicultural Navigators builds trust within the communities we serve, helps ensure that services are provided in a culturally competent manner and improves our continuing education opportunities for service providers working in a growingly diverse region.
>
> - BRENDA GREEN, Immigration Services and Connection

The two primary functionalities of referral platforms are a resource directory and referral management. Resource directories are searchable and regularly updated lists of community-based organizations and agencies providing services to address human service needs. Referral management describes how referral platforms send referrals to community organizations and track referral outcomes.[xxi] Other functionalities include privacy protection, systems integration, care coordination, case management, reporting and analytics, social needs screening, and auto-suggested resources. Appendix 1 lists some of the features that differentiate these referral platforms from each other.

Finally, navigation systems support different stages of the client's help-seeking process (See Figure 1). In general, there are three categories of systems in this regard. First, some systems, like PA 211 and Aunt Bertha, primarily focus on the front end of the process, helping individuals identify their needs and match them to appropriate services. Second, some systems, especially those supported by the state (e.g., COMPASS), focus on the enrollment process – offering systems that help individuals complete the enrollment process and submit the documentation necessary to receive services. Finally, the third group of providers focuses on the entire process, starting with identifying the individual's needs and ending when a client successfully receives services (e.g., PA Serves, Community Connection Project). The nature of the intervention influences the types of reporting and analytics they focus on.

METHODS

Social Impact Network Consulting conducted interviews with network and community leaders across Pennsylvania. These interviews focused on how navigation systems worked in practice from the perspective of navigation network leaders. A list of networks is included in Appendix 2. The interviews were conducted via videoconference.

Social Impact Network Consulting identified the initial interviewees from key informants at The Heinz Endowments and the Allegheny County Department of Human Services. The interviewer asked interviewees for additional nominations based on their experience. In total, they conducted 25 interviews and identified 20 navigation systems. Although it is unlikely that all the navigation systems in Pennsylvania are represented in this analysis, the sample is sufficiently diverse to understand the design features and trends. The interview protocol is included in Appendix 3.

ORIGINS OF PA NAVIGATION SYSTEMS

In Pennsylvania, navigation systems have originated from seven entities, each with its own rationale for providing navigation: the United Way, State of Pennsylvania, county and municipal government agencies, local community-based organizations, national network catalysts, healthcare organizations, and technology platform developers. These origin organizations act as a convener for the network and often its ongoing manager. However, the convener is not necessarily the only or even the primary funder.

One of Pennsylvania's oldest and best-recognized navigation providers is PA 211, coordinated by the United Way of Pennsylvania. United Ways across the country have recognized their deep knowledge of community-based organizations and community needs, leveraging their work in community impact reporting. These assets made them well suited to develop 211 systems. PA 211 serves over 230,000 clients per year. They operate a 24-hour, seven-day-a-week call center. In addition, of all the networks in Pennsylvania, they invest most heavily in creating an up-to-date resource directory. Each of the four regional call centers has a team that maintains the directory, and each of the call center employees can also request an update if they receive new information.

The second group of networks originates from the state. The COMPASS system is designed to help individuals who are eligible for benefits to apply. Individuals can complete an application and receive their health and human service benefits from the state. It's a single access point application for health care coverage, SNAP benefits, cash assistance, long-term living services, home energy assistance programs, free or reduced-cost school meals, and subsidized childcare. More recently, the Department of Military and Veterans Affairs in Pennsylvania launched PA VetConnect. It uses its network of county officers for veterans and veterans service officers to help match veterans with providers. And recently, the referral and contact tool was proposed as a statewide system to address needs by the Department of Human Services. Although the Department of Human Services withdrew the proposal, such efforts signify a growing role for state government in navigation.

Similarly, local counties offer extensive navigation support. For example, the Allegheny County LINK system is housed in the Department of Human Services. The county has invested heavily in making better connections between citizens and the community, especially addressing housing and homelessness and early intervention

for families (e.g., Hello Baby). Senior Line, supported by the county but run by the Area Agency on Aging, provides similar services for local seniors. These various referral networks are supported through extensive investment in a data warehouse, tracking individual's use of or involvement with various county departments.

Fourth, local community-based organizations across the state offer navigation to their clients. These networks either focus on a specific neighborhood or a specific population, as they lack the resources to operate at the same scale as the government or United Way networks. For example, Steel Smiling focuses on the mental health of primarily Black residents of Allegheny County. Similarly, the Hill District Consensus Group offers navigation services to the residents of the Hill District.

Fifth, some networks were founded with the help of national organizations that developed the model. PA Serves, supported by The Heinz Endowments, is part of the more extensive America Serves Network. The model was developed by the Institute for Military Families at Syracuse University, and their data team supports ongoing evaluation benchmarked against similar networks around the United States. Similarly, the Community Care Hub was founded as the local instantiation of Pathways Community Hubs. The Community Care Hub focuses on navigation for pregnant women in Cambria and Somerset counties who have gestational diabetes or are eligible for medical assistance. It recently expanded to provide navigation services to students and families in Greater Johnstown Public Schools (K-4) deemed high risk. Certified Community Health Workers use the Pathways Model to determine a trajectory of care for their clients.

Sixth, more recently, healthcare organizations across the state have launched navigation systems. These networks are influenced by new payment models, such as Accountable Care Organizations,[xxii] and mandates, such as the Affordable Care Act's modification of the nonprofit hospital tax exemption standards to include community health needs assessments. They are also increasingly seen as vehicles to address the social determinants of health and reduce healthcare costs. For example, Tower Health received a five-year Centers for Medicare & Medicaid Services grant as a pilot site to demonstrate the ROI for patient navigation to human services. The project tracks emergency department usage, missed visits, and Medicare and Medicaid costs.

Seventh, recently, referral platform providers have sought and received funding to expand the implementation of their products. For example, Unite Us has one of the most significant expansions planned. Although Unite Pennsylvania is currently focused on Philadelphia, the plan is to create a multi-stakeholder closed-loop referral system across the state. Other vendors have different funding models but are combining resources to enhance directories. For example, when any hospital adds to the Pennsylvania resource directory, all Aunt Bertha customers receive the updated information.

CHALLENGES RESULTING FROM THE PROLIFERATION OF NETWORKS

The proliferation of multiple navigation systems from multiple agencies has the potential to create challenges. First, although each system maintains its own resource directory and tracks its own referrals, many community-based organizations and services are listed in multiple navigation systems. These overlapping systems, especially when they do not consider interoperability standards, create additional burdens on these community-based organizations.[xxiii] Further, many of these referral systems send additional clients but do not consider the different budget models of community organizations.[xxiv] Although community-based organizations aim to serve clients as part of their mission, in some cases, they are not compensated on a per-client basis. For these organizations, navigation systems introduce new demands but no new revenues to meet those demands.

Finally, the proliferation of systems can replicate many of the problems that the systems aim to solve. Clients now find themselves in a marketplace of navigation systems, many of which only serve one type of client or one set of needs. Information about these clients' needs must be repeated as they encounter each new system. And that data about the outcome of previous referrals in other systems is unknown.

OPPORTUNITIES RESULTING FROM THE PROLIFERATION OF NETWORKS

Despite these drawbacks, there are some opportunities. The emergence of new players and resources in navigation systems means more significant resources than ever before in the area. Interest across the sectors means that the time is ripe for developing innovations and re-aligning financial incentives.

Moreover, the proliferation of systems introduces opportunities arising from market competition. Market competition may lead to lower costs associated with the purchase or licensing of referral platforms. It may also induce navigation systems to improve their quality and outreach efforts to capture greater market share.

ADOPTION OF REFERRAL PLATFORMS

Community referral technologies and case management are two types of referral platforms that support navigation networks. In case management systems, human navigators record the referrals they make and then follow up with the referred individual to learn about the status of those referrals. Longitudinal case records are kept about individuals' histories. In Pennsylvania, Apricot, Salesforce, and Airtable are the most common case management platforms used.

In contrast, community resource referral technologies are used primarily for the management of referrals. Healthcare developers and system integrators are most likely to use community resource referral technologies. Referrals are managed through technology, with partner agencies responding about the referral's status (i.e., accepted, rejected, complete). In Pennsylvania, community referral technologies include Aunt Bertha, Healthify, internally developed systems by Allegheny County, and Unite Us.

DATA MANAGEMENT AND INTEROPERABILITY

In general, there are two critical pieces of data that most navigation systems manage: the resource directory and information about clients and their referrals. The resource directory is the foundation of most navigation networks. Although some community-based navigation networks use a "mental directory" rather than a formal one, most navigation systems recognize the need for a documented list of providers, services, eligibility requirements, and contact details (e.g., how to sign up, hours of operation). PA navigation networks vary widely in terms of their investment in creating and maintaining resource directories. Some aim to collect information about all the providers in an area, while others only collect data about providers that are "in-network." PA 211 has the most extensive investment in its resource directory, consistent with other United Way 211 systems nationwide. In some cases, 211s have licensed their directories to other vendors (e.g., Unite Us).

Moreover, resource directories must organize providers/services into groups to make them more navigable, and in some cases, to compare providers' performance. There are a variety of different ways to organize this information. These organization methods are called data standards.

Some of the data standards are proprietary and require licensure. For example, the 211 LA County Taxonomy of Human Services is

used by United Way 211 systems across the United States. It is available only to licensed subscribers. Moreover, the United Way 211 systems are increasingly making their data available to other providers through API, suggesting the data standard will be increasingly used in DHS and national vendor systems (e.g., Unite US). Additional certification standards for data compatibility are licensed through the Alliance for Information and Referral Systems (AIRS).

Alternatively, open data and creative commons data standards are being developed. These systems are available without additional costs, ultimately becoming a public good. For example, Open Referral's Human Referral Data Specification uses a Creative Commons license and is freely available. Similarly, Aunt Bertha relies on a taxonomy they created called the Human Services Taxonomy, licensed through Creative Commons.

With multiple competing standards, the space operates much like the early days of electronic medical records, where eco-systems of products did not work together. If the Office for National Coordination of Health Information adopted a standard and the Centers for Medicare & Medicaid Services tied the standard to procurement, the eco-system would become less siloed.

The proliferation of referral systems, many exclusive to one agency (e.g., HMIS, SPAR) or one navigation system, raises the burden on community-based organizations that provide services. Attention to interoperability (e.g., single sign-on, entering data once) and common data standards are essential for reducing the administrative burden on these organizations. Most referral platforms sold by vendors today use APIs to pass information from one system to another. Some APIs only pass information one way, and others pass information back and forth between systems. For example, AuntBertha, Unite Us, and Healthify have APIs that work with common electronic medical records systems (i.e., EPIC). In some cases, like Healtify's integration for the Community Connection Project, the referral system appears within a window in the electronic medical records. The most common APIs used in Pennsylvania are HL7 and SMART on FHIR. Notably, Allegheny County has built a system that works with its data warehouse but does not offer interoperability outside of its network.

NAVIGATION SYSTEM DESIGNS

Based on the three elements of navigation system design, four types of navigation designs emerge: community connectors, demanded directories, healthcare developers, and system integrators. Appendix 2 identifies the design of each of the navigation systems reviewed in the research. This typology is simplifying, as all are, but highlights several key design components that cluster together. Advantages and disadvantages are more readily apparent by using this classification.

Community connectors are more likely to originate from community-based organizations. They often serve marginalized and oppressed communities. Generally, human navigators in these systems work closely with clients throughout the help-seeking process. They often take a client-centered approach, where they work with the client to identify needs and goals. Then they continue to follow up with the client, helping them make progress on their individualized goal plan. These systems tend to have lower operational capacity. Resource directories may only exist in the mind of the human navigator or minimally in a shared document. In general, community connectors lack the resources to purchase or participate in larger referral platforms.

In contrast, demanded directories focus on matching clients seeking help with the appropriate benefits, services, and programs. They invest heavily in creating comprehensive resource directories with up-to-date information. Human navigators help clients identify needs and match them to providers who can address those needs. Demanded directories focus on accessibility, often running local offices or 24-hour call centers. They tend to utilize systems that record the volume of requests and demographics of help-seekers.

More recently, in Pennsylvania, healthcare developers have emerged as leading providers of human services navigation. These navigation systems often have an anonymous public-facing side that acts more like a demanded directory. But the more developed of these systems, or systems currently being implemented, offer closed-loop referrals. These systems store information about the outcomes of referrals in electronic medical records; thus, the information is only visible to the healthcare developer. Any clinician can make a referral, and social determinants of health screeners are utilized to identify needs as part of routine care. Healthcare developers are keen to demonstrate the return-on-investment in these systems, especially related to reduced healthcare costs.

In contrast to the healthcare developer, systems integrators offer no-wrong-door referral networks. No-wrong-door referrals mean that any organization participating in their network can refer a client. They utilize closed-loop referral platforms that support the entire client help-seeking process. Client referrals are stored in the platform and can be accessed with any user with the appropriate permissions, including community-based organizations. The most advanced of these systems (e.g., Allegheny Link, Unite Pennsylvania) use predictive analytics to identify client needs proactively before they make a request.

Figure 3: Navigation designs based on the nature of the intervention, the referral platform used, and the role of human navigators

HUMAN NAVIGATORS

- Prioritizes human navigators, especially those that live and have experience in the community served
- Often takes a client-centered goals approach and works with clients throughout the client help-seeking process
- Records only kept by client organization
- Examples: AgeWell Pittsburgh, Steel Smiling, Community Care Hub, Macedona FACE

DEMANDED DIRECTORY

- Priortizes creating an up to date resource directory
- Focuses on stage 2, matching the client with services, of the help-seeking process.
- Often has incomplete information about whether the client received services
- Examples: PA 211, PA Vet Connect

HEALTHCARE DEVELOPER

- System that integrates healthcare providers and human service agencies that address the social determinants of health
- Referrals are stored in electronic medical record and are created only by healthcare provider
- Examples: Community Connection Project, Neighborly PA, Highmark Aunt Bertha

SYSTEMS INTEGRATOR

- Combines closed-loop referral platform with human navigators to support the entire client help-seeking process.
- Utilizes a closed network strategy, which enables system integrator to track the outcomes of referrals. They generally operate no-wrong-door referral networks, where referrals can be made by any provider
- The most advanced provide predictive analytics to identify client needs or which clients require additional navigation support
- Examples: PA Serves, Unite Pennsylvania, Allegheny LINK

NETWORK DESIGN ADVANTAGES AND DISADVANTAGES

Each network design described has clear advantages over the other types (see Table 1 in the executive summary for details). Community connectors have greater trust, especially among marginalized and oppressed communities. They can often work with clients before they begin the help-seeking process, providing the necessary support for a client to be willing to ask for help. Demanded directories invest the most in creating an up-to-date resource directory and provide the most accessible portal to care (e.g., 24-hour helplines). Healthcare developers have access to and can integrate information about client health, which is generally not available to other networks. Moreover, they have implemented regular screeners as part of routine health appointments to prompt clients to begin the help-seeking process. Finally, system integrators provide the most tractable system for referrals, with the power to hold providers accountable for their responsiveness. This tractability reduces the burden on human navigators to follow-up to see if clients could receive care or not.

In addition, each of the navigation system designs has disadvantages compared to the other types. Community connectors lack the technological and operational capacity to track referrals at scale, and they have little power to hold providers accountable. Demanded directories intervene during the matching stage of the client referral process (stage 2 in Figure 1) and have little visibility before or after that stage. Healthcare developers place high-value care and healthcare needs at the center of the referral process – making medical providers the "right door" to referrals. Finally, system integrators require community-based organizations to adopt another platform to manage referrals and are often the most expensive technology systems.

> Serving the community over the phone or online is not the same as looking directly in someone's eyes and seeing that their soul is in Pain.
>
> - CAROL HARDEMAN,
> Hill District Consensus Group

CLIENTS AND OVERLAPPING NAVIGATION SYSTEMS

One of the critical factors that define navigation systems is the clients that they serve. Navigation systems serve clients within a geographic boundary (e.g., neighborhood, county, region, area that hospital serves). However, many PA navigation systems also use additional eligibility requirements to define their client population. Examples of client foci include:

- veterans (i.e., PA Serves, PAVet Connect),
- new parents (i.e., Hello Baby),
- individuals with barriers because of language or culture (i.e., Immigrant Services and Connections),
- pregnant women who have gestational diabetes or who are eligible for medical assistance (i.e., Community Care Hub), and
- seniors (60+) and their caregivers (i.e.., Agewell Pittsburgh, SeniorLine)

Some of these eligibility requirements are related to payers (e.g., seniors, veterans) unique to this population. Others are related to the capacity of the navigation network. Small navigation networks are more likely to specialize because they cannot meet the needs of a larger client segment.

The challenge of client segmentation is that some households may not neatly fit into a segment or remain in that client segment for long. For example, individuals at high risk may be eligible for coordinated navigation services at Community Connection Project. However, over time they may age into an Area on Aging navigation system. Any trust they develop with a specialized navigation system may not transfer to another one they become eligible for later in their lives. Moreover, because many (but not all) of these navigation systems operate independently, longitudinal client histories developed in navigation systems do not follow them. This scattered client data means that individuals must recount their history again to each navigation system, and coordinators may have incomplete information about their needs over time.

For community-based organizations, client segmentation means that they must use different systems for different types of clients. Unless the systems are interoperable with their local case management technology, providers must check a separate system for veterans' referrals, senior referrals, hospital-related referrals, and individuals with a cultural/language barrier. They must coordinate these requests and prioritize them against available resources. These overlapping systems represent an additional burden to already stretched human services providers. Further, navigation providers have an incomplete view of community-

based organizations' capacity since they tap only one segment of their resources. When demands for services from another navigation system increase for the provider, competing navigation systems are unaware of the reason for slow responses or refusing referral requests.

From a statewide public health perspective, overlapping systems represent additional overhead costs. Each of these navigation systems purchases, licenses, or maintains its own referral platforms. Their navigation employees and volunteers must spend time reconstructing client histories from other systems. And because each of these specialized navigation networks addresses different client populations, there are additional challenges in evaluating their relative effectiveness.

ANALYTICS AND OUTCOMES IN PA NAVIGATIONS SYSTEMS

Three of the four navigation system types offer opportunities for better data-driven continuous quality improvement and systems alignment. Demanded directory, healthcare developer, and system integrator navigation systems each collect and analyze data. When integrated into learning communities, training, strategic plans, and budgetary analyses, this data can improve outcomes for clients. Each of these navigation system types collects different types of data – providing helpful information. This report identifies five types of data that these systems collect and identifies emerging best practices across the Pennsylvania navigation landscape.

QUALITY CONTROL METRICS

Among the navigation systems, demanded directories collect and utilize quality control metrics more often than their counterparts. By recording and reviewing calls with call center navigators, demanded directories analyze the interactions between navigators and clients. They review the number of calls, what types of questions were asked, and whether the appropriate referrals were made. In many ways, these metrics resemble those of call centers in for-profit businesses. These metrics allow for the evaluation of navigators at scale and are not replaced by other types of system metrics. If the research on patient navigation applies, then the quality of the interactions between a navigator and the client is critical in motivating clients to continue the help-seeking process.

DEMAND METRICS

Demand metrics are collected by demanded directories, healthcare developers, and system integrators. They refer to the number of clients that have requested services. They are often further disaggregated by zip code, client demographics, and whether clients are eligible for benefits.

Demand metrics are important because they allow communities to determine if sufficient resources are available to match client needs. Moreover, they allow an observant analyst to track abnormalities, such as high unmet needs in areas where services are available. Such information can be helpful at spotting problems at the provider level.

SUPPLY METRICS

Supply metrics refer to the availability and capacity of providers to offer services in an area. They are the mirror image of demand

metrics. Here the demanded directory and most healthcare developer navigation systems differ from system integrators. Demanded directory and most healthcare developers utilize an open network. They attempt to identify all the organizations in an area providing services. In doing so, they provide a complete snapshot of the number of organizations providing services at the time when the resource directory was last updated.

In contrast, system integrators provide more real-time data about provider capacity but for fewer organizations. The smaller network size is because each provider organization must agree to adopt the referral platform to capture data about the results of the help-seeking processes. System integrators track referrals through closed-loop systems that provide complete information about the outcomes of referrals. This information includes whether the referral was accepted by a provider and the time to receive care. These demand metrics can aid system designers and human navigators in reallocating referrals across the system.

REFERRAL METRICS

Referral metrics are uniquely available to healthcare developers and system integrators that operate using closed-loop referrals. They can track the status of different types of referrals. Referral metrics describe the quality of the service episode – or the chain of events starting with a client's request for service and ending with a client receiving that service (or not). Referral metrics describe the accuracy, efficiency, and service-episode outcome.

Accuracy describes the number of rejections that a service episode receives before a client is enrolled for or receives services. It is a measure of the quality of the referral. It is based on the accuracy of the human navigator or navigator system's information about the provider, eligibility requirements, and provider capacity.

Efficiency describes the time a client waits between when they request services and the subsequent steps in the help-seeking process. Efficiency should track the time from request to when the client begins to receive services and to when a client completes those services. Efficiency is highly dependent on service type, as some services take longer to initiate and complete.

Service-episode outcome describes whether the client received services. Referrals can lead to various adverse outcomes, including the client failing to respond to follow-up calls, refusing services, or being unable to be matched with a provider. Ultimately, the service episode only succeeds if a client persists through the help-seeking process and there is a sufficient supply of services available to meet client needs. Most closed-loop referral systems track not only the outcomes but the provider-supplied reason for that outcome. Combining this information with demand metrics can provide a picture of which types of clients are most likely to persist and receive services in referral networks.

SYSTEM IMPACT

While the previous metrics track the processes of navigation systems, system impact describes their outcomes. In other words, they track whether a navigation system results in better outcomes than not having the navigation system. As noted in the review at the beginning of this report, academic research on system impact is somewhat rare. However, emerging best practices are being utilized by Pennsylvania navigation systems to track four classes of systems impacts.

01 **Reduction in the cost of care and healthcare use.** Healthcare developers are most interested in how navigation systems reduce the cost of care and healthcare use. A Medicare and Medicaid funded grant to Tower Health's Community Connection Project, for example, will track emergency department usage, missed visits, and Medicare and Medicaid costs. They are a demonstration project to show how referral systems that address the social determinants of health result in more affordable care.

02 **Self-reported improvement in client health or family outcomes.** The second set of outcomes is determined through patient/client surveys. Healthcare developers often use established measures to track patient self-reported health outcomes before and after navigation. Many other providers track client progress against a set of outcomes that are either defined through pre-established measures of risk/care or against client self-identified goals. In all cases, clients complete surveys that evaluate their status before navigation begins and during regular intervals after receiving referrals. In some cases (e.g., Community Care Hub, Community Connection Project), the client receives coordinated care and completes interim surveys.

03 **Prevention of Child Protective Service involvement or homelessness.** One of the critical outcomes for Allegheny County Department of Human Services referrals is preventing harmful outcomes. Its integrated system allows them to track whether individuals who receive navigation services from Hello Baby or through LINK are less likely to experience Child Protective Services involvement or homelessness than individuals who do not receive navigation. Prevention science suggests that although these outcomes are more difficult to track, avoiding these experiences are both less costly interventions and less traumatic for clients.

04 **Community identified needs and assets.** Finally, both United Way and some community-based organizations track outcomes at the community level – not just the individual level. The United Way's community impact report, for example, tracks the level of need in particular zip codes. This information can be used to determine if referrals improve community-level health. Although not a navigation system, the Neighborhood Resilience Project has developed a community-based assessment tool, imHealthy. The tool scales health assessments across five domains to assess outcomes at the person, household, micro-community, and macro-community levels. In doing so, it offers a promising assessment of community health that can be assessed against navigation system use.

WHAT KIND OF DATA IS NEEDED?

For optimal network management and cost savings, three data types are needed: closed-loop referral data, government-tracked service utilization, and costs of care.

01 **Closed-loop referral data** – Closed-loop referral data provides critical information about the outcomes of referrals for clients and providers' performance. Such data is essential to establish the impact of navigation systems. Moreover, network managers can gain insights into provider responsiveness, the accuracy of referrals, and whether clients have received services. They can intervene to address bottlenecks in care and make new referrals before the client asks again.

02 **Government-tracked service utilization** – Ultimately, navigation systems not linked to publicly held service utilization data are incomplete. Where privately run navigation systems can track who has contacted their network and their outcomes in the short term, public data provides insights into what individuals are not contacting navigation systems. Service utilization is one of the critical drivers of the public health and welfare benefits of navigation systems. Moreover, public data provides a complete picture of clients longitudinally, especially as they cross different navigation systems or apply for benefits. These measures are critical for determining the long-term impact of navigation beyond the service episode.

03 **Costs of care (ROI)** – One of the advantages of navigation systems is the prevention of acute or chronic needs. These needs are often more costly to remedy than prevent. Comparative cost data is needed for individuals who receive navigation support and those that do not. Some early research on Areas on Aging finds that coordinated care reduces costs per person by $136 a year.[xxv] Similar data is being gathered by the Centers for Medicare & Medicaid Services on the impact of coordinated human services on medical costs.

WHERE DO EMERGING BEST PRACTICES IN ANALYTICS AND OUTCOMES FALL SHORT?

Despite notable advances in navigation analytics and outcome measurement in the past several years, there are four areas where the current metrics fall short. Each of these areas describes avenues for future exploration and research.

01 **Identifying the aspect of referrals that reduces costs and results in greater client wellness.** Although emerging research suggests that navigation systems reduce the cost of care, it treats participation in the navigation system as an intervention. More information is needed to track what aspects of referrals result in reduced costs and greater client wellness. Possible aspects include the relationship with a human navigator, knowledge about benefits, services, and programs available, the coordination of multiple types of care, and the use of screeners to identify unmet needs.

02 **Current system outcome data is rarely disaggregated by race/ethnicity.** The best-in-class closed-loop referral systems report on the accuracy, efficiency, and service-episode outcomes. They allow the network leader to drill down to examine outcomes by service type and provider. However, these systems rarely disaggregate data regarding systematic differences in the outcomes of referrals by race/ethnicity. Disaggregating this data is the first step to identifying if navigation systems replicate the structural and institutional racism that plagues public health and human service sectors.

03 **Trajectories of care.** Many navigation systems track client referrals longitudinally. However, these systems lack predictive analytics that identify the best trajectories of care. Research finds that addressing housing first, before addressing other human service needs, results in better outcomes. Similarly, it may be that some sequencing of services represents optimal trajectories of care. However, current methods only identify high-risk clients based on these case histories.

CONCLUSION

In summary, there is a growing number of navigations systems in Pennsylvania. One metaphor that captures the current landscape is a water reservoir surrounded by farmland. Each of the farmers has developed its own system to access the water. However, they have done so without consulting with any of the other farmers. The costs of this strategy are apparent. Each farmer spends more money than they need to because they have not worked with other farmers to coordinate their irrigation system. Moreover, as their water demands grow, the reservoir can become overtaxed. Finally, some areas are unlikely to benefit from the farmers' irrigation systems at all.

Similarly, navigation systems across the state have been developed independently. They all tap the reservoir of provider organizations, demanding them increasingly to manage more requests from different systems. For many community-based organizations not paid on a per-client basis, greater demands do not equal greater resources. The reservoir also includes clients' willingness to seek help via navigation systems. If they try a navigation system and do not receive help, they are less likely to try again in the future.

Each navigation system is separately investing in human navigators, referral platforms, and resource directories. But there are obvious opportunities to coordinate across navigation systems if common data and interoperability standards are adopted.

Finally, marginalized and oppressed communities are at risk of being left out of this development because the most trusted organizations lack the technological or operational capacity to participate. As such, navigation systems may reproduce or worsen health and economic inequity.

But there is hope. There are opportunities to coordinate existing navigation systems to benefit everyone. Institutions can invest in the operational and technological capacity of community connectors. And thoughtful navigation system leaders will consider how to make the reservoir healthy for everyone in the years to come.

If such investments are made, when vulnerable individuals seek help, they will encounter a coordinated system of care. They can ask for help from any medical or human service provider and receive personalized help from someone in their community. Providers and community resource advocates will have up-to-date information about the services available and can make the referral in their local system. Those referrals will be tracked by caring human navigators to determine whether a provider has reached out to the person and intervene when challenges arise. Fewer individuals will fall through the cracks or just give up trying. Such a system would improve community well-being and economic prosperity and reduce healthcare costs across Pennsylvania.

APPENDIX 1:
REFERRAL PLATFORM FEATURES

FEATURE	DESCRIPTION
RESOURCE DIRECTORIES	A resource directory lists all the services provided in an area, contact information for the provider, and eligibility criteria. They may be comprehensive, attempting to provide a complete list of all resources in an area. Alternatively, they may be focused on organizations that are part of the referring network or provide a particular class of services (e.g., mental health, human services). Directories may be updated by dedicated resource directory teams, human navigators, and providers.
SEARCHABILITY	When resource directories are accurate and up to date, both providers and clients who access them must still find the correct information in them. Searchability refers to being able to locate the right service with the appropriate eligibility in the right geography. On most platforms, users can browse for services or search based on keywords, including provider, program, need, and location. Some platforms allow users to search for multiple needs concurrently.
CLIENT ACCESS	Clients may have access through a dedicated platform, e-mail address, or call center phone number. Sometimes they can request a referral directly through a platform and can view the status of their request.
PRIVACY PROTECTIONS	Depending on the types of providers, systems should be compliant with HIPAA, SAMHSA 42 CFR Part 2, and FERPA. Sensitive information is protected with appropriate viewing permissions, and client consent is required before information is shared.
REFERRAL TRACKING	Referral tracking can rely on human care coordinators at the referral-sending agency. Some systems provide status updates on whether the client was eligible for and received services. Others only record whether a referral was made.
LONGITUDINAL CASE MANAGEMENT	Some systems include a persistent client record which records services requested over time. In some cases, detailed client records will include all contact logs with the client across human care coordinators and clients.

FEATURE	DESCRIPTION
PREDICTIVE ANALYTICS	Algorithmic or risk-factor-based assessments identify clients requiring more navigation support or that may require services. The most advanced of these systems identify likely needs before an individual requests help.
SYSTEM INTEGRATION	APIs are essential for cross-system integration, especially with electronic medical records if Medicaid or Medicare funding will be used. Common APIs include HL7, FHIR, and SMART on FHIR. Many platforms can integrate with HMIS, electronic medical records (e.g., EPIC), and SPARS using these APIs.
SOCIAL NEEDS SCREENING	Some networks include social needs screening as part of their patient intake process. These screeners may be the responsibility of any referring organization in the case of no-wrong-door networks or human care coordinators in self-referrals. Common social needs screeners include PREPARE, AHC, WE CARE, and Protective Factors.

APPENDIX 2:
NAVIGATION SYSTEMS IN THIS REPORT[xxvi]

Navigation System	Coordinating Organization(s)	Client Characteristics	Platform	Navigation Design
AgeWell Pittsburgh https://agewellpgh.org/	JCC Pittsburgh, JFCS Pittsburgh, JAA Pittsburgh	Seniors (60+) and their caregivers	Salesforce	Demanded directory
Community Connection Project https://www.bewellberks.org/community-connection	Tower Health	Tower Health patients	Healthify	Healthcare developer
Community Care Hub https://www.1889jeffersoncenter.org/hub/	1889 Jefferson Center for Population Health	Pregnant women in Cambria and Somerset counties who have gestational diabetes or are eligible for medical assistance. Families with children in the greater Johnstown School District deemed high risk	Care coordination systems	Community connector
Hello Baby https://hellobabypgh.org/	Allegheny County DHS, Health Department, Healthy Start, Family Centers, Nurture PA, and the United Way of SW PA	Allegheny county new parents (up to 1-year-old), especially focused on high risk	Internally developed system	Community connector

Navigation System	Coordinating Organization(s)	Client Characteristics	Platform	Navigation Design
Highmark Aunt Bertha	Highmark/ Gateway/ Allegheny Health Network	Public anonymous facing site available to anyone; closed-loop referrals to clients and employees	Aunt Bertha	Public site: Demanded directory Client & employee site: Healthcare developer
Hill District Consensus Group https://www.hdcg.org/	Hill District Consensus Group	None	Air Table	Community connector
Immigrant Services and Connections https://isacpittsburgh.org/	Shim, Casa San Jose, JFCS, Literacy Pittsburgh, AIU Family and Immigrant Connections, Allegheny County DHS	Allegheny County residents with barriers because of language or culture	Apricot	Community connector
Allegheny LINK https://www.alleghenycounty.us/Human-Services/About/Contact/Allegheny-Link.aspx	Allegheny County DHS	Individuals with disabilities and individuals who are experiencing or at risk of homelessness	Internally developed system	System integrator
Macedonia FACE http://www.macedoniaface.org/	Macedonia FACE	None	Apricot	Community connector
Neighborly PA https://www.neighborlypa.org/	Geisinger	None	Aunt Bertha	Healthcare developer

Navigation System	Coordinating Organization(s)	Client Characteristics	Platform	Navigation Design
PA 211 https://www.pa211.org/	United Way of PA	None	ReferNet & Client Track	Demanded directory[xxvii]
PA Serves https://pittsburgh.americaserves.org/	Veterans Leadership Program	Military veterans, service members, and their families	Unite Us	System integrator
PAVet Connect https://www.dmva.pa.gov/veteransaffairs/VetConnect/Pages/VetConnect.aspx	PA Department of Military and Veterans Affairs	Military veterans and their beneficiaries	Salesforce	Demanded directory
RentHelp https://renthelppgh.org/	Hill District Consensus Group, Community Justice Project, Create Lab at Carnegie Mellon University, and Pittsburgh Hispanic Development Corporation	Allegheny County Residents	Internally built system combining several products through API	Community connector
Steel Smiling https://www.steelsmilingpgh.org/	Steel Smiling	Black people who want mental health support	None	Community connector
Unite Pennsylvania https://pennsylvania.uniteus.com/	Unite Us, JEVS Human Services	None	Unite Us	Systems integrator

APPENDIX 3:
INTERVIEW QUESTIONS

1. Which clients are eligible to participate in the system?
2. What are the services provided?
3. How many providers? Who are they?
4. What technology platform is used?
    - What's your ongoing relationship with the vendor (if any) like?
    - What's the process for making changes to the platform?
5. What's the cost of the platform, and who pays?
6. Does it have the ability for direct access by clients, or is it only organization-facing? Who can refer?
7. How are resource directories updated?
8. What type of referral management occurs? (i.e., receiving organization only, referring organization, coordination center)
9. What is the role of humans in care coordination? If there is a coordination center or care coordination:
    - How many FTE?
    - What percentage of cases receive care coordination?
10. Does the system use Open Referral's Human Services Data Specification standard?
11. What privacy protection does the system offer? (i.e., HIPPA compliant, FERPA, levels of patient access)
12. What type of system integrations are implemented (i.e., single sign-on, only enter data once)?
    - Any use of data interoperability APIs? (i.e., FHIR API, Open Referral API)
13. What type of persistent records are kept for care coordination and case management over time?
14. What type of social needs screening does the network conduct?
15. What type of reporting/analytics do you track?
    - How do you benchmark the success of the network?
    - What types of performance evaluation do you use?
16. What metrics are you using to monitor the impact/health of the network?
17. What other navigation systems are you aware of in Pennsylvania?
    - What is the relationship between your network and these other systems?

ABOUT
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ENDNOTES

[i]PA 211 has several closed-loop referral pilots underway. In addition, they operate a separate system for housing and homelessness referrals that integrates with HMIS. These programs run more as system integrators.

[ii]The public facing website which allows anonymous users to find services operates more like a demanded directory.

[iii]Urban Institute. What's the "wrong pockets problem?" https://pfs.urban.org/faq/what-wrong-pockets-problem

[iv]J Lee and J. Korba, "Social Determinants of Health: How Are Hospitals and Health Systems Investing in and Addressing Social Needs?," Deloitte United States, 2017, https://www2.deloitte.com/us/en/pages/life-sciences-and-health-care/articles/addressing-social-determinants-of-health-hospitals-survey.html.

[v]Erik Eriksson et al., "Collaborative Public Management: Coordinated Value Propositions among Public Service Organizations," *Public Management Review* 22, no. 6 (June 2, 2020): 791–812, https://doi.org/10.1080/14719037.2019.1604793.

[vi]Fichtenberg et al., "Health And Human Services Integration"; Alley et al., "Accountable Health Communities — Addressing Social Needs through Medicare and Medicaid"; Towe et al., "Cross-Sector Collaborations And Partnerships"; Argita and Hinton, "Beyond Health Care."

[vii]Cartier, Fichtenberg, and Gottlieb, "Community Resource Referral Platforms: A Guide for Health Care Organizations."

[viii]Shumate and Cooper, *Networks for Social Impact.*

[ix]Danielle Varda et al., "Community Carrying Capacity to Address Health System Referrals: A Networked Approach," *Journal of Health and Human Services Administration* 43, no. 2 (2020): 154–77, http://dx.doi.org/10.37808/jhhsa.43.2.5; Rachel Hogg-Graham et al., "Exploring the Capacity of Community-Based Organisations to Absorb Health System Patient Referrals for Unmet Social Needs," *Health & Social Care in the Community*, 2020, https://doi.org/10.1111/hsc.13109; Caroline Fichtenberg et al., "Health and Human Services Integration: Generating Sustained Health and Equity Improvements," *Health Affairs* 39, no. 4 (2020): 567–73, https://doi.org/10.1377/hlthaff.2019.01594.

[x]Joint State Government Commission, "Coordination of Veterans Services in Pennsylvania."

[xi]Cartier, Fichtenberg, and Gottlieb, "Community Resource Referral Platforms: A Guide for Health Care Organizations."

[xii]Throughout the report, I refer to clients as individuals who are seeking help. There is a broad consensus that this word has limitations, as does alternatives like patient and members. To be fair, the term if more transactional that most community-based organizations would use to describe their ongoing relationship with people. However, in the case of navigation systems, the term captures certain aspects of the help-seeking process well.

[xiii]Lee and Korba, "Social Determinants of Health: How Are Hospitals and Health Systems Investing in and Addressing Social Needs?"

[xiv]Lee and Korba.

[xv]Zinzi D. Bailey et al., "Structural Racism and Health Inequities in the USA: Evidence and Interventions," The Lancet 389, no. 10077 (April 8, 2017): 1453–63, https://doi.org/10.1016/S0140-6736(17)30569-X; Zinzi D. Bailey, Justin M. Feldman, and Mary T. Bassett, "How Structural Racism Works — Racist Policies as a Root Cause of U.S. Racial Health Inequities," *New England Journal of Medicine* 384, no. 8 (February 25, 2021): 768–73, https://doi.org/10.1056/NEJMms2025396.

[xvi]Bailey et al., "Structural Racism and Health Inequities in the USA"; Bailey, Feldman, and Bassett, "How Structural Racism Works — Racist Policies as a Root Cause of U.S. Racial Health Inequities."

[xvii]Bailey et al., "Structural Racism and Health Inequities in the USA"; Bailey, Feldman, and Bassett, "How Structural Racism Works — Racist Policies as a Root Cause of U.S. Racial Health Inequities."

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[xxvi]Other networks identified but not interviewed for this research include Community Resource Connects (CHOP-Penn), Find Childcare Allegheny, Senior Line, and Southwest PA AHEC.

[xxvii]PA 211 has several closed-loop referral pilots underway. In addition, they operate a separate system for housing and homelessness referrals that integrates with HMIS. These programs run more as system integrator approaches.