Business Plan
Delaware Health Information Network

September 2011

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Letter to the Bond Bill Committee, General Assembly and Governor

On behalf of the Delaware Health Information Network (DHIN), we are pleased to submit this detailed business plan to the Governor, members of the General Assembly and the Controller General, as required by Senate Bill 231 (SB231), the Bond Bill Committee and the Joint Sunset Committee of the General Assembly.

Health information exchanges are foundational to improving the quality of patient care and reducing health care costs. With the DHIN, Delaware is nationally recognized as a leader among health information exchanges. The DHIN is designed as an interoperable network to exchange clinical health care information among all health care providers across the state to improve patient outcomes and reduce costs. The system is designed to allow patient clinical information to be shared across all health care facilities and organizations and across public and private sectors. This provides for increased access to better and more timely information and reduces unnecessary and duplicative tests and procedures.

Through the DHIN, test results are electronically sent from a laboratory to the physician that ordered them and are immediately available to other providers treating that patient. DHIN also enables information on a patient who is admitted, transferred or discharged from a hospital to be sent to their primary care physician. This information from pathology reports, admission and discharge summaries and transcribed reports includes diagnoses, report results, allergies, reason for visit, admission, or transfer, as well as patient demographics, next of kin, and insurance information. Through the DHIN this information is available by query as needed for improving the management of a patient's care. Collectively, these data types provide a rich trove of clinical information to inform decision making in the ambulatory environment and to support coordination of patient care across multiple providers and facilities.

As other states are planning and developing health information networks, Delaware has executed on this vision and continues to set the standard as an operational HIE with high provider usage rates and very strong clinical data transfer rates. DHIN has an enviably high participation rate with seven of its eight acute care hospitals actively or committed to participating, all of its Federally Qualified Health Centers receiving clinical results exclusively through DHIN, and over 80% of its health care providers receiving clinical results. From the individual patient perspective, 90% of Delaware citizens have clinical data available for query by Delaware clinicians through DHIN.

As DHIN continues to provide the technology backbone for the exchange of health care information in Delaware, it will increasingly result in efficiencies of the magnitude that are evidenced in several recent studies discussed in this business plan. These studies, based on actual field results, project that Delaware could save approximately $100 million per year in health care expenditures across all health care organizations in the state.

The DHIN is a critical component of improving patient outcomes. It will enable primary care physicians to create Patient Centered Medical Homes in which historically scattered information on their patients can flow electronically to a single point from other sources, such as specialists, laboratories, and pharmacies. It will enable emergency rooms to have information that they

might have never had when making emergency care decisions; such as access to a patient's condition, medical and medication history, relieving the burden from family members to remember this information in a stressful time, or providing a lifesaving piece of information when a family member arrives in the emergency room unconscious. Access to this information will not only reduce duplicate tests and medical mistakes, it will also speed the delivery of care by empowering the emergency room team with critical information to which they were once blind. The ability of a primary care physician to access a complete set of patient information will enable better prevention and management of chronic conditions, thereby reducing emergency room visits and health care costs. Finally, working with the Consumer Advisory Council and continuing the DHIN's commitment to privacy and security technology and protocols, patients will be able to access their information from DHIN in the future, better enabling all Delawareans to partner in their health and well-being, which is one of the most important steps in the universal goal of improving the cost and value of health care in our own community.

The past investment in the DHIN has provided a strong foundation to deliver all of these benefits to Delawareans. As evidenced by this business plan, the DHIN will be sustainable in the future. The move to a more traditional public/private governance structure, as directed by SB231, has led to a more sustainable business model, both financially and operationally. With this sustainability plan DHIN is now aligning its financial support structure with the value received by stakeholders. In FY2011 over 50% of DHIN's revenue came from fees for services. These fees will account for nearly 100% of revenue in FY2013. Federal grants are not required for sustainability, but may be pursued in the future. Management and processes are in place to ensure that DHIN is able to respond to the dynamic health care market in a way that continues to support the financial sustainability of the organization.

We appreciate your tremendous vision and your critical financial support of the DHIN in the past and look forward to delivering a strong return on that investment as we move forward.

Sincerely,

Dr. Jan Lee
Executive Director
Delaware Health Information Network

Randall Gaboriault
Chairman of the Board
Delaware Health Information Network

Board of Directors

Executive Summary

The call was unexpected – when aren't they? Mom fell at dinner and the skilled nursing facility brought her to the local hospital. I arrived a few minutes after my brother, who was at the nursing station answering questions about Mom's medical history. Recent blood work? Medications? History of falls? Prior admission?

Anxiety mounts as patient and family deal with critical questions they cannot answer. Tests are ordered which are repetitive and unnecessary. Meanwhile, care is compromised due to insufficient information. The result? Inefficient and ineffective care.

National health care expenditures represent 17.6% of Gross Domestic Product (GDP) and are projected to increase to 19.3% by 2019.[1] In Delaware $6.5 billion was spent on personal health care (about $7,500 per person) in 2008, with an annual rate of growth of approximately 5% per year, slightly less than the national rate.[2] The most significant trends affecting this growth are an aging population and an increasingly sophisticated practice of medicine. Despite this enormous and increasing expenditure, care is often inefficient and not coordinated.

As a key response to the increasing costs and problems with usage, the industry is exploring moving towards new systems of delivery including Patient Centered Medical Homes and Accountable Care Organizations. Patient Centered Medical Homes employ a coordination of care model with a strong focus on prevention and management of chronic disease, via shared medical information related to a specific patient. An Accountable Care Organization is an entity that manages the quality, cost and overall care of a community of patients. Health information exchanges, such as DHIN, are foundational to both of these evolving models. Health information exchanges facilitate the transfer and availability of data that are essential to enable providers to make high quality, safe, timely and cost effective decisions.

A Nationally Recognized Leader

The Delaware Health Information Network (DHIN) is nationally recognized in the rapidly growing and dynamic field of health information exchanges (HIEs). Sustainability is one of the most challenging topics facing regional and state HIEs, with few having a concrete plan for post-grant funding. As it achieves financial and operational sustainability in FY2013, DHIN will reinforce its position as a leader.

Launched in 2007, DHIN is the longest operating statewide HIE. It is designed as an interoperable network to exchange clinical information among all health care providers across the state to improve patient outcomes and patient-provider relationships. The system is designed to allow patient clinical information to be shared across all health care facilities and organizations and across public and private sectors. It has been built through a consensus process

[1]https://www.cms.gov/NationalHealthExpendData/25_NHE_Fact_sheet.asp, (accessed September 13, 2011).
[2]Delaware Health Care Commission Annual Report, 2010. p16.

among the health care stakeholders, which has resulted in an exceptionally high participation rate when compared to other state and regional exchanges:

- Seven of Delaware's eight acute care hospitals actively, or are committing to, participate.
- All three of Delaware's Federally Qualified Health Centers exclusively receive clinical results via DHIN.
- Over 80% of Delaware's health care providers are receiving clinical results via DHIN.
- 90% of Delaware residents have clinical information available for query through DHIN.
- 80% of laboratory tests ordered or performed in Delaware are reported through DHIN.

Value to Delaware

The social and economic value of DHIN is greatest when all those eligible to participate do so to the maximum possible degree. To the extent that any single component of our health care community hesitates to participate, it diminishes the value of DHIN for everyone else. Therefore, a key component of the plan for sustainability is DHIN's management and staff continuing to work with hospitals, laboratories and other health care organizations to use DHIN to share information. The plan also includes strategic partners, such as the federally designated Regional Extension Center and Quality Insights of Delaware, in conjunction with the Medical Society of Delaware, who encourage and support the adoption of Electronic Health Records (EHR) systems that connect to DHIN.

DHIN enables the flow of information. The value comes when organizations contribute and use that information.

Recently, rigorous studies based on actual operational data have shown dramatic savings[3] among groups that have implemented health information networks. The Department of Veterans Affairs has demonstrated an HIE-based cost avoidance of $30.26 per veteran per year.[4] This is equal to $2.52 per veteran per month. If Delaware achieves a level of savings from DHIN comparable to that experienced by the Department of Veterans Affairs from 2001 to 2007, it would be equivalent to $106 million in savings per year across all health care organizations in the state. A new study by Humana of emergency room visits in Wisconsin demonstrated an HIE-based cost avoidance of $29/emergency room visit.[5] This savings would be equivalent to $10 million per year in emergency room visits alone when applied to Delaware.

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[3] In this document the term "savings" and "cost avoidance" are used interchangeably. The financial savings from sharing health information are cost avoidances. There is not an implication that absolute health care costs will be reduced given numerous factors driving increases in health care expenditures.

[4] C. Byrne, L. Mercincavage, E. Pan, A. Vincent, D. Johnston, and B. Middleton. "The Value From Investments In Health Information Technology At The U.S. Department Of Veterans Affairs." *Health Affairs*, 29, no.4 (2010):629-638. doi: 10.1377/hlthaff.2010.0119.

[5] A. Tzeel, V. Lawnicki, K. Pemble. "The Business Case for Payer Support of a Community-Based Health Information Exchange: A Humana Pilot Evaluating Its Effectiveness in Cost Control for Plan Members Seeking Emergency Department Care."*American Health & Drug Benefits*. Vol. 4, No 4 l July/August 2011.

Preliminary results from a highly respected third party research firm show that Delaware is already receiving measurable and dramatic savings from DHIN. These savings affect each of the key stakeholder groups.[6]

- Payers - Over a two year period, a sub-set of high cost test results sent through the DHIN declined by 30% for radiology exams and 33% for lab results. These results are indicative of a reduction in duplicative and unnecessary tests.
- Data Senders - Documented, significant savings have been realized by data senders with providers who utilize the DHIN as the primary method for receiving results based on the average cost to send results using traditional methods of fax and mail.
- Providers - Through DHIN negotiated interface rates and the single point of interface, estimated savings if all providers connected to a DHIN certified EHR (Electronic Health Record) are $7.5 million in one-time costs and $1.5 million in annual costs.

Sustainable Operations

Because the health care market is extraordinarily dynamic, flexibility in operations and robust processes are critical to a sustainable organization. DHIN has applied these concepts to its organization, technology, functionality development, and operations.

Strong leadership and governance is a key element to sustainability. With the hiring of Dr. Jan Lee (Executive Director), the hiring of Mark Jacobs (Chief Information Officer), and the continuity of Mike Sims (Financial Manager), DHIN has transitioned from a contracted management firm to directly employed executive team management with strong Board of Directors' oversight.

The Office of National Coordinator (ONC) and the Centers for Medicare & Medicaid Services (CMS) are driving the adoption of health information sharing through the combination of health information exchanges and electronic health records. These will build the foundation for every Delawarean to be connected to an integrated and vastly improved system of care delivery. Incentives have been offered for meeting Meaningful Use criteria. DHIN's strategy is to remain aligned with these two organizations as they continue to lead in this field. DHIN will continue to apply for grants to develop new functionality. DHIN will support that functionality which enables health care organizations in Delaware to receive incentives or supports financial sustainability.

As DHIN continues its transition from start-up to sustainable operations, it is implementing a product development process reflecting the best practices used in other research and development intensive industries. This process includes a set of criteria to evaluate new development opportunities. These criteria ensure there are organizations that will gain value from and are willing to pay for new functionality and to do so at a price that exceeds the cost of providing that functionality. To support this process, DHIN has added a market assessment step into future grant proposals in order to check the opportunity against the criteria.

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[6]Maestro Strategies. Preliminary results from "Delaware Health Information Network Evaluation Analysis." September 14, 2011.

DHIN's technology strategy is to purchase technology as a service. From a sustainability perspective, this contracting strategy reduces the risk of owning and maintaining potentially obsolete hardware and software in the rapidly changing information technology (IT) field. The development and maintenance of the DHIN IT infrastructure is currently contracted with one of the national leaders in health information exchange software. Strong vendor management practices, a priority for DHIN under its new leadership, have resulted in a negotiated reduction of approximately $1 million per year in ongoing licensing expenses.

Sustainable Finances

The plan for financial sustainability is based on stakeholders paying to support DHIN relative to the value provided. The participants in DHIN agree with this principle. The revenue model for DHIN, necessary to achieve sustainability, projects the expansion of the current fee for services model from data senders, such as hospitals, to include payers, such as health plans.

The revenue model projects the expansion of the number of data senders and keeps the transaction pricing model at its current rate. As fee for service expands to payers, it is forecast to be on a per member per month basis. The State of Delaware is a significant payer because it includes Medicaid recipients, current employees and retirees. With approximately 200,000 Medicaid recipients, CMS and the Delaware Division of Medicaid and Medical Assistance have agreed to support DHIN with this pricing structure. DHIN will work with the State Employee Benefits Advisory Council to follow the Medicaid lead. DHIN is currently in conversation with private health plans, which are seeking to ensure that the value they receive is greater than the fees. As shown in the study results mentioned above, the payers are already receiving significant savings through the elimination of duplicative and unnecessary tests, but they are not yet financially supporting DHIN. Establishment of payer fees consistent with the plan and DHIN's statutory authority is expected to be completed in FY2012[7].

In the future medical providers, such as physicians, may also pay for value added services. Consistent with its charge to adopt a more traditional corporate structure, DHIN will also continue to explore other revenue generating opportunities in the future.

Financial Projections

In June 2011, the Delaware General Assembly passed the Bond Bill (Senate Bill 130), which appropriated $2,996,900 for DHIN. This business plan outlines DHIN's ability to become fiscally self-sustainable and its timeframe in achieving fiscal self-sustainability.

In the Epilogue the legislature required the following points, which are included in this plan:

(1) "A budget that outlines the expenditure for the $2,771,300 of the state appropriation, including a breakdown of categories (personnel/contractual services/supplies, etc.).
(2) "A total project budget over multiple years that includes funding allocations detailing federal, private and state requested amounts.

[7] SB231 gives DHIN authority ". . . to establish reasonable fees or charges for provision of its services to nonparticipant third parties."

(3) "Expenditures of the remaining $225,600 of state funds that are used only for the purpose of matching the American Recovery and Reinvestment Act (ARRA) Health Information Exchange (HIE) grant funds. These remaining funds will not be applied towards any purpose other than ARRA HIE grant matching. Working with state agencies, DHIN will work to identify match requirements for the ARRA HIE grant for Fiscal Year 2013 and Fiscal Year 2014 from non-federal in-kind sources, and not limited to non-federal cash contributions."

The table below summarizes DHIN's financial sustainability plan, consistent with the Epilogue to SB130. It shows the revenue, expense and cash flow statements forecasted for FY2011 to FY2015. Sustainability is but a foundation from which to build. The technology and infrastructure of DHIN will not simply pay for itself. Rather, the beneficiaries must contribute to financially sustain the DHIN in a financial model that will be an essential component for decades to come in our state's provision of high quality, safe, timely and cost effective health care.

DHIN Profit and Loss Statement, FY2011 – 2015 Forecast*, ($000)					
	FY2011	**FY2012**	**FY2013**	**FY2014**	**FY2015**
Revenue:					
Bond Bill	1,517	2,997	0	0	0
Other Stakeholders	1,402	1,906	6,811	8,712	9,152
Total Revenue	2,554	4,903	6,811	8,712	9,152
Total Expenses	5,246	7,471	6,717	7,090	7,235
Net Income	(2,692)	(2,568)	0.094	1,622	1,916
Beginning Cash	7,056	5,940	2,980	3,074	4,697
Ending Cash	5,940	2,980	3,074	4,697	6,613

*Accrual Basis

Notes:

- Details are in the Pricing & Revenue Model and the Financial Projections &Analysis sections of this plan.
- Cash from Cooperative HIE grant was received in FY2010 and is spent in FY2011 through FY2014.
- The net income increases to illustrate building of cash reserves for future technology development and ensure timely vendor payments.

The DHIN Difference

The call was unexpected – when aren't they? Mom fell at dinner and the skilled nursing facility brought her to the local hospital. I arrived a few minutes after my brother, who was in with Mom, telling stories. The nurse ushered me in, assuring me that they had all Mom's medical records from her primary care doctor and the skilled nursing facility, which they accessed through DHIN.

A recent change in her medication led doctors to assess the cause of the fall. They adjusted her prescription and sent her back to the skilled nursing facility with dietary suggestions and plans for a follow up with their resident doctor, to whom all records were forwarded through DHIN. Efficient and effective care with a grateful family knowing Mom was well cared for.

DHIN's Accomplishments

DHIN became the ***first*** operational statewide health information exchange in the country in May 2007. It was sanctioned as the official health information exchange for the State of Delaware in Senate Bill 231.

Recent Significant Developments:

- Preliminary results from an actual usage study show that Delaware has achieved measurable and significant savings from DHIN, including a greater than 30% reduction in a sub-set of high cost laboratory tests.[8]
- CMS and the Delaware Division of Medicaid and Medical Assistance have agreed to fund DHIN on a per member per month basis.
- DHIN negotiated a reduction of approximately $1 million per year in ongoing licensing expenses.
- The Delaware Division of Long Term Care Residents Protection received grant funding to connect all 45 of its skilled nursing facilities to DHIN.
- Nemours/A.I. DuPont Hospital for Children has agreed to connect to DHIN.

DHIN by the numbers**:**

- 75% of Delaware acute care hospitals participate in DHIN (BayHealth Medical Center, Beebe Medical Center, Christiana Care Health System, St. Francis Hospital).
- DHIN's participating hospitals represent 86% of all staffed hospital beds, 79% of all emergency department visits and 76% of all outpatient visits in Delaware.
- Five hospital emergency departments and laboratories send data through DHIN to the Division of Public Health for public health monitoring.
- Three federally qualified health centers (La Red Health Center, Henrietta Johnson Medical Center and Westside Family Health) are among the practices exclusively receiving results via DHIN.
- More than one million unique patients are represented in the master patient index, representing 90% of Delaware residents, as well as patients from other states.
- 80% of providers currently practicing in Delaware are enrolled in DHIN.
- More than 5,000 providers and staff at 465 Delaware practices are live on DHIN; 168 of these practices receive clinical results/reports exclusively through the DHIN.
- DHIN delivers more than 7 million clinical results and reports each year.
- Two national reference laboratories (LabCorp and Quest Diagnostics) and a local pathology provider (Doctors Pathology Services) participate in DHIN.
- 80% of laboratory tests ordered or performed in Delaware are reported through the DHIN.

[8]Maestro Strategies. Preliminary results from "Delaware Health Information Network Evaluation Analysis." September 14, 2011.

DHIN Shaping the National Front:

- One of only three states awarded federal stimulus dollars for implementation of a health information exchange; the remaining 47 states received money to develop a plan that DHIN developed in 2005.
- Appointment to the National HIT Standards Committee statutorily created by the ARRA.
- Testimony to a congressional committee charged with defining "Meaningful Use" of health information technology under the ARRA—the basis for ARRA HIT spending.
- Nationwide Health Information Network participation: shaping the national approach to health information technology (HIT).
- Named the State Designated Entity for responding to the State HIE Cooperative Agreement program by Delaware Governor Jack Markell.

History: From Formation (1997) to Operational Launch (2007)

The Delaware Health Information Network (DHIN) was created at the inspiration of the Delaware General Assembly, which established the instrumentality in 1997. A public–private partnership, DHIN was given the mission of developing an electronic data interchange network to provide health care professionals across the state with immediate access to the most current patient information at the point of care. DHIN has succeeded in crossing geographical and organizational boundaries to expedite the delivery of clinical test results to ordering physicians as well as any other provider with a relationship to that result (i.e. copy to, primary care, admitting and/or attending providers).

In 2005, DHIN was awarded an Agency for Healthcare Research and Quality (AHRQ) State and Regional Demonstration project contract. The contract was for $4.7 million with funding ending in September 2011. Additionally, DHIN was selected as one of the original nine health information exchanges to participate in the Nationwide Health Information Network (NHIN) Trial Implementation project led by the Office of the National Coordinator for Health Information Technology and was subsequently awarded an option year contract to continue participation in the NHIN. As such, DHIN is helping to shape the infrastructure, standards and policies for nationwide health information exchange and technology adoption.

Via the Delaware Health Care Commission (DHCC), DHIN contracted with technology firms in September 2006 to implement software solutions and maintain the technological infrastructure needed to ensure more timely delivery of laboratory and pathology results, imaging studies, and admission face sheets from three hospital systems and LabCorp.

On March 30, 2007, DHIN went live with a technical pilot and on May 1, 2007 the system was fully operational in five physician practices. Delaware became the nation's first operational, standardized, real-time, interoperable statewide health information exchange, connecting hospitals, reference laboratories, and physician practices across the state.

Mission, Vision and Goals

Mission

DHIN's mission is to facilitate the design and implementation of an integrated, statewide health data system to support the information needs of consumers, health plans, policymakers, providers, purchasers and research to improve the quality and efficiency of health care services in Delaware.

Specifically, it is designed to:

1. Promote more efficient and effective communication among multiple health care providers, including, but not limited to, hospitals, physicians, payers, employers, pharmacies, laboratories and other health care entities;
2. Create efficiencies in health care costs by eliminating redundancy in data capture and storage and reducing administrative, billing and data collection costs;
3. Create the ability to monitor community health status; and
4. Provide reliable information to health care consumers and purchasers regarding the quality and cost-effectiveness of health care, health plans and health care providers;

Vision

DHIN's vision is to share real-time clinical information among all health care providers (office practices, hospitals, labs, diagnostic facilities, etc.) across the state to improve patient outcomes and patient-provider relationships, while reducing service duplication and the rate of increase in health care spending.

Goals

The DHIN's five primary goals serve as the basis for interoperability among all health care providers in the State of Delaware:

1. To improve the care received by patients served by Delaware's health care system and to reduce medical errors associated with the often inaccurate and incomplete information available to providers of medical care.
2. To dramatically increase the use of electronic distribution methods among a large number health care organizations, resulting in a reduction of time required and financial burdens of exchanging health information among health care providers and payers.
3. To improve communication among health care providers and their patients to provide the right care at the right time based on the best available information.
4. To reduce the number of duplicative tests to afford specialists a more comprehensive view of the patient upon referral from his/her primary physician and to expedite the reporting of consultant opinions and tests/treatments between specialists and the referring physicians.
5. To improve the efficiency and value of electronic health records (EHR) in the physician office and to assist those physicians without an EHR to better organize and retrieve test results.

Environmental Scan

Financial sustainability of DHIN depends upon broad participation and financial support of Delaware's diverse health care organizations. The environment that DHIN operates within has led to the sustainability model that is described in this business plan. Because the environment has similar goals, yet different needs compared to other states, this sustainability model is unique to Delaware, but contains some common elements of other successful HIEs.

The health care sector is a large portion of the Delaware economy, it is dynamic, and its costs are growing. It is DHIN's mission to improve health care quality, safety and effectiveness and to reduce costs.

Trends and Drivers

National health care expenditures grew 4.0% to $2.5 trillion in 2009, or $8,086 per person, and accounted for 17.6% of Gross Domestic Product (GDP).[9] Growth in national health care expenditures is expected to increase an average of 6.1% per year through 2019. The health share of GDP is projected to reach 19.3% by 2019.[10] In Delaware $6.5 billion was spent on personal health care (about $7,485 per person) in 2008, compared to $5.9 billion in 2006 and $5.0 billion in 2003. The annual rate of growth has been averaging about 5% per year, which is lower than the national average.[11]

Trends that are driving the increase in health care expenditures include:

- The aging population will continue to spend more on health care costs per capita.
- As the practice of medicine becomes more sophisticated, the need for exchanging large quantities of health information increases.
- Both of the above are likely to lead to continually increasing health care costs.

Despite this enormous and increasing expenditure, care is often either underused (patients do not get recommended care) or overused (patients receive inappropriate care that is of little value or may expose them to harm). Furthermore, missing information has been shown to adversely affect care in 44% of clinic visits and delay care in 59% of visits.[12] In 2007, a study by Kaelber and Bates reported that 18 percent of patient safety errors and 70% of adverse drug events could be potentially eliminated if the right information about the right patient was consistently available at the right time.[13]

The passing of the Health Information Technology for Economic and Clinical Health Act of 2009 (HITECH) has resulted in a continued increase in the number of Health Information

[9] https://www.cms.gov/NationalHealthExpendData/25_NHE_Fact_sheet.asp, (accessed September 13, 2011).
[10] Ibid.
[11] Delaware Health Care Commission Annual Report, 2010. p16.
[12] Smith PC, et al. "Missing clinical information during primary care visits." *JAMA 293*(5):565–571, 2005.
[13] Kaelber DC, Bates DW. "Health information exchange and patient safety."*Journal of Biomedical Informatics* , 40(6):S40–S45, 2007.

Exchanges (HIEs) across the United States. The Office of the National Coordinator (ONC) of Health Information Technology is driving the national efforts for health information exchanges (HIEs) and electronic health records (EHRs).

> "There has been an increase in interest in Health Information Exchanges (HIEs) and electronic health records (EHRs) in the past year as a consequence of the Health Information Technology for Economic and Clinical Health Act of 2009 (HITECH). All 50 states plus the territories have received funding to implement state-level HIEs. Hospitals and physicians are required to adopt certified EHRs and meet Meaningful Use requirements starting in 2011 if they are to continue to receive Medicare and Medicaid payments. Starting in 2011, hospitals and physicians will receive incentive payments for meeting adoption requirements. . . Regional Extension Centers (RECs), which are funded by the U.S. Department of Health and Human Services (HHS), are being established across the country to assist physicians with EHR purchase and adoption, and Beacon grants (also funded by HHS) have been distributed to communities to model promising practices for coordinated care using EHRs and HIEs. The Office of the National Coordinator (ONC) has been instrumental in providing leadership to all these national HIT efforts."[14]

Two additional trends that have arisen to address the growth in health care spending are Patient Centered Medical Homes and Accountable Care Organizations. Patient Centered Medical Homes will create a single point of collection of all medical information related to a specific patient, most commonly considered to reside with a patient's primary care physician. An Accountable Care Organization is an entity that manages the quality, cost and overall care of a community of patients. Both of these trends are designed to lead to patient-centric care, payment reform, appropriateness and efficiency of care, workflow redesign and data exchange to improve the coordination of care. HIEs and EHRs are foundational to both of these trends.

How to maintain financial sustainability of HIEs, however, is a major question raised by community, regional, and state-level health information exchanges. To date they have primarily been funded through federal and state grants, which is not a sustainable funding model. The various stakeholders agree that HIEs provide value to each of them, but have been seeking quantitative data of that value in order to agree to a long term funding structure. Recently several well-designed studies have been published that quantify this value.

Value Proposition - Quantified

Extrapolating studies by the Center for Information Technology Leadership (CITL) to Delaware indicate health care cost avoidance of approximately $100 million per year across all health care organizations in Delaware based on coordinated exchange and use of health care information. Extrapolating a study from Humana indicates as much as $10 million per year in Delaware from cost avoidance in emergency room visits alone. Preliminary results using data from Delaware show that Delaware is already receiving savings from DHIN.

The following are three analyses that show potential value to DHIN stakeholders based upon research conducted by the Center for Information Technology Leadership (CITL) and Humana.

[14]Pennsylvania eHealth Initiative, "Financing Research and Framework Development for a Health Information Exchange," p7.

The CITL research group published, "The Value of Healthcare Information Exchange and Interoperability" in Health Affairs in 2005.[15] The same group later published, "The Value From Investments in Health Information Technology in the Department of Veterans Affairs," in 2010.[16] Both analyses illustrate an approximate value to Delaware of $100 million per year across all health care organizations. In its July/August 2011 issue, American Health and Drug Benefit published "The Business Case for Payer Support of a Community-Based Health Information Exchange: A Humana Pilot Evaluating Its Effectiveness in Cost Control for Plan Members Seeking Emergency Department Care."[17]

As DHIN has been adding participants and functionality since it became operational in 2007, stakeholders are receiving some of this value already. However, payers have contributed only $300,000 through the end of FY2011. With this sustainability plan DHIN is now aligning its financial support structure with the value received by stakeholders.

1) Projected National Savings Applied to Delaware

In the first analysis the savings, or cost avoidance, generated by HIEs at the national level are applied to Delaware health care expenditures on a percentage basis. Since the national savings estimates assume an advanced level of interoperability, and since many health care organizations in Delaware do not yet have EHR systems with advanced levels of interoperability, to be conservative in this analysis it was decided to use only 30% of the projected savings from HIE networks.

This analysis shows the following annual financial benefits for Delaware. The total savings is estimated to be $94 million per year. (Detailed calculations are in the Appendix).[18]

Projected Savings (and/or Cost Avoidance) from HIE Networks		
Source of Savings	Annual Savings to Delaware Providers and Data Senders ($ million)	Annual Savings to Delaware Payers ($ million)
Outpatient Providers & Laboratories		3.38
• Reduced Tests	4.43	
• Efficiencies on Remaining Tests	28.89	
Outpatient Providers & Radiology Centers		7.24
• Reduced Tests	9.52	
• Efficiencies on Remaining Tests	17.93	
Providers Communicating with Other Providers		8.86

[15] J. Walker, E. Pan, D. Johnston, J. Adler-Milstein, D. Bates, and B. Middleton. "The Value Of Health Care Information Exchange And Interoperability." *Health Affairs*, no. (2005).doi: 0.1377/hlthaff.w5.10.

[16] C. Byrne, L. Mercincavage, E. Pan, A. Vincent, D. Johnston, and B. Middleton. "The Value From Investments In Health Information Technology At The U.S. Department Of Veterans Affairs ."*Health Affairs*, 29, no.4 (2010):629-638. doi: 10.1377/hlthaff.2010.0119.

[17] A. Tzeel, V. Lawnicki, K. Pemble. "The Business Case for Payer Support of a Community-Based Health Information Exchange: A Humana Pilot Evaluating Its Effectiveness in Cost Control for Plan Members Seeking Emergency Department Care." *American Health & Drug Benefits*. Vol. 4, No 4 l July/August 2011.

[18] J. Walker, et al. "The Value of Healthcare . . ." pp.w5.12-15.

Source of Savings	Annual Savings to Delaware Providers and Data Senders ($ million)	Annual Savings to Delaware Payers ($ million)
• Physicians	9.30	
• Hospitals	4.54	
Providers & Public Health Departments		N/A
• Physicians	0.11	
• Public Health Departments	0.11	
Total Interoperability Savings	74.94	19.44

2) Veterans Affairs Savings Applied to Delaware

In the second analysis the savings generated by a longitudinal study of actual cost avoidance by the Veterans Affairs are applied to Delaware. There are 22.7 million veterans, and the Department of Veterans Affairs spends $42 billion per year on medical care.[19] The savings can be calculated per veteran and as a percentage of health care costs.

The study calculated five types of benefits of the HIE:

1. Reduced workload due to improved or eliminated tasks, such as the need for fewer radiology film clerks because images are stored electronically.
2. Freed space – example, because of elimination of the need to store film.
3. Eliminated redundancy – for example, due to a reduced number of duplicate tests.
4. Avoided utilization attributable to improved quality of care, such as avoided hospital admissions because of the prevention of medication errors.
5. Decreased expenses, such as from reduced use of film supplies.

The annual savings, or cost avoidance, has been $687 million per year.[20] The savings have been determined to be:

- 65% of value from avoiding unnecessary care.
- 27% of value from eliminated redundancies.
- The remainder, 8% of value, was due to reduced work, decreased operating expenses, and freed work space.

The Department of Veterans Affairs has an HIE-based cost avoidance of $30.26 per veteran per year, $687 million in annual savings divided by 22.7 million veterans. This is equal to $2.52 per member per month. When only the administrative efficiencies that represent 8% of the value are considered, the savings are $0.20 per member per month. This calculation represents the approximate savings that a third party administrator would gain. The percentage of health care savings that are likely to be realized from the implementation of an HIE is $30.26 per veteran, or 1.64%, which is primarily from avoiding unnecessary care and eliminating redundancies.

[19] http://www.va.gov/vetdata/Expenditures.asp, (accessed August 11, 2011).
[20] C. Byrne, et al. "The Value From Investments . . ."p633.

If Delaware achieves a level of savings from DHIN comparable to that experienced by the Department of Veterans Affairs from 2001 to 2007, it would be equivalent to $106 million savings per year across all health care organizations.

3) Wisconsin Emergency Department Savings Applied to Delaware

In the third analysis the savings, or cost avoidance, generated from actual visits to Emergency Departments comparing a control group and a test group in Wisconsin are applied to Delaware. Humana measured the costs of emergency room visits during a sixteen month period by two similar populations of their members. In the control group the emergency room did not query the health information exchange, and in the test group the health information exchange was queried.

The study considered first visits to the emergency room as well as subsequent visits by the same person. It analyzed costs including procedures, testing, prescriptions, physician costs, inpatient and outpatient costs. The results showed $29 was saved per emergency room visit when patient information was queried using the health information exchange.[21]

In 2009 there were 444 emergency room visits per 1000 people in Delaware.[22] Given the population of Delaware, this equates to 393,000 emergency room visits per year. At a $29 savings per visit, Delaware would save over $11 million each year on emergency room visits alone.

4) Actual Results from Delaware

Preliminary results from a highly respected third party research firm show that Delaware is already receiving measurable and dramatic savings from DHIN. Among the many positive results in the study, three highlights are:

- "Among the providers interviewed, there was consensus that data provided in the DHIN will have an impact on care delivery including reduction in duplicate tests. This was supported with an analysis of test results for tests that are often high cost and high volume. From the period July 2009 through June 2011, test results sent through the DHIN declined by 30 percent for high cost radiology exams and 33 percent for high cost lab results."
- "Using the DHIN structure, significant savings have been realized by data senders with providers who utilize the DHIN as the primary method for receiving results based on the average cost to send results using traditional methods of fax and mail. Additional savings could have been realized for the same period if all DHIN member providers were committed to use the DHIN as their primary source of results reporting.
- "As DHIN member practices adopt EHRs, the total potential savings for connecting to the DHIN for interoperability required to achieve Meaningful Use under the Health Information Technology for Clinical and Economic Health ("HITECH") is

[21] A. Tzeel, V. Lawnicki, K. Pemble. "The Business Case for Payer Support of a Community-Based Health Information Exchange: A Humana Pilot Evaluating Its Effectiveness in Cost Control for Plan Members Seeking Emergency Department Care." *American Health & Drug Benefits*. Vol. 4, No 4 l July/August 2011.
[22] http://www.statehealthfacts.org/profileind.jsp?cat=8&sub=94&rgn=9

significant. Through DHIN negotiated interface rates and the single point of interface, estimated savings if all providers connected to a DHIN certified EHR are $7.5 million in one-time costs and $1.5 million in annual costs."[23]

Stakeholders and Benefits

DHIN has strong ties to the majority of health care entities in Delaware. Delaware's collaborative environment brings together consumers, hospitals, health plans, physicians and reference laboratories to focus on efficient and effective health care through health information exchange. The many stakeholders include hospitals, health plans, laboratories, providers, nursing homes, self-insured employers, pharmacies and patients. With ties to State government, DHIN enjoys a strong working relationship with Medicaid and the Division of Public Health. DHIN brings value to each of these stakeholders in different ways.

In this sustainability business plan, the stakeholders are discussed in four groups:

- Data senders
- Providers
- Payers
- Patients and the Community

Data Senders

Data senders are the health care organizations that send information, such as laboratory test results, to providers of care.

- **Hospitals**

DHIN has an enviably high participation rate with seven of its eight acute care hospitals actively or committed to participating.

DHIN connects Delaware's largest cities with outlying rural and coastal areas through the participating organizations of BayHealth Medical Center (Dover and Milford), Beebe Medical Center (Lewes), Christiana Care Health System (Wilmington, Newark), and Laboratory Corporation of America (LabCorp), Quest Diagnostics, and Doctors Pathology Services each serving the entire state. St. Francis Hospital (Wilmington) went live in 2010. Nemours/A.I. DuPont Hospital for Children (Wilmington) has committed to connect to DHIN, and details are currently being negotiated.

- **Federally Qualified Health Center (FQHCs)**

All of Delaware's Federally Qualified Health Centers (FQHCs) receive clinical results exclusively through DHIN. The FQHCs provide significant amounts of care to low-income, medically underserved populations. Two of them in particular, Westside Family Healthcare in

[23]Maestro Strategies. Preliminary results from "Delaware Health Information Network Evaluation Analysis." September 14, 2011.

Wilmington and Dover, and La Red Health Center in Georgetown, primarily serve minority patients and those with limited English proficiency.

- **Laboratories and Imaging Centers**

Two national reference laboratories (Quest and Laboratory Corporation of America) and a local pathology provider (Doctors Pathology Services) participate in DHIN. The hospital laboratories use DHIN as well as a growing number of local and regional laboratories and imaging centers.

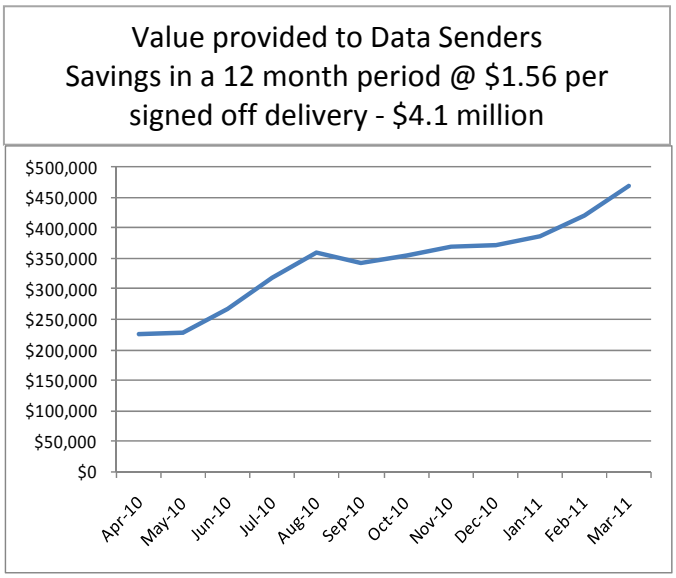
- **Pharmacies**

Electronic prescribing and access to medication histories are two features of health information exchanges that provide value to stakeholders. Delaware is ranked 4th in Surescripts annual Safe-Rx rankings[24], which measure the level of e-prescribing activity in each state and the District of Columbia. Rankings are calculated to reflect all three critical steps in the electronic prescribing process: total prescription benefit requests and responses as a percent of the total number of patient visits in the state in 2009, total medication history requests and responses as a percent of the total number of patient visits in the state in 2009, and the number of prescriptions routed electronically (new prescriptions plus prescription renewal responses) as a percent of all prescriptions that were eligible to be submitted electronically in the state in 2009. According to SureScripts, 95% of community pharmacies in Delaware have e-prescribing activated.[25]

Benefits to Data Senders include:

- Prompt access to patient information from other health care facilities.
- Expedite patient information to Emergency Departments.
- Minimize unnecessary/avoidable services.
- Reduce expensive manual information processing costs, especially for non-routine requests.
- Capability to use the DHIN for report distribution functions instead of building their own new interfaces.
- Opportunity to reduce lost revenue from lab orders that lack complete patient billing information.

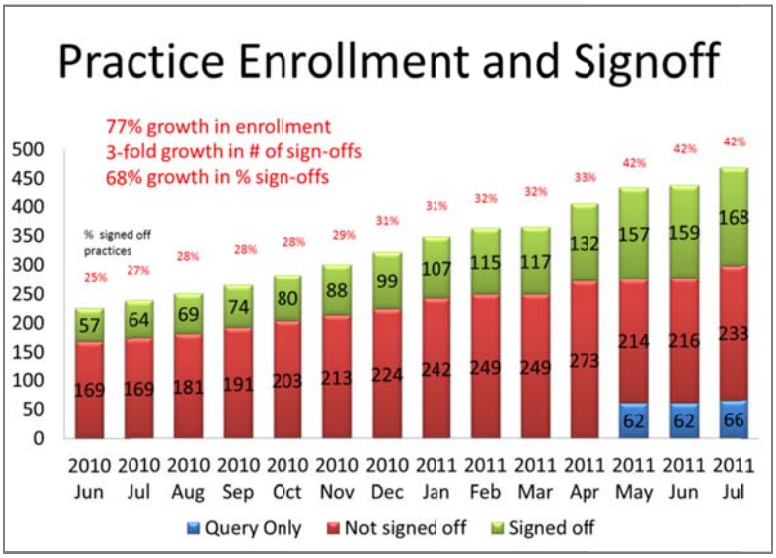
The data senders have more efficient delivery when using DHIN, as shown in the graph, with estimated savings of $1.56 per transaction.[26] From April 2010 to March 2011 data senders saved $4.1 million by using DHIN, as shown in the graph.



[24] http://www.surescripts.com/about-e-prescribing/progress-reports/state.aspx?state=de. (accessed August 15, 2011).
[25] Ibid. (accessed May 2011). ONC site visit, July 2011.
[26] Savings estimates provided by DHIN users.

Providers

DHIN has an enviably high participation rate among providers. 80% of providers currently practicing in Delaware are enrolled in DHIN. More than 5,000 providers and staff at 465 Delaware practices are enrolled in DHIN. 168 of these practices receive clinical results/reports exclusively through the DHIN, referred to as being "signed off." The maximum costs savings occur when practices are able to eliminate their paper processes.



The University of Delaware's Center for Applied Demography and Survey Research, on behalf of the Delaware Division of Public Health's Office of Primary Care and Rural Health, conducts a capacity study of primary care and specialty providers every other year. The last study was completed in 2008. The following are highlights from the 2006 and 2008 report with regard to physician response to questions related to use of technology.[27]

Use of Technology	2008 % Primary Care	2006 % Primary Care	2008 % Specialists	2006 % Specialists	% All Respondents 2008
High Speed Internet Connection	88%	74%	89%	78%	88%
Electronic Billing	90%	88%	83%	84%	86%
Electronic Scheduling	86%	82%	82%	79%	84%
Email	70%	68%	85%	81%	78%
Electronic Medical Records	43%	28%	51%	43%	48%
Electronic Order Entry	22%	15%	29%	26%	26%
Electronic Prescribing	30%	22%	25%	21%	27%
Electronic Lab/Rad Results	53%	34%	48%	46%	51%
Local Area Network	66%	57%	69%	70%	68%

While all use of technology in physician practices has increased during the two year period between 2006 and 2008, the use of electronic medical records has increased the greatest at a rate of 15 percent for primary care providers and 8 percent for specialists. In 2008, nearly 50 percent of Delaware physicians were using an electronic medical record. The use has continued to

[27] Edward C. Ratledge and TiborTóth, University of Delaware, Center for Applied Demography and Survey Research, "Primary Care Providers in Delaware 2006." March, 2007;TiborTóth, University of Delaware, Center for Applied Demography and Survey Research, "Primary Care Providers in Delaware 2008." October 2008.

increase since 2008 with the work of Quality Insights of Delaware, who was recently recognized for signing up another 1000 physicians.[28]

DHIN enrollment of providers has grown by more than 50 percent since the implementation of the patient search function, affording authorized providers secure, immediate access to patient clinical history at the time and place of care.

The distribution of DHIN users is consistent with the distribution of health care providers in the State of Delaware, with almost 50 percent of DHIN practices located in New Castle County—the most populous county in the State; 20 percent located in Kent County—the smallest of Delaware's three counties; and 30 percent coming from Sussex County –the largest county in terms of land mass and the most rural of the three. DHIN users also are diverse and representative of the State's provider population with regard to specialty.

% of Results Delivered to Signed Off Practices	
County	Deliveries Sign-off %
New Castle	36.20%
Kent	41.40%
Sussex	67.30%
Total	42.20%

DHIN provides significant benefit to those providers in the rural portions of the state who traditionally have had less access to electronic delivery infrastructure. For them, DHIN meets a previous gap in technology infrastructure. The sign-off rate in Sussex County is the highest, providing evidence that they have embraced and are committed to DHIN.

Nursing homes, rehabilitation centers and other care providers are an important part of the continuing care organizations. Their participation in DHIN will continue to maximize the potential value that DHIN technology can enable as patients move from one environment to another with their medical information. A recent grant to the Delaware Division of Long Term Care Residents Protection furthers this goal as it will connect all of its skilled nursing facilities to DHIN. This stakeholder group is significant because the seamless transition of information in the continuity of care process among hospitals, rehabilitation centers and long term care organizations will reduce the rate of hospital readmissions.

Benefits to Providers

- Prompt access to information from other health care providers (including medical practices, hospitals, public health organizations, etc.).
- Better clinical decisions and care with access to more complete data.
- Able to provide care with fewer delays.
- Avoid rework - repeating taking of histories.
- Better access to current medications lists.
- Less time collecting or getting information, more time using available information.
- There may be less liability risk exposure with improved information access.

It is DHIN's goal to support providers (hospitals and physician practices) in meeting Meaningful Use criteria in a manner that allows them to maintain their current systems and allows for them to leverage their investment in DHIN to support standardized reporting, meet eOrder entry, ePrescribing, public health reporting and quality reporting requirements, among others.

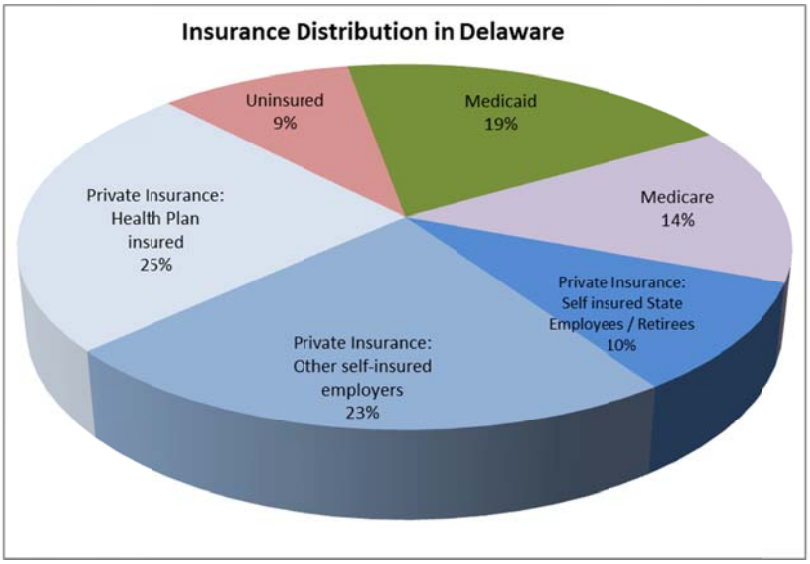
[28] Press release QIDE, "QIDE REC Hits 1,000 Provider Goal - 7th REC in Nation To Hit Target." August 2011.

Payers

Payers have a vested interest in improving the coordination of care of their members. They will receive financial value from more complete information because better coordination leads to cost savings over time. Payers that benefit greatly from HIEs are the Medicaid, Medicare, private health plans, and self-insured employers.

- **Health Plans**

Health Plans, such as Blue Cross and Aetna are both private insurers and third party administrators for self-insured employers. As third party administrators they only receive value from the reduced costs of processing claims electronically and the reduced costs of not processing claims for duplicative and unnecessary tests. According to CITL studies these administrative costs represent approximately 8% of the savings from electronic health information sharing. As private insurers, along with self-insured employers, they are estimated to receive 92% of the savings.[29]



- **Self-Insured Employers**

Many companies and organizations are "self-insured," meaning that they pay the actual costs of medical care for their employees, though they often have an insurance company act as the administrator of the plan. Most large companies are self-insured, as is the state government.[30]

Historically, Delaware has a higher percentage of people covered by self-insured employers than nationally. More than half the population of Delaware is covered by self-insured employers including the State of Delaware employees and retirees, Christiana Care Health System, W.L. Gore, Astra Zeneca, Bank of America, DuPont, Avon, Computer Science Corporation, and Liberty Mutual Insurance.[31]

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[29] C. Byrne, et al."The Value From Investments . . ." pp. 633-634.
[30]Christina H. Park, Division of Health Care Statistics at the National Center for Health Statistics, Centers for Disease Control and Prevention. "Prevalence of Employer Self-Insured Health Benefits: National and State Variation." Medical Care Research and Review, Vol. 57 No. 3, (September 2000), 340-360.
[31]http://www.delawareinsurance.gov/departments/news/020808-Press-SelfInsured_AetnaColonoscopyPolicy.shtml (accessed August 15, 2011).

- **State of Delaware**

The State of Delaware is a payer for the approximately 200,000 people in Delaware insured by Medicaid. The State of Delaware receives benefit from DHIN as a result of a reduction in duplicated tests for its Medicaid population, employees, and retirees.

The State of Delaware benefits from DHIN not only as a self-insured employer, but also through its agencies. DHIN provides emergency chief complaint and reportable lab results to the state's Department of Public Health bio-surveillance system for outbreak detection and will soon provide information to other state registries (i.e., immunizations, cancer, trauma, etc.). Through two recently awarded grants to the Division of Long Term Care Resident Protection (DLTCRP), DHIN will assist the Division in both administrative and clinical support. Through the first grant, DHIN will send drug testing results on potential employees of DLTCRP to a background check dashboard, streamlining the process of hiring well qualified employees to care for this vulnerable population. A second grant will connect all skilled nursing facilities in the state to DHIN, providing access to relevant clinical data in the DHIN on behalf of all residents of these facilities.

Benefits to Payers

- Reduction of redundant lab and radiology tests will lower costs.
- Faster clinician access to more complete patient information improves efficiency and lowers costs across the entire health care community.
- Potential use of clinical data for quality reporting and for pay-for-performance.
- Better patient outcomes (i.e., lower hospital readmissions)
- Lower absenteeism and higher productivity for employers as employee health improves.

Patients and the Community

Patients and the public are the ultimate beneficiaries of DHIN as it improves health care quality and safety, and reduces costs. Increased availability of information is expected to lead to more effective care. More coordinated care will lead to better prevention and management of chronic conditions. This benefit is of particular importance to the uninsured population with the least consistency in primary care.

In 2010, the census estimated the state's population at 897,934, an increase of about 15% over the 2000 population.[32] The population is expected to grow by 45,000 by 2015 with a birth count of approximately 12,000 per year through 2015. The distribution of race among Delawareans is 69% white, 21% black and the remaining 10% are of other races. Those of Hispanic ethnicity are at just over 8% of the population. Gender distribution is relatively even at 48.5% male and 51.5% female; with a growing aging population of 15% of residents 65 years or older; expecting to exceed 18% by 2012.[33]

[32]Delaware 2010 Census.http://stateplanning.delaware.gov/census_data_center/2010_data.shtml. (accessed August 20, 2011.)
[33] Ibid.

The "Delawareans without Health Insurance" study in 2008 estimated that there were 101,000 uninsured Delawareans in 2008, representing 11.2% of the population with rural Delaware having the highest percentage. Furthermore, African Americans are 21% more likely to be uninsured than are whites; and Hispanics are three times more likely to be uninsured than non-Hispanics. Nearly two-thirds of those surveyed report having been uninsured for greater than one year.[34]

According to the Delaware Health Care Commission report, "Analysis of Delaware's Safety Net", uninsured people are less likely to receive regular preventive and screening services, less likely to be screened for cardiovascular disease and, as a result, are apt to be diagnosed in the later stages of the disease. They also are less likely to receive appropriate treatment for chronic disease and more likely to experience adverse outcomes from illness than those with insurance. In Delaware, the uninsured are six times more likely to say they use the emergency room for their health care and are five times more likely than those who have health insurance to say they could not see a doctor because of the cost.[35]

Delaware's state rates of chronic disease, including infant mortality, asthma, cancer, and diabetes are ranked as some of the poorest in the nation. Heart disease and cancer remain the leading and secondary causes of death in the state, according to the Delaware Vital Statistics Report 2006. Further findings indicate that health disparities of disease incidence and mortality are strongest within the minority populations throughout Delaware's three counties. Minorities are more adversely affected in all counties for each disease.

Benefit to Patients and the Community

- Continuity of care across health care providers will be dramatically improved.
- Patients can avoid both the time and expense involved with redundant laboratory and radiology tests.
- Patients will experience less frustration caused by providing information again and again.
- Patients will know that they are receiving higher quality care because physicians will have access to all of their health records without delays even when their records are scattered across multiple health care facilities.
- Decreased escalation of health care costs.
- Healthier community members, allowing increased productivity and freeing financial resources for other needs.
- Increased economic development, since employers seek to relocate in areas with high quality health care.
- Support for Patient Centered Medical Home models will enable better coordination of care through collaboration and technology.

To maximize ongoing participation, when new health organizations come into Delaware they should be strongly encouraged, if not required, to connect to DHIN.

[34]Edward C. Ratledge. Center for Applied Demography & Survey Research. University of Delaware. "Delawareans without Health Insurance." 2008. vii.
[35]Delaware Health Care Commission. "Analysis of Delaware's Safety Net." November 2003.

Connecting to other HIEs

Capturing the maximum value of information from a health information exchange depends upon connections among regional, state and national health care organizations. In our highly mobile society, people freely move across state boundaries in both work and leisure activities, and health care needs may arise outside the person's state of residence.

National

DHIN was selected as one of nine health information exchanges to participate in the Nationwide Health Information Network (NHIN) Trial Implementation project led by the ONC. As a contract award winner it actively participated in the development of NHIN gateway specifications and implementation of a core services and bio-surveillance use case during the trial demonstrations. Among the long list of DHIN accomplishments, one was being the first to connect to the Federal partners during the trial implementation in 2008.

Because DHIN is one of a few operational statewide Health Information Exchanges, it is considered a leader by the ONC. DHIN intends to retain the benefits of its leadership position by continuing to seek grants from the ONC, participating on committees that further its interest, and strategically partnering with ONC as other opportunities arise.

Regional

While DHIN is primarily focused on connecting all health care providers within the State of Delaware, there is a great deal of interest in moving beyond State boundaries. This effort may be through the NHIN or via direct connections to the primary hospitals, labs and physicians in neighboring out-of-state communities.

From a regional perspective, Delaware has had initial conversations with Maryland and Pennsylvania that may lead to a regional approach to health information exchange among Mid-Atlantic States. For example, patients in Delaware are referred to hospitals in Philadelphia and Baltimore for specialty care and specialized trauma services. Residents of Maryland and Pennsylvania frequent Delaware beaches, casinos, shops and restaurants and when in Delaware may need to seek emergent care. This is exemplified by the significant increase in emergency visits to beach-area facilities during the summer months. As work toward regional connectivity begins, attention toward understanding interstate privacy and security, legal and policy inconsistencies will be taken to ensure an optimal environment to support interoperability.

Through the State HIE Cooperative Agreement, these states (and possibly others) will work on cross-state exchange issues to further explore the feasibility and desirability of pursuing this alternative, to include:

- Review of State laws that impact health information exchange and determine their impact on cross-state information exchange.
- Explore options for a regional governance structure, such as an interstate compact.

- Explore the feasibility of implementing quality and/or population health reporting for the region and/or sub-regions to support federal and state programs, such as CMS, CDC, State Medicaid and Public Health.
- Define cross state policies with regard to access to patient-identifiable information for use by health professionals and public health agencies.

Priorities for these connections will be based on usage of the regional organizations by Delawareans and on DHIN's ability to achieve a return on investment.

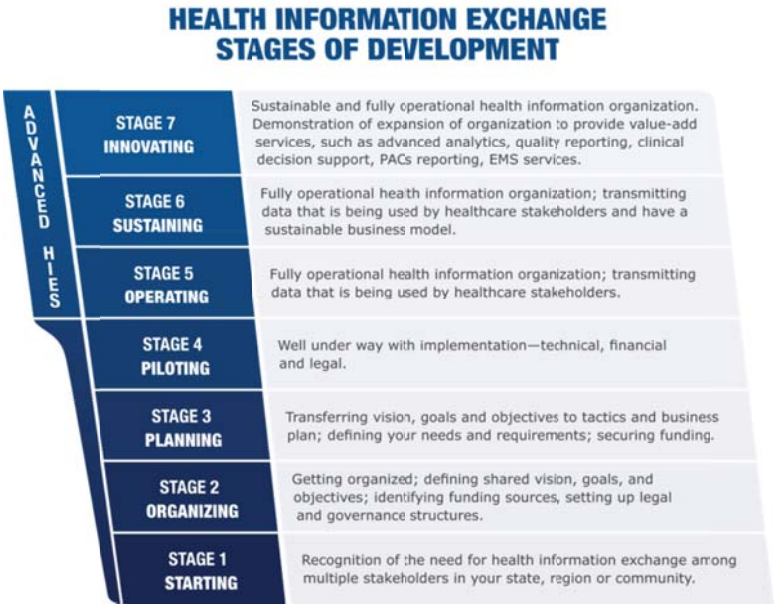
Private HIEs

DHIN is supportive of Private HIE ecosystems in Delaware, understanding that the full value for the statewide information sharing cannot be achieved unless the private HIEs are also connected to DHIN. Technically, DHIN can integrate with any private HIE that follows the industry interoperability standards.

DHIN is capable of connecting with virtually any system or technology solution able to transmit Health Level 7 (HL7) transactions – the internationally accepted standard for health care data sharing – and can also support other industry formats such as CCR/CCD/ANSI standard transactions. This architecture ensures wide adoption of the system by organizations that perform tests and services in support of clinical care.

Comparisons to other State HIEs

State, regional and private HIEs can be compared based on their stage of development as shown in the accompanying graphic.[36] DHIN is recognized to be a leader at Stage 5.[37] There were few functioning state-level HIEs in the United States prior to the HITECH Act. As of FY2014 when DHIN successfully executes the HIE Cooperative Agreement functionality as planned, it will achieve Stage 7.



In addition to DHIN, two known statewide HIEs are operational:

- Vermont
- Utah

[36]Pennsylvania eHealth Initiative. "Pennsylvania HIE Stakeholder Planning Meeting." July 26, 2011. p19.
[37]www.ehealthinitiative.org, (accessed August 3, 2011.)

The few states that are planning to operate statewide exchanges are in the planning and piloting stages relying on federal and state grants for funding. Most state-level HIEs are umbrella organizations for multiple regional health information organizations (RHIOs). The costs, operations and pricing structures of these umbrella organizations are significantly different from a statewide organization. Similarly, RHIOs do not have the scope of services or public health information and responsibilities of a state-level HIE.

DHIN continually monitors the progress of other State HIEs in order to learn from each other and share best practices. For example, Delaware is monitoring the Vermont sustainability plan as a contingency option.

Vermont Information Technology Leaders (VITL)

VITL began in 2005 and initiated data exchange in 2008, as an essential component of the state's Patient Centered Medical Home (PCMH) pilot, a key aspect the state's Blue Print Initiative. Vermont has selected the same software vendor as DHIN. By the end of 2011 VITL expects 11 of the 14 hospitals to be participating in the PCMH pilot, clinical exchange and/or medication histories. VITL has been named the HIE state-designated entity and the state Regional Extension Center. Seven-year startup funding for data exchange was provided by the legislature through a mandated fee on payer claims. It is planning for financial sustainability through payer funding after 2012.[38]

Utah Health Information Network

The Utah exchange (UHIN) is statewide and operational, but to-date it has only been used for shared administrative claims processing. At issue for comparability to DHIN is that it is only in the piloting stage for sharing clinical results.

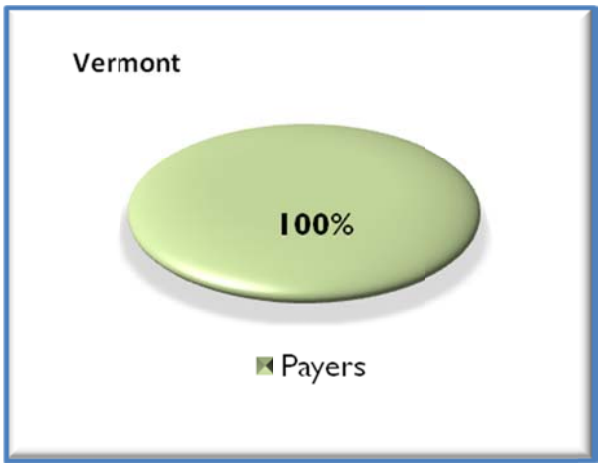
UHIN started an exchange in 1993, which quickly spread to the entire state of Utah because of the strong business case around coordinated administrative data sharing (i.e. claims processing). For administrative information it engages 100% of the hospitals, labs, local health departments, and mental health centers, and 95% of the physicians. In terms of clinical data, to date, it has 500,000 identities entered in the Master Patient Index and will push for beginning exchange among physicians and Medicaid in the near future. UHIN has successfully involved payers and health systems in its financial sustainability model for the administrative claims processing, and therefore, believes it will be able to engage payers in its clinical exchange.[39]

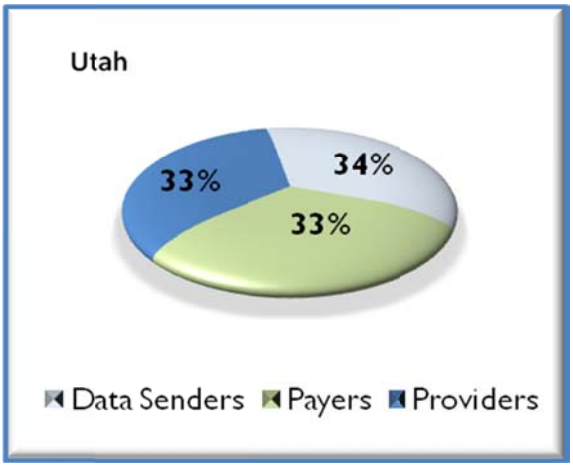
Vermont and Utah Funding Models

Vermont is the only comparable statewide operational HIE today that is sharing clinical results. It has a payer pricing model that has been approved by its legislators that is effectively a price of $1.16 per capita per month. Utah is still piloting its ability to share clinical results. When the

[38]Pennsylvania eHealth Initiative, "Financing Research . . ." p48 and conversation with VITL.
[39]Pennsylvania eHealth Initiative, "Financing Research . . ." p48.

clinical data sharing is implemented it expects payers, hospitals and providers to contribute equally with each paying 1/3 of the costs.





Products and Services

To ensure sustainability DHIN is using best practices of product line management to manage its functionality development and service offering. Specifically, it has processes to ensure that the services that it is offering are valued by participants to the degree that they are willing to pay for those services. Confirmation of value is being built into development processes and will be checked periodically for services in its existing portfolio.

The core services offered by DHIN will continue to be evaluated and extended with stakeholder feedback. DHIN will proactively encourage any health information technology infrastructure that is proposed within the state of Delaware to be incorporated into the DHIN. This leveraging of technology resources will reduce duplication and increase economies of scale.

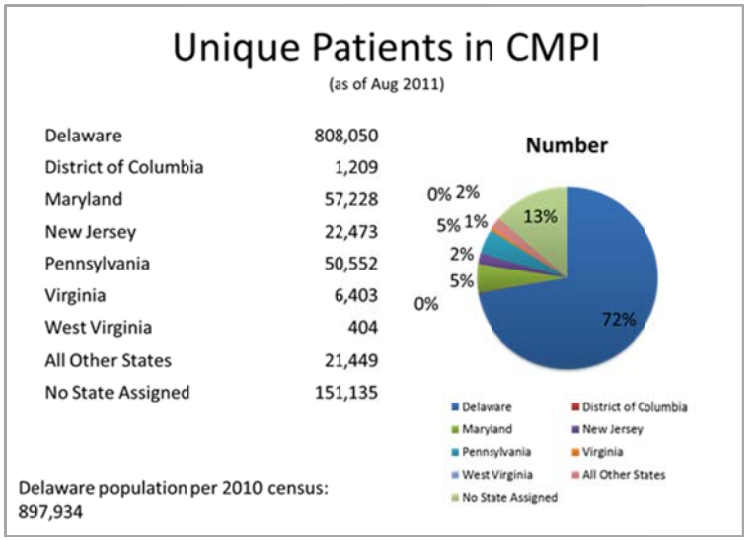
Current Services

DHIN is an operational statewide HIE with a community master patient index (CMPI) and record locator services (RLS) to enable patient record searches of laboratory data, radiology reports, transcribed reports, and admission, discharge and transfer (ADT) face sheets. Test results are sent from a laboratory to the physician that ordered them through the DHIN system. It also enables the exchange of information on a patient when they are admitted, transferred or discharged from a hospital. Each type of information is available by query as needed for improving the management of a patient's care.

An estimated 80% of health care providers in Delaware use DHIN to retrieve clinical results and search for patient-centric clinical summaries. DHIN has direct interfaces with EHR vendors to support results delivery directly into a patient's electronic chart in the provider's EHR. DHIN also supports real-time electronic reporting to the State's bio-surveillance system.

Community Master Patient Index

A Community Master Patient Index (CMPI) is a core element for HIEs that identifies all patients in a health care community. Providers use unique numbers to organize and extract information from patient records within the CMPI. Longitudinal, community health records enable providers in a community to provide high-quality patient care based on a complete and accurate understanding of a patient's medical history – regardless of where



the care was received.

DHIN has a patient record inquiry function that today includes clinical results and soon will include medication history. A query of the community health record in DHIN displays a patient's clinical results and reports from participating organizations as far back as May 2007, offering providers a rich set of data for clinical decision-making.

Because competing hospitals and health systems prefer not to commingle their data in one centralized repository, DHIN uses an architecture in which the patient information from each entity is stored in a separate mirrored database.

Record Locator Service

The Record Locator Service (RLS) is the "umbrella" designation for a variety of HIE and NHIN services. The RLS provides authorized users with pointers to the location of consumer health information across the network nodes, i.e. the clinical data sources. It enables users to access and integrate consumer health care information from the distributed sources.

It works in concert with the CMPI to efficiently construct an indexed location for all relevant patient data. Similar to how a card catalog in the library points to where a book is located, the RLS points to where a patient record is located within a system of shared databases.

This technology makes the physical location of clinical data sources transparent to the end users of data and facilitates the creation of a virtual community health record on demand, irrespective of application, organizational or regional boundaries. The RLS enables competing entities to cooperatively participate in community HIE initiatives, while ensuring that the privacy and security of their information is maintained.

Identity management component of DHIN

One of the greatest challenges in leveraging health care IT to improve patient care is establishing a true longitudinal patient record that is chronologically accurate and contains all relevant patient encounters for an individual, regardless of where that care occurred.

The identity management automates the task of reconciling patient information across multiple care locations for both inpatient and ambulatory systems. Where matching ambiguity exists, DHIN identifies the match for manual adjudication via an easy-to-use utility. With vital information correctly matched to the patient, care providers are empowered to make timely clinical decisions, based on a full and accurate patient profile.

Electronic Public Health Reporting

DHIN reports chief complaint data from hospital emergency departments to the State's Public Health bio-surveillance system – the Delaware Electronic Reporting and Surveillance System (DERSS). This functionality was demonstrated to NHIN as part of the bio-surveillance use case. Via the emergency department admission (ADT transaction), DHIN receives the chief complaint

for the patient's visit to the Emergency Department (ED) and routes it to the patient's provider as well as to the DERSS system in real-time standardized format. For privacy Public Health pseudonominizes the data and imports it into the DERSS system nightly in batch.

DHIN is currently in testing with DERSS on lab reporting from hospitals for reportable diseases. This service works much the same as the ED chief complaint data feed to Public Health, however, only lab results flagged by the laboratory's interface are delivered to DERSS.

Data distribution

Authorized and authenticated users can receive clinical results in three ways: electronic inbox, auto printing, and a direct interface to an existing electronic health record (EHR) system.

Meaningful Use

Continuing to provide functionality that the ONC advocates on the ONC timelines is important to DHIN remaining a leading HIE as well as maximizing the potential financial benefits for its participants. DHIN has worked with its users and participants to assess their needs in terms of meeting Meaningful Use criteria, which enables them to receive substantial financial incentive payments. With the release of updates for EHR incentives, DHIN and its stakeholders review the impact of the new rules on previous plans for supporting Meaningful Use among eligible providers. It also reviews the impact of changes for those who do not qualify for Medicare and Medicaid incentives.

Product Development Process

As DHIN continues its transition from a capital start-up phase to its sustainable operation, it is implementing a product development process similar to the best practices used in other research and development intensive organizations. Stakeholder collaboration is a key component of product development decision making.

The DHIN management team has created a set of criteria to evaluate new development opportunities. Examples of these criteria are:

- Is it a Meaningful Use or ONC requirement?
- Is there a group that is willing to pay for this functionality or service?
- Is there a revenue stream able to cover the development and ongoing costs?
- What is the ROI to the impacted stakeholders?
- If it is a Meaningful Use requirement without an adequate ongoing revenue stream, can the functionality be "turned off" after development?

To support this process, DHIN will build a market assessment step into future grant proposals in order to check the opportunity against the criteria.

Functionalities on the current product development roadmap include connectivity to immunization registry, administrative functions (e.g., eligibility verification, claims

submissions), additional interfaces to EHR systems, medication reconciliation, quality reporting, transitions of care, radiology order entry, patient portal and PHR connectivity, and enhanced public health connectivity. In addition DHIN plans to roll out future functionalities in the DHIN including lab order entry, bi-directional continuity of care document exchange (CCD), picture archiving and communication system (PACS) image retrieval, medication history, and NHIN referral network implementation.

Pricing and Revenue Model

The sustainable revenue model is designed to generate revenue associated with the value that participants receive for DHIN services. For financial sustainability, revenue must at least cover the ongoing costs associated with providing those services. If there is a determination that a particular service will be offered at a loss, the DHIN will ensure that another service that is offered provides enough value to cover that loss.

The current revenue model for financial sustainability is based on the following pricing structure:

- Data Senders – Tiered value model
- Payers – Per Member Per Month
- State of Delaware – Same funding rates as other data senders and payers

Data Senders

Hospitals and reference laboratories that use DHIN to distribute reports and results gain value from reducing and eventually eliminating paper-based processes, faxing and the administrative costs associated with these manual processes. Furthermore, the ability to use DHIN to interface with physician practice EHR systems eliminates the work to build and maintain interfaces with each individual practice.

The benefit of DHIN as a clinical results/reports distribution method is enhanced by expanding the types of transactions and the volume of transactions that are delivered through DHIN. Additionally, hospital clinical personnel are users of DHIN information. Medications, clinical results and reports from other data senders are most valuable to hospital-based providers as they care for patients with whom they may not have a previous and/or long-term clinical relationship.

Regional data senders are a potential revenue stream using a similar or slightly modified pricing model. Revenue from this group has not been included in the pro forma financial projections.

Pricing Model - Transaction Fees

In FY2011, the data senders agreed to move to a transaction-fee based model that is based on the value they derive from each transaction. The tiers are as follows:

- Tier 1: Results/reports sent to DHIN for which the recipient of the result is not a DHIN user. There is assumed value from sending the result to DHIN because it is available for query which saves the data sender from having to send copies of the result to a provider who needs it in the future. The cost for such results/reports is $0.02 per transaction sent to DHIN that is available for query.
- Tier 2: Results/reports that are sent to DHIN and were delivered to a DHIN user who has not yet “signed-off” to exclusively receive results/reports through DHIN. The cost for such results/reports transactions is $0.10 per transaction sent to a DHIN user.
- Tier 3: Results/reports that are delivered by DHIN to a signed-off practice for which DHIN is the only way that practice receives results/reports from the participating data sender. The cost for such results/reports transactions is $0.25 per transaction sent to a

DHIN user who has "signed-off" on DHIN. This tier is priced highest and also has the most value to data senders because they can eliminate the costs of maintaining the paper-based option.

Based on the current transaction volumes among current data senders, this model is forecast to generate $2.4 million dollars in FY2015. DHIN continues to work with the major non-participating hospitals as well as the smaller radiology and laboratory facilities. DHIN expects to achieve an additional $1.3 million in revenue in FY2015 from those additional data senders.

In the future hospitals may pay for a menu of value added services, such as medication history, electronic orders, and referrals and consultations. The fee structure would be based on the number of users from each hospital.

Note that the tiered approach assumes that 75% of transactions sent to DHIN are delivered to a signed-off DHIN user by 2015. The rate of deliveries to signed off practices increased from 30% in FY2010 to 48% in FY2011.

Payers

Public and private insurers should pay on a fair share principle because they receive significant value from DHIN. The State of Delaware will not pay operating expenses for DHIN from the Bond Bill in the future; however, this revenue model includes the State of Delaware as a purchaser of DHIN services as a health care payer for Medicaid and for State employees, retirees and potentially other populations, such as the prison population.

Payers benefit from DHIN's query/patient search functionality with regard to avoided costs associated with reduced duplication of tests being performed and prescriptions being filled. As stated previously, for the last several years the State and other payers have benefited from DHIN, and DHIN is now aligning the financial support structure with the value being received. Furthermore, the reduced complications from duplicative therapies can also reduce emergency visits, readmissions and further testing and treatments resulting from those complications.

This revenue model is premised on health plans paying a fee to support the DHIN due to its significant potential for savings and improved patient care/quality, as evidenced by the above-referenced data. Health plans can also receive significant value resulting from access to DHIN's clinical data, providing more timely information than current claims data.

In the future, health plans could become users of DHIN with a limited ability to query their own members to support disease management, quality monitoring and clinical decision support. A plan for health plan access and very clear usage requirements must first be defined.

Pricing Model – Per Member Per Month

DHIN has proposed a per member per month fee structure to health plans to support the HIE. The projections in this plan forecast over $5 million per year from the three major payers (Medicaid, Blue Cross Blue Shield, and Aetna).

Gaining commitment from all health plans is a challenge. Medicaid has obtained conditional CMS approval to fund DHIN, and private health plans are looking toward Medicaid to determine their commitment. DHIN will work with the State Employee Benefits Advisory Council to follow the Medicaid lead. DHIN is currently in conversation with private health plans, which are seeking to ensure that the value they receive is greater than the fees. As shown in the study results mentioned above, the payers are already receiving significant savings through the elimination of duplicative and unnecessary tests, but they are not yet financially supporting DHIN. Establishment of payer fees consistent with the plan and DHIN's statutory authority is expected to be completed in FY2012[40].

With regard to giving health plans access to data, DHIN must continue to work with the health plans and Consumer Advisory Council to allay consumer concerns that health plans will inappropriately use the data. Education must occur to help consumers understand that health plans already have access to this information. DHIN continues to work with both constituencies to develop a working data use agreement that addresses concerns while meeting the data needs of the health plan.

Revenue Projections

The table below illustrates the change in funding structure described in this plan.

DHIN Revenue, FY2011 – 2015 Forecast, ($000)					
	FY2011	FY2012	FY2013	FY2014	FY2015
Revenue					
Bond Bill	1,152	2,997	0	0	0
Data Senders	1,402	1,906	2,702	3,301	3,740
Payers	0	0	4,110	5,411	5,411
Providers	0	0	0	0	0
Total Revenue	2,554	4,903	6,811	8,712	9,152

Assumptions and Risks:

- In FY2012 the State of Delaware is providing funding through the Bond Bill.
- For new large Data Senders FY2013-2015 the Data Sender revenue is based on average DHIN delivery/sign-off behavior.
- 6% of the revenue for FY2012 (increasing to 14% in FY2015) is based on signing up Nemours/A.I. DuPont Hospital for Children and Nanticoke.
- For existing large data senders, funding is based on delivery metric drivers which vary with each data sender.
- New labs and radiology centers are based on assumed set up and operating costs.
- 1% of the revenue is based on signing up additional small labs and other data senders.

[40] SB231 gives DHIN authority ". . . to establish reasonable fees or charges for provision of its services to nonparticipant third parties."

- 18% of the revenue for FY2013 (increasing to 28% in FY2015) is based on signing up Health Plans and Insurers.
- 39% of the revenue for FY2013 (decreasing to 30% in FY2015) is based on signing up the State of Delaware Medicaid and for Employees and Retirees.

Other Potential Revenue Sources

The sustainable revenue model may be adjusted over time. As HIEs become operational across the country various pricing structures could become acceptable as standard practices. A technology principle of DHIN is conforming to national standards. This principle of standardization applies to the pricing structures as well, while maintaining an openness to innovative revenue opportunities.

The following are options for future revenue sources. These are neither included in the current revenue plan nor the pro forma financial projections. These are alternatives being considered by other State and Regional HIEs and are not being ruled out by DHIN.

Providers

DHIN is choosing to consider the current set of functionality to be "Core Services" which the providers can access free of charge. Practices that have electronic health records (EHRs) that are connected to DHIN receive an added benefit in terms of workflow efficiency, administrative cost savings, and incentive payments for Meaningful Use. These benefits are derived from four primary areas:

1. Support provided by DHIN for interfacing DHIN with their EHR
2. Direct delivery of clinical results and reports into the electronic patient chart
3. Improved quality reporting capabilities
4. Ability to share data from the EHR with other DHIN users

Practices without EHRs receive less benefit from the use of DHIN. However, when fully integrated into the practice's workflow, DHIN provides value in terms of operating efficiencies and administrative savings.

While DHIN policy has established that DHIN users will not be charged for the base functionality of results delivery and patient record search, accessing the medication history function as well as future functions (e.g., electronic order entry and electronic referrals and consultations) may be of added value to users. These services could result in a subscription fee.

There may be value added services that are added in the future that will result in revenue from Providers. Also, as a combination of contingency planning and fair share philosophy, the following pricing structure has been considered and not ruled out.

Fees for providers/users will be based upon the value derived from the service, such as:

- Interface Connectivity: A one-time interface connectivity fee may be charged to each practice to support the DHIN connectivity work. This includes setting up the practice to

receive results/reports into their EHR, installing the DHIN application at the practice, coordinating the interface go-live with the EHR vendor, facilitating the validation process and upon practice sign-off, assuring that the data senders cease old delivery methods.

- Annual Subscription Fee: EHR practices may be charged a nominal annual subscription fee. For non-EHR practices this may be a tiered subscription fee based on the type of information they send or receive.

If providers do not want to pay for services, this could impede further DHIN adoption. There needs to be a tie to federal incentive payments, Meaningful Use and/or enhanced reimbursement rates in order to implement this option. The societal value of DHIN is diminished if providers elect not to use some or all of the services DHIN provides.

Employers

Employers will benefit from future functionality that is consumer focused. Implementation of a patient portal will provide benefit to employers. In the future, when security issues have been fully considered and addressed, patients will be afforded the opportunity to join the patient portal and will be able to direct their clinical information from DHIN to a personal health record (PHR) of their choice. Additionally, they could sign-up for reminders to inform them of preventive services based on nationally recommended protocols, medication refill reminders and other alerts.

The self-insured employers will benefit as discussed above under Payers.

ERISA laws make it difficult for third party administrators to pass through DHIN charges to the self-insured employers. DHIN will continue to explore opportunities to partner with self-insured employers to support the value delivered by DHIN.

All Payer Assessments

An alternative funding model is all payer assessments. The pro forma financial projections do not include revenue from all payer assessments in the next three years. This method would most directly tie the value to the beneficiary. It is also the only existing mechanism for Medicare to pay its share, which is substantial considering the significant and growing portion of health care expenses associated with the Medicare population.

Under this model, because health plans act as the patient agent and every patient covered by a health plan benefits from health information exchange, a surcharge on health care insurance claims may be assessed. If pursued, the fee assessment would require an act by the legislature to require that all health plans doing business in Delaware pay the claims assessment.

The Vermont HIE (Vermont Information Technology Leaders (VITL) is a case study for all payer fees. Since October 1, 2008, each health insurer operating in Vermont has paid a quarterly fee into a fund. Insurers choose between paying 0.199 of one percent of all health insurance

claims for Vermont members paid for their Vermont members in the previous quarter, or a fee based on the insurer's proportion of overall claims in the past year.[41]

Legislative and/or economic climate may or may not support this option and if it were to be proposed and passed, payers may pass the fee on to patients or employers through increased premiums. Additionally, ERISA plans may fall outside the State's jurisdiction and therefore, may not be directly assessed. The third party health plan arrangement could include the assessments, however, further options need to be explored to allow the health plans paying the assessment to pass the cost onto the ERISA covered entity.

[41]State of Vermont Agency of Administration, "Overview of Vermont's Health Care Reform."October, 2008. p26.

Marketing and Enrollment Strategy

The marketing and enrollment strategies are aimed at continuing to increase adoption and usage. Maximum participation by health care organizations in Delaware will increase the realized value and benefits DHIN enables, leading to long term sustainability.

User Enrollment

Enrollment into the DHIN has historically been through word of mouth and presentations made to audiences of physicians and their office staffs. Through these efforts, DHIN has enrolled 80% of practicing providers in the State. In addition, DHIN collaborates with participating hospitals, labs, health plans and public health agencies to promote the use of DHIN and provide incentives for enrollment.

One obstacle to obtaining 100% provider enrollment is developing interfaces to small or specialized EHR vendors. Signing up new EHR vendors requires DHIN resources, which means they must be prioritized. An enrollment strategy DHIN employs is mapping the market share of EHR software vendors, targeting those with the highest percentage of providers to maximize enrollment.

Signed On to Signed Off

The definition of "signed on" is when a provider enrolls to receive data through DHIN. The definition of "signed off" is when a provider chooses to receive the data exclusively through the DHIN's electronic delivery method. Signed off practices contribute more revenue through higher fees for this tier of data delivery. Therefore, an important sales strategy is to decrease the time from signed on to signed off. DHIN will continue to improve its understanding of issues that prevent sign off in order to better address those issues.

Channel Description

DHIN Management and Staff

DHIN management and staff will spend time working with hospitals, laboratories, payers, and large provider practices to proactively find solutions to get them to connect to and pay for the DHIN. Some of these solutions may need to be creative in order to balance the individual needs of these data senders and users with the principle of fairness for the existing participants.

Regional Extension Centers – Quality Insights of Delaware

DHIN and DHIN participants have a strategic relationship with Quality Insights of Delaware, the Regional Extension Center ("Quality Insights"), to encourage the adoption of EHRs and connection to DHIN. Quality Insights provides special support and services to health care providers to make the transition to EHRs faster, easier, and more successful. In July 2011

Quality Insights became the seventh regional extension center in the United States to reach its recruitment goal of 1,000 providers. Currently, it has enrolled 1,021 priority primary health care providers to assist them in achieving Meaningful Use of electronic health records (EHRs).

The support provided to community providers through the Medical Society of Delaware in partnership with Quality Insights is DHIN's preferred source for supporting providers with HIT adoption, workflow analysis and change, and sustainable HIT operations. DHIN therefore, serves to support providers with HIT adoption in two ways:

1. Through a single source interface for receiving clinical results and reports in discrete data format when available.
2. Through the provision of the existing vendor software enabling providers to make a gradual transition to EHR.

Communications Strategy

DHIN contracted a public relations and marketing firm to increase the awareness of DHIN and its benefits, motivate health care providers to join the DHIN, encourage adoption of the DHIN as the primary vehicle for the delivery of clinical information, and develop a sense of community for DHIN users. The marketing strategies are to:

- Develop marketing that directly engages key decision makers
- Create a sense of value around being a "member" of DHIN
- Leverage testimonials of doctors benefitting from DHIN for credibility
- Leverage reach of member hospitals to encourage system doctors
- Raise awareness in medical community through established events
- Establish value of DHIN with general public in order to generate trust
- Differentiate DHIN from other health information methodology
- Clarify DHIN's role in relation to EHR to medical community
- Educate the general public about the security and value of the system
- Protect and maintain the DHIN brand

It will use a broad range of marketing communications to accomplish its marketing and sales objectives. These include video development, endorsements, training, collateral, display and trade events, public relations, social media, print advertising and speaking engagements.

An electronic newsletter is published at least quarterly and is widely distributed to all DHIN users and stakeholders. A "splash page" on the DHIN secured portal is used to communicate important system and policy changes, updates and planned downtime to DHIN users.

Additionally, the DHIN public website is used to update the general public on DHIN progress and status. DHIN is also restarting regular public forums to obtain input from users and stakeholders. The collaborative philosophy has made DHIN successful in the past, and we expect this philosophy to continue to serve it well in the future.

Technology Strategy

A fundamental design theory is that DHIN pushes data out to users rather than requiring them to pull data in using query features. Query functionality is also available, but is not the primary design driver.

DHIN has achieved a significant and growing level of interoperability because it is flexible enough to work with the existing systems and infrastructure at the participating organizations from both a technical and operational standpoint.

Technology Strategy

DHIN's technology strategy is to purchase technology as a service. From a sustainability perspective, this outsourcing strategy reduces the risk of owning and maintaining potentially obsolete hardware and software in the rapidly changing IT field. The development and maintenance of the DHIN IT infrastructure is currently outsourced to a national leader in health information exchanges.

The vendor market for developing and maintaining HIEs is crowded according to a study by KLAS research. DHIN's partner is one of the leaders.

> "Four of the five companies that were considered in buying decisions that had top mindshare (Salt Lake City- based Medicity (23 percent); San Jose, Calif.-based Axolotl (22 percent); Atlanta-based RelayHealth (16 percent); and Verona, Wis.-based Epic (11 percent),—popped up as early leaders in the space and were noted in KLAS' February performance report. According to Jason Hess, KLAS general manager of clinical research and author of the report, pure-play HIE companies like Medicity, Axolotl, and Wellogic have been in the HIE space "long before it was an understood concept by most providers."[42]
>
> "Among acute-to-ambulatory exchanges, where at least one hospital or health system is sharing data with a clinic, lab or other ambulatory facility, Medicity's Novo Grid was the clear leader with 22 live sites, the report said."[43]

A key success factor in this type of relationship is to have strong vendor management practices based on service level agreements (SLAs) and contracts with incentives and penalties. These vendor best practices, a priority for DHIN, are being strengthened at DHIN, and have resulted in a negotiated reduction of approximately $1 million per year in ongoing licensing expenses.

Using our technology provider's secure, web-based solution with Internet access as the only technology requirement for end users, DHIN is accessible to all Delaware providers via a web browser. For those providers that have deployed EHRs that are interfaced with the DHIN, clinical data is integrated directly into the EHRs in discrete data formats. This solution can work

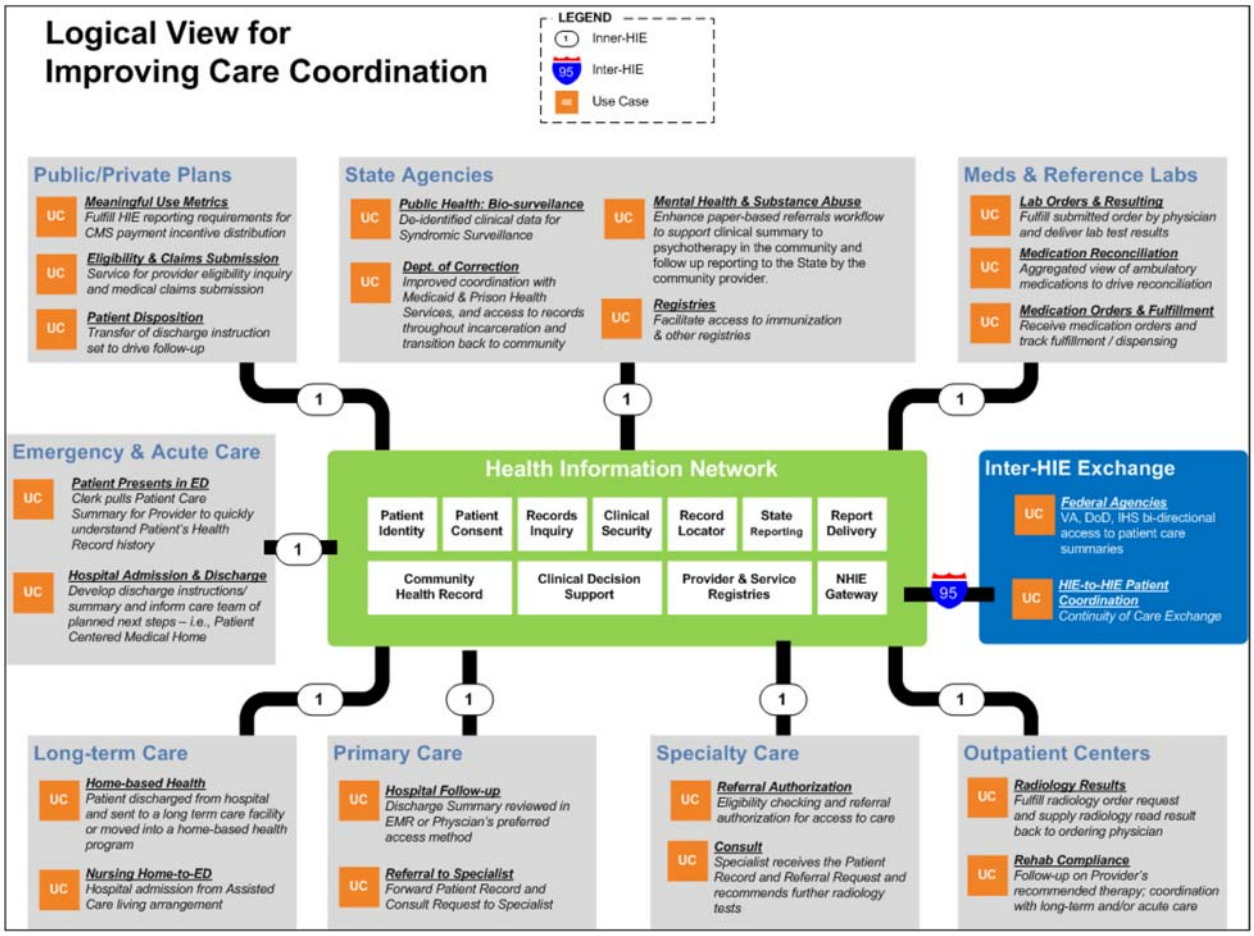
[42]Jennifer Prestigiacomo, "KLAS Report Cites Crowded HIE Vendor Market." *Health Care Informatics online.* July 2010.
[43]KLAS Research press release, "KLAS Takes a Hard Look at the Reality of HIE Adoption." February 2010.

with any EHR system that meets national interoperability standards. – enabling providers to choose what system works right for them without losing access to DHIN's vital information.

Technical Infrastructure

DHIN has committed to continue participation and conformance to all nationally defined standards for inter-HIE clinical data exchange, including that with federal partners, such as the Office of National Coordinator (ONC) for Health Information Technology (HIT) and the Veterans Affairs/Department of Defense Health Information Sharing (HIS) Directorate.

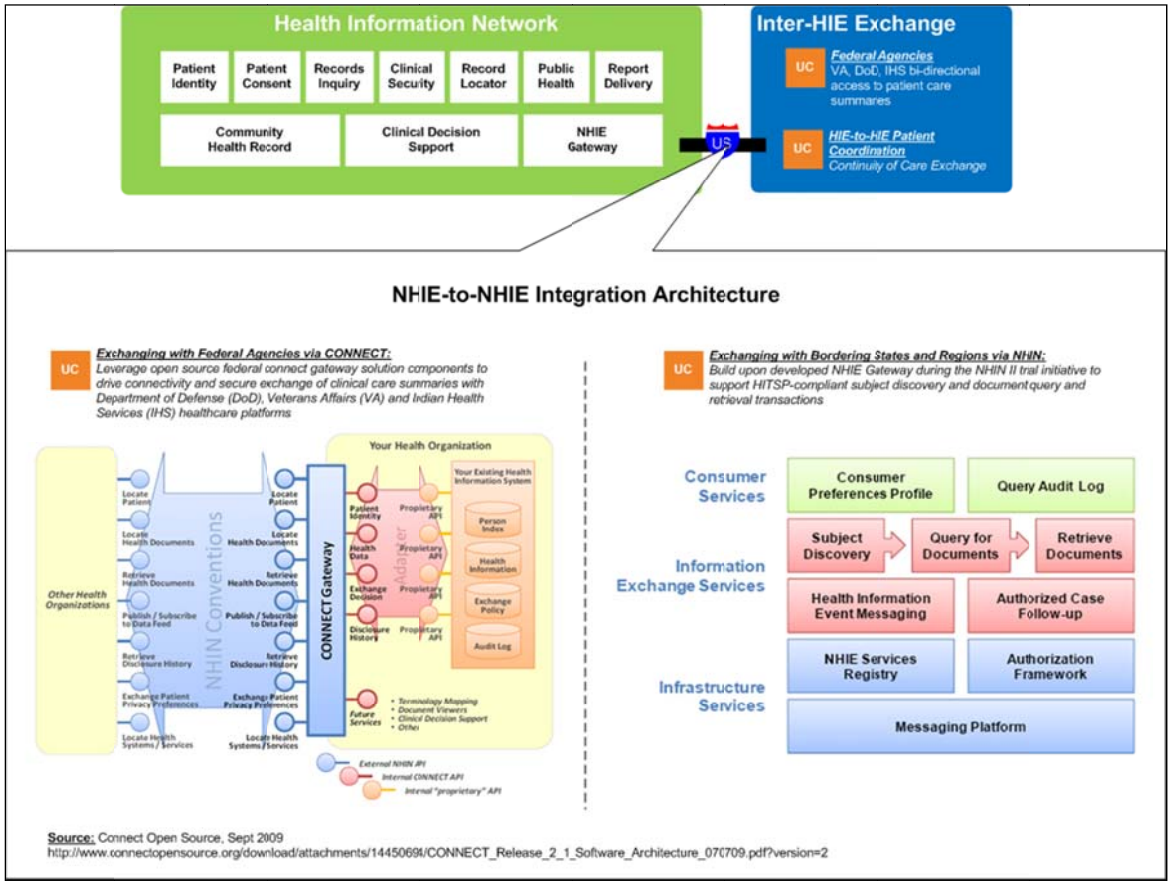
The following graphic describes the DHIN's approach to implementing the required functions of the State HIE Cooperative Agreement and ensuring a system of coordinated care. Much like the highway system in Delaware, the DHIN connects health care providers and other organizations in Delaware to provide a direct and efficient route for clinical information. The result is a more cost-effective experience for the patient that results in better outcomes and quality of care. The diagram depicts how DHIN will leverage Core Services to meet established use cases for improving care coordination within the DHIN.



DHIN has been designed to send data to other states and federal organizations using National Health Information Network (NHIN) architecture standards. It has designed a DHIN/NHIN gateway. The gateway was designed to fully comply with all applicable NHIN core service interface specifications which do not make a distinction between intra-state and inter-HIO parings. Thus the DHIN-NHIN gateway is agnostic as to its use of or relationship to other responding or initiating gateways. This means it can be used for intra-state and inter-HIO exchanges of data.

Business agreements, not technical limitations, dictate the use of the DHIN-NHIN gateway for specific scenarios. The DHIN-NHIN gateway has already demonstrated compatibility with NHIN Trial Implementations II specifications and was extensively tested exchanging data with other NHIN compatible gateways, some of which included federal agencies, states, and inter-HIO participants (SSA/VA, MedVA, and Long Beach respectively). DHIN's intended use leverages the NHIN gateway between other trading partners that also are deploying a NHIN gateway.

The diagram below illustrates DHIN's technical integration architecture with Federal partners via the Federal CONNECT Gateway as well as connecting with other HIEs and RHIOs using federal standards for the NHIN.



Privacy and Security

DHIN was created by statute, which defines its governance as well as provides liability protections. DHIN has promulgated regulations for participation in the network, which include patient notification of the use of DHIN. Furthermore, policies, procedures and/or protocols for privacy and security, provider relations and user management, and system monitoring have been adopted. A continuous evaluation of these policies and procedures is in place to ensure that the DHIN remains in compliance with State and Federal laws and regulations as well as the changing HIE environment.

With the assistance of DHIN's hospitals, privacy officers, legal counsel and Consumer Advisory Council, DHIN has established a privacy policy that considers individuals' rights and expectations, while balancing the need for health care providers to have information that enables them to make informed decisions and ultimately provide better quality health care services. DHIN's Access to Individually Identifiable Health Information Policy is applicable to all users and data contributing organizations of DHIN.

A successful first time log-in to the DHIN system results in the display of a data use agreement. Before users can log-in for access to clinical data for the first time, they must read and agree to the terms of the agreement. This action is equivalent to an electronic signature. Additionally, DHIN has signed Memoranda of Agreement with each of its data sender organizations, which outline roles and responsibilities and fiduciary requirements. A business associate agreement also is required between DHIN and all data senders and EHR vendors. Due to State law, DHIN's privacy policy has not addressed public health reporting because this is required to be done electronically by hospitals and labs. DHIN is simply the method by which these organizations accomplish electronic public health reporting.

In accordance with DHIN's privacy and security policies, DHIN monitors all patient record searches to ensure that the patient records are only accessed for clinical purposes. When a user is suspected of inappropriate use of the DHIN, their access is suspended and they are reported to the DHIN administrator at the user's place of employment. DHIN works with the employer to determine if the access was appropriate and both entities take proper disciplinary and/or legal action based on findings.

In addition to ensuring DHIN policies and procedures are in adherence to Federal and State law and are carried out with the patient's rights to privacy and security in mind, DHIN has made strides in addressing other legal/policy issues that hinder health information exchange. For example, DHIN promulgated a regulation regarding participation in DHIN and patient notification, which included a clause that addressed the limitations put on reference laboratories with regard to releasing data to the DHIN without having the provider first sign-up and consent to having their data delivered through DHIN. This issue resulted in data not being available to DHIN users upon query of a patient's history in DHIN. Resulting from the regulation, the reference laboratories are now able to send data for all Delaware providers regardless of their enrollment status in DHIN. The DHIN will review other policies and barriers to exchange to determine the need for additional policy changes. For example, the DHIN may review laws and

policies and recommend changes to support health plan participation so that in the event the DHIN wishes to work with health plans to exchange data, the patient is not at risk for being penalized (affecting their current or future coverage) due to the health plan having access to this data.

EHR Vendors

The EHR software market is fragmented. It is also volatile as the EHR adoption rates are rapidly increasing with Meaningful Use incentives. According to KLAS research, "72 percent of small practices with one to five physicians are considering solutions outside the best-known vendors. Allscripts, NextGen and eClinicalWorks have the largest market shares in the ambulatory market.[44]The hospital market is more concentrated with the top 10 EHR vendors accounting for 68% of the market. Meditech, McKesson and Cerner have the largest market shares in the hospital market.[45] DHIN is committed to working with the medical community to support their preference of software products.

DHIN has connectivity to the leading electronic health record (EHR) vendors that serve ambulatory practices, and many more are in the contract negotiations state with DHIN. DHIN utilizes its community purchasing power to negotiate discounted interface rates with EHR vendors, which are passed along to EHR customers in Delaware. Currently 74 practices and 307 providers have direct EHR connectivity with DHIN.

The following EHR vendors are currently developing a DHIN interface or are in discussions with DHIN to do so in the coming year. DHIN can interface to any Electronic Medical Record (EHR) product that is capable of connecting via a web-service interface using HL7 (health level 7) standard language.

Vendors with a Certified DHIN Interface:

- Allscripts (Including Eclipsys)
- STI Computer Services

Vendors with a DHIN Interface that is in Certification Testing:

- Cerner
- eClinicalworks
- GEMMS
- MicroMD
- PhysiciansXpress

Vendors Under Contract to Develop a DHIN Interface:

- Advanced Data Systems
- GE Healthcare (Centricity)
- InfoQuest
- McKesson (Practice Partners)

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[44]KLAS Research, "KLAS Takes a Hard Look . . ."
[45]http://www.billianshealthdata.com/news/vitals/InFocus/EMR_Marketshare.html, (accessed August 30, 2011).

- NextGen
- Office Practicum (Connexin Software)
- Quest Diagnostics (Care360)
- SequelMed

Vendors with Whom Contract and/or Technical Discussions are in Progress:

- Advanced MD
- Alto Solutions (Onco EMR)
- Aprima
- Clear Practice
- CureMD
- Dr. First
- EHS Med/Success EHS
- EyeMD Healthcare Systems
- Greenway Medical Technologies
- MCS (Med Com Systems)
- Noteworthy Medical Systems
- Prognosis (Bizmatics)
- Sage
- Sequel Systems
- SoapWare
- Varian

DHIN's strategy is to prioritize developing connections and signing contracts based on market share unless the cost of building the interface is significantly different. In the long run DHIN will be as vendor neutral as possible, considering the cost/benefit ratio. Eventually there will be national standards for these interfaces and the cost to bring on new EHR vendors will be reduced.

Operations Strategy

Business and Technical Operations

Flexibility is the key to the operations strategy for DHIN as it relates to sustainability, due to the dynamic health care industry and uncertainty regarding health care reform. There are three key focus areas for flexible operations:

- DHIN emphasizes the processes for functionality development over a specific development roadmap. In other words, DHIN creates a functionality development roadmap, but bases it upon explicit assumptions. If these assumptions change then the individual items on the roadmap are re-evaluated. An example is the ability to respond to changes in the Meaningful Use requirements.
- As the adoption of DHIN approaches 100% and the signed off to signed on ratio increases, users become more dependent upon the DHIN for their health care information. As a result the DHIN is expected to have very high service level agreements (SLAs), and hold its vendors to equally high SLAs.
- Contingency planning is another component of flexibility. Using contractors to supplement hired staff and placing a high priority on disaster recovery are two examples that DHIN uses for contingency planning.

Metrics

DHIN has implemented a rigorous third party evaluation of success to date in improving health quality, efficiency and cost. This evaluation activity included measures required by its contract with the Agency for Healthcare Research and Quality (AHRQ). DHIN worked with partners across Delaware to obtain baseline data of health care providers in the State and their current use of health information technology (HIT). This data was compared with data derived from the DHIN management reporting data mart. Factors associated with reporting Meaningful Use of HIT were defined in collaboration with Delaware Medicaid.

A leading research firm was subcontracted to conduct this evaluation activity for DHIN. The preliminary results are positive, and the final report is expected by the end of September 2011. The questions for evaluation were organized into the following categories:

1. Use of DHIN-Data Senders: Metrics for how data senders, such as hospitals, laboratories, imaging centers, use and gain value from participation in DHIN.
2. Costs For DHIN Participation: Metrics of costs for clinical providers to initiate and maintain DHIN participation.
3. Public Health: Metrics related to reporting and use of data for public health surveillance.
4. Use of DHIN–Process Measurements: Metrics on processes of actual DHIN use.
5. Payer Cost Savings: Metrics of health care cost changes.
6. Use of DHIN–Clinical Provider / Data Receiver Perceptions: Metrics on health care provider perceptions and satisfaction with participation in DHIN.
7. Cost Changes: Metrics on clinical practice changes in costs.

DHIN's metrics are primarily based on adoption and usage because maximizing participation will enable health care organizations to capture the value of using information to reduce health care costs. DHIN has received federal grants to develop technology solutions, and providers and hospitals are being offered Meaningful Use incentives to use this technology to exchange data. As evidenced in the data presented in this plan, DHIN saves its users money through more efficient transfer of information. Significant savings are also realized when health care organizations use the data to better coordinate and manage patient care. The most value to Delawareans will be achieved with 100% participation and continuously increasing usage.

DHIN has established and successfully met targets in the following categories in the past. DHIN is currently in the process of setting new targets for each of these metrics.

Metric	**Current Value**
Acute care hospitals participating*	6
Participating hospitals represent:	
• staffed hospital beds	86%
• emergency department visits	79%
• outpatient visits in Delaware	76%
Hospital emergency departments and laboratories that send data through DHIN to the Division of Public Health for public health monitoring	5
Three federally qualified health centers (La Red Health Center, Henrietta Johnson Medical Center and Westside Family Health) are among the practices exclusively receiving results via DHIN	3 signed off
Unique patients represented in the master patient index	>1 million
Providers currently practicing in Delaware are enrolled in DHIN	80%
• Number of users in Delaware practices	>5,000
• Number of practices signed on	465
• Number of practices signed off	168
Clinical results and reports delivered each year	> 7 million
National Laboratories	2
Pathology Providers	1

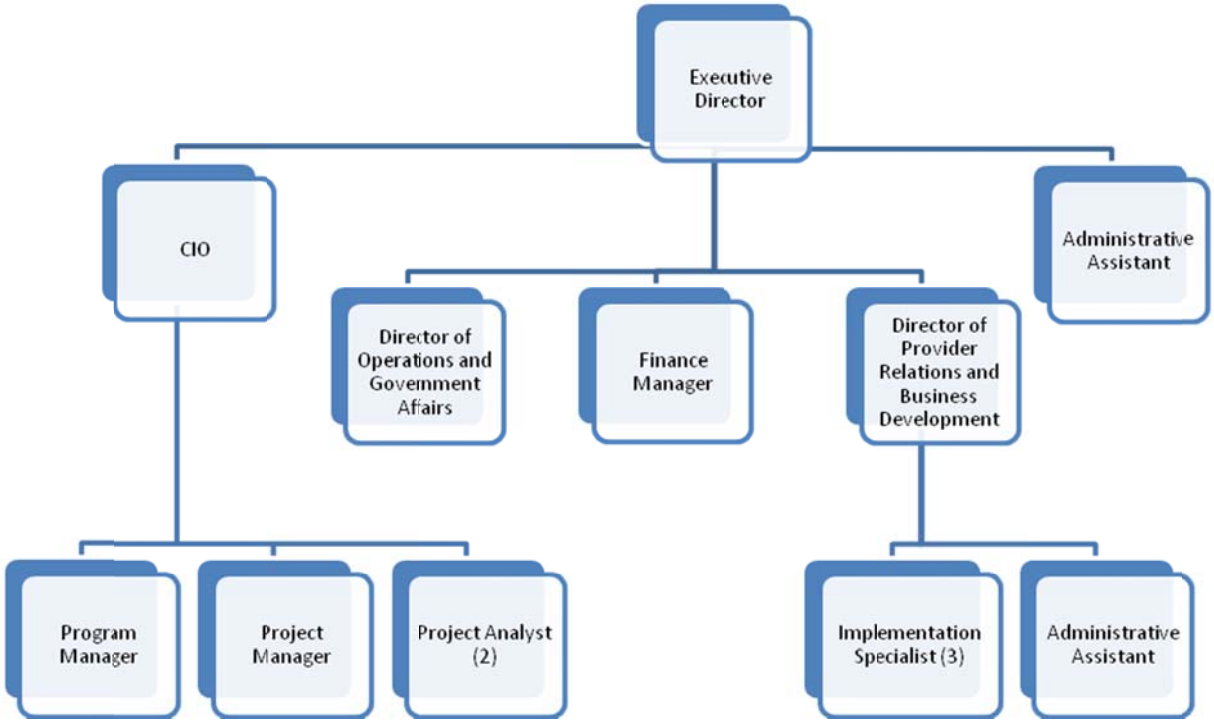
* Nemours/A.I. DuPont Hospital for Children has made a commitment to connect to DHIN, and details are currently being negotiated.

Management and Organization

The changes to a more permanent governance structure with Senate Bill 231 for FY2011 has created changes in the decision making processes and governance that will result in a more sustainable organization.

Organizational Structure

The following chart illustrates the current organizational structure as well as current and planned management and staffing.



Management Team

The **Executive Director** oversees the day-to-day operations of DHIN with support from staff and guidance from the Board of Directors.

The **Executive Director** of DHIN is **Dr. Jan Lee**.
Jan is a board certified Family Practice physician with a Master of Medical Management degree and a wealth of leadership experience. Prior to joining DHIN, she was Vice President of Knowledgebase and Content for NextGen Healthcare, a leading vendor of health information technology products and services, where she was responsible for the development of clinical content in 26 medical specialty areas for the NextGen electronic health record. She transitioned to NextGen from a career in the United States Air Force, where she had worldwide assignments

in clinical settings from outpatient clinics to medical centers, several academic appointments, and varied leadership and command assignments. She served in a senior leadership capacity at Headquarters, Air Force as the Chief Information Officer of the Air Force Medical Service. She steered management of a $3.2 billion IT portfolio supporting 130,000 Department of Defense health care employees and 9.1 million beneficiaries worldwide. She led implementation of the Department of Defense EHR throughout the Air Force to 75 facilities of all sizes supporting all medical and surgical specialties and subspecialties. She has served on a range of national level committees and workgroups, and is frequently sought as a speaker on health and health IT topics. Her specific areas of interest are health policy and the use of health IT to improve clinical practice and population health. Recent recognition includes listing in "Guide to America's Top Family Doctors" and "Who's Who in America" and selection by "Cambridge Who's Who" as Executive of the Year.

Mark J. Jacobs is the **Chief Information Officer** for the DHIN.
Mark holds a Masters degree in Health Administration, a Certified Professional in Health Information Technology (CPHIMSS), and a HIMSS Fellow (FHIMSS) and has over 30 years of Health Information Technology experience in several leading health systems, health insurance, and health planning entities. He has extensive experience in leading HIT integration efforts for several integrated delivery systems, multi-million data center consolidations, state-of-the-art technologies, and physician and community integration. He was Vice Chair of the Pennsylvania eHealth Initiative where he led strategic planning efforts and the Business and Technology Committee. Mark was the first HIMSS Health Information Exchange steering committee Chair, as well as a member of the eHealth Initiative Technology workgroup, and the Certification Commission for Health Information Technology workgroup. He also served on the Office of National Coordinator's Alliance effort to formulate key industry definitions. Mark has authored numerous articles in leading health care IT journals and was a participant in the publication of the 2010 whitepaper entitled "Building a Sustainable Model for Health Information Exchange in Pennsylvania".

Mike Sims has served as the initial **Finance Manager** of the DHIN since 2009.
Prior to joining DHIN, Mike led financial management efforts for numerous divisions for 18 years at MBNA and Bank of America. Mike oversaw the management of the $300 million budget for the Customer Satisfaction division whose 3,500 employees responded to 135 million inquiries each year. Mike was the CFO for the company's Business Card, Deposits, and Credit Insurance product lines. Mike was chosen to lead the financial and analytical efforts of several of the company's start-up divisions, including Internet and Research and Development. Mike earned the Financial Award of Excellence for his work in partnering with 12 domestic and international business lines in evaluating the enterprise impact of the Internet. While in Research and Development, Mike was instrumental in the financial and strategic development of numerous new products and services which contributed millions to the company's bottom line. In addition to his financial management work, Mike also led product management efforts for the company's stored value products and the company's flagship BankAmericard product.

DHIN Staff

The DHIN staffing model is comprised of three teams:

- Financial Management,
- Technical Operations, and
- Communications and Provider Relations.

Financial Management is responsible for vendor financial management, budgeting, revenue and expense management, financial reporting, financial policy development, accounts payable receivable management, staff timekeeping, analytics development, new product and stakeholder pricing and EHR vendor contract management.

Technical Operations is responsible for managing the technology contracts, overseeing the project plan, managing EHR vendor relationships, working with participant organizations, collaborating with the provider relations team to address provider issues, and monitoring the system for availability, usage, access controls and security. This team is responsible for tracking and monitoring projects to ensure that they are progressing according to plan.

Communications and Provider Relations is the “face of DHIN.” They are responsible for enrolling and training DHIN users, communicating with consumers and addressing questions or concerns, providing customer service to providers and working with potential data sender and EHR partners to educate them on DHIN participation, making presentations in the community to educate providers and consumers on DHIN, and developing marketing and communications materials.

Financial Sustainability Strategy

The DHIN principles of financial sustainability are:

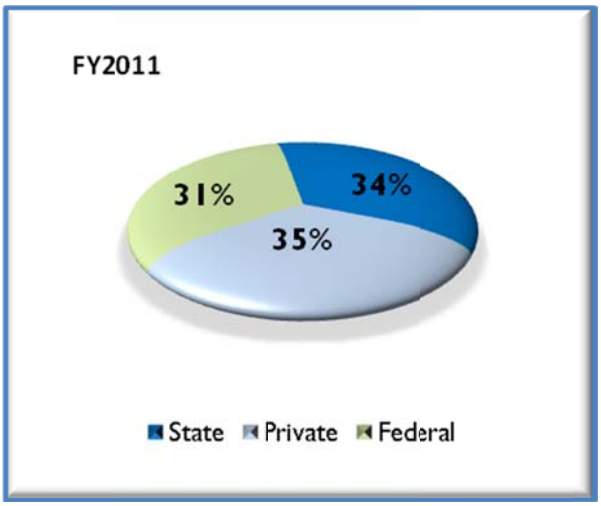
- Those who benefit from DHIN pay for it.
- Amount paid is proportionate to value received.
- Sustainability projects receive high prioritization.

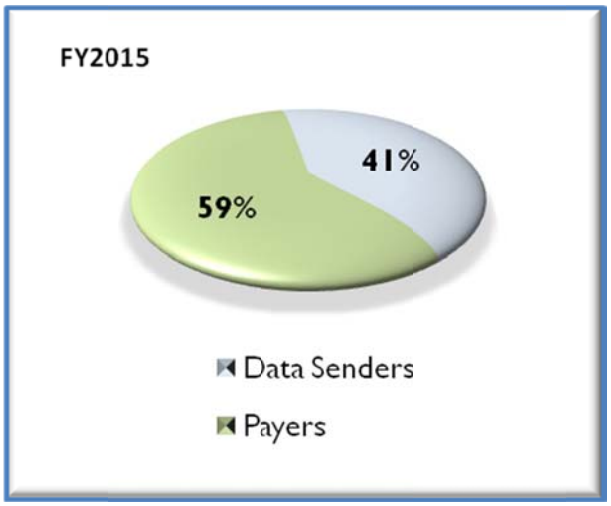
Leveraging Medicaid

CMS (Centers for Medicare and Medicaid Services) has set a policy that uses its funding leverage to drive all stakeholders who stand to benefit from electronic HIE to share in a portion of the costs. It based its policy on a scan of HIE initiatives that revealed that HIEs traditionally have been funded by too few organizations. CMS determined that only relying upon hospitals, philanthropies and the government would be both unsustainable and unfair. It has stated that all beneficiaries should pay to support health information exchanges. In an important development for DHIN that is consistent with this view, CMS has agreed to match the State Medicaid support for DHIN on a per member per month basis. The level of this funding is limited by Medicaid's fair share limit. (See letter in the Appendix). This Medicaid funding is included with Payers in the financial projections.

Sources and Uses of Funds

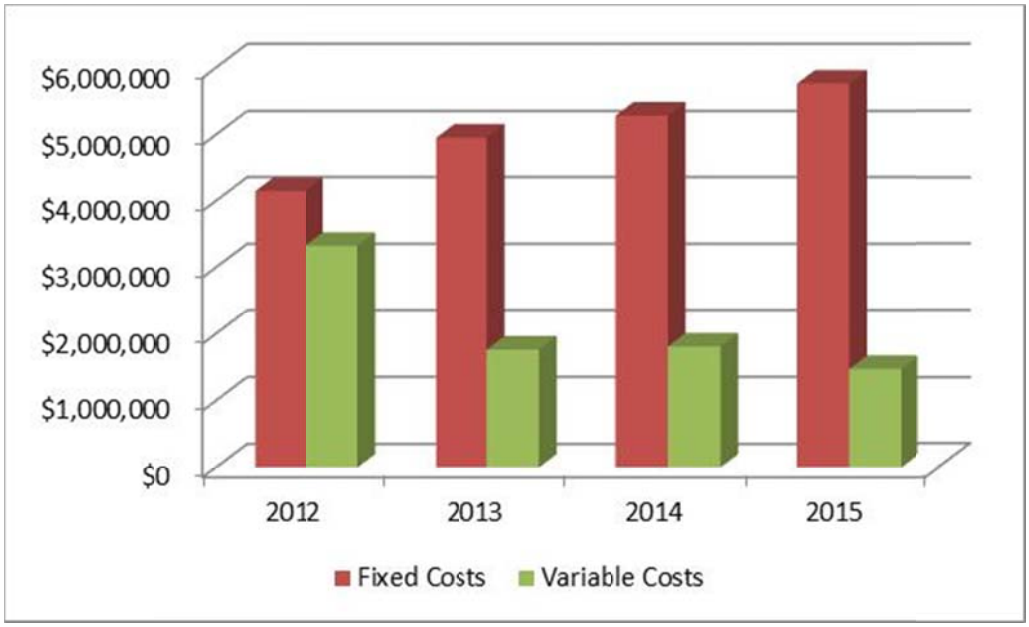
The graphs below show how the funding of DHIN transitions over time in this plan. The State and Federal contributions are eliminated in the pro forma projections, and the future contributions are split among data senders and payers. Providers may become contributors in the future through subscription fees, but they are not included in these projections. There may be unknown federal grant opportunities in the future, but these revenue streams are not included in the pro forma financials because they would be associated with additional expenses that are not included or known.





The pro forma financial projections that follow in the next section identify how the operational activities are related to the cash flow stream.

The graph below illustrates the difference between fixed costs for ongoing operations and the variable costs associated with new functionality development. Fixed costs increase marginally over time as new functionality is added each year. Variable costs spike in fiscal years 2012 and 2013 due to the investment in HIE Cooperative Agreement projects which facilitate Meaningful Use requirements and also provide the planning framework for connecting numerous State agencies and departments to the DHIN. In addition, investment in projects which add additional stakeholders such as payers and new data senders also contribute to the short term spike in variable costs.



Historically, new functionality has been funded by grants. Without a guarantee for future grant availability, DHIN needs to reserve cash for technology investments. These pro forma projections include an expense line of $1 million in FY2014 and FY2015 for new functionality development that has yet to be determined. Cash reserves (revenue minus expenses) are also shown, which will be able to fund the investments, associated expenses and working capital. Whether funded by grants or cash reserves, the product development process includes a step to confirm that any new functionality will be valued and paid for before building that new functionality.

Financial Projections and Analysis

DHIN has received funding from Federal, State, and private sources since FY2006. In particular, DHIN received a $4.7 million award from ONC for the HIE Cooperative Agreement in FY2010, whose funding was for defined implementation activities through FY2014. DHIN has drawn down against its various appropriations over time and as of the beginning of FY2011, DHIN had just over $7 million in funding available. In FY2011 and FY2012, DHIN will have drawn down against the previously earned funds, showing as a net loss during that period of time. As DHIN's grant funds are exhausted and as new income streams from payers begin in FY2013, DHIN will earn a profit. With payer funding solidly in place, DHIN will begin building reserves to use for future investment and growth as stakeholder needs necessitate, such as Stage 2 and Stage 3 Meaningful Use requirements which will provide regulatory and financial benefits for the entire Delaware stakeholder community.

The tables below summarize DHIN's revenue, expenses and cash flow for FY2011 through FY2015. It illustrates financial sustainability beginning in FY2013.

DHIN Profit and Loss Statement, FY2011 – 2015 Forecast*					
($000s)	**FY2011**	**FY2012**	**FY2013**	**FY2014**	**FY2015**
Revenue					
Bond Bill	1,152	2,997	0	0	0
Data Senders	1,402	1,906	2,702	3,301	3,740
Payers	0	0	4,110	5,411	5,411
Providers	0	0	0	0	0
Total Revenue	2,554	4,903	6,811	8,712	9,152
Expenses					
Personnel	1,591	1,398	1,614	1,774	1,943
Administration	23	218	358	481	611
Operations	1,396	1,048	1,078	1,078	1,078
Depreciation	16	0	0	0	0
Contractual (Non-Technical)	905	1,541	709	432	432
Ongoing License & Maintenance	1,050	1,050	1,474	1,518	1,698
Marketing	4	75	100	100	100
New Functions	169	1,416	1,331	1,613	1,280
New Functions Maintenance & License	92	725	54	94	94
Total Expenditures	5,246	7,471	6,717	7,090	7,235
Net Income	-2,692	-2,568	94	1,622	1,917

DHIN Statement of Cash Flows, FY2011 – 2015 Forecast *					
($000s)	**FY2011**	**F 2012**	**FY2013**	**FY2014**	**FY2015**
Cash At Beginning of Period	7,065	5,940	2,980	3,074	4,697
Net Income	-2,692	-2,568	94	1,622	1,917
Net Accounts Payable/Receivable	1,567	-392	0	0	0
Cash At End of Period	5,940	2,980	3,074	4,697	6,613

*Accrual Basis

Fiscal Year 2012

The table below shows the profit and loss forecast for FY2012. As required by the Epilogue to Senate Bill 130, this budget outlines each funding source and the breakdown of associated expense categories (personnel, contractual services, supplies, etc.), including the state appropriation and expenditure for the $2,771,300. It shows the budget for FY2012 that includes funding allocations detailing federal, private and state requested amounts and associated expenditures. It also shows the expenditures of the remaining $225,600 of state funds that are being used only for the purpose of matching the American Recovery and Reinvestment Act (ARRA) Health Information Exchange (HIE) grant funds. These remaining funds have not been applied towards any purpose other than ARRA HIE grant matching. Working with state agencies, DHIN is currently working to identify match requirements for the ARRA HIE grant for Fiscal Year 2013 and Fiscal Year 2014 from other sources.

Although the net income for FY2012 is negative, cash reserves from grant money received in previous years for the HIE Cooperative Agreement and AHRQ continue to be expended in FY2012.

DHIN Profit and Loss Statement, FY2012 Forecast* ($)							
	AHRQ	HIE Cooperative Agreement	HIE Coop Agreement Matching Funds (State)	State Bond	State & Private	Interest	Total
Revenue	0	0	0	0	0	0	0
State of Delaware (Bond)	0	0	225,600	2,771,300	0	0	2,996,900
Data Senders	0	0	0	0	1,905,739	0	1,905,739
Payers	0	0	0	0	0	0	0
Providers	0	0	0	0	0	0	0
Total Revenue	0	0	225,600	2,771,300	1,905,739	0	4,902,638
Expenses							
Personnel	201,904	276,805	37,394	440,736	440,736	0	1,397,574
Administration	49,444	41,828	5,514	60,715	60,715	0	218,216
Operations	0	0	0	523,861	523,861	0	1,047,722
Depreciation	0	0	0	0	0	0	0
Contractual (Non-Technical)	183,000	815,790	109,994	216,236	216,236	0	1,541,256
Ongoing License & Maintenance	0	0	0	524,874	524,874	0	1,049,748
Marketing	33,000	0	0	21,000	21,000	0	75,000
New Functions	0	670,528	94,972	325,425	325,425	0	1,416,350
New Functions Maintenance & License	0	218,750	31,250	237,405	237,405	0	724,810
Total Expenditures	467,347	2,023,701	279,124	2,350,252	2,350,252	0	7,470,676
Net Income	(467,347)	(2,023,701)	(53,524)	421,048	(444,513)	0	(2,568,038)

*Accrual method

Fiscal Year 2013

Beginning in FY2013 the State will be charged the same rate as other data sender and payer stakeholders. The table below shows the profit and loss forecast for FY2013.

Cash reserves from grant money received in FY2010 for the HIE Cooperative Agreement continues to be expended in FY2013. Working with state agencies, DHIN is currently working to identify match requirements for the ARRA HIE grant for Fiscal Year 2013 and Fiscal Year 2014 from other sources.

DHIN Profit and Loss Statement, FY2013 Forecast* ($)							
	AHRQ	HIE Cooperative Agreement	HIE Coop Agreement Matching Funds (State)	State Bond	State & Private	Interest	Total
Revenue							
State of Delaware (Bond)	0	0	0	0	0	0	0
Data Senders	0	0	0	0	2,701,694	0	2,701,694
Payers	0	0	179,032	0	3,930,541	0	4,109,574
Providers	0	0	0	0	0	0	0
Total Revenue	0	0	179,033	0	6,632,235	0	6,811,268
Expenses							
Personnel	0	283,514	79,557	0	1,250,593	0	1,613,664
Administration	0	61,569	17,277	0	279,564	0	358,410
Operations	0	0	0	0	1,077,722	0	1,077,722
Depreciation	0	0	0	0	0	0	0
Contractual (Non-Technical)	0	227,547	49,119	0	432,472	0	709,139
Ongoing License & Maintenance	0	0	0	0	1,473,762	0	1,473,762
Marketing	0	0	0	0	100,000	0	100,000
New Functions	0	883,070	33,079	0	414,719	0	1,330,869
New Functions Maintenance & License	0	0	0	0	53,600	0	53,600
Total Expenditures	0	1,455,700	179,032	0	5,082,433	0	6,717,165
Net Income	0	(1,455,700)	0	0	1,549,802	0	94,103

*Accrual method

Fiscal Year 2014

The table below shows the profit and loss forecast for FY2014.

Cash reserves from grant money received in FY2010 for the HIE Cooperative Agreement continues to be expended in FY2014.

DHIN Profit and Loss Statement, FY2014 Forecast* ($)							
	AHRQ	HIE Cooperative Agreement	HIE Coop Agreement Matching Funds (State)	State Bond	State & Private	Interest	Total
Revenue							
State of Delaware (Bond)	0	0	0	0	0	0	0
Data Senders	0	0	0	0	3,301,075	0	3,301,075
Payers	0	0	0	0	5,411,147	0	5,411,147
Providers	0	0	0	0	0	0	0
Total Revenue	0	0	0	0	8,712,222	0	8,712,223
Expenses							
Personnel	0	161,499	53,833	0	1,558,754	0	1,774,086
Administration	0	35,072	11,691	0	434,412	0	481,175
Operations	0	0	0	0	1,077,722	0	1,077,722
Depreciation	0	0	0	0	0	0	0
Contractual (Non-Technical)	0	0	0	0	432,472	0	432,472
Ongoing License & Maintenance	0	0	0	0	1,517,562	0	1,517,562
Marketing	0	0	0	0	100,000	0	100,000
New Functions	0	287,500	(65,524)	0	1,390,857	0	1,612,833
New Functions Maintenance & License	0	0	0	0	94,050	0	94,050
Total Expenditures	0	484,071	0	0	6,605,829	0	7,089,900
Net Income	0	(484,071)	0	0	2,106,393	0	1,622,322

*Accrual Method

Fiscal Year 2015

The table below shows the profit and loss forecast for FY2015. All current federal grant funding is forecasted to be exhausted by this point, with revenue coming entirely from Delaware stakeholders. Additional grant opportunities may be identified in the future, but are not included in these projections.

DHIN Profit and Loss Statement, FY2015 Forecast* ($)							
	AHRQ	HIE Cooperative Agreement	HIE Coop Agreement Matching Funds (State)	State Bond	State & Private	Interest	Total
Revenue							
State of Delaware (Bond)	0	0	0	0	0	0	0
Data Senders	0	0	0	0	3,740,368	0	3,740,368
Payers	0	0	0	0	5,411,147	0	5,411,147
Providers	0	0	0	0	0	0	0
Total Revenue	0	0	0	0	9,151,515	0	9,151,515
Expenses							
Personnel	0	0	0	0	1,942,682	0	1,942,682
Administration	0	0	0	0	610,983	0	610,983
Operations	0	0	0	0	1,077,722	0	1,077,722
Depreciation	0	0	0	0	0	0	0
Contractual (Non-Technical)	0	0	0	0	432,472	0	432,472
Ongoing License & Maintenance	0	0	0	0	1,697,562	0	1,697,562
Marketing	0	0	0	0	100,000	0	100,000
New Functions	0	0	0	0	1,279,500	0	1,279,500
New Functions Maintenance & License	0	0	0	0	94,050	0	94,050
Total Expenditures	0	0	0	0	7,234,971	0	7,234,971
Net Income	0	0	0	0	1,916,544	0	1,916,544

*Accrual method

APPENDIX

Epilogue to Senate Bill 130

In June 2011, the Epilogue to Senate Bill 130 provided the following requirements for DHIN:

a) The Section 1 Addendum to this Act appropriates $2,996,900 for the Delaware Health Information Network (DHIN), a joint initiative between private, federal and state funds. The $2,996,900 shall be utilized to support the development of an interoperable network to exchange clinical information among all health care providers across the state to improve patient outcomes and patient-provider relationships. The system shall be designed to allow patient clinical information to be shared across all health care facilities and organizations and across public and private sectors. The DHIN, shall provide the following to the Director of the Office of Management and Budget, the Secretary of the Department of Health and Social Services and the Controller General:

    (1) A budget that outlines the expenditure for the $2,771,300 of the state appropriation including a breakdown of categories (personnel/contractual services/supplies, etc.); and

    (2) A total project budget over multiple years that includes funding allocations detailing federal, private and state requested amounts.

b) Expenditures of the remaining $225,600 of state funds shall be used only for the purpose of matching the American Recovery and Reinvestment Act (ARRA) Health Information Exchange (HIE) grant funds, and shall be authorized by the Secretary of the Department of Health and Social Services Remaining funds of this amount may not be applied towards any purpose other than ARRA HIE grant matching. Working with state agencies, DHIN shall work to identify match requirements for the ARRA HIE grant for Fiscal Year 2013 and Fiscal Year 2014 from non-federal in-kind sources, and not limited to non-federal cash contributions.

c) Of the funds outlined in subsection a) of this section, $1,000,000 shall be withheld and may be expended only upon approval of the Co-Chairs of the Joint Legislative Committee on the Capital Improvement Program. Such approval shall be contingent upon acceptance of DHIN's September 2011 business plan outlining DHIN's timeframe in achieving an ability to become fiscally self-sustaining.

DEPARTMENT OF HEALTH & HUMAN SERVICES
Centers for Medicare & Medicaid Services
7500 Security Boulevard, Mail Stop S2-26-12
Baltimore, Maryland 21244-1850

Center for Medicaid, CHIP and Survey & Certification

SMDL# 11-004
ARRA# 9

May 18, 2011

Re: Use of administrative funds to support health information exchange as part of the Medicaid EHR Incentive Program

Dear State Medicaid Director:

This letter provides further guidance to State Medicaid agencies regarding the implementation of section 4201 of the American Recovery and Reinvestment Act of 2009 (the Recovery Act), Pub. L. 111-5 and regulations at 42 Code of Federal Regulations (CFR) Part 495, Subpart D. Division B, Title IV, Subtitles A and B of the Recovery Act established the Medicare and Medicaid Electronic Health Record (EHR) Incentive Programs, as one component of the Health Information Technology for Economic and Clinical Health (HITECH) Act. HITECH, as well as our final regulation, governs incentive payments to eligible professionals (EPs) and eligible hospitals to promote the adoption and meaningful use of certified EHR technology.

The Recovery Act provides 100 percent Federal financial participation (FFP) to States for incentive payments to eligible Medicaid providers to adopt, implement, upgrade, and meaningfully use certified EHR technology through 2021, and 90 percent FFP for State administrative expenses related to the program. These administrative matching funds must be for activities that are proper and efficient (as defined by OMB Circular A-87) for the administration of the Medicaid EHR Incentive Program.

The Centers for Medicare & Medicaid Services (CMS) issued a State Medicaid Director (SMD) letter on August 17, 2010 that provided guidance to States on allowable expenses for activities supporting the administration of the Medicaid EHR Incentive Program. The letter outlined CMS expectations of activities and potential eligible costs for the 90 percent FFP for administration and oversight of the EHR incentive payments. In addition, that letter provided initial direction regarding State Medicaid agencies' role in promoting EHR adoption and health information exchanges (HIE). This letter provides more detailed guidance on the State expenditures related to the development and sustaining of HIE(s) that may be eligible for the 90 percent FFP.

Background

As defined in our July 28, 2010 final regulations, Stage 1 of "meaningful use" includes several objectives related to the electronic exchange of health information. Anticipating that State Medicaid agencies would have a role in promoting EHR adoption and HIE, CMS identified ten

Guiding Principles for the 90 percent FFP funds for those activities in the August 2010 SMD letter. Please refer to that letter and Enclosure C of that letter for more detail, as this SMD letter focuses on a subset of those principles. States are reminded that the first core principle applied to use of the 90 percent HITECH FFP is that the activities can be directly correlated to the Medicaid EHR Incentive Program.

Specifically, this SMD letter provides further detail on our criteria that health information exchange promotion activities: 1) have costs that are divided equitably across other payers (e.g., private/commercial) based on the fair share principle (defined in OMB Circular A-87 as "in accordance with benefits received") and are appropriately allocated, 2) leverage efficiencies with other Federal HIE funding, and 3) are developmental and time-limited in nature. This letter also reiterates the principle that the 90 percent FFP would not be available for on-going HIE costs where these services are fully operational.

As we have stated previously, HIEs are a necessary ingredient to meaningful use of EHRs and to the success of delivery system reform efforts. This letter outlines the circumstances in which we believe States can use enhanced administrative FFP to join or spearhead efforts to build this needed infrastructure.

Other Payer Participation/Fair Share Principle

The August 2010 SMD letter noted that States should consider Medicaid's contribution to HIE in view of contributions by other payers. Funding from Medicaid should be part of an overall financial plan that leverages multiple funding sources to develop and maintain HIEs between hospitals, health systems and individual practices.

Various Federal and State funding, as well as contributions by commercial payers, large employers, integrated delivery networks, associated entities such as laboratories, registries and provider user fees may be necessary to share the costs of building and maintaining HIEs. There are several rationales for entering into HIE infrastructure development activities via public/private partnerships. First, the efficiencies and quality improvements associated with electronic health information exchange accrue to all participants; e.g., other payers, integrated delivery networks, Accountable Care Organizations, medical and health home networks, hospital systems, etc. Likewise, the governance and risks associated with developing HIE infrastructure, such as seeking provider buy-in and determining effective pricing strategies, should not be borne solely (or predominately) by a single payer. Lastly, each State's HIE assets and challenges are different, and HIE strategies need to be developed with broad stakeholder involvement to ensure that the marketplace is balanced to support both the public and private health systems' business cases.

States should leverage their Medicaid investment with investments by a sufficient number of other payers and stakeholders to establish a sustainable business model. States have asked CMS to determine the degree of other payer contribution that is needed to meet this principle for approval of administrative funding. While Medicaid may serve as a catalyst to establish an HIE infrastructure, additional partners must be drawn into the marketplace based upon their share of the allocated costs. Medicaid funding cannot be the sole funding source for building,

implementing or operating HIE entities and/or HIE services. CMS will consult with the Office of the National Coordinator (ONC) for Health Information Technology, which has awarded HIE grants in all States and Territories to determine, on a case-by-case basis, the soundness of the Medicaid agency's HIE funding proposal. States should focus on obtaining proportional investments based upon market share and expected volume of transactions, as described in the Cost Allocation section of this letter. Medicaid funding must leverage and support the ONC grant funding; therefore CMS expects proposals to reflect aligned benchmarks, approaches and performance goals. CMS will examine HIT Implementation Advanced Planning Documents (HIT IAPDs) to ensure that States adopt HIE approaches that maximize return on investment and minimize project risk, including review of State's benchmarks, approaches, and performance measures related to State IT systems and meaningful use progress. This approach is consistent with the process by which CMS will work with States to ensure they meet the seven standards and conditions for receiving enhanced FFP for Medicaid technology investments.

CMS reminds States that the Medical Loss Ratio interim final rule published on December 1, 2010, makes references, at 45 CFR 158.151, to health information technology expenses that a private health insurance issuer may include in the share of the premium that must be devoted to health care services and quality improvement, such as those that provide the technological infrastructure to enhance current quality improvement or make new quality improvement initiatives possible, "…and that are designed for use by health plans, health care providers, or enrollees for the electronic creation, maintenance, access, or exchange of health information, as well as those consistent with the Medicare and/or Medicaid meaningful use requirements…." States may find it helpful when meeting with health plan stakeholders to emphasize that if they provide funding for health information exchange activities, such expense may be considered an allowable quality improving activity that may be reported as part of the 80-85% of premium revenue that must be devoted to clinical services and quality improvement if such expenses satisfy the criteria set forth in the Medical Loss Ratio interim final rule.

In order to confirm that other payers and providers will contribute an appropriate share of costs, States will be required to seek legal agreements (i.e., Memoranda of Understanding) with their HIE partners. These agreements should clearly outline the terms (scope, budget and timing) of each party's contributions in the near- and long-term functioning of the HIE. States should anticipate scenarios where additional payers and providers invest as the HIE(s) mature. Therefore, States should describe to CMS how early investor benefits will be handled, e.g., offering lower costs once others join and costs are allocated among a greater number of participants. The agreements between State Medicaid Agencies and other payers and providers must be submitted to CMS for review along with the State's HIT IAPD. While this degree of planning and business modeling may require intensive public/private negotiations within each State, CMS believes it is necessary and will not approve 90/10 funding for HIE infrastructure costs (such as those cited in the August 2010 SMD letter) without assurances that other payers and providers will bear an appropriate share of the costs, risks and governance. These agreements are just one indicator of other payers' commitment to HIE and as such, changes to these agreements will be reviewed by CMS along with the other performance metrics referenced above on an annual basis.

States may fund the non-federal share consistent with federal rules and regulations at section 1903(w)(6)(A) and 42 CFR 433.51. CMS will review the non-federal share funding sources on an individual basis using information provided by the State and gathered by CMS staff. Please be mindful that all sources of the non-Federal share and any fees, taxes, or donations must meet the requirements of section 1903(w) of the Social Security Act, implementing regulations, CMS guidance, and other applicable laws, rules, and regulations.

Cost Allocation

Cost allocation principles, as defined by OMB Circular A-87, should be utilized where entities other than the Medicaid agency stand to benefit in the results of the activity. In determining Medicaid's share of the costs towards building HIE, CMS will consider different allocation approaches depending upon whether the State is requesting Medicaid Management Information System (MMIS) or HITECH administrative funding, as follows:

- When the HIE functions directly relate to MITA business services and are necessary to enable them, and/or there are interfaces to the MMIS from external HIE entities, States may seek MMIS matching funds for the interfaces or connections between the MMIS and the HIE. These States should calculate the Medicaid-eligible percentage of their total covered population; or the percentage of total healthcare expenditures within the State that are Medicaid expenditures. That percentage will be Medicaid's allocated share.
- If the State Medicaid agency is seeking HITECH funds directly tied to the Medicaid EHR Incentive Program, States may calculate the percentage of all providers the State projects will receive Medicaid EHR incentives over the next five years from the onset of proposed HIE activities to the State's total number of providers. For example, if there are 10,000 providers in the State, and the State projects that 500 of them will receive Medicaid EHR incentives within five years, then Medicaid's allocated share would be five percent. States' environmental scans ("As-Is" HIT assessments) should support these projections.
- If the activity to be funded does not meet the criteria of this letter, or the August 2010 letter, then States wishing to request the 50 percent match for general program administration must provide justification as to how the HIE activity supports the Medicaid enterprise, and if approved, should calculate the Medicaid allocation using one of the MMIS cost allocation formulas described above.

Statewide Efficiencies

CMS recognizes that there are several types of HIE models emerging in the U.S. and that not all involve statewide services or governance, and will review each proposal individually. However, CMS encourages a State's HIE model to include the following characteristics:

- Deploys a statewide layer of HIE services or orchestrate existing sub-state nodes;
- Plays a significant role in the collection of Medicaid providers' meaningful use attestations and clinical quality measure data;
- Is directly focused on enabling providers to meet meaningful use requirements, such as lab results and clinical summary exchange;
- Provides immediate value to providers through affordable services that help them meet meaningful use requirements and coordinate and improve patient care;

- Is governed by state-level policies, accreditation processes and exchange standards that are aligned with Federal policy; and
- Is actively engaged with State government.

State Medicaid HIT Plans (SMHPs) and IAPDs should clearly describe the rationale for the HIE model selected from the perspective of benefits and risks to the Medicaid agency. If a proposed model does not include the characteristics above, the State should provide justification of why an alternate model is more appropriate given unique circumstances in that State. ONC will be a full partner with CMS in the evaluation of State Medicaid agencies' HIE funding proposals for consistency and alignment with the ONC funded cooperative agreements, and Nationwide Health Information Network (NwHIN) initiatives including Direct and Exchange. The funding proposal should also detail how the costs will transition from infrastructure build to operations and maintenance.

Sustaining Operational HIE

One of the Guiding Principles in the August 2010 letter was that HITECH funds are meant to support time-limited activities. In the context of HIE, examples include the development or expansion of provider directories, master patient indexes and laboratory interfaces. Once established and functional- and based upon the degree of provider enrollment and transaction volume, the funding perspective should shift from design and development to supporting ongoing operations and maintenance costs. There are some States where operational HIEs already exists; these States may seek Federal matching funds to sustain ongoing operational costs. Per our August 2010 SMD letter, under that scenario, CMS believes that the most appropriate means to support HIE is through adjustments to provider reimbursement methodologies, which are matched at a State's Federal medical assistance percentage (FMAP), and/or through the 50 percent match rate for general program administration if the HIE is related to administering Medicaid. States wishing to pursue HIE maintenance through provider reimbursement are encouraged to submit a State Plan amendment to their CMS regional office.

States are encouraged to consult with CMS in advance of formal SMHP and IAPD updated submissions to obtain technical assistance regarding the funding options and boundaries outlined in this SMD letter. States should reach out to their CMS regional office's Medicaid HIT staff lead as the initial point of contact. We believe that by taking a collaborative and informed approach, Federal and State investments can be carefully and measurably directed to develop and support HIE. Whether HIE is employed as part of meaningful use of EHRs, for enhancing care coordination and medical home strategies, or as enablers of new provider payment models, HIE is an essential tool in improving individual and population health and reducing unnecessary costs.

This letter provides three additional parameters to an existing collection of information that had been approved by OMB under control number 0938-1088 (CMS-10292). CMS is seeking OMB approval of those parameters which include the voluntary submission of information concerning the HIE business and sustainability model, HIE-specific performance metrics, and other payer contributions to HIE infrastructure build. To initiate the approval process, the 60-day notice

seeking public comment will be placed on public display on May 17, 2011 and will publish in the Federal Register on May 18, 2011.

For further information or clarification on this State Medicaid Director letter, please contact Mr. Rick Friedman at 410-786-4451, or Richard.Friedman@cms.hhs.gov.

Sincerely,

/s/

Cindy Mann
Director

cc:
CMS Regional Administrators

CMS Associate Regional Administrators
Division of Medicaid and Children's Health

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National Coordinator for Health IT
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CITL - INTEROPERABILITY BENEFITS					
Period/ Dollar valuation	National Savings Study year 2003 billions of 2003 $	National Savings Adjusted to 2011 billions of 2011 $ (inflation $1.23)	Delaware % (% health $)	Total Delaware Savingsmillions of 2011 $	30% of doctors with EHR Total Delaware Savings 30%
Outpatient Providers & Laboratories					
Reduced tests	4.00	4.92	0.30%	14.76	4.43
Efficiencies on remaining tests	26.10	32.10	0.30%	96.309	28.89
Outpatient Providers & Radiology Centers					
Reduced tests	8.60	10.58	0.30%	31.734	9.52
Efficiencies on remaining tests	16.20	19.93	0.30%	59.778	17.93
Providers & Other Providers					
Physicians	8.40	10.33	0.30%	30.996	9.30
Hospitals	4.10	5.04	0.30%	15.129	4.54
Providers & Public Health Depts					
Physicians	0.10	0.12	0.30%	0.369	0.11
Public Health Departments	0.10	0.12	0.30%	0.369	0.11
Total Interoperability Savings	67.70	83.27	0.30%	249.813	74.94

Total Annual Benefit to Payers by HIEI Level 4						
from:	Level 2	Level 3	National Savings to Payers Level 4	Delaware %	Delaware Savings to Payers	Delaware Savings to Payers 30% Savings
			billions	(% health $)	millions of 2011 dollars	millions of 2011 dollars
Provider-Lab	$0.74	$1.09	$3.76	0.30%	$11.28	3.38
Provider-Radiology	$1.59	$1.96	$8.04	0.30%	$24.12	7.24
Provider-Payer	$0	$0	$9.84	0.30%	$29.52	8.86
Total	$2.32	$3.06	$21.60	0.30%	$64.80	19.44

Forward-Looking Statements:

This business plan contains forward-looking statements based on management's current expectations, estimates and projections. All statements that address expectations or projections about the future, including statements about the organization's strategy for growth, product and technology development, market adoption, expected expenditures and financial results are forward-looking statements. Some of the forward-looking statements may be identified by words like "expects," "anticipates," "plans," "intends," "projects," "indicates," and similar expressions. These statements are not guarantees of future performance and involve a number of risks, uncertainties and assumptions. Many factors could cause results to differ materially from those stated here. These factors include, but are not limited to changes in the laws, regulations, policies and economic conditions, such as inflation, interest, research and development of new functionality, including regulatory approval and market acceptance.