



Early CHINs and HIE Organizations

Lessons for the Next Evolution

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Community Health Information Networks (CHINs) ~ 1985

“A Community Health Information Network is an organization and technical entity designed and operated to facilitate the electronic data interchange and integration of various types of healthcare information for the benefit of those organizations and healthcare professionals that participate in the network.”¹

Introduction

Exchanging and interfacing data between disparate application software systems “within the walls” of a provider health system is difficult in and of itself, but attempting to do this “outside the walls” of the organization increases the degree of difficulty exponentially. The first attempts to exchange data outside the source organization were called CHINs, or Community Health Information Networks. These later evolved into regional health information organizations (RHIOs), regional health information networks and health information exchange organizations (HIEs or HIOs), to name a few.

Regardless of the acronym, these organizations shared the same basic set of goals and objectives. This white paper examines these early attempts to make connections “outside the walls” of healthcare systems in a given geographic region, and explores several of these organizations to draw common themes and key lessons learned from the initiatives.

Data Collection Methodology

The data provided in this report was obtained through a combination of interviews with key players of the surveyed CHINs and HIOs, as well as online review of articles, white papers and local news releases published during the life of each organization. The interviews were conducted in confidence so that all participants will remain anonymous. The analyses within this paper are based on these interviews, published articles, presentations and reports. The study focused on a set of organizations dispersed across the United States, including organizations that have been closed for some time, others recently closed, and one example of an organization that evolved into a successful HIO. This investigation found many recurrent issues across organizations, along with some insight into ways that future HIOs can prepare for long-term sustainability.

¹ Friedman, B.A., and Mitchell, W. Community Health Information Networks and Their Relationship to Telemedicine. In: Bashshur, R., Sanders, J.H., Shannon, G.W., eds. Telemedicine Theory and Practice. Springfield: Charles C. Thomas. 1955:53-76.

The Seven CHINs and HIEs: An Overview

Santa Barbara County Data Exchange (SBCDE)

Perhaps the most well-known failed HIE organization is California's Santa Barbara County Data Exchange (SBCDE). It was formed as a non-profit organization in late 1998 when participants in the county-sponsored Medicaid health plans inquired about health information technology funding opportunities. An HIE demonstration project was created with the help of CareScience, who studied the project's feasibility and helped to build the system into what was at the time considered to be a model for emerging regional health organizations. The project was heavily grant-funded by the California Health Care Foundation (CHCF), which awarded a \$10 million, three-year grant to CareScience as the project's manager. The SBCDE was tasked with improving the quality of communitywide healthcare by creating a single portal to obtain all healthcare data for a patient across all healthcare facilities and providers.

As the organization began taking shape, a variety of issues surfaced, including lack of community leadership, lack of momentum, and lack of a compelling value proposition. After grant funding ran dry and requests for financial contribution received a lackluster response from participants, Santa Barbara ultimately had no choice but to shut its doors.

What Went Wrong

In hindsight, building a system based on grant funding without a viable plan for long-term financial sustainability was in large part the reason for the SBCDE's demise. The lack of a compelling value proposition was just as much to blame, since the system counted on participants to actively participate and contribute to ongoing operations once funding was gone. When those participants did not step up to the plate and contribute to the organization, the perceived lack of value to potential investors was revealed. Overall, the SBCDE was overly ambitious for its time, and its founders deeply underestimated the level of complexity they had created.

CalRHIO

Another California-based HIE organization that did not survive its tribulations was CalRHIO. Similarly to Santa Barbara, CalRHIO was established as a non-profit 501(c)(3) with the goals of improving patient safety and reducing costs by facilitating physicians' electronic access to patients' medical information. With Molly Coyle—an MD, politician and past CIO—at the helm in 2005, the project initially had strong support from the 'movers and shakers' in the industry. CalRHIO's role was intended as an umbrella organization acting on behalf of other HIOs. However, when it seemed as if the organization was moving toward a business model where CalRHIO was an HIO in itself, many participants began to distance themselves from the project, uncomfortable with the feeling that it was steering away from its earlier goals. When it came time to get participants on board, the potential supporters bowed out.

What Went Wrong

A lack of involvement from the CIOs and other integral players, aside from CEOs, can be partially to blame. The concerns of these parties eventually pushed them to the creation of their own organization,

and in 2009 the California eHealth Collaborative was formed. As the final straw, CalRHIO lost the bid to become the state's designated HIE governance organization and was disbanded.

Broward Information Network (BIN)

The Broward Information Network (BIN), based in the Fort Lauderdale area of South Florida, was a bit different than the other exchanges examined in this study. Unlike the rest, this organization was not started by hospitals and for hospitals. The BIN was created in 1995 by a Broward CEO group that included representatives from several county agencies, the school board, and the North and South Broward hospital districts. It was formed with the intention of making information available from a variety of social services, healthcare being just one of the many entities.

The BIN's mission statement was, *"To provide one stop service centers for recipients of services to develop a "seamless" system for agencies to exchange client information and service histories, and to produce better information planning and funding decisions."*² The mission statement was supported by a goal of providing a one-stop client information center to system agencies, but the information included more than just healthcare-related data points. Demographics and employment information were also planned to be collected, in addition to the data needed by the health-related organizational sponsors.

What Went Wrong

In line with many of the organizations in this study, the BIN's leading concern was to find an ongoing source of funding. Grants would launch the initiative and fund it partially, but participants were needed who would eventually be required to invest in order to receive the benefits of the exchange. Some of these targeted participants did initially contribute, but the BIN's business plan was not structured to solve the financial problem.

Another challenging issue for the BIN was addressing the need for hosting services. One hospital actually built a server environment to support the services, but data was never transmitted and shared. Like many of the early organizations, there was a lack of commercially available software available to provide the user interface, so it was developed from scratch. Security was a prevailing concern for participants at the time, as well. Laws were being set up to address patient confidentiality, which raised many legal issues that could not be resolved between constituents.

Resolving all of these hurdles required time and money which the BIN did not have, and these issues gradually took their toll on the organization, and on its participants. Many became weary of their involvement in the BIN, participation waned, members dropped out and the BIN closed.

CareSpark

CareSpark, created in 2005, was another HIO that could not financially sustain itself. Located in Tennessee and serving Northeast Tennessee and Southwest Virginia, CareSpark worked in a 17-county area to establish a collaborative sharing of health information.³ CareSpark's goals of creating better

² Taken from the Broward Information Network website located at <http://www.browardinfo.net/index.html>, ©2006. Accessed July 24 2013.

³ Enrado, P. *Hope for CareSpark still remains*. Healthcare IT News. July 19 2011. <http://www.healthcareitnews.com/news/hope-carespark-still-remains>

patient outcomes, improving patient quality and reducing costs to the system were similar to the other CHINs and HIE organizations studied in this report.

What Went Wrong

Comprised of local healthcare systems, medical groups, businesses, community members and over 250 volunteers, CareSpark's participants could not agree on funding and subscription rates. This inability to reach a mutually satisfactory decision resulted in hospitals declining to participate in the organization and revenue streams running dry. Privacy issues also took a toll on participation and extended the time and cost of getting the organization set up. Further exacerbating CareSpark's struggle was the termination of the Social Security Administration project, reducing funding to the troubled organization. Participants were unwilling to actively support the transition from a grant- and contract-based business model to a subscription-based model.

In the end, the organization did not have the funding required to develop and deliver their new infrastructure.⁴ Buried in debt, CareSpark had to shut down, ultimately closing its doors in 2011.

Wisconsin Health Information Exchange (WHIE)

At the time of this paper's publication, the most recent HIE to close its doors was the Wisconsin Health Information Exchange (WHIE). The WHIE was a remarkably established and quite successful operation, from its humble beginnings in March 2007 until its closure in April 2013, and was notably successful in obtaining involvement from critical local and governmental leadership. Partnerships were formed with Humana and the Center for Disease Control (CDC), and grant funding was received from the Centers for Medicare and Medicaid Services (CMS).

With the right funding, involvement and support, the WHIE established itself as a powerfully effective HIO capable of delivering value to its stakeholders. They solved their financial issues by creating a valuable dataset that subscribers were willing to pay for; they successfully marketed their services and gained acceptance from a significant number of paying customers; and they delivered the software and hardware needed to support their large infrastructure. The WHIE became part of the workflow that its participating hospitals ultimately relied upon, making it valuable to its constituency.

What Went Wrong

For the WHIE, it was not so much an internal shortcoming that ended the operation, but more of a displacement. State-designated entities funded by the Office of the National Coordinator (ONC) were ultimately put in its place, leaving no room for the WHIE in the market. However, despite the eventual closing of its doors, during its lifetime the WHIE connected 50 hospitals across 29 counties in Wisconsin, and in many ways represents a great model for a successful HIE organization.

Louisville Health Information Exchange (LouHIE)

The Louisville Health Information Exchange (LouHIE) was opened as a non-profit organization in March of 2006. The HIO has not officially been closed as of this writing, but it is presently not active.

⁴ CareSpark press release. Dr. Jerry Miller. July 11 2011.

The development and strategy for the organization were supported by the University of Louisville through the use of a comprehensive market study. LouHIE was set up to be a community data exchange which would theoretically improve the quality of care and reduce costs, similar to the other HIOs reviewed in this paper.

LouHIE's financial sustainability was based on contributions, with the first two years of operation supported primarily by donations, gifts and grants. Subsequent years were increasingly funded by service contributions based on the value being given to the user.⁵ Support for LouHIE in its service area was fairly broad, resulting in a useable and functioning HIO and, in partnership with 3M Health Information Systems and InterComponentware, LouHIE developed a health data bank to support over 1.2 million citizens.⁶

What Went Wrong

LouHIE, like the WHIE, was a viable HIO financially sustaining itself up until the shift in funding to statewide HIEs. This resultant drop in funding led to LouHIE's demise.

HealthBridge – A Success Story

Not every early HIE organization collapsed under the weight of the obstacles outlined above. One example of a successful collaborative network of organizations and technology is HealthBridge.

The Ohio-based non-profit was formed in 1997 with the objective of improving the quality and efficiency of healthcare by ensuring that healthcare providers and organizations had electronic access to health information. HealthBridge has received several major grants to support it throughout its life, including funds from the Social Security Administration, but overall the main source of revenue eventually evolved to a fee-based model. With about a million dollars in funding, good representation from providers and a solid vendor in place, HealthBridge seemed to be making headway until they faced a struggle with getting providers to actually sign on to participate. Inquiries into why there was little initial participation revealed several concerns, from providers not being strongly engaged to the value proposition not having been strongly marketed to consumers.

Although this was a significant early obstacle, the organization was able to overcome it largely due to sound and strong business products and services. HealthBridge remains extremely active today, sending out millions of clinical messages monthly and providing services like ambulatory order entry, e-disease reporting and public health alerts, e-prescribing and medication management, and quality reporting. Through service expansion, they created additional products that helped them generate new revenue, which also helped them to remain solvent.⁷ HealthBridge is now one of the oldest and largest community HIE organizations with strong financial stability.

⁵ "A HIMSS Guide to Participating in a Health Information Exchange". HIMSS HIE Guide Workgroup. November 2009.
http://www.himss.org/files/HIMSSorg/Content/files/HIE/HIE_GuideWhitePaper.pdf

⁶ Merrill, M. "LouHIE to build health record banking system." Healthcare IT News. March 26 2009.
<http://www.healthcareitnews.com/news/louhie-build-health-record-banking-system>

⁷ Monegain, B. "HealthBridge offers HIE advice." Healthcare IT News. October 18, 2010.
<http://www.healthcareitnews.com/news/healthbridge-offers-hie-advice>

Analysis and Conclusions

While no single reason was identified to explain why these HIE organizations were unsuccessful, the general theme revolves around funding: first and foremost is the explicit need for cash to keep an operation open and functioning. There were several other factors that contributed to these organizations having to close their doors, but each one contributed to a lack of monies that would have been required to extend project timelines, provide more legal assistance, or develop required software.

For a high-level overview of the basic structures and problems faced by the seven organizations outlined above, see *Appendix A: Comparison of Reviewed CHINs and HIE Organizations*.

Financial Issues

Close examination of these organizations' business structures reveals that many faced similar financial strains due to a structure based on grant funding with no concrete ability to generate the income required to remain solvent. Although initial grants provided the needed funding to launch the programs and develop the organizations, there was not a solid plan to successfully ensure the required resources beyond grants and related funding. Many of the self-funding plans used a model of providing a valuable data set that the constituents would be willing to pay a small subscription fee to receive. This, coupled with the rapid expansion of participating members and an increase of the "value add" data services, would provide a smooth transition to an ongoing longer term funding source. Unfortunately, there were many reasons within each of these organizations why they were never able to achieve a long-term sustainability model.

Similarly, public relations issues arose with these organizations, such as CalRHIO's experience of being unable to gain the trust and participation of their primary stakeholder group. It appears that support waned in the C-Suite of healthcare providers for many of these HIE organizations. This lack of support resulted in a lack of funding commitment by stakeholders, as well as many that also pulled back overall support for the organizations. Since providers were a key source of funding for many of these organizations, money quickly dried up, creating severe cash shortages and eventually forcing the organizations to close their doors.

Technology

When the CHINs were first incorporating, they established governance structures and identified business goals and service offerings which ultimately determined their information technology hardware, software and network infrastructure requirements. The challenge proved to be a lack of commercially available technology meeting these requirements, as what was obtainable during this time period was still rather primitive.

Many CHINs and early HIEs hired developers to actually build the client-facing software and aggregation tools for data access and review, while others purchased off-the-shelf software. At that time however, this software was not in a state that could be readily used to support the exchange requirements of HIE organizations, and many had to endure some level of software rewriting. This required time and

money, compounding the existing hurdles of having limited funds and short timeframes for rolling out their service offerings.

The data warehouse and storage methodologies supporting CHINs were also relatively new to healthcare, especially for this type of disparately sourced information. Putting all of the technical components together was not only expensive, it was critically time consuming, delaying the deployment of working solutions out to paying members. Time was not on the side of these organizations as many were under time-limited grants, operating with limited funds and trying to satisfy a demanding stakeholder group.

It appears that the lack of readily available technology solutions supporting their needs was one of the major impediments to deployment of an easy-to-use secure environment for early CHIN participants. Much of what these organizations were attempting to implement was considered to be leading-edge technology at the time. While technology was not the single reason for failure, availability of resources and funding to financially support the technology build-out and ongoing management clearly contributed to the overall challenge faced by these organizations.

Support

It was not uncommon for many early CHIN participants to initially support the organization's goals and objectives—until it became time to contribute data and/or provide financial support. Many CHIN failures are attributed, at least in part, to the stakeholders' reluctance or inability to provide long-term support. Limited budgets and difficulty determining the real value of what they would receive in return for their investments were significant concerns for participants. Even though many participants' technical and clinical staff supported these organizations, healthcare executives and Chief Financial Officers often could not define the value and backed away from active participation. Also, some had concerns over the potential loss of a competitive advantage in the marketplace by participating in these organizations. This was especially true in geographic areas with highly competitive healthcare providers, and where there was not a clearly defined participation value and benefit for the participant.

Support was most often obtained by HIE organizations when there was a working model that could be demonstrated and, more importantly, a set of data that was valuable to those who would be paying for access and use. Today's most successful HIE organizations have proven that it is critical to have the right set of data available to their members, and to implement focused efforts to obtain support from the entire C-Suite of potential participating providers. This has helped start-up HIE organizations to ensure participation once data sets are being exchanged, and to reduce the number of providers that drop out at the last minute.

Legal Issues

The sharing of clinical data and associated privacy concerns created legal issues for the early potential CHIN and HIE organization participant. In many instances, it took months or even years to get agreeable patient data sharing consents in place. The time and effort required to get over these hurdles were sometimes too long and costly to be achieved within the short timelines for success faced by these organizations. Examples of key issues that had to be resolved by these early organizations include:

- **Confidentiality.** Data confidentiality agreements differ by organization. Each organization had to work through these various agreements to develop one that all parties could sign off on.
- **Data set.** The data sets had to be reviewed and agreed upon by the participating members and their respective legal departments.
- **Competition.** Data viewed as a competitive advantage across participating organizations was a concern, and many times this issue was addressed in their legal agreements.

While there are still challenges today, legal issues are much easier to navigate, due in part to the implementation of the Health Insurance Portability and Accountability Act of 1996 (HIPAA). Much of this language is now standardized; however, with any organization planning to share sensitive or confidential data, sufficient time should be allotted to accommodate legal negotiations.

Impact of the State Exchange Cooperative Agreement Program

In 2010, the ONC announced the State Health Information (State Level HIE) Exchange Cooperative Agreement Program⁸ awardees. In total, 56 states, eligible territories and qualified State Designated Entities (SDE) received awards. Some states have handed this money back to the government, and there is a mix of successes and HIE deployments across the nation under this program.

In some specific instances, the move toward statewide HIE organizations actually put further financial distress on existing CHINs and HIE organizations. This appears to have been specific to the geographic market, as well as the success of the specific state's HIE organization effort, and some organizations ultimately failed as a result. However, many states have found ways to be successful without significantly impacting existing CHINs or HIE organizations, and it is hoped that successful and functional HIE organizations will be able to leverage their accomplishments and service offerings as states move forward with their initiatives.

Key Observations

Many of the individual challenges faced by early CHINs and HIE organizations are similar to those faced by any new business; however, when the various pieces are viewed collectively, they illustrate a specific set of requirements necessary to support a successful, sustainable HIE organization.

- **Stakeholder-Driven Value Proposition.** There must be a great desire among potential participants to be part of the HIE organization. Goals and objectives for the organization must focus on the core service offerings that will be of most value to stakeholders or customers, thus ensuring their ability to drive recurring revenues.
- **Attainable Goals.** Each organization must weigh the proposed deliverables against the ease, cost and priorities of actual delivery. The deliverables of the organization must be attainable. This means that there may be some projects that must be sacrificed or delayed until they can be effectively delivered. One rule of thumb is that organizations should be diligent in their review

⁸ Office of the National Coordinator (ONC) for Health Information Technology. State Health Information Exchange Cooperative Agreement Program. <http://www.healthit.gov/providers-professionals/state-health-information-exchange>

of service line deliverables when developing their strategic plans. If an organization cannot deliver within a reasonable amount of time and within budget, it will affect both the overall organization and participation.

- **Realistic Technology Strategy.** Ideally, technology that will support the organization's efforts should be readily commercially available. Organizations must be very realistic about following the path of development for new software and network solutions on a time-bound, limited budget. Careful review of what the organization is trying to deliver against the available (and preferably low cost) technology is key to providing timely solutions and engaging members both in paying for and using the services.
- **Decision-Maker Buy-In.** When soliciting potential HIE organization participants, it is essential that the entire C-Suite be targeted, as well as the informal decision makers who must be identified and engaged in the overall decision-making process. Each member of the C-Suite is critical: the Chief Information Office (CIO) provides the technology perspective, the CFO provides the financial perspective and the Chief Executive Officer (CEO) handles the strategic perspective. There will not be success and serious interest in participating in the HIE organization unless all are on board with the decision. Obtaining a preliminary agreement for support from each targeted participating organization, in writing, is also highly recommended.
- **Realistic Timelines for Legal Issues.** Legal matters will take time! What can be underestimated is just how much will be time required to negotiate all sides leading to the agreement of the legal terms required for participation. While this is never easy, one suggestion may be to approach large, successful HIEs for sharing any templates they have used. Use of these types of templates can provide a solid starting point even if the HIE organization will have to work through state-specific requirements and the most difficult pieces in their agreements. Also, HIE organizations should consider taking advantage of pro bono legal support, which is offered by many legal firms.
- **Strong, Dynamic Financial Sustainability Plan.** Ongoing financial sustainability will always be the most difficult challenge, and money has to be secured or obtained through a revenue stream. Financial strategies require thought, planning and execution. Certainly grants, donations and in-kind gifts will get the organization started, and may even supplement some ongoing expenses. However, the key financial 'make or break' situation will be the ability to start the organization and deploy services as quickly as possible in order to generate an ongoing revenue stream. Any project delays will impact the ability to obtain recurring fees or revenue, potentially beginning the organization's slow demise.
- **Diverse Service Offerings.** Diversification has been shown to provide additional sources of revenue while not straying from the initial intent and goal of the organization. Providing services, infrastructure or technology to others can result in a revenue stream that will provide additional funding to the organization.

With HIE organizations as with any new business, project delays can come in the form of goals that are too grandiose or unattainable. Keep it simple. Technology that is costly or too bleeding-edge and unproven will delay delivery and consume too much of the budget. Long, drawn-out legal review meetings will result in the delay of the required agreements being signed by your key start-up members. Issues like these will also result in cost overruns, unpredictable delays, and ultimately in reduced confidence from stakeholders.

Summary

The first CHINs were ahead of their time. The goals and objectives were aggressive, funding scarce, and technology very limited, creating an almost perfect storm of insurmountable obstacles.

There were, however, a few early HIE organizations that did get all of the pieces in place, and the failures of those organizations that did not make it laid the important groundwork for where the industry is today. Learning from the issues they faced, how they addressed them and, in some instances, overcame them has facilitated the ongoing pursuit of widely exchanged data. Innovators like the organizations described herein offer valuable lessons for the rest of the industry, and these lessons have propelled the advancement of healthcare technology and all of its inherent benefits significantly forward.

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Appendix A: Comparison of Reviewed CHINs and HIE Organizations

| | Santa Barbara | CalRHIO | CareSpark | Wisconsin HIE | Broward | LouHIE | HealthBridge |
|-------------------------------------|---|--|---|---|--|--|--|
| Corporation Type | 501(c)(3) | 501(c)(3) | 501(c)(3) | Private entity | 501(c)(3) | Non-Profit | Non-Profit |
| Year Opened | 1998 | 2005 | 2005 | 2007 | 1995 | 2006 | 1997 |
| Initial Funding | Grant funding | Private funding | Grant funding | Grant funding | Grant funding | Donations, grants and gifts | Grant funding |
| Ongoing Funding | None | None | Subscription fees | Grants, providers and payors | Each participating agency to provide financial support | Service contributions based on value received | Social Security Administration, subscriber fees |
| Primary Organizational Goals | Improve the quality of care | Umbrella for other local HIE organizations | Improve quality, reduce costs in the system, improve population health | Develop a statewide network that connects physicians, clinics, hospitals, dental labs & pharmacies | Provide simple, easy access to data to reduce duplication and errors | Community exchange to improve the quality of care and reduce costs | Improve quality and efficiency of healthcare by building a collaborative network of orgs and technology |
| Service Offerings | <ul style="list-style-type: none"> ▪ Lab results ▪ Clinical reports ▪ Radiology images/reports ▪ Demographic data ▪ Rx claims ▪ Eligibility info ▪ Referrals ▪ Authorizations | <ul style="list-style-type: none"> ▪ Delivery of claims data to the ED ▪ Pharmacy use case | <ul style="list-style-type: none"> ▪ Medicine management ▪ Diagnostic services ▪ Preventative medicine ▪ Disease management | <ul style="list-style-type: none"> ▪ Clinical care summaries ▪ Lab results ▪ Build a statewide HIE | <ul style="list-style-type: none"> ▪ Person demographics ▪ Intake information ▪ Health information ▪ Employment data | <ul style="list-style-type: none"> ▪ Core health record banking service ▪ Research services ▪ Non-core vendor services ▪ Personalized messaging and content services | <ul style="list-style-type: none"> ▪ Electronic Health Record (EHR) selection and implementation assistance ▪ Master patient index ▪ Provider director ▪ Record locator ▪ Data warehouse ▪ Data normalization & mapping ▪ Electronic results delivery (lab, radiology, more) ▪ Public health reporting ▪ Disease registry |

| | Santa Barbara | CalRHIO | CareSpark | Wisconsin HIE | Broward | LouHIE | HealthBridge |
|------------------------------------|--|---|---|---|--|---|--|
| Primary Issues Encountered | <ul style="list-style-type: none"> ▪ Lack of community leadership ▪ Foundation grant money ended ▪ Project momentum ▪ Compelling value proposition ▪ Time needed to develop required technology | <ul style="list-style-type: none"> ▪ Moved away from initial purpose, causing potential supporters to back out ▪ Ongoing funds ▪ Data security | <ul style="list-style-type: none"> ▪ Developing agreeable subscription fees to provide needed funding ▪ Privacy issues ▪ Lack of funding to complete the build and implement new required infrastructure | <ul style="list-style-type: none"> ▪ Loss of funding when statewide HIE organizations became the funded projects | <ul style="list-style-type: none"> ▪ No real drive or interest from the hospitals involved ▪ No funding or incentive to fund ▪ Encountered significant legal issues with what was an acceptable datasheet vs. what couldn't be shared | <ul style="list-style-type: none"> ▪ Loss of funding when statewide HIE organizations became the funded projects | <ul style="list-style-type: none"> ▪ Initial participation was weak ▪ Lack of provider outreach ▪ Weak marketing of value proposition |
| Technology | <ul style="list-style-type: none"> ▪ Custom software (off-the-shelf products could not be used) ▪ Customized interfaces were developed | <ul style="list-style-type: none"> ▪ Outsourced to Medicity and ran out of their data center ▪ Medicity served as the central hub | <ul style="list-style-type: none"> ▪ Secure network ▪ Vendor-based software outsourced to large vendors ▪ Large data repositories | <ul style="list-style-type: none"> ▪ Customized software (Amalga-based) ▪ Direct Project ▪ Push technology | <ul style="list-style-type: none"> ▪ Each agency provided their own content on their own locally hosted server ▪ Software was being developed specifically for each agency's user interface | <ul style="list-style-type: none"> ▪ Outsourced to "core services vendors" who will provide required hardware/software, networking infrastructure, development and deployment services | <ul style="list-style-type: none"> ▪ Outsourced – partnered with IBM ▪ Utilized several different technologies from various vendors through expansion of service portfolio |
| Current Status | Closed | Closed | Closed | Closed | Closed (healthcare portion) | Dormant | Operational |
| Date Closed (if applicable) | 2006 | 2010 | 2011 | 2013 | 1999 | N/A | N/A |

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