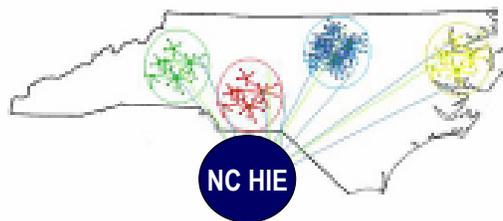


# NCHICA



## Office of the National Coordinator for Health Information Technology (ONC)

**NHIN Trial Implementations  
Sustainability Planning  
Version 1.2 Iteration**



**Draft**

NHIN Trial Implementations	Version: 1.2 Iteration	<b>NCHICA</b>
NC HIE Sustainability Planning	Date: 01-09-2009	

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### **About this Interim Report**

This interim report was developed as one of the work products under a contract with the US Department of Health and Human Services Office of the National Coordinator for Health Information Technology (HHS/ONC) utilizing models developed prior to the contract and at private expense by IBM Corporation. The data included in this report is available for reprinting with attribution to HHS/ONC, NCHICA, and IBM. This interim report provides a foundation for further use of the model to validate and adapt the underlying assumptions in future extensions of the Nationwide Health Information Network activity as circumstances and resources permit. Others wishing to use the underlying model should contact IBM since that is not a contract deliverable.

### **Acknowledgements**

The NCHICA staff and the NC NHIN Trial Implementations Team extend our thanks to:

- Dr. Robert Kolodner, Dr. John Loonsk, Ginger Price and their entire staff at the Office of the National Coordinator for Health Information Technology (ONC) for providing financial support for the development of this Business Plan as a deliverable under the NHIN Trial Implementations contract;
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- The NCHICA NHIN Steering Committee that has provided advice and support to the project over the past year;
- And with great appreciation: the IBM Corporation team, especially primary contributor, Richard Steen, IBM Executive Consultant, with support provided by Mary Thompson, RN, and Project Executive Ginny Wagner, PMP. Thank you for your efforts to help design a sustainability plan that elaborates options to meet the needs of the multiple stakeholders of North Carolina and achieve ROI;
- And finally, Andrew Weniger, the NCHICA Project Manager for the NHIN Trial Implementations project, who has made substantial contributions to this work product and Holt Anderson, Executive Director, NCHICA, and Project Sponsor for the NHIN Trial Implementations project.

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**IBM Corporation, Global Business Services, Application Innovation Services (AIS),  
Healthcare Practice [www.ibm.com](http://www.ibm.com)**

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## 1. Document Control

### **Summary of Changes**

Version #	Version Date	Nature of Change	Date Approved
V1	11/14/2008	Initial Submission to HHS/ONC	
V1.1	12/11/2008	Review by NCHICA members	
V1.2	1/9/2009	FINAL Version	

### **Document Approvals**

**This document requires the following approvals.**

Name	Title	Date
Holt Anderson	NHIN Project Executive and NCHICA Executive Director Document Owner	
Andrew Weniger	NHIN Project Manager	

### **Document Approvals**

**Document owner maintains document approval for this document.**

### **Document Review Plans**

**This document will be reviewed and updated, as defined below:**

NCHICA is pleased to present this first iteration of a Sustainability Plan for statewide HIE. We have built a complex simulation model that allows extraordinary flexibility in the ROI financial analysis as supported by our understanding of state and national healthcare ecosystems.

NCHICA looks forward to iteratively refining this plan with further input and testing from the North Carolina healthcare stakeholders.

### **How to Find the Latest Level of This Document**

The latest version of this document may be requested from the document owner.

### **Document Distribution**

The version 1.1 document was distributed to members of NCHICA participating in the NC HIE Council, NC HIE Council – Finance & Administration Committee and the NCHICA Board for their review and input. The version 1.2 document is being provided to the public through the NCHICA website and submission to HHS/ONC.

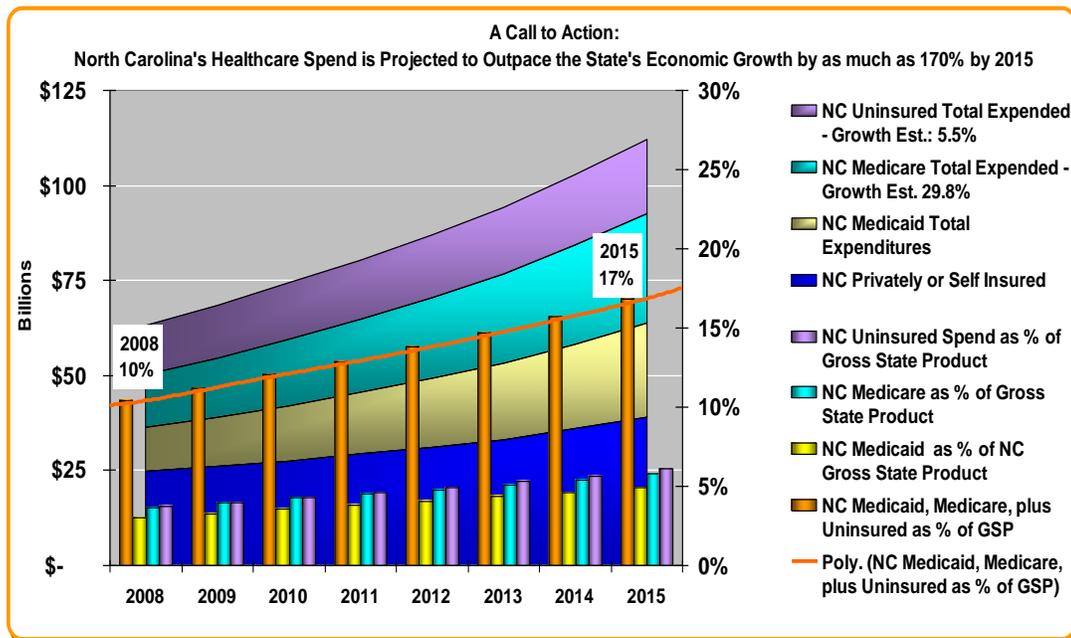
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## 2. Executive Summary

### 2.1 A Call to Action

North Carolina is facing an unsustainable escalation in healthcare costs. In order to drive more value for North Carolinians and all of their healthcare stakeholders, a more secure, modern, connected approach to providing clinicians with patient information is required. This integrated approach is referred to as Health Information Exchange (HIE), the electronic movement of health-related information among organizations according to national standards. This document outlines a financial and operational use of HIE to deliver breakeven by 2012 and an aggregate benefit to the state of \$2B to \$3B a year by 2015 through improved quality of care, increased patient safety, efficient use of limited resources, streamlined administrative workflows and reduction in waste across the state of North Carolina.

Today, over \$60 billion<sup>1</sup> is being spent annually on healthcare in North Carolina. Costs to provide healthcare to an increasing elderly, chronically ill and uninsured population is expected to rise faster than the GDP unless drastic measures at local, state and national levels are taken in the immediate future. Even before the recent economic downturn, studies indicate that at current trend rates North Carolina's healthcare Spend could Outpace Economic Growth over the next seven years by as much as 170%<sup>2,3</sup> (see Illustration 2-1).



*Illustration 2-1 Projection of overall Healthcare Spend Compared with North Carolina's Gross State Product*

Yet North Carolina has a remarkable legacy of innovation and creativity in the healthcare sector. A mere sampling from the Marketing Plan section in this report attests to North Carolina's national reputation as a leader in inter-enterprise collaboration:

- Public health statewide biosurveillance collection and analysis (NC Detect)
- Medical home networks, Community Care of North Carolina (CCNC),

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- First of a kind rural Health Information Exchange, Western North Carolina Health Network (WNCHN/DataLink),
- Enterprising program to encourage rapid adoption of ePrescribing technology (BCBSNC),
- Pioneer work in healthcare privacy standards, charter participant in the NHIN Architecture Prototype and NHIN Trial Implementations projects, and in the Social Security Administration use case on Authorization for Release of Clinical Information (NCHICA).

Yet while North Carolina has pockets of momentum already underway in enterprises and communities across the state, these are for the most part siloed by individual corporate interests.

The Nationwide Health Information Network (NHIN) projects, under the sponsorship of the U.S. Department of Health and Human Services (HHS), and the Office of the National Coordinator for Health Information Technology (ONC), were created “to establish standards for secure exchange of personal health information within and between health information organizations (HIOs) for the purposes of decreasing overall healthcare costs and improving quality outcomes for healthcare provided across a network of networks.” There have been two NHIN projects since 2005: the NHIN Prototype Architecture Project (2005-2007), and the NHIN Trial Implementations Project (2007-2009). North Carolina has been one of the leaders in HIE, with the North Carolina Health Information and Communications Alliance (NCHICA) participating as a subcontractor during the first NHIN project and as a primary contractor during the more recent NHIN Trial Implementations project. NCHICA serves as the establishing entity, sponsoring development of the statewide North Carolina Health Information Exchange (NC HIE).

This document outlines a financial and operational approach to leveraging the current momentum to fill the gaps through a cooperative approach to statewide coordination of priority HIE initiatives. According to this approach, a network of between 7 and 30 interoperable Health Information Exchange Organizations across North Carolina would be sustainable. The Sustainability Plan shows that an average Health Information Organization could deliver a positive 5 year Return on Investment with continually compounding results, realized through improved quality care, increased patient safety, efficient use of limited resources, streamlined administrative workflows and reduction in waste across the state of North Carolina.

Several key requirements will drive achievement of a sustainable business model:

- Leadership at the state government level including endorsement of a central HIE governing entity
- Implementation of effective technology and operational policies to enable HIE. (Example: consumer consent policies reflecting North Carolina laws and regulations as well as the preferences of the NC HIE community)
- Standards-based HIE applications and technological solutions
- Ever increasing adoption of HIT by clinicians
- Quantifiable demand for the information made available by HIE
- Initial funding

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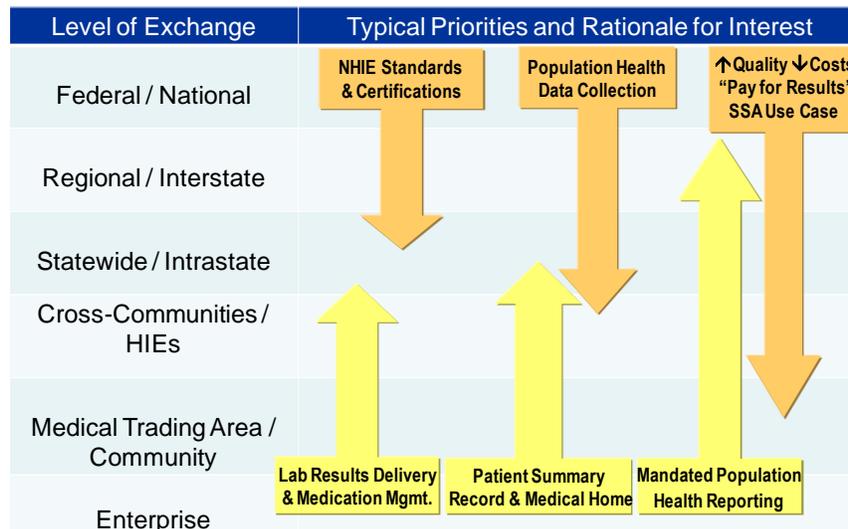
Key components for delivering sustainable value from HIE in North Carolina by 2012 are detailed in this document: Leadership, Policy, Technology, Market and Financial.

## 2.2 North Carolina Environment

North Carolina has many advantages which will help prepare for effective implementation of HIE across the state. Some of the key elements likely to increase the demand for and usefulness of HIE include:

North Carolina's Medicaid's program has already successfully implemented a Patient Centered Medical Home environment through the Community Care of North Carolina (CCNC) program. Following ten years of development and deployment, the vast majority of Medicaid recipients have been enrolled in a Medical Home with access to their own primary care physician. CCNC is designed to provide continuous, comprehensive care to patients and to maintain effective communication between all providers involved in the care process. Improved health outcomes have resulted in more than \$150 million in cost avoidances<sup>4</sup>, even though the Medical Home utilizes only manual processes and paper medical records. Implementation of a statewide HIE can provide the envisioned level of care coordination and contain managing rising healthcare costs, while providing more timely access to efficiently delivered information.

Enterprise and community-led HIE efforts around the state are building experience and momentum for electronic movement of health-related information among organizations. These multiple strategies to support HIE are generally compatible even though they are being implemented in siloed, enterprise-specific ways, or within limited community geographies. Illustration 2-2 depicts the currently recognized levels of Exchange Strategies.



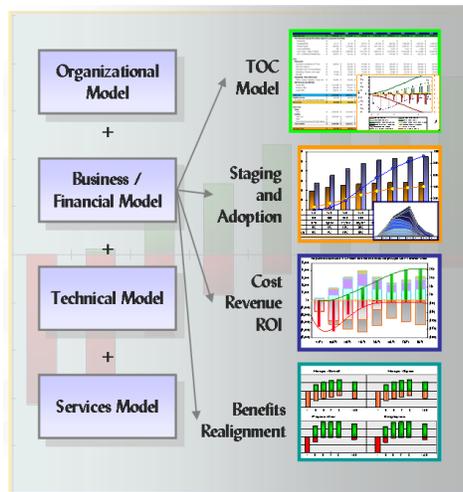
*Illustration 2-2 Exchange Levels and Rationale for Interest*

It acknowledges that grass roots demand for HIE is building at enterprise and community levels, often to support efficiency in results reporting, medication management, patient summary records, medical home processes, and population health. Simultaneously at the national level, opportunities to leverage standards-based HIE are being defined, such as the

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“pay for results” being pursued by Center for Medicare & Medicaid Services, (CMS) population health efforts from the Center for Disease Control (CDC) and efficiency efforts such as the Social Security Administration (SSA) Use Case included in the NHIN Phase 2 project. Additionally, this Sustainability Plan shows the potential impact that statewide leadership within North Carolina could have on the success of HIE across the state.

### 2.3 Financial Projections and Plans



*Illustration 2-3 Business Planning Approach*

This Sustainability Plan focuses on cross-cutting initiatives that were selected specifically because of their ability to impact quality and deliver value to key stakeholders within North Carolina’s greater healthcare ecosystem. The financial analysis looks at the relative difficulty (funding, technology, operations and adoption) of implementing the initiatives.

North Carolina is a recognized innovator in standards-based healthcare integration in the provider and public health sectors. The starting point for this Sustainability Plan is to leverage the substantial foundation of initiatives (many already operational) being sponsored by a wide variety of healthcare organizations across North Carolina and nationally.

The plan employs a four-stage business planning approach (see

Illustration 2-3) to analyze a program of initiatives to be implemented over the next three years. The analysis is designed to articulate quantitative benefits, qualitative benefits, and dependencies. Additionally, several mechanisms are presented that enable rebalancing benefits and costs to create win/win incentives for the primary stakeholders.

The primary objective of this plan is to holistically analyze a select combination of (core, high value-add, and transforming) initiatives already proven as high value with manageable risk by Health Information Exchanges [HIEs] across the nation, especially those demonstrating financial stability (see Illustration 2-4). These initiatives are foundational to inter- and intra-organizational sharing of healthcare information in a standards-based, secure, and auditable manner. These shared services initiatives are ideal candidates for coordinated state-wide implementation by all of North Carolina’s healthcare stakeholders.

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The plan uses scenario modeling to compare alternative approaches. For example, centralized versus decentralized implementation scenarios contrast how proactive collaboration and governance (of state and community-sponsored initiatives) affects outcomes, speed of adoption and ultimate value to stakeholder groups.

Potential HIE Initiatives in North Carolina (Statewide - "Green" and Independent, Community-wide - "Yellow")		Years->					Core Exchange Physician Directory Access Permissions Secure Email & Alerts Workflow Mgmt Physician ID & Access Physician Portal Consumer ID & Access Consumer Portal								-< Technologies						
		2008	2009	2010	2011	2012	KEY														
<b>CORE + QUICK HITS</b>	<b>1) Summary Patient Record Exchange</b>																				
	1a) Emergency Care Summaries →		1				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	1b) In-Patient Discharge Summaries →		1				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	1c) Out-Pat. Summaries & Consult Reports →			2			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	<b>2) Test Results Reporting</b>																				
	2a) Lab Results Delivery or Notification →		1				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
2b) Radiology Reports Delivery / Notification →			2			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
<b>HIGH VALUE-ADD</b>	<b>3) Medication Management</b>																				
	3a) Medication History from PBMs →		1				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	<b>4) Federal Agency Program Automation</b>																				
4a) Authorized Release of Information (SSA) →		1				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
<b>5) Consumer / Provider Communication</b>																					
5a) Consumer Access and Permissions →			2			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
<b>6) Provider to Provider Communication</b>																					
6a) Secure Email Messaging →				3		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
<b>TRANS-FORM</b>	<b>7) Patient Centered Medical Home</b>																				
	7a) Integrate PCMH with HIE Infrastructure →				3		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

Illustration 2-4 Core, Value-Add and Transforming Candidate Initiatives

Independent factors may change the order of initiative implementation, as well as the timing of those implementations. For example, accelerating the HIE support for North Carolina's already well respected Medical Home movement (CCNC) might change the mix of initiative adoption and timing. With additional upfront commitment to bringing statewide HIE to North Carolina, initial funding demands may increase beyond our projected amounts, and benefits could begin to accrue earlier. At the same time, every potential implementation path will need vigilant management to ensure that benefits are not left behind and that duplication of efforts is minimized.

Sustainability Plan modeling defines quantifiable benefits for each initiative. This Plan attempts to isolate those benefits that are exclusively a byproduct of the HIE technology itself, and are therefore distinct from the many valuable process improvement benefits though they are closely associated with HIE technology enablement. Of course, the realization of each benefit's full potential depends on phased implementation, timing of the associated initiative and an adoption curve by physicians and their patients. In these models, credit-for-benefits are conservatively phased in over multiple years.

The models project both one time costs and five to eight year recurring costs for an ecosystem of small to large Health Information Organizations (HIOs) that already exist or are in formative stages across the state. The variation in size of HIE community allows for some assessment of efficiencies of scale. However, the model leans heavily towards a federated

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(decentralized) representation of the state healthcare ecosystem. This ecosystem today is not dominated by any one or even a small group of vendors. Therefore, no single architectural approach is assumed and hardware, software, implementation and support services are represented by industry average price ranges. One output of the model is to calculate Return on Investment (ROI) by stakeholder group for typical small to large sized standards based HIOs.

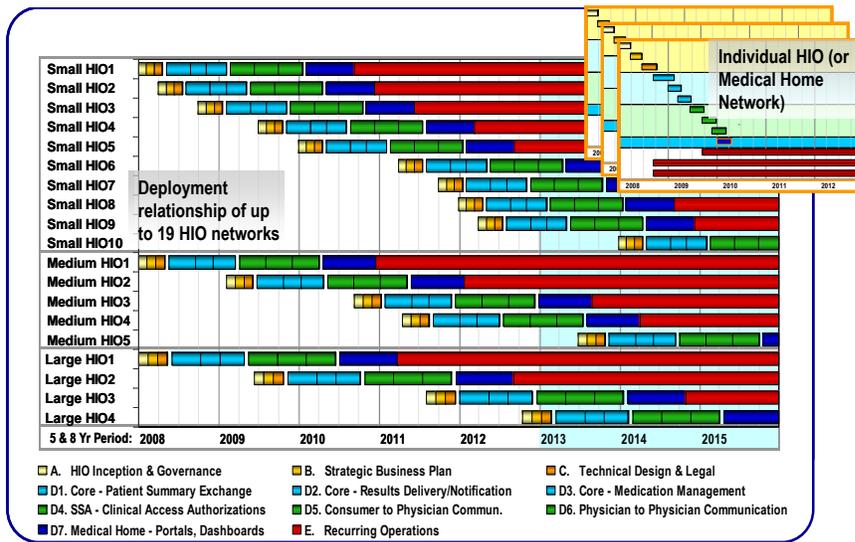
The alternative financial scenarios illustrated in this report are based on output from a proprietary HIE simulation model developed by IBM Corporation designed to contrast sustainability outcomes for large regions or states. Data inputs such as demographics, participation rates, costs, charges, and benefits and the resulting simulation outputs are artifacts of the NHIN Trial Implementations project, provided in an effort to gauge a range of outcomes to guide planning and strategy.

The financial plan also calculates the costs and revenues for a hypothetical public / private exchange coordinating and integrating across North Carolina. Formation of a state-wide, non-profit public / private exchange with the authority to set policy and funding priorities to support local HIEs is one approach being implemented successfully in other states. While many reasonable alternatives exist, we believe the state will ultimately require a formal policy and fiscal mechanism to effect equitable balancing of benefits to stakeholders who bear the cost for HIE innovation. This is especially the case as a state as large and varied as North Carolina should probably anticipate the value in leveraging and supporting community-based (Medical Home or HIO) initiatives while focusing on standards, regulatory policies, financing incentives (and perhaps some core interoperability shared services) at the state level. Illustration 2-5 depicts one scenario for how statewide coverage consisting of “small”, “medium”, and “large” HIEs<sup>1</sup> might evolve over the next eight years. Plausibly there might be a gradual consolidation towards large, fewer HIE entities due to cost efficiency.

---

<sup>1</sup> HIEs are used here generically to represent the interoperability organization in a community or medical trading area. Many of these might actually be Medical Home networks (such as those operated by CCNC, or health system / hospital networks (national chains, geographic clusters), or payer sponsors both private (BCBSNC) or public (Medicaid). Additionally their jurisdictions will always be overlapping and sometimes highly competitive.

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*Illustration 2-5 Projected statewide evolution of multiple small to large-scale HIEs (or Medical Home Communities)*

This Financial Model and resulting Pro Forma is based on a non-profit statewide exchange organization which redistributes revenue fees to support local HIEs in providing the most appropriate services for each medical trading area.

We modeled the multi-tiered relationship of patients, physicians, hospitals, and community HIEs spanning the entire state so that we could construct scenarios based on various scaling parameters. For example, what is an appropriate ratio of costs to benefits for an individual patient, within a hypothetical “medium-sized” HIE serving a community of 500,000 citizens in the North Carolina marketplace. We are equally interested in understanding how variable implementation schedules across the state would affect multi year ROI and even cumulative benefits savings at the state level. To illustrate one such scenario, we make the following assumptions:

- Strong collaboration and coordination at state and local levels (public-private governance model)
- Efficient implementation of the program of seven (core, value-add and transforming) initiatives
- Costs for implementation and operation based on vendor-neutral industry averages
- Benefits attributable only to the HIE technology automation and phased in over time

In our scenario, the cumulative statewide ROI is designed to be maintained at breakeven, while the role of the community HIOs in the overall ecosystem is to facilitate a more efficient and effective healthcare system. When benefits exceed costs (as they do in year five), the efficiencies accrue first to the investing stakeholders who have incurred the costs and only then to reducing the overall costs of the ecosystem.

Resulting projections over an eight year period are tracked on three interrelated levels. The first analysis (see Illustration 2-6) includes all capital and operate costs the eight year period but only counts benefits (phased in over time) that can be attributed solely to the introduction

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of the HIE technology. Per capita benefits for a participant in the local HIE are \$276 and \$413 annually in years 5 and 8 respectively. Statewide cumulative benefits could exceed \$3 Billion over eight years even allowing for the graduated startup of community HIEs.

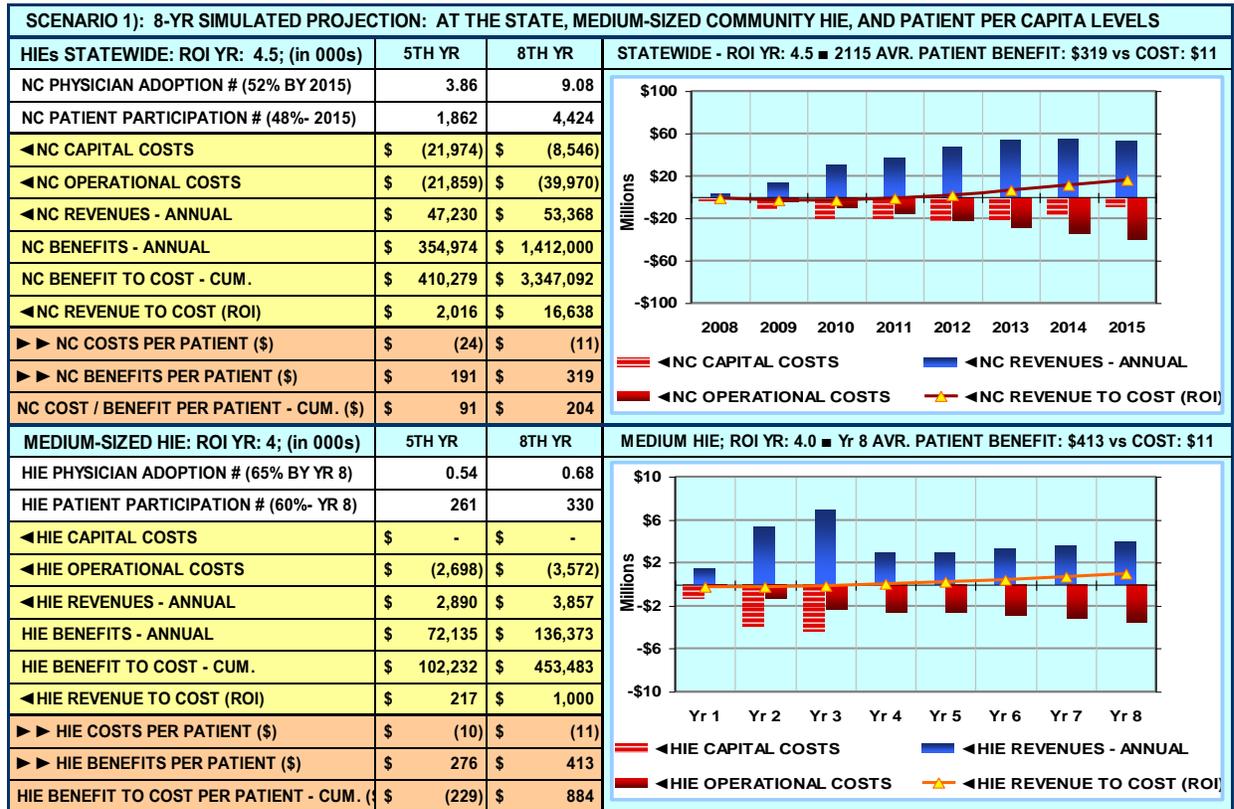


Illustration 2-6 Medium-sized HIO Assuming Technology Only Benefits

and Illustration 2-8 show the same scenario with the addition of non-technology Medical Home Quality Care process improvement benefits. While the HIE initiatives listed in Illustration 2-4 are foundational to patient-centric Medical Home care coordination the processes themselves produce significant savings. Because the initial stages of Medical Home can be put into effect and start producing benefits almost immediately. These early benefits can be useful in offsetting the initial bulge of technology implementation startup costs and transition costs.

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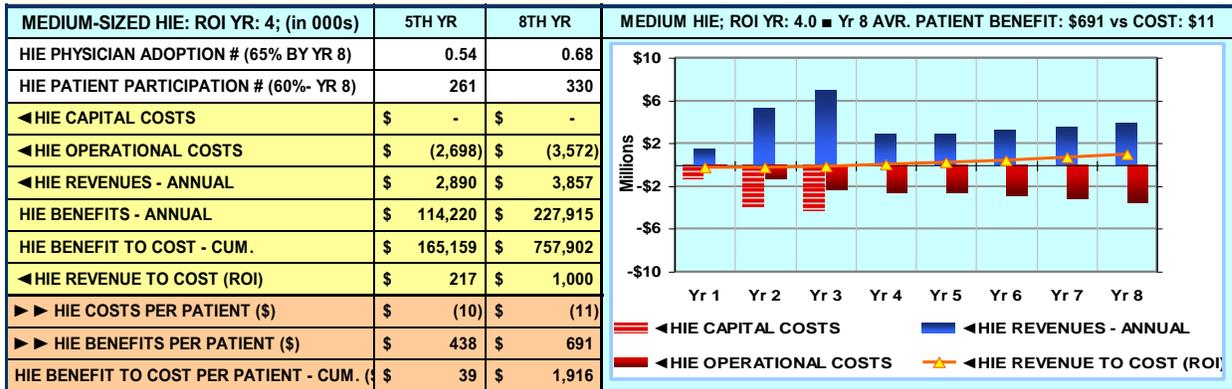


Illustration 2-7 Medium-sized HIO Assuming Technology and Medical Home Process Improvement Benefits

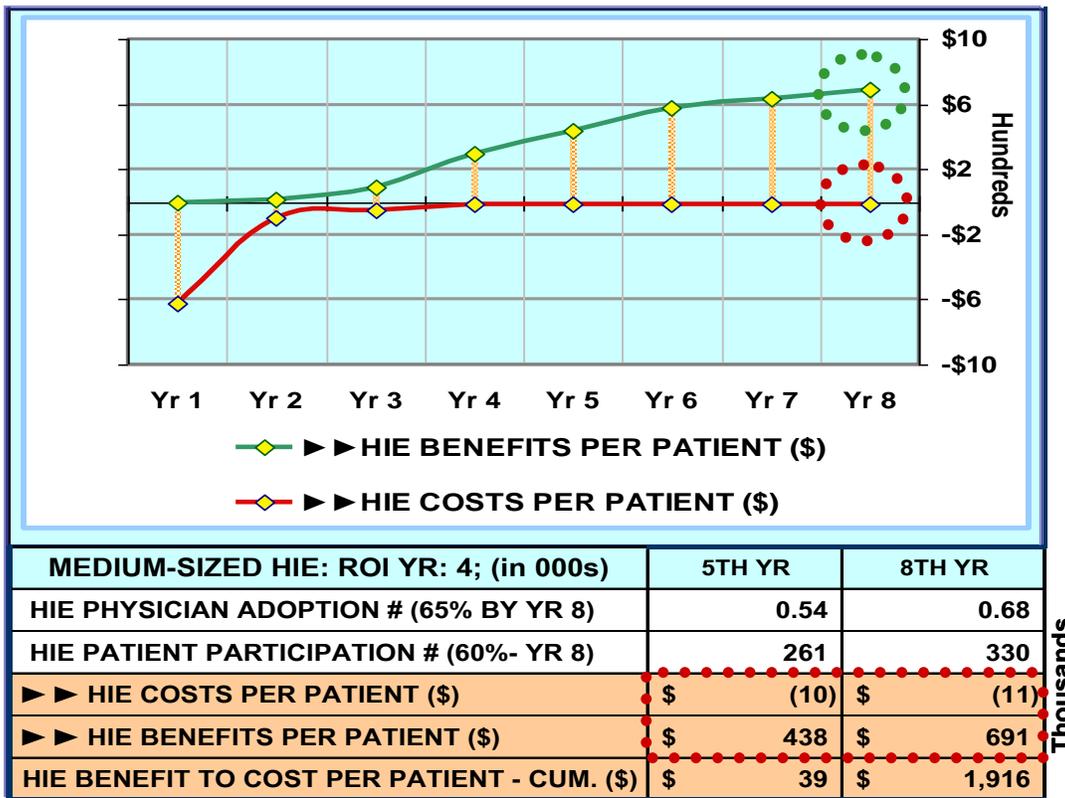


Illustration 2-8 ROI Snapshot of Medium-sized HIO Supporting Core, Value-Add and Transforming Initiatives

In summary, the financial modeling performed for the NC HIE shows that in year four a combination of local HIOs and the statewide coordinating HIO cumulatively would reach

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breakeven<sup>2</sup>; subsequent years would deliver benefits in excess of costs. Based on assumptions for costs and benefits, average net per capita benefits from HIE in NC could total almost \$700 annually by 2015.

Likewise, if standards-compliant HIEs are made pervasively available, the healthcare spend for North Carolina could be reduced by almost \$1.5B a year by 2015. All these financial benefits are accrued beyond those realized through improvements in quality of care and effectiveness, giving evidence that quality can also cost less.

Note: This Sustainability Plan is intended to be a first iteration and will undergo continuing refinement with notable immediate influences expected to include federal support for HIE as part of the Obama Administration Economic Stimulus / Recovery Program, commitment to the Nationwide Health Information Exchange by members of the Federal Health Architecture (DoD, MHA, IHS, SSA, CMS, etc.), and the implementation of Option Year One requirements for the NHIN Trial Implementations' project.

UPDATE: At this writing, significant potential for support of both HIT and HIE as part of the Obama Administration Economic Stimulus / Recovery Program appears likely. If this support manifests, the underlying assumptions in this plan would require adjusting to allow for significantly faster initial investments, with requisite acceleration in delivery of results.

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<sup>2</sup> Assuming by year 8, a 65% participation level by physicians and by 60% of participating physician's patients..

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### 3. Background, Scope and Assumptions

#### 3.1 NCHICA and NC HIE Council

The North Carolina Healthcare Information and Communications Alliance, Inc. (NCHICA) is a nonprofit membership organization established by the Governor of North Carolina with a mission to improve health and care in North Carolina by accelerating the adoption of information technology and enabling policies. NCHICA has used its role as a neutral convener for healthcare stakeholders to sponsor the initial formation of the NC HIE Council.

The stated mission of the NC HIE Council is to implement HIE within and across North Carolina state boundaries, to improve the quality, safety and efficiency of healthcare provided to residents, regardless of where care is administered. The NC HIE Council undertakes their mission through planning efforts, establishing policy and standards, and by advocating and supporting Health Information Exchange through the establishment of a statewide network which connects to the nationwide “network of networks” or the NHIN. This organization may help to create and facilitate operation of an actual exchange. This exchange may be managed through contracts with outside technical providers or by facilitating processes whereby multiple enterprises form a federation to deliver HIE services across North Carolina.

#### 3.2 Sustainability Plan Scope

This Sustainability Plan, a deliverable for the Nationwide Health Information Network Trial Implementations Contract awarded to NCHICA in September 2007, is constructed to serve multiple purposes:

- Deliver on NCHICA’s mission by providing North Carolina leaders a first iteration Sustainability Plan to establish statewide HIE across North Carolina.
- Fulfill a requirement from the NHIN Phase 2 Participant’s Contract -Task 9: “Building from the 2006 NHIN Deliverables (operations plans, deployment plans, and cost and revenue plans) and other ONC contract deliverables, the Contractor shall provide a jurisdiction-specific business plan outlining how its health information exchange will share data with other NHIN participants and be self-sustaining within five years.”<sup>3</sup>
- Be dynamic, so that this first iteration will be undergoing continuing refinement. The most immediate influences expected to include the health policies of newly elected officials at the state and national levels.<sup>4</sup>

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<sup>3</sup> Additional guidance was provided by the Office of the National Coordinator (ONC) in an amendment to the NHIN Trial Implementations contract in March, 2008, referencing the deliverable for Task 9: “Service area-specific business plan that shows how the health information exchange will share data nationally and be self-sustaining within five years.”

<sup>4</sup> NCHICA’s Fall 2008 Strategic Planning effort, and the implementation of Option Year One requirements for the NHIN Trial Implementations’ project are other opportunities for updates and expansion.

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### 3.3 Assumptions

Health Information Exchange is capable of delivering improvements in healthcare quality, safety and value for North Carolinians. (These improvements are commonly referred to as “benefits.”)

Development of enterprise and community level HIEs will increase stakeholder commitment, build momentum for priority initiatives, solve local healthcare problems and provide “markets” for HIE solutions.

Duplicate efforts can reduce the net benefit of HIE by creating redundancy.<sup>5</sup>

Statewide collaboration on key initiatives will increase the overall net value of HIE across North Carolina.

Successful HIE is dependent upon effective and pervasive adoption of elements of Health Information Technology (HIT) such as clinician incorporation of portal usage and Electronic Medical Records into their “thinkflow.”<sup>6</sup>

Establishing effective common policies, such as development of a consumer consent policy, is critical to success.

At the current stage of market maturity, HIE should utilize standards-based, non-proprietary approaches, and maintain hardware, software and reimbursement system neutrality.

Moving beyond enterprise and community based HIE efforts within the state of North Carolina will require formal state-level authority. (According to analyses by the National Governors Association and the National Conference of State Legislatures, almost every other state, has a governor or legislative appointed task force, some operational for several years).

HIE benefits may not align with costs for every stakeholder, and therefore a re-balancing of costs and benefits will be necessary.

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- 5 It is prudent to minimize duplication of effort in deploying HIE across North Carolina. For example, preventing adverse events from medication prescription interactions is an expected benefit from HIE, and yet avoiding a single adverse event is a benefit that can be delivered once, no matter how many systems, enterprises, clinicians, or Health Information Organizations(HIOs) are involved.
  - 6 Building this “on-ramp” of clinician connectivity is a significant undertaking, and the speed and pervasiveness with which this adoption of HIT continues within North Carolina will have an impact on all elements of this Sustainability Plan. Many recommendations have been made to improve adoption of HIT by providers. Most recently within North Carolina recommendations were included as part of the report Improving Access to Healthcare for Uninsured North Carolinians delivered to the NC general Assembly by the NC Department of Health & Human Services, April 2007; and through the joint statewide sponsoring of ePrescribing by Blue Cross Blue Shield of NC and NC State Medicaid.

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## 4. National Perspective

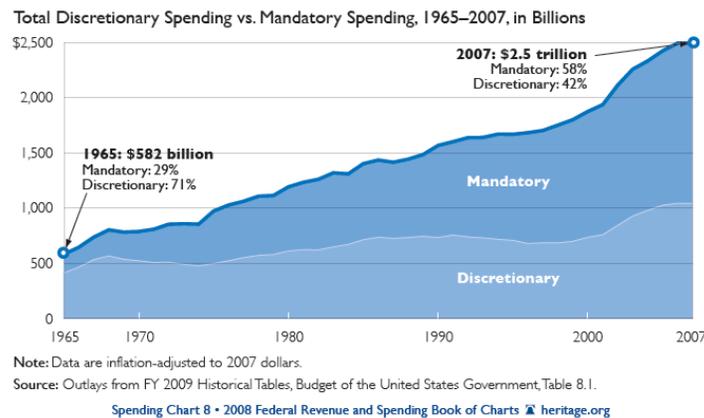
This Sustainability Plan addresses the factors influencing healthcare costs and shows how HIT and HIE can be used to drive value in healthcare, and therefore contribute to a path toward sustainable healthcare.

Current and projected healthcare costs are an unsustainable burden on the US economy.

### 4.1 Healthcare and the National Economy

Recent economic events have highlighted an already critical condition of the economy in the United States. In October, stock prices turned in some of the worst one day, one week and one month returns ever recorded. This apparent onset of recession put a damper on both consumer confidence and capital investment spending including the growing trade deficit, the down turn in the real estate market, rising unemployment rates, the sub-prime mortgage and credit crisis and the rise in oil prices.<sup>5, 6, 7</sup>

In the face of these fiscal challenges, the federal government continues to face on-going economic burdens. While defense and homeland security spending escalated significantly after the 9/11 events, approximately a two hundred billion dollar increase from 2001 through 2008, this currently represents less than 5% of the GDP.<sup>8, 9</sup> Instead, the primary drain on the federal budget is the mandatory or non-discretionary category of government spending. Illustration 4-1 shows how mandatory spending has ballooned over the past several decades and now consumes over half of the federal dollars spent each year.<sup>10</sup> This increased rate is primarily due to Social Security, Medicare, and Medicaid committed expenditures. Healthcare related spending is growing at an alarming rate due to: the increase in life expectancy from 47.3 to 77.8 years over the past century; to the aging of the baby boomer generation and the rise of chronic illness among this population; and to the increasing complexity and cost of readily available medical treatments.<sup>11</sup> Since many of these expenditures fall into the mandatory spending category for the US Congressional budget, the government is facing significant fiscal challenges.



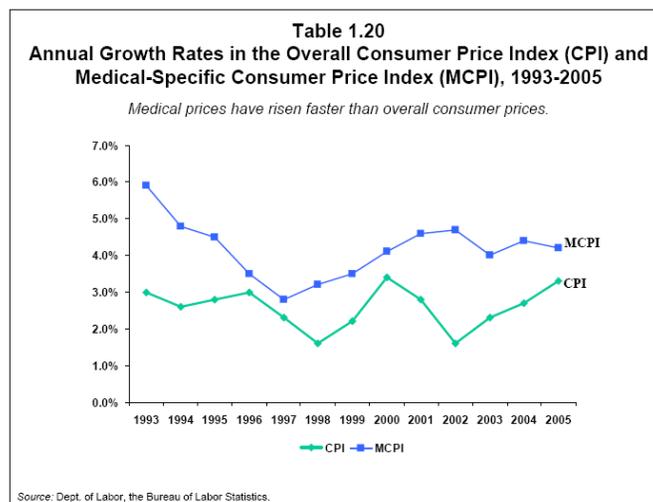
**Illustration 4-1: Discretionary vs. Mandatory Spending in Federal Budget**

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This economic state of affairs is not just a federal spending problem. Healthcare expenditures are significantly impacting individuals, families, businesses, and state governments. As a nation, the US spent \$2.1 trillion on healthcare in 2006, or \$7,026 per person, which represented 16% of GDP.<sup>12</sup> This is expected to increase to 20% of GDP and over \$12,000 per person by 2015, greatly impacting the ability of both the government and society to spend on other necessary components of U.S. infrastructure and investment in social and economic development.

The portion of the total healthcare bill that is paid by state and federal governments is 46%. While the share of out-of-pocket healthcare spending by Americans has decreased from 40% to 13% over the past four decades, the dollar burden on individuals and families has increased from \$25 billion in 1970 to \$244 billion in 2004.<sup>13</sup> A constant annual growth rate for this period would be calculated as 6.93%. As Illustration 4-2 shows, medical costs continue to increase faster than overall consumer prices.<sup>14</sup> While this would perhaps be acceptable if Americans felt that their healthcare dollars were truly buying superior care, comparative benchmarks with other developed countries do not bear this out. Reports released by the World Health Organization show that the US has little or no quality improvement and fewer people with health coverage than peer countries, despite significantly higher expenditures. In a world where there are many challenges to remaining competitive in a global economy, state and federal governments have been joined by large and small business in the race to slow the amount of dollars spent on healthcare.

At a September 4, 2008 briefing in the nation's capital, the Business Roundtable called for legislative action to address the increasing costs of healthcare and energy. The Business Roundtable is comprised of 160 of the country's top CEOs, representing companies that provide healthcare coverage for 35 million Americans. As stated in a letter from CEO John J. Castellani to Congressman John Dingell, "Enactment of HIT legislation is a top priority for the Business Roundtable. We believe our healthcare system must use current technologies to promote efficiencies, reduce errors and provide the technological platform to assess the quality and value of healthcare."<sup>15</sup>



**Illustration 4-2: Medical vs. Overall Consumer Spending Trends.**

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The rising cost of our current healthcare system is a critical concern within the mindset of the American people, causing healthcare to climb to the forefront of the national political agenda. Stabilization of Social Security and Medicare is an absolute priority for the newly elected Congress and President. Not only are the expenditures for these programs spiraling upward, disruptions of these benefits represent threats to an economically vulnerable population, the aged and retired who survive on a fixed income. Another economically vulnerable population is the uninsured. Some of these individuals are unemployed, self-employed, or employees of small to medium-sized businesses. Medicaid is generally considered the refuge for people who are below poverty level or are disabled, but states have typically been forced to cut back on benefits during tough economic times when assistance is most needed. In addition, the restrictive income qualifications for Medicaid and the lengthy approval process for disability claims add to the economic stress experienced by these populations. A third group whose right to high-quality and financially non-punitive healthcare is returning veterans from Iraq and Afghanistan. There is a clear need for continuing access to consistent health services and financial support as these individuals and their families transition from military healthcare to civilian healthcare institutions.

Americans have historically believed in the rights of all citizens to receive a basic level of healthcare services regardless of socio-economic status. However, there is a great deal of disparity when analyzing the reality of healthcare delivery across the U.S. Much research has been directed at studying the presence of and possible causes for this inequality in the practice of medicine. The differences in treatments prescribed, prices of services rendered, and health outcomes vary widely in this country across economic, racial, and geographic boundaries. These issues are being approached from many angles as quality efforts become more pronounced surrounding clinical practice. Professional medical organizations are making strides in defining and communicating best practices and evidence-based policies that will help diminish disparities in the delivery of efficient and effective quality healthcare.

#### **4.2 Impact of National Healthcare Trends**

**CMS and Other Government Agencies: Equal Access and Quality Care Initiatives** The federal government via the Centers for Medicaid and Medicare Services (CMS) is implementing new policies intended to begin to equalize quality in healthcare services throughout the country. One primary mechanism is through reimbursement (as evidenced by the continuing refinement of reimbursement schedules by CMS). A widely shared hypothesis is that reimbursement reform must be enacted within this country so that prevention, quality, continuity of care, and proper utilization of technology can be driven by appropriate incentives for hospital and individual physician providers. Another strategy for equalizing healthcare is to make the cost structure and flow of money more transparent to the general public (see HHS' Four Cornerstones Initiative – specifically *Measure and Publish Price Information*). A cross-section of hospitals and insurance companies are now posting pricing to the public and membership on internet sites. This transparency is being extended into quality issues and the issuance of “report cards” for hospitals. (North Carolina has an extensive hospital reporting system in place through the NC Hospital Association). One goal is to help the consumers of healthcare services to be more informed and active participants in their care by choosing quality service organizations that offer lower prices. As it prepares new initiatives and pilots for local communities, CMS has been able to leverage important emerging interoperability standards from groups such as Integrating the Healthcare Enterprise [IHE] and the NHIN sponsored Health Information Technology Standards Panel [HITSP].

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CMS is one of twenty-seven federal agencies who have committed to exploratory use of the NHIN through participation in ONC-sponsored projects. It is anticipated that CMS will sponsor a use case demonstration during the next phase of the NHIN projects: Use of the NHIN to enable a patient's EHR to follow their "transition of care" between inpatient, rehabilitation, outpatient, skilled nursing, and home health care environment(s) is expected to result in improved quality of care, massive efficiencies within the healthcare and payment systems, and cost savings.

Many other government agencies, particularly the Social Security Administration [SSA], Veterans Administration [VA] and Department of Defense [DoD] have been strong advocates for NHIN standards and are beginning to sponsor and fund NHIN use cases intended to illustrate the viability of public to private sector interoperability. States are also becoming active proponents of the NHIN standards, as exemplified by the National Governor's Association sponsorship of e-Health initiatives.

These efforts will go a long way towards achieving national goals of curbing healthcare costs while obtaining better quality care that lead to healthier outcomes. Other concerns that keep healthcare in the forefront of political and policy discussions include: an ever increasing escalation of chronic disease and the associated burden it lays on U.S. resources; the impact of rising insurance costs that prevent businesses from hiring more people and from competing in a world market; and the desire of residents for ownership of their healthcare records in a complete, private, secure and transportable form.

### **Standardizing interoperability In Health Information Technology**

The issues to be addressed by healthcare leaders are highly diverse and complex; yet there is significant movement within the healthcare industry and government sectors to develop systems and policies that support more efficient and effective delivery of healthcare in the United States. Over the past several years, standardization of data exchange processes has been maturing rapidly. The primary goals of the Nationwide Health Information Network Trial Implementations project are to establish standards for secure exchange of personal health information within and between health information organizations (HIOs), decrease overall healthcare costs, and improve quality outcomes. Various industry groups are working diligently to establish both industry and technical standards in support of secure electronic health data exchange, to meet clinical and business needs for sharing information among health stakeholder organizations and systems. Some of the groups leading this effort include:

- **Integrating the Health Enterprise (IHE):** IHE promotes the use of industry-established standards. IHE is an initiative where healthcare professionals and industry work together to improve the way healthcare applications share information.
- **The Healthcare Information Technology Standards Panel (HITSP):** a cooperative partnership between the public and private sectors, formed for the purpose of harmonizing and integrating health information standards.
- **The Certification Commission for Healthcare Information Technology (CCHIT):** CCHIT is an ONC recognized certification body for healthcare applications such as Electronic Medical Records and Personal Health Records (PHR). , CCHIT's mission is to accelerate the adoption of health information technology by creating an efficient, credible and sustainable certification program for healthcare vendors who wish to participate in the NHIN.

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- **The Health Information Security and Privacy Collaboration (HISPC):** HISPC has surveyed 44 states and territories, identifying and proposing practical solutions that protect privacy and security of health information exchange and permit interoperable health information exchange through adoption of best in class practices.

### **Accelerating HIE Deployment And EMR System Adoption**

Health information exchange is at the forefront of state and national efforts to provide secure, interoperable transmission of digitized standards-based clinical data between providers and patients within a community, regionally and nationally.

Electronic medical records (EMR) are slowly being adopted by physicians, encouraged by hospital offerings and government incentive programs. EMRs have been proven to reduce clinical and administrative inefficiencies, enable the use of best practice alerts and clinical reminders, reduce medical errors and improve chronic disease management. Without more widespread adoption of EMRs however, change will be slow to occur.

HIE and EMR adoption by healthcare providers lays the groundwork for the information needed by public and private payer plans if they are to change reimbursement mechanisms. Payers are initiating programs to focus more on quality of care delivered, and outcomes realized rather than continuing the older payment method for episodes of care. Implementation of balancing mechanisms such as pay-for-performance reimbursement are necessary to evolve fee-for-service practice patterns.

Finally, the use of HIE has the ability to put the consumer in control of their own personal healthcare data by creating a methodology for the provision of a secure portable lifetime personal health record.

### **Effect Of 2008 National And State Elections**

The recently national and state elections are expected to increase emphasis of the healthcare sector government. These developments are expected to encourage HIE capital investment through grants and legislative funding. Such programs should enhance efforts to establish a self-sustainable HIE in North Carolina over the next few years. During their campaigns, newly elected President Obama and Governor Perdue each described their desire to utilize electronic medical records to improve the efficiency and effectiveness of healthcare.

NCHICA is prepared to assist in turning those campaign promises into reality, by continuing their support in the formation of the NC HIE, and ongoing operation of a statewide HIE.

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## 5. North Carolina Healthcare Perspective

North Carolina faces a healthcare crisis even greater than the national situation. Therefore, this Sustainability Plan describes the market elements specific to North Carolina which may be best addressed through appropriate application of HIT and HIE. This Sustainability Plan addresses benefits, costs and funding options for several key cross-cutting initiatives that will enhance current enterprise and community level programs already underway in North Carolina. Many communities of interest (payer, employer, healthcare enterprise, medical specialty, public health, etc) exist and this Sustainability Plan seeks to examine ways cross-cutting initiatives can support the formation of a network of communities and enterprises based upon common goals.

Examples of current initiatives include:

- A statewide immunization registry
- The public health situation awareness system
- The Duke Healthcare System patient and physician portal initiatives
- The Western North Carolina Health Network DataLink project and
- The Blue Cross Blue Shield of NC / Medicaid ePrescribing incentive program

The best deployments of HIT and HIE for North Carolina will build upon the momentum being developed by independent enterprise and community initiatives already underway to create statewide collaboration on those efforts which can best be delivered once across the state.

### 5.1 Statewide Issues in North Carolina

#### **Healthcare As A Competitive Advantage For Attracting/Maintaining Employers**

While all of the national healthcare issues and complexities discussed in this document apply to North Carolina, several have particular urgency in this state. North Carolina's economic foundation is formed by keeping current employers in the state, attracting large employers to the state, and maintaining an entrepreneur-friendly. To accomplish these objectives, the cost burden of health insurance on businesses must be contained. A recent study by the Rand Corporation found average employer contributions for health insurance increased for all businesses regardless of size between the years 2000 to 2005. While the reported 30% increase was the most burdensome for small businesses with fewer than 25 employees, the increases were also significant for mid-sized firms who have 25 to 49 employees and 50 to 99 employees, at 16% and 25% respectively. In addition, businesses with 100 or more employees spend on average 10% of their payroll on health insurance.<sup>16</sup>

For North Carolina, it is especially important to offer more competitive rates than other states in the competition for large employers. As of 2006, North Carolina ranked 18th in the United States for percent of businesses offering insurance and 18th for states with the lowest average cost for employers' contributions per employee at \$8,103.<sup>17</sup> While this might appear to be reasonable, the economy in North Carolina is lukewarm and worse for many residents as unemployment outpaced jobs growth in 2008, particularly for those in lower income or blue collar trades.<sup>18</sup>

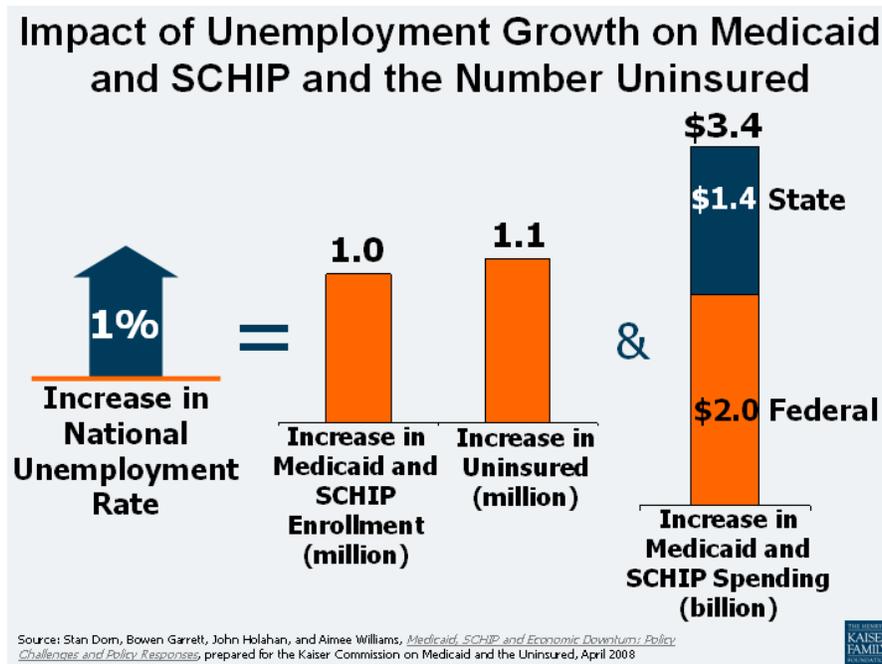
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**Growing burden of Medicaid and uninsured on state budgets**

It is worrisome that spending on elderly, low-income, and uninsured populations through state retirement programs and Medicaid is escalating. A report issued recently by the Center for State and Local Government Excellence listed North Carolina as one of the states holding significantly more than average unfunded liabilities due to retirement healthcare benefits owed to state employees.<sup>19</sup> In addition, North Carolina is also in a precarious position regarding the cost of healthcare services for Medicaid recipients. This burden on the state budget typically increases annually while state revenues decrease as lower taxes are collected during these less than desirable economic conditions.

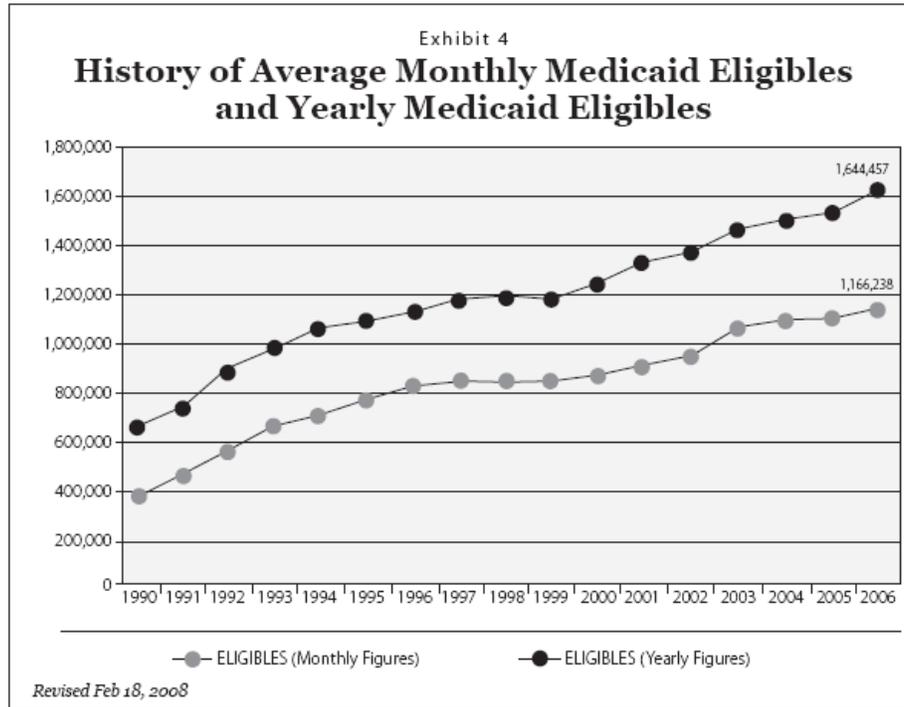
**Unemployment Increase And Medicaid Enrollment In A Slow Economy**

*Illustration 5-1* shows the problematic relationship between unemployment and state healthcare spending.<sup>20</sup> As of 2005, North Carolina had 18% of North Carolinians (or over 1.5 million of its population statewide) were enrolled in Medicaid.<sup>21</sup> Historic trends from *Illustration 5-2* show that Medicaid enrollment has been growing for the past two decades and will most likely continue to do so.<sup>22</sup> In fact, the average annual Medicaid spending growth in North Carolina has outpaced that in the U.S. since 1990.<sup>23</sup>



*Illustration 5-1 Impact of Unemployment on Growth in Medicaid and Uninsured.*

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**Illustration 5-2 Upward Trend of Medicaid Eligibles.**

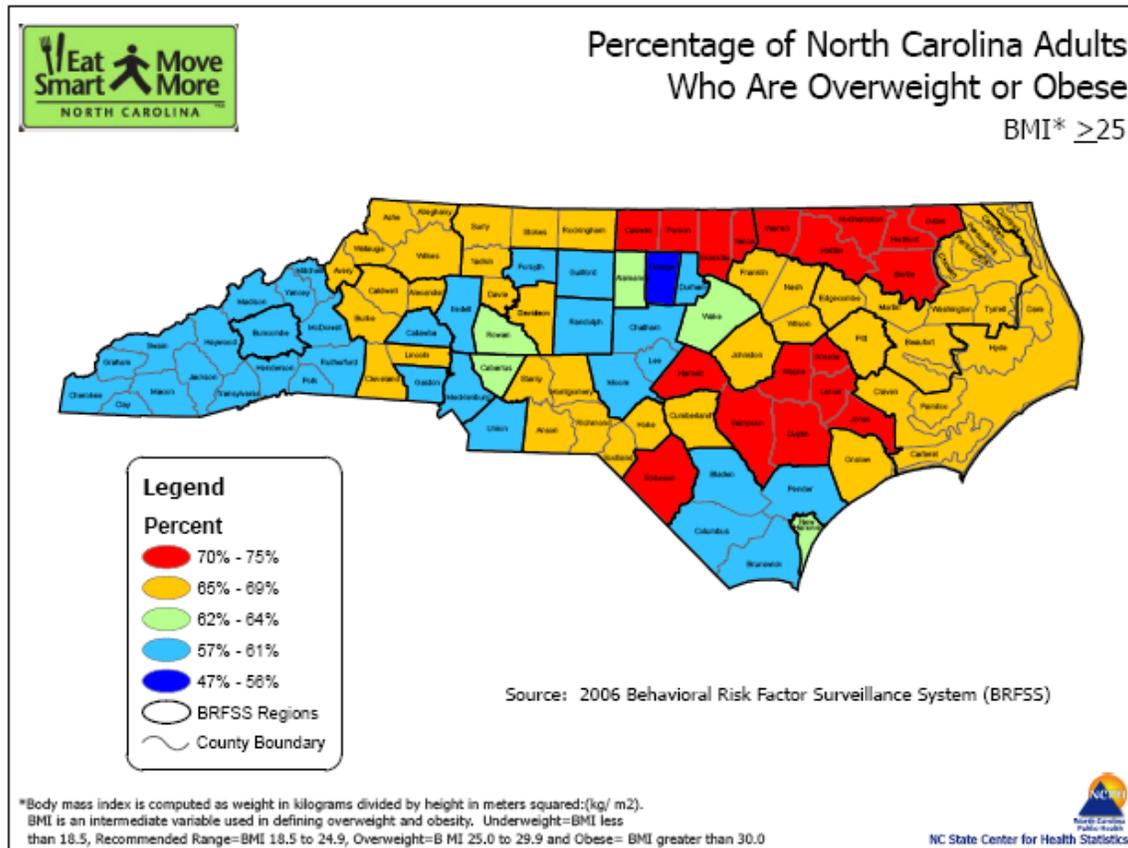
The economic impact of chronic disease can be broken into two categories, actual expenditures and lost productivity. In 2003, spending on chronic conditions for North Carolina totaled \$7.9 billion, and lost productivity was calculated at \$32.1 billion.<sup>24</sup> Cancer, heart disease, and stroke ranked as the top three causes of death in the state in 2006.<sup>25</sup>

10.1% of North Carolinians have had an asthma-related incident in their life, with 17.8% of them being children.<sup>26</sup>

Diabetes also has a high prevalence in the state affecting 600,000 or 9.1% of the population, and an additional 408,000 individuals have been diagnosed with pre-diabetes conditions.<sup>27</sup>

Even more worrisome for the future is that almost all of these conditions count obesity as a risk factor. The map in *Illustration 5-3* emphasizes the direness of the situation in which North Carolina finds itself.<sup>28</sup>

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*Illustration 5-3 2006 Incidence of Overweight & Obesity in North Carolina by County.*

### **NC’s High Percentage Of Returning Military Personnel With Significant Medical Issues**

Another pertinent population sub-group on the radar for North Carolina includes returning veterans or “Wounded Warriors.” The economic impact of medical care for returning military personnel is as much about the lives and families affected as it is about state expenditures. As of September of 2007, North Carolina was the 9th most veteran-populated state in the nation.<sup>29</sup> The issues surrounding these North Carolinians center around the continuity of care between Department of Defense (DoD), Veterans Administration (VA) and civilian health providers,, especially in the case of disability where it is critical to capture the longitudinal medical record. The Social Security disability application process in general has become a hot topic, as more and more cases have been backlogged due to the paper-based system and a shortage of workers who process the disability claims in Social Security offices. These are just a few of the healthcare-related issues that North Carolina is facing now.

## **5.2 Statewide Solution Building Blocks**

### **Role Of HIT Technology In Curbing Growing Healthcare Costs**

The careful application of healthcare information technology and health information exchange can yield large returns in helping North Carolina reach its goals of establishing a statewide network that will help curb costs and improve health status for its citizens. In addition, the NC statewide network will enable access to the (federal-level) Nationwide Health Information

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Network, helping to lay the underpinnings for additional levels of interoperability and functionality in the future. Politics, policy, and processes lay the foundation for this strategy and must involve a complex set of healthcare communities and influential non-geographic institutions while seeking legislative support. There are currently a number of independent forward-looking activities within North Carolina focused on the transformation of healthcare delivery, many reflecting diverse community interests. The needs, incentives, and sphere of influence of these existing efforts must be carefully considered as we create the statewide road-map of connectivity for North Carolina.

**Medical Home Movement**

The Medicaid population is a significant demographic influence affecting communities across North Carolina. The medical home model for healthcare delivery has been embraced by North Carolina in the effort to address some of the traditional problems encapsulated by Medicaid programs: inadequate access and coverage, inappropriate utilization of services and lack of focus on prevention and health.

Originated by pediatric physicians, the Medical Home methodology seeks to place every patient with a primary care physician who serves as the coordinator of care *in partnership with the patient*, a significant departure from the “gatekeeper” model. The ultimate goal is to provide continuous, comprehensive care to patients while maintaining effective communication between all providers involved in the care process. Accomplishing this goal requires an encompassing approach that provides compensation incentives to physicians and other members of the delivery team.

**Community Care of North Carolina**

The Medical Home model has been championed by Community Care of North Carolina (CCNC) in the struggle to provide high-quality care for Medicaid patients at lower costs. The map in *Illustration 5-4* shows how CCNC is organized regionally across the state.<sup>30</sup> CCNC focuses on clinical initiatives such as medication management, emergency department utilization, and chronic disease management.

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## Community Care of North Carolina Access II and III Networks



PUS Access II III 9-2007

**Illustration 5-4 Map by County of Community Care of North Carolina Networks.**

Early success of the CCNC model has been documented in studies conducted by both the Ships Center at the University of North Carolina (UNC) and the Mercer Human Resources Consulting Group, detailing savings from its asthma, diabetes, and pharmacy management programs of \$3.5 million, \$2.1 million, and \$1 million respectively.<sup>31</sup>

### **Large Employer Support for Medical Home**

The patient-centered Medical Home model is being taken up by large employers in the state, especially those with national scope, because of its goals of lowering costs and maintaining health status. The Bridges to Excellence (BTE) program was formally organized in the U.S. in 2003 by a group of nation-wide employers. In North Carolina, the initiative is led by companies with a large presence in the state including IBM, Duke Energy, GlaxoSmithKline, Cisco, and Wachovia. Participating insurers, necessary to the success of the transformation of reimbursement, are BCBSNC, Aetna, United Healthcare, and CIGNA.<sup>32</sup>

The BTE program incorporates a technology strategy into healthcare delivery as it requires third level certification for participating physician practices. BTE recognizes the need for data exchange between providers of care to support the comprehensive patient summary profile required by the primary physician, the inclusion of the patient in promoting their own health status and decision-making activities, and the data elements needed for proper quality

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measurements and reimbursement tools. The Medical Home model, whether applied to public programs or private healthcare, is expected to continue to thrive in North Carolina.

### **Community HIEs In North Carolina**

Today, technology is infiltrating many aspects of the healthcare system. North Carolina has experienced a great deal of regional activity in health information exchange. The Healthcare Information and Management Systems Society (HIMSS) State Dashboard lists twelve Regional Health Information Organizations (RHIOs)<sup>33</sup> within the state of North Carolina. Three of the twelve are completed pilot projects created under the support of the eHealth Initiative and are considered to be expired.

Health information exchange initiatives throughout the state are usually organized around very specific regional needs, while a few focus on public health data uses and statewide scope.

#### ***Western Counties***

### **Western North Carolina Health Network**

In the mountainous western region of the state, we see an example of overlapping community programs coming together to form a larger regional HIE. The WNC Health Network (WNCHN) is the region's largest cross-cutting organization, with representation in the sixteen western-most counties in addition to affiliate hospitals throughout both Carolinas and southern Virginia. The Network focuses on reducing costs for members through group negotiation, taking a leadership role in assessing and improving health in these western communities, and *advancing best practices and data sharing for the promotion of quality care*. It is this last objective that drove the formation of the WNC Data Link, an HIE that connects sixteen hospitals with the long-term goal of creating a longitudinal electronic medical record for every patient that can be accessed and updated at any time.<sup>34</sup>

#### **Mission Health and Hospitals HIE**

A smaller initiative in the western region is run by Mission Health and Hospitals, a group that has hospitals in Buncombe, McDowell, and Mitchell Counties. In partnership with Cerner, this Community HIE initially connected Mission Hospital with the Buncombe County Health Center and is now focused on bringing in other alternative health providers such as nursing homes and home care providers. Mission Hospital is a cornerstone member of the WNCHN.

### **Community Health Network (CHN)**

Another three-county initiative in western North Carolina is the Community Health Network (CHN). This effort is focused on disease management for the uninsured and low-income populations in Henderson, Polk, and Transylvania counties through electronic data exchange between healthcare providers and social service agencies.<sup>35</sup>

#### ***Eastern/Central Counties***

### **Pitt County Memorial Hospital**

Pitt County Memorial Hospital, the primary hospital for University Health Systems, was awarded a \$2,000,000 grant in 2007 for the development of a health information exchange to serve the state's eastern counties. All other RHIOs in this section of the state, as listed by the HIMSS State Dashboard, are categorized as active meaning that they are either up and running or are at some stage of implementation.<sup>36</sup>

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**NCHIEC**

Also in the Eastern/Central region of the state, a public health-focused group, the North Carolina Health Information Exchange Consortium (NCHIEC), is spearheaded by a partnership between WakeMed and the Department of Public Health. Their project centers on real-time data exchange for the purpose of monitoring public health threats in the region.<sup>37</sup>

**Community Partners Health Net, Inc.**

Another public health collaborative with IT services is Community Partners Health Net, Inc., a nonprofit organization that works with seven community health centers, mostly in the eastern half of North Carolina. This organization offers electronic health record and database services with the goal of facilitating quality healthcare for populations in medically underserved areas.<sup>38</sup> While there seem to be fewer HIE grass-root efforts in eastern North Carolina than in other regions, one can expect more activity in the future as the Medical Home concept is applied to a greater extent in these counties through the efforts of CCNC and other organizations.

***Central Counties***

**Sandhills Community Care Network**

The central part of the state has several HIE initiatives active, all at different levels of maturity. The projects range from those being conducted by academic hospitals, to those being conducted by non-profit and public health organizations with a statewide scope. One community-level HIE project has developed through the Community Care program with a Medicaid focus: the Sandhills Community Care Network (SCCN) in the Harnett, Hooke, Moore, Montgomery, Richmond, and Scotland Counties. SCCN is in the process of merging the medical home model with the technical capabilities of health information exchange and EMRs for rural communities.

**Duke University Health System – Durham County Medicaid data exchange**

With funding from AHRQ, Duke University Health System (DUHS) also piloted a project targeted at Medicaid patients, measuring the benefits of data exchange between academic, public, and private healthcare providers in Durham County. Another topic that DUHS has studied through AHRQ funding is the impact application of clinical decision support and messaging on adverse drug event management.<sup>39</sup>

***Other State, Regional and National Healthcare Stakeholders***

**NCHICA**

A statewide perspective for technology development is represented by the North Carolina Healthcare Information Communications Alliance, Inc. (NCHICA) and the public health initiatives that NCHICA has participated in over the years. Established in 1994 by the Governor, NCHICA is charged with promoting the adoption of health information technology by all participants in the state, from large commercially motivated enterprises to small physician practices in rural areas, with the eventual goal of connecting North Carolina into a nationwide HIE network.<sup>40</sup> In order to accomplish this task, NCHICA will help develop economic strategies and public policies by enabling consensus-building relationships between key healthcare stakeholders. NCHICA is currently participating in the NHIN Trial Implementations project under administration of the Office of the National Coordinator (ONC) for the U.S. Department of Health and Human Services. NCHICA is managing the

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implementation of Core Technical services and three use case scenarios with its technical partner IBM and is developing the business case for sustainable statewide HIE.

### **NCEDD, NC DETECT, NCHES**

Early on, NCHICA contributed to public health initiatives such as the North Carolina Emergency Department Database (NCEDD), a project piloted by the UNC Emergency Department., and the Provider Access to Immunization Registry Securely (Pairs) system which evolved into the current web-based North Carolina Immunization Registry used by the Division of Public Health. In order to better meet the needs of the state agencies, the NCEDD tool was eventually revamped and split into two systems, the North Carolina Disease Event Tracking and Epidemiologic Collection Tool (NC DETECT) and the North Carolina Hospital Emergency Surveillance System (NCHES).

### **HIS, NCMMIS+**

The Department of Health and Human Services plans to roll out two other statewide systems this year and next. The Health Information System (HIS) will provide better monitoring, reporting, and billing services for over-burdened local health agencies and providers while the North Carolina Medicaid Management Information System (NCMMIS+) will replace three older claims systems and expand the payment functionality to several agencies within Health and Human Services.<sup>41 42</sup>

### **Health Systems and Academic Medical Centers**

Reflecting the geographic and demographic diversity and economic complexity of North Carolina are a number of other disjointed and overlapping influences on the development of healthcare delivery and policy. It is expected that communities across the state will continue to create increasingly collaborative relationships between community leaders, healthcare providers, and public health officials as a result of resources and education provided through the governor-supported Health Carolinians organization. Health systems with significant influence throughout North Carolina include Novant Health and the Carolinas Healthcare System as well as systems affiliated with the four medical schools at Duke University, University of North Carolina, Wake Forest University, and East Carolina University. Duke, UNC, and Wake Forest have notably competitive relationships, not only as centers of research, but through their health systems' overlapping regional presence and referral patterns.

### **Community Hospitals as Community influencers**

Hospital systems, large and small, have very specific concerns regarding the sharing of patient data and the implementation of performance measures, not to mention varying degrees of interest or lack thereof in connecting to statewide and nation-wide information networks, However, these HIE initiatives will not be successful without their input and participation.

### **Existing initiatives sponsored by commercial healthcare vendors**

Similarly, commercial enterprises such as diagnostic centers, insurers, and pharmacies have seemingly conflicting needs for protecting competitive advantages and utilizing information technology to minimize costs and increase efficiency. Some companies already have significant market share within North Carolina such as LabCorp and Quest for outpatient lab services and BCBSNC for insurance. These enterprises will affect the course of healthcare

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delivery in North Carolina through their own HIT initiatives. TABCORP already has connectivity solutions for test ordering and results reporting, offering web portal access, point-to-point interfaces, and other application-based products.<sup>43</sup> Additionally, almost all insurers have their own portals for members and internal claims and administrative systems for the purpose of collecting data and performing analytics and quality measurement

### **Promoting Medication Management**

In the field of medication management, SureScripts-RxHub and BCBSNC have taken the lead with ePrescribing initiatives; aided by the impending national mandate from CMS... SureScripts-RxHub has worked closely with pharmacists in the state, achieving a 67% rate of adoption in 2007, though physicians have been much slower to adopt ePrescribing.<sup>44</sup> To rectify this, BCBSNC is currently offering financial incentives to physicians for the rest of 2008 to encourage them to register with a certified e-prescribing vendor and to demonstrate use of ePrescribing for a minimum of 20 patients.<sup>45</sup> This program has been extended to become an ePrescribing solution for physicians supporting Medicaid patients.

### **Non-commercial statewide healthcare organizations**

There are several non-commercial organizations exercising an over-arching influence on healthcare delivery in North Carolina. The North Carolina Institute of Medicine (NC IOM) was organized by the state to be a nonpartisan policy think-tank. The NC IOM convenes task forces on a range of issues from ethnic minority needs to workforce shortages and health coverage issues and publishes the influential North Carolina Medical Journal.<sup>46</sup> The Carolinas Center for Medical Excellence (CCME), was established in 1983 as the Medical Review of North Carolina, Inc. The CCME focuses on quality measures in healthcare, offering evaluative services to providers and enterprises and acts as an information sources to consumers.<sup>47</sup> The North Carolina Hospital Association offers similar services to its members and promotes quality healthcare delivery through its Rural Health Center, and Center for Hospital Quality and Patient Safety.

### **State Government role in healthcare initiatives**

Political and legislative efforts in healthcare are centering more and more on technology initiatives, looking at privacy issues, policy changes, funding sources, and other applicable topics. The state recently passed the unfunded Health Information Management Study request as part of Bill #2241 to support the creation of an integrated approach to health information management and the review of current federal systems and the Emergency Preparedness Study as part of "The Studies Act of 2008" to facilitate the application of health information technology to emergency response.<sup>48 49</sup>

NCHICA has been involved with legislative efforts in the form of the North Carolina Health Information Security and Privacy Collaboration (HISPC) Project at the behest of AHRQ and the drafting of HIPAA policies.

### **Impact of Stark Law Relaxation**

Recent changes in Stark Law legislation are creating new opportunities for hospital systems to act as "system donors" in order to accelerate EMR adoption by affiliated physician practices. The Stark Law has been one of the most controversial pieces of legislation in the past two decades because it was viewed as unnecessarily complex and that it interfered with the provider to provider communication which is the basis of most healthcare improvement

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solutions. The impact of Stark law relaxation will be on-going and must be reflected in HIE planning efforts.

**Influence of governor and state legislative elections in November**

The election for governor will have a significant impact on the direction of healthcare policies in North Carolina. Both candidates campaigned on upon the premise that the healthcare ecosystem will run more efficiently and effectively with the assistance of electronic health records for all the residents of North Carolina. Winning candidate Beverly Perdue is expected to be an activist governor, especially as to increasing healthcare coverage and care for children.

**NC HIE as convener and forum for policy and standards and service provider**

Moving forward, NCHICA and the NC HIE Council have the opportunity to fulfill several roles on behalf of key healthcare stakeholders across North Carolina. The state will continue to need the assistance of NCHICA in monitoring the ever-changing national landscape, drafting legislation, and developing strategies for increasing HIE and EMR adoption.

As described later in the Operation Plan, to the extent agreed by the North Carolina stakeholders, the NC HIE should continue beyond the NHIN Trial Implementations, providing technical services and connectivity for community and regional HIEs. The NC HIE is also primed to leverage its positioning to offer cross-cutting services not yet provided by existing initiatives and to champion interoperability and standards on behalf of stakeholders who must make the financial investments needed in technology solutions. Building on the foundation laid by NCHICA and others, the NC HIE could serve as the forum for facilitating neutral relationships between key stakeholders positioned in complex business environments with significant competitive barriers.

Finally, and perhaps most importantly, the NC HIE can act as an exchange medium for rebalancing the benefits and costs of health information technology that currently flow disproportionately among multiple stakeholders. This last point is fundamental to creating an environment where investment in health information exchange makes economic sense to all investors and healthcare participants in North Carolina. This rebalancing must occur within the context of the entire healthcare economy, but must not be deterred by lack of overall progress.

**5.3 Market Opportunity**

There is no magic formula for the implementation of functionalities or services across all NHIEs. The uniqueness of various communities of care in North Carolina will require solutions that will be supported by area business, healthcare and consumer leadership in order for the benefits from HIE to accrue to the residents statewide. For example, when physicians are queried regarding their priorities for health information exchange, recurring answers include medication management, results reporting, and the exchange of discharge summaries. However, these priorities are likely to differ across the medical trading areas (MTA) of North Carolina. Some large and influential IDNs may select administrative data exchange as their top priority initiative while others may have an expressed need for a physician portal for the exchange of summary patient data and peer to peer communications.

Ten HIT functionalities were identified as initiatives having potential value to stakeholders across North Carolina. The selection of these ten services was based upon an extensive

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literature review, on input from the NC HIE Council and analysis of current state healthcare programs. Seven of these initiatives have been selected for more serious consideration due to their strategic, operational, technical and financial fit with the intention to establish a financially sustainable plan for delivering the benefits of HIE to the residents of the state in a manner that fits into the framework of the NHIN's network of networks. *Illustration 5-5* depicts the proposed initiatives which are broken into three types – Core, Extended Value and Transformational services.

Core initiatives are those considered by key stakeholders to offer the greatest value to the largest number of participants in a health information exchange and ones able to fit more immediately into the NC HIE technical solution. These and the extended value initiatives more immediately address goals of helping to provide more cost efficient, safe patient care for the residents of North Carolina. The Patient Summary, Test Results Reporting and Medication Management Core initiatives will be discussed in greater detail below and incorporated in the financial plan.

Extended Value initiatives might be a priority for a number of MTAs but represent service offerings that may be provided by entities other than the NC HIE or ones that could take more extensive technical, operational, marketing or funding efforts to implement. The Federal Agency Program Automation is the first of the Extended Value initiatives and will address the Social Services Administration (SSA) authorization and document retrieval business case. Because of their significance to medical home automation the Consumer to Provider and Provider to Provider Communication will be mentioned as Extended Value initiatives of special interest but will not be included in the financial analysis.

Transformational initiatives build upon well established foundational HIE initiatives. Owing to the significant impact the Community of Care of North Carolina (CCNC) program has had on the quality and cost of care for the chronically ill Medicaid population over the past five years, the Patient Centered Medical Home Automation initiative will be discussed in detail below and will be included in the financial analysis for sustainability. The categorization of CCNC related deliverables as the last of the centrally administered initiatives is dependent upon the roadmap for HIT and HIE put into place by CCNC.

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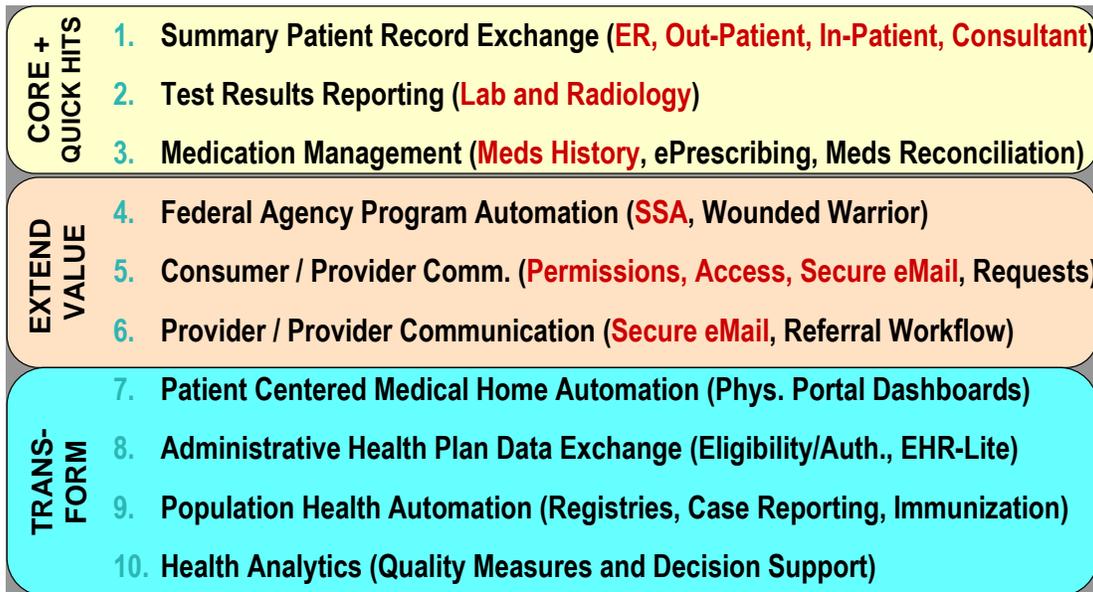


Illustration 5-5 Potential Initiatives.

Illustration 5-6 shows the implementation stages for each initiative and the technologies necessary to support them. Initiatives recommended for inclusion in the NC HIE roadmap include Core, Extended and Transformational types. The dotted lines in this diagram depict the interdependency between the initiatives across a four year span of time.

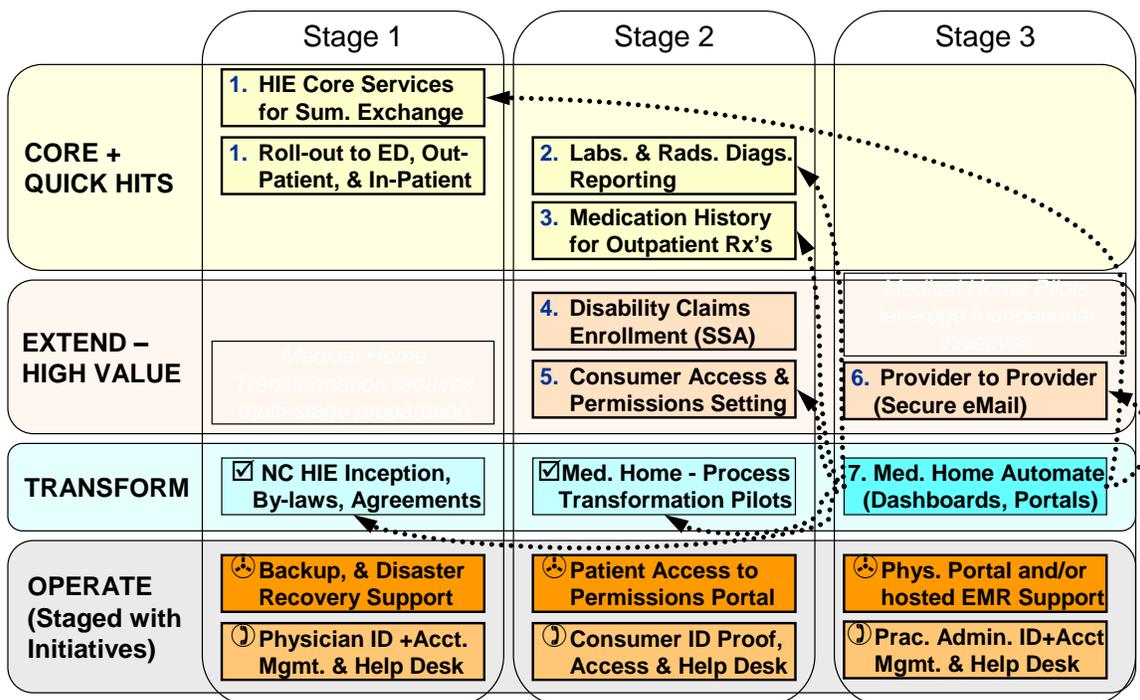


Illustration 5-6 Example of Staged Deployment for Potential Initiatives.

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*Illustration 5-7* lays out the Core, Extended Value and Transformational initiatives across a period of five years, which is the timeframe in which the ONC is looking for health information exchanges participating in the NHIN Trial Implementations to have reached financial sustainability. The table identifies in green those initiatives which appear to be most effectively deployed *once* across the state rather than at multiple enterprise and/or community levels, and they therefore should be considered priorities for the NC HIE. Initiatives marked with yellow boxes are those already underway in North Carolina or ones more suited for implementation by independent entities having expertise in the specified area. These “initiatives underway” almost exclusively fall into the categories of enterprise and community level originated initiatives, and their independent deployment in multiple iterations across the state is either already underway, or inevitable due to stakeholder interest (ePrescribing, Immunization Records, Situational Awareness, Referral Management, Quality Measures, Eligibility/Authorization, EHR-Lite, etc.).

Various health information technologies are also identified in this table as required or optional. Core Exchange services are identified as required for most of the functionalities listed in the initiatives. Core Exchange services as defined by the NHIN Trial Implementations are the architectural components required for data, consumer, user and subject identification management and management services that can support secure exchange of health information within a “network of networks”.

Potential HIE Initiatives in North Carolina (Statewide - "Green" and Independent, Community-wide - "Yellow")		Years->					Technologies							KEY			
		2008	2009	2010	2011	2012	Core Exchange	Physician Directory	Access Permissions	Secure Email & Alerts	Workflow Mgmt.	Physician ID & Access	Consumer ID & Access		Consumer Portal		
<b>CORE + QUICK HITS</b>	<b>1) Summary Patient Record Exchange</b>																
	Emergency Care Summaries →		1				☑	☑		☑	✓						
	In-Patient Discharge Summaries →		1				☑	☑		☑	✓						
	Out-Pat. Summaries & Consult Reports →			1			☑	☑		☑	✓						
	<b>2) Test Results Reporting</b>																
	Lab Results Delivery or Notification →		2				☑	☑	☑		☑	✓					
	Radiology Reports Delivery / Notification →			2			☑	☑	☑		☑	✓					
	<b>3) Medication Management</b>																
	Medication History from PBMs →			3			☑		☑		☑	✓					
	ePrescribing - Electronic Orders / Refills						☑										
Medication Reconciliation						☑											
<b>EXTEND HIGH VALUE</b>	<b>4) Federal Agency Program Automation</b>																
	Authorized Release of Information (SSA) →		4				☑	☑	☑		☑	✓	☑	✓			
	Wounded Warrior Data Exchange(VA, DoD)						☑		☑		☑	✓					
	<b>5) Consumer / Provider Communication</b>																
	Consumer Access and Permissions →			5			☑	☑	☑				☑	✓			
	Consumer / Physician Sec. Email & Alerts							☑		☑		☑	✓				
Patient to Physician Office Requests							☑		☑	☑	☑	✓					
<b>6) Provider to Provider Communication</b>																	
Secure Email Messaging →				6			☑		☑		☑						
Referrals and Transfer of Care Workflow							☑			☑	☑	✓					
<b>TRANSFORM</b>	<b>7) Patient Centered Medical Home</b>																
	Organize PCMH Networks & Sponsorship																
	Initiate PCMH Pilot Sites																
	Integrate PCMH with HIE Infrastructure →				7		☑	☑	☑	☑	☑	☑	☑	✓			
	Align Reimbursement with PCMH																
	<b>8) Administrative Health Plan Exchange</b>																
	Eligibility/Authorization of										☑	☑	✓	✓	✓		
	EHR-Lite - with Health Plan Claims Data						☑				☑	✓					
	<b>9) Population Health Initiative Automation</b>																
	Biosurveillance & Situational Awareness																
Electronic Population Health Case											☑	✓					
Immunization Records & Disease Registries											☑	✓					
<b>10) Health Analytics</b>																	
Quality Measures												☑	✓				
Decision Support											☑	☑	☑				

Illustration 5-7 Potential Statewide Programmatic Areas and Priority "Shared Interest" Initiatives with Supporting Technologies.

The burden of participation in health information exchange could be lessened through the provision of centralized Core Technical Services to geographic and non-geographic HIE across the state. The NC HIE, through their participation in the Trial Implementations is in an

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ideal position to offer these established services to HIEs across the state. Alternatively, healthcare organizations in North Carolina other than the NC HIE may want to provide a standards-based technology infrastructure along with value added services such as portals and registries, and should be considered as viable options to the NC HIE taking on this responsibility. These alternatives will be discussed further in the operations section of the plan.

The initiatives outlined above have been selected for detailed review because they have been generally acknowledged<sup>7</sup> to contribute to financially sustainable HIEs across the nation or because of their perceived value in supporting and complementing existing North Carolina efforts to improve quality of care and to slow the rise in healthcare costs. A detailed description of each initiative and its value proposition, followed by an analysis of costs and benefits flowing to key stakeholders, and concluding with an overview of barriers to adoption is included in Appendix 7.3: Program of Initiatives in Detail. It is the intent of the descriptions to acknowledge the momentum developed by enterprises and communities within North Carolina while highlighting the opportunities to drive more value through coordinated approaches to certain HIE initiatives.

**Initiatives Summary:**

The initiatives presented in this section are suggestions for consideration by key business, healthcare, consumer and state government leaders for inclusion in an approved implementation plan. They were selected for inclusion in the list of possible options based upon: priority initiatives executed by HIEs that have reached a moderate level of sustainability; feedback from NC HIE council members and the current state of HIE in North Carolina. The final decision regarding priority initiatives will depend upon results from a key stakeholder survey and input from business leaders who might share responsibility for providing the necessary governance, technology and operations of a statewide NHIE. Implementation will require significant system and policy work to ensure that the implementation is effective. *Illustration 5-8* and *Illustration 5-9* below represent value and sustainability assessments for all ten of the Core, Extended Value and Transformational initiatives. The preliminary financial analysis included in this iteration of the Sustainability Plan share deployment assumptions with this section.

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<sup>7</sup> Such as in the the AHIMA FORE health information exchange study on governance and sustainability, reported in: [journal.ahima.org/2008/05/09/integrating-state-level-hie-into-the-nhin/](http://journal.ahima.org/2008/05/09/integrating-state-level-hie-into-the-nhin/).

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<u>VALUE ASSESSMENT</u>	Improves Patient Safety	Increases Quality of Patient Care	Enhances Chronic Disease Mgmt.	Improves Service Level Efficiency	Improves Patient Satisfaction	Satisfies Regulatory Mandates	Reduces Risk or Liability	Improves Health Promotion, Prevention
1. Summary Patient Record Exchange (ER, Out-P, In-P)								
2. Test Results Reporting (Lab and Radiology)								
3. Medication Management (Hx, Rx, Reconciliation)								
4. Federal Agency Program Automation (SSA, VA, DoD)								
5. Consumer / Provider Comm (Permiss., Access, eMail)								
6. Provider to Provider (Secure eMail, Workflow)								
7. Patient Centered Medical Home (Portal, Dashboards)								
8. Admin. Data (Eligibility, Referrals, EHR-Lite)								
9. Population Health(Registry, Case Reporting, Immun.)								
10. Health Analytics (Quality Measures, Decision Supt.)								
= Minimal to Low Impact = Medium Impact = High Impact	I. CORE:	Yellow	II. EXTEND VALUE:		Rose	III. TRANSFORM:		Blue

Illustration 5-8: Value Assessment of HIE Initiatives.

<u>BUSINESS SUSTAINABILITY</u>	Strategic Fit with Organization	Operational Fit with Organization	Manage-ability of Capital Costs	Manage-ability of Recurring Costs	Speed to Return on Investment	Ease of Technical Solution	Likelihood of Securing Funding	Confidence in Managing Risk
1. Summary Patient Record Exchange (ER, Out-P, In-P)								
2. Test Results Reporting (Lab and Radiology)								
3. Medication Management (Hx, Rx, Reconciliation)								
4. Federal Agency Program Automation (SSA, VA, DoD)								
5. Consumer / Provider Comm (Permiss., Access, eMail)								
6. Provider to Provider (Secure eMail, Workflow)								
7. Patient Centered Medical Home (Portal, Dashboards)								
8. Admin. Data (Eligibility, Referrals, EHR-Lite)								
9. Population Health(Registry, Case Reporting, Immun.)								
10. Health Analytics (Quality Measures, Decision Supt.)								
= Minimal to Low = Medium = High	I. CORE:	Yellow	II. EXTEND VALUE:		Rose	III. TRANSFORM:		Blue

Illustration 5-9: Business Sustainability Assessment of HIE Initiatives.

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## 5.4 Market Strategy

### Assumptions

Successful HIOs build an interoperable technical infrastructure that is scalable and can accommodate increasing network traffic and iterative expansion of capabilities. They implement services gradually and start with “low hanging fruit” or projects that are easier to implement and that provide the greatest value for the largest number of stakeholders. Initiatives which should be coordinated at a statewide level - the “green” initiatives depicted in Illustration 5-7 were selected as early phase offerings because they target realistic short-term priorities and because of their potential to increase provider rates of HIT adoption. Once adopted by the statewide HIE governing body the HIE roadmap for NC will need to be re-evaluated periodically to ensure a thoughtful phased implementation of initiatives that are aligned with current state and federal strategies.

Independent health information exchange initiatives of varying scope and maturity are already underway in North Carolina but they operate exclusively in the shadow of siloed enterprise interests or within very limited geographic communities. The market strategy proposed in this Sustainability Plan builds upon current programs and relationships and assumes statewide HIE will facilitate new levels of collaboration.

Public payers have significant influence on how key healthcare stakeholders will support statewide HIE. Public health and state Medicaid programs can provide important contributions to building statewide HIE capacity and their strategies should be linked to support the value proposition for sustainable statewide HIE. As such, a key focus of this Sustainability Plan is the establishment of an HIE roadmap that implements HIE solutions to support programs such as the Medicaid sponsored Community of Care of North Carolina medical home model of patient care delivery.

### Centrally Coordinated Offerings (potential)

A strategic underpinning of the financial planning is that core technology services will be centrally coordinated, perhaps by using a Healthcare Service Provider (HSP) model. Significant economies of scale across North Carolina will be achieved through an interoperable system that can apply consistent and standard operational and technical workflows. Use of common, comprehensive, scalable, standards-based technology solutions will allow healthcare communities, public health organizations and payers to share best practices and benefits and it will lay the foundation for participation in the Nationwide Health Information Network.

There are a number of small and medium sized HIEs in North Carolina and this number is expected to increase over the next few years. Additionally, existing HIEs will likely grow in membership and financial strength as new initiatives are rolled out. For instance, the WNCHN which has to date been hospital-based, is planning to connect physician offices.

The architecture of these existing HIEs however does not fully utilize state and nationally recognized data and security standards. The application of these standards to their current independent “yellow” initiatives will be important if they wish to participate as a Certified NHIE in the statewide initiatives that have been suggested as part of the NC HIE roadmap and sustainability plan. The ability for existing and new HIEs to collaboratively participate in the statewide Core and Extended Value initiatives is foundational to their ability to fully participate in later stage Transformation Initiatives. Transformational initiatives such as the technology

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enabled Patient Centered Medical Home are where the greatest quantitative and qualitative value for key participants will be found. (Note: Illustration 5-7 depicts the “yellow” & “green-labeled” initiatives).

As the success of an HIE grows through the addition of new services and increasing adoption rates so does the operational burden. Collaboration among key healthcare stakeholders on shared services such as a physician registry, consumer permissions, patient identity management, etc. is important for achieving economies of scale for capital and operational investments. Although the governance and technology start up costs and costs to provide incentives for participation are significant they don’t compare to the ongoing operational costs of an expanding exchange.

North Carolina with its disproportionate number of Medicare, Medicaid, uninsured and Veteran populations must position itself to be the recipient of as much state and federal funding it can obtain. In order to accomplish this, it will be important for state agencies, private enterprises and healthcare communities to establish a statewide HIE which can demonstrate effective collaboration and coordination of standards-based, interoperable, secure healthcare data exchange. Technology and standards exist to support the creation of a statewide HIE but North Carolina must move rapidly to establish an effective governance structure and a viable funding model. Sections 6 Operating Plan and 7 Financial Plan address these areas in more detail.

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## 6. Operating Plan

### 6.1 NC HIE Provisional Organizational Structure

As described earlier, this Sustainability Plan anticipates a hypothetical public / private exchange organization coordinating and integrating across North Carolina. Formation of a non-profit public / private exchange organization with the authority to set policy and funding priorities to support local HIEs is one approach being implemented successfully in other states. While many reasonable alternatives exist, we believe the state will ultimately require some formal policy and fiscal mechanisms to effect equitable balancing of benefits to stakeholders who bear the cost for HIE innovation.

An existing organization has been established within NC with the experience and breadth of representation necessary to successfully support these efforts across the state. With additional endorsing leadership from the state, the NC HIE Council is prepared to provide this support.

NCHICA was established in 1994 by executive order as a neutral and representative body that could provide statewide coordination and operational functions for connecting referral and care networks; that would establish multi-enterprise operations with policies, procedures, technology selection, operating and financing mechanisms that have the approval and support of the participants; and could make proposals to federal agencies that require such a statewide coordinating entity. NCHICA established the North Carolina Health Information Exchange (NC HIE) in 2007 as an operating division of NCHICA in conjunction with of the Nationwide Health Information Trial Implementations project. The NCHICA Board of Directors has committed to support the principles of the North Carolina Health Information Exchange (NC HIE) and its Charter. Details of the Mission, Charter and how the NC HIE Council is prepared to serve as the formal governance mechanism for HIE across North Carolina are included in Appendix section 8.4 and 8.5.

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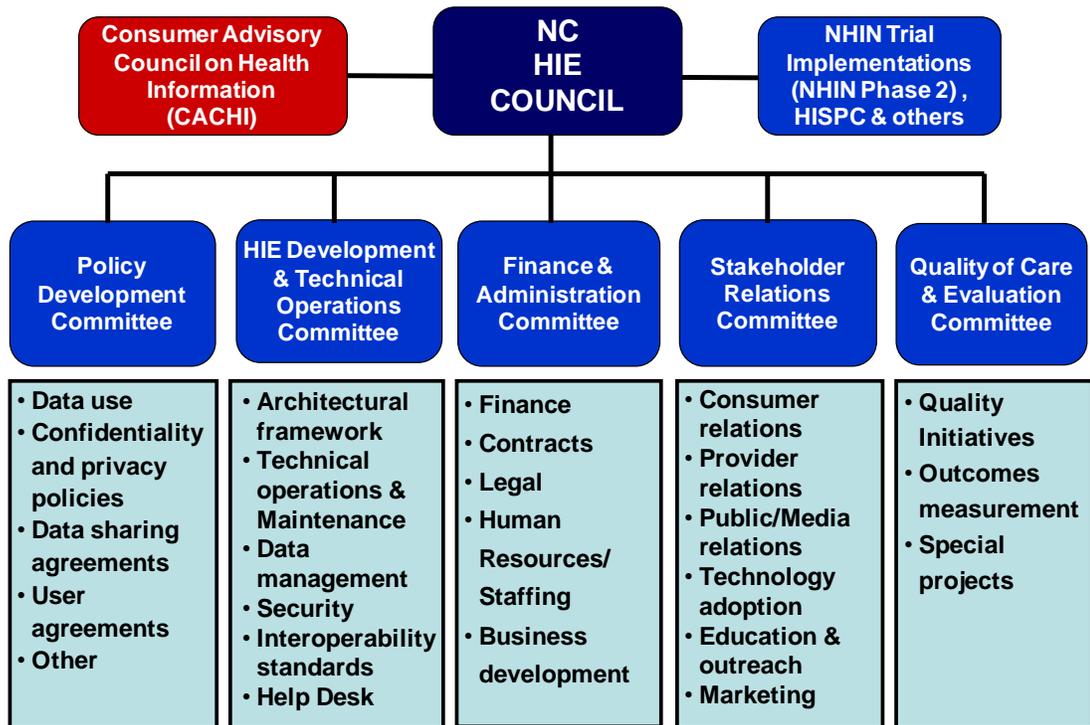
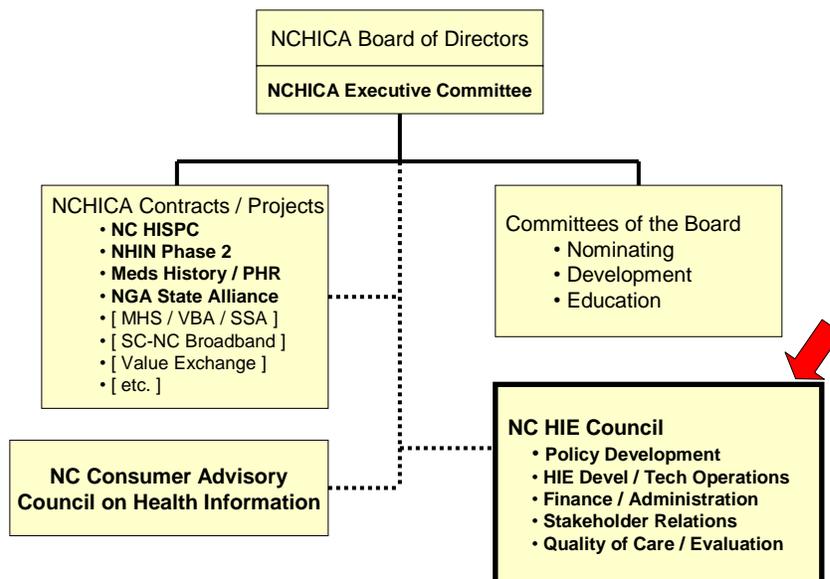


Illustration 6-1 NC HIE Organizational Structure



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Illustration 6-2 NC HIE Relationship to NCHICA

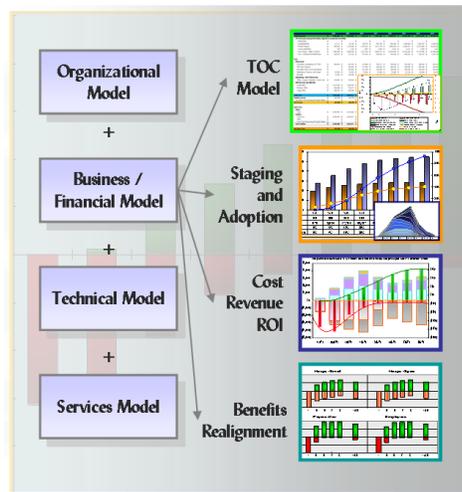
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## 7. Financial Plan

### 7.1 Financial Model

This Sustainability Plan focuses on North Carolina HIE initiatives, selected specifically because of their individual and combined impact on quality and delivery of value within the greater healthcare ecosystem. The financial analysis of these initiatives considered difficulty of implementation in four areas: funding, technology, operations and adoption.

North Carolina is a recognized innovator in standards-based healthcare integration in the provider and public health sectors. This Sustainability Plan leverages the substantial foundation of initiatives (many already operational) across North Carolina and nationally.



**Illustration 7-1 Business Planning**

*The Sustainability Plan employs a four-stage business planning approach (see*

*Illustration 7-1) and has a full program of initiatives defined, which could be implemented over the next three years. The analysis contained within this Plan enunciates quantitative benefits, qualitative benefits, and dependencies. Additionally, several mechanisms are presented that provide the ability to “rebalance” the benefits and costs in order to create win/win stakeholder incentives. The outcomes presented in this Sustainability Plan reflect the *most likely* combination of results from the product of the variables and assumptions driving those results. Therefore, it is an accepted fact that further refinement of these variables and assumptions is the next iteration of HIE Sustainability Planning in North Carolina.*

*The business model was developed interactively with the governance, technical, and service models, as shown in*

Illustration 7-1. Additional models were produced during our deployment and operational planning cycles, and provide cost and revenue elements.

The Cost And Revenue Model includes several interrelated components that identify the initialization, operation, and maintenance costs of a statewide HIE; the model also describes how the revenue model(s) could enable a self-sustaining enterprise.

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**Total Cost of Ownership:** This Sustainability Plan assumes North Carolina must be able to develop a self-sustaining financial model for a statewide health information exchange. Services must be adopted by and paid for by the active stakeholder participants in the health delivery and payment systems. The approach is designed to help stakeholders define a self-sustaining financial model based on an optimal program of initiatives. Further, the approach leverages the cost and revenue elements and promotes coordination between the NCHICA HIE and the Medical Home (CCNC) operations already underway in the state.

Our financial analysis integrates both one-time and ongoing cost items, calculated over a typical five-year time period. For instance, we have included the costs related to providing the NHIN Core and advanced level services such as patient record exchange, patient identification services, normalization services, etc. We have also included the costs related to change management, adoption policy, administering the incentive programs, etc. Benefit projections are calculated and illustrated over five- and eight-year timeframes.

**Staging and Adoption:** The value derived from any health information exchange depends on the volume of participating stakeholders, and all experience a single common issue: initial participants may realize little return until a critical mass of participants is reached. It is only then, when most stakeholders are participating, that the real benefits of information exchange can be realized.

The financial analysis performed is a simulation, and as such is a dynamic exercise; the resulting analysis is not easily reduced to simple numbers on a page. The financial analysis provides the controls (variables) to simulate the impact of varying adoption rates and staging of initiatives deployment. This simulation tool includes the ability to assign (different) confidence levels to each projected benefit, to vary the ramp-up period (time projected for the benefits to be fully realized). The results have been arrived at following many simulation exercises. This process has assisted us in identifying the optimal adoption timetable and sequencing of interdependent initiatives.

**Cost Revenue ROI:** An effective sustainability plan must be capable of tracking a state's interdependent perspectives throughout the multi-level, multi-stakeholder ecosystem (federal, state, medical trading area, community, resident, etc.). A comprehensive return on investment (ROI) model should track ROI projections both at the statewide HIE level as well as at the Community HIE level, and it must capture per capita patient and citizen levels. The Cost Revenue Model should identify the cost as well as the benefit impact for each stakeholder group. (How are the benefits aligned versus the costs incurred for each critical stakeholder group? What ROI does each stakeholder group need to realize to ensure full participation?)

In summary, this financial analysis model captures per capita return (benefits over cost) as well as local HIE and statewide aggregate ROI perspectives (revenue versus cost). Using simulation scenarios, the model estimates the multi-year impact of state level policies and/or incentive programs for the statewide HIE customers (those Community HIEs who in turn support most of the local healthcare needs of their customers), patients, and provider care teams. Equally important is the ability to analyze outcomes for key healthcare market demographic segments (e.g., high utilization end of life, chronic disease, disabled, veterans, uninsured, elderly populations).

**Benefits Realignment:** In many HIE initiatives, the party making the financial investment may not be the primary beneficiary. We strongly believe that financial sustainability will require that

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each stakeholder receives an equitable financial return relative to their investment. Each key participant *requires* the ability to assess their own pre- and post-exchange financial position, and to demonstrate equitable return on investment. This is true across the state’s healthcare ecosystem for each stakeholder group. Ultimately, all participating communities (and stakeholder groups) must have confidence that a statewide exchange remains competition neutral, where participants value the opportunity to compete on value-added services and products.

This Sustainability Plan’s financial analysis model is designed to simulate “what if” conditions to methodically redistribute expected costs and returns.

Future iterations of North Carolina’s HIE Sustainability Plan will need to address funding strategies and incentive programs appropriate to initial, medium and long range stages of development.<sup>8</sup> This includes identifying and cultivating new revenue streams to sustain ongoing operations (beyond initial capitalization) and defining and formalizing the business arrangements of the financial model, including the proposed incentive program(s).

The key to the success for any statewide HIE effort lies in finding a sustainable business model that provides immediate and sustained value for the state’s existing Community HIEs and Medical Home networks. The statewide HIE should also provide attractive business opportunities for a broad range of Community HIE technology services that comply with NHIN and other health care industry standards.

Financial Plan Approach:

The primary objective of this plan is to holistically analyze a select combination of (core, high value-add, and transforming) initiatives already proven as high value with manageable risk by Health Information Exchanges [HIEs] across the nation, especially those demonstrating financial stability (see Illustration 7-2). These initiatives are foundational to inter- and intra-organizational sharing of healthcare information in a standards-based, secure, and auditable manner. These shared services initiatives are ideal candidates for coordinated statewide implementation by North Carolina’s healthcare stakeholders.

The simulation used to build these financial projections allows significant adjustment of variables. As an illustration of a variable choice that was made to drive these calculations, examine the *Annual Cost Efficiency Improvements* table where the SSA authorized Access to

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<sup>8</sup> Outputs from this first iteration business plan will become the starting point for a more in depth second iteration, which would provide the framework for proposing and assessing finance options for medium to long-term growth, and to define success metrics for evaluation of progress on an ongoing basis for NC HIE’s business strategy. This longer range strategic business analysis function would provide the analytic justifications for financial investment strategy while also developing jurisdiction specific mid- to long-term Business Plans.

This iterative process will need to be flexible in design to address the needs of the state’s governance organizations and primary sponsors and highly adaptive to the evolving critical success factors of North Carolina.

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Clinical Information Initiative is highlighted. The SSA HIE initiative drives considerable value by eliminating inefficient manual processes. This efficiency is an example of nationwide drivers for HIE which can be expected to fuel HIE deployment. In this case, the simulation has been based on an assumption that 5 % of the eligible population would be impacted by the SSA HIE initiative and that the savings / benefits accrued would equal 0.50 %. These and the other variables incorporated into the simulation were chosen first for their relevance to the NC healthcare ecosystem, and secondly to provide a conservative, or minimal benefits, scenario. In the SSA case, 5 % of the [eligible] population and 0.50 % is less than currently projected by SSA, and yet would be adequate to provide value to the customer (SSA) and begin to drive a benefits/revenue stream for HIE across North Carolina.

The plan uses scenario modeling to compare alternative approaches. For example, centralized versus decentralized implementation scenarios contrast how proactive collaboration and governance (of state and community-sponsored initiatives) affects outcomes, speed of adoption and ultimate value to stakeholder groups.

Potential HIE Initiatives in North Carolina (Statewide - "Green" and Independent, Community-wide - "Yellow")		Years->					<-Technologies								
		2008	2009	2010	2011	2012	Core Exchange	Physician Directory	Access Permissions	Secure Email & Alerts	Workflow Mgmt	Physician ID & Access	Physician Portal	Consumer ID & Access	Consumer Portal
<b>CORE + QUICK HITS</b>	<b>1) Summary Patient Record Exchange</b>														
	1a) Emergency Care Summaries →	1					<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
	1b) In-Patient Discharge Summaries →	1					<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
	1c) Out-Pat. Summaries & Consult Reports →		2				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
	<b>2) Test Results Reporting</b>														
	2a) Lab Results Delivery or Notification →	1					<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
	2b) Radiology Reports Delivery / Notification →		2				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
<b>3) Medication Management</b>	3a) Medication History from PBMs →		1				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	
	<b>4) Federal Agency Program Automation</b>														
<b>HIGH VALUE-ADD</b>	4a) Authorized Release of Information (SSA) →		1				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
	<b>5) Consumer / Provider Communication</b>														
	5a) Consumer Access and Permissions →			2			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		
<b>TRANS-FORM</b>	<b>6) Provider to Provider Communication</b>														
	6a) Secure Email Messaging →				3		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
	<b>7) Patient Centered Medical Home</b>														
	7a) Integrate PCMH with HIE Infrastructure →				3		<input checked="" type="checkbox"/>								

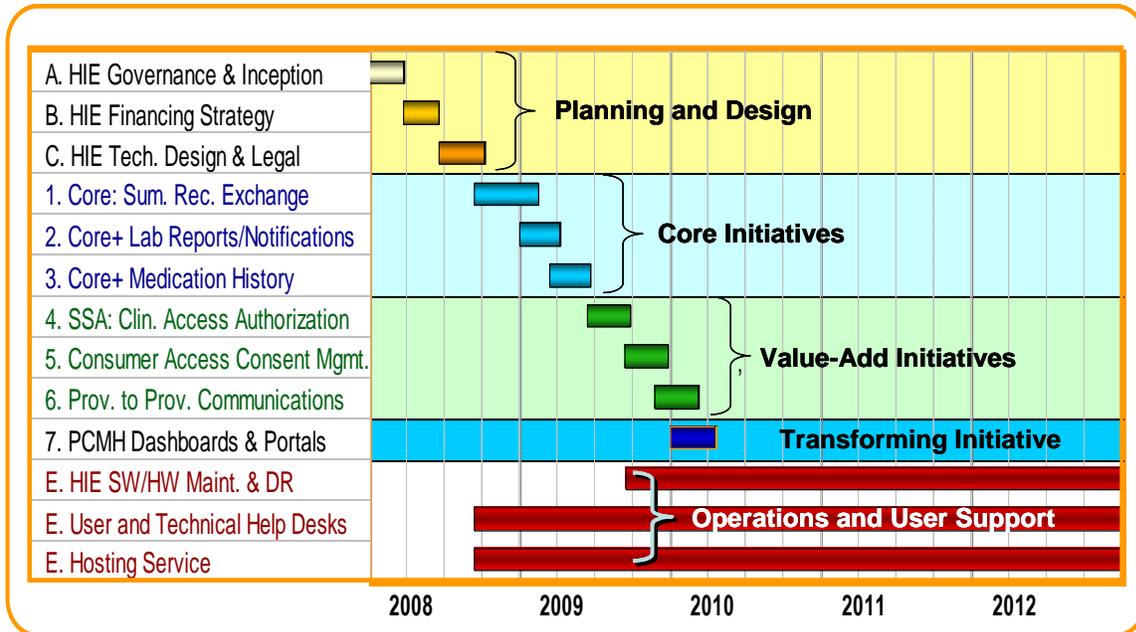
Illustration 7-2 Core, Value-Add and Transforming Candidate Initiatives

Independent factors may change the order of initiative implementation, as well as the timing of those implementations. For example, accelerating the HIE support for North Carolina's already well respected Medical Home movement (through Community Cares of North Carolina (CCNC)) might change the mix of initiative adoption and timing. Early up-front commitment of the CCNC program to utilize the NCHICA HIE (and NHIN) could increase initial funding demands but benefits would also begin to accrue earlier.

Each potential implementation path will need vigilant oversight to ensure that benefits are not left behind and that duplication of efforts is minimized. Illustration 7-3 shows how a specific community might plan, implement, and operate the proposed program of initiatives. It is not

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intended to be a literal program plan, but rather an archetype which models how a typical HIO might proceed if they were to implement the entire program in stages.



*Illustration 7-3 Phased design, deploy, and operate schedule for average-sized HIE*

Sustainability Plan modeling identifies quantifiable benefits for each defined initiative. This Plan attempts to isolate those benefits that are exclusively a byproduct of the HIE technology itself, and are therefore distinct from the many valuable process improvement benefits (even though they are closely associated with HIE technology enablement). The realization of each benefit's full potential is dependent upon phased implementation, timing of the associated initiative, and an adoption curve by physicians and their patients. In these models, quantified benefits are conservatively phased in over multiple years.

The alternative financial scenarios illustrated in this report are based on output from a proprietary HIE simulation model developed by IBM Corporation designed to contrast sustainability outcomes for large regions or states. Data inputs such as demographics, participation rates, costs, charges, and benefits and the resulting simulation outputs are artifacts of the NHIN Trial Implementations project, provided in an effort to gauge a range of outcomes to guide planning and strategy.

The models project both one time costs and five to eight year recurring costs for an ecosystem of small to large Health Information Organizations (HIOs) that already exist or are in formative stages across the state. The variation in size of HIE community allows for some assessment of efficiencies of scale. However, the model leans heavily towards a federated (decentralized) representation of the state healthcare ecosystem. This ecosystem today is not dominated by any one or even a small group of vendors. Therefore, no single architectural approach is assumed and hardware, software, implementation and support services are represented by industry average price ranges. The model has parameter settings to account for different approaches to implementation causing capital and operating costs to vary widely (e.g., where some or all of implementation or operate services may be efficiently provided by existing institutions). The model allows for segmenting between community and institution

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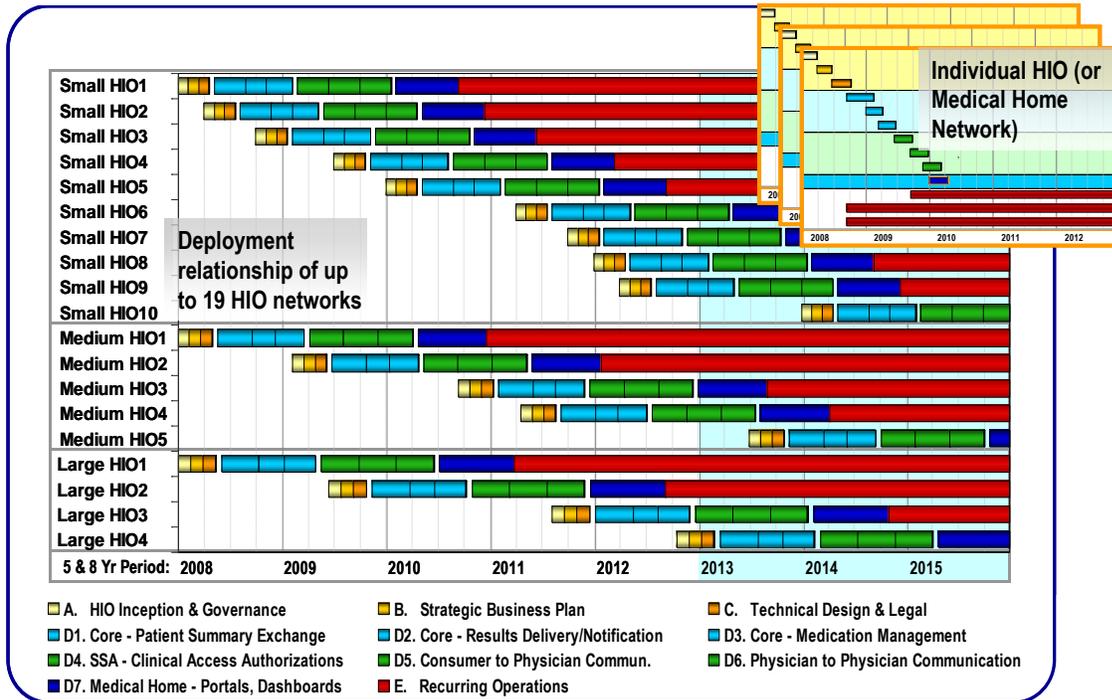
borne costs and services. It also accounts for hosting, help desk and other maintenance services that are commonly required for secure HIE operations.

One output of the model is to calculate Return on Investment (ROI) by stakeholder group for typical small to large sized standards based HIOs. The financial plan also calculates the costs and revenues for a hypothetical public / private exchange coordinating and integrating across North Carolina. Formation of a statewide, non-profit public / private exchange with the authority to set policy and funding priorities to support local HIEs is one approach being implemented successfully in other states. While many reasonable alternatives exist, we believe the state will ultimately require a formal policy and fiscal mechanism to deliver equitable balancing of benefits to stakeholders who bear the cost for HIE innovation. This is especially the case as a state as large and varied as North Carolina should probably anticipate the value in leveraging and supporting community-based (Medical Home or HIO) initiatives while focusing on standards, regulatory policies, financing incentives (and perhaps some core interoperability shared services) at the state level. Illustration 7-4 depicts one scenario for how statewide coverage consisting of “small”, “medium”, and “large” HIOs or HIEs<sup>9</sup> might evolve over the next eight years. Plausibly there might be a gradual consolidation towards large, fewer HIE entities due to cost efficiency.

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<sup>9</sup> HIEs are used here generically to represent the interoperability organization in a community or medical trading area. Many of these might actually be Medical Home networks (such as those operated by CCNC, or health system / hospital networks (national chains, geographic clusters), or payer sponsors both private (BCBSNC) or public (Medicaid). Additionally their jurisdictions will always be overlapping and sometimes highly competitive.

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**Illustration 7-4 Projected statewide evolution of multiple small to large-scale HIEs (or Medical Home Communities)**

This Financial Model and resulting Pro Forma is based on a non-profit statewide exchange organization which redistributes revenue fees to support local HIEs in providing the most appropriate services for each medical trading area.

**PARAMETERS:**

This Financial analysis modeled the multi-tiered relationship of patients, physicians, hospitals, and community HIOs spanning the entire state to construct scenarios based on various scaling parameters. For example, what is the ratio of costs to benefits for an individual patient, within a hypothetical “medium-sized” HIO serving a community of 500,000 residents in the North Carolina marketplace.

The financial simulator bases its scenario projections for the evolution of HIEs on parameters such as: the types and sizes of HIEs, service offerings costs and benefits, adoption rates by users as shown in Illustration 7-5.

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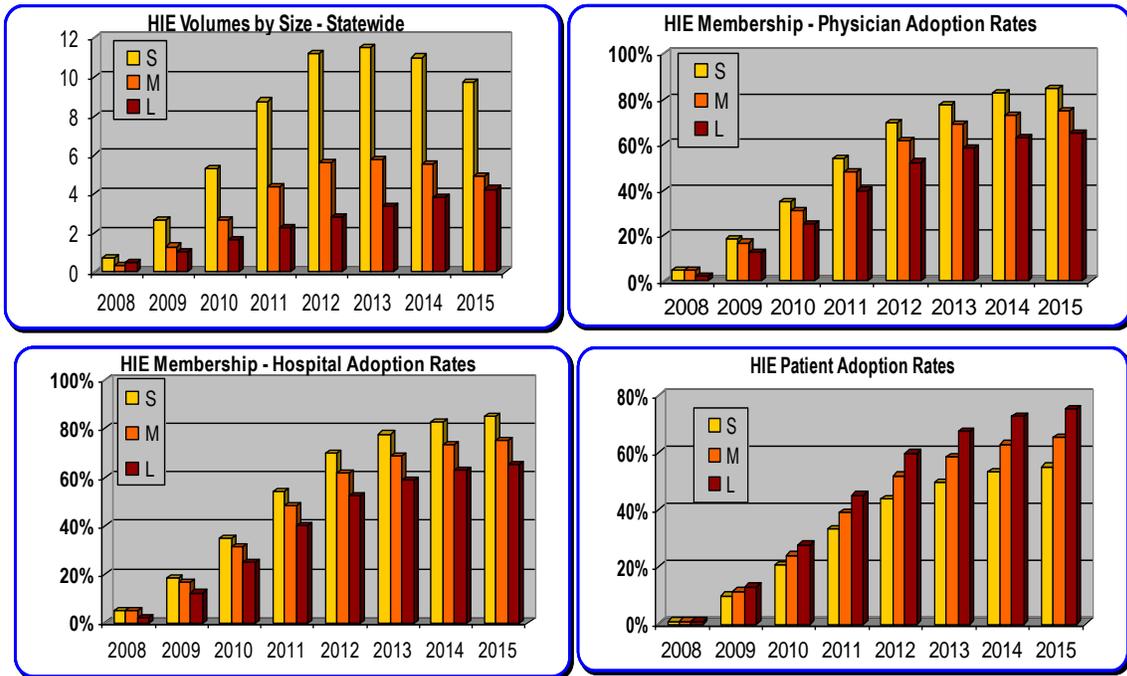


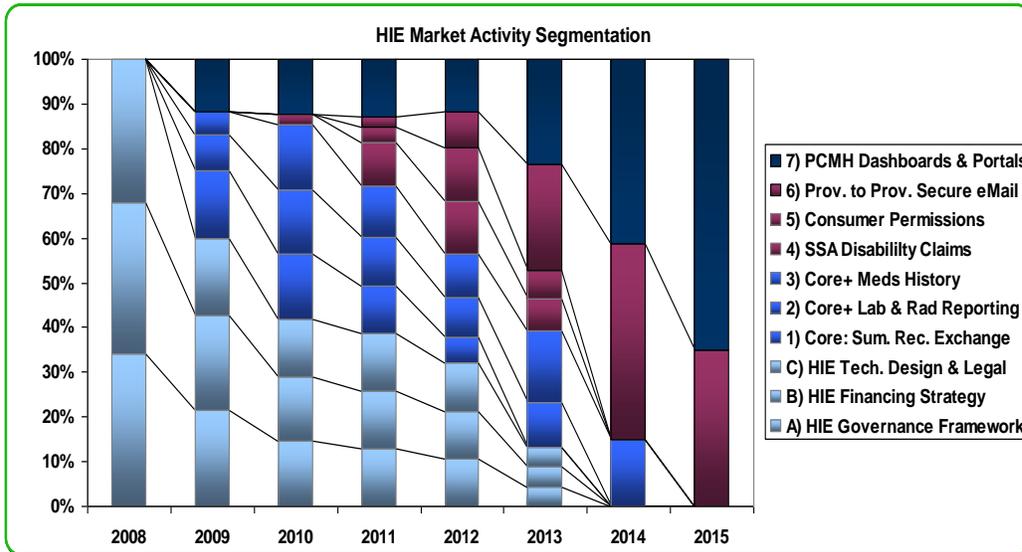
Illustration 7-5 Parameter setting sliders for HIE volumes and physician, hospital and patient adoption rates

The potential for statewide coverage is anticipated by defining units of HIEs (“small”, “medium” and “large”) to service the entire population plus key healthcare resources and entities, see Illustration 7-6.

HIE Units' - Size, Composition, Costs			
Characteristics	Small	Medium	Large
- Population	250,000	625,000	1,000,000
- Physicians	500	1,250	2,000
- Hospitals/IDNs	3	8	12
- Private Payers	6	6	6
- Local Labs/Rads	2	3	4
- Govt. Payer - State, Federal	1	1	1
- Gov. Contracts & Philanthropy	1	1	1

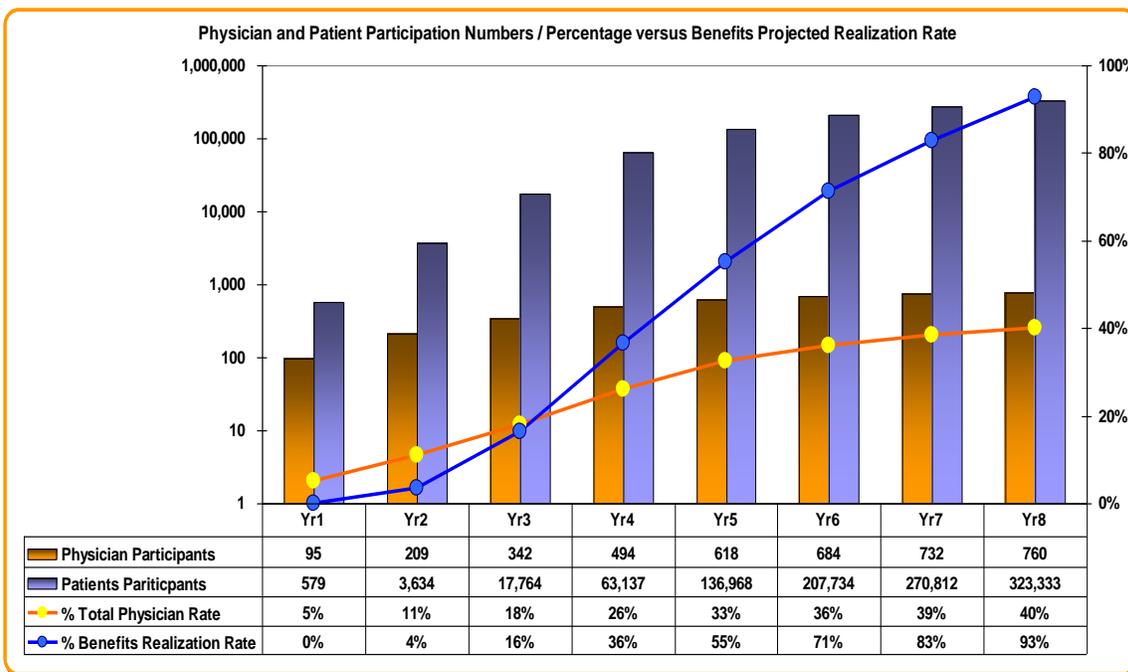
Illustration 7-6 Illustration of HIE “Units”, the parameters defining Small, Medium and Large HIEs

Other parameter settings delineate the market segmentation factors that guide when, where and by whom the proposed program of initiatives is implemented. For example, in one case a “Core” initiative could be coordinated across geographically disbursed HIEs while in another case a specific healthcare entity (e.g., a payer, an Academic Medical Center or a state agency might take ownership of a specific “green field” initiative. Illustration 7-7 shows how the year by year market driven progression of the proposed program of “green field” initiatives collectively implemented across North Carolina.



*Illustration 7-7 Illustration of statewide market segment activity on HIO planning and initiative implementations*

One of the most volatile parameters affecting financial sustainability turns out to be the ability to start initiatives swiftly and to succeed in encouraging wide and continued usage. Illustration 7-8 shows the prerequisites to realizing benefits are user adoption and service availability which in turn is dependent on the completion of a planning, financing, and implementation cycle.



*Illustration 7-8 Projected Physician and Patient Participation and Benefits Realization Rate Projection*

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We have included simulation modeling in our financial analysis hoping to help inform the next iteration of planning. It is at this critical juncture that North Carolina’s healthcare stakeholders will be interested in understanding how variable implementation schedules would affect multi-year ROI and cumulative benefits savings at the state level. To illustrate one such scenario, the Financial Analysis utilized the following assumptions:

- Strong collaboration and coordination at state and local levels (public-private governance model)
- Efficient, methodical implementation of the program of seven (core, value-add and transforming) initiatives
- Costs for implementation and operation based on vendor-neutral industry averages
- Benefits attributable only to the HIE technology automation and phased in over time

In this scenario, the cumulative statewide ROI is designed to be maintained at breakeven, while the role of the community HIOs in the overall ecosystem is to facilitate a more efficient and effective healthcare system. When benefits exceed costs (as they do in year five), the efficiencies accrue first to the investing stakeholders who have incurred the costs and only then to reducing the overall costs of the ecosystem.

Resulting projections over an eight year period are tracked on three interrelated levels. The first analysis (see Illustration 7-9 includes all capital and operating costs the eight year period but only counts benefits (phased in over time) that can be attributed solely to the introduction of the HIE technology. Per capita benefits are still \$276 and \$413 annually in years 5 and 8 respectively. Statewide cumulative benefits could reach nearly \$3.5 Billion over eight years even allowing for the graduated startup of community HIEs and nearly \$1.5 Billion annually by year 8.

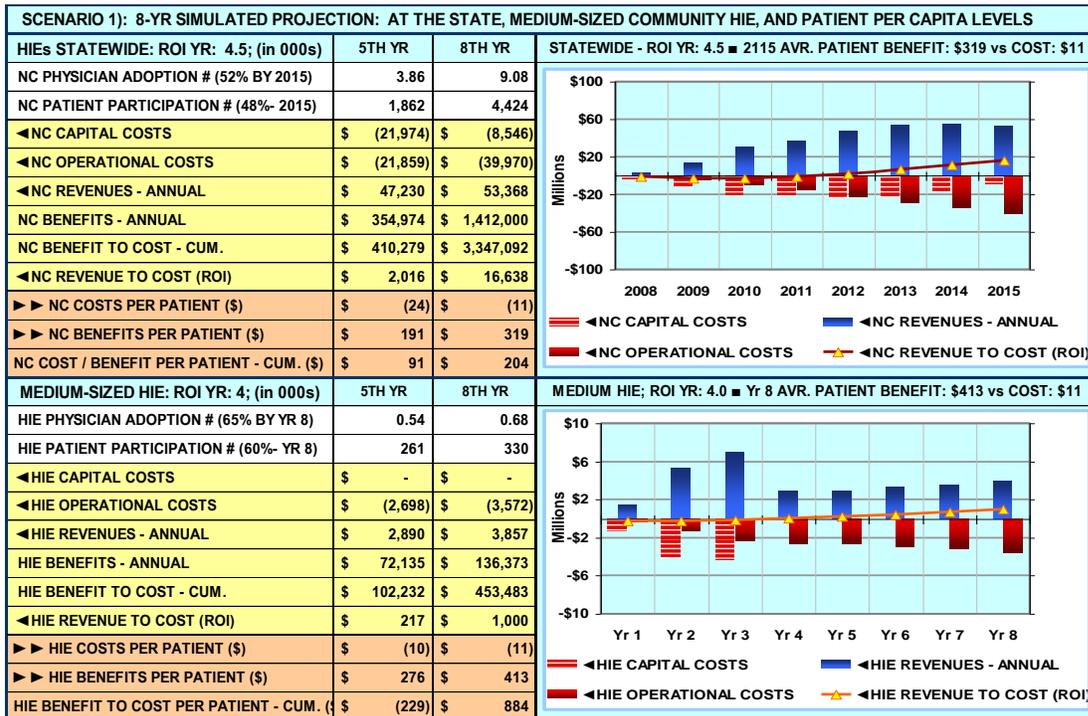


Illustration 7-9 Statewide NC HIE (above) and Medium-sized HIO (below) Assuming Technology Only Benefits

Illustration 7-10 and Illustration 7-11 show the same scenario with the addition of non-technology Medical Home Quality Care process improvement benefits. While the HIE initiatives listed in Illustration 7-9 are foundational to patient-centric Medical Home care coordination the processes themselves produce significant savings. Because the initial stages of Medical Home can be put into effect and start producing benefits almost immediately (as proven by the NC Medicaid Medical Home movement). These early benefits can be useful in offsetting the initial bulge of technology implementation startup costs and transition costs.

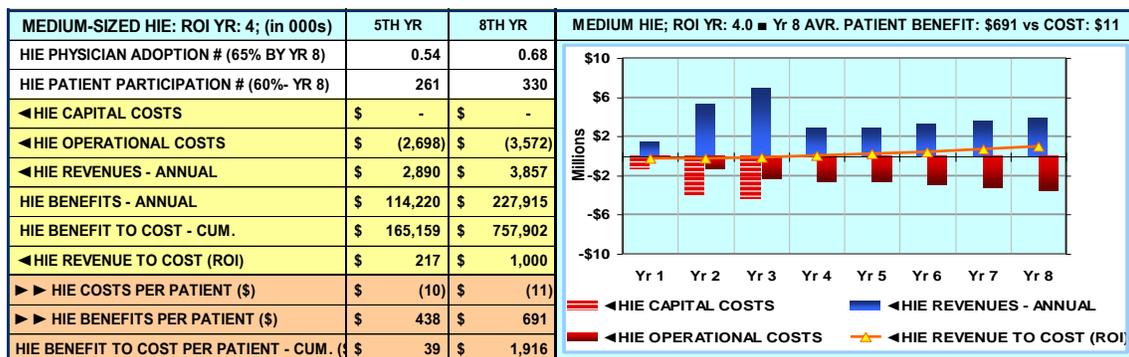


Illustration 7-10 Medium-sized HIO Assuming Technology and Medical Home Coordinated Care Benefits

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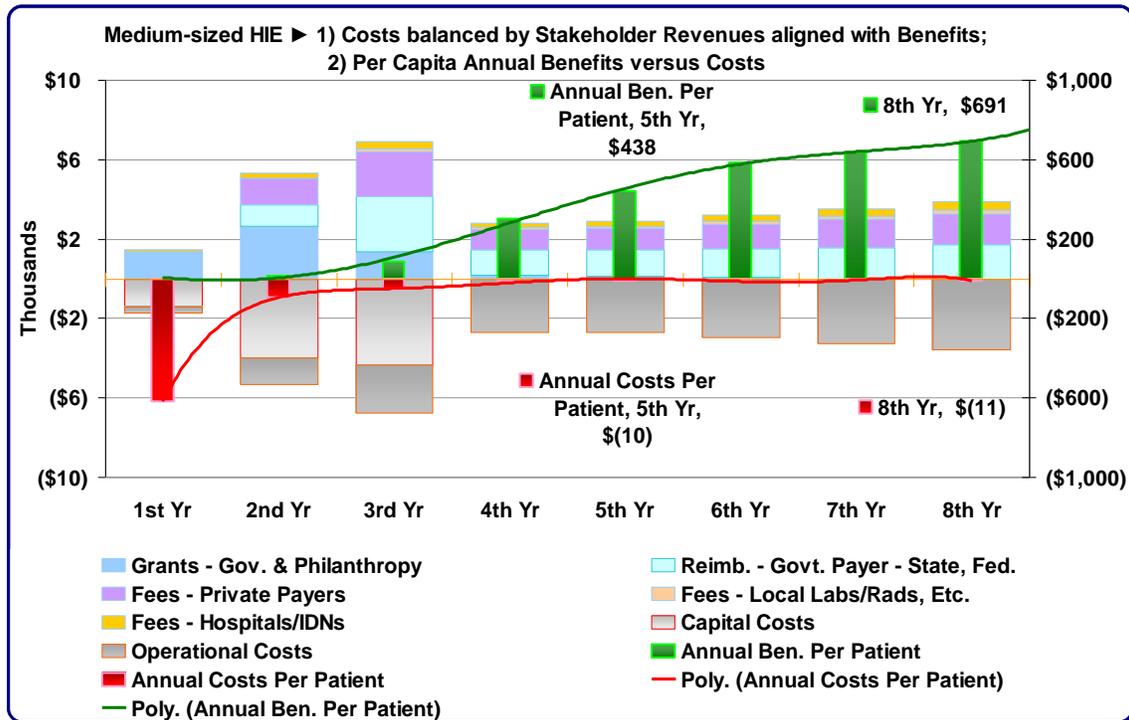


Illustration 7-11 ROI Snapshot of Medium-sized HIO Supporting Core, Value-Add and Transforming Initiatives

In summary, the financial modeling performed for the NC HIE shows that in year four a combination of local HIOs and the statewide coordinating HIO cumulatively would reach positive cash flow<sup>10</sup>; subsequent years would deliver benefits in excess of costs. Based on assumptions for costs and benefits, average net per capita benefits from HIE in NC could total nearly \$700 annually by 2015.

It is important to note that HIE benefits accrue at each level of the healthcare ecosystem, and therefore the Financial Analysis performed has incorporated benefits accruing from certain nationwide HIE initiatives such as Social Security Administration disability determination, where an estimated per capita benefit is incorporated into the simulations.

Likewise, if standards-compliant HIEs are made pervasively available, the healthcare spend for North Carolina could be reduced by \$2B to \$3B a year by 2015. All these financial benefits are accrued beyond those realized through improvements in quality of care and effectiveness, giving evidence that quality can also cost less.

<sup>10</sup> Assuming by year 8, a 65% participation level by physicians and by 60% of participating physician's patients.

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**NC HIE Funding Options**

The Governance Council for the statewide North Carolina HIE will be charged with establishing a roadmap to provide information exchange services across North Carolina; As a result of this Sustainability Plan and the financial modeling completed, this body will have several business models from which to choose.

The following models represent a continuum from private to public funding alternatives. They can be implemented individually or as a blended approach to achieving financial sustainability.

- *Free Market* models are at the private funding end of the continuum where a separate business such as a community portal would provide enough value for people to pay for its use.
- *Recaptured Waste* which is a cost avoidance model is next on the continuum toward public funding options where savings from streamlined clinical and administrative processes flow back into HIE operations.
- *HIE-Generated Revenue* or “pay to play” is a model where subscription and/or transaction fees are charged for use of the exchange by hospitals, physician practices, data sources and research organizations.
- *Value-based* models require stakeholders to pay fees based on value received from participation in the HIE.
- *Employer-based* model is near the public end of the continuum and is a way for employers to provide funding support for an HIE through premium surcharges.
- *Public Good* models represent the other end of the continuum from Free Market models and apply taxes or surcharges, spreading cost across the largest number of stakeholders.<sup>50</sup>

State governments will be called upon to continue and/or increase their investment in initial HIE adoption strategies through such alternatives as: tax incentives, matching fund initiatives, debt financing, healthcare infrastructure fees and technology operations funding. Consensus is growing regarding the need for a blended public-private financing strategy that calls upon investment at the provider level and for defined contributions from public programs and public beneficiaries to support statewide HIE as a public good.

- In April, 2008, Vermont passed legislation that will impose a fee on insurers for all medical claims. The Vermont Health IT Trust fund will provide a stable source of funding for health IT initiatives. \$32 million is expected to be raised over the next seven years and will be managed by the Vermont Secretary of Administration. A similar sized funding in North Carolina would total approximately \$450 million.
- Minnesota established the Electronic Health Record System Revolving Account and Loan Program in 2007 to provide a total of \$6.3 million to rural hospitals, small-town physician practices, nursing homes and other community providers. The money will be used to help facilities meet the state's Jan. 1, 2015, deadline for all providers to have implemented EMR systems as part of Minnesota’s e-Health Initiative.

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- In 1997 the Delaware legislature laid the initial groundwork for an unfunded HIE. The DHIN was organized after the state received two federal grants, and in fiscal 2007, the state legislature provided \$2 million in upfront capital that required matching funds. Funds were matched and the following year the DHIN received \$3 million from the legislature with the same matching requirement.
- With the issuance of Medicaid Transformation Grants over the past few years, state Medicaid programs are beginning to apply resources to enable statewide HIE capacity.

All HIOs face the critical issue and difficult task of reaching and maintaining financial sustainability. The financial model employed by a statewide HIO depends to some degree on the type and level of financing made available by the state as well as changing market forces. Decisions about which clinical initiatives to undertake will be influenced by available funding and potential income sources that can be attracted as a result of their value propositions.

A successful HIO must seek contributed income from various stakeholders to support its financial needs and grow its capabilities. The statewide HIO for North Carolina should consider a blended business model that pulls from the Community Good and HIE-generated Revenue based models for its initial funding strategy. In this manner the state and federal governments would help support the initial capital investment required to establish the governance. Potentially, cross-cutting core service offerings would be offered. Hospitals, larger private payers and large employers might contribute some initial funding and pay subscription or transaction fees to support ongoing operations once a technology solution is agreed upon.

## **7.2 Financial Projections and Scenarios**

### **Initiatives Benefits Correlation**

We have not attempted to duplicate the many studies from IOM, CITL, NGO and others on the benefits of standards-based interoperability at the community and state levels. A sustainable financial model assumes the existence of strong quantitative and qualitative benefits to justify the investment made by funders. In fact there are substantial opportunities for savings, particularly in the payer community, though there are also substantial savings to be realized in provider settings such as hospitals and lab companies. We account for quantitative benefits in two classes:

Savings attributable to technology enablement of processes that can improve quality outcomes and care coordination. (An example are the benefits realized by Medical Home networks, such as the widely reputed CCNC in North Carolina).

Savings based almost entirely on the factors contributed by the technology enabled interoperability.

A well run Medical Home Coordinated Care Network provide benefits through improved processes. Patient centered communication provides consumer education and support services which may enable patients to stay well longer. Illustration 7-12 is the well documented statistic from CMS that shows that 49% of the cost for healthcare services are consumed by just 5% of the high utilization patients and the top 10% account for nearly 2/3rds of the healthcare spend.

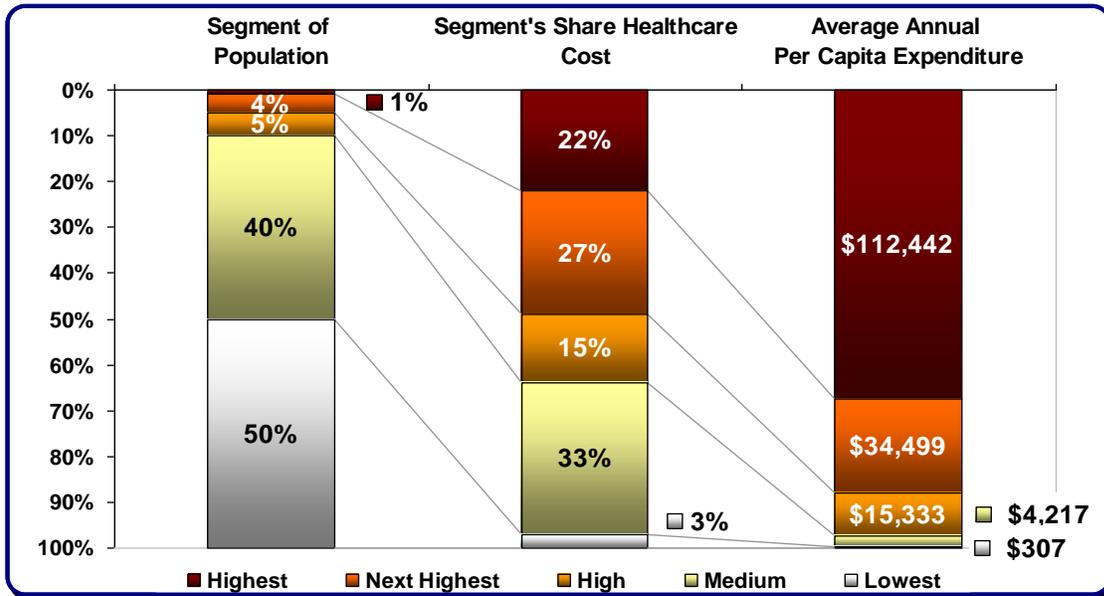


Illustration 7-12 Relationship of Population Segments to Healthcare Spend nationally

The illustration below indicates how the ability to shift relatively small numbers of patients into the next healthier wellness category results in cost avoidance. This example yields 2.5% savings from the healthcare spend, or about \$170 annually per capita.

<b>Case 1:</b>						
<i>Effect of shifting patients towards better health status as a result of Medical Home processes without automation</i>						
<b>Cost Avoidance through Medical Home Processes</b>						
	Top	Next	Next	Next	Lowest	Totals
Population Segments by %	1%	4%	5%	40%	50%	100%
Population Segments by # (circa 2007)	92,403	369,612	462,014	3,696,116	4,620,145	9,240,289
Healthcare \$ Utilization US Avr. (c. 2002)* (%)	22%	27%	15%	33%	3%	
Expended by Segment in NC (Mil. \$\$)	\$ 14,102	\$ 17,307	\$ 9,615	\$ 21,153	\$ 1,923	\$64,100
Per Capita Expenditure by Segment (\$\$)	\$152,615	\$46,825	\$20,811	\$5,723	\$416	
<i>Cost Avoidance through Medical Home</i>	of Top 1% of Next 4% of Next 5%					
% Shifted out of highest utilization segments	1%	8%	10%			
# shifted out high utilization segment	-924	-29,569	-46,201	↓		
# patients shifted into next wellness category	↪	↪ 924	↪ 29,569	46,201		
Percent Shifted to Next Wellness Category	-1.00%	-8.00%	-10.00%	0.00%	0.00%	
Population Segments by %	1%	4%	5%	40%	50%	100%
Decrease from Higher Cost Segments (Mil. \$\$)	(\$141)	(\$1,385)	(\$962)			(\$2,487)
Offsets from Lower Cost Segments (Mil. \$\$)		\$43	\$615	\$264		\$923
Annual Savings Per Segment (Mil. \$\$)	\$ 141	\$ 1,341	\$ 346	\$ (264)	\$ -	\$1,564
Adjusted Total Healthcare Spend (Mil. \$\$)	\$ 13,961	\$ 15,966	\$ 9,269	\$ 21,418	\$ 1,923	\$ 62,536
<i>Annual Benefits Per Capita in Percentiles</i>	of Top 1% of Next 4% of Next 5%					
Population Segments by %	1%	4%	5%	40%	50%	100%
Annual Savings as a % of Total Expended	1.0%	8.4%	3.7%	-1.2%	0.0%	2.5%
Per Capita Medical Home Annual Savings (\$\$)	\$1,526	\$3,629	\$749	(\$72)	\$0	\$169

Illustration 7-13 Illustration of effect of shifting some patients towards better health status

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The second class of benefits are based almost entirely on the factors contributed by the technology enabled interoperability. The following care lists the benefits we quantified relative to our proposed initiatives:

Annual Cost Efficiency Improvements	% Pop.	Savings *	Type
<b>1) Exchange of Summary Patient Record -</b> Decreased cost for number of readmits <u>Who:</u> post-acute patients <u>How:</u> due to readily available discharge summary. <sup>51</sup>	10%	0.50%	<b>Core+</b> (Trans. to non-Acute Care)
<b>2) Diagnostic Results -</b> Reduced cost for unnecessary lab orders, inappropriate treatment, and office efficiency <u>Who:</u> ER patients (+ some referrals) <u>How:</u> increased speed and completeness of diagnosis due to patient centric lab results history. <sup>52</sup>	50%	0.25%	<b>Core+</b> (Lab Results)
<b>3) Medication History -</b> Decrease in severe, preventable medication errors <u>How:</u> due to availability of medication history <sup>53</sup>	100%	0.25%	<b>Core+</b> (Rx History)
<b>4) SSA Authorized Access to Clinical. Info. -</b> Reduced cost and time for authorized access to support disability claims <u>How:</u> SSA "smart form" workflow and HIE Core services <sup>54</sup>	5%	0.50%	<b>Value-Add</b> (Trans. of Care)
<b>5) Consumer to Provider Communications -</b> Reduced cost for unnecessary in-patient and inappropriate ER visits <u>How:</u> access to dashboards through portal interface <sup>55, 56, 57,58</sup>	100%	0.50%	Value-Add
<b>6) Provider to Provider Communication -</b> Improved efficiency in coordinating care <u>How:</u> secure email communications and "smart" forms via physician portal interface <sup>59</sup>	50%	0.50%	<b>Value-Add</b> (Trans. of Care)
<b>7) Care-Coordination -</b> Reduced cost of inappropriate ER visits and hospital [re-] admissions <u>Who:</u> patients with 1 or more chronic diseases <u>How:</u> real-time availability of patient centric record. <sup>60,</sup>	10%	2.5%	Trans-forming

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61, 62, 63, 64				
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**Table 7-1 Quantitative Benefits correlated with Core, Value-add and Transforming Initiatives**

We have purposely been quite conservative in our benefit projections, as well as in the projected benefit uptake (or realization rate) assumed by the model. Many of the benefits were applied only against high utilization categories, yet the potential savings yielded a substantial 3.64% of overall healthcare spend. This averages out to \$253 annually over the entire population, or thousands of dollars savings for the higher utilization candidate groups.

The two savings percentages combine to just over 6% of the healthcare spend, a ratio that fits with other study averages.

<b>Case 2:</b>						
Improved efficiency in coordinating care attributed solely to HIE technology automation of Medical Home processes						
<b>Cost Avoidance through Technology Enablement</b>	Top	Next	Next	Next	Lowest	
Population Segments by %	1%	4%	5%	40%	50%	100%
Population Segments by # (circa 2007)	92,403	369,612	462,014	3,696,116	4,620,145	9,240,289
Healthcare \$\$ Utilization in US (circa 2002)* (%)	22%	27%	15%	33%	3%	
Expended by Segment in US (Mil. \$\$)	\$14,102	\$17,307	\$9,615	\$21,153	\$1,923	\$64,100
<b>Total Annual Savings (Mil. \$\$)</b>	<b>\$705</b>	<b>\$865</b>	<b>\$433</b>	<b>\$317</b>	<b>\$14</b>	<b>\$2,335</b>
<b>Adjusted Total Healthcare Spend</b>	<b>\$13,397</b>	<b>\$16,442</b>	<b>\$9,182</b>	<b>\$20,836</b>	<b>\$1,909</b>	<b>\$61,766</b>
	<b>Top 1%</b>	<b>4%</b>	<b>5%</b>	<b>40%</b>	<b>50%</b>	<b>100%</b>
Per Capita Expenditure by Segment (\$\$)	\$152,615	\$46,825	\$20,811	\$5,723	\$416	\$6,937 **
Per Capita Benefits (Savings) (%)	5.00%	5.00%	4.50%	1.50%	0.75%	3.64%
Per Capita Adjusted Expenditure	\$144,985	\$44,484	\$19,875	\$5,637	\$413	\$6,684
<b>Annual Benefits Per Capita in Percentiles</b>	Aggregated Ranges in (millions \$\$)					
Top Aggregate % of Healthcare Spend	Top 1%	4%	5%	40%	50%	100%
1) Core+ - Average Annual Savings***	\$1,526	\$468	\$208	\$29	\$1	\$56
2) Value-Add - Average Annual Savings***	\$2,289	\$702	\$208	\$57	\$2	\$86
3) Transforming - Average Annual Savings***	\$3,815	\$1,171	\$520	\$0	\$0	\$111
<b>Per Capita Technology Enablement Savings***</b>	<b>\$7,631</b>	<b>\$2,341</b>	<b>\$937</b>	<b>\$86</b>	<b>\$3</b>	<b>\$253</b>

\* Medical Expenditure Panel Survey Statistical Brief #81, Yu, William W. & Trena M.Ezzati-Rice, AHRQ, May 2005.  
\*\* Kaiser Family Foundation, Health Care Expenditures per Capita by Service by State of Residence, 2004  
\*\*\* Per Capita by Aggregated Segments (\$\$)

**Illustration 7-14 Cost savings most directly attributable to technology enabled interoperability**

### **Revenue Assumptions**

- Benefit savings can only be realized through large numbers of users who actively participate in the services of the statewide HIE.
- Investment will be necessary to initiate and sustain such a large public private exchange across the state of North Carolina.
- Funders will be required who will invest in the initial infrastructure and the changes required by healthcare providers.

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- Stakeholders will need to collectively agree upon an equitable cost sharing approach; (one hypothetical scenario shown is the one currently in use in our financial model.)

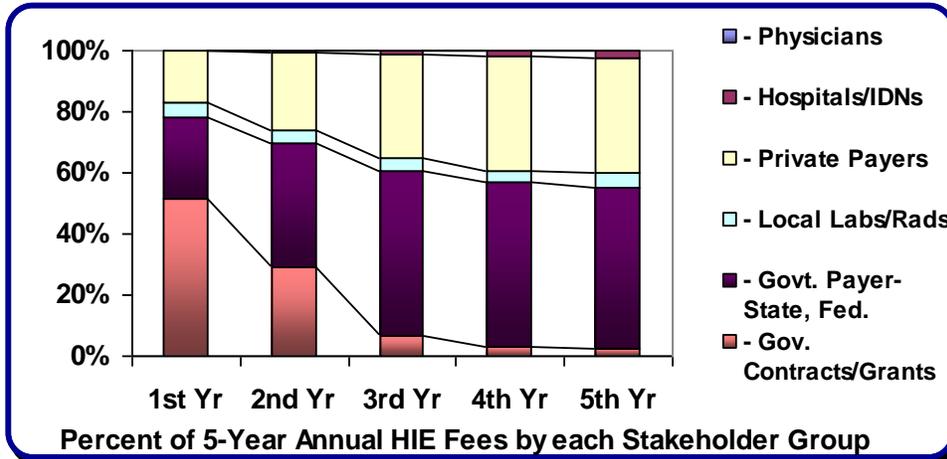


Illustration 7-15 Illustration of Revenue Sharing by Year

As previously described, our financial model is multi-level. Costs are incurred and revenues are generated by numerous Community HIOs, but costs and revenues can also be financially accounted for on a statewide basis, as well as on an (individual) citizen per capita basis. For example: by using a phased design, we can deploy and operate an average-sized HIO covering a population of 500,000 citizens, with 1,000 physicians and 5 hospitals.

The simulations used throughout our financial modeling have allowed us to test assumptions against the projected statewide evolution of HIOs. These HIOs must interoperate with each other and with Federal agencies who participate in the NHIN. We anticipate that it will be necessary to coordinate within a range of five to twenty separate centers of activity if we are to provide the state's citizenry with a seamless interoperable healthcare infrastructure.

Our financial model for the State of North Carolina tracks individual Community HIOs and aggregates statewide perspectives in calculating cost versus revenue. The North Carolina citizen becomes our common and most appropriate accounting unit. Therefore, we can clearly state that our financial model is based on statewide demographics and accounts for adoption growth of HIEs, and key stakeholder groups.

### **ROI Simulation Scenarios**

The following are key variables which influence the level and distribution of cost, benefits, and revenues, and factors affecting rate and depth of adoption.

- Span of Control** – The mixture of small to large-sized HIEs one finds in an HIE, and the level of coordination required because of the shared infrastructure and services provided
- Initiative Priorities** - Level of statewide consensus on “program of initiatives” (what comes first, and why the initiative comes first)

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- **Adoption Rates**– How quickly will physicians, hospitals, patients and other critical stakeholders become active users; what will they want first and what incentives are necessary to encourage use
- **Infrastructure Cost** - Cost basis for hardware, software, and levels of support services (how much infrastructure and investment is anticipated for education and user support)
- **ROI by Stakeholder Group** – Aligning costs and benefits by stakeholder group (mechanisms and coordination to effect balancing of investment and return)
- **Willingness to Fund** - Breadth of participation by stakeholders with the incentive and means to fund the investment

The first five of these are variables we explored through the financial model's simulation scenarios, some of which are included in this report. Regarding the last, bullet regarding potential public and private financiers of the state's infrastructure, and of the NHIN as a whole, we hope that this plan sparks creative discussion around the state and that it will begin to provide a financial framework for further deliberations.

The following pages show the results from a few of the simulations showing:

- A full-page template showing the Statewide level, a Medium-sized HIO, and Per Capita annual costs and benefits for State and HIO – implementing all initiatives including Medical Home Care Coordination,
- The same scenario with Small-sized HIO,
- The same scenario with Large-sized HIO,
- The same Medium-sized HIO scenario with all initiatives but the Medical Home Care Coordination (i.e., it does include costs and benefits for the technology enablement aspects such as portals and dashboards),
- The same Medium-sized HIO implementing only the three Core initiatives (preceded by three brief HIO inception and financial planning exercises),

Space precludes including other scenarios which were run to contrast varied priorities and timing of initiatives, adoption rates for physicians, hospitals and patients, HIO inception schedule and mixture of small to large, benefits realization (uptake) rates and cost assumptions. While all of these affect ROI and benefits to cost ratios at some level, they do not all have equal weight.

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SCENARIO 1): 8-YR SIMULATED PROJECTION: AT THE STATE, MEDIUM-SIZED COMMUNITY HIE, AND PATIENT PER CAPITA LEVELS								
HIEs STATEWIDE: ROI YR: 4.1; (in 000s)		5TH YR	8TH YR	STATEWIDE - ROI YR: 4.1 ■ 2115 AVR. PATIENT BENEFIT: \$501 vs COST: \$16				
NC PHYSICIAN ADOPTION # (50% BY 2015)		3.27	8.55					
NC PATIENT PARTICIPATION # (46%- 2015)		1,567	4,142					
◀NC CAPITAL COSTS	\$	(31,369)	\$ (15,912)					
◀NC OPERATIONAL COSTS	\$	(25,398)	\$ (48,657)					
◀NC REVENUES - ANNUAL	\$	61,166	\$ 71,026					
NC BENEFITS - ANNUAL	\$	366,443	\$ 2,073,157					
NC BENEFIT TO COST - CUM.	\$	346,715	\$ 4,465,649					
◀NC REVENUE TO COST (ROI)	\$	3,995	\$ 22,779					
▶▶ NC COSTS PER PATIENT (\$)	\$	(36)	\$ (16)					
▶▶ NC BENEFITS PER PATIENT (\$)	\$	234	\$ 501					
NC COST / BENEFIT PER PATIENT - CUM. (\$)	\$	92	\$ 309					
MEDIUM-SIZED HIE: ROI YR: 4; (in 000s)		5TH YR	8TH YR		MEDIUM HIE; ROI YR: 4.0 ■ Yr 8 AVR. PATIENT BENEFIT: \$691 vs COST: \$11			
HIE PHYSICIAN ADOPTION # (65% BY YR 8)		0.54	0.68					
HIE PATIENT PARTICIPATION # (60%- YR 8)		261	330					
◀HIE CAPITAL COSTS	\$	-	\$ -					
◀HIE OPERATIONAL COSTS	\$	(2,698)	\$ (3,572)					
◀HIE REVENUES - ANNUAL	\$	2,890	\$ 3,857					
HIE BENEFITS - ANNUAL	\$	114,220	\$ 227,915					
HIE BENEFIT TO COST - CUM.	\$	165,159	\$ 757,902					
◀HIE REVENUE TO COST (ROI)	\$	217	\$ 1,000					
▶▶ HIE COSTS PER PATIENT (\$)	\$	(10)	\$ (11)					
▶▶ HIE BENEFITS PER PATIENT (\$)	\$	438	\$ 691					
HIE BENEFIT TO COST PER PATIENT - CUM. (\$)	\$	39	\$ 1,916					
NC HIE BENEFICIARIES AND FUNDERS	MEDIUM HIE	FUNDING	SERVICES AND IMPLEMENTATION TIMETABLE	OPERATIONAL				
HIE TYPE, USERS & FUNDERS	VOLUME #	% BY GROUP	INCL.	INITIATIVES	START	HOST	HELP	MAINT
PATIENT POPULATION (SAMPLE HIE)	550,000	60%	Y	A. HIE GOVERNANCE & INCEPTION	Yr 1 Mo. 1	N/A	N/A	N/A
PHYSICIANS (PCP AND SPECIALTY)	1,045	65%	Y	B. HIE FINANCING STRATEGY	Yr 1 Mo. 4	N/A	N/A	N/A
HOSPITALS/IDNS	7	8.6%	Y	C. HIE TECH. DESIGN & LEGAL	Yr 1 Mo. 6	N/A	N/A	N/A
PRIVATE PAYERS	4	37.8%		▶ CORE ◀				
LABS/RADS/PHARMACIES	2	4.1%	Y	1. CORE: SUM. REC. EXCHANGE	Yr 1 Mo. 8	75%	75%	100%
GOVT. PAYER - STATE, FEDERAL	1	43.5%	Y	2. CORE+ LAB REPORTS/NOTIFICATIONS	Yr 2 Mo. 1	75%	50%	100%
GOV. AWARDS & PHILANTHROPY	1	6.0%	Y	3. CORE+ MEDICATION HISTORY	Yr 2 Mo. 3	50%	50%	100%
STATEWIDE HIE - PARAMETER SETTINGS:	# OF HIEs	IMPLEM. PACE		▶ VALUE-ADD ◀				
SMALL-SIZED HIEs (#, INCEPTION RATE)	10	Rapid	Y	4. SSA: CLIN. ACCESS AUTHORIZATION	Yr 2 Mo. 6	25%	50%	100%
MEDIUM-SIZED HIEs (#, INCEPTION RATE)	5	Moderate	Y	5. CONSUMER ACCESS CONSENT MGMT.	Yr 2 Mo. 8	50%	75%	100%
LARGE-SIZED HIEs (#, INCEPTION RATE)	4	Gradual	Y	6. PROV. TO PROV. COMMUNICATIONS	Yr 2 Mo. 10	50%	50%	100%
FINANCIAL METRIC PARAMETER SETTINGS:	ASSUMP.	TYPE / RATE		▶ TRANSFORMING ◀				
COSTS: (HW / SW / IMPLEMENTATION)	( 1 )	Full-Service	Y	7. PCMH PROCESSES & TECHNOLOGY	Yr 3 Mo. 1	50%	75%	100%
BENEFITS REALIZATION (INITIAL RATE)	50%	Rapid	Y	7B. MEDICAL HOME COORDINATED CARE	Yr 2 Mo. 1	N/A	N/A	N/A

Illustration 7-16 Medium HIO: all initiatives including 7b: Medical Home Coordinated Care

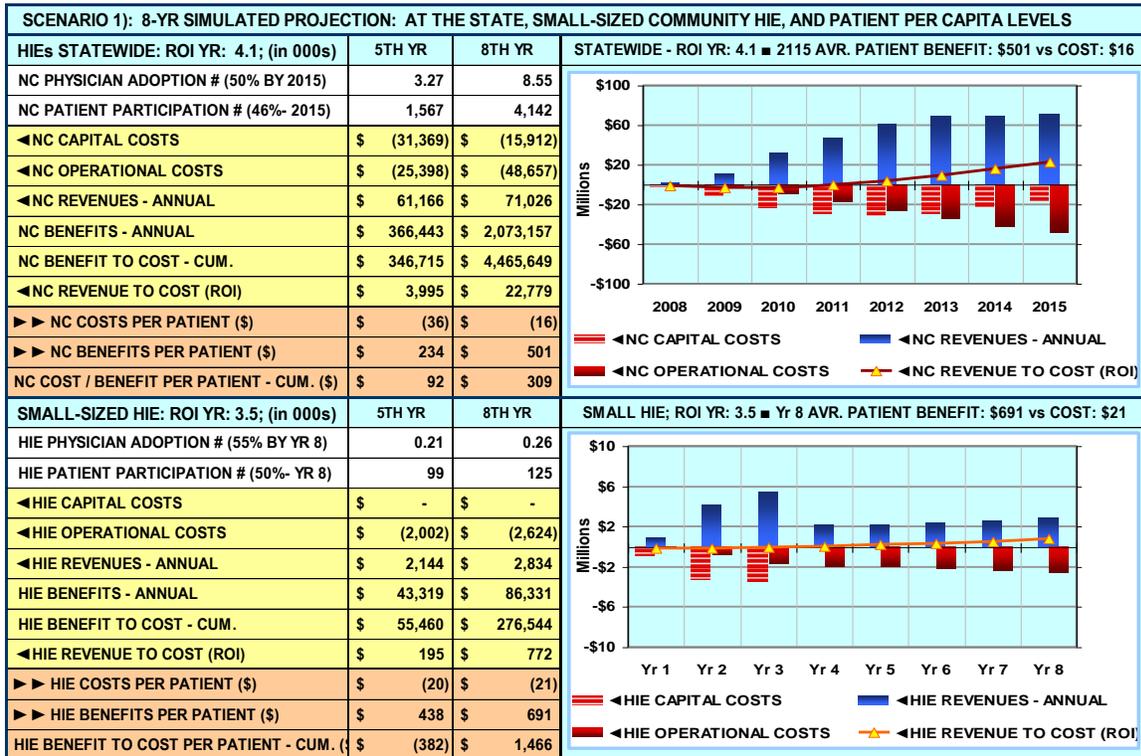


Illustration 7-17 Small HIO: all initiatives including 7b: Medical Home Coordinated Care

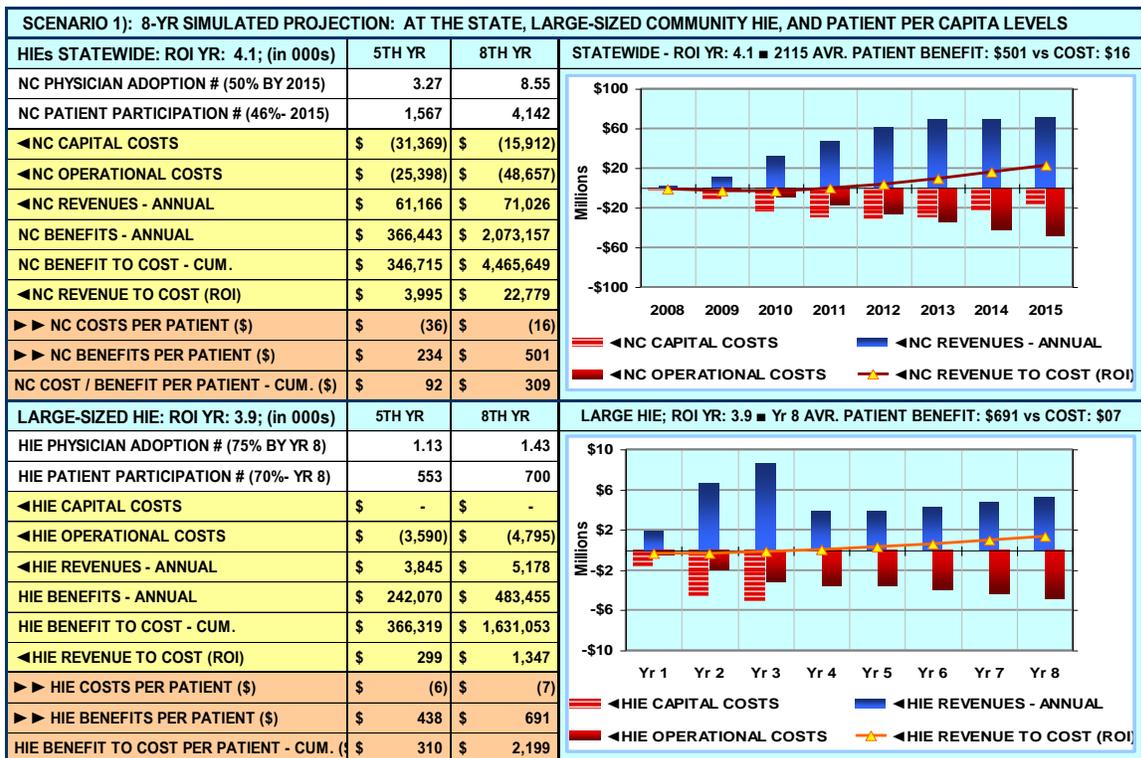


Illustration 7-18 Small HIO: all initiatives including 7b: Medical Home Coordinated Care

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SCENARIO 1): 8-YR SIMULATED PROJECTION: AT THE STATE, MEDIUM-SIZED COMMUNITY HIE, AND PATIENT PER CAPITA LEVELS								
<b>HIEs STATEWIDE: ROI YR: 4.1; (in 000s)</b>	<b>5TH YR</b>	<b>8TH YR</b>	<b>STATEWIDE - ROI YR: 4.1 ■ 2115 AVR. PATIENT BENEFIT: \$307 vs COST: \$16</b>					
NC PHYSICIAN ADOPTION # (50% BY 2015)	3.27	8.55						
NC PATIENT PARTICIPATION # (46%- 2015)	1,567	4,142						
◀NC CAPITAL COSTS	\$ (31,369)	\$ (15,912)						
◀NC OPERATIONAL COSTS	\$ (25,398)	\$ (48,657)						
◀NC REVENUES - ANNUAL	\$ 61,166	\$ 71,026						
NC BENEFITS - ANNUAL	\$ 248,432	\$ 1,272,716						
NC BENEFIT TO COST - CUM.	\$ 199,949	\$ 2,691,526						
◀NC REVENUE TO COST (ROI)	\$ 3,995	\$ 22,779						
▶▶ NC COSTS PER PATIENT (\$)	\$ (36)	\$ (16)						
▶▶ NC BENEFITS PER PATIENT (\$)	\$ 159	\$ 307						
NC COST / BENEFIT PER PATIENT - CUM. (\$)	\$ 49	\$ 186						
<b>MEDIUM-SIZED HIE: ROI YR: 4; (in 000s)</b>	<b>5TH YR</b>	<b>8TH YR</b>	<b>MEDIUM HIE; ROI YR: 4.0 ■ Yr 8 AVR. PATIENT BENEFIT: \$413 vs COST: \$11</b>					
HIE PHYSICIAN ADOPTION # (65% BY YR 8)	0.54	0.68						
HIE PATIENT PARTICIPATION # (60%- YR 8)	261	330						
◀HIE CAPITAL COSTS	\$ -	\$ -						
◀HIE OPERATIONAL COSTS	\$ (2,698)	\$ (3,572)						
◀HIE REVENUES - ANNUAL	\$ 2,890	\$ 3,857						
HIE BENEFITS - ANNUAL	\$ 72,135	\$ 136,373						
HIE BENEFIT TO COST - CUM.	\$ 102,232	\$ 453,483						
◀HIE REVENUE TO COST (ROI)	\$ 217	\$ 1,000						
▶▶ HIE COSTS PER PATIENT (\$)	\$ (10)	\$ (11)						
▶▶ HIE BENEFITS PER PATIENT (\$)	\$ 276	\$ 413						
HIE BENEFIT TO COST PER PATIENT - CUM. (\$)	\$ (229)	\$ 884						
<b>NC HIE BENEFICIARIES AND FUNDERS</b>	<b>MEDIUM HIE</b>	<b>FUNDING</b>	<b>SERVICES AND IMPLEMENTATION TIMETABLE</b>		<b>OPERATIONAL</b>			
<b>HIE TYPE, USERS &amp; FUNDERS</b>	<b>VOLUME #</b>	<b>% BY GROUP</b>	<b>INCL.</b>	<b>INITIATIVES</b>	<b>START</b>	<b>HOST</b>	<b>HELP</b>	<b>MAINT</b>
PATIENT POPULATION (SAMPLE HIE)	550,000	60%	Y	A. HIE GOVERNANCE & INCEPTION	Yr 1 Mo. 1	N/A	N/A	N/A
PHYSICIANS (PCP AND SPECIALTY)	1,045	65%	Y	B. HIE FINANCING STRATEGY	Yr 1 Mo. 4	N/A	N/A	N/A
HOSPITALS/IDNS	7	8.6%	Y	C. HIE TECH. DESIGN & LEGAL	Yr 1 Mo. 6	N/A	N/A	N/A
PRIVATE PAYERS	4	37.8%		▶ CORE ◀				
LABS/RADS/PHARMACIES	2	4.1%	Y	1. CORE: SUM. REC. EXCHANGE	Yr 1 Mo. 8	75%	75%	100%
GOVT. PAYER - STATE, FEDERAL	1	43.5%	Y	2. CORE+ LAB REPORTS/NOTIFICATIONS	Yr 2 Mo. 1	75%	50%	100%
GOV. AWARDS & PHILANTHROPY	1	6.0%	Y	3. CORE+ MEDICATION HISTORY	Yr 2 Mo. 3	50%	50%	100%
STATEWIDE HIE - PARAMETER SETTINGS:	# OF HIEs	IMPLEM. PACE		▶ VALUE-ADD ◀				
SMALL-SIZED HIES (#, INCEPTION RATE)	10	Rapid	Y	4. SSA: CLIN. ACCESS AUTHORIZATION	Yr 2 Mo. 6	25%	50%	100%
MEDIUM-SIZED HIES (#, INCEPTION RATE)	5	Moderate	Y	5. CONSUMER ACCESS CONSENT MGMT.	Yr 2 Mo. 8	50%	75%	100%
LARGE-SIZED HIES (#, INCEPTION RATE)	4	Gradual	Y	6. PROV. TO PROV. COMMUNICATIONS	Yr 2 Mo. 10	50%	50%	100%
FINANCIAL METRIC PARAMETER SETTINGS:	ASSUMP.	TYPE / RATE		▶ TRANSFORMING ◀				
COSTS: (HW / SW / IMPLEMENTATION)	( 1 )	Full-Service	Y	7. PCMH DASHBOARDS & PORTALS	Yr 3 Mo. 1	50%	75%	100%
BENEFITS REALIZATION (INITIAL RATE)	50%	Rapid	N	7B. MEDICAL HOME COORDINATED CARE				

Illustration 7-19 Medium HIO: all initiatives through 7a Medical Home Dashboards & Portals

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SCENARIO 1): 8-YR SIMULATED PROJECTION: AT THE STATE, MEDIUM-SIZED COMMUNITY HIE, AND PATIENT PER CAPITA LEVELS								
HIEs STATEWIDE: ROI YR: 4.7; (in 000s)	5TH YR	8TH YR	STATEWIDE - ROI YR: 4.7 ■ 2115 AVR. PATIENT BENEFIT: \$073 vs COST: \$06					
NC PHYSICIAN ADOPTION # (50% BY 2015)	3.27	8.55						
NC PATIENT PARTICIPATION # (46%- 2015)	1,567	4,142						
◀NC CAPITAL COSTS	\$ (15,280)	\$ (5,917)						
◀NC OPERATIONAL COSTS	\$ (11,762)	\$ (19,367)						
◀NC REVENUES - ANNUAL	\$ 29,138	\$ 27,813						
NC BENEFITS - ANNUAL	\$ 73,007	\$ 301,283						
NC BENEFIT TO COST - CUM.	\$ 29,977	\$ 609,342						
◀NC REVENUE TO COST (ROI)	\$ 877	\$ 8,456						
▶▶ NC COSTS PER PATIENT (\$)	\$ (17)	\$ (6)						
▶▶ NC BENEFITS PER PATIENT (\$)	\$ 47	\$ 73						
NC COST / BENEFIT PER PATIENT - CUM. (\$)	\$ 1	\$ 41						
MEDIUM-SIZED HIE: ROI YR: 6.1; (in 000s)	5TH YR	8TH YR	MEDIUM HIE; ROI YR: 6.1 ■ Yr 8 AVR. PATIENT BENEFIT: \$092 vs COST: \$04					
HIE PHYSICIAN ADOPTION # (65% BY YR 8)	0.54	0.68						
HIE PATIENT PARTICIPATION # (60%- YR 8)	261	330						
◀HIE CAPITAL COSTS	\$ -	\$ -						
◀HIE OPERATIONAL COSTS	\$ (1,066)	\$ (1,379)						
◀HIE REVENUES - ANNUAL	\$ 1,142	\$ 1,489						
HIE BENEFITS - ANNUAL	\$ 18,045	\$ 30,410						
HIE BENEFIT TO COST - CUM.	\$ 24,621	\$ 101,499						
◀HIE REVENUE TO COST (ROI)	\$ (97)	\$ 207						
▶▶ HIE COSTS PER PATIENT (\$)	\$ (4)	\$ (4)						
▶▶ HIE BENEFITS PER PATIENT (\$)	\$ 69	\$ 92						
HIE BENEFIT TO COST PER PATIENT - CUM. (\$)	\$ (540)	\$ (297)						
NC HIE BENEFICIARIES AND FUNDERS	MEDIUM HIE	FUNDING	SERVICES AND IMPLEMENTATION TIMETABLE	OPERATIONAL				
HIE TYPE, USERS & FUNDERS	VOLUME #	% BY GROUP	INCL.	INITIATIVES	START	HOST	HELP	MAINT
PATIENT POPULATION (SAMPLE HIE)	550,000	60%	Y	A. HIE GOVERNANCE & INCEPTION	Yr 1 Mo. 1	N/A	N/A	N/A
PHYSICIANS (PCP AND SPECIALTY)	1,045	65%	Y	B. HIE FINANCING STRATEGY	Yr 1 Mo. 4	N/A	N/A	N/A
HOSPITALS/IDNS	7	8.3%	Y	C. HIE TECH. DESIGN & LEGAL	Yr 1 Mo. 6	N/A	N/A	N/A
PRIVATE PAYERS	4	37.0%		▶ CORE ◀				
LABS/RADS/PHARMACIES	2	3.9%	Y	1. CORE: SUM. REC. EXCHANGE	Yr 1 Mo. 8	75%	75%	100%
GOVT. PAYER - STATE, FEDERAL	1	42.5%	Y	2. CORE+ LAB REPORTS/NOTIFICATIONS	Yr 2 Mo. 1	75%	50%	100%
GOV. AWARDS & PHILANTHROPY	1	8.3%	Y	3. CORE+ MEDICATION HISTORY	Yr 2 Mo. 3	50%	50%	100%
STATEWIDE HIE - PARAMETER SETTINGS:	# OF HIEs	IMPLEM. PACE		▶ VALUE-ADD ◀				
SMALL-SIZED HIES (#, INCEPTION RATE)	10	Rapid	N	4. SSA- CLIN. ACCESS AUTHORIZATION				
MEDIUM-SIZED HIES (#, INCEPTION RATE)	5	Moderate	N	5. CONSUMER ACCESS CONSENT MGMT.				
LARGE-SIZED HIES (#, INCEPTION RATE)	4	Gradual	N	6. PROV. TO PROV. COMMUNICATIONS				
FINANCIAL METRIC PARAMETER SETTINGS:	ASSUMP.	TYPE / RATE		▶ TRANSFORMING ◀				
COSTS: (HW / SW / IMPLEMENTATION)	( 1 )	Full-Service	N	7. PCMH DASHBOARDS & PORTALS				
BENEFITS REALIZATION (INITIAL RATE)	50%	Rapid	N	7B. MEDICAL HOME COORDINATED CARE				

Illustration 7-20 Medium HIO: three Core initiatives plus HIO inception planning only

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## 8. Appendices

The Appendices consist of an 8.1 Glossary of Terms followed by additional supporting material and detail for the body of the report. The other sections are:

- 8.2 Identification of Medical Trading
- 8.3 Program of Initiatives in Detail
- 8.4 NC HIE Council – Existing Governance Detail
- 8.5 Organizational Structure for Statewide NHIE Operations

### 8.1 Glossary of Terms

#### **Deliverable:**

**Sustainability Plan:** Describes how the NHIN will evolve during nationwide implementation of this network of networks. The Sustainability Plan addresses the jurisdiction appropriate initiatives, governance, technology and financing that will lead to a sustainable statewide NHIE deployment within five years.

#### **Technology:**

**Nationwide Health Information Network (NHIN):** A network that encompasses two major components, business and technology, which operate on three different levels: federal/national, state, and local/county/regional. A multidimensional and multilevel network, the NHIN consists of technical, organizational, social, cultural, economic, and political complexities. It has a set of common interconnected tools, such as mobile authentication, Web services architecture, and security technologies. These tools are needed to support inexpensive and secure sharing of health information data among HIEs across the nation.

**Health Information Exchange (HIE):** The mobilization of healthcare information electronically across organizations within a region or community. The HIE's infrastructure enables exchange among members of the region and/or community.

**NHIN HIE:** An HIE that can cross-communicate with other NHIN HIEs. A NHIN HIE must implement specific technologies that enable cross-HIE communication based on standards established by the Health Information Technology Standards Panel and the Health Information Security and Privacy Board. The HIE must also be certified as NHIN-ready by the Certification Commission on Health Information Technology.

**Health Service Provider (ONC-Use Case):** A multistakeholder organization or vendor that enables or oversees the secure exchange and use of health information to promote improved health quality, safety, and efficiency.

**Health Information Technology (HIT):** The application of information processing involving both computer hardware and software that deals with the storage, retrieval, sharing, and use of healthcare information, data, and knowledge for communication and decision-making.

**Interoperability:** The ability to communicate and exchange data accurately, effectively, securely and consistently with different information technology systems, software applications, and networks, in various settings.

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Electronic Health Record (EHR): Generic term for all electronic patient care systems. It is a real-time patient health record with access to evidence-based decision support tools that can be used to aid clinicians in decision-making. The EHR can automate and streamline a clinician's workflow, ensuring that all clinical information is communicated. It can also prevent delays in response that result in gaps in care. The EHR can also support the collection of data for uses other than clinical care, such as billing, quality management, outcome reporting, and public health disease surveillance and reporting.

Electronic Medical Record (EMR): Electronic record with full interoperability within an enterprise (hospital, clinic, or practice).

Master Patient Index (MPI): A software database program that collects a patient's various hospital identification numbers, perhaps from the blood lab, radiology, admission and so on, and keeps them under a single, enterprise wide identification number.

Patient Record Locator: An electronic health record locator that would help patients and their clinicians locate test results, medical history, and prescription data from a variety of sources. For example, physicians could use the locator to find out which other physicians have information on patients they are seeing. A record locator would act as a secure health information search tool.

Personal Health Record (PHR): An electronic application through which individuals can maintain and manage their health information (and that of others for whom they are authorized) in a private, secure, and confidential environment.

ePrescribing: A type of computer technology in which physicians use handheld or personal computer devices to review drug and formulary coverage and transmit prescriptions to a printer or a local pharmacy. ePrescribing software can be integrated into existing clinical information systems to give the physician access to patient-specific information in screening for drug interactions and allergies.

Continuity of Care Record (CCR): A type of patient health summary. CCR is a way to create flexible documents that contain the most relevant and timely core health information about a patient and to send it electronically from one caregiver to another. It contains various sections—such as patient demographics, insurance information, diagnosis and problem lists, medications, allergies, and care plan—that represent a snapshot of a patient's health data that can be useful, even lifesaving, if available when the patient has his or her next clinical encounter.

Application Service Provider (ASP): A business that provides computer-based services to customers over a network. The most limited sense of this business is that of providing access to a particular application program (such as medical billing) using a standard protocol such as HTTP.

### **Government:**

Office of the National Coordinator for Health Information Technology (ONC): U.S. Department of Health and Human Services office that provides leadership for the development and nationwide implementation of an interoperable health information technology infrastructure to improve the quality and efficiency of healthcare and the ability of consumers to manage their care and safety.

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AHIC: Federal public-private collaboration assigned the initial oversight role. Convened by the Secretary of Health and Human Services (HHS), it is comprised of leaders from public agencies and private companies. The community of healthcare experts provides guidance and recommendations to the Secretary of HHS on issues related to NHIN adoption. The original AHIC has been succeeded by the “AHIC Successor,” a private organization.

Centers for Medicare and Medicaid Services (CMS): U.S. Department of Health and Human Services agency that seeks to protect and improve beneficiary health and satisfaction; foster appropriate and predictable payments and high-quality care; promote understanding of CMS programs among beneficiaries, the healthcare community, and the public; promote the fiscal integrity of CMS programs and be an accountable steward of public funds; foster excellence in designing and administering CMS programs; and provide leadership in the broader healthcare marketplace to improve health.

Quality Improvement Organization (QIO): Medicare QIOs work with consumers, physicians, hospitals, and other caregivers to refine care delivery systems to make sure patients get the right care at the right time, particularly among underserved populations. The program also safeguards the integrity of the Medicare trust fund by ensuring payment is made only for medically necessary services, and investigates beneficiary complaints about quality of care. Under the direction of CMS, the program consists of a national network of 53 QIOs responsible for each U.S. state, territory, and the District of Columbia. (See Health Services Advisory Group.)

Institute of Medicine (IOM): A nonprofit organization specifically created for this purpose as well as an honorific membership organization, IOM was chartered in 1970 as a component of the National Academy of Sciences. IOM's mission is to serve as advisor to the nation to improve health. It provides unbiased, evidence-based, and authoritative information and advice on health and science policy-to-policy makers, professionals, leaders in every sector of society, and the public at large.

Federal Health Initiatives: The federal government has three distinct roles in health exchange initiatives:

*Governing the NHIN*—American Health Information Community (AHIC) serves as an advisor to the Secretary of Health and Human Services (DHHS), evaluating and recommending standards bodies, e.g., the Health Information Technology Standards Panel and the Health Information Security and Privacy Board, breakthrough health initiatives, and NHIN functionality.

*Accelerating NHIN adoption*—Congress provides the policy and financial incentives for accelerated adoption.

*Participating as a “network” in the NHIN*—Federal agencies, e.g., the Office of Personnel Management (OPM), Centers for Medicare & Medicaid Services (CMS), Veterans Administration (VA), Centers for Disease Control (CDC), National Institutes of Health (NIH), and others, may implement technology within their agency networks to participate as a network.

State Health Information Initiatives: State initiatives can be divided into three areas, with states serving as a:

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*Support for existing local and regional initiatives*—States are responsible for developing the technology infrastructure to provide information exchange services that support local and regional community exchange initiatives.

*Recipient of aggregated health information for public health and biosurveillance*—States can be a recipient of deidentified personal health information to improve the quality and safety of care for Medicaid recipients.

*Regulatory responsibility*—States have a responsibility to remove the legal barriers and provide financial incentives that accelerate health IT adoption.

**Standards:**

Certification Commission for Healthcare Information Technology (CCHIT): The mission of CCHIT is to accelerate the adoption of robust, interoperable HIT throughout the U.S. healthcare system by creating an efficient, credible, sustainable mechanism for certifying HIT products.

HITSP: Group organized to harmonize the standards used to exchange health data in the United States. The Panel brings together experts from across the healthcare IT community from consumers to doctors, nurses, and hospitals; from those who develop healthcare IT products to those who use them; and from the government agencies that monitor the U.S. healthcare system to those organizations that are actually writing the standards

Health Information Security and Privacy Collaborative (HISPC): RTI International, working with the National Governors Association Center for Best Practices, has subcontracted with 33 states and one territory to create the Health Information Security and Privacy Collaboration (HISPC). These subcontractors will involve state leadership and a broad range of stakeholders in health information exchange to assess variations at the organization level in privacy and security practices and policies, and the legal basis for these practices and policies, where applicable.

Health Insurance Portability and Accountability Act (HIPAA): Enacted by the U.S. Congress in 1996. According to CMS, Title I of HIPAA protects health insurance coverage for workers and their families when they change or lose their jobs. Title II of HIPAA, the Administrative Simplification provisions, requires establishing national standards for electronic healthcare transactions and national identifiers for providers, health insurance plans, and employers.

**Community:**

Health Information Exchange (HIE): Multistakeholder collaborative within regions or cities, created to facilitate information sharing that drives improvements in healthcare quality, safety, and efficiency. The HIE (or Regional Health Information Organization – RHIO) is the primary driver of these improvements. As the HIE/RHIO matures and develops sustainable operational, financial, and services models, it may also develop a technology infrastructure to provide community, regional or statewide services.

Statewide HIO: A health information organization that is statewide in scope and involves some form of public-private collaboration, partnership, or governance. Statewide HIOs take various organizational forms, according to their scope of work and their origin.

Health Information Organization (HIO): An organization that oversees and governs the exchange of health-related information among organizations according to nationally recognized standards.

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Medical Trading Area (MTA): A Medical Trading Area (MTA) is a self-organizing geographic market area in which a delineated population receives most of their medical services. MTA identification takes into account where patients seek medical care as well as where their health professionals refer them for specialized medical care

Stakeholder: Parties whose involvement (or at least consent) is necessary to operate an HIE. Stakeholders include, but are not limited to, HIE participants, investors, regulators, policy makers, and others with power to curtail or prevent exchange (including patients).

HIE/RHIO Models:

*Convener*—Role is to organize stakeholders, provide education on HIT topics, and coordinate activities of various types of information providers, including network service providers, HIT software vendors, and others for the benefit of its members. It assumes no fiduciary responsibility for any of the IT services of its members.

*Broker*—Role is to convene multistakeholders and agree to contract for health information exchange services on behalf of its membership. The broker contracts with a network services provider and agrees to be responsible for all aspects of the HIE/RHIO, including fiduciary responsibility for health information exchange services. The broker may choose to have the NSP provide all or only some of the required technology exchange services.

*Operator*—Role is to serve as the owner/operator of all technology services provided by the RHIO. It is in essence a Healthcare Service Provider (HSP).

Communities of Practice: A community of individuals whose objective is to exchange and expand a body of knowledge and enhance individual learning. A community of practice includes three elements: domain, community, and practices. One community of practice is the Health Information Exchange (HIE/RHIO). Its goal is to improve the quality, safety, and efficiency of healthcare in the region by collaborating with health providers, consumers, and other stakeholders who form the community to share and expand health knowledge. (See HIE.)

Regional Community: A population bounded by geography, where the community members determine the boundaries. Regions can be within a state or cross-state.

Local Community: The population residing in a local city or county. The term ‘community,’ unless otherwise noted, refers to a local community.

**Consumer:**

Personal Health Data: An individual’s health data used in the care delivery process.

**Provider:**

Healthcare Delivery Organizations: Organizations, such as hospitals and physician practices which manage the delivery of care.

Chronic Care Management: Process used to administer care for high-cost beneficiaries.

Clinical Document Architecture (CDA): The CDA, until recently known as the Patient Record Architecture (PRA), provides an exchange model for clinical documents (such as discharge summaries and progress notes) and brings the healthcare industry closer to the realization of an electronic medical record.

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Disease Management: A system of coordinated healthcare interventions and communications for populations with conditions in which patient self-care efforts are significant. Disease managements supports the physician-patient or practitioner-patient relationship and plan of care, emphasizes prevention of exacerbations and complications using evidence-based practice guidelines and patient empowerment strategies, and evaluates clinical, humanistic, and economic outcomes on an ongoing basis with the goal of improving overall health.

Pandemic: An epidemic (outbreak of an infectious disease) that spreads worldwide, or at least across a large region.

**Public Health:**

Population Data: Aggregated, deidentified personal health data at a collective level for biosurveillance and public health disease surveillance, identification, and potential reporting or predictive modeling.

Public Health Agencies: Those agencies of local, state, and federal government charged with the health of their populations.

First Responders: Police, fire, EMS, and other trained personnel who respond to emergencies.

**Research:**

Affinity Health Domain Networks: Networks developed to support their affinity groups. They may be profit-driven, such as national health system networks, payer/provider networks, or a local/regional exchange created to improve the competitiveness of their members. They may also be not-for-profit information domain specific, such as cancer, diabetes, or clinical trials. Affinity domains are analogues to subnetwork organizations (SNOs); both are formed to share health information among their members and are generally closed to individuals outside their specific domain. Affinity domains can participate in a local Health Information Exchange (HIE) or implement the NHIN HIE technology to participate as a node on the NHIN.

Virtual RHIO: An organization of homogeneous stakeholders formed to share specific types of health information such as a pediatric cancer or research network.

Translation Research: Cross-disciplinary clinical research that develops new treatments that can be delivered efficiently and more quickly to patients.

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## 8.2 Identification of Medical Trading Areas

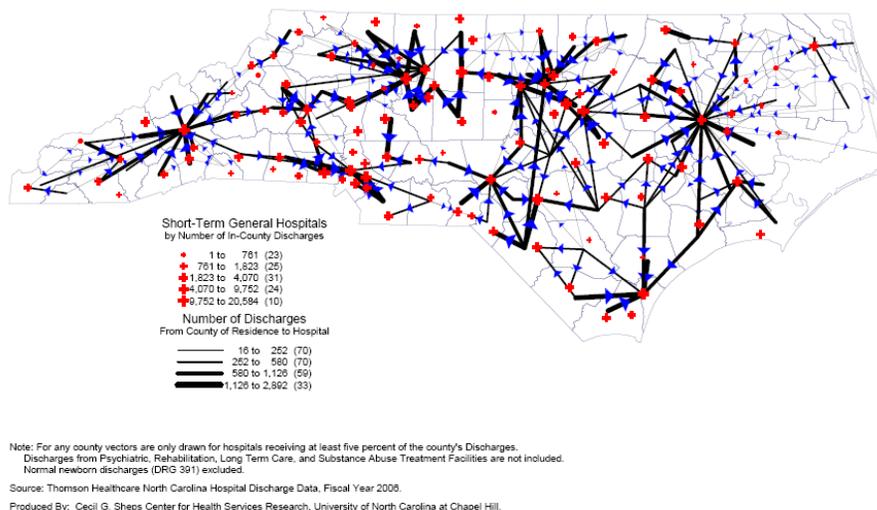
To prepare for financial sustainability, it is important to define the pattern of care delivery and geographic boundaries or “regions” supporting a particular implementation of HIE as administered by a RHIO. An effective way to define this region is to perform a Medical Trading Area (MTA) analysis.<sup>65</sup> An MTA is defined as an area where a population receives the majority of its healthcare. The area typically includes groups of physicians, hospitals, laboratories, mental health providers, and other providers that offer healthcare services.

Specifically, this analysis is crucial to regional efforts in order to:

- Provide guidance on identifying potential user and participant stakeholders
- Provide a framework for understanding initiatives in the area
- Understand targeted population groups and the number of participants likely needed for sustainability.

This MTA analysis assists in determining the number and location of potential customers for the RHIO. This analysis is used to determine what clinical service providers and specialty procedure and testing physicians would be needed as participants in a RHIO to provide the vast majority of the clinical results, reports, and documents necessary to meet the goals of the RHIO’s users. The “region” covered by a RHIO must be big enough to support expense and resource requirements.

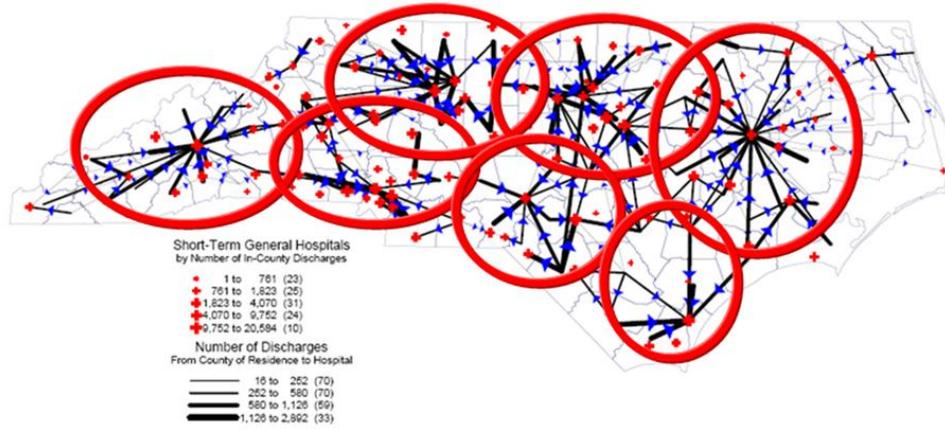
Within North Carolina, several of the potential Regional breakdowns possible are indicated by these maps, drawn from available information. A more thorough analysis may provide further insight to the types of HIE initiatives best suited to meeting the needs of each region. The first map was drawn by the Cecil G. Sheps Center for Health Services Research at UNC – Chapel Hill based on hospital discharges, and shows that the major hospitals in the state draw the majority of their patients from some form of “geographic funnel,” with the most clear illustration being the referrals to Greenville.



**Illustration 8-1 North Carolina Map of Discharge Summaries (Sheps Center)**

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Superimposing regionalization on this map shows intrastate patterns of hospital care.



Note: For any county vectors are only drawn for hospitals receiving at least five percent of the county's Discharges.  
 Discharges from Psychiatric, Rehabilitation, Long Term Care, and Substance Abuse Treatment Facilities are not included.  
 Normal newborn discharges (DRG 391) excluded.  
 Source: Thomson Healthcare North Carolina Hospital Discharge Data, Fiscal Year 2009.  
 Produced By: Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

**Illustration 8-2 North Carolina Map of Discharge Summaries (Sheps Center)**

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### 8.3 Program of Initiatives in Detail

#### Statewide Programmatic Opportunities

##### **Core Initiative 1: Summary Patient Record Exchange**

*Description:* The exchange of patient summary documents can be generally defined as “the ability to generate and/or receive summaries of relevant clinical information on a patient that are typically transferred between healthcare providers when a patient is referred to a specialist or admitted or discharged from a hospital.”<sup>66</sup>

As the patient centered medical home model becomes a more accepted method of practice for primary care physicians, the desire to exchange summary records will underscore the need for availability of electronic data from all possible healthcare sources. Within North Carolina, the importance of continuity of care has continued to grow, whether it is for individuals with mental health needs, military personnel transferring from government installations to civilian providers, or citizens navigating the Medicaid system. The volumes alone make this initiative critical for inclusion in North Carolina’s HIE strategy. In 2003, the number of general acute care hospital discharges was 935,132; average expenses per inpatient day were \$1,200 for that year and increased to \$1,362 in 2006.<sup>67 68</sup> There were 434 emergency department visits and 1,941 outpatient visits in 2006 per 1,000 North Carolinians.<sup>69</sup>

Summary Patient Record Exchange is a critical objective in the national agenda for HIE because it advances interoperability standards and highlights the underlying need for broader provider communication. The exchange of summary records will help unite multiple healthcare participants in the care of a single patient. By supporting the avoidance of errors caused by lack of information and promoting more efficient utilization of available data, patient summaries are viewed as a corner stone in the effort to minimize costs and improve quality.

For any goal to be achieved statewide through HIE in North Carolina, it is important to break it down into manageable steps for implementation to be realistically attainable. With the goal of spurring on initial hospital participation in HIE activities, the first step for the HIE across NC regarding the availability of patient summaries electronically will be the deployment of the Emergency Care Summaries service in 2009, connecting all emergency departments within the state.

In-patient Discharge Summaries would be the second phase with initial implementation targeted for 2010. Office-based physicians are specifically interested in this type of data for the purposes of performing better follow-up care with their patients, which is expected to encourage physician EMR adoption once hospitals regularly offer electronic patient summaries. Utilization of the discharge summaries by primary care physicians would depend on the varying EMR adoption rates in small, medium, and large physician practices and the willingness of non-EMR-enabled physicians to incorporate the use of a portal into their workflow. The third stage for this HIE initiative, to be offered in 2011, will be Out-patient Summaries and Consult Reports, since this service would be of most value once a critical mass of HIE participants has been reached. Illustration 8-3 is a graphic summary of the value assessment and business sustainability potential for the Summary Patient Record Exchange initiative.

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Value Assessment:		Business Sustainability:	
●	Improves Patient Safety	●	Strategic Fit with Organization
●	Increases Quality of Patient Care	●	Operational Fit with Organization
●	Enhances Chronic Disease Mgmt.	○	Manageability of Capital Costs
●	Improves Service Level Efficiency	○	Manageability of Recurring Costs
●	Improves Patient Satisfaction	○	Speed to ROI
○	Satisfies Regulatory Mandates	●	Ease of Technical Solution
○	Reduces Risk or Liability	○	Confidence in Securing Funding
○	Improves Health Promotion, Prevention	●	Confidence in Managing Risks
Key: ○ = Minimal to ● = Maximum Impact		Key: ○ = Low to ● = High	

*Illustration 8-3 Summary Patient Record Exchange Value and Sustainability Assessments.*

*Cost Impact and Benefits Flow by Stakeholder:* The cost impact and flow of benefits for this initiative are depicted in Illustration 8-4. The majority of upfront and operational costs to support the exchange of summary documents will be incurred by hospitals. Reduced administrative costs and enhanced workflow benefits flow to hospitals and clinicians. However, several of the larger benefits are derived from error/cost avoidance and flow primarily to the payer and then to the patient and finally to the hospital and employer populations. One in five patients discharged from hospitals experience some level of adverse event, and up to 13% require a return to hospitalization.<sup>13</sup> Missing clinical information during primary care visits is considered to “at least somewhat likely adversely affect patients” 44% of the time and “result in delayed care or additional services” 59.5% of the time.<sup>70</sup> Because the largest share of monetary benefits flow to payers and costs to hospitals -as will be the case for many of the initiatives, a mechanism is needed to rebalance this equation to ensure those making the fiscal investment will have incentives to do so.

Within North Carolina there is currently no organization with the authority to implement a mechanism to rebalance benefits between payers and providers, whether it is a certification system or a taxation scheme. Some form of legislative action will be required, and the timetable for such activity might not be in synch with the strides that North Carolina has already made. This assessment for the need to rebalance benefits between payers and providers is true of all the potential initiatives detailed in the Sustainability Plan.

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Stakeholders:	Participant	Qual. <sup>2</sup>	Quant. <sup>2</sup>	Costs
<b>Hospitals</b>	✓✓	+++	\$\$	\$\$\$
<b>Physicians</b>	✓✓	+++	\$	\$
<b>Payers (private)</b>	✓	+++	\$\$\$	\$
<b>Payers (gov't)</b>	✓	+++	\$\$\$	\$
<b>Gov't Grants</b>				
<b>Population Health</b>	✓	++		\$
<b>Researchers</b>	✓	++	\$\$	\$
<b>Patients</b>	✓	+++	\$	
<b>Employers</b>	✓	+	\$	
<small><sup>1</sup> Potential Initiative Financiers; <sup>2</sup> Projected Qualitative &amp; Quantitative Benefits.</small>				

**Illustration 8-4 Summary Patient Record Exchange Cost Impact and Benefits Flow.**

*Barriers to Adoption:* Several potential barriers to the success of the Summary Patient Records Exchange exist within North Carolina. Several larger hospital systems have expressed the opinion that their information base is complete enough to adequately serve patients without patient information available from outside their health system. From the opposite perspective, small community hospitals with a stable community population feel little need for supporting connection into a nation-wide network, Rather these organizations are focused on exchange of information with the physicians “across the street.” Additionally, hospitals of all sizes feel competitive pressures, and patient data has historically been used as a competitive advantage by hospitals payers and physicians. From their point of view, interoperable data sharing is a risk for providers, having an unknown impact on their fiscal strategy.

EMR adoption rates by physician practices represent another unknown. North Carolina is characterized by a mix of urban communities with sophisticated academic and commercial healthcare enterprises and rural counties dominated by the Medicaid population and small physician practices.

The investment in technology is no small matter for many physicians, and yet the fate of much of the potential for HIE rests on EMR adoption. Even for those who can afford the investment, adoption can seem risky to physicians and hospitals if the initial interruption to clinical workflow seems too great.

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### **Core Initiative 2 – Test Result Reporting**

*Description:* The value proposition for Test Result Reporting is similar in ways to that of the Summary Patient Record Exchange. More efficient data exchange for the millions of in and outpatient test results is needed to support cost effective provider communication and improve the quality of services delivered. Provider-laboratory connectivity via an HIE would give multiple clinicians – not just the ordering doctor - real-time access to patients’ longitudinal test results, eliminate errors associated with misplaced faxes or results reported verbally, reduce the number of unnecessary and duplicative tests and enabling more rapid treatment intervention thus improving quality outcomes for patients.

There is no question that traditional methods for delivering laboratory results are slow and inefficient for both laboratory and clinical staff. Electronic transfer of test information improves the timeliness and completeness of patient reports which in turn reduces the time to diagnosis and treatment.<sup>71</sup> A study by the Indiana Health Information Exchange showed significant costs are incurred when results are printed and mailed (81 cents versus 17 to 37 cents for electronic exchange of the same data).<sup>72</sup> Studies done by the Regenstrief Institute and Santa Barbara County show that with information sharing, duplicate tests decrease by 13% and 20% respectively.<sup>73</sup>

Hospitals provide in-house services for most laboratory and radiology tests. Interoperability between hospitals and other providers would enable reduction of redundant tests, and reduce delays and costs associated with paper-based ordering and reporting of results.<sup>74</sup> According to the report by the Center for Information and Technology Leadership (CITL) in 2005 national level savings from electronic test result transmittal would range from \$8.09 billion at Level 2 (machine transportable), \$18.8 billion at Level 3 (machine organized), and \$31.8 billion at Level 4 (machine interpretable)<sup>75</sup>. Lab data exchange by standards-based HIE in NC would be at level 4 and although considerably less than the national savings, it would still equate to millions of dollars saved if result reporting via HIE was widely adopted across North Carolina.

Most imaging procedures ordered in the outpatient arena, are performed at external radiology versus hospital diagnostic centers. Connectivity between these organizations could reduce redundant tests and would save time and costs associated with paper and film-based processes. The CITL report claimed annual national savings from avoided tests and improved efficiencies to be \$26.2 billion at Level 4. This value does not include other benefits of interoperability such as providing radiologist access to relevant clinical information, ordering optimal tests based on patient history, increasing patient safety through allergy and patient condition alerts, and lessening adverse environmental impacts by reducing the use of chemicals and paper in film processing.<sup>76</sup>

When surveyed about which initiatives should hold top priority for an HIE, exchange of test data (lab results in particular) is most often rated at the top of the list by physicians and administrators above all other options. An overview of trends in health information exchange presented by the eHealth Initiative in their 2008 annual survey report supports this finding in that the predominant business model of health exchanges operating at a modest level in 2008, was built initially on results viewing and delivery.<sup>77</sup> The early phase of the Test Result Reporting initiative would focus on the exchange of laboratory results through the NC HIE. Diagnostic image result exchange would follow in 2011. The value and sustainability assessment ratings are shown in Illustration 8-5.

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Unlike the Summary Patient Record Exchange, this initiative is not dependent upon physicians having EMR systems implemented to be able to view lab results. This can be achieved via a physician portal. Provision of a physician portal is something the NC HIE might consider as a cross cutting service offering for physicians as a supplement to other aggregating hospital or payer based portal solutions. Illustration 8-5 presents the value and sustainability assessments for the Test Result Reporting initiative.

Value Assessment:		Business Sustainability:	
○	Improves Patient Safety	●	Strategic Fit with Organization
●	Increases Quality of Patient Care	●	Operational Fit with Organization
○	Enhances Chronic Disease Mgmt.	○	Manageability of Capital Costs
●	Improves Service Level Efficiency	○	Manageability of Recurring Costs
●	Improves Patient Satisfaction	○	Speed to ROI
○	Satisfies Regulatory Mandates	●	Ease of Technical Solution
○	Reduces Risk or Liability	○	Confidence in Securing Funding
○	Improves Health Promotion, Prevention	●	Confidence in Managing Risks
Key: ○ = Minimal to ● = Maximum Impact		Key: ○ = Low to ● = High	

Illustration 8-5 Test Result Reporting Value and Sustainability Assessments.

*Cost Impact and Benefit Flow by Stakeholder:* The cost impact and flow of benefits for this initiative are depicted in Illustration 8-6. The majority of upfront and operational costs to support the Test Result Reporting, will be incurred by hospitals, labs and diagnostic centers. Reduced administrative costs and enhanced workflow benefits flow to these three stakeholders as well as to clinicians. However, several of the larger benefits are derived from savings on redundant or unnecessary tests and flow primarily to the payer and to a lesser extent to patients.

Stakeholders:	Participant	Qual. <sup>2</sup>	Quant. <sup>2</sup>	Costs
Hospitals	✓✓	++	\$	\$\$\$
Physicians	✓✓	+++	\$	\$
Payers (private)	✓✓	+	\$	\$\$
Payers (gov't)	✓	+++	\$\$\$	
Gov't Grants				
Population Health	✓	++		\$
Researchers	✓	++	\$\$	\$
Patients	✓	+++	\$	
Employers	✓	+	\$	

<sup>1</sup> Potential Initiative Financiers; <sup>2</sup> Projected Qualitative & Quantitative Benefits.

Illustration 8-6 Test Result Reporting Cost Impact and Benefits Flow.

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*Barriers to Adoption:* Barriers to adoption for test result reporting lie primarily with outpatient lab services. Significant legal obstacles in delivering test results to persons other than the “authorized person” will remain until state laws are changed allowing the extension of the definition of “authorized person” to go beyond the persons allowed to order tests. In North Carolina the law is silent on the issue of who is authorized to receive test results and by default, CLIA limits result recipients to those authorized to order tests under NC law (licensed physicians).which would restrict non-physician providers/coordinators of care from receiving test results. As a result any persons or entities that need test results for legitimate purposes are not expressly defined as “authorized persons” for the purpose of receiving test results directly from labs. The current workaround involves CLIA-specific provisions in Business Associate Agreements, Provider Agreements, or Participation Agreements but can be difficult to negotiate. This process is even more complex when dealing with cross-NHIE exchanges because of conflicting state laws. CLIA and/or state regulatory changes to expand the list of permissible lab result recipients are needed to correct the situation.

Labs that connect to an HIE incur additional hardware, software and support services above those required for already established point to point interfaces. Although moving to a standards-based NHIE interface might be an ultimate goal for national laboratory systems, close examination of the cost/benefit equation will be necessary to fully engage national and local lab systems – especially if they are required to maintain parallel systems to support non-automated physician practices.

The slow rate of HIT adoption by physicians in North Carolina is a significant barrier to this initiative as is the resistance to move away from dependence on a paper-based workflow. It is difficult to move providers away from easy-to-access and easy-to-read fax reports when the alternative electronic flow is perceived as increasing the complexity of their workflow. Physician dependence on paper processes causes lab to maintain parallel systems when electronic exchanges are put into place and the duplicity of effort reduces the benefit and incentive for them to participate in an HIE. Additionally, there are legal concerns related to the security, privacy and ownership of data submitted to and retrieved from an HIE that must be addressed in legal agreements between all participating parties.

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### **Core Initiative 3 – Medication Management**

*Description:* Adverse drug events cost the nation \$177 billion annually. Studies indicate that 400,000 preventable drug-related injuries occur each year in hospitals. Another 800,000 occur in long-term care settings, and roughly 530,000 occur just among Medicare recipients in outpatient clinics.<sup>78</sup> Addressing the quality and cost issues behind this serious situation is a high priority for the federal and state governments, patients, hospitals, providers, pharmacies, and payers. As such, Medication Management is viewed as an important Core Initiative for HIE in NC and will be designed to address some of the more immediate safety, quality and cost issues related to the high incidence of preventable adverse drug events. Medication Management as defined by the NC HIE is comprised of three components: medication history, electronic prescribing and medication reconciliation. The NC HIE Medication Management initiative will place its emphasis on offering medication histories but before describing the specific benefits of this functionality some background on ePrescribing as a component of medication management is warranted to set the context for this initiative.

Electronic prescribing or “ePrescribing” technology has reached key milestones over the past several years but billions of paper, phone and fax prescriptions continue to impede even greater progress toward a safer and more convenient medication management processes for patients, physicians and pharmacists. These efforts include wide-scale testing and support for ePrescribing technical standards and the establishment of a legal/regulatory framework to allow ePrescribing throughout the United States for all types of drugs. Some recent initiatives fostering ePrescribing are: the Medicare Modernization Act of 2008 which provides incentives as well as penalties related to the use or lack thereof of ePrescribing for Medicare patients; the elimination of the fax exemption adopted by HHS that goes into effect January 2009; recent Drug Enforcement Agency (DEA) efforts to lift ePrescribing restrictions on controlled substances and the Blue Cross Blue Shield of NC statewide ePrescribing program announced in July of this year. The Blue Cross initiative is especially noteworthy because of the program support it will provide to the CCNC which covers 750,000 Medicaid enrollees.

Even with the aforementioned incentive programs and the anticipated increase in ePrescribing adoption rates by physicians over the next three years, many doctors will continue to be reluctant or financially unable to participate in full scale ePrescribing programs. In 2007 only 2% of the estimated 1.47 billion new prescriptions and renewals eligible for ePrescribing were written electronically by only 6% of office-based physicians. North Carolina ranked seventh nationally with an adoption rate of 3.07%<sup>79</sup>, but this is still very low utilization compared with the huge benefits to be gained in quality and cost improvement.

To help improve on this rather poor rate of adoption, the NC HIE will focus its efforts on providing hospitals and then physician practices access to the first component of medication management - Medication History. Over a quarter of hospital prescribing errors are attributable to incomplete medication histories being obtained at the time of admission.<sup>80</sup> Studies have reported that 10%–67% of patients had at least 1 prescription medication history error. When nonprescription drugs were included, the frequency of errors was 27%–83%. When information regarding drug allergies or prior adverse drug reactions was added the frequency was 34%–95% of patients with at least 1 error.<sup>81</sup> Access to an accurate medication history at the time of admission is the first and an important step in the process of improving of medication safety.

This foundational component of a medication management program can be introduced with minimal workflow disruption and cost to providers. It will more immediately improve the safety

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and quality of patient care for physicians unable to participate in fully interoperable ePrescribing programs. The CCNC is now hiring pharmacists to better manage the costs and quality outcomes for chronically ill patients who are frequently non-compliant with their medication regimes, and statewide medication history availability would be a useful supplement to this Medicaid care management program..

On-line (portal) access to medication histories, which include prescription fill/refill information, would be especially beneficial to programs such as the CCNC.

Medication History pilot programs are underway in several states. Horizon Blue Cross Blue Shield of New Jersey announced in July that they will be assisting select hospitals with the costs of implementing medication history technology.<sup>82</sup> Additionally, Vermont Information Technology Leaders (VITL) is undertaking a similar program in two hospital emergency rooms and is able to access medication histories on 70% of the emergency patients.<sup>83</sup>

Providers can avoid omissions, duplications, and interactions that may lead to medication errors or ADEs (adverse drug events) through the use of medication histories – even before full ePrescribing implementation is feasible. Administrative costs will be reduced as a result of streamlined medication reconciliation. Significant efficiencies and safety benefits are gained when staff members don't have to "tease" the information from patients or go through the time consuming process of pill identification when patients walk in with a "candy bowl" of medications. Early results from the VITL implementation have shown that the medication reconciliation process is faster and more accurate when patients aren't called upon to remember all the drugs they are taking.<sup>84</sup> It is possible through the use of electronic medication histories to improve workflow efficiencies, patient safety and quality outcomes. The benefit value and sustainability assessment overview for this initiative is presented in Illustration 8-7

Value Assessment:		Business Sustainability:	
●	<b>Improves Patient Safety</b>	●	<b>Strategic Fit with Organization</b>
●	<b>Increases Quality of Patient Care</b>	●	<b>Operational Fit with Organization</b>
●	<b>Enhances Chronic Disease Mgmt.</b>	◐	<b>Manageability of Capital Costs</b>
●	<b>Improves Service Level Efficiency</b>	◐	<b>Manageability of Recurring Costs</b>
◐	<b>Improves Patient Satisfaction</b>	●	<b>Speed to ROI</b>
◐	<b>Satisfies Regulatory Mandates</b>	◐	<b>Ease of Technical Solution</b>
◐	<b>Reduces Risk or Liability</b>	◐	<b>Confidence in Securing Funding</b>
◐	<b>Improves Health Promotion, Prevention</b>	●	<b>Confidence in Managing Risks</b>
Key: ○ = Minimal to ● = Maximum Impact		Key: ○ = Low to ● = High	

*Illustration 8-7 Medication History Benefits and Sustainability Assessments.*

*Cost Impact and Benefit Flow by Stakeholder:* The cost impact and flow of benefits for this initiative are depicted in Illustration 8-8. The majority of upfront and operational costs to support Medication History interfaces with pharmacy benefit managers and transaction fees (\$3/request on average) will be incurred by hospitals; but this is where the greatest safety and quality benefits can be derived during medication reconciliation processes. Reduced administrative costs and enhanced workflow benefits flow to hospitals and somewhat to

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physicians caring for chronically ill patients. Payers would also benefit from the reduction in costs for avoidable adverse drug events due to errors of omission but these are hard to quantify because error reporting data doesn't always segregate the potential cost impact of omission errors.<sup>85</sup> The patient is also a recipient of the major safety and quality benefits of this initiative.

Stakeholders:	Participant	Qual. <sup>2</sup>	Quant. <sup>2</sup>	Costs
<b>Hospitals</b>	✓✓	+++	\$\$\$	\$\$\$
<b>Physicians</b>	✓✓	++	\$	\$
<b>Payers (private)</b>	✓✓	+	\$	
<b>Payers (gov't)</b>	✓✓	+	\$	
<b>Gov't Grants</b>				
<b>Population Health</b>	✓	++		\$
<b>Researchers</b>	✓	++	\$\$	\$
<b>Patients</b>	✓	+++	\$	
<b>Employers</b>		+	\$	

<sup>1</sup> Potential Initiative Financiers; <sup>2</sup> Projected Qualitative & Quantitative Benefits.

*Illustration 8-8 Medication History Cost Impact and Benefits Flow.*

*Barriers to Adoption:* Typical barriers such as startup and operating costs for hospitals exist for this initiative. For physicians a key barrier relates to a lack of trust for the accuracy and completeness of on-line medication histories since not all pharmacies are connected to SureScripts-RxHub and pharmacy benefit management systems. In addition, outpatient physicians repeatedly state that until there is a change in the current reimbursement structure where current reimbursement is fee based and not outcome driven, they will resist workflow changes that increase patient visit time – such as accessing on-line medication histories.

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Extended Value Initiative 4 – Federal Agency Program Automation (SSA Authorization for Release of Information)

*Description:* Even though \$500 million a year is spent by the Social Security Administration (SSA) requesting paper records for disability determination, the national backlog for initial decisions, reconsiderations, Administrative Law Judge hearings, and Appeals Council reviews has reached crisis proportions. In 2007 the NC Department of Disability Services received 133,498 disability claims. The number of individuals in NC receiving benefits is just of 500,000 with \$342,828,000 annual benefits paid by SSA. The average time to initial medical determination is 83 days and the backlog of disability claims has grown to over 48,000 in NC. . The backlog for wounded soldiers has reach 400,000 nationally. If a rate of 3.8%, (the North Carolina percentage of the total number of disability beneficiaries in 2006) is applied to this figure, there are perhaps 15,000 wounded soldier cases in North Carolina waiting for a disability determination. By 2012 the national backlog is expected to reach over 1 million as baby boomers age and experienced SSA employees retire. The physical, emotional and financial hardship experienced by claimants while they wait for a decision about their disability status is very difficult to comprehend. Some have lost jobs, homes, families and more due to the long and inefficient processes related to initial application and claims adjudication .That's the bad news.

The good news is, in a recent SSA project, Beth Israel Deaconess Medical Center in Massachusetts demonstrated near real time automated patient authorization processes and electronic production of requested medical records using the Continuity of Care Document standard. According to Dr. John D. Halamka, Chief Information Officer of the CareGroup Health System “This new process, based on the Continuity of Care Document, takes a few seconds, does not require human intervention and will lead to adjudication of many cases in near real time through the use of a business rules engine.”<sup>86</sup> According to one SSA official, the Veterans Administration was able to process twice as many claims using a partially automated solution. In these cases, the quick turnaround for the requested documentation would likely have prevented the need for a consultative examination by another provider due to delay or non-receipt of requested medical records. The increased efficiency of even partially automated processes can help reduce inconvenience, costs and delays associated with the disability determination process.

In December 2008 the NC HIE will be demonstrating the SSA use case components of automated patient authorization and electronic retrieval of patient records from multiple providers as part of the NHIN Trial Implementations Project. NCHICA’s goal for supporting the SSA’s efforts is to expedite the flow of benefits - helping to alleviate the economic burden to beneficiaries and their families and to increase the efficiency of both the SSA and provider organizations. Key improvements anticipated with this initiative are to:

- Reduce/eliminate snail-mail portions of the application process and replace with electronic communications.
- Streamline “authorization” process for access to information.
- Streamline collection and compilation of available medical evidence.
- Automate/supplement medical evidence “filtering” process.
- Automate/complement the “evaluation/determination” process.
- Improve accounts receivable for participating providers

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Adoption of this initiative would start out slowly in 2009 and gradually build momentum through 2012 as adoption of EMRs accelerates. In North Carolina for 2007 there were 89,156 initial claims, 29,700 claims for reconsideration and 9,435 for claims continuing disability review. If even 10% were managed electronically that would equate to 13,000 claims that could be processed more quickly with less chance for denial and all the administrative, financial and personal costs associated with reconsideration and hearing processes. If the state or federal government could provide reasonable incentives for the implementation of EMRs and for electronically submitting requested SSA documents - especially to the 20% of providers receiving 80% of the SSA requests – some increase in the EMR adoption rate might be gained.

Illustration 8-9 depicts the overall benefit value and sustainability assessment information for the implementation of the SSA Authorization for Release of Information initiative. These assessments are almost identical to the ones for the Patient Summary Record Exchange because the SSA initiative is dependent upon the production of an SSA version of the patient summary record.

Value Assessment:		Business Sustainability:	
◐	<b>Improves Patient Safety</b>	●	<b>Strategic Fit with Organization</b>
◑	<b>Increases Quality of Patient Care</b>	●	<b>Operational Fit with Organization</b>
◒	<b>Enhances Chronic Disease Mgmt.</b>	◐	<b>Manageability of Capital Costs</b>
●	<b>Improves Service Level Efficiency</b>	◑	<b>Manageability of Recurring Costs</b>
●	<b>Improves Patient Satisfaction</b>	◒	<b>Speed to ROI</b>
◐	<b>Satisfies Regulatory Mandates</b>	◑	<b>Ease of Technical Solution</b>
◑	<b>Reduces Risk or Liability</b>	◐	<b>Confidence in Securing Funding</b>
◒	<b>Improves Health Promotion, Prevention</b>	◑	<b>Confidence in Managing Risks</b>
Key: ◐ = Minimal to ● = Maximum Impact		Key: ◐ = Low to ● = High	

*Illustration 8-9 Federal Agency Program Automation Benefits and Sustainability Assessment.*

*Cost Impact and Benefit Flow by Stakeholder:* Most of the costs for this initiative would be attributed as “sunk costs” for stakeholders participating in the Patient Summary Record Exchange initiative except for the SSA. The SSA would be paying fees directly to providers for participation in an electronic exchange of summary records. However, the SSA is already paying \$15 per request in North Carolina and it is not known if reimbursement would be higher for electronically submitted medical summaries. The benefits for this use case are extremely compelling from a public good perspective and flow most heavily toward the patient. Just as significant are workflow efficiency benefits the SSA will gain from automation. Overall cost impact and benefits flow for this initiative are reflected in Illustration 8-10.

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Stakeholders:	Participant	Qual. <sup>2</sup>	Quant. <sup>2</sup>	Costs
<b>Hospitals</b>	✓✓	+	\$	
<b>Physicians</b>	✓✓	++	\$	
<b>Payers (private)</b>	✓	++	\$	
<b>Payers (gov't)</b>	✓✓	+++	\$\$\$	\$\$
<b>Gov't Grants</b>				
<b>Population Health</b>				
<b>Researchers</b>				
<b>Patients</b>	✓✓	+++	\$\$\$	
<b>Employers</b>	✓	+	\$	
<sup>1</sup> Potential Initiative Financiers; <sup>2</sup> Projected Qualitative & Quantitative Benefits.				

*Illustration 8-10 Federal Agency Program Automation Cost Impact and Benefit Flow.*

*Barriers to Adoption:* The largest barrier to adoption is the need for established EMR systems in physician offices and hospitals that can produce the SSA Continuity of Care document. Providers will also need to be connected to a NHIE to receive the authorization request and to submit the requested documents. Hospitals and IDNs do not always see the value in connecting to a NHIE when 90% of their need for sharing health information is within their own network. Finally, a reimbursement of \$15 is hardly adequate to cover the costs of submitting records when it takes between one and three years to receive payment; so non-response to requests for medical records may continue even when the process is automated.<sup>87</sup>.

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**Extended Value Initiative 5: Consumer to Provider Communications**

Consumer to Provider Communications has been shown to demonstrate cost effectiveness and solid satisfaction ratings among patients and physicians but would likely be supported by non-NC HIE organizations such as large payers, Google Health, Microsoft HealthVault, a patient record bank or perhaps as part an initiative to automate the CCNC medical home care coordination processes. Establishing secure electronic communications between patients and their physicians is a natural step for practices that have embraced the Patient Centered Medical Home (PCMH) model where technology is considered a key factor in providing greater efficiency, quality and satisfaction. A patient portal with secure electronic communications would allow care coordinators to send patients reminders and alerts and provide an efficient way to follow up on self care activities and medication compliance. Patients in turn would be able to send email requests for clinical or schedule information or to transmit vital signs (blood sugar, blood pressure, weight, peak flow readings, etc.) to care coordinators for closer monitor of at-risk patients. Patients without access to the internet in their homes have options such as public libraries and large retail stores.

In addition to secure email, this initiative might include patient controlled access permissioning services where consumers identify which providers are allowed to access specific components of their medical record. Depending upon the implementation model employed, once a consumer and their providers have completed identity proofing steps, the administrative staff of their medical home - or they themselves -could establish access permissions to their personal health information. Value and business sustainability assessments for this initiative are presented in Illustration 8-11.

Value Assessment:		Business Sustainability:	
○	Improves Patient Safety	○	Strategic Fit with Organization
◐	Increases Quality of Patient Care	○	Operational Fit with Organization
◑	Enhances Chronic Disease Mgmt.	○	Manageability of Capital Costs
◒	Improves Service Level Efficiency	○	Manageability of Recurring Costs
◓	Improves Patient Satisfaction	○	Speed to ROI
◔	Satisfies Regulatory Mandates	○	Ease of Technical Solution
◕	Reduces Risk or Liability	○	Confidence in Securing Funding
◖	Improves Health Promotion, Prevention	○	Confidence in Managing Risks
Key: ○ = Minimal to ◖ = Maximum Impact		Key: ○ = Low to ◖ = High	

*Illustration 8-11 Consumer to Provider Communications Overview.*

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***Extended Value Initiative 6: Provider to Provider Communications***

Provider to Provider Communications is another Extended Value initiative that would serve to increase the efficiency and effectiveness of care offered to North Carolina residents through improving the timeliness of communications between providers. The ability for physicians to electronically and securely communicate patient health status in situations of transfer of care, referral requests and multi-provider assessments has been expressed as a priority need by physicians and hospital administrators alike. This need is driven by a desire to have timely access to transfer of care summaries so that follow through on patient instructions can be monitored; to have access to supporting documentation at the time a referral request is submitted; and to have a collaborative electronic exchange of information between multiple physicians in complicated multi-provider assessment situations.

Healthcare executives are beginning to recognize that the experience their community, patients, physicians and employees have with their organization directly impacts their competitiveness and ultimate success. The power of the internet can transform how organizations interact with their consumers, patients, physicians and employees and can help differentiate them in their local hospital market.<sup>88</sup> Hospital-based portals are being developed throughout North Carolina (Duke, WNCHN, UNC Charlotte, etc) that enable doctors to access and direct patient data remotely, sparing them a trip to the hospital or forcing them to make clinical decisions without the benefit of all the information they need because the patient's paper record is unavailable.

However, there are many physicians not associated with a specific hospital or IDN who will require secure communication and other portal services in order to take full advantage of the value of the internet in their efforts to improve the efficiency and quality of care they provide. The 3,000 physicians and associated care coordinators who are part of the CCNC networks are a case in point for providers that would greatly benefit from secure electronic communications. The NC HIE or another healthcare entity capable of providing HIT services across the state might consider hosting a physician portal that offers secure email. Later, portal services could be expand to include workflow management, patient dashboards, disease management tools, decision support, EMR lite, alerts and analytics – services that would enhance the current manual processes used by clinicians to manage chronically ill, high-risk, high-cost patient populations. The figures below illustrate the benefits, sustainability, costs, and benefits flow for the Consumer to Provider initiative. The value and business sustainability assessments for this initiative are presented in Illustration 8-12.

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<b>Value Assessment:</b>	
	<b>Improves Patient Safety</b>
	<b>Increases Quality of Patient Care</b>
	<b>Enhances Chronic Disease Mgmt.</b>
	<b>Improves Service Level Efficiency</b>
	<b>Improves Patient Satisfaction</b>
	<b>Satisfies Regulatory Mandates</b>
	<b>Reduces Risk or Liability</b>
	<b>Improves Health Promotion, Prevention</b>
<b>Key:</b>  = Minimal to  = Maximum Impact	

<b>Business Sustainability:</b>	
	<b>Strategic Fit with Organization</b>
	<b>Operational Fit with Organization</b>
	<b>Manageability of Capital Costs</b>
	<b>Manageability of Recurring Costs</b>
	<b>Speed to ROI</b>
	<b>Ease of Technical Solution</b>
	<b>Confidence in Securing Funding</b>
	<b>Confidence in Managing Risks</b>
<b>Key:</b>  = Low to  = High	

*Illustration 8-12 Provider to Provider Communications Overview.*

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***Transformational Initiative 7 – Patient Centered Medical Home (PCMH) Automation***

*Description:* In its simplest terms the medical home provides a model for patient-centered, comprehensive and integrated care coordinated by the patient’s personal doctor, which is typically a primary care physician. The medical home approach was initially developed by the American Academy of Pediatrics and has been fully endorsed by the American Academy of Family Physicians, American College of Physicians and the American Osteopathic Association. The Patient Centered Medical Home (PCMH) is a model of efficient and effective healthcare delivery centered upon principles of: a personal physician, physician directed medical practice, whole person orientation, coordinated and integrated care, quality and safety as hallmarks of care, enhanced access to care and payment that recognizes the added value of PCMH. Benefits ascribed to this model are:

- Reduced mortality caused by cardiovascular & pulmonary disease
- Reduced inpatient days and fewer emergency room visits
- Better detection of and reduced mortality for breast, colon & cervical cancer
- Reduced number of redundant & unnecessary tests
- Increased patient and physician satisfaction
- Lower care related costs
- Reduced health disparity especially for areas with high income inequality<sup>89</sup>

The Community of Care of North Carolina (CCNC) operates under many of the same principles as the PCMH model. The CCNC is a network of 14 healthcare communities across North Carolina organized and operated by community physicians, hospitals, health departments and departments of social program serves. These networks which have over 3,000 physician members have put into place locally controlled systems to better manage the care of 750,000 Medicaid enrollees. The CCNC’s goals are to: improve the care of the Medicaid population while controlling costs, developing community networks capable of managing recipient care, fully develop the Medical Home and develop the systems needed to improve chronic illness.<sup>90</sup>

The economic impact of chronic illness can be broken into two categories, actual expenditures and lost productivity. In 2003, spending on chronic conditions for North Carolina totaled \$7.9 billion, and lost productivity was calculated at \$32.1 billion.<sup>91</sup> Obviously, there are also loss of life and long-term quality of life issues to be considered as well. Cancer, heart disease, and stroke ranked as the top three causes of death in the state in 2006.<sup>92</sup> 10.1% of North Carolinians have had an asthma-related incident in their life, while already 17.8% of children in the state have had an incident.<sup>93</sup> Diabetes also has a high prevalence in the state with 600,000 individuals diagnosed, representing 9.1% of the population, and 408,000 individuals with pre-diabetes conditions.<sup>94</sup> Even more worrisome for the future is that almost all of these conditions can count obesity as a risk factor.

Evidence of significant success from the CCNC’s initiatives was reported in a recent actuarial study from Mercer Human Resource Consulting Group. This study found, when comparing what the Access model (case management model replaced by CCNC in 1998) would have cost in SFY06 without any concerted efforts to control costs, the program saved approximately \$161 million while annual costs for the program were \$10.2 million.<sup>95</sup> Specific clinical results associated with these cost savings are:

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Asthma

34% lower hospital admission rate

8% lower ED utilization rate

24% lower episodic cost for children

93% received appropriate inhaled steroids

Diabetes

15% increase in quality measures<sup>96</sup>

While successes of the CCNC program is very impressive, it has been suggested that through the application of health information technology (HIT), even greater efficiencies in workflow, reduction in costs and improvements in quality care outcomes would be gained. Technology tools to support the PCMH include options such as physician and patient portals, disease registries, health information exchanges, work flow tools, data bases and disease dashboards. These tools provide increased data and transparency from all relevant sources at the point of care, access to real-time information for a comprehensive longitudinal view of patient health records, access to insights from evidence-based medicine and best practices alerts and enhanced intervention management through the use of disease and condition dashboards. Several organizations such as Bridges to Excellence (BTE), Blue Cross and Blue Shield and IBM have implemented programs fostering the use of HIT and Patient Centered Medical Home initiatives and offer qualifying providers financial rewards based on successful use of one or both to improve the cost and quality of care for their patients.

In January of this year BTE announced the nation’s largest effort to reward physicians who demonstrate adoption of “really good systems and processes of care” and are using them to deliver positive results in the management of their patients – especially ones suffering from chronic illness. Through participation in this program, named Physician Office Link, practices that implement specific HIT processes to reduce errors and increase quality can earn up to \$50 per month for each patient covered by a participating employer.<sup>97</sup> Through participation in the BTE Medical Home recognition program, doctors can receive an annual bonus payment of \$125 for each patient covered by a participating employer, with a suggested maximum yearly incentive of \$100,000. “Our research shows that patients who are well taken care of cost less,” said Francois de Brantes, BTE CEO. The average potential savings per covered life would be approximately \$250 a year.”<sup>98</sup>

Another large player in the PCMH movement is a group of Blue Cross and Blue Shield companies which are “...working to transform the traditional primary care doctor’s office into a central point for Americans to organize and coordinate their healthcare and develop patient-centered medical home demonstration sites throughout the U.S. Initiatives such as the BTE Medical Home recognition may assist us in accomplishing our goals to impact patient health and costs and are an important step toward reengineering medical practices” said Allan Korn, MD, senior vice president and chief medical officer of the Blue Cross and Blue Shield Association.<sup>99</sup>

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As of December 2007, North Carolina had 10,023 non-federal primary care physicians. If 8,000 are estimated to be active, one might expect with the right balance of incentives and support, physician adoption of HIT in patient-centered medical home practices to grow slowly but incrementally to around 20% by the end 2012. To promote adoption at the fastest rate possible, it would be prudent to focus on two physician groups. The first would be safety net providers participating in the CCNC network who are already receiving rewards for their participation in PCMH model of care. This group might be selected for implementation of an open EMR system offered at reduced pricing through a state purchasing agreement (as recommended by the State of North Carolina Department of Health and Human Services in 2007<sup>100</sup>). The second group would be large primary care practices in a selected MTA because they are generally in a better financial position to support IT initiatives such as the automation of a patient-centered medical home practice. Illustration 8-13 depicts the benefits and sustainability assessments for this initiative.

Value Assessment:		Business Sustainability:	
●	Improves Patient Safety	●	Strategic Fit with Organization
●	Increases Quality of Patient Care	●	Operational Fit with Organization
●	Enhances Chronic Disease Mgmt.	○	Manageability of Capital Costs
●	Improves Service Level Efficiency	○	Manageability of Recurring Costs
○	Improves Patient Satisfaction	○	Speed to ROI
○	Satisfies Regulatory Mandates	○	Ease of Technical Solution
○	Reduces Risk or Liability	●	Confidence in Securing Funding
●	Improves Health Promotion, Prevention	○	Confidence in Managing Risks
Key: ○ = Minimal to ● = Maximum Impact		Key: ○ = Low to ● = High	

*Illustration 8-13 Medical Home Automation Benefits and Sustainability Assessments.*

*Cost Impact and Benefit Flow by Stakeholder:* Benefits flow to the payers, physicians and patients with the automation of a fully mature PCMH model but only if financially aligned incentives are provided to physicians for engaging in cost and quality initiatives. The current reimbursement structure needs reform for benefits to flow to organizations providing chronic care management. Illustration 8-14 shows the benefits and cost impacts by stakeholder.

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Stakeholders:	Participant	Qual. <sup>2</sup>	Quant. <sup>2</sup>	Costs
<b>Hospitals</b>	✓	+	\$	\$\$
<b>Physicians</b>	✓✓	+++	\$\$	\$\$
<b>Payers (private)</b>	✓	++	\$\$	\$
<b>Payers (gov't)</b>	✓✓	+++	\$\$\$	\$\$
<b>Gov't Grants</b>				
<b>Population Health</b>	✓			\$
<b>Researchers</b>	✓			\$
<b>Patients</b>	✓✓	+++	\$	
<b>Employers</b>	✓	++	\$\$	\$\$

<sup>1</sup> Potential Initiative Financiers; <sup>2</sup> Projected Qualitative & Quantitative Benefits.

*Illustration 8-14 Medical Home Automation Cost Impact and Benefits by Stakeholder.*

**Barriers to Adoption:** Barriers for the Patient-Centered Medical Home Automation are similar to the ones examined earlier for Core and Extended Value initiatives. Hospitals and physicians will need resources to implement and operate EMR systems that can produce patient summary records. Physicians will resist the changes that come about when implementing EMR systems and adhering to the principles of a PCMH model. They will need change management assistance and IT support to maximize the potential of automating their clinical workflows. There will likely be some resistance to enhanced quality monitoring made easier through electronic clinical documentation. Larger payers may resist helping to pay a lion's share of start up costs when smaller insurers stand to benefit from practice automation and movement toward delivering more cost efficient care using the medical home approach. Finally, some consumers, especially lower income and mentally ill patients, are likely to continue using emergency departments as their primary medical home out of convenience. Interim results from Medical Home projects nationally appear to have mixed results about readiness of some consumers to participate in self-directed care activities such as tracking and sharing vital signs via a patient portal with their primary care team.

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## 8.4 NC HIE Council – Existing Governance Mechanism

### Mission

It is the mission of the NC HIE Council to enable the timely and secure exchange of electronic health information for the purposes of improving the quality, safety and efficiency of healthcare and the overall health of North Carolina residents. The NC HIE Council undertakes this mission by planning, establishing standards and advocating for Health Information Exchange across North Carolina connected with the nationwide health information network. This will be done, wherever possible, by adopting existing standards and policies & procedures. With the support of NCHICA, the NC HIE Council may help to create and arrange to operate an actual exchange, may manage it through contracts with outside technical providers or facilitate processes whereby multiple enterprises form an federation to deliver HIE across North Carolina.

### NC HIE Council and Charter

The NC HIE Council draws membership from NCHICA's own member community HIE executives, along with professional organization representation specific to healthcare stakeholder communities, state government representation, and technology experts. These Council members will bring a unique combination of professionalism and domain knowledge, both to the NC HIE and to the ONC HIE Project. The Council consists of not more than twenty-five (25) volunteer Members, representing the majority of healthcare stakeholders in North Carolina. The Executive Director of NCHICA serves as an ex-officio (non-voting) member of the NC HIE Council. Terms of the individuals appointed by specified organizations shall expire in October of years ending with either an even or odd number.

The NC HIE Council elects, from among its Members, a Chair, a Vice-Chair, and any other such officers as it deems necessary. Each officer shall hold office for one year, unless he or she earlier resigns or is removed from office by a majority vote of the NC HIE Council. The Executive Director of NCHICA serves as the Secretary of the NC HIE Council. Appointment to the NC HIE Council is for a two (2) year term, unless the Member either resigns or no longer meets the criteria for the category of membership he or she filled when originally appointed, in which case the Member's term shall terminate immediately and a replacement shall be appointed for the remainder of such term.

The NC HIE Council is supported by the NCHICA staff which maintains an office in Research Triangle Park, NC. The Council's senior management team brings to the table a depth of knowledge and experience regarding national, regional, state and local healthcare issues and initiatives. Holt Anderson, the Executive Director of NCHICA, is well known in national healthcare circles, including NHIN, and serves on numerous organizations, committees, and governance organizations specific to NHIN projects. The NCHICA CIO Roundtable functions in an advisory capacity to the NC HIE Council by providing guidance on the execution of NHIN contracts and new opportunities such as the Social Security Administration Use Case NHIN contract and the Federal government Charter Value Exchange program. NCHICA's 501(c) 3 status allows increased access to funding from government agencies and private foundations; avoids conflicts with other regional healthcare organizations and health information exchanges

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and avoids federal legal issues, thus broadening the scope of activities the NC HIE may perform as an operating division of NCHICA.

Under the structure of the Council, the functioning committees will meet regularly to define and adopt policies and processes specific to operation of a statewide HIE. Committees will include Policy Development, HIE Development and Technical Operations, Finance and Administration, Stakeholder Relations, and Quality of Care and Evaluation. The membership of all committees are comprised of a broad representation of healthcare stakeholders and competing provider organizations, with individual members representing both private and public providers, ancillary services, payers, public health, governmental agencies, public health, and subject matter experts. Illustration 8-15 shows the organizational structure of the NC HIE Council which is comprised of five (5) working committees. The relationship of the NC HIE Council to the NCHICA Board of Directors is depicted in Illustration 8-16.

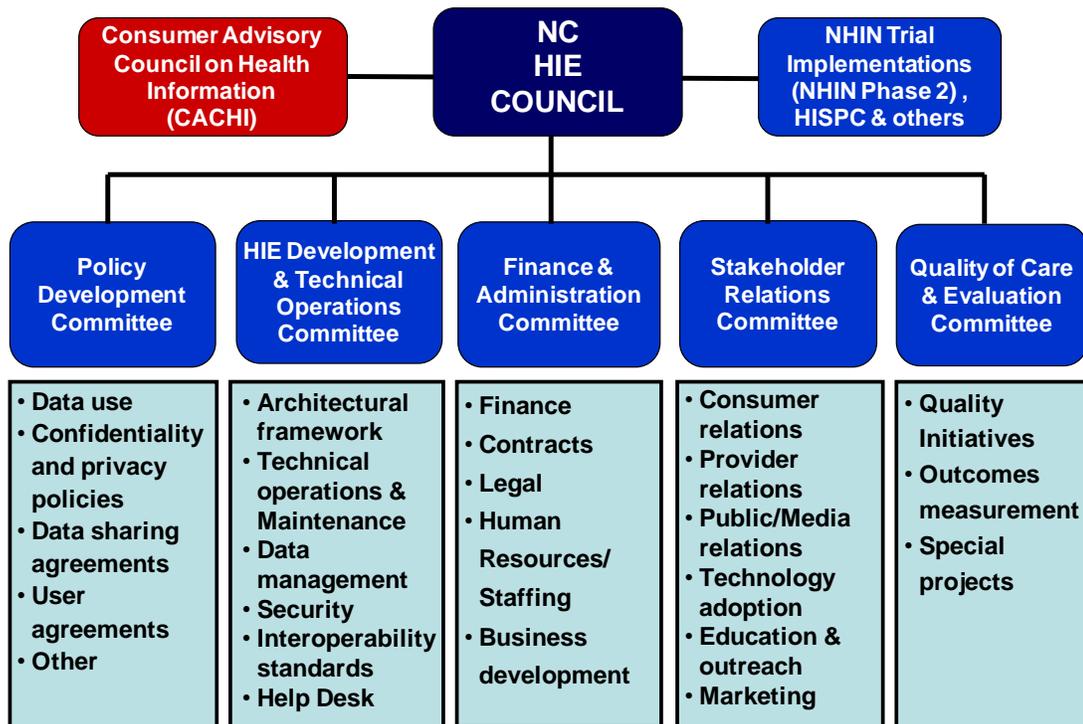
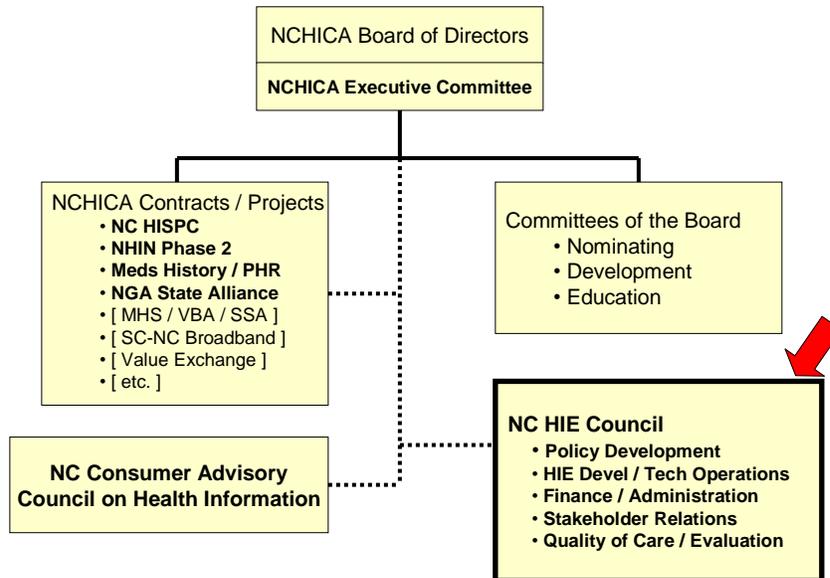


Illustration 8-15 NC HIE Organizational Structure

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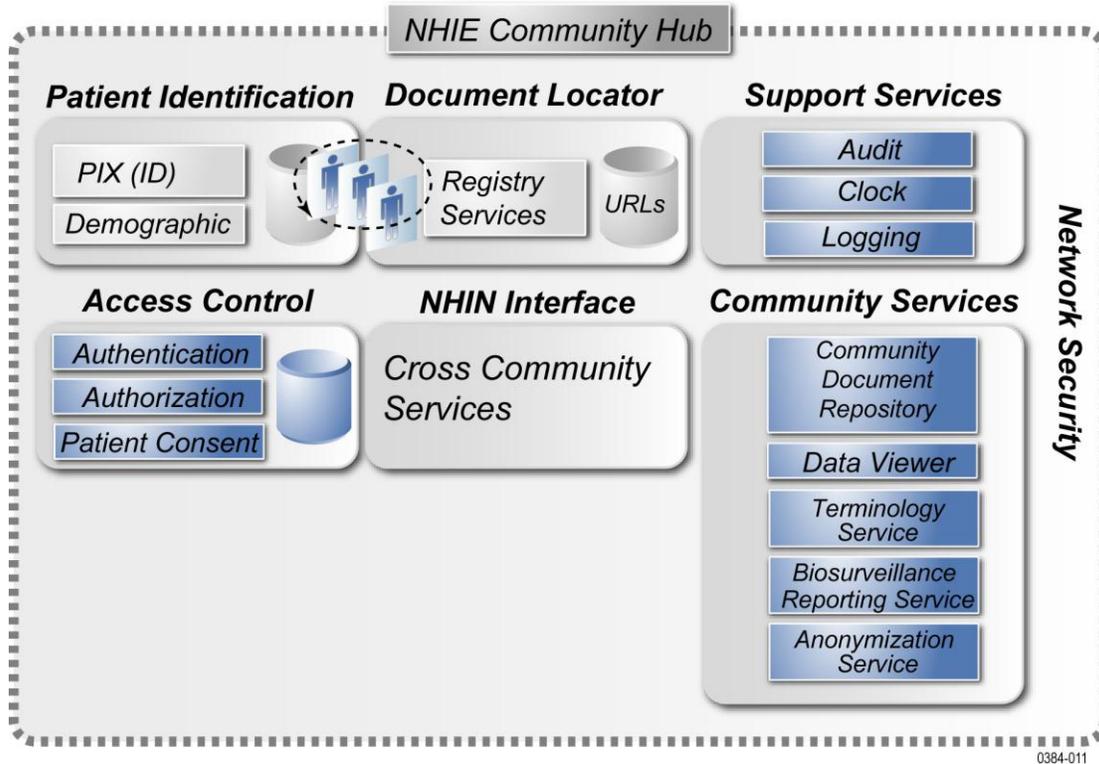
Illustration 8-16 NC HIE Relationship to NCHICA

### Exchange Operations – NHIE Core Services

In conjunction with IBM, the NC HIE is developing and operating, a set of Core NHIE Technical Services as part of the NHIN Trial Implementations project. As a rule this approach is hardware and software neutral, and is included here **only as an illustration** of the current approach. Continuing to implement this approach is a decision not yet undertaken. The architectural plan for these services addresses control of patient data for all the communities within the NC HIE and influences the location of stored patient data. A hybrid model is used for storing patient demographics and clinical information where data is either maintained under the control of a source entity (Federated model) or at the IBM Health Information Service Provider (HSP) hosted facility (Centralized model). However, the indexes and meta-data is always maintained at the IBM HSP hosted facility under secured access. Illustration 8-17 depicts the architectural detail of the NHIE Core Services.

The IBM HSP Hosted Service Solution is comprised of a number of software and hardware components, which are described in Table 8-1: Key IBM HIE Components. These components implement the services that make up the Services Oriented Architecture of the NHIN-Compliant HIE (NHIE). The design of the IBM HSP Hosted Service Solution anticipates interchangeability due to requirements and preferences. To address this need the majority of the components providing core services to have been integrated using a “pluggable” model, using standard interfaces, thus isolating dependencies and allowing substitution of components without modification to the infrastructure or co-existing services.

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*Illustration 8-17 Architectural Overview of Core Services supporting the NHIN Trial implementations Project.*

The *IBM Health Information Exchange* is a set of software components that implement several IHE Integration Profiles. These components form the backbone of the IBM HSP Hosted Service Solution Architecture and are listed in the table below. The IHE profiles supported by the IBM Health Information Exchange are:

- Cross-Enterprise Document Sharing (XDS)
- Patient Identity Cross-Reference (PIX)
- Patient Demographics Query (PDQ)
- Audit Trail and Node Authentication (ATNA)

Component	Description	Vendor and Product
Document Registry	Provides record-locator service for the NHIE	IBM HIE
Document Repository	Provides document storage for the NHIE; used to store documents on behalf of NHIE participants that do not provide their own repository for	IBM HIE

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	document storage.	
Federated Query Services	Allows the community to search for patients and documents within other NHIEs. It uses the same standard protocols specified by IHE, but issues these queries against other registered NHIEs to resolve queries that cannot be satisfied within the local NHIE.	IBM HIE
Access and Consent Management Service	Provides services that allow patients to record consent directives (statements about who should be allowed to access their clinical data for what purposes), and enforces those directives at run-time.	HIPAAAT Privacy eSuite™ and IBM Consent Management Utility
Terminology Services	Provides services to perform data normalization and mapping between code sets.	Apelon Inc. Distributed Terminology Services
Identity Management Service	Provides Master Person Index function; enables the unique identification of patients across data-provider systems	Initiate Systems Identity Hub

*Table 8-1: Key IBM HIE Components*

### **Privacy, Security and Confidentiality**

Security, Privacy and Confidentiality within the NHIE is addressed through several mechanisms to provide end-to-end security and privacy of data and transactions within the NHIE. Security within the NC HIE is based on four fundamental facilities. The first facility is Authentication and Authorization services which provide the facilities for identification of users of the NC HIE and the authorized access to services provided by the NC HIE. Second is Role-based Access Control is the capability to control access to documents and data in the NHIE based on the user's role in an organization. Essentially this is "who gets to see what data" within the NHIE. The next facility is Message Integrity, Confidentiality and Non-repudiation which are supported through standardized security models utilizing encryption, digital signatures and certificates. Through the use of these basic security building blocks and applications based on industry standards, the integrity and confidentiality of data transactions and data at-rest is intended to be protected. The final facility which supports a distributed model of security across NHIE's is established utilizing the Secure Assertion Markup Language (SAML) specification, from OASIS. The SAML-enabled NHIE architecture provides for the exchange of assertions (Authentication, Attribute and Authorization) across NHIE's utilizing security tokens according to the SAML specification. These implementations are

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supported by significant policies and agreements developed as part of the NHIN 2 Trial Implementations and complementary work performed by the NCHICA community under the Healthcare Information security and Privacy Collaborative (HISPC).

**Description of Proposed Offerings**

The NC HIE Council has proposed ten (10) initiatives for consideration as part the clinical road map for statewide HIE. Seven of these are discussed in detail in appendix section 6.3 as the initiatives most likely to be perceived as high priority needs by healthcare stakeholders across the state and ones most likely to demonstrate sustainability by 2013. The following five initiatives will be further detailed in the financial analysis section: 1) Patient Summary Record Exchange, 2) Test Result Reporting, 3) Medication Management, 4) Federal Agency Program Automation and 5) Medical Home Automation. A survey of key stakeholders in the seven North Carolina MTAs will be conducted during the first quarter of 2009 to determine the final list of initiatives that should be included in the NC HIE 2009-2012 roadmap.

One factor to keep in mind as the NC HIE moves towards establishing a clinical initiatives roadmap, is the changing nature of the healthcare landscape. An example is the rapid movement this year at national and state levels toward ePrescribing and the Patient-Centered Medical Home Model by both public and private organizations. Initiatives selected for inclusion in the initial roadmap that don't begin for several years will need to be reassessed for alignment with state and national economic and political factors.

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## 8.5 Organizational Structure for Statewide NHIE Operations

### **Broaden stakeholder representation**

Working closely with its members, NCHICA has traditionally operated under its charter as a convener, promoter, educator, catalyst and innovator, while providing a trusted environment in which its Members could function. NCHICA is engaged in the legislative and regulatory arenas, and in initiatives that inform and engage clinicians and other healthcare stakeholders in electronic health information interoperability, related privacy and security policies, and developing seamless and secure health information exchange capability for all stakeholders.

NC HIE, as a part of NCHICA, serves as a neutral convener of standards-based community efforts focused on improving the quality and lowering the cost of healthcare. As a participant in the NHIN Trial Implementations project it has the additional responsibility of managing hosted hardware, software and services for the NC HIE. This role is one that many statewide HIOs consider ultimately owning or contracting to more efficiently facilitate health information exchange. Members of the NC HIE Council and the NCHICA Board will need to make a decision if it will continue in the role of technical operator or focus more on convening and coordinating roles.

The NC HIE is at a point in its evolution where broader and more active stakeholder involvement is required to address this important decision and establish a permanent governance model, organizational structure and operational plan. The NC HIE Council was formed to include representatives from the major healthcare stakeholders in North Carolina but currently only a handful of representatives are consistently involved in committee activities. Obtaining endorsement of the NC HIE as the statewide central governance entity will help raise commitment by Members to the NC HIE to a level required for success.

### **Obtain Endorsement from the State**

HIE organizations need to be empowered by state governments in order to sustain key statewide functions and to alert stakeholders of the importance of various initiatives. In order to move beyond enterprise and community based HIE efforts, formal state level authority appears needed in North Carolina. Virtually every other state has undertaken this approach. The authority conveyed to the statewide HIO needs to: 1) recognize a central coordinating body for public/private HIE initiatives in North Carolina, 2) provide start-up and operations funding, 3) structure its authority to enable the coordinating body to receive financial and other benefits, and 4) define its accountabilities related to state policy goals and related statutory requirements.<sup>101</sup>

Transfer of authority from the state to the designated statewide HIO entity can be accomplished by identifying and empowering the HIO in gubernatorial executive orders, legislation, agency regulations and rules, and/or contracts to perform certain roles or tasks. The AHIMA FORE health information exchange study on governance and sustainability did find that there is even movement by some states (New York, Rhode Island and Florida) toward statutory definition of statewide HIE initiatives and authority.<sup>102</sup>

Without official endorsement for a centralized coordinating body for HIE across North Carolina, duplication of effort in the form of various readiness assessments will be completed, stakeholder surveys administered, consensus building exercises conducted, public forums

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held and recommendations made that have no guarantee of leading to effective planning, implementation, operation and evaluation of HIE initiatives in a timeframe that will address the critical fiscal and public need to reduce healthcare costs and improve overall health for the residents of North Carolina. And most importantly, initiatives will continue to be developed and deployed piecemeal to satisfy local or enterprise specific objectives, possibly even limiting the potential value from deploying HIE across the state. Endorsement through collaborative, bi-partisan leadership of both the governor and the legislature is a critical step in the establishment of effective HIE across the state of North Carolina.

As a regulator the state government can provide support through funding, removal of legislative barriers to HIE and NHIN development, and statewide policies on cross-boarder credentialing and privacy and confidentiality of patient information. States are a critical component in HIE and NHIN development for public health and biosurveillance activities along with the coordination of these activities between the state and local governments and the state and federal activities.

States have the opportunity to create statewide policies that impact the use and deployment of health information technology and the exchange of health data. The government can regulate the use of standards and digital data for quality performance measures, Medicaid providers, and employee health plans. Agencies within the states can work together on grants and other funding initiatives to gain greater learning and most importantly, specify that grant activities be cross-cutting and involve other stakeholders in the grant process. Policies that require the use of technology for reporting and compliance in public and private healthcare will demonstrate the value of the technology to improve efficiency and at the same time, drive greater efficiency into the compliance reporting process.

### **Elements in Defining Permanent NHIE Governance**

A permanent governance structure is not required for statewide HIO to be engaged in valuable work related to sharing healthcare data. Several “convening” activities focused on broadening stakeholder representation and engagement might be undertaken by the state and the NC HIE while a final decision about what the permanent governance structure for the statewide HIO is being made. Collaborative processes such as surveys, stakeholder meetings and public forums, can be used to gain insight into the needs and positions of key stakeholders in the various Medical Trading Areas (MTAs). These activities can also be leveraged for the purposes of constituent education, consensus building and advocacy for statewide HIE while official endorsement for the statewide HIO is being sought and formalization of the organizational structure is being accomplished.

A study of statewide HIOs showed that the configuration of organizations providing governance and technical operations for health information exchanges varies by state. However, the organization model considered most viable long term is a trusted, neutral, independent public-private partnership (PPP). This structure is viewed as necessary to ensure a statewide HIO’s effectiveness and freedom to function in an entrepreneurial role - free from government bureaucracy and political agendas.<sup>103</sup> Public and private sectors will share data, financing commitments, participation in governance, and development of certification and roles to leverage resources for common good.

The NC HIE Council has thus far functioned as a trusted, neutral convener and consensus builder among key stakeholders. Statewide governance roles include convening diverse statewide stakeholders and leading consensus-based efforts. A statewide governance entity

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is a neutral and skilled resource serving all stakeholders that is situated between state government and the healthcare sector and facilitates compliance across diverse interests and organizations.<sup>104</sup> One approach to determine how the permanent governance organization for the statewide HIO would be structured is for the governor and/or legislature to convene a summit of healthcare thought leaders. This group might seriously consider candidates capable of providing a collaborative, balanced and broad representation of North Carolina healthcare stakeholders.

There are several basic operating models that might be considered during the summit. First the statewide HIO could function as a loose group of decentralized volunteers, that continues to convene, coordinate and inform while Members implement HIE initiatives independent of one another (current NC HIE model). As a second alternative the governing organization could remain loosely structured with one or more Members providing coordinated technical operations for select statewide clinical initiatives such as core NHIE services, physician portals or disease registries. Third, the HIE governing body could establish a Public-Private Partnership (PPP) that is centralized with a formal operating structure and paid leadership positions. In this model the HIO would be responsible for technical operations which could be subcontracted, or the organization may take on the responsibility of building and maintaining the HIE infrastructure.

Adding technical operations to an HIE model is considered a key strategy for enhancing adoption of HIT across the provider space and is something more HIOs are considering as they mature. The NC HIE is currently providing technical solutions for the NHIN Trial Implementations. Consideration for continuing in this role will need to be given when determining what appropriate long term operational model a statewide HIO will establish.

The NC HIE Council already includes major North Carolina healthcare stakeholders and is in an excellent position to mobilize the state's healthcare community into action by becoming the statewide, centralized governing Health Information Organization (HIO) -with or without taking on a technical operations role).

**Requisite Activities for Permanent Governance**

Once it has been determined which operational model best fits with North Carolina's public and private healthcare agendas it can begin addressing individual components of a permanent governance structure. Several key elements of governance to consider early on will include Legal Considerations and Rules of Governance, Organizational Structure, Membership, Communications, and most importantly collaboration and coordination with the existing HIE initiatives underway at the enterprise and community level.

*Legal Considerations:* If it is determined that the statewide HIO should be a public-private partnership it could establish itself as 501(c)3. If a new organization, separate from NCHICA is deemed appropriate for the statewide central governing HIO of North Carolina, additional costs legal and operational costs will be incurred in the establishment and maintenance of this separate organization with its own board, councils, committees, by-laws, charter etc. Other legal considerations beyond tax status include membership agreements; minimal participation requirements; non-compliance; data use and reciprocal agreements; participation agreements, permitted uses of personal health information, person identification (patient and provider), legal liability and privacy, security and confidentiality responsibilities of the HIE. Legal and financial functions are essential and may be outsourced on an as needed basis.

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*Rules of Governance:* By-laws are rules governing the internal affairs of an organization and they establish terms under which organization decisions will be made for commitment of resources or contractual obligations. By-laws specific to a statewide HIO would need to be written with consideration for: types of membership, member fees, board and committee terms, roles and responsibilities, member voting rights and ways of establishing organization strategy, policy and procedure.

*Organizational Structure:* The NC HIE Council has established bylaws and a structure of officers, committee liaisons and committees. In a permanent statewide HIO organization, the Council structure might be replaced with one that is lead by a smaller Board of Directors supported by stakeholder advisory councils that inform the Board on constituent priorities as well as working committees consisting of subject matter experts. The current terms of appointment to committees of the NC HIE are staggered and last two years. Maintaining this pattern would achieve an optimal balance between continuity and creativity.

As the statewide HIO matures an Operations Committee may be necessary to facilitate communications between the executive staff, councils/committees and the Board of Directors. This committee would be especially necessary if the HIO took on the role of technical operations. The Operating Committee would be responsible for policies and procedures necessary to manage HIE and for advising the Board of Directors.

The HIE Board would be established to serve as the executive oversight body for statewide initiatives. As such the Board should represent all major community stakeholders and oversee strategy and execution related to the NC HIE Vision, Mission and Policies. The Board would have responsibility to establish and ensuring strategic alignment with priority clinical initiatives; manage relationships and facilitating activities across MTAs; provide guidance and education and establish policies on issues of standards, data use, compliance, privacy and security; advocate with the governor and state legislature for HIE initiatives; and maintain open communication with all stakeholders about HIE plans and success stories

*Membership:* Membership options must balance the need to include key constituents while positioning the organization for effective decision making. Currently the NC HIE Council consists of volunteer representatives from up to twenty-five (25) key healthcare stakeholder groups. The potential for a formal membership (and dues) structure of the future statewide HIO governance body would depend on whether the HIO evolves towards a significant cross-entity contracting or operational role. In such a case, membership decisions would need to go beyond which stakeholders should be included, to considering who has authority to participate or be a decision-maker. Consideration might be given to a governance structure where classes of stakeholders with voting rights based upon their level of involvement and investment guide the HIO.

*Communications:* HIE success depends on the ability of stakeholders, including consumers, to understand the value of the initiatives. Marketing and communication involves crafting the messages the stakeholders and members of the local community understand as the HIE and its value to the community. This function is not an optional function and provides three primary needs:

- Consumer: Inform and educate consumers throughout the community on the value of sharing patient information, the steps that have been taken to protect their privacy, and the availability of a personal health record for their use;

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- Stakeholder: Expand the customer base for the HIE through presentations, newsletters, and testimonials by current customers and encourage collaboration;
- Customer: Build trust and encourage collaboration with the HIE's most valuable assets, current customers, through frequent communications and feedback.

A communication plan would be developed as part of the process of establishing a permanent governance structure for the statewide HIO. This would include identifying specific communication requirements of key stakeholders and their preferred method of information delivery. Options for disseminating information include the following communication tools:

- NC HIE website
- Organizational newsletters
- Public broadcasts
- Public forums
- Email
- Print media

Please return to section 5 for summary.

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