Nationwide Health Information Network (NHIN) Trial Implementations

Task 9 Deliverable:
Jurisdiction-Specific Business Plan

Contract No. HHSP23320074102EC

January 12, 2009

Presented to:

Office of the National Coordinator for Health Information Technology

U.S. Department of Health and Human Services

Presented by:

Indiana Health Information Exchange
846 N. Senate Avenue
Suite 300
Indianapolis, IN 46202
(317) 644-1750
www.ihie.com

J. Marc Overhage M.D., Ph.D.
CEO and President, Indiana Health Information Exchange
Director of Medical Informatics and Research Scientist, Regenstrief Institute, Inc.
Regenstrief Professor of Medical Informatics, Indiana University School of Medicine

Table of Contents

I. Executive Summary

IHIE Origins and Background

Health information exchange (HIE) emerged in Indianapolis in the early 1990's. As HIE services began to grow in variety and scale, there was a general recognition that, for a number of reasons, HIE could and should be operated as a business. Out of this recognition, a unique collaboration of 13 institutions representing hospitals, healthcare providers, researchers, public health organizations, and economic development groups created the Indiana Health Information Exchange (IHIE) (www.ihie.org).

IHIE is a non-profit company incorporated in the state of Indiana on February 24, 2004. By design, IHIE is extending and scaling the principles and infrastructure devised, demonstrated, and built by the Regenstrief Institute. IHIE works hand-in-hand with Regenstrief to create sustainable business models and provide commercial levels of support for the Institute's technologies in the marketplace. IHIE has grown to 35 employees and has continues to implement its growth plan, with new data sources and new customers are being added each month. IHIE's volume of clinical messages delivered now exceeds 1.4 million messages per month delivered to over 9900 physicians. Additional services based on the value of health information exchange are being launched.

HIE Sustainability – Basic Conceptual Principles

IHIE's sustainability strategy is based in certain principles that are key to health information exchange being a self-sustaining endeavor. These principles serve as the basis of IHIE's business planning:

- HIE is a business
    - HIE is a business and as with all businesses, creating a sustainable HIE requires offering services that the market wants at a price the market will bear and doing so in such a way that revenue exceeds expenses. It also means that the services delivered by the HIE must be at a level that healthcare organizations have come to expect from their suppliers.
- The Leveraging of High-cost, High-value Assets
    - Once the dollars have been invested in the creation of HIE infrastructure, it is essential to leverage and re-use those assets to deliver as much and as many services as is necessary to achieve sustainability. In other words, the services an HIE is able to provide to the market must be capable of producing sufficient revenue to cover expenses and, due to the cost of the infrastructure that is required, offering multiple services to various market stakeholders is conducive to sustainability.

- No Loss Leaders
    - In the business of HIE, there may be potential opportunities to create and offer a future value-added service only if an earlier service is "sold at a loss" to create the infrastructure or assets (e.g. data) to support the future service. However, in the context of an evolving HIE policy and business model landscape, the risk that the future services might never be possible is too great and should not be factored into sustainability plans.
- Independent, Local Sustainability
    - When the country is connected via the national health information network (NHIN), many HIEs will be giving or receiving more value than a given partner. In the future "NHIN economy," dollars will need to change hands between sub-network organizations (SNOs) to reflect the imbalance in the flow of value. However, until the business rules of who will pay who for what in the NHIN are undefined, sustainability plans of individual HIEs, based in a specific market or region, should not be dependent on HIE-to-HIE (SNO-to-SNO) exchange.
- Natural Monopoly
    - HIEs are natural monopolies. That is to say that the total cost of producing HIE services for a given market is lower if there is just a single producer than if there are several competing producers. There is a large cost for the necessary infrastructure (which is a fixed cost), making the creation of a redundant infrastructure wasteful and detrimental to the economy as a whole. In addition, in order to achieve sustainability, HIEs must have the opportunity to offer all (or nearly all) revenue generating health information exchange services to their market.
- The Need for Scale
    - Micro-economics tells us that there is an optimal size for businesses of any given type; therefore, there is an optimal size for an HIE. There is a scale in terms of population or medical service area concentration at which a given HIE service model is optimal and below which a given service model is not economically sustainable. Based on the experience of the largest HIEs, the upper bound of the optimal size of a health information exchange business has not yet been reached. There may be no market in the country so large that it cannot be served optimally by a single health information exchange.
- Avoidance of Grants for Operational Cost
    - Grants are indispensable sources of start-up funds for HIEs but should not be counted on to cover operational costs beyond a HIE's early ramp up stage. We believe that, once fully operational, HIE services must be able to generate revenue equal to or in excess of expenses such that grants (or other non-operating revenue sources) are not necessary to cover operational costs.

IHIE's Services

Many of the HIE services offered by the Indiana Health Information Exchange were developed and proven by the Regenstrief Institute. Currently, three services make up the profile of IHIE's offerings and, therefore, the core of its plan to be sustainable. These are:

- **Clinical messaging service:** IHIE's clinical messaging service is the delivery of clinical results to physician offices -- either directly into their electronic medical record, into a secure web-based clinical messaging application, or via fax. Called the DOCS4DOCS® service, the system receives lab/transcription/radiology results and other clinical messages from participating data sources (e.g., hospitals and labs) via HL7 interfaces, converts the clinical results into a consistent report format, and delivers them to the intended provider. The business model for clinical messaging is a per-result delivery fee. Hospitals, labs and other data sources pay IHIE to deliver results they would otherwise have to deliver; physicians pay nothing regardless of their chosen method of receipt.
- **Clinical repository service:** The Indiana Network for Patient Care (INPC), which the Regenstrief Institute has operated in the greater Indianapolis healthcare market since 1998, is the basis of IHIE's clinical repository service. The INPC is a community health repository system that merges individual patient health information from multiple sources into one single, virtual patient medical record. The information is aggregated in real-time, so the summary provides the most-accurate, up-to-date information about a patient, regardless of treatment location. The INPC carries nearly one billion discrete results as well as text documents, images and other data and in addition to serving central Indiana, is currently being implemented in Northwest, Southwest, and North Central Indiana.
- **Chronic disease, preventive care and quality reporting service**: IHIE's clinical quality data service is called the Quality Health First® (QHF) program. It provides physicians with actionable patient-level data to improve quality. For health plans, it offers the administration of an incentive-based quality program that unifies multiple payors into a single program with measures based on clinical as well as claims data. Physicians receive monthly reports that provide information about which patients are due or overdue for certain tests and screenings. In addition, the physicians are rewarded for improvements in performance in these clinical measures. The QHF program combines the use of claims data and clinical data in the calculation of the measures for all participating physicians.

IHIE's Plan for Sustainability

IHIE's plan for sustainability can be summarized in this way:

- We will offer a growing profile of value-added services to various stakeholders across the health care supply chain

- We will continue to add customers -- within the central Indiana market and in additional healthcare markets within Indiana, focusing initially on population centers.

In the near-term, IHIE's growth plan can be divided into strategies and tactics around (1) services offered to healthcare providers, and (2) services offered to health plans and employers.

A summary of IHIE's near-term sustainability strategies and tactics for **services offered to healthcare providers**:

- Continue to provide clinical messaging services to the Indianapolis, Northwest Indiana, Lafayette, and Crawfordsville markets.
- Transition the operations, support, and promotion of the clinical repository from the Regenstrief Institute to IHIE while continuing the delivery of uninterrupted service to the Indianapolis/Central Indiana market.
- Implement the clinical repository in additional Indiana markets. In the near-term this includes Evansville, Northwest Indiana, Kokomo, and Lafayette.
- Transition the clinical repository from a grant-funded to a fee-based (revenue generating) service.
- Continue to grow clinical messaging and the clinical repository by selling the services bundle.
- Continue to investigate new service concepts and push forward development of the most promising – launch a new service aimed at providers in 2010.

A summary of IHIE's near-term sustainability strategies and tactics for **services offered to health plans and employers**:

- Quality Health First® program
    - Launch Quality Health First program in the 9-county Indianapolis market.
    - Enroll additional commercial payors with members in the Indianapolis market.
    - Enroll additional physician groups serving the Indianapolis market
    - Expand the program to additional Indiana markets, focusing first where the clinical repository is being implemented (Lafayette, Evansville, Northwest Indiana, and Kokomo).
    - Expand the program to additional medical specialties beginning with orthopedics, oncology, and cardiology.
    - Devise a strategy for engaging self-insured employers in all markets where the Quality Health First program is offered in an effort to enroll them in the program.
- Engage the health plans and employers regarding beginning to pay for the clinical repository value that accrues to them.
- Continue to investigate new service concepts and push forward development of the most promising – launch a new service aimed at health plans and/or employers in 2010.

A financial forecast for IHIE over the next five years can be found in Appendix A on page 28.

Conclusion

IHIE continues to grow – in breadth of services, in market penetration, and in geographic reach. While we are experiencing steady progress, we remain aware that continued growth and sustainability are not assured and should not be taken for granted.

II. IHIE Origins and Background

Origins

Health information exchange (HIE) emerged in Indianapolis in the early 1990's out of a desire by business and healthcare leaders to enlist the ever-increasing capabilities of information technology in the struggle against unyielding growth in the complexity, inefficiency, and waste of the healthcare system. The resulting initiatives dovetailed well with the mission and work of the Regenstrief Institute (www.regenstrief.org). This healthcare research institute is based in Indianapolis and has a demonstrated history of healthcare informatics research and applied discovery.

However, as HIE services began to grow in variety and scale, there was a general recognition that, for a number of reasons, HIE could and should be operated as a business. The reasons include:

- The delivery of HIE services had been demonstrated to have value, but the delivery of services had associated costs. To sustain the delivery and growth of services as well as the development of additional services, there need to be a permanent source of funding.
- There were certain HIE services for which both feasibility and business value had been demonstrated, and it was clear that some services were capable of generating revenue greater than the expense necessary to operate them
- HIE services were consumed by healthcare providers, payers, and other business entities that had both a legitimate business need and a clear expectation that services would be delivered consistently, efficiently, and in a professional manner.

Out of this recognition, a unique collaboration of 13 institutions representing hospitals, healthcare providers, researchers, public health organizations, and economic development groups created the Indiana Health Information Exchange (IHIE) (www.ihie.org). The founding organizations included:

- BioCrossroads
- Central Indiana Corporate Partnership
- City of Indianapolis
- Clarian Health Partners
- Community Health Network
- Health and Hospital Corporation of Marion County
- Indiana State Department of Health
- Indiana State Medical Association
- Indiana University School of Medicine
- Indianapolis Medical Society
- Marion County Health Department
- Regenstrief Institute
- St. Francis Hospital and Health Centers
- St. Vincent Health

Company Background

IHIE is a non-profit company incorporated in the state of Indiana on February 24, 2004. By design, IHIE is extending and scaling the principles and infrastructure devised, demonstrated, and built by the Regenstrief Institute. IHIE works hand-in-hand with Regenstrief to create sustainable business models and provide commercial levels of support for the Institute's technologies in the marketplace. Key support has also come from BioCrossroads (www.biocrossroads.com), which provided capital and in-kind resources, and five Indianapolis area hospital systems, which were IHIE's first large customers.

IHIE has grown to 35 employees and has continues to implement its growth plan, with new data sources and new customers are being added each month. IHIE's volume of clinical messages delivered now exceeds 1.4 million messages per month delivered to over 9900 physicians. Additional services based on the value of health information exchange, such as Quality Health First program (www.qualityhealthfirst.org), are being launched.

IHIE's vision is to use information technology and shared clinical information to:

- Improve the quality, safety, and efficiency of health care
- Create unparalleled research capabilities for health researchers
- Exhibit a successful model of health information exchange for the rest of the country

IHIE is dedicated to supporting communities by providing services that enable the right medical information to get to the right provider at the right time. Ultimately, the HIE infrastructure will be the basis of services that give providers better information for treatment purposes at the point-of-care, demonstrates economic value to multiple stakeholders, and gives researchers a richer pool of data to guide more far-reaching treatment and system improvements.

III. HIE Sustainability -- Basic Conceptual Principles

In order to communicate how our health information exchange will be self-sustaining, we first explain the basic conceptual principles that serve as the basis of IHIE's business planning. These principles are:

- HIE is a business
- The Leveraging of High-cost, High-value Assets
- No Loss Leaders
- Independent, Local Sustainability
- Natural Monopoly
- The Need for Scale
- Avoidance of Grants for Operational Cost

HIE is a Business

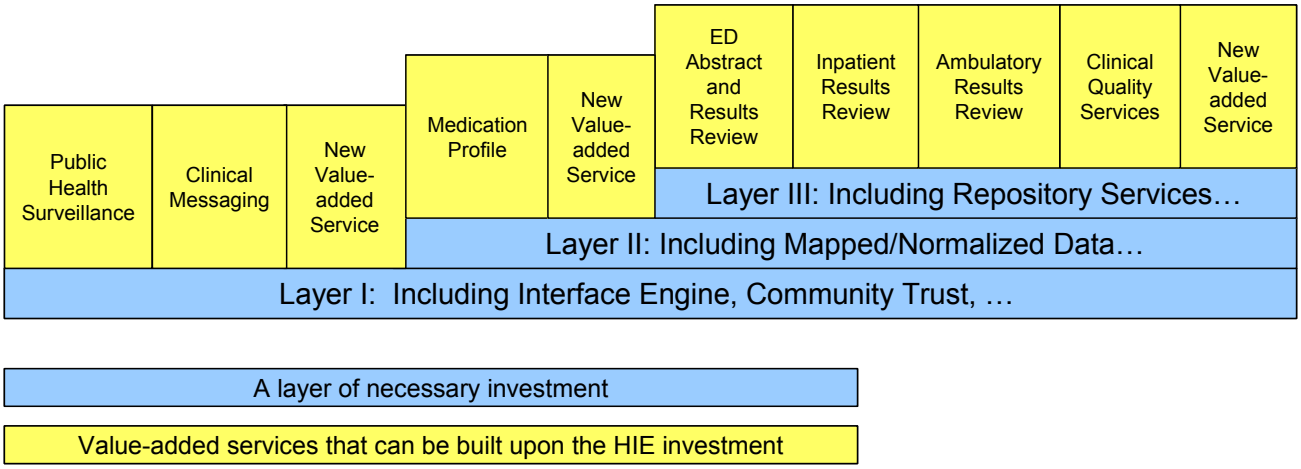
In different healthcare markets across the nation, the view of what a sustainable HIE is or should be varies widely. In our view, HIE is a business – it is not a charity or a co-operative, nor is it an agency of the government. And as with all businesses, creating a sustainable HIE requires offering services that the market wants at a price the market will bear and doing so in such a way that revenue exceeds expenses. It also means that the services delivered by the HIE must be at a level that healthcare organizations have come to expect from their suppliers. For example, the HIE's speed and quality of implementation services, the quality of its applications, and the level of customer service must be comparable to other successful service providers in the healthcare marketplace. A physician practice or hospital would not use a supplier of goods or services that delivers bad service – nor will they participate in and rely on an HIE that delivers bad, unreliable, or low-value services. HIEs cannot presume to be judged by a lower standard than other businesses in the marketplace simply because they have community benefit as part of their mission.

Leveraging of High-cost, High-value assets

Establishing a mature HIE capable of a variety of high-value services requires the creation of an infrastructure that can be quite expensive. In this context, the word "infrastructure" is meant in the broadest sense to imply all that is needed as the basis of HIE services -- not just servers and software; but also processes, human resources, and inter-organizational relationships. For reasons that include economics, technology, and local social/political concerns, we believe it is best to build the infrastructure in phases. Each phase is justified and created on the basis of the value-added services it will enable. Once the dollars have been invested in the creation of a layer of infrastructure, it is essential to leverage and re-use those assets to deliver as much and as many services as is necessary to achieve sustainability. In

other words, the services an HIE is able to provide to the market must be capable of producing sufficient revenue to cover expenses and, due to the cost of the infrastructure that is required, offering multiple services to various market stakeholders is conducive to sustainability. (See Figure 1)

Figure 1: HIE infrastructure investments should be leveraged to deliver multiple value-added services.



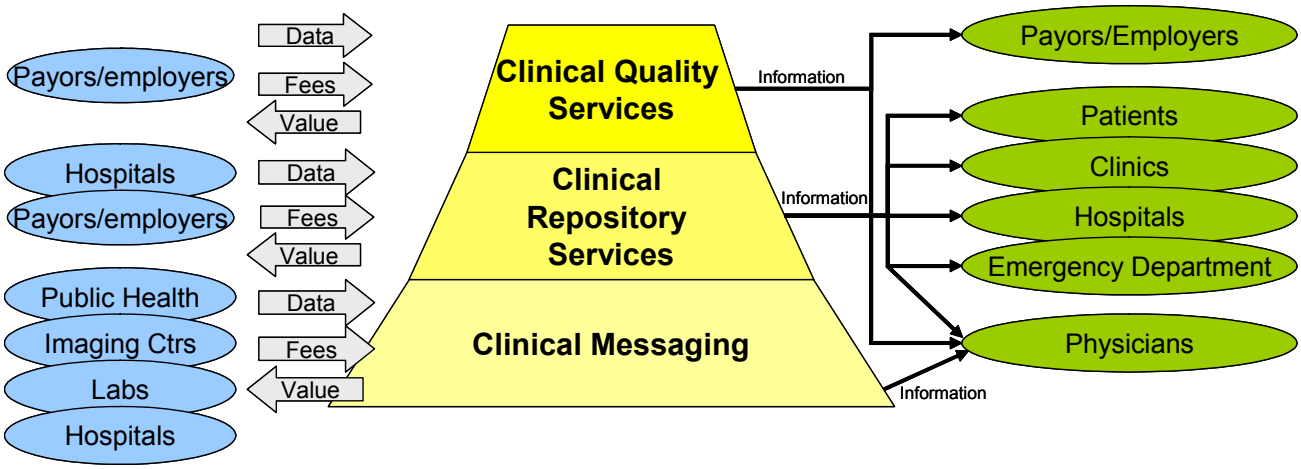
The leveraging of high-cost/high value assets described above can also be thought of as the layering of services. For each layer of infrastructure:

- The infrastructure (i.e. assets) needed to support HIE in a given market is costly to build and operate. Once built, HIEs cannot be financially sustainable by using the infrastructure to deliver only one revenue-generating service.
- Given that the same infrastructure (e.g. servers, software, processes, relationships) can create value in many different ways to the various stakeholders across the healthcare system, HIEs should offer multiple services.
- When the costs of the infrastructure are spread across multiple services and delivered to a market of sufficient scope, the services can be offered at a price that will meet market and revenue needs.

Regenstrief and IHIE have had success in taking HIE services from concept, through development and implementation, and into self-sustaining services. In the interest of sustainability and additional community value, we continue to develop and deploy new services as well as increase the geographic reach and market penetration of current services. We have found that without multiple, layered services, the economics of health information exchange determine that too much cost will be concentrated in too few services. The prices the HIE must charge to cover cost will exceed the value of the services in the marketplace, and the HIE will not be sustainable in the long-term. We are applying this concept in our HIE by implementing clinical messaging services followed by clinical repository services and and clinical quality services (See Figure 2). We fully expect to devise and implement

additional services in the future and currently have several service concepts under consideration.

Figure 2: One possible combination of services enabled by multiple layer of HIE infrastructure investment.



No Loss Leaders

In retail, a "loss leader" is a product sold at a loss to stimulate other, profitable sales. In HIE, there may be a strategic linkage to a future value-added service that can only be established if an earlier service is "sold at a loss" to create the infrastructure or assets (e.g. data) to support the future service. For example, an HIE might devise a strategy to offer the delivery of lab results at a price below their actual costs based on the idea that storing and accumulating lab data over time will put them in a position to offer other, more profitable services. However, in the context of an evolving HIE policy and business model landscape, the risk that the future services might never be possible is too great. Key assumptions on which the future service model is based could be changed – by emergence of a less costly or more complete source of data, by future federal or state laws that render them illegal, or by unanticipated local influences. While the risk of such a strategy may mitigate in the future as HIE takes root and matures, the current legal and business standing of HIE is such that we have made the assumption that this type of "two-stage" service is too precarious to be factored into sustainability plans.

In general, while services and the infrastructure underlying them are related, and the creation of a given new service may depend on the existence of previously established services or the infrastructure they create, each new HIE service should be individually self-sustaining. This then becomes a corollary to the principle of layered services in that some services are economically sustainable only after previous services have been established and created infrastructure or assets that are "economic prerequisites" for the new service.

Not to be confused with a loss leader service (one deliberately delivered at a loss to make profit in another way), a mature, sustainable HIE may chose to offer services to healthcare stakeholders at no cost (or below cost) because the service has community/societal benefit. Indeed, one could argue that HIEs have a moral obligation to provide such services when economically feasible. Examples might include an HIE role in public health (e.g. bio-surveillance, communicable disease reporting, or communication of public health alerts) or indigent care.

Independent Local Sustainability

In the future, when the country is connected via the national health information network (NHIN), large regional HIEs, small-market HIEs, state HIEs, and nationwide sub-network organizations (SNO) will all need to exchange data. Across the NHIN, a large HIEs may send significantly more information to a nearby HIE in a smaller market. Or a nationwide source of patient-level medication data may send out much more information than they receive from other SNOs. Therefore, many HIEs, each with their own need for economic sustainability, will be giving or receiving more value than a given partner. One might reasonably expect that dollars will need to change hands between SNOs in the future "NHIN economy" to reflect the imbalance in the flow of value. However, the business rules of who will pay who for what in the NHIN are undefined. For that reason, we feel it is imperative that the sustainability plan of an individual HIE, based in a specific market or region, has no dependence on HIE-to-HIE (SNO-to-SNO) exchange for financial sustainability.

This would not be true of a SNO like the example of the nation-wide source of patient-level medication data given earlier. That SNO, by definition, is based on a business model whereby information created through a non-HIE business is provided to market-based HIEs who would find value in data. Clearly, their sustainability plan would include revenue generated through SNO-to-SNO services.

As with the principle of "no loss leaders", as the business of HIE matures and the NHIN begins to take form, the financial risk and benefit of participation in the NHIN will become known and SNO-to-SNO exchange may be a predictable source of revenue for a given market-based HIE.

Natural Monopoly

HIEs are natural monopolies. That is to say that the total cost of producing HIE services for a given market is lower if there is just a single producer than if there are several competing producers. Commonly cited examples of natural monopolies include railroads, telecommunications, electric power transmission systems and water supply systems. In each example, there is a large cost for the necessary infrastructure (which is a fixed cost), making the creation of a redundant infrastructure wasteful and detrimental to the economy as a whole[1].

[1] http://www.linfo.org/natural_monopoly.html

In addition, in order to achieve sustainability, HIEs must have the opportunity to offer all (or nearly all) revenue generating health information exchange services to their market. In the future, there may be many "tried and true" revenue generating HIE services, each with a service model that can be replicated by HIEs in each market in the country. For now, however, there are a limited number of proven service models and it is necessary to layer these in order to generate enough revenue to cover the cost of operating the HIE infrastructure. If two HIEs existed in the same market, offering competing services on separate HIE infrastructures, both would be likely to struggle with economic sustainability until one failed and the other remained as a local monopoly.

The Need for Scale

Micro-economics tells us that there is an optimal size for businesses of any given type. It does not make economic sense to build a steel mill that produces steel in small volume. The necessary infrastructure investment and demands of the steel market drive steel mills to be large manufacturing entities to function optimally in economic terms. On the contrary, the proliferation of Starbucks® and its many imitators demonstrates that highly-personalized, small-scale production of coffee by the cup makes more economic sense than one giant "coffee mart" in the center of town. Since this principle applies to all business entities including HIEs, there is an optimal size for an HIE. Because HIEs, HIE services, and the means of delivering them differ so dramatically, there is no one "magic number" that represents that minimum or optimal scale of an HIE business. However, we believe that there is a scale in terms of population or medical service area concentration at which a given HIE service model is optimal and below which a given service model is not economically sustainable.

The largest, most established HIEs in the country are serving markets as large as 2 million people and are still growing and improving their economic position through growth. As mentioned above, optimal size may be dependent on the services offered and business models employed by a given HIE. However, based on the experience of the largest HIEs, the upper bound of the optimal size of a health information exchange business has not yet been reached and is likely to exceed to size of any single medical service area in the United States. In other words, there may be no market in the country so large that it cannot be served optimally by a single health information exchange. As a practical matter, since the population of the largest markets is more than adequate to support multiple HIEs, local factors and overall complexity in these markets may lead to the ongoing presence of multiple exchanges.

Avoidance of Grants for Operational Cost

Grants are indispensable sources of start-up funds for HIEs but should not be counted on to cover operational costs beyond a HIE's early ramp up stage. While this may be a common and pervasive point of view, it is an important tenant that is consistent with our view that HIEs must be sustainable businesses. IHIE and the Regenstrief Institute have created the necessary infrastructure and developed new services using funds obtained from grants. We hope for and anticipate continued use

of grant dollars for start-up projects such as new service development and initial investments in new markets. However, we believe that, once fully operational, HIE services must be able to generate revenue equal to or in excess of expenses such that grants (or other non-operating revenue sources) are not necessary to cover operational costs.

It should be acknowledged that, consistent with the layering of services principle, that an individual service may be capable of generating some revenue, less than their operational costs, and still be a valid part of a sustainability plan. This would be true if the service is accompanied by other services that re-use existing HIE assets (sharing operational costs). In this way, the services when considered together, generate revenue over expenses and make ongoing grant support unnecessary.

IV. IHIE's Services

Many of the HIE services offered by the Indiana Health Information Exchange were developed and proven by the Regenstrief Institute. From among the HIE concepts that are developed at Regenstrief, only those services that can conform to the basic concepts articulated above form the core of what IHIE offers to the Indian healthcare marketplace. Currently, three services make up the profile of IHIE's offerings and, therefore, the core of its plan to be sustainable. These are:

- Clinical messaging service
- Clinical repository service
    - Abstract and results review in the emergency department setting
    - Abstract and results review in the ambulatory care setting
    - Results review in the inpatient setting
- Chronic disease, preventive care and quality reporting service

Clinical Messaging

IHIE's clinical messaging service is the delivery of clinical results to physician offices -- either directly into their electronic medical record, into a secure web-based clinical messaging application, or via fax. Called the DOCS4DOCS® service, it was designed and developed at the Regenstrief Institute and is operated by IHIE. The system receives lab/transcription/radiology results and other clinical messages from participating data sources (e.g., hospitals and labs) via HL7 interfaces, converts the clinical results into a consistent report format, and delivers them to the intended provider. The DOCS4DOCS service can also deliver electronic copies of discharge summaries, operative notes, and EKGs.

The business model for clinical messaging is a per-result delivery fee. Hospitals, labs and other data sources pay IHIE to deliver results they would otherwise have to deliver; physicians pay nothing regardless of their chosen method of receipt. Because of the specialization and volume of IHIE, the pricing of the service can represent a significant reduction in costs for the organization. Results retain the branding of the originating organization (e.g. a hospital or health system). The benefits include: elimination of duplicate tests and duplicate results, provision of reports in a consistent format, and increase in the speed and safety of patient care. Also, because of the perceived advantages for physician practices, clinical messaging can also contribute to physician relationship retention and satisfaction.

For the physician practices, clinical messaging typically represents the unification of a number of disparate delivery mechanisms for their office and presents results from many organizations is a consistent format and singular delivery vehicle. In Indiana, DOCS4DOCS is the delivery service for 30 different hospitals and connects to more than 3000 Indianapolis practices and 9900 individual physicians.

The DOCS4DOCS system provides Regenstrief/IHIE with a direct connection to the physician's practice. This is significant in that DOCS4DOCS is a channel that can serve as the basis of other services. For example, we are currently developing the capability to annotate a laboratory report with patient specific reminders, or a comment about a new research result that may apply. Additionally, the DOCS4DOCS

system could be used for public health alerts. The capability for a notification to all practices is already built into the system and is currently used to announce information such as new software features.

Clinical Repository Service

The Indiana Network for Patient Care (INPC), which the Regenstrief Institute has operated in the greater Indianapolis healthcare market since 1998, is the basis of IHIE's clinical repository service. The INPC is a community health repository system that merges individual patient health information from multiple sources into one single, virtual patient medical record. The information is aggregated in real-time, so the summary provides the most-accurate, up-to-date information about a patient, regardless of treatment location. The system has grown to include information from several hospital systems, the county and state public health departments, commercial and government payors, and RxHub.

The INPC carries nearly one billion discrete results as well as text documents, images and other data and in addition to serving central Indiana, is currently being implemented in Northwest, Southwest, and North Central Indiana.

Organizations contributing data to the INPC in the Indianapolis market include:

- Over 20 hospitals including the 5 major hospital systems and community hospitals (99% of inpatient care)
- Regional laboratories
- Local imaging centers
- Public health departments (county and state)
- Approximately one third of physicians in ambulatory settings

The INPC model is to aggregate data from as many clinical data sources as possible while semantically normalizing the data so that, when patient matching algorithms are employed, the system constitutes a virtual community health record for each citizen in the markets it serves. Granting clinicians access to this virtual record at the point of care – either via a "pushed" clinical abstract or a "pulled" view of the patient's information – comprises the repository services offered by IHIE. We refer to these services as clinical abstracting and results review. They can be delivered into an emergency department, outpatient/practice, or inpatient setting – with workflow, access control, and security designed appropriately for each clinical setting.

An illustrative example of how the INPC works to deliver information into the workflow of patient care may be helpful. The INPC clinical abstracting and results review service is currently most widely implemented and used in the hospital Emergency Departments (ED). When a patient is registered in the ED of a participating hospital, an electronic message (via an HL7 interface from the hospital to the INPC) is sent to the INPC. Employing a proven matching algorithm, the patient identity information in the message is used to locate the patient in a global patient index. Once the patient is identified, separate queries are sent to the clinical data repositories populated with data from the participating provider organizations. Any data pertaining to the patient is sent back in HL7 message format. All responses from the various repositories are

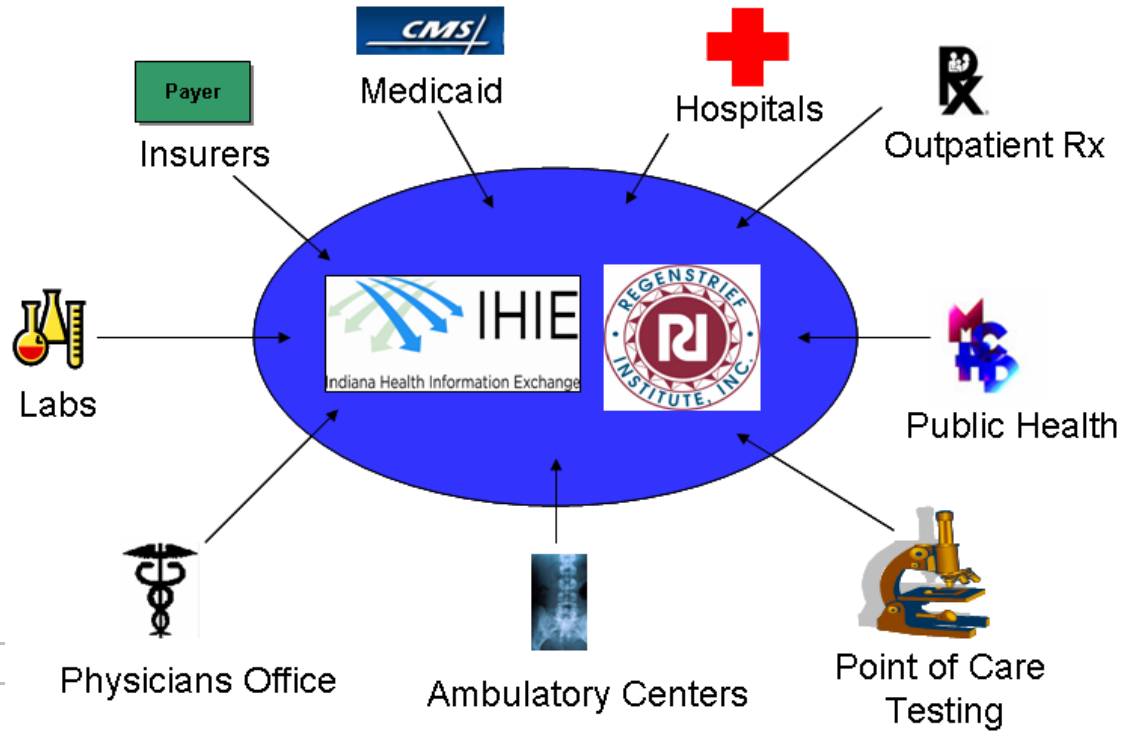
then aggregated and organized into a clinical abstract. The clinical abstract is a concise, consistently formatted summary of the information gathered about the patient. It is sent to the hospital ED where it is automatically printed and given to the physician for review. When data in the abstract is clinically relevant to the patient's current episode of care, the physician may choose to go to a workstation in the ED where he/she may retrieve more detailed information via a web-based interface to the INPC.

Chronic Disease, Preventive Care and Quality Reporting Service

IHIE recently developed a clinical quality data service that provides value to both health plans and physicians. This service, called the Quality Health First® (QHF) program, provides physicians with actionable patient-level data to improve quality. For health plans, it offers the administration of an incentive-based quality program that unifies multiple payors into a single program with measures based on clinical as well as claims data. Physicians receive monthly reports that provide information about which patients are due or overdue for certain tests and screenings. The measures include asthma care, breast cancer screening, cholesterol screening and management, and diabetes screening and management.

The physicians are rewarded for improvements in performance in these clinical measures. The QHF program combines the use of medical and drug claims, patient drug information, and laboratory and radiology test results with the Indiana Network for Patient Care clinical data in the calculation of the measures for all participating physicians.

Figure 3: Data sources used in the Quality Health First program to support the calculation of measures and the attribution of patients to their respective physicians.



Creating the QHF program required an intensive collaborative effort between health plans, providers, and employers. The Employers' Forum of Indiana, with participation from health insurers and healthcare providers in the nine county Indianapolis area, played an indispensable role in convening and leading committees in sculpting the specifics of Quality Health First.

Other Future Services

In addition to the services described above, IHIE continues to develop new value-added services. We have defined a process for evaluating new service concepts and vetting their technical, economic, and operational viability. Those that appear promising will enter a development phase. Our forecasted financial outlook (see Appendix A on page 28) reflects the expectation that we will continue to develop and implement new services in the years ahead.

V. IHIE's Plan for Sustainability

IHIE's plan for sustainability can be summarized in this way:

- We will offer a growing profile of value-added services to various stakeholders across the health care supply chain
- We will continue to add customers -- within the central Indiana market and in additional healthcare markets within Indiana, focusing initially on population centers.

IHIE's profile of services and plan for sustainability reflect and demonstrate the sustainability principles articulated above.

IHIE's Near-term Strategies and Tactics

In the near-term, IHIE's growth plan can be divided into strategies and tactics around (1) services offered to healthcare providers, and (2) services offered to health plans and employers.

Services Offered to Healthcare Providers

As noted earlier IHIE has two established services for providers – clinical messaging and the clinical repository. We have, for several years, been growing our clinical messaging in Indianapolis and have added customers in other Indiana markets as well as new customers in the Indianapolis market. The clinical repository has also seen significant growth and is on path to serve four of the six largest markets in Indiana (see the table on page 22). In 2009, we plan to transition it to a revenue generating service by bundling it with clinical messaging and offering our customers a new pricing scheme that includes the clinical repository and clinical messaging together. IHIE's continued success depends on a successful transition of the clinical repository to a fee-based service. Details of our strategies and tactics for the services we offer to healthcare providers are below.

A summary of IHIE's near-term sustainability strategies and tactics for services offered to healthcare providers:

- Continue to provide clinical messaging services to the Indianapolis, Northwest Indiana, Lafayette, and Crawfordsville markets.
- Transition the operations, support, and promotion of the clinical repository from the Regenstrief Institute to IHIE while continuing the delivery of uninterrupted service to the Indianapolis/Central Indiana market.
- Implement the clinical repository in additional Indiana markets. In the near-term this includes Evansville, Northwest Indiana, Kokomo, and Lafayette.
- Transition the clinical repository from a grant-funded to a fee-based (revenue generating) service. To do this, we need to:
    - Convince customers in Indianapolis, Evansville, Northwest Indiana, Kokomo, and Lafayette that are currently using (or will soon be) both clinical messaging and the clinical repository to accept a new pricing

approach that includes one base fee for IHIE participation and a separate fee for the bundled clinical messaging/clinical repository services.
    - Convince customers that are currently only participating in the clinical repository begin paying for a bundled service that also offers them clinical messaging.
    - Part of gaining acceptance for the pricing approach may involve IHIE committing to decreasing fees to health systems over time predicated on engaging health plans in beginning to pay for the clinical repository value that accrues to them.
- Continue to grow clinical messaging and the clinical repository by selling the services bundle:
    - In additional Indiana markets (other than Evansville, Northwest Indiana, Kokomo, and Lafayette)
    - To new customers in existing markets
- Continue to investigate new service concepts and push forward development of the most promising – launch a new service aimed at providers in 2010.

Services Offered to Health Plans and Employers

The Quality Health First program is currently our only established service offered to health plans and employers. It was recently launched in the 9-county Indianapolis healthcare market and discussions with business and healthcare leaders in other Indiana markets have been ongoing for some time. In the future, we expect to develop additional services aimed at providing value to organizations that pay for healthcare. This may include a service or services leveraging and demonstrating the clinical repository's ability suppress healthcare costs. In the near-term, our sustainability plans are not dependent on any new services to health plans, but the acceptance and growth of the Quality Health First program is a key success factor. Details of our strategies and tactics for the services we offer to healthcare providers are below.

A summary of IHIE's near-term sustainability strategies and tactics for services offered to health plans and employers:

- Quality Health First® program
    - Launch Quality Health First program in the 9-county Indianapolis market.
    - Enroll additional commercial payors with members in the Indianapolis market.
    - Enroll additional physician groups serving the Indianapolis market
    - Expand the program to additional Indiana markets, focusing first where the clinical repository is being implemented (Lafayette, Evansville, Northwest Indiana, and Kokomo).
    - Expand the program to additional medical specialties beginning with orthopedics, oncology, and cardiology.
    - Devise a strategy for engaging self-insured employers in all markets where the Quality Health First program is offered in an effort to enroll them in the program.

- Engage the health plans and employers regarding beginning to pay for the clinical repository value that accrues to them.
- Continue to investigate new service concepts and push forward development of the most promising – launch a new service aimed at health plans and/or employers in 2010.

Growing to Additional Markets

As discussed above, HIEs businesses can enhance their economic viability by growing to the optimal size for their business. Our financial analysis suggests that, for our business, "bigger is better" and that growing our customer base would enhance our revenue to expense ratio. This aligns with our mission to serve the entire state of Indiana, and we continue to make headway in extending our services to markets beyond Indianapolis. In addition to Indianapolis, IHIE and the Regenstrief Institute are currently implementing services in 3 of the 5 largest Indiana population centers and continue to collaborate with state government to identify ways to best serve the whole state (See table 1).

Table 1: Largest Population Centers in Indiana

Population Center	Approximate Population	Current IHIE Service Area
• Indianapolis metropolitan area	1.7M	■
• Northwest Indiana (Gary and Chicago suburbs)	710,000	■
• South Bend/Mishawaka/Elkhart	460,000	
• Fort Wayne/Allen County	340,000	
• Evansville/Vanderburgh County	300,000	■
• Lafayette/Tippecanoe County	155,000	■

Transitioning Repository Services to Fee-based

Regenstrief's clinical repository (INPC) has been grant-funded since its inception more than a decade ago. IHIE is in the process of transitioning repository services to a fee-based service for existing and future health system customers. We anticipate a pricing strategy that links clinical messaging and repository services as bundled services and plan to offer the services to hospitals and health systems with fees in proportion to business volume. For example, gross patient services revenue or adjusted patient days could be used as metrics from which a bundled services price could be calculated for each potential customer. For a large multi-hospital system with an adjusted average daily census over 1000, fees might be on the order of $55,000 per month. For a small hospital with an adjusted average daily census of

100, fees could be closer to $5500 per month. Many of our customers who will be asked to begin paying for repository services are already paying clinical messaging customers. Because of the synergies between clinical messaging and repository services, we believe we can deliver both services together at a price that will be well under the perceived value.

How IHIE Applies the Sustainability Principles

The following table summarizes how IHIE applies the broad principles described previously.

Table 2: How IHIE Applies the HIE Sustainability Principles

HIE Sustainability Principle	Examples of How it is Applied by IHIE
HIE is a business	• *IHIE is an independent 501(c)3 non-profit organization, but views that designation in terms of its tax status and funding advantages* • *New services target achieving a net positive cash flow within 24 months of their launch* • *IHIE employs business development and marketing professionals to grow its business and its brand* • *IHIE delivers a high-level of customer support and touts this advantage in sales efforts*
The Leveraging of High-cost, High-value Assets	• *Repository services reuse of the same interfaces and data that are part of the clinical messaging service* • *The helpdesk, data center, training staff, and other assets supporting clinical messaging will also support repository services and Quality Health First.* • *Quality Health First would not be possible without use of the clinical data that is available through repository services.*
No Loss Leaders	• *All IHIE's current and planned services are designed to be delivered at a price point the market will bear and are expected to generate revenue in excess of their cost of operation.*
Independent, Local Sustainability	• *Until the economics and "rules of the road" of the NHIN are developed, our business planning assumes participation in the NHIN will be cost neutral.*
Natural Monopoly	• *IHIE is the only HIE serving central Indiana. We are growing into other markets in Indiana not served by other HIEs.* • *In markets that have existing HIEs, we are working with the HIE organization to develop complementary services and/or HIE-to-HIE connectivity.*
The Need for Scale	• *The Indianapolis medical service area has a population of over 1.7 million people and is more than large enough to support a sustainable HIE. However, several markets in Indiana are not sufficiently large to support their own HIE and we are growing to serve them.*

HIE Sustainability Principle	Examples of How it is Applied by IHIE
Avoidance of Grants for Operational Cost	• *In developing new services, the business plan must target the service achieving net positive cash flow within 24 months of its launch*

Financial Forecast for the Future of IHIE

A financial forecast for IHIE over the next five years can be found in Appendix A on page 28.

Revenues

IHIE expects to continue to generate revenue through its clinical messaging (DOCS4DOCS service), repository services (based on Regenstrief's Indiana Network for Patient Care) and its chronic disease, preventive care and reporting service (Quality Health First® program). As the clinical repository service is transitioned from a grant-funded to fee-funded model, clinical messaging and repository services will be bundled and, together, are expected to generate a growing revenue stream. Currently about a third of all Indiana hospitals, representing 38% of all inpatient and outpatient hospital care, have committed to participation in the INPC and the forecasted revenues in Appendix A are based on the assumption that IHIE will grow to serve hospitals and health systems that deliver 75% of all Indiana hospital care by 2012. The Quality Health First® program revenues are also projected to climb significantly as additional payors and additional Indiana markets become part of the program.

In addition, beginning in 2010 we have projected modest but growing revenue from two as yet undeveloped services – one aimed at health plans and one at health systems. IHIE has defined a process for the evaluation and development of new services based on perceived value in the market, technical feasibility, and predicted economic viability. While this process is relatively new, IHIE expects to evaluate many ideas and develop only a few, yielding two new services over the next two years.

While some growth and revenue forecasts are aggressive, the risk to sustainability is mitigated by the fact that in the HIE business, once a minimum scale is achieved, additional volume is needed only for efficiency – not necessarily survival. Said another way, if IHIE's growth forecasts turn out to be higher than are born out in reality, then both revenue and expenses will be proportionately lower. A greater risk to IHIE's sustainability is finding a price points for the clinical messaging / repository services bundle and chronic disease, preventive care and reporting service that are acceptable to the market while still generating revenue in excess of operating costs.

Assumptions associated with the revenue forecast:

- Repository services and clinical messaging will grow to serve health systems delivering 75% of patient care Indiana (in terms of adjusted patient days) by 2012

- Clinical quality services will grow to serve 2 million covered health plan members/employees by 2012
- Two new services of modest scope are implemented in 2010
- Approximately 5% of operating revenue is invested in new service development beginning 2009

Expenses

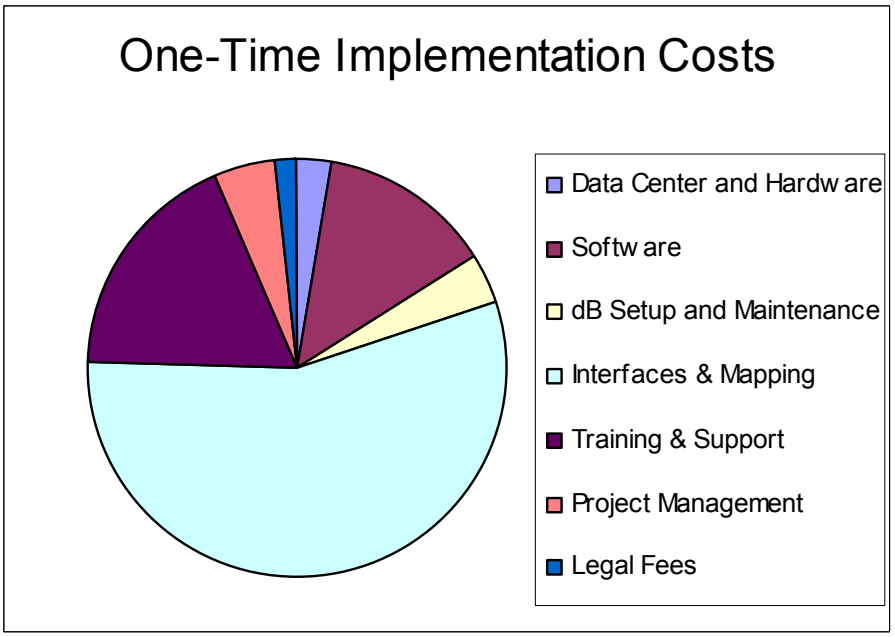
As demonstrated by the expenses forecast below, IHIE's operation, like most service businesses, is labor intensive. Building and maintaining interfaces to and from data sources as well as the initial and ongoing semantic normalization of data from different sources (i.e. "mapping") makes up roughly half of our ongoing expenses. The training and support of new and existing customers makes up another quarter. The remaining quarter is divided, in decreasing portions, amongst software, database set-up and maintenance, project management, data center and hardware, and professional services.

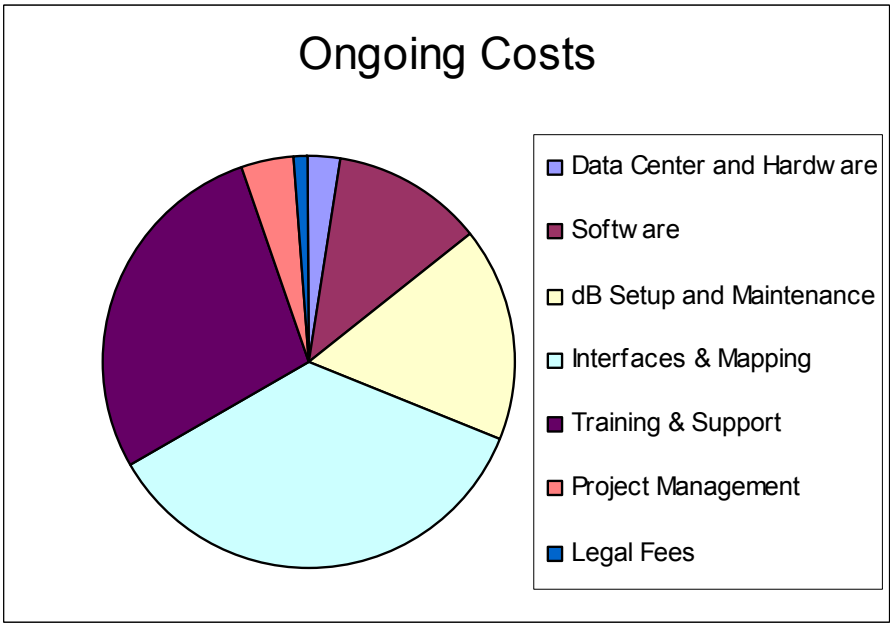
Assumptions associated with the expense forecast:

- Expenses will grow in proportion to the growth of services yielding only modest economies of scale
- Overhead rate of the company will remain relatively constant
- Overhead includes activities such as marketing, accounting, new service development, regulatory compliance, et cetera.

The expense forecast shows the overall categorization of costs which blends all cost-creating activities into a single budget. All overhead costs have been allocated across these categories proportionately. In reality, the IHIE workforce is constantly engaged in a balance of implementation of new customers and ongoing support of existing customers. It is noteworthy that the fraction of costs in each category associated with new implementations is markedly different than it is for the support of existing customers. Given this is not discernable from the expense forecast, figure 4, below, shows the approximate allocation of costs of IHIE's operation for one-time implementation costs versus ongoing costs.

Figure 4: Allocation of one-time implementation costs versus ongoing costs





VI. Conclusion

The Regenstrief Institute and IHIE are working together to create successful, sustainable HIE services in Indiana. We are accomplishing this using a measured approach based on principles formed out of experience. IHIE continues to grow – in breadth of services, in market penetration, and in geographic reach. While we are experiencing steady progress, we remain aware that continued growth and sustainability are not assured and should not be taken for granted. IHIE continues to believe in the value and future of HIE, and when approached and delivered as a business in the healthcare market place, so do our customers.

Appendix A: A financial forecast for IHIE over the next five years

IHIE's Financial Forecast -- 2008 through 2012

IHIE's Operating Revenue	2008	2009	2010	2011	2012
Revenue from Services to Health Systems					
Clinical Messaging / INPC Services Bundle	$3,100,000	$5,200,000	$7,300,000	$9,100,000	$9,900,000
Future Value-Added Service Revenue	$0	$0	$250,000	$350,000	$500,000
Revenue from Services to Health Plans					
Quality Health First® Revenue	$2,000,000	$2,500,000	$3,000,000	$3,500,000	$4,000,000
Future Value-Added Service Revenue	$0	$0	$250,000	$350,000	$500,000
Total ►	$5,100,000	$7,700,000	$10,800,000	$13,300,000	$14,900,000

IHIE's Operating Expense*	2008	2009	2010	2011	2012
Data Center and Hardware	$130,000	$200,000	$225,000	$240,000	$270,000
Software	$600,000	$850,000	$1,100,000	$1,300,000	$1,475,000
Database Setup and Maintenance	$375,000	$550,000	$730,000	$840,000	$940,000
Interfaces and Data Mapping	$2,700,000	$4,000,000	$5,350,000	$6,120,000	$6,835,000
Customer Training and Support	$1,330,000	$1,900,000	$2,600,000	$2,960,000	$3,300,000
Project Management	$175,000	$250,000	$325,000	$360,000	$400,000
Professional / Legal Services	$90,000	$150,000	$170,000	$180,000	$200,000
New Service Development	$255,000	$385,000	$540,000	$665,000	$745,000
Total ►	$5,655,000	$8,285,000	$11,040,000	$12,665,000	$14,165,000

IHIE's Other Funding Sources	2008	2009	2010	2011	2012
Other Funding Sources (e.g. Grants)	$500,000	$500,000	$500,000	$0	$0

Contribution to Cash Reserves ►	-$55,000	-$85,000	$260,000	$635,000	$735,000

*Includes the costs associated with supporting existing customers and implementing new customers as well as allocated overhead