PROVIDER DIRECTORY SOLUTIONS:
MARKET ASSESSMENT AND OPPORTUNITIES ANALYSIS

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Introduction

Developing, populating, and maintaining the "ideal" provider directory solution is a complex proposition, with many details to consider; however, it is important to take a step back and consider the business drivers and customer needs first. In doing so, let's imagine we are a business conducting a careful market analysis—ultimately, we need to answer the following question. Is there is a real demand for a new kind of provider directory solution, such that we are willing to put capital at risk to develop it?

In HIE there has been a constant tension between the worthy goal of total data liquidity (making the right health data available to treating clinicians and public health experts, at the right place and time) and viable, long-term business models (coming up with services that deliver enough business value that customers are willing to pay for them). Policymakers need to be cautious of creating artificial demand in the near- to mid-term for services that may not be viable in the long-term. At the same time, a short-term financial "spark" may be just what certain technologies need to achieve scale and prove the value that will lead to sustainability.

Provider directory services are no different from other areas of HIE where pursuing worthy goals and developing value-based demand must go hand-in-hand. Businesses that are considering developing provider directory solutions (and the policymakers who are looking to support the market) must think outside the box, because the real business drivers may be outside of the primary requirement of clinical health information exchange. In fact, they are probably likely to be. This may be an uncomfortable reality for many in the HIE world.

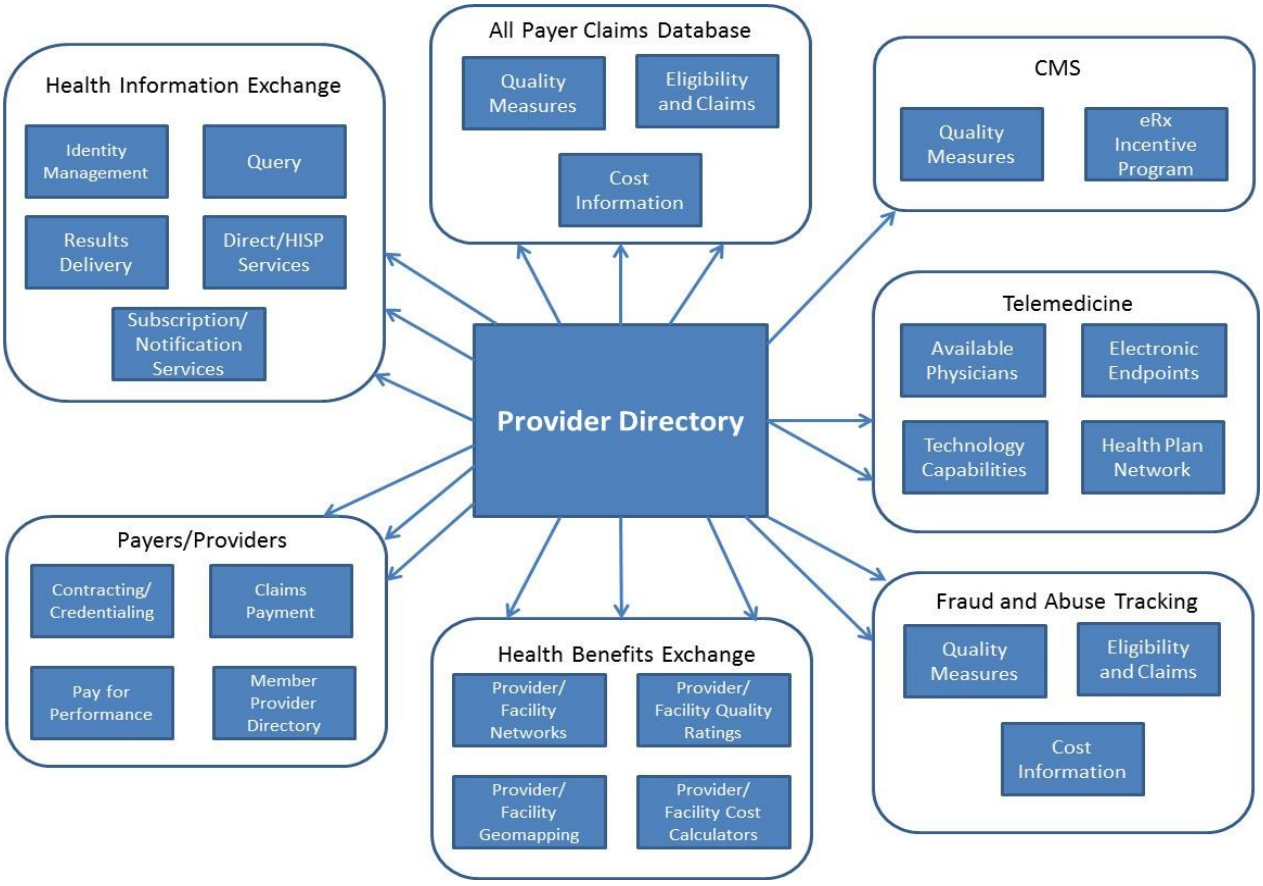
On the other hand, it may be a significant opportunity. There will be an evolving understanding of the new behaviors that health reform will incent as programs like accountable care organizations (ACOs) are implemented, but much is still unknown. Successful health information exchange organizations (HIOs) will be flexible and creative, thinking about their role more broadly in a transforming healthcare marketplace. By managing a provider directory for a service area such as a state, HIOs may be well positioned to offer services that today feel off-mission or out-of-scope, but tomorrow could lead to real revenue streams and sustainability. In addition to the HIOs themselves, their governance structures and funding sources must also be attuned to this reality.

There is a real opportunity in the way that provider directory requirements of major state-level initiatives such as Medicaid management information systems (MMIS), health benefit exchanges (HBE), and HIE all converge. That opportunity is tempered somewhat by the fact that each initiative has its own time pressures and set of unique stakeholders—it is unclear whether, in reality, such major undertakings can be coordinated across state, federal, and private entities to achieve real synergy. Cross-program coordination and shared-services, while well-recognized best practices, are all too often not pursued because of the perceived risk of putting the fate of one program into the hands of a third party. While we recognize these are challenges, we believe that there are reasonable ways to mitigate those risks in the near-term, while benefiting from shared services in the mid- to long-term. An incremental approach and the right collective vision-setting could encourage a shift towards a more modular, shared approach to provider directories over time.

What does a modular, shared provider directory mean? Directory solutions that are integrated into HIE platforms today are likely restricted because of past architecture decisions. For instance, most directories in the market offer application programming interfaces (APIs) specific to HIE functions but were not designed with consideration of the need to expose web services for non-HIE use cases. Accommodating this need would require major product reengineering and the time and investment that entails. The

provider directory solution of the future should meet more than core clinical data exchange requirements; be extensible to serve the needs of other organizations' requirements, such as payers, providers, and insurance exchanges; and be capable of connecting via web services to other entities. The business that is considering investing in the development of such a solution could meet a real market need, though it may not be able to come to market in time to capitalize on short-term funding streams and compete in the rapidly-closing procurement window.

More likely, existing provider directory solutions, both those built for HIOs and those serving other use cases, will gradually evolve to become more modular and flexible, or HIOs will implement parallel directories to serve multiple functions. We believe that an opportunity exists for HIOs to position themselves to operate this technology and look to play a central role across the healthcare delivery system not just with respect to the liquidity of clinical data. In order to do this, they must have the right relationships within their service areas, enjoy the support of and a shared vision with their governance and funding sources, and partner with a vendor community that is moving in the same direction. The purpose of this analysis is to frame the key issues and lay out a path for HIOs, policymakers, and vendors towards demonstrated value and financial sustainability for provider directories.



Uses for Provider Directories

To date, HIOs have deployed provider directory solutions to meet current clinical data exchange requirements. In exploring additional revenue opportunities associated with expanding the functionality of a provider directory, some HIOs may need to evaluate deploying parallel infrastructure in the near-term, because their existing vendors cannot support the new requirements. These parallel infrastructures supporting provider directory solutions may be completely separate technical modules, as HIOs continue to support current HIE needs while deploying infrastructure to serve a future state, though they may communicate or sync in some way.

Before considering the business opportunity and its technical implications, an HIO must also take an honest look at its position in the community it serves. At least at the present time, some HIOs may not be the appropriate vehicles to deploy and manage such services due to lack of community buy-in, previous execution problems, or because another entity is better suited. Whether as the operator of a provider directory, a stakeholder in a collaborative or modular directory or merely a consumer of a directory's services, HIOs have a role to play in highlighting the potential of the technology across the entire healthcare and government landscape. What follows are descriptions of the most clearly defined use cases beyond clinical messaging and data exchange.

Payers / Providers

Payers manage dynamic provider networks. Maintaining a provider network is a complex, multi-faceted process. Payers frequently contract with new providers and hospitals; they also regularly reevaluate and re-negotiate their existing contracts. Contracting requires access to and maintenance of a number of data elements, including: provider demographics, such as address, phone, fax, and specialty; licensing, credentialing, and privileging information; hospital affiliation; rate information; and contracting terms. Maintaining an accurate provider network is also pivotal for processing and correctly paying claims. Payers must maintain information on whether a provider is participating in electronic remittance advice (ERA) and electronic funds transfer (EFT) as well as who their clearinghouse vendor is. A payer's claims processing system needs to know where to send remittance advice and claims payments, either a clearinghouse or via mail. Many payers currently outsource EFT/ERA to a clearinghouse that maintains a provider directory with endpoints for electronic information delivery, but they must also maintain their own directory for non-electronic payments.

Member services are also part of a provider network. Payers provide a provider directory to their members that includes both entity information and individual provider information. Member-facing provider directories include demographic information (location, phone, specialty, gender, etc.), degree and residency information, licensing information, hospital and group affiliations, languages spoken, and whether they are accepting new patients. The directories often allow for fairly complex searches for providers.

The medical loss ratio (MLR) rules were created under the Patient Protection and Affordable Care Act (PPACA). Under the MLR rules, small group plans must spend 80 percent of premiums on non-administrative functions including claims reimbursement and activities that improve member care quality; large group plans must spend 85 percent of their premiums on non-administrative functions. Maintaining a provider network, including credentialing and contracting, is considered an administrative expense

under the MLR rules.[1] Maintaining the claims processing system is also considered an administrative expense. As a result, payers are highly incented to develop ways to reduce and contain the cost of maintaining their provider network, including the most expensive aspect of credentialing, primary source verification.

Health Benefit Exchanges

A provider directory will be pivotal to health benefit exchanges. A provider directory must be exposed via a website that each state is required to provide for its residents. Before individuals choose a health plan, it will be important that they know the providers, facilities, and hospitals that participate in particular plans. Individuals will likely have the ability to search the directory by demographics of providers, the insurance plans they accept, and whether they are accepting new patients. Individuals should also have the ability to search for facilities and hospitals to determine demographics, the insurance plans they accept, and their affiliated physicians. Many states are also including quality ratings for providers and hospitals in their directories, as well as facility cost information for specific procedures. Health benefit exchanges will require a directory that can maintain relationships between providers and facilities, providers and payer networks, and facilities and payer networks.

Key Technical Concepts

ILPD and ELPD

Much discussion and collaboration has taken place with regards to defining the core functional and data requirements of Individual Level Provider Directories (ILPD) and Entity Level Provider Directories (ELPD). Generally, the analysis correctly focuses on the functionality and data required for accomplishing the primary use case (for instance Direct) and recommends an extensible architecture that allows for phased development to meet the requirements of future use cases. However, frequently lost in the discussion is the false division of ILPD from ELPD and the general focus on "provider." Depending on the starting point of a given HIE service (e.g. results delivery in an HIO requires certain provider directory functions), the entity correlations back to an individual can become an extension of the ILPD, rather than a wholly new or separate directory service. That basic point is not meant to imply that creating individual- to entity-level correlations is easy, but rather to demonstrate that in contemplating the development of a provider directory the ILPD component of the solution may simply be a starting point that evolves to include ELPD functionalities and data capabilities. Additionally, there may be highly relevant non-provider types of valid identities in a directory solution (e.g. an immunization registry as an electronic endpoint).

Identity Management

Provider identity management includes the front-end identity proofing process (How do I know you are who you say you are?), the ongoing authentication of the provider (How do I continue to know you are the same person whom I identity-proofed on the front end?), as well as the maintenance of that identity should any key data be created or changed (How do I know the provider is now credentialed at a new

[1] Note that this is not referring to the cost of supporting health information exchange, rather the cost of maintaining a provider network.

facility?). From an HIO perspective, provider identity management for HIE purposes has tended to rely on approaches that align with the types of HIE services offered and the types of users of the system. For instance, an HIO may allow a hospital to create user accounts for its employed physicians without any intervention by the HIO itself. In this case, the business associate agreements, contracts, and level of trust between the hospital and HIO are sufficient to allow the HIO to outsource identity proofing to the hospital.

In fact, most HIOs, prior to Direct, focused on creating identities for providers (or provider support staff) to enable results delivery to an EMR or for access to a portal for querying and results delivery. The identity proofing process generally relies on identifying a trusted individual within the organization that signed the contract with the HIO and relying on that individual to be the conduit through which all new accounts are requested for that organization (i.e. a "registration authority"). This is generally as simple as filling out a form or a spreadsheet and sending it to the HIO. The responsibility (and contractual liability) falls on the organization (via the designated individual) to appropriately and accurately identify users who require access to the HIO.

Identity management, however, takes on greater significance for other use cases. A directory solution that houses not only information on providers' and other entities' electronic endpoints (i.e., an EMR, a Direct address, an immunization registry, etc.) and their digital signatures, but also information relevant to processes such as credentialing, billing, and quality reporting, requires a different set of processes for identity management—ones that HIOs may not currently be set up to support. This issue will be discussed in more depth in our analysis.

Data Maintenance

Directory solutions have two major components: the technical solution and the data that populates that solution. Many companies in the marketplace today are experts in one or the other, but few are experts in both. In today's environment, payer and provider organizations engage in various processes to ensure their provider directory information is maintained, including partnering with credentialing verification organizations (CVOs). These processes tend to have mixed results. Many of these organizations also rely on partners (CAQH and Health Market Sciences as examples) to supply them with provider data feeds. The data provided through these feeds is then generally kept up to date with highly manual processes that are not viable at larger scales. The overall process is resource-intensive and very costly.

From an HIO perspective, as already described, provider data is generally loaded by creating individual accounts or loading a spreadsheet (as provided by a hospital, acting as a kind of registration authority). After that, the processes to ensure the data remains accurate tend to focus on what is required to support a specific functionality. As an example, an HIO may need to make sure a provider's Drug Enforcement Administration (DEA) information is correct for e-prescribing; on the other hand, since the physical address is not used by the DEA, it is not important to the HIO if the address is maintained. Conversely, a payer organization may need physical addresses or EFT data for claims payment, but may have less need for the DEA number. Across all the different directories where an individual provider may exist, different data is important for different reasons, and therefore inaccurate data of different types exist in most, if not all, directories.

Today's solutions tend to rely on "manual feeding and maintenance." As an example, when an HIO integrates with a data provider like a hospital or a lab, it requests a dump of provider data from that organization, normally in the form of a basic spreadsheet. This spreadsheet generally includes

demographics, specialty, physical address, NPI, and local hospital provider ID (if one exists). The HIO loads that spreadsheet into its master HIO provider directory, but at that point it is not used for any purpose. When the HIO activates a provider to receive results through the HIO, they manually search for the provider in the master spreadsheet and find all sites that included that provider in their lists. A record is then created cross-referencing the NPI and other local provider IDs and lab account numbers, so that the HIO can route results from any data provider to the ordering provider. This is a cumbersome and messy process. When data is changed or is missed during the creation of the cross-reference, the provider will not receive results from a given location, potentially the only indication that an error exists. In a query portal scenario, an entirely separate user profile is created, based on information from the hospital or other provider organizations, to capture the individual user information and role assignment. Both of these approaches to managing provider identities—one for results delivery and one for a query portal—are use-case specific and conceptually simple, yet can become difficult to manage at larger scales and do not lend themselves well to supporting future use cases.

Analysis

Our analysis boils down to three recommendations:

- First, the industry needs to develop a broader view of the objectives of provider directory. HIOs and their stakeholders must evaluate the wide variety of use cases a provider directory can support and invest accordingly.
- Second, federal agencies and states/grantees need to engage in big-picture planning around provider directory. Concurrent to the expending of HITECH cooperative agreements, a number of other federal programs (90/10 funding, CMMI, etc.) are investing in other use cases which incorporate provider directories. States/grantees need to evaluate how they can achieve efficiencies and economies of scale with provider directory.
- Finally, HIE vendors who have generally been HIE-centric with regards to provider directory development should pursue a more modular approach in the future.

There is potentially a closing window to take effective action on these recommendations, as a generation of policy, funding, and procurement decisions are being made by public and private sector healthcare leaders over the course of the next 12 to 24 months. In addition, there are a number of more specific issues with significant bearing on the path forward. Each is discussed in detail below.

Modularity

A modular solution is developed by breaking down primary features into smaller discrete functions called modules. Taking HIE infrastructure as an example, the master patient index, record locator service, document repositories, and audit functions are all modules within the infrastructure. However, in most HIOs those modules are not architected in ways that allow them to mix and match modules from different technology vendors.

In discussing concepts of modularity with HIOs and vendors in the provider directory space, the conversation sounded nearly identical to a discussion on service oriented architecture (SOA). Ultimately, SOA is a means to accomplishing modularity by exposing key features to heterogeneous systems. When thinking about SOA there is a tendency to picture larger complex infrastructures, which have many services running to support a larger mission. However, a single service (in this case a directory) can be

exposed via a web service to interact with a wide range of other systems to serve different purposes. Ideally, the web service or interface would be standards-based, helping to minimize the cost of custom integration. In fact, the ideal provider directory solution would likely have many web services in order to enable functions such as populating data, managing data, and allowing access to data (i.e. a series of web services for credentialing specific use cases, a series of web services for HIE use cases, and web services for master data management or reconciling with other trusted sources of demographic data, etc.).

Architects and implementers of provider directories today need to envision how their directory may interact with many other systems in the future, to maximize its value. The more accessible the directory data is, and the more flexible the HIO can be in what data it collects, as well as how it shares data and interacts with other stakeholders for different purposes, the more likely it will be that the solution becomes sustainable. This will be an incremental, evolutionary process, as the discussion among HIOs about how to unlock the power of provider directories is only now beginning.

Standards

Standards for provider directories are necessary to enable the sharing of directory information across organizations. They also help to maximize the flexibility and usability of a directory across multiple organizations, agencies, and use cases. The easiest way for an organization to provide access to its directory is by exposing the directory through a web service. Just as CONNECT relies on web services to allow HIOs to access information, a provider directory can be exposed in the same way. CONNECT has created standardized XML schemas for a number of services, such as patient discovery and query for documents. Each web service can be easily accessed via standard Internet protocols because the XML schema has been standardized to accept specific query types and return specific information. Because standards in this area do not yet exist, if an HIO or HISP wants to expose its directory through web services, other organizations must build custom interfaces to query the directory. This is expensive, time consuming, and not scalable.

A second step in sharing directories is ensuring that HIOs and HISPs abide by standards for identity management. Many HIOs and HISPs are hesitant to share information due to a lack of insight about whether other HIOs and HISPs are adhering to rigorous identity-proofing and identity management processes. Specifically, it has been noted in relation to HISPs that they are operating with little constraint on identity-proofing practices, leading one observer to refer to it as the "wild west." The landscape of HISPs is propagating rapidly and with little coordination; as a result, there are trust issues that pose risks to HISP-to-HISP communication. A number of initiatives are working on solving the trust issues between HIOs and HISPs. In May 2012, ONC released the NwHIN Governance request for information (RFI). The RFI contains proposed Conditions for Trusted Exchange (CTEs) that will be used to govern the behavior of HIOs and HISPs that seek such certification. It is expected that comments received on the RFI will be used to develop a notice of proposed rulemaking (NPRM), after which a final rule will be developed. In addition to ONC's work, DirectTrust.org, a multi-stakeholder, non-profit organization, is working on policies and standards for certificate authorities, registration authorities, and HISPs.

While it is true that standards for the data elements of a provider directory and web services are not fully developed, the standards and protocols used by the Internet to support web services are fairly well established and widely used. These standards and protocols include Domain Name System (DNS), Representational State Transfer (REST), and Simple Object Access Protocol (SOAP). If the data elements of the web services can be standardized, a trust framework can be built, the industry will be able to move forward with sharing their provider directories, setting the stage for more complex use cases in the future.

Operational and Business Issues

For HIOs across the country contemplating the value of offering provider directory services, a basic but key question is where to begin. Frequently, the answer of where to start depends on where an organization is currently. The aggressive pursuit of Direct over the last year has caused a split among HIOs throughout the country: some have already deployed query-based exchange services and are now also pursuing Direct, while others are starting with Direct and are pursuing it as the primary exchange methodology in their geography. This split in focus, along with the fact that HIOs vary widely in their progress executing against their plans, means that now may or may not be a realistic time for an HIO to embark on a bold and broad strategy with regards to provider directory. But at the very least, all HIOs should be taking a step back and asking themselves if their approach to provider directory is moving in the general direction of modularity and openness. At the same time, they should also consider whether their vendors are likely to help them in this effort. It may also be an opportunity, as different HIOs bring different urgent needs and past experiences to their approach to provider directories, to inject the market with a healthy dose of creative problem-solving and experimentation.

The reality is that the provider management tools deployed in most existing HIE models, cannot support a more diverse set of use cases in their current form. Organizations that are just now procuring and deploying HISP services may be in a position to work with their technology partners to reshape their approach to provider directory, better positioning themselves for broader opportunities beyond secure routing of messages. Others, though, are locked into past procurement decisions and vendor relationships. These HIOs need to embrace a concept they are likely already familiar with—rapid incrementalism. They need to ask what is achievable in the short term as well as how to move gradually but deliberately towards longer-term objectives as well. Additionally, for those organizations that already have provider directory solutions to meet their HIE needs but which may not be suitable starting points for the broader offering, a dual directory model could be feasible. In this case, the existing solution which meets current operational needs and an independent (modular) solution for other use cases could be deployed in parallel. These two directories may to some extent sync or share data. Depending on the circumstances, retiring the original solution over time may or may not be possible. From our experience, provider directories developed in the payer community to meet administrative use cases tend to be more powerful, flexible, and technically mature; further, these organizations can offer more in the way of services. If an HIO's HIE infrastructure allows, it may consider implementing such a directory from the start or in parallel, instead of a directory developed by an HIE vendor. (It is worth noting that a number of the payers with strong provider directory technology now also own HIE technology vendors, and they are beginning to consider how these solutions can work synergistically.)

HIO Focus on Core Activities

Understandably, health information organizations around the country have focused efforts on core exchange functionality. The driving forces behind pursuing these services have been both the founding core missions of the organizations as well as the requirements of HITECH funding. Many HIOs that came to maturity prior to HITECH and are less dependent on grant funds for near- and mid-term sustainability have developed large scale results delivery services, support administrative data exchange, or have other services that are not reliant on query-based exchange or clinical messaging (e.g., Direct). These points support a view that revenue generating services outside of the core clinical data exchange offering are likely necessary to support an HIO. That is not to say that an HIO that exclusively offers basic HISP services could not generate enough revenue to operate, initially jump started by incentive-based demand, but ideally transitioning into value-based demand as Direct becomes more broadly adopted. However, we

are skeptical of this as a business plan on its own. In all likelihood, to generate enough revenue to be sustainable, sooner or later an HIO will need to look beyond the confines of the traditional core HIE service offering. If it waits too long to come to this realization, it will have exhausted its near-term funding sources, and may lack the resources for capital intensive process of rolling out new technology and new services. Having the support of funding sources such as ONC to pursue services that may fall outside of the scope of work now defined by the Requirements and Recommendations for the State HIE Cooperative Agreement Program Information Notice (such as a broader application of provider directory) would encourage HIOs to revisit their plans now.

At first glance, this may be an uncomfortable process because many HIOs' missions and current efforts are focused on rolling out core HIE services. Leaders are rightfully leery of scope creep and distractions. The re-focus on Direct services over the last year and a half have been largely successful (measured by how many HIOs are pursuing HISP services as a priority); however, that shift caused substantial frustrations among many organizations. Many HIOs may be locked into deployment plans for the coming six, 12, or 18 months and feel uncomfortable departing from those plans, particularly if compelled to do so by ONC. But we believe these conversations need to happen anyway, and soon if possible. Some people assert that health reform, specifically ACOs, will drive value-based demand for clinical data exchange services. Ultimately that is likely to be true. But the timing of the development of ACOs, when they will require HIE-like infrastructure, and how well most HIOs will be positioned to support those infrastructures given their current efforts, are all unknown. In the meantime, for many HIOs, expanding the plans of their HISP offering to incorporate additional provider directory services (e.g. credentialing) and partnerships (e.g. payers, HBE, etc.) could be an important pathway to driving additional revenue or at a minimum establishing themselves as critical infrastructure.

Competitive Landscape and Political Dynamics

HIOs generally work towards service offerings that are best pursued through cooperation between otherwise competitive organizations. Breaking through the barrier of clinical data sharing between separate and competitive entities is a significant undertaking, and it is the challenge most HIOs have been designed to address. Accountable care requirements will promote these data sharing activities. To the extent that a provider directory solution is a component of the infrastructures that support these types of data exchange there is a natural entry to offering a directory solution that is capable of serving a broader set of non-clinical data exchange use cases. However, serving the needs of the broader set of stakeholders requires identifying if directory solutions are a realistic place for cooperation between competitive entities to occur, given current approaches and the beneficiaries of those approaches.

The underlying driver behind the development, deployment, and use of a shared provider directory service by major players is if there is an opportunity to create value, and in turn, drive revenue (this means both to the HIO or other host organization and the underlying technology providers) through collaboration. Stakeholders need to buy into the idea that they can rely on the directory for operations, and recognize that using a shared directory is not a competitive disadvantage. For example, if a robust provider directory allows a payer to credential its providers faster, it should not matter that their competitors will see similar benefits, since it will be less costly to perform that credentialing. In the credentialing space, CVOs have relationships with payers and hospitals to facilitate the credentialing process. If an HIO were able to expose a broader provider directory solution via web services to entities, and facilitate credentialing in a new and efficient way that drives down cost—specifically, by reducing the burden of primary source verification—the CVOs may compete directly with the HIO offering. The

market should take care of it—a new, more cost-effective way of doing business will attract customers and revenue over time.

On the public-sector side, there may still be resistance from major state initiatives and operations like HBEs and MMIS to outsourcing key infrastructure to nascent or evolving entities. Stakeholders may point to existing project plans or established timelines, or put up other barriers. However, it is not necessary to gain buy-in from all potential parties at the outset of pursuing a directory solution that could ultimately support their needs. On one hand, the HIO will want to paint a picture of the opportunity that excites and engages key stakeholders. On the other hand, the HIO needs to be cautious not to encroach into territory too early (even if intending to move into that space) and draw reactions from opponents who may "throw stones" prior to the HIO having a solution to offer. Many successful HIOs have been skilled at identifying and engaging influential stakeholders in their geographies who are leaders at key institutions or who have convening authority. This is an especially valuable process to adhere to in socializing the concept of offering a modular provider directory.

These issues, which will be different from region to region, will help shape the appropriate entry point and evolutionary pathway for an HIO pursuing a modular directory solution, which is discussed in more depth below.

Starting Points and Evolutionary Pathways

While the competitive landscape and politics will vary from one community to another, they must be navigated skillfully in order for an HIO to be successful. Evaluating where to begin in pursuit of a provider directory solution will need to include a near- to mid-term needs evaluation. The near-term needs may be fulfilled by a solution that will be retired as the longer-term solution is developed. A part of the modularity concept is that the directory can be deployed independent of the HIE infrastructure but relied on as a service.

Identifying a key partner or set of partners who are willing to pursue the first additional use case to expand beyond results delivery, query, or Direct messaging is a key initial step. Even before engaging a technology provider, understanding the landscape of willing partners is critical. As discussed above, those partners will depend on the existing relationships in place, governance of the HIO, past cooperation, and mutual agreement on the value of the opportunity. Engaging Medicaid agencies may be particularly effective as CMS has been outwardly supportive of states' use of 90/10 funding for broader provider directory solutions.

The incremental approach to pursuing broader provider directory services implies beginning with a lightweight solution that can be deployed relatively quickly to meet HISP needs. Whether an HIO is beginning from a solution it has already procured, or whether it has the benefit of selecting technology with a more modular approach in mind, it should look opportunistically for the best first partner. A single use case, such as credentialing services, may begin with a single partner, but be expandable to many other entities requiring credentialing, without the need to expand the technical offering. This is the spirit of rapid incrementalism.

Business Opportunities

The Statewide HIE Funding Opportunity Announcement (FOA) released in 2009, directly contemplated the value of a broad range of provider directory-enabled services and incorporated them into the technical

infrastructure requirements. In revisiting the FOA, a majority of the HIE services that were outlined likely have a legitimate value-based demand aspect including electronic eligibility and claims transactions, e-prescribing, lab ordering and results delivery, quality reporting, and importantly, the ability to *"develop or facilitate the creation and use of shared directories and technical services as applicable for the state's approach to statewide HIE. Directories may include but are not limited to: Providers…"* In addition, the FOA recognized that *"the work associated with enabling statewide HIE services is complicated and may become overwhelming if not broken down into manageable components. An 'all at once' approach is not recommended, but instead this program will allow for an incremental approach to ensure continuous improvement and expansion of HIE capabilities."*

The language from the FOA is an important reminder that the concept of shared directory services deployed in an incremental approach is not new and indeed was important in the thinking as HITECH was being developed. They were envisioned as real business opportunities then, as they are now. However, over two years have now passed and focus has shifted to achieving broad-based exchange of data relying on the Direct standard. This, in large part, is out of recognition for realities on the ground. While making progress against the Direct objectives remains central to most HIOs, returning back to other services that may drive revenue is important if HIOs are to endure and remain relevant for years to come. For those HIOs who have adequate remaining funding in their HITECH budgets, they should consider how to maximize the long-term value of their spend on provider directory. Further, they should be encouraged to do so.

Many HIOs have become well-known in their geographies as they deploy HIE infrastructure. Through governance structures and employees, they have relationships with other healthcare organizations. As such, they have some level of "market share" in being the HIO and have convening capabilities themselves or in combination with key stakeholders. They should look to engage in dialogue with other stakeholders about provider directory. They likely would find that those other organizations are exploring this topic as well and have engaged in discussions with vendors who are looking to expand or adapt provider directory solutions. HIOs can position themselves as attractive partners—and potentially the best entities to oversee statewide, multi-use provider directories—by leveraging their relationships, highlighting their work-to-date, and demonstrating their execution capability and future viability.

Appendix A: Market Intelligence

The Market Intelligence section provides real world examples of organizations that are working to implement provider directories in a state or large HIE. The information was developed based on interviews with the CEO, Executive Director, or state HIT Coordinator. The individuals interviewed were provided an opportunity to review the content and provide edits where appropriate.

Massachusetts

In November 2011, Massachusetts modified its strategy for both its Medicaid MMIS and statewide HIE, taking a new enterprise approach. As part of the new approach, the state better aligned its MMIS plan with the state HIE plan and determined what infrastructure to build in each phase. A statewide provider directory will be built in the first phase, to be completed by the fourth quarter of 2012. This sort of alignment, a truly holistic approach, is new among state health departments. The provider directory will be utilized by the MMIS and the state HIE, starting with Medicaid providers. The initial data elements for the directory will include demographics, the Direct address, and the digital certificate. These data elements will support the Direct use case, among other things. The initial directory will also link providers to Medicaid member data. Massachusetts expects to add additional data elements to the directory in phases two and three to support expanded functions. As the directory expands, the state will support other use cases including: the health benefit exchange, integrated eligibility, and quality metrics.

OneHealthPort

OneHealthPort, an organization located in the state of Washington, launched its business by offering single sign-on services (SSO) to allow provider organizations and individual providers to access payer sites, clinical sites, and administrative tools. SSO services rely on a provider directory that is a relational database model. In addition, for three years, OneHealthPort operated an NPI registry that facilitated provider and organization sign-up for NPI numbers. OneHealthPort offered a paid service that allowed organizations to pull information from the NPI registry on the back-end in an XML format.

OneHealthPort is currently the statewide HIE for Washington and is developing a statewide provider directory based on its existing database to facilitate health information exchange, credentialing, and privileging. Currently, the directory is an entity level directory that includes the entity identifier, credentials, and the electronic endpoints for messages sent through the OneHealthPort HIE. OneHealthPort is continuing to layer on additional data fields to support HIE, credentialing, and privileging. When an entity registers to participate in the HIE, it chooses a point of contact that is responsible for updating and maintaining the organization's information with OneHealthPort. The organization is then shown how to find information on its trading partners in the provider directory. In 2012, OneHealthPort is working to create an individual level provider directory. OneHealthPort uses RSA Verid to verify the identity of the initial person registering an organization for the SSO service. That initial person then becomes the delegated administrator and registers and identity proofs additional individuals within that organization.

Maintaining the provider directory is a major challenge. Key to overcoming the challenge is providing organizations and providers with one location to update and maintain their information, rather than multiple locations for different state agencies or different purposes—OneHealthPort believes its key value proposition is as a cost-effective "one-stop shop" for verified and validated provider identity information.

OneHealthPort believes that the only way to successfully build a provider directory is to have a business need first that the directory can fulfill. This is the only way to ensure there is a critical mass of data, ensure organizations and providers will maintain their information, and ensure that it creates value that will ultimately generate revenue to support the organization. Consequently, the way OneHealthPort has built its directory is by adding layers of data that meet a specific business purpose. OneHealthPort is working on exposing the directory through a web service or as an LDAP directory, but national standards for exposing directories are currently lacking. Once the directory is exposed to an organization (signed sharing agreements are required), web services and APIs can be built to the directory and the data can be used to meet business need. For example, a number of quality organizations have shown interest in using the provider directory for quality reporting once the directory is available. These organizations struggle to correctly attribute data to the right provider at the right location because of the complexity of one-to-many relationships. OneHealthPort can potentially support the quality organizations by using the provider directory to correctly attribute a provider to an organization with the right taxonomies and then exposing the data to quality organizations for quality metrics and analytics.

Vermont

Vermont is pursuing an enterprise infrastructure for their health department, using an enterprise service bus. Part of the enterprise approach is a statewide master provider directory. The Department of Vermont Health Access, part of Vermont's Agency of Human Services, is responsible for the health benefit exchange and health information exchange, as well as the Medicaid program. The Agency currently has over 200 databases. In order to offer a single master provider database for the Agency, the Department evaluated the databases for gaps and strategies for a single database. Based on the evaluation, the Department plans to release an RFP for the provider directory module. The master provider directory will be offered as a state utility. While the single master provider directory has not been codified in law, it is expected that the governance of the directory will be codified, in order to eliminate territorial issues between the three organizations that maintain provider information.

Appendix B: Additional Provider Directory Use Cases

Licensing: DEA and Sanctions

State licensing boards maintain databases that include demographic information about a provider, as well as current licensing information, including any sanctions or revocations. As HIOs grow to include more ambulatory providers, having licensing information in the provider directory and updating it regularly with the state licensing database will become more important for ensuring that only appropriately licensed providers can access PHI. Few of the state licensing databases communicate with one other, making it fairly easy for a provider who has had his license revoked to move to a new state and receive a new license. An HIO that can receive information from multiple state licensing databases can ensure that such providers cannot access PHI through the HIO. In addition, in order to electronically prescribe controlled substances, providers are required to register with the Drug Enforcement Agency (DEA) and receive a DEA number and a digital certificate from an approved certification authority. If an HIO is providing e-prescribing services, it will need to capture not only the DEA number, but also the digital certificate location. Both items are needed by Surescripts in order to send a controlled substance prescription to a pharmacy.

CMS Physician Quality Reporting System (PQRS) and eRx Incentive Program

CMS approves organizations to manage PQRS registries that allow providers to report their quality measures and in some cases their eRx information to CMS. A PQRS registry is basically a provider directory that includes both demographic information (name, location, NPI, tax identification number [TIN], license) and quality measures information. Qualified registries must be able to do advanced calculations and measurements at the NPI or TIN level. Registries must also have the ability to submit the information to CMS via a secure channel, including the NwHIN. Qualified registries must have appropriate business associate agreements with providers who submit data to their registry. A broad range of organizations are approved by CMS to offer a registry, including EHR vendors, HIE vendors, and at least one HIO (Indiana Health Information Exchange). These organizations, especially the EHR vendors, allow providers to submit their information to the registry directly from an EHR system. Maintaining an accurate directory with the required data elements for the quality reporting measures will be necessary to be a CMS qualified registry.

Statewide All-Payer Claims Database

All payer-claims databases have increasingly been implemented by states. These databases collect administrative data from all payers operating in a state. The data is typically from eligibility or provider files. States use these databases to improve population health, measure provider and facility performance, and provide cost and performance information to consumers. Currently, only 15 states are not considering a statewide all-payer claims database, and 11 states have already implemented an all-payer claims database with five additional states in the process of implementing a database.[2] Most states are strongly considering implementing a database. Because of the various data sources used to populate an all-payer

[2] Information was gathered from the All-Payer Claims Database Council Interactive Map, located at: http://www.apcdcouncil.org/state/map.

claims database and the usage of the data, these databases require a provider directory that is the single source of truth for the database. These databases must link together claims from various payers to a single provider or facility, in order to determine provider/facility performance. The All-Payer Claims Database Council (APCD) has recommended that states consider a shared provider directory between the all-payer claims database, the state HIO, and the state HBE.

Telemedicine Networks

As states begin to implement broad telemedicine networks, the need for a provider directory of available physicians will become more important. A searchable provider directory that includes demographic information about physicians, as well as their electronic capabilities and information about their electronic endpoints, will be vitally important. As payers begin to contract with providers offering telemedicine services, it will also be important that the directory contain information about which providers are included in a payer's network.

Medicare and Medicaid Fraud and Abuse Tracking

As healthcare costs have continued to increase, decreasing Medicare and Medicaid fraud and abuse has become more important to CMS and to states. The majority of states maintain databases that allow them to track fraud and abuse by providers and facilities. Much like all-payer claims databases, fraud databases must be able to attribute all claims and payments to the correct provider. When providers submit claims, they are not always consistent with using their individual NPI or their organization or department's NPI. This inconsistency can lead to multiple provider entries in the database, making fraud detection more difficult. A provider directory that can use algorithms to correctly match providers and maintain a single provider record is necessary for advanced automated analytics to track fraud and abuse.

Appendix C: Reference Materials

- S&I Framework
  - http://wiki.siframework.org/Electronic+Service+Information+Discovery
  - http://wiki.siframework.org/Certificate+Discovery+for+Direct+Project
  - http://wiki.siframework.org/DNS+and+Microdata+Overview
- EHR and HIE Interoperability Workgroup
- IHE HPD Technical Document
- Experian and Symantec presentation on Identity Proofing and NIST
- Presentation on the CAQH Universal Provider Directory (UPD)
- Provider Directory Environmental Scan