

IBM Center for The Business of Government

Collaborative Networks: The Next Frontier in Data Driven Management



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FOREWORD

On behalf of the IBM Center for The Business of Government, we are pleased to present this report, *Collaborative Networks: The Next Frontier in Data Driven Management*, by Julia L. Carboni, Catherine Annis, Mariana Escallon Barrios, Zachary Gibson, Joshua Miles, Nicholas Armstrong, Gilly Cantor, Karen Smilowitz, and Michelle Shumate.

The need to improve the customer experience for those seeking assistance from the federal government has long been acknowledged. The recent focus on customer experience is evident in the [President's Management Agenda \(PMA\)](#), the [Customer Experience Executive Order](#), and the earmark of \$100 million in funding from the [Technology Modernization Fund \(TMF\)](#) to support the modernization of systems that support the operations of the High Impact Service Providers (HISPs).

Support of the HISP service providers is welcome and will go far in helping agencies transform the way they deliver their individual client transactions. However, rarely does someone seek a singular service from one agency. Most often they request a portfolio of services from many providers to address multiple needs holistically. To make things even more complicated, people often need supplemental services delivered outside the organizational boundaries of federal, state, and local agencies—some services are commercial or quasi-commercial. Often, various service providers in the delivery chain have no formal relationship to each other, either organizationally or contractually.

The entire portfolio of services must be orchestrated on behalf of an individual client receiving services, to achieve a seamless and frictionless customer experience. If disparate entities within the delivery chain do not have an effective way of “handing off” their client to the next step, or if they don’t have a feedback mechanism to ensure that the client received satisfactory services, then the client may drop out without receiving the full set of needed supports. The public will benefit when organizations chain transactions together through a combination of governance, technology, and a coalition of willing participants.

In this report, Dr. Julia Carboni, the chair of Citizenship and Civic Engagement at the Syracuse University Maxwell School, and a team of her esteemed colleagues have completed a relevant study of this issue. The report proposes a series of targeted management interventions to improve efficiency, accountability, and effectiveness of network operations, with the “networks” in this case being the series of service providers needed to deliver needed outcomes to a client. The report also introduces the concept of network referral technology and shows how this technology can enable service providers to develop workflows within networks, improving organizational performance and client outcomes.



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The insights in this report are supported by a case study of 11 AmericaServes networks. AmericaServes is the country's first coordinated system of public, private, and nonprofit organizations that work together to serve veterans and transitioning service members and support their families within geographically defined communities.

This report builds on the IBM Center's long-standing research into leveraging networks that facilitate service delivery by governments, including *Managing the Next Crisis: Twelve Principles for Addressing Viral Uncertainty*, *Silo Busting: The Challenges and Successes of Intergovernmental Data Sharing*, and *Improving the Delivery of Services and Care for Veterans*, by another team of authors from the Maxwell School.

We hope that this report provides guidance on how governments can work with each other and with partners to address complex, boundary-spanning problems such as poverty, homelessness, hunger, and climate change, by bringing together organizations to address complex client needs that could not be served by a single organization.

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EXECUTIVE SUMMARY

Collaborative networks to deliver services are ubiquitous where public policy or management challenges require the efforts of multiple organizations to solve a problem or assist clients with complex needs.¹

While guidance on how to manage networks abounds, much of it is limited to strategies focused on network inputs, structure, and relationship building. There is a dearth of data and guidance on how to manage real-time network processes, outputs, and outcomes. This is largely due to data limitations that prevent managers and researchers from looking into the “black box” of real-time network operations.

Increasingly, networks are using *referral system technologies* to better integrate health and human services for clients. Referral system technology provides time-stamped data on client case interactions with systems. One indirect advantage of using referral technology to manage communication within networks is that it provides immediate, objective data on real-time interactions. These data can then be used for timely and targeted management interventions to improve efficiency, accountability, and effectiveness of network operations. This advantage also provides opportunities to develop new insights on managing within networks.

In this report, we expand network management guidance by focusing on how to use referral system technology data to learn, adapt, and react to workflows within networks and improve organizational performance and client outcomes.

Practical insights

We illustrate management insights with a case study of 11 AmericaServes networks. AmericaServes is the country’s first coordinated system of public, private, and nonprofit organizations that work together to serve veterans and transitioning service members, and support their families within geographically defined communities. Each of these networks relies on referral system technology to manage network communications and client connections to service. For managers not using referral system technology, we provide practical insights about how to design networks to include referral technology.

While our insights are applicable to other types of public management networks where communication among providers is necessary for network success,² we limit our discussion of how to manage networks in real time to data driven networks³ for the sake of brevity. In data driven networks, organizations work together to connect clients to services. Like all types of networks, leaders and managers of (and in) these networks face challenges related to ensuring efficiency, accountability, and effectiveness. These challenges are different from traditional, hierarchical management challenges because network management requires horizontal management of independent entities who may not be bound by formal mechanisms (e.g., contracts).

1. Jang et al. 2016; Milward and Provan 2006; Popp et al. 2014.

2. See Milward and Provan 2006.

3. We use the term data driven network here as it is likely more familiar to our readers and it captures the essential data analytics aspect of these networks. Academic literature also refers to this type of network as a referral network that uses referral system technology.

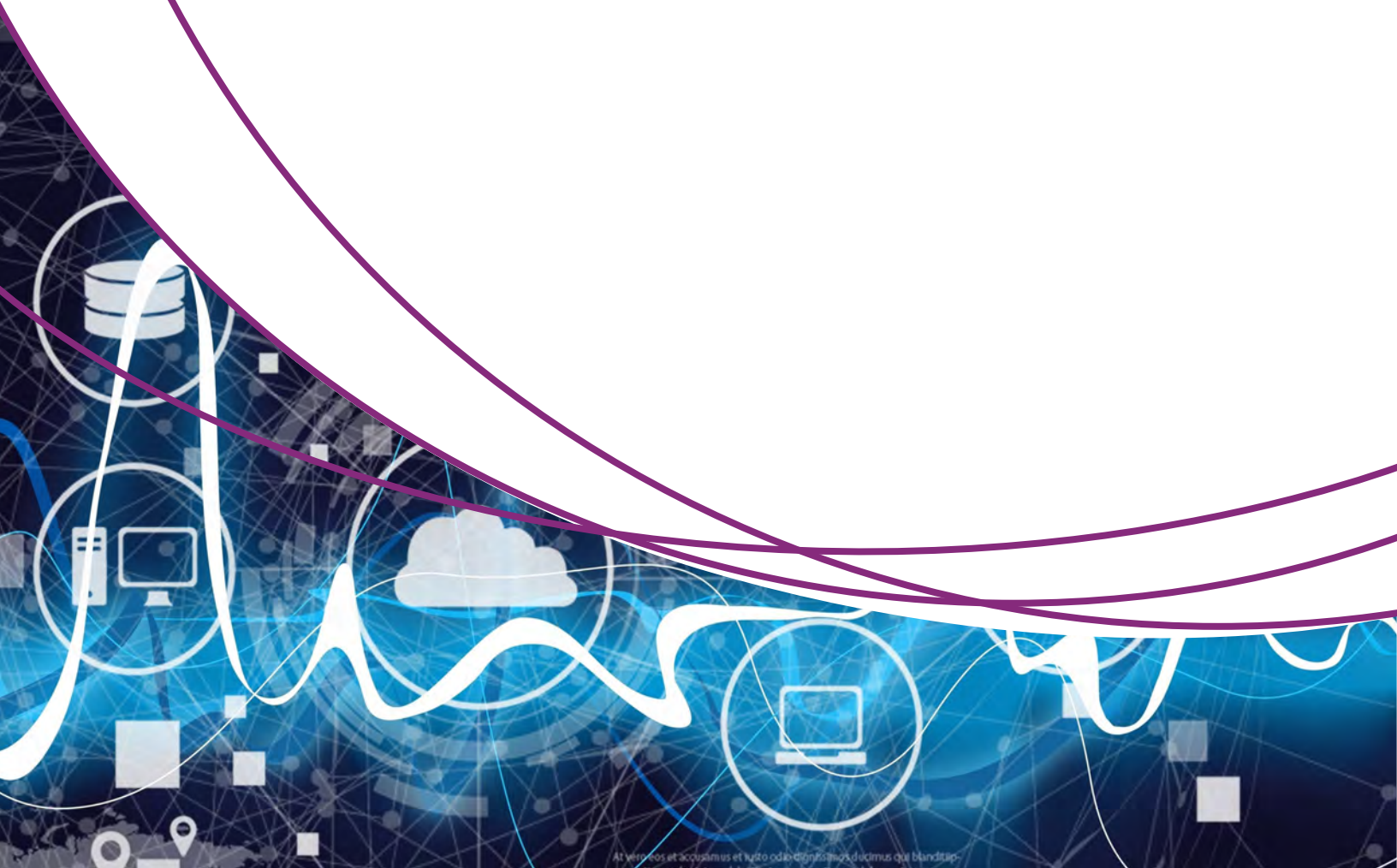
Design of these networks—including use of referral system technology—has implications for network management. We demonstrate how data driven management strategies of data driven networks can mitigate these challenges while also promoting efficiency, accountability, effectiveness, and adaptability of network operations to clients, providers, funders and policymakers, and communities. Well-designed data driven networks using referral system technology represent an opportunity to serve clients and communities efficiently and effectively with high degrees of accountability to clients, funders, and policymakers.

Report objectives

Offer guidance on how to manage real-time network processes, outputs, and outcomes in alignment with the PMA.

1. Provide practical insights about how to design networks to include referral technology.
2. Advise on how to use referral technology to make timely and targeted management interventions to improve efficiency, accountability, and effectiveness of network operations.
3. Expand network management guidance showing how to use referral system technology data to learn, adapt, and react to workflows within networks and improve organizational performance and client outcomes.
4. Explain how to conceptualize data for managing networks. Data can be conceptualized in four categories of metrics: quality control metrics, demand metrics, supply metrics, and process metrics.
5. Illustrate management insights with a case study of 11 AmericaServes networks.
6. Provide data-driven findings on what management insights can be gathered from referral system technology.

Understanding Collaborative Networks



What are data driven networks?

In the United States, individuals routinely need to be referred from one organization to another to receive sufficient services. Data driven networks refer to “systems of relationships among organizations that allow them to direct people (e.g., clients) to the appropriate services that are not available at their own facility.”⁴

Data driven networks for services are ubiquitous at all levels of government to address complex, boundary-spanning problems such as poverty, homelessness, hunger, and climate change. Similar to service implementation and service delivery networks,^{5,6,7} these networks bring together organizations to address complex client needs that could not be served by a single organization. For example, a person experiencing severe mental illness may require case management, housing, and medical care. A data driven network can coordinate these services and remove the burden of coordination from the client and potentially reduce costs associated with providing services.

As an example, Area Agencies on Aging (AAAs) provide services to help older adults live independently in their communities⁸ and have recently begun partnering with local health care organizations to coordinate this care. Early research demonstrates a savings of \$136 in average annual Medicare spending per beneficiary, a significant savings when aggregated to all Medicare beneficiaries.⁹ Similarly, recent research on Continuum of Care¹⁰ networks designed to reduce homelessness in local communities suggest that networks with higher participant level governance and influence in decision making decreased regional chronic homelessness,^{11,12} thereby reducing costs necessary to address homelessness.

Recently, data driven networks have arisen to integrate multiple health and human services to serve clients more holistically. These integrations aim to improve patients’ health outcomes and promote equity in service access.¹³ Systems that cross multiple organizations and policy domains, with different operating assumptions, services, and payer mixes, are more complex to implement and manage. A constant question for network leaders and managers is how to align systems across varied organizations to achieve the best outcomes for clients.¹⁴

Existing research on network management emphasizes the need for efficiency, effectiveness, and accountability to clients and public funders, but available data tends to be subjective and provides static representations of networks based on recollections of network participants. For example, networks have positive impacts, but these impacts are related to general network

4. Gibbons, D. E., & Samaddar, S. (2009). Designing referral network structures and decision rules to streamline provision of urgent health and human services*. *Decision Sciences*, 40(2), 351–371., p. 352.

5. Isett, K. R., Mergel, I. A., LeRoux, K., Mischen, P. A., & Rethemeyer, R. K. (2011). Networks in public administration scholarship: Understanding where we are and where we need to go. *Journal of Public Administration Research and Theory*, 21(suppl_1), i157–i173.

6. Lecy, J. D., Mergel, I. A., & Schmitz, H. P. (2014). Networks in public administration: Current scholarship in review. *Public Management Review*, 16(5), 643–665.

7. Milward, H.B., & Provan, K.G. (2006). *The managers guide to choosing and using collaborative networks*. Washington, D.C.: IBM Center for the Business of Government.

8. Partially funded by the U.S. Department of Health and Human Services Administration for Community Living.

9. Brewster, A. L., Wilson, T. L., Frehn, J., Berish, D., & Kunkel, S. R. (2020). Linking Health and Social Services Through Area Agencies On Aging Is Associated With Lower Health Care Use And Spending. *Health Affairs*, 39(4), 587–594.

10. Funded by the U.S. Department of Housing and Urban Development.

11. Jang, H.S., Valero, J.N., & Jung, K. (2016). *Effective Leadership in Network Collaboration: Lessons Learned from Continuum of Care Homeless Programs*. Washington, D.C.: IBM Center for the Business of Government.

12. Mosley, J. E., & Park, S. (2022). Service Providers’ Influence in Collaborative Governance Networks: Effectiveness in Reducing Chronic Homelessness. *Journal of Public Administration Research and Theory*, 32(1), 130–149.

13. Fichtenberg, C., Delva, J., Minyard, K., & Gottlieb, L. M. (2020). Health and human services integration: Generating sustained health and equity improvements. *Health Affairs*, 39(4), 567–573.

14. Kania, J., & Kramer, M. (2011). Collective Impact. *Stanford Social Innovation Review*, Winter 2011 Issue.

structure and membership (e.g., increasing range of services) or aggregate community measures (e.g., building awareness, decreasing homelessness).¹⁵

While convincing and important, these findings lend little insight into day-to-day network structure and operations including real-time interactions and information flows. Data on real-time interactions and information flows may provide public leaders and managers with the opportunity to identify strengths and weaknesses in the system and create targeted interventions to improve system function and outcomes for clients in a timely way. Our report complements existing research on network management by offering management insights based on real-time operational data.

What is referral system technology?

Data driven networks are often, but not always, supported by technology. Referral system technology describes any platform or communication system used to send or receive client referrals between users in the network. Users may be care providers, social workers, customer relationship managers, or any person who needs to direct a case or client to another person or organization. Referral system technology used to support data driven networks vary, and include, searchable resource directories, referring organization case management systems, and more complete referral platforms.

The two primary functionalities of a referral platform are a resource directory, which is searchable and regularly updated with community-based organizations and agencies providing services to address social needs, and referral management, which is the ability to send referrals to community organizations and track referral outcomes. Other functionalities include privacy protection, systems integration, care coordination, case management, reporting and analytics, social needs screening, and auto-suggested resources. Table 1 describes referral system technology platform features in greater detail.



15. Jang, H.S., Valero, J.N., & Jung, K. (2016). *Effective Leadership in Network Collaboration: Lessons Learned from Continuum of Care Homeless Programs*. Washington, D.C.: IBM Center for the Business of Government.

Table 1: Referral System Technology Platform Features

| Feature | Description |
|------------------------------|--|
| Resource directories | A resource directory is a list of all of 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, either to organizations that are part of the referring network or that 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 right information in them. Searchability refers to the ability to locate the right service with the appropriate eligibility in the right geography. In 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. |
| 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 the case of self-referrals. Common social needs screeners include PREPARE, AHC, WE CARE, and Protective Factors. |
| Needs identification | Some community referral platforms (e.g., Unite Us) offer predictive analytics that identify client needs before a referral request is made, based on X, Y, Z for example. |
| Privacy protections | Depending on the types of providers, systems should be compliant with HIPAA, SAMHSA 42 CFR Part 2, and FERPA. This means that 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, the referral-receiving agency, clients, and human care coordinators. 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 record client services requested over time. In some cases, detailed client records will include all contact logs with the client across human care coordinators and clients. |
| Human care coordination | Human care coordination describes the role of social workers, community health navigators, and coordination center employees in aiding clients in selecting and applying for services. Some networks primarily rely on clients to manage referrals after they contact a call center. Others provide more concierge service, ensuring that the client can navigate eligibility and application processes. |
| System integration | APIs are important for cross system integration, especially with electronic health records if Medicaid or Medicare funding will be used. Common APIs include HL7, FHIR, and SMART on FHIR. Using these APIs, many platforms can integrate with HMIS, EHR (e.g., EPIC), and SPARS. |
| Reporting and analytics | Systems vary significantly on the type of analytics they can provide. Some common groups of analytics include: <ul style="list-style-type: none"> • Client demand and provider supply • Network activity, including efficiency, cases resolved, and co-occurring needs • Savings, including hospital readmission, cost of care • Client satisfaction |

Figure 1 outlines five types of technologies data driven networks use to connect clients to services. Technology is arranged according to the level of data provided to track client interactions with the system from self-guided health and human service directories to closed-loop community resource referral technology that allows for tracking every client connection point in the referral system.

Figure 1: Technologies that Support Referral Networks



We focus on data driven networks using community resource referral technology. This referral system technology includes a shared referral system that provides closed-loop tracking of referral processes and outcomes that updates service request status without requiring clients to provide updates.¹⁶ In addition to being geared toward creating a positive customer experience, these closed-loop systems are the most useful for network managers to develop insights about networks because case movement through the system can be tracked at the client, organizational, and service type level, thus providing nuanced data on where the system is working and where it is falling short of goals. Examples of common platforms used by government and health service agencies include Aunt Bertha, Healthify, Unite Us, and ReferNet.¹⁷

Why should public managers and leaders care about data driven networks and referral system technology?

As previously described, data driven networks are becoming ubiquitous and often these networks include public funders and/or providers. Public managers should be attuned to systems and technologies that fulfill public policy goals including providing evidence on client outcomes and responsible use of public resources. Referral system technology data can provide managers with a reliable, real-time source of data that can be easily scraped from system logs to understand the flow and evolution of interactions within networks. Increased computing power and data processing and analysis capabilities open new avenues for network management without having to rely on more time and resource-intensive methods of collecting information

16. Shumate, M. (2021). Mapping the Navigation Systems of Pennsylvania: Opportunities for the Future. Social Impact Network Consulting.

17. See Cartier et al. (2019) for a systematic review of these platforms. Cartier, Y., Fichtenberg, C., & Gottlieb, L. (2019). Community resource referral platforms: A guide for health care organizations (p. 98). Social interventions research and evaluation network. https://childrenshealthwatch.org/wp-content/uploads/SIREN-webinar-for-HVS-NCOP-2019_05.pdf.

about network functioning. Both the platforms and managing with real-time data represent the potential for better client outcomes and more efficient use of public resources.

System data for managing networks can be conceptualized in four categories of objective metrics. *Quality control metrics* are used to evaluate the interaction between human navigators and individuals seeking help. *Demand metrics* may capture the number of requests, type of requests, and information about who is making requests. *Supply metrics* may capture information about which services are available and capacity of providers. *Process metrics* may capture information about the quality of referrals made including, their accuracy, efficiency, and the outcomes of each episode. This information can be used by network managers to make real time interventions in to improve networks on multiple dimensions including efficiency, accountability, and effectiveness.

Once network managers have referral system technology designed to capture quality control, demand, supply, and process metrics, we can begin to ask specific questions about each category of metrics that will shed light on which management strategies may be most appropriate to improve network function and outcomes. Additionally, tracking these measures allows network managers to assess supply and demand match, improve the balance of services, and track referrals to completion to ensure clients receive services.

Quality control metrics

- How many individuals seeking help should a human navigator interact with on a daily basis? Which navigators are exceeding or below that standard?
- What training enables human navigators to make the best interventions in the client help-seeking process?
- Which human navigators are making the best referrals? Which are best at helping individuals gather the necessary documentation for enrollment?

Demand metrics

- From what zip codes do we receive the highest volume of requests for each service?
- What are the demographics of individuals requesting services?
- What kinds of services are most often requested?
- What services are co-requested?

Supply metrics

- How many requests does each provider receive?
- What type of services are refused due to lack of capacity? Eligibility requirements?

Process metrics

- How accurate are referrals?
- How quickly do clients receive follow-up from providers?
- What percentage of clients fail to persist from referral to receiving services?
- What is the time from referral received to services rendered?

These metrics are actionable for managers. They allow them to drill down to assess some of the following questions:

Managing quality control

- Which kinds of cases should be flagged for higher service coordination? Which types of services or co-occurring services are most complex for clients or organizations to navigate?
- Which providers are the most responsive to referrals? Which providers, in each service category, have better outcomes from referrals? How can we learn from these providers as a network to raise the quality of outcomes for everyone?

Managing demand

- What are the needs of individuals in our area?
- Are there systematic differences in which services particular types of clients (e.g., racial/ethnic groups, veteran status, gender) request? Do they seek referrals at different rates?
- Are there systematic seasonal variations in service requests?

Managing supply

- Does the supply of services match the demand? If not, what types of investments would help to close this gap?
- What is the capacity of organizations in the network? Does it fluctuate seasonally?

Managing process

- Are there systematic gaps in how well particular types of clients (e.g., racial/ethnic groups, veteran status, gender) are served?
- Are there differences in the accuracy, efficiency, and outcomes of referrals among particular types of clients? What interventions would reduce these gaps?

Being able to answer these questions will help managers increase accountability to clients, provider organizations, funders, and policymakers; identify leverage points for system improvement; and engage in adaptive learning for improved performance. Network managers that attend to these metrics have unique insight that cannot be gained without navigation data systems. Moreover, such data systems allow network managers to establish the system impacts of better navigation.

When navigation systems function well, quality control, demand, supply, and process metrics demonstrate benefits of greater access to and decreased wait time for services, resulting in greater efficiency, accountability, and effectiveness in connecting clients to service. Emerging best practices also track metrics associated with system impact including reduced costs of care and health care usage and self-identified improvement in individual and family outcomes.

In the next section, we explain network design considerations to build data driven networks and referral system technology that will be most useful to network managers who want to capture the metrics discussed above.

Network Design Considerations



Data driven network managers should consider the following factors in referral system network design: centralization of referrals, the role and training of human navigators, the type of intervention made in the help-seeking process, data capture, and data interoperability and data standards. Each of these factors has management implications.

Centralization of referrals

Centralization of referrals refers to who controls the referral process and how clients enter the system. In centralized data driven networks, one actor—usually a coordination center—manages the referral process for all requests that come into the network. For example, a client may ask a provider organization for services. If that provider cannot assist the client, the case is referred to the coordination center to connect the client with services. This is advantageous because coordination centers have a global view of the system in real time which may allow them to understand capacity of both the system and individual organizations, allowing them to make referrals accordingly.¹⁸

A centralized system with a coordination center may also have capacity to analyze information flows in systems and make targeted, real-time interventions to improve network efficiency, accuracy, and effectiveness. In decentralized data driven networks, there are multiple paths for referrals including provider-to-provider and self-referrals by clients. This may allow for quicker access into the system but because referrers do not have a global view of the system or capacity, it may take more time to successfully match a client to services.

Role and training of human navigators

In practice, many new network managers think that the technology contract is the most important decision. They neglect the human capital that is needed to effectively manage the navigation process. A knowledgeable and trained work force is critical for system functioning. Human capital investments potentially include:

- Call center operators
- Social workers
- Community health navigators/workers
- Community outreach advocates
- Coordination center employees
- Data analysts and technical advisors

From a network management perspective, it is imperative that human navigators in the network receive proper training, support, and work loads that allow them to help clients navigate the system. We detail the role of human navigators below, including the touch points at which they interact with the system.

Human navigators listed above can intervene in the early stages of the help-seeking process. They often help clients identify their needs and develop the self-efficacy needed to seek help. In short, human navigators can intervene before an individual calls a helpline or conducts a search in a community resource technology system that is public facing. Human navigators

18. In interviews with coordination center managers, we found these managers had institutional knowledge about organizations and capacity not readily captured by the system. For example, they knew which providers might be quick to take a claim and which providers less likely to be responsive.

can help clients determine the right provider to gain access to benefits, services, and programs. Human navigators can be especially helpful in overcoming issues with using technologies such as literacy challenges, including digital literacy challenges. Moreover, they may be able to better identify providers that specialize in a set of co-occurring needs, reducing the number of providers an individual needs to seek help from in order to have a set of needs met.

Human navigators may also play an important role in addressing barriers that clients encounter in the help-seeking process. Clients 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.

Human navigators are also often helpful in the enrollment process after a provider match is made. They can help clients identify the documentation they need to access some types of services, complete enrollment applications, and address delays in receiving services. For example, establishing chronic homelessness can be challenging for some people. Human navigators can help collect records from multiple institutions to establish chronic homelessness, helping clients access key benefits.

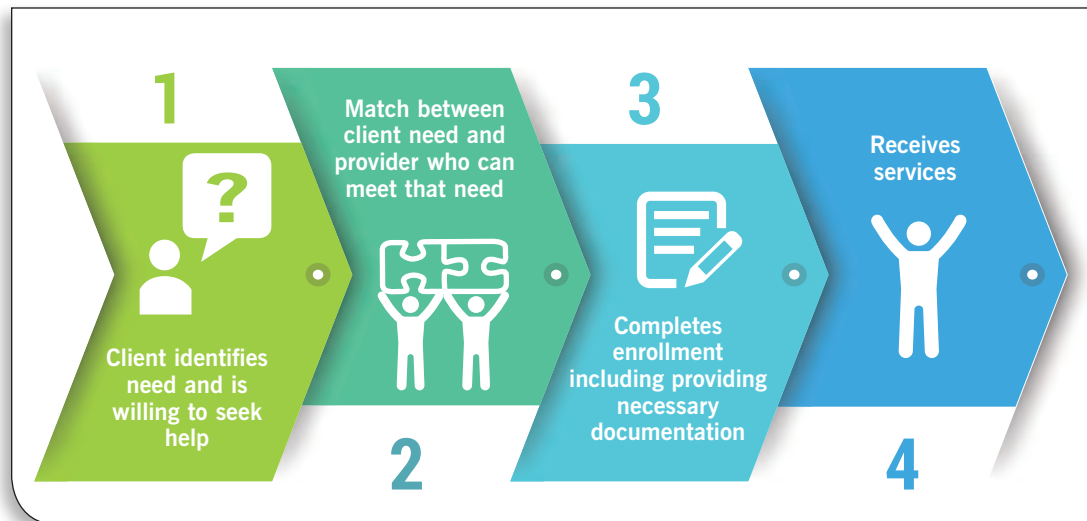
Human navigators also play an important role in evaluating the navigation system and intervening when providers are not responding as efficiently or effectively as possible. For example, coordination center employees often contact providers about specific service episodes to determine the reason for delays. They can remind providers to keep records up to date and can update resource directories as new programs or resources become available. Data analysts and technical assistance employees can identify gaps in service and poorly performing providers. By tracking the performance of the network in real-time, they can design just-in-time interventions to address new unmet needs in the community.

When human navigators are deployed to address key barriers in individual help-seeking, they provide the necessary oversight and increase equal access to care. Without their help, navigation networks can exacerbate inequality since barriers to help seeking are not evenly experienced. Without coordination center employees, data analysts, and technical assistance employees, navigation systems have the potential to decay over time. Such human capital investment is needed to make approaches like continuous quality improvement feasible.

The nature of the help-seeking intervention

One of the key aspects of navigation systems is identifying the nature of the help-seeking intervention. Figure 2 describes the help-seeking process in four steps. First, a client identifies the need and is willing to seek help. Then, they identify a provider who offers the benefit, program, or service that will meet that need and for which they are eligible. Next, they complete the enrollment for the benefit, program, or service, providing the necessary documentation. Finally, the individual receives service.

Navigation networks may intervene to support individuals in any stage of this help-seeking process. Some systems only support individuals in a step of the process (e.g., matching an individual with the appropriate provider), while others support the individual throughout the entire process. The metrics available to managers depend heavily on these design choices.

Figure 2. Help-Seeking Process

Navigation networks that only support individuals in Step 2, or the matching of individuals to providers, typically only have access to quality control and demand metrics, reducing the potential for management intervention. They rarely have information on the results of the referral, including whether providers have capacity to take on additional clients, the amount of time between the referral and client contact with the provider, and whether the client received services. In contrast, closed-loop referral technologies that rely on individuals to initiate help-seeking have data on the outcomes of referrals, including accuracy and efficiency of the referrals. However, they lack data about why some individuals sought help from their navigation network and others did not. Public managers, with the right data systems and human navigation investment, have insight into the entire help-seeking process, including which individuals utilizing government benefits are not seeking help from the navigation network.

Data capture

The nature of data capture is critical for using referral system technology to manage networks. In particular, system log data from referral system technology is the basis for management recommendations. The referral system technology automatically collects, aggregates, and stores real-time logs of interorganizational activities in the network, including referrals and other client connection points.^{19, 20} Because this data comes from time-stamped referrals with information about specific service requests, managers can use it to understand disaggregated patterns in networks at the client, service type, and organizational level. This intelligent automation lends itself to management insights and interventions and does not require intensive data collection efforts or suffer the same biases as traditional network surveys and interviews. Network managers can use this data to better understand which organizations are performing and intervene with poor performers and develop best standards based on high performers.

19. Itkin, I., Gromova, A., Sitnikov, A., Legchikov, D., Tsymbalov, E., Yavorskiy, R., Novikov, A., & Rudakov, K. (2019). User-assisted log analysis for quality control of distributed Fintech applications. 2019 IEEE International Conference On Artificial Intelligence Testing (AITest), 45–51.

20. Landauer, M., Skopik, F., Wurzenberger, M., & Rauber, A. (2020). System log clustering approaches for cyber security applications: A survey. *Computers & Security*, 92.

Data interoperability and data standards

Data interoperability and data standards should be considered at the outset of network design to ensure managers have the data they need to manage within and across networks, including being able to disaggregate data by organization, client, and service type that can be compared across networks, particularly where networks provide multiple services. When data cannot be aggregated to compare across networks, it may be unclear what progress is being made to assist a particular population or address a social problem. For example, data driven networks may connect clients to myriad services that naturally have different time horizons such as emergency food assistance and mental health services.

Comparing metrics of these services within networks gives little insight about how well the network is performing on either service. However, being able to compare across networks may provide managers with insights about how well they are doing on a particular service relative to peer networks. This also applies to examining how well a network serves particular types of clients and how well individual types of organizations are performing in the network.

To avoid data silos, data driven network managers should consider interoperability among systems, standardized metrics, data accessibility, and development APIs. With a proliferation of referral systems, many exclusive to one agency (e.g., HMIS, SPAR) or one sector (e.g., EPIC EMR), raises the burden on community-based organizations that provide services. Attention to interoperability and data standards is essential for reducing the administrative burden on these organizations. Moreover, data standards can assist leaders in comparing system performance both within and across networks. Defining metrics for efficiency, accuracy, and effectiveness requires consistency in the service log data recorded. Different classification systems for services muddy comparisons across systems. Some systems create home-grown folksonomies of service types and data fields. However, there have been significant efforts to create data standards to enable interoperability.

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, increasingly the United Way 211 systems are 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). They are the sole source for certifications and accreditations of referral data systems.

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 that is also creative commons licensed.

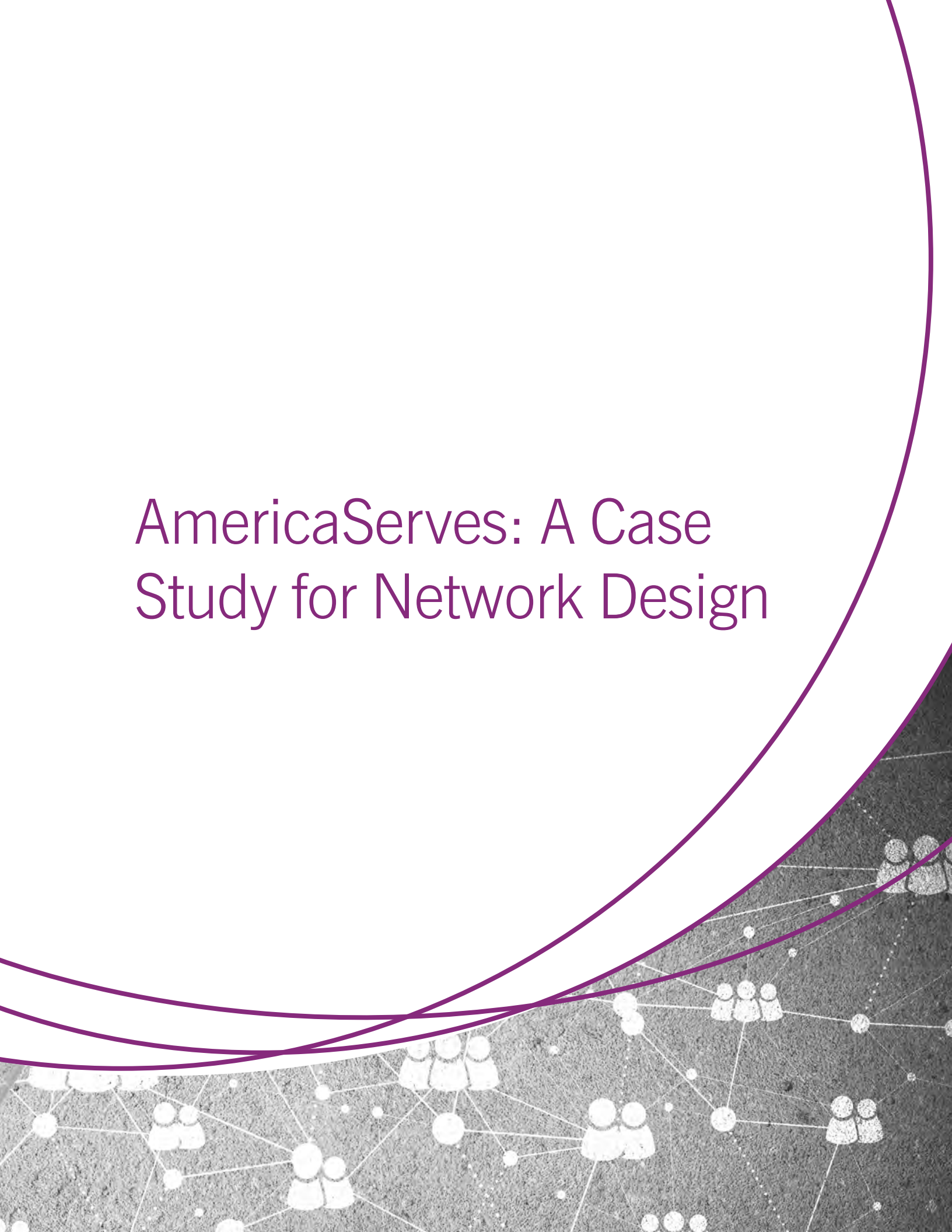
With multiple competing standards the space operates much like the early days of electronic health records, where ecosystems of products did not work together. If the Office of the National Coordinator for Health Information Technology adopted a standard case management system and tied the standard to procurement, the ecosystem would become less siloed. The Gravity Project, initiated by SIREN, has made significant strides in developing both data standards and interoperability guidelines. In lieu of federally adopted data standards and interoperability requirements, public sector leaders should use creative commons licensed data standards and the HL7 FHIR protocols.

Public sector leaders may also look to existing legal frameworks to develop data standards.^{21,22} The Evidence Act (PL 115-435) requires agencies to submit systematic plans for identifying and addressing policy questions to the Office of Management and Budget (OMB) on an annual basis. This includes information about data types and collection. The DATA Act (PL 113-101) requires federal expenditures to be more easily accessible and transparent to the public. The Federal Data Strategy introduced interagency protocols to leverage data as a strategic asset for the public good. Aligned with the DATA Act, it provides detailed guidance for agencies to develop principles, practices and action steps to leverage the full value of public data. The GRPA Modernization Act (PL 111-352) requires quarterly assessments of government programs for the purpose of assessing and improving performance. The Program Management Improvement and Accountability Act (PL 114-264) aims to improve program and project management in part by establishing federal government wide standards and Program Management Improvement Officers tasked with implementing program management policies and reviews in coordination with the OMB.

21. Rumsey, M., & Gurin, J. (2021). *Aligning Open Data, Open Source, and Hybrid Cloud Adoption in Government*. Washington, D.C.: IBM Center for the Business of Government.

22. Thompson, J., & Medina, A. (2020). *Measuring the Quality of Management in Federal Agencies*. Washington, D.C.: IBM Center for the Business of Government.

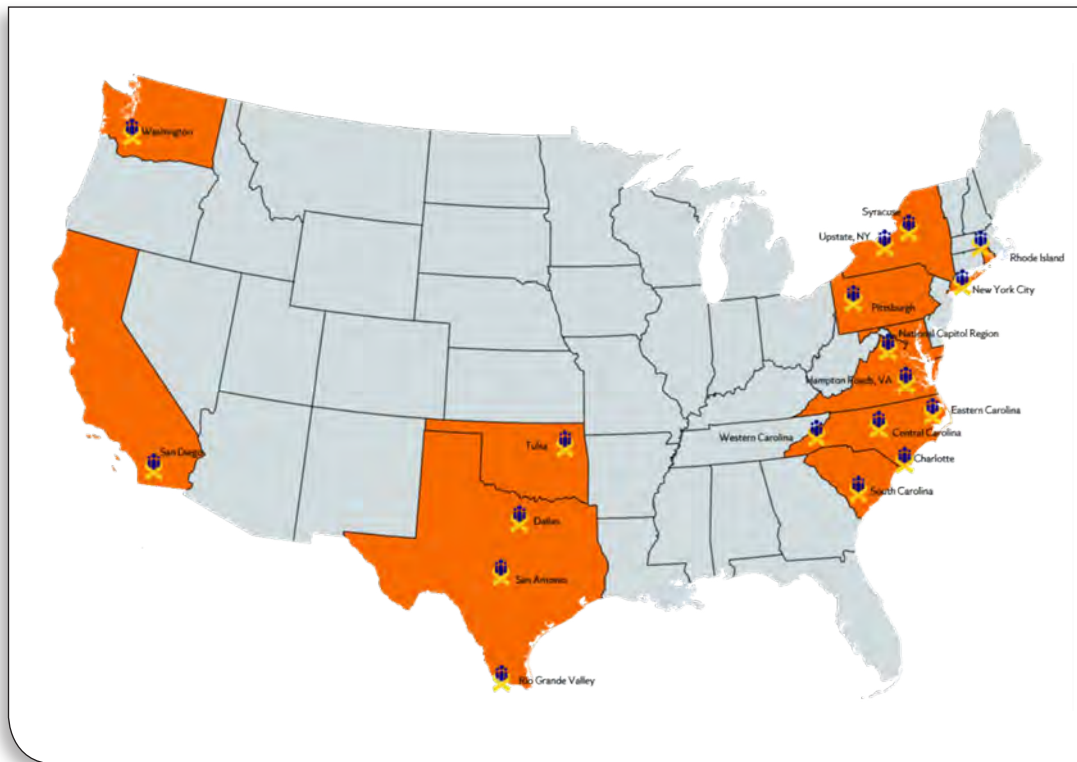
AmericaServes: A Case Study for Network Design



To demonstrate the utility of referral system and referral system technologies, we present a case study of AmericaServes, the country’s first coordinated system of public, private, and nonprofit organizations working together to serve veterans, transitioning service members, and their families and caregivers. With technical assistance and support from the D’Aniello Institute for Veterans and Military Families (IVMF) at Syracuse University, communities have developed and sustained coordinated networks to successfully navigate the military-connected population to the services, resources, and care they need.

Together, 18 networks in different locations throughout the United States comprise the overall referral system (see Figure 3). Each network utilizes a closed-loop referral technology, typically provided by a third-party company, and includes a coordination center to manage referrals between provider organizations.

Figure 3. AmericaServes Locations



We examine system log data from 11 AmericaServes data driven networks utilizing the same referral system technology for this report. Networks range in size from 59 to 187 provider organizations with 26 service type categories across networks. See Table 2 for information on each network.

Table 2. AmericaServes Networks

| Network Name | Number of Providers | Number of Service Types Provided |
|--------------|---------------------|----------------------------------|
| Network A | 59 | 22 |
| Network B | 69 | 22 |
| Network C | 82 | 24 |
| Network D | 97 | 22 |
| Network E | 131 | 22 |
| Network F | 126 | 22 |
| Network G | 153 | 24 |
| Network H | 147 | 24 |
| Network I | 153 | 24 |
| Network J | 187 | 24 |
| Network K | 118 | 24 |

Service type categories are wide ranging and cover a complex suite of needs including mental health, education, transportation, food assistance, employment and housing, among others. See Table 3 for a full list of service type categories provided across networks. It is important to note that many of these categories also have subcategories to better refine matches to assistance.

Table 3. Service Type Categories

| | |
|--|-------------------------------|
| Benefits Navigation | Income Support |
| Clothing | Individual and Family Support |
| Conflict Resolution and Mediation | Legal Assistance |
| Developmental Delay and Disability Support | Mental Health |
| Education | Money Management |
| Employment | Physical Health |
| Entrepreneurship | Social Enrichment |
| Family Support and Home Visiting Programs | Spiritual Enrichment |
| Food Assistance | Sports and Recreation |
| Health | Substance Use |
| Health Management | Transportation |
| Homeless Drop-in Services | Utilities |
| Housing | Wellness |

Centralization of referrals

Each of the networks has a coordination center which oversees helping veterans and their families find a provider that meets their service needs. During the period studied, service requests were managed by the coordination center and followed the following process. Clients enter the system via referral from a network provider or via self-referral by web form or direct contact with the coordination center by phone, email, or in-person. However, clients consent to enter the network, their request is first routed to a central coordination center which monitors and manages referrals throughout the network. The coordination center for each network has a global view of client information, details about requests for services, organizational responses to requests, and metrics related to supply, demand, process, and quality control. Coordination centers are ideal locations for network managers because they provide access to real-time data that can be used for targeted management interventions in the system.

Role of human navigators

Human navigators are the primary coordinator of referrals in the technology platform on behalf of clients. In order to ensure clients have a seamless and successful experience, human navigators actually cover a range of functions for providers and the overall network as well. For clients, human navigators initially take on the role of intake specialist. They capture the service request or requests and work with clients to triage and prioritize needs for referral. After referrals are created, human navigators take on the role of intermediary, overseeing the progress of referrals. They view themselves as a voice and advocate for clients as their referrals move through the technology to various providers. If necessary, human navigators will reconnect with clients mid-process. For example, they may explain to clients why they are ineligible for a particular service and identify other paths to access care or update them on the status of their referral. Human navigators have a wide range of latitude and autonomy when creating and executing standard operating procedures (SOPs) to guide network operations. This autonomy allows them to tailor their actions to the nuances of any particular client request, while maintaining a baseline of uniformity in the overall referral process.

At the same time, navigators maintain strong connections with providers, to support regular communication and extensive knowledge of supply metrics. They secure documentation and information needed to maximize the likelihood that clients successfully access care or enroll in programs. They closely track the capacity of programs, the amount of funding or supplies remaining with particular grants or resources. Ultimately, navigators' relationships with providers, along with their experience and knowledge, influence how referrals and therefore clients move through the network.

Once a referral is sent, the navigator assumes a more managerial role. They ensure that referrals are accepted or rejected by providers in a timely manner, enabling them to reroute referrals as needed if a provider is at capacity or otherwise unable to serve the client. They can also resolve errors or miscommunication observed through case notes and other data in the platform. They further monitor this data to track status updates and timely closure of cases. For example, when a service request has not changed statuses for a noticeable amount of time, human navigators will communicate via the technology or pick up the phone and call the provider directly to clear up issues to the best of their ability.

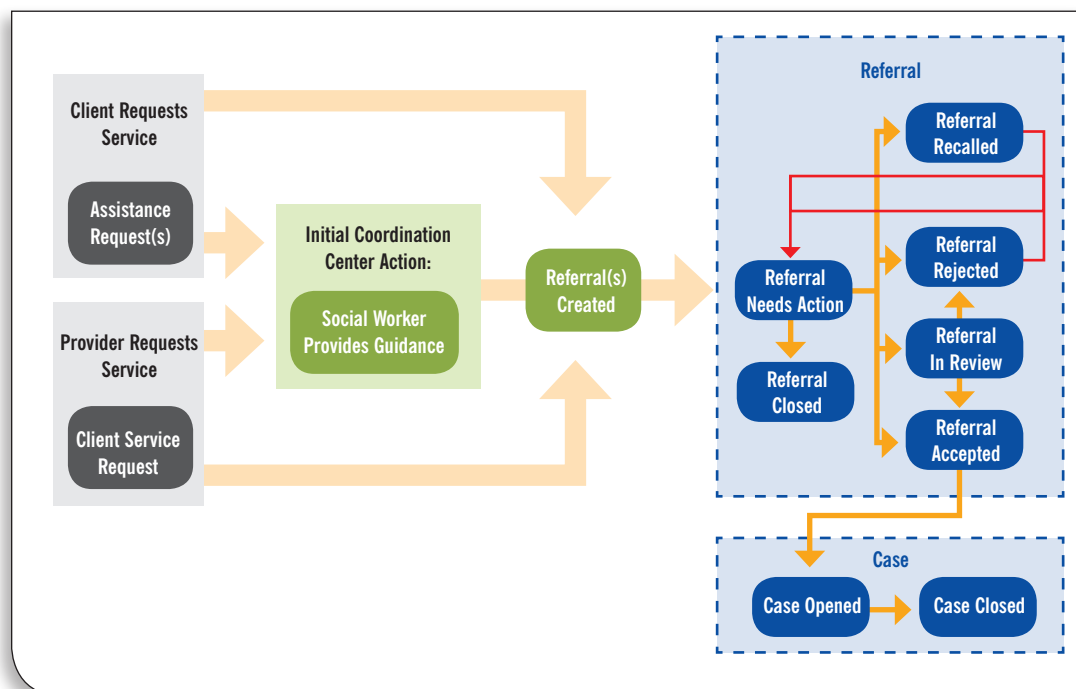
Finally, as the main practitioners and experts in all aspects of the referral process and system, human navigators tend to take on added responsibilities on behalf of all network organizations and stakeholders. They influence how the referral technology is ultimately used and understood, monitor and share outcome and performance data, frequently become the first line of defense for any questions or feedback providers may have, and represent the network in conversations with the technology company, IVMF, funders, and other stakeholders.

The nature of the help-seeking intervention

The help-seeking process begins when the client consents for a request for services to be entered into the referral system technology. The coordination center receives the request and begins the intake process with the client to elaborate on the original request, as well as identify any additional, co-occurring needs that may be helpful to address. At the same time, the coordination center collects any preliminary documentation that may assist with connecting the client to care (e.g., DD-214, proof of residence, bank statements, etc.). After identifying the client's needs and acquiring supporting documentation, the coordination center refers requests to specific providers offering the most appropriate services.

If the receiving organization accepts the referral, a case is created and care for the client begins. If the receiving organization declines the referral (perhaps due to capacity issues), the coordination center continues seeking out services on behalf of the client. Notably, throughout the coordination center's pursuit of care, the routing of referrals is largely invisible to the client, who is only contacted if additional documentation or information is necessary, thus creating a streamlined customer experience. The help-seeking process continues until the client's need is either resolved or unable to be resolved. Due to co-occurring needs or the emergence of additional needs over time, multiple programs, organizations, and individuals may be involved in the process. See Figure 4 for a visual representation of the help-seeking process.

Figure 4. AmericaServes Referral Process



Data capture

The technology platform enables data capture about organizations, clients, and service requests. Organizational data is collected when providers initially onboard into the network and register for licenses to use the technology platform. Data include the type of information found in a resource directory, such as points of contact, locations, service offerings, and program eligibility criteria. Data about clients is typically captured at the point of intake. For both self- and provider-originating referrals, clients complete an informed consent form and share demographic and military service-related information. These data include gender, age, race

and ethnicity, as well as data that may affect eligibility, such as discharge status, branch and era of service, and address. The technology platform automatically captures timestamps and other system log data about requests as they move through the service provision process. It also allows for system users to enter information about the progress of requests, such as statuses, case notes, appointments, and ultimately outcomes of referrals and cases.

Through data sharing and technical assistance agreements between networks and the IVMF at Syracuse University, IVMF data analysts support system- and network-level performance measurement to support collaborative learning, decision making, and adaptation to changing population level needs in each community. Drawing upon core tenets of collective impact, IVMF leaders worked with community stakeholders early on to adopt a standard set of data measures that participating network providers could track network performance and outcomes over time. Example measures include case resolution, service demand and type, referral speed and accuracy, and provider engagement, among others. Consequently, network stakeholders have been enabled to explore internal benchmarks around case resolution for different service types, and demand for specific services by specific client demographics (e.g., housing requests by female post-9/11 veterans).

Data interoperability and data standards

The adoption of a common technology system and shared performance measures across multiple communities has greatly reduced the challenges with interoperability and data standards across AmericaServes networks. With multiple networks utilizing the same case management software and established performance metrics, AmericaServes stakeholders are able to track trends and performance across multiple networks and regions of interest. It has even allowed for monitoring of inter-network referrals across state lines as clients moved from one state to another, reducing the barriers to clients seeking care when they relocate.

However, interoperability with other community networks remains a challenge in some instances. On the one hand, the software technology utilized by the majority of AmericaServes networks (Unite Us) is HIPAA compliant and has expanded its standards-based integration offerings for the health care sector with a focus on electronic health record integration (e.g., Epic, Cerner). Yet, many other non-health care, community-based referral systems utilize competing case management systems (e.g., Aunt Bertha) or custom-built customer relationship management systems (e.g., Salesforce), with wide-ranging adoption of data standards, making interoperability with AmericaServes a costly, if not impossible feat.

These systems were designed with much attention toward gathering data for network management to ensure the networks are efficient, effective, and accountable to clients, funders, and other stakeholders. Data also allows network managers to make real time interventions and adapt as demand for services changes. We discuss management insights in the next section.

Management Insights from Referral System Technology



We analyzed network performance across all 11 AmericaServes networks using data from the referral system technology. We also interviewed two human navigators from each network to gain additional insights about managing the system. We developed the following seven management insights related to network design and metrics.



Insight 1: Demand and supply metrics provide guidance on how to shift navigation resources.

Demand is often easier to measure than supply. In the context of service networks, referral system technologies can track demand as the number of requests in a network or for particular services over a given time. For example, Figure 5 shows the demand for each of the networks during the pre-COVID and COVID-era time period. While most of the networks had a decrease in demand from the pre-COVID to the COVID-era, N_A and N_D had an increase in demand. To understand these changes, we looked at the service level changes for each network. Figure 6 shows the number of service episodes for network N_D for the time periods analyzed. We can see that the increase in service episodes is due to an increase in food assistance demand. Looking at this more granular level of demand helps organizations to shift their navigation resources where they are needed the most, including adding new organizations to the network to absorb increased demand.

Figure 5. Demand for Services for Each Network, Pre-COVID and COVID

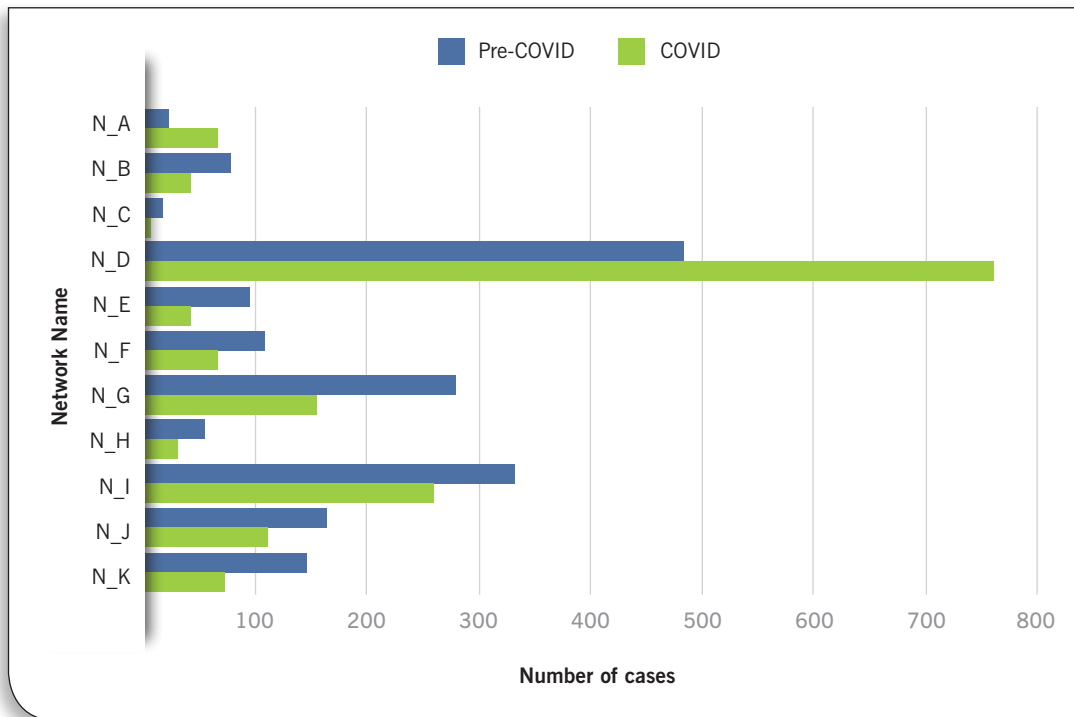
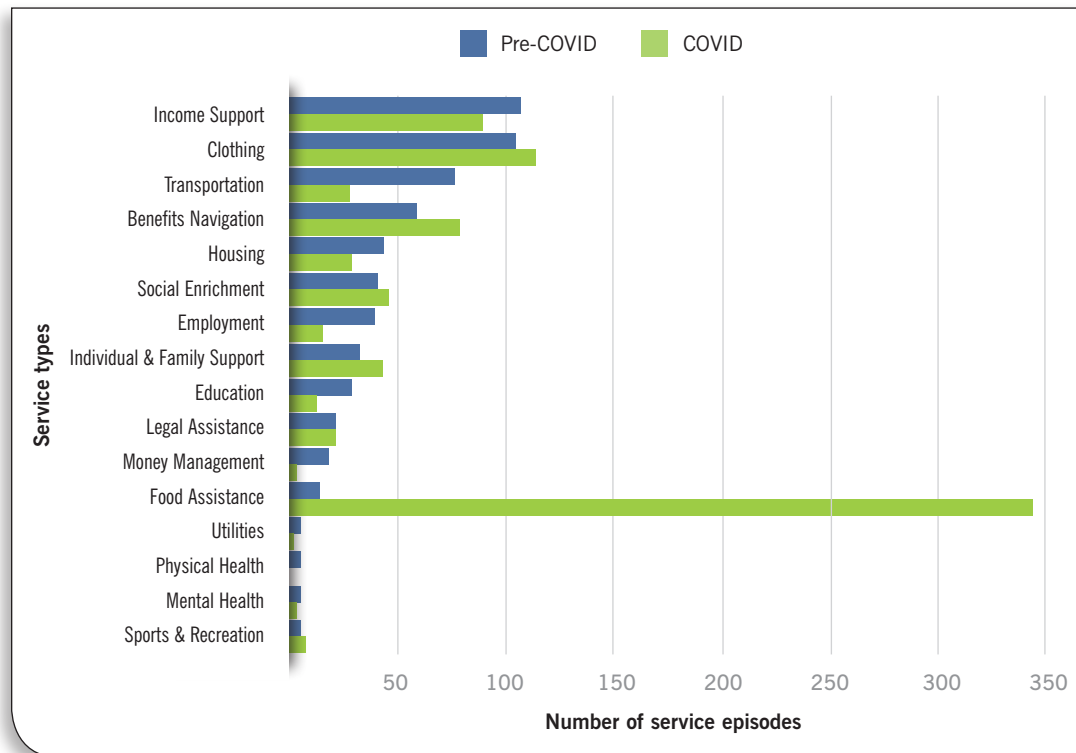


Figure 6. Number of Service Episodes for Each Service Type for Network D

Supply, however, is more challenging as measures of supply often vary across different sectors of care such as housing, food, transportation, physical and mental health, employment, and so on. Further, providers often operate beyond the network under study, making it hard to quantify capacity available for network clients. It is often easier to assess the extent to which the services that providers offer match those requested by clients. Referral system technologies can track how often providers reject referral due to capacity issues, providing an indirectly proxy for supply or capacity. In turn, network managers can use this data to identify which services have the most rejections. They can either recruit more partners into the network who provide those services or facilitate additional funding for current partners in those service areas. If capacity information is not available, as in the case of this study, the number of organizations offering each service type can be used as an approximation.

Figure 7 shows the number of organizations for each service type. However, to analyze capacity issues we need to consider the supply and the demand together. Figure 8 shows the ratio of organizations to service requests. Ideally an organization would like to have the same ratio for all the service episodes, perfectly matching supply with demand. As seen in the figure, that is usually not the case, and this metric can help the organization shift their organizational resources.

Figure 7. Number of Organizations for Each Service Type for Network D

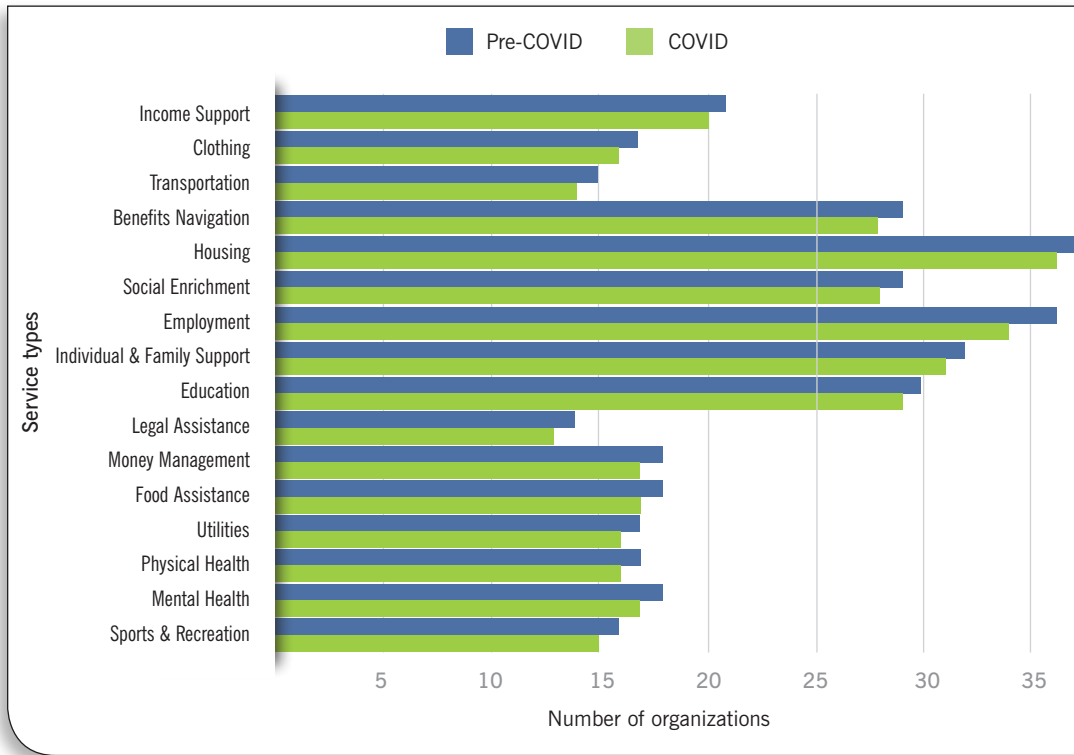
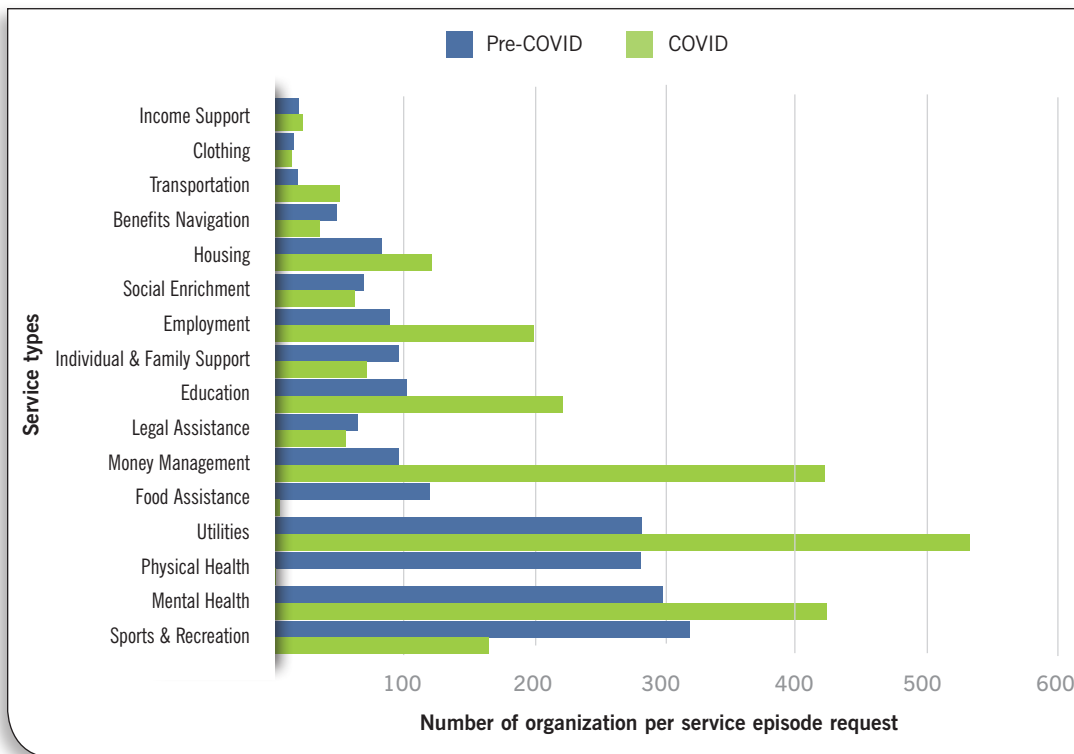


Figure 8. Number of Organizations Per Service Episode Request for Each Service Type for Network D





Insight 2: Metrics are comparable at the level of the service rather than the network level.

Likewise, metrics of network performance should be compared at a disaggregated level by service type provided rather than in aggregate. Providing tangible goods (like food or clothing) differs from providing short-term services (like transportation and benefits navigation), which differs from providing long-term services (like mental health, housing assistance, or employment). Services vary in their complexity, capacity, and logistics which can affect performance metrics. Networks offering more longer-term services will have a different performance profile than networks with more goods-based offerings. To appropriately understand performance across networks, it is necessary to compare how networks perform for the same service type; for example, housing to housing or clothing to clothing.

To do such analysis, we divided the type of services into four different categories that were both quantitatively proximal (efficiency, effectiveness, accuracy, and the total number of episodes) and qualitatively coherent with the perspective of the actors in the networks. Such categories are:

- *Daily needs*: clothing and household goods, food assistance, physical health, social enrichment, transportation
- *Economic needs*: benefit navigation, employment, housing & shelter, income support
- *Support needs*: legal, mental and behavioral health, money management
- *Long-term needs*: education, individual and family support, utilities

Looking at Table 4, Cluster 3 networks seem to be the most efficient, accurate, and effective. However, when looking at a more granular level by service type category (Table 5), Cluster 3 networks are the least efficient and the least effective on support needs service types indicating variance in the network. In the aggregate, this cluster of networks seems to perform better because a large proportion of their service requests are not support needs.

Table 4. Mean performance metric by network

| Network | Cluster | Efficiency | Accuracy | Effectiveness |
|---------|---------|------------|----------|---------------|
| J | 1 | 5.50 | 83.7 | 83.7 |
| C | 1 | 8.01 | 100.0 | 94.6 |
| H | 1 | 9.25 | 87.5 | 70.5 |
| G | 2 | 4.98 | 67.9 | 59.9 |
| K | 2 | 4.92 | 85.4 | 60.6 |
| F | 2 | 4.80 | 80.3 | 54.7 |
| E | 2 | 4.04 | 93.0 | 56.1 |
| A | 2 | 3.90 | 88.6 | 65.9 |
| I | 3 | 2.03 | 92.2 | 86.2 |
| D | 3 | 1.03 | 97.1 | 80.2 |
| B | 3 | 1.15 | 88.5 | 83.6 |

Mean performance metric by network. Efficiency is measured as the median time in days to accept a referral, and accuracy and effectiveness are measured as percentages.

Table 5. Mean performance metric by network cluster

| Network Cluster | Cluster Code | Efficiency | Accuracy | Effectiveness |
|-------------------|--------------|------------|----------|---------------|
| Low efficiency | 1 | 6.80 | 87.0 | 80.3 |
| Low effectiveness | 2 | 4.84 | 79.2 | 59.3 |
| Well-rounded | 3 | 1.28 | 94.8 | 82.4 |

Efficiency is measured as the median time in days to accept a referral, and accuracy and effectiveness are measured as percentages.

Table 6. Performance in each metric by network cluster and service cluster

| Cluster | Efficiency (days) | | | | Accuracy (% 1st accept) | | | | Effectiveness (% resolved) | | | |
|---------|-------------------|------|------|------|-------------------------|------|------|------|----------------------------|------|------|------|
| | D | E | S | LT | D | E | S | LT | D | E | S | LT |
| 1 | 8.69 | 8.63 | 4.08 | 6.06 | 100 | 91.7 | 55.6 | 89.1 | 83.3 | 80.6 | 69.4 | 81.6 |
| 2 | 4.89 | 5.92 | 3.81 | 4.90 | 76.3 | 82.3 | 66.1 | 80.7 | 68.4 | 54.4 | 51.8 | 59.5 |
| 3 | 0.94 | 5.00 | 7.85 | 1.82 | 99.7 | 96.4 | 70.7 | 92.4 | 93.2 | 87.3 | 41.5 | 74.9 |

D = Daily needs, E = economic needs, S = support needs, LT = long-term needs



Insight 3: There are tradeoffs among process metrics.

There are numerous process metrics relevant to data driven networks. These include accountability, efficiency, accuracy, and adaptability, to name a few. At this time, it is unlikely that any network can perform highly in all process metrics given the tradeoffs among them (Table 4 and Table 5). We find that networks aiming to be accurate also tend to be efficient, and vice versa. However, the pursuit of efficiency or accuracy can translate to shortfalls in client outcomes. Networks pursuing effectiveness often struggle with accuracy and accuracy. Such tradeoffs likely exist among other metrics as well. Therefore, it is valuable that networks decide which metrics they will prioritize, tie to this their overall mission and vision, then adopt technology or develop measures which capture those process metrics. These metrics should guide management strategies and interventions.




Insight 4: Service episode status provides information needed for human navigator intervention.

AmericaServes defines six statuses for their service episodes.


- *Accepted*: when a provider has accepted a referral
- *Rejected*: when a provider has rejected a referral
- *In Review*: when a provider is reviewing a referral to determine feasibility
- *Needs Action*: when a provider has not yet responded to a referral
- *Recalled*: when the Coordination Center has pulled a referral back
- *Closed*: when the Coordination Center has marked a referral as infeasible

These statuses offer valuable information on the current state of the referral and whether the coordination center needs to engage in further action. Service episode statuses within a referral technology are the primary indicators to determine what steps can come next, when addressing client needs. Many of these statuses signal when the human navigator needs to reach out to a target provider and remind them that there is a referral requiring action.




We like to keep an eye on it. Sometimes the agency will close it, sometimes they don't. When they don't and we see that it's been worked on, we follow up with that agency just to confirm. Then we remind them, hey, this is an individual you helped out. If you can please log onto Unite Us and close the case with a description of what assistance was provided.

Network A, Network Manager





These statuses also correspond with the complexity of service. Statuses like “In Review” and “Recalled” often indicate to human navigators that a client’s request may need more attention, communication, or documentation to meet the request.




We do not have the capabilities or the time to hunt down all the documents for the veteran. So we will tell them what we need and then we'll put that referral in review and it's up to the veteran to give us the documentation. If we don't get the documentation within 30 days, then we close that case as unresolved. After that everything else is, it's all accurate for our operations.

Network D, Coordination Center Case Manager



We take the need and try to find the best provider available, and we'll send it there and if we don't get a quick enough reply or an acceptance of referral, then we'll go to a second choice.

Network J, Network Manager



Connecting to Insight 6, due to the knowledge, skills, and abilities that human navigators possess influence how these statuses are perceived and addressed. This level of complexity is connected to how providers may use the system, and this influences how human navigators respond to these statuses due to previous relationships with provider organizations.



Insight 5: Disaggregating data highlights service gaps in both service capacity and client satisfaction.

Similar to Insights 1 and 2, disaggregating data highlights which services are not meeting client needs. Services with high rates of rejection, particularly for capacity reasons, indicate areas where the network needs to grow. Growth may mean recruiting new partners into the network or finding additional funding for current partners so that they can expand their services. Likewise, a disaggregated view identifies which services are more or less successfully resolving client needs. Services with low rates of resolution can be targeted for more direct, less resource-intensive interventions to identify the reasons behind dissatisfaction and address them.

Table 7. Top 5 services with greater percent of unresolved requests

| Service | # Episodes | Resolved (n, %) | Unresolved (n, %) |
|--------------------------|------------|-----------------|-------------------|
| Wellness | 16 | 11 (68.8%) | 5 (31.2%) |
| Physical Health | 81 | 58 (71.6%) | 23 (28.4%) |
| Income Support | 519 | 385 (74.2%) | 134 (25.8%) |
| Housing & Shelter | 1,094 | 832 (76.1%) | 262 (23.9%) |
| Mental/Behavioral Health | 137 | 108 (78.8%) | 29 (21.2%) |

Percentages add up to 100 per row.

Table 8. Request resolution by gender

| Gender | # Episodes | Resolved (n, %) | Unresolved (n, %) |
|-------------|------------|-----------------|-------------------|
| Female | 1,322 | 1,108 (83.8%) | 214 (16.2%) |
| Male | 3,995 | 3,370 (84.4%) | 625 (15.6%) |
| Nonbinary | 3 | 3 (100%) | 0 (0%) |
| Other | 3 | 3 (100%) | 0 (0%) |
| Undisclosed | 358 | 309 (86.3%) | 49 (13.7%) |

Table 9. Request resolution by service era

| Service Era | # Episodes | Resolved (n, %) | Unresolved (n, %) |
|------------------|------------|-----------------|-------------------|
| World War 2 | 10 | 8 (80%) | 2 (20%) |
| Pre-Korean | 2 | 2 (100%) | 0 (0%) |
| Korean War | 27 | 15 (55.6%) | 12 (44.4%) |
| Post-Korean | 31 | 22 (71%) | 9 (29%) |
| Vietnam Era | 562 | 470 (83.6%) | 92 (16.4%) |
| Post-Vietnam | 1,210 | 1,005 (83.1%) | 205 (16.9%) |
| Persian Gulf War | 724 | 595 (82.2%) | 129 (17.8%) |
| Post 9/11 | 1,910 | 1,666 (87.2%) | 244 (12.8%) |
| Undisclosed | 24 | 17 (70.8%) | 7 (29.2%) |



Insight 6: Human navigators play an important role in how referral technologies will be used.

The importance of human navigators in referral systems cannot be overstated. Navigators act as the glue of the network. They know the services provided by many, if not all, of the providers in the network, various logistical requirements for each provider, and often have a sense of providers' capacities. They handle the work of connecting a client with care, rather than leaving the client adrift in the ocean of possible providers

So basically, we're that conduit between all the providers and then the veterans that come through.

Network D, Coordination Center Case Manager

As such, they often use referral technologies in a far different way than providers. Navigators will be highly engaged with the technology and will often have a more global view of the network's flows and its operations. In this way, navigators can set the tone for how the network needs to use the referral technology in order to make the technology and the network more effective.

We take the need and try to find the best provider available, and we'll send it there and if we don't get a quick enough reply or an acceptance of referral, then we'll go to a second choice.

Network J, Network Manager



Insight 7: Engagement gaps can provide guidance on where to focus provider outreach and communication efforts.

Expanding on Insight 5, disaggregated data can identify providers who are either fully disengaged or actively disengaging. In data driven networks, engagement might be measured in a number of ways, including: the timeliness of responses, how often they accept referrals, or how many clients they refer into the network. By taking a deeper look at the data in referral system technologies, managers can identify these partners who are slipping toward the periphery and reengage them. Reengagement may involve further community-building or direct conversations with the disengaged partner but will most likely require greater use of the disengaged partner's services. In other words, reengagement will most likely happen through sending referrals to the disengaged partner.

Table 10. Provider response time by network.

| Network | Response Time | | |
|---------|---------------|--------|------|
| | Min | Median | Max |
| A | 0.002 | 8.79 | 18.2 |
| B | 0.001 | 0.77 | 3.75 |
| C | 0.001 | 2.45 | 10.1 |
| D | 0 | 0.96 | 5.92 |
| E | 0.001 | 4.16 | 8.78 |
| F | 0.003 | 3.99 | 11.1 |
| G | 0.001 | 4.18 | 9.86 |
| H | 0.001 | 5.2 | 11 |
| I | 0.001 | 3.02 | 7.7 |
| J | 0.003 | 3.92 | 8.43 |
| K | 0.003 | 2.08 | 5.82 |
| 3 | 0 | 0.96 | 5.92 |

Similar Networks



Outside AmericaServes, there are numerous other examples of networks employing similar models to coordinate care across providers and service areas. We particularly highlight different models of referral platforms, human navigation support, and continuous improvement models to demonstrate the generalizability of what we learned in the veteran space to a more general set of cross-sector coordinated service providers.

Mixing closed-loop platforms and human navigators

Outside of the veteran's space, networks around the country have effectively mixed closed-loop referral platforms with human navigators. We provide some examples in this section to highlight the use and potential of these systems for better policy implementation and client outcomes.

NCCARE360 emerged from a collaboration between United Way of North Carolina, Unite Us, Expound Decision Systems, and Benefits Data Trust, to build the North Carolina Resource Platform. The NC Resource Platform acts as a combined resource directory, data repository, and shared referral platform to enable providers to send clients to one another. Much like AmericaServes, NCCARE360 uses a “no wrong door” model so that clients entering the network for one service can access any other service in the state. Unlike AmericaServes, NCCARE360 does not rely on centralized coordination through human navigators. Providers instead refer directly to one another as with more traditional referral models.

Similarly, the Southwest System of Care (SWSOC) is a decentralized community-based data driven network in Chicago, Illinois. SWSOC uses community relationships as the primary mechanism to mitigate and ease barriers to human services. The network incorporates traditional nonprofits, government agencies, community-based organizations, and health providers. SWSOC serves community members on the southwest side of Chicago by creating multiple doors to various services. SWSOC uses IRIS as its case management system to connect and communicate with local provider organizations and facilitate referral coordination. This care system relies on human navigators to assist and support community members in navigating the care-seeking process. Human navigators are placed in community schools and are the primary access points for students and families entering the care system. SWSOC's human navigators share information about available services and communicate with providers on behalf of community members.

Pathways Community HUB sets up a similar model but with a more technology-agnostic approach. The Agency for Healthcare Research and Quality (AHRQ) guide to setting up a HUB describes identifying a lead agency to coordinate the HUB, conducting a needs assessment to identify service needs, then organizing those identified needs into *pathways*.²³ One example of this model launched in September 2020 in Cambria and Somerset Counties in Pennsylvania. The 1889 Jefferson Center for Population Health (JCPH) serves as the community hub (i.e., lead agency) and conducted a needs assessment with the local population. The assessment identified three target populations: 1) pregnant women receiving or eligible for medical assistance; 2) pregnant women diagnosed with gestational diabetes; and 3) families with children experiencing low school attendance or poor grades. JCPH then connected with three nonprofit agencies in the area to set up pathways for each of the target populations and to act as care coordination agencies for their respective pathways. Their 2021 annual report reveals how this multilayered management approach reinforces closure of referrals and enhances the role of human navigators. Regarding data, each HUB determines their own data needs and measurement strategies to ensure that clients successfully address their needs.

23. Applegate, M., et. al. (2016). Pathways Community HUB Manual: A Guide to Identify and Address Risk Factors, Reduce Costs, and Improve Outcomes. Agency for Healthcare Research and Quality.

Using data to drive improvement

[Healthy Alliance](#) (Alliance for Better Health and its affiliates) connects the underserved to a growing network of organizations—big and small—that provide services that are essential for a healthy life. With over 580 organizations spanning 22 counties in New York State, Healthy Alliance works to provide all communities with consistent access to the resources they need to ensure every New Yorker has the same opportunity to be healthy. Much like the AmericaServes networks described here, they use a closed-loop referral platform and manage referrals within their coordination center to ensure community members get connected to needed services.

With a person-centered approach to health, their network promotes collaboration across medical, behavioral, and social care—linking providers of all kinds. Using analytics to identify providers who are not closing cases or responding as effectively as others, Healthy Alliance’s team of Performance Consultants work with the organizations to ensure that they are meeting quality standards, improving response time, and integrating referrals more effectively into their workflow. In essence, they use demand and process metrics to identify which providers need more support and then provide these organizations with the tools they need to be successful.

CIE San Diego provides a more generalized approach to linking health care and human services that is applicable to communities across the U.S. CIE San Diego describes five elements necessary to creating a community information exchange (CIE): 1) network partners, 2) a shared language, 3) an integrated technology, 4) a resource database for referring, and 5) community care planning. CIE San Diego provides a model by which communities can organize and coordinate care across different services without prescribing a particular set of technologies or tools. Instead, they emphasize the importance of collaboration, mutual investment, and shared standards to encourage communities to hold themselves accountable with whatever technologies and tools they adopt. The mutual accountability surfaced by shared language, technology, and planning of the CIE San Diego model enables communities to continually assess their performance and identify growth areas.

Recommendations



Data driven management can reduce some challenges to working in networks including the administrative burden of relying on informal accountability mechanisms. The data give us a clear picture of who is participating and performing rather than relying on talking to people to get a general sense of it, reducing the number of resources needed for information search and capture and increasing the resources available for management.

Referral system technology can be used to develop data driven management strategies that assess performance at the network, organizational, and client level. It can also be used to assess performance on particular service types. We offer the following general management recommendations based on our findings and insights from the AmericaServes networks. For each recommendation, we discuss why it is important and who should be responsible for its implementation.

Recommendation 1: Ensure network design lends itself to capturing metrics to manage the network.

- **Why?** In Insight 1, we discussed metrics. Metrics such as quality control, demand, supply, and process metrics will help managers understand how the network is performing as a whole along with shedding light on individual parts (e.g., organizations or service type areas) of the network that may need improvement or guidance.
- **Who is responsible?** Network leaders should work with data analysts to ensure metrics are embedded into the system before it is operational. Network leaders should continue to work with data analysts to refine metrics and interpret data once the network is operational. Data analysts should automate regular reports based on metrics that provide leadership and management with insights about network performance.

Recommendation 2: Use performance measures effectively.

- **Why?** In Insight 2, we advocated for examining metrics by service type as services may have variance in efficiency, accuracy, and effectiveness. In insight 3, we highlighted tradeoffs among metrics. This recommendation requires network leaders to resist the temptation to look at whole network level functioning when assessing individual network performance or performance across networks. Disaggregating by service type allows network leaders to develop nuanced insights about network function and make decisions about how to manage the system in light of tradeoffs among metrics.
- **Who is responsible?** Network leaders should work with data analysts to ensure reports can be automated by service type. Reports should include metrics discussed in Recommendation 1.

Recommendation 3: Use data to know when to get human navigators involved. Use data systems for monitoring service episodes, not just evaluating network performance.

- **Why?** In Insight 4, we highlighted useful information that can be pulled from the system to assess the current state of referrals and whether a human navigator should get involved to help resolve a case.
- **Who is responsible?** The coordination centers should work with data analysts to automate reports that list cases that have been “In Review” or “Needs Action” status for an unacceptable amount of time. The time frame should be designated by service type. Coordination centers might use average or median response times as benchmarks to flag cases that need human navigator intervention. Cases that are recalled should also be flagged for attention by the coordination center. In each scenario, the coordination center at regular intervals should be sent automated reports about cases that may need intervention at regular intervals (e.g., once a week). Checking these reports and assignment human navigators to cases in need of attention should be an integral part of the coordination center workflow.

Recommendation 4: Use real-time data to respond adaptively to shifting supply and demand. Data will yield nuanced insights and points for management intervention.

- **Why?** This recommendation is related to Recommendation 1 which advocates for establishing process metrics during the network design phase. It is related to Insights 1, 2, 5, and 7. In particular, Insight 5 calls for disaggregating data to understand service gaps in service capacity and client satisfaction. Using real-time data to manage supply and demand in networks will likely result in increased efficiency, accuracy, and effectiveness. For example, low service capacity and/or client satisfaction are both leverage points for management of network providers and may result in identifying and/or replacing underperforming providers if management interventions are not successful.
- **Who is responsible?** Network leaders should empower coordination centers to analyze data for shifting supply and demand trends. Network leaders should work with coordination centers to identify gaps in services and use this information to recruit new partners or implement management interventions with underperforming partners.

Recommendation 5: Promote communities of practice and learning among providers to highlight top performers and best practices.

- **Why?** Data driven networks are similar in that they use real time data analytics and human navigators to connect clients to services. While networks may vary in terms of services provided, they may be able to learn from each other to improve network accuracy, efficiency, and effectiveness for clients. Within data driven networks, regular meetings among providers may be beneficial for learning and spreading best practices.
- **Who is responsible?** Network leaders should engage with each other in regular meetings (e.g., monthly or quarterly) to highlight top performers and best practices and to discuss challenges to network implementation and management. Coordination centers may also convene communities of practice within networks to promote network cohesion and information sharing.

Recommendation 6: Data interoperability and data standards are critical to compare across networks. Utilize existing policy frameworks to design approaches to data driven management in networks.

- **Why?** Evidence is critical for implementing public policy and improving the lives of clients served by data driven networks. Data interoperability and data standards allow network leaders, policymakers, and the research community to compare across networks to fully understand what is working and what is not working in aggregate and to ensure public policy is being faithfully executed.
- **Who is responsible?** Network leaders and managers should certainly advocate for data interoperability and data standards, but the onus is on the federal government to enact and implement requirements for data interoperability and data standards to ensure networks that receive federal funding will be able to plug into an existing ecosystem of data driven networks.

Recommendation 7: Pay as much (or more) attention to the help-seeking intervention design and the role of human navigators and the choice of technology platform vendor.

- **Why?** This recommendation is related to Insight 6 which indicates that human navigators are critical to system functioning, including having a sense of the overall system and ensuring cases do not fall through the cracks.
- **Who is responsible?** Network leadership should invest in training and capacity building for human navigators. This should be an integral part of the network design.

Recommendation 8: Disaggregate metrics to identify disparities in care.

- **Why?** This recommendation is an overarching one related to ensuring equity in access to and receipt of care. Systems should collect demographic information from clients to understand whether clients are being treated equitably by the system.
- **Who is responsible?** Network leaders should work with data analysts during the network design phase to ensure appropriate data are collected to understand and address care equity. Coordination centers should work with data analysts once the network is operational to complete regular checks about equity of access to and receipt of services. Where discrepancies arise, network leaders and coordination center staff should seek to understand disparities and design management interventions to increase equity.

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