The Commonwealth of Massachusetts 2012 Health Information Exchange Strategic and Operational Plan

Presented by:

MeHI
Massachusetts eHealth Institute

A Division of the Massachusetts Technology Collaborative

Acknowledgements:

This plan would not have been possible without the following individuals, who so generously offered their time and expertise to this report: JudyAnn Bigby, M.D., Secretary of the Executive Office of Health and Human Services for the Commonwealth of Massachusetts; Members of the Health IT Council; Members of the HIE-HIT Advisory Committee; their five Ad-Hoc Workgroups; MeHI/Mass Technology Collaborative staff; and a wide variety of key healthcare stakeholders.

Document History:

Version	Date	Changed By	Remarks
2.6	July 16, 2010	Fell-Remmers	Updated executive summary, governance, finance and legal/policy
2.7	August 2, 2010	Fell-Remmers	Strategic Plan: Updated Environmental Scan, added summary table in 1.1, minor edits in 2.2 and 2.3; edited table in 5.1; added 2 new sections – 1.5 and 1.6.
2.7.1	August 3, 2010	Fell-Remmers	Strategic Plan; added 1.3 Adoption and use of E-Prescribing at State Level Operational Plan: Added 4 Strategy to Address ONC PIN Priority Exchanges
2.7.3	August 3, 2010	Cyr	Strategic Plan: Updated Environmental Scan
2.7.4	August 4, 2010	Fell-Remmers	Strategic Plan – General: Added 2.3 Stakeholder RIO to Finance section; added 1.7 Status of Electronic Lab Reporting; updated PIN information Operational Plan: Updated Risks and Issues: deleted 2.2 SHARP; deleted 2.3 Beacon; added 4 Strategy to Address ONC PIN Priority Exchanges; updated 4.2 Service Delivery Model Appendix: Added Appendix H: Lab Entity Profile
2.7.5	August 4, 2010	Cyr	Strategic Plan – General: 1.7.3 edited Goals; 1.7.4 edited strategies; 7.5 Beacon Submissions – added introductory paragraph; Domains: 3 Technical Infrastructure – updated Network of Networks graphic and edited public health reporting data; 4.3 HIE MU capabilities – replace table of services
2.7.6	August 5, 2010	Fell-Remmers	Strategic Plan – General: added 7.3.2 Massachusetts Health Professional Grants table Operational Plan – Domains: Added 4.6 Workforce Development
2.7.6	August 5, 2010	Cyr	Strategic Plan – General: Updated Network of Networks graphic; moved PIN detail to Operational Plan Operational – Domains: Added quality strategy to Business and Technical Operations; Updated project plan
2.7.7	August 6, 2010	MeHI Team	Reviewed and edited entire plan
2.7.8	August 13, 2010	Mass Technology Collaborative/HIT Council	Global edits
2.7.9	August 30, 2010	MeHI Team	Incorporated requirements from ONC, Mass Technology Collaborative and Health IT Council; edited Executive Summary; added Legal/Policy to Operational Plan; updated project plan

Version	Date	Changed By	Remarks
3.1	11/21/2011	DC, MFR, CR, RS, JS, TW	Merged revised strategic plan, new information on Last Mile, various sections from new SMHP and APD, revised section on collaboration with other states, merged in comments from HIT Council, added a cross reference table with SMHP/APD documents, removed old extraneous appendix sections, revised section on workforce development, revised section on governance.
3.1.1	11/21/2011	DC	Same as above with track changes and comments removed.
3.1.2	11/28/2011	DC	SMHP Revisions. Table in section 1.5,
3.1.3	11/28/2011	DC, MFR	Edited content for clarity
3.1.4	12/15/2011	RC, JS, MFR	Incorporated changes to Executive Summary, Health IT Adoption and Governance sections. Changes based on suggestions from Health IT Council, EOHHS and HIT-HIE Advisory Committee.
3.1.5	01/18/2012	MT, RS, MFR	Edits to Section 1, chapter 3
3.1.6	01/19/2012	RS	Comments and edits to section 1, chapter 3
3.1.7	01/20/2012	MFR	Added budget information
3.1.8	01/31/2012	MFR	Incorporated changes/suggestions from ONC and Workgroups
4.0	02/03/2012		Submission to ONC
4.1	3/5/2012	MFR	Incorporated changes requested by ONC Submission to ONC

TABLE OF CONTENTS

Executive Summary

In accordance with the Office of the National Coordinator's (ONC) guidelines, the Massachusetts Statewide Health Information Exchange Strategic and Operational Plan defines the vision, goals, objectives, strategies and operational plans that will support health IT adoption. It provides a roadmap that will move the Commonwealth from our current health information exchange (HIE) capabilities to our vision of a totally connected physician and patient community.

The initial Massachusetts Statewide HIE Strategic and Operational Plan (SOP) was submitted to ONC on August 30, 2010, in accordance with the terms of the State Health Information Exchange Cooperative Agreement Program. Since that time, a number of significant changes in both the structure of the participating entities and increased specificity with respect to operational elements have evolved. This annual update to the Massachusetts SOP reflects this evolution and marshals Medicaid and ONC funding streams and existing infrastructure to create a unique and innovative statewide HIE approach that focuses on putting health information exchange infrastructure in place practically and rapidly. It also recognizes the barriers to entry and use of the HIE from the provider perspective and focuses on integration of end-user systems to remove as many of these barriers as possible.

In addition, the SOP addresses (1) MeHI's refocus and use of the ONC funding to facilitate end user adoption and Last Mile connectivity to the Statewide HIE and (2) MassHealth's refocus on the implementation of the statewide HIE. Because CMS has required a revision to the State Medicaid Health IT Plan (SMHP) and Advanced Planning Document (APD), and ONC has requested a revision of the HIE Strategic and Operational Plan (SOP) all three documents were modified to accurately reflect the program linkages, while allowing each document to stand alone. This revised final SOP has been approved by both the Massachusetts Health Information Technology Council (the "Health IT Council") and the Executive Management of the Massachusetts Technology Collaborative.

As reflected in the APD and SMHP and in this revised SOP, Mass Technology Collaborative will no longer be responsible for any HIE implementation deployment, services or procurements, but rather, those responsibilities will be assumed by MassHealth. In addition, Mass Technology Collaborative will use the ONC funding to focus on end-user integration and developing a Last Mile solution that will maximize connectivity to the operational HIE by as many providers as possible, and shall continue to be responsible for management of the HIE Challenge Grants. In order to reflect this re-focus of efforts and the division of responsibility between Mass Technology Collaborative and EOHHS, the Cooperative Agreement between ONC and Mass Technology Collaborative will require an amended Notice of Grant Award (or some other form of contract amendment) to accurately reflect the activities and Project Schedule that Mass Technology Collaborative will be contractually bound to achieve. Mass Technology Collaborative and EOHHS will also enter into a Memorandum of Understanding (MOU) to reflect this re-focus, the division of responsibilities between them and the joint commitment to cooperation and coordination. The new State Health IT Coordinator is Manu Tandon, CIO of the Executive Office of Health and Human Services.

The HIT-HIE Advisory Committee and its Workgroups

Massachusetts is fortunate to have the force of state law (Chapter 305) and both state and federal funding to develop its health IT infrastructure. Most important, however, has been the ability to leverage its rich public and private HIT/HIE assets – both in terms of existing technology and in subject matter

expertise and experience. Given the statutory limitations of membership on the appointed Health IT Council, an HIT-HIE Advisory Committee was named in 2011 to take better advantage of those latter resources. Recognizing that challenges to a sustainable HIE are legal, political, cultural, and financial in addition to technical, five workgroups were created to ensure that all barriers and opportunities were explored and recommendations made that would ensure long-term success for the statewide HIE. The Advisory Committee and its Workgroups are advisory in nature. They research and advise, with the support of the Massachusetts eHealth Collaborative, who was procured by Mass Technology Collaborative to be the Subject Matter Expert and to facilitate and staff all meetings. The Health IT Council is the Commonwealth's HIE decision-making body, taking the input of the Advisory groups into consideration.

The Approach

Massachusetts has formally adopted a three-stage approach to the development of its HIE infrastructure:

- Stage One incorporates the standards of Direct exchange, where one provider can send (push) _ health information to another. This allows us to build a vehicle for basic information exchange that does not require new consent considerations, new policies, or a complex funding model, and can be used by any clinician with an EHR that has incorporated the Direct standards and can link to the Commonwealth's statewide Health Information Services Provider (HISP)
- Stage Two, the development of registries and analytical repositories, will require additional technical complexity, such as an electronic Master Patient Index, as well as an appropriate policy infrastructure and clearly articulated business case.
- Stage Three will allow for fully functional bi-directional exchange (the ability to push and pull information as needed) and will require extensive pre-work in the areas of policy and legal considerations, financial sustainability, consumer education and engagement, and provider engagement.

The HIE-HIT Advisory Committee workgroups are addressing these issues now, in preparation for the timed roll out of Stages Two and Three.

Statewide HIE Implementation

Massachusetts is also fortunate to have engaged a technically advanced Medicaid division within the Executive Office of HHS. This has allowed the Commonwealth to leverage Chapter 305 state funding to maximize federal match dollars in the development of a statewide HIE infrastructure for Medicaid participants which will be deployed and operated by MassHealth. The necessary revisions to both MassHealth's SMHP and IAPD reflecting this change have been submitted to CMS. This SOP has been revised to align with both of these documents.

Mass Technology Collaborative will continue to be the State Designated Entity for HIE with respect to the ONC Cooperative Agreement, but will no longer have responsibility for HIE implementation deployment, services or procurements. Instead, Mass Technology Collaborative will concentrate on ensuring that all interested providers can access information and services through the various stages of the statewide HIE infrastructure being put in place by MassHealth as it becomes available. This Last Mile effort will be comprised of three main components: connection, education and optimization. Connection addresses the technical adoption of EHRs and the HIE, to fulfill stages 1 through 3 of meaningful use. Education is directed at providers, patients and consumers to instruct them on the benefits of using health IT for better

health outcomes. Optimization focuses on how the providers will best use the technology in an effective manner to maximize efficiency while delivering quality care to the patient. These components are cyclical in nature, in that all three are required at different points in time for health IT adoption and optimization to continue, as it evolves along with the technology.

MeHI, along with its partners and collaborators, is pleased to present this revised plan to ONC at this time. We believe that it represents a major step forward towards reaching our goal of safer, better, more efficient care through widespread adoption and use of Health IT.

Section One: Health Information Exchange Strategic Plan

Chapter One:
General Components

1. Environmental Scan

Massachusetts is fortunate to have a concentration of leading universities, research organizations and public and private enterprises already engaged in health care innovation and information technology. In fact, Massachusetts has historically been at the cutting edge of thought leadership in health care and Health IT innovation. Thus, it is no surprise that a significant amount of time, effort and capital has already been invested in building several community and provider-based Health Information Exchanges (HIE) in Massachusetts. MeHI and MassHealth have leveraged lessons learned from these initiatives and are applying them to the Statewide HIE planning and implementation, which will eventually connect to a secure, nationwide, interoperable health information infrastructure that will allow providers, consumers and others involved in supporting health and healthcare to share clinical information securely and reliably.

Massachusetts HIEs occur at the community (including hospital networks), state, regional (across states) and the national levels. The various types of HIEs provide the following capabilities and value:

- Community level primarily supports patient care and coordination.
- Statewide level supports public health and quality reporting.
- Regional level supports patient care coordination, public health reporting and bio-surveillance.
- National level supports population health; i.e., data for public health, clinical research and quality reporting.

1.1. Current State vs. Future State

The following table highlights some of the key differences that exist between our current fragmented, provider oriented state of health care and one where widespread adoption of health IT would allow care to be centered around the needs of both an individual patient and a larger community. While there are some patients who are cared for in large integrated systems that are fully electronic, such as the Veterans Administration, or have access to physicians who e-prescribe now, the vast majority of the Massachusetts population is still cared for in a delivery system that is supported by a combination of paper records and electronic transactions. Even among providers who currently use an EHR system, some have not maximized the system's potential. It is important to move these providers to the next stage of meaningful use.

Activity	Current Process	Future State
Accessing care in physician office	Patient calls provider to make office appointment, which usually requires a call back. Resulting appointment might not be at the most convenient time for the patient.	Patient makes an online query about a particular problem. Clinician provides online guidance or answers to questions, or, if conversation would be more productive, provides a same day call-in appointment. If face to face encounter is necessary, appointment is made online for a time that is convenient for patient.
Administering Benefits	Multiple calls are made between provider and insurance company, between patient and insurance company, and patient and provider to assure that coverage is available for	Providers and patients can easily access online, clearly defined, up to date eligibility status, benefits and participating providers.

Activity	Current Process	Future State
	necessary services. Physicians spend 30 minutes of this administrative time for every 60 minutes of direct patient care.	
Preparing for visit	Patient completes several pages of standard information, while spending time in waiting room. The information is contained in the EHR, but it is not easily accessed by the provider or patient, or is not incorporated into the practice design of the provider.	All "clipboard" information is available online, including a list of current medications. Patients need only to acknowledge and record any updated clinical information and make note of problems or errors.
Documentation of clinical information	Most documentation of clinical problems, diagnosis and treatment is currently on paper, of varying degrees of legibility, and sequestered in multiple records among multiple providers of care – all of which make access to information by patients difficult. Documentation is contained in EHR but is not accessible to providers or patients, in a meaningful way.	Use of certified EHRs allows for digital documentation of both text and structured data, such as vital signs and lab results. Patients have electronic access to the clinical information generated by the provider, as soon as it's entered into the system.
Tests to prevent or screen for various problems	Immunizations, mammography, other screening tests and routine screening specific to various conditions, such as blood tests for diabetes, are dependent on the patient's or provider's ability to look up the timing of previous tests and order new ones—and their remembering to do so.	Automated systems send prompts to patients and their clinicians reminding them of recommendations for routine screenings. Patients schedule the tests online at a time that is convenient for them, while simultaneously notifying their clinician they have done so. Should they miss an appointment, both are notified and the test is rescheduled.
Coordinating Care among multiple providers	A patient who sees a primary care physician and other specialists frequently discovers that information is not shared among them, leading to duplications in prescriptions, testing, and confusion about diagnoses and treatments.	The electronic health record used by any one clinician in any setting captures pertinent information from all other providers of care and the patients themselves, so they are fully informed about the patients' status at the time of contact: in an office, in an emergency room, or virtually.
Referrals	Seeing a specialist at the request of another physician requires administratively burdensome paperwork, to assure coverage. It also requires extensive copying/faxing of paper records.	A referral to another physician is made and scheduled immediately, since automated benefit checking is part of the process. The new physician has access to all online information through a health information exchange process

Activity	Current Process	Future State
		and the patient can review the referrals from a secure portal or personal health record.
Prescriptions and refills	Prescription is handwritten and given to patient to bring to the pharmacy. It may be illegible, requiring a call to physician; a duplicate of another medication; or not covered by insurance. Electronically generated prescription is printed and handed to or sent to patient to deliver to pharmacy.	E-Prescribing allows clinician to order the appropriate medication that is covered by the insurer and patient to access and review this information. E-prescribing also checks for allergies, drug-drug interactions, appropriate dosing and allows for easy online refills. Should a patient not obtain medication as prescribed, clinician is notified and can follow up with the patient.
Test results	Patients frequently make calls to office or wait for a letter to arrive in mail regarding test results. They are often told to assume that all is well, if they do not hear anything. Providers await paper results, review them at end of day, paste in chart, and notify patients as above.	Test results are available electronically to patients, immediately following their entry into electronic health record of ordering provider. They are also available to other providers as designated by the patient.
Access to research and targeted public health opportunities	Most patients are not aware of research projects that may affect their specific condition. If they are on a research protocol, both the physician and patient must fill out special forms that capture research data in a specified way.	Patients may authorize submission of their names and status to secure registries, which allow them to be notified of research programs and public health interventions relevant to them. Examples include priority access to specific flu vaccines for asthmatics in the event of an epidemic, or notification of research on a new, noninvasive approach to administering insulin.
Sharing information with other family members/loved ones	Providers must have written documentation from a patient before sharing any information with their loved ones. This documentation needs to reside in as many places as a patient receives care, and may be difficult to obtain under certain circumstances.	Through health information exchange mechanisms, patient authorization to access their protected health information, including the type of health information, are clearly defined and available to any of their health care providers.

1.2. Achieving Meaningful Use of Electronic Health Records

Before proposing state coordinated tactics and methods to assist with increasing the Commonwealth's EHR and HIE adoption rate, analysis and studies were completed to estimate the current state of adoption in three large categories:

1. Ambulatory Office Physicians

   While Massachusetts is considered a national leader in Health IT, and many providers have adopted EHRs into their practices, there is still a high number of providers who have yet to convert from a manual process to one supported by an EHR. Overall, Massachusetts has more than 15,000 office-based physicians, and it is estimated that approximately 70% have implemented an EHR.[1] Most of these physicians are concentrated in the greater Boston area, where they are supported by a number of integrated delivery networks. EHR adoption is significantly lower in central and western Massachusetts, and the South Shore and the Cape, where there is a higher proportion of smaller, independent practices and hospitals.

   More importantly for realizing the benefits of Health IT in Massachusetts is not the number of physicians using an EHR, but the number that are using EHR in a way that enables improved access, increases quality and safety, and ultimately improves health outcomes for their patients. Although there are currently no new statistics, the general consensus is that there is still a tremendous amount of work to be done to implement EHRs for those physicians who do not already have them and to move all physicians towards the meaningful use of the technology. MeHI will prepare and distribute a statewide provider survey to determine the percentage increase in EHR adoption. This is scheduled for the fall of 2012.

2. Community Health Centers

   Community Health Centers (CHC) also offer opportunity to increase EHR adoption, as these centers deliver care to Massachusetts' underserved population. There are 48 CHCs in the State, of which 40 currently have or will have an EHR system. Thirty-nine of the state's CHCs are Federally Qualified Health Centers (FQHC), which receive federal funding. While 32 of these FQHCs have implemented an EHR, seven have not and will thus need to work towards achieving meaningful use.[2]

   As the state implements the Health IT Strategic plan and supports meaningful use of EHR's among ambulatory office physicians and community health centers, the state will track specific outcomes related to strategies[3] adopted through the Massachusetts Health Care Quality and Cost Council (HCQCC). These outcomes including the following:

   - Implement patient centered medical homes to promote the management of chronic care models, with an initial emphasis on diabetes.
   - Reduce avoidable hospitalizations and emergency department visits.
   - Reduce preventable hospital readmissions.
   - Reduce medical errors, especially as they relate to serious reportable events.
   - Improve care coordination, as a patient transitions from one clinical setting to another or to the community.
   - Improve end of life care.

[1] ONC Survey, 2010 Simon et al., 2009, Physicians' Usage of Key Functions in Electronic Health Records from 2005-2007. Journal of the American Medical Informatics Association.

[2] Massachusetts League of Community Health Centers EHR Survey, Ellen Hafer, August 2010.

[3] The Official Website of the Massachusetts Health Care Quality and Cost Council http://www.mass.gov/?pageID=hqcchomepage&L=1&L0=Home&sid=lhqcc, July 7, 2010.

3. Acute Care Hospitals

Implementation of EHRs and Computerized Physician Order Entry (CPOE) in hospitals is much more complex than in ambulatory settings. An estimated 48% of the Commonwealth's 72 acute care hospitals have partially implemented CPOE with clinical decision support.[4] Much of this success is related to Massachusetts Technology Council's (Mass Technology Collaborative) work, on the Massachusetts Hospital CPOE initiative, a Mass Technology Collaborative initiative that uses expertise within the New England Healthcare Institute (NEHI). Chapter 305 heightened the sense of urgency, by mandating that CPOE implementation will be a condition of hospital licensure, beginning October 1, 2012.

As with individual physicians, if hospitals simply install Health IT, neither the hospital nor the Commonwealth will realize full benefits from their investments, unless technology is integrated into the workflow and care delivery processes. So while many of the state's hospitals have adopted CPOE, most still have significant gaps in achieving the federal definition of "meaningful use", in both technology and care process. A recent study by MeHI suggests that the majority of hospitals in the Commonwealth are not using Health IT to its full capacity, as defined by evolving federal guidelines. The same study estimates that it will cost more than $438M to get all Commonwealth hospitals to achieve the stage 1 definition of meaningful use – more than half of that cost is related to training and implementation support.[5]

[4] Based on a recent MeHI study – Estimated Costs to Achieve Meaningful Use of Certified EHRs in Massachusetts Hospitals – Results from Spring 2009 Survey

[5] Based on a recent MeHI study– Estimated Costs to Achieve Meaningful Use of Certified EHRs in Massachusetts Hospitals – Results from Spring 2009 Survey

1.3. Collaboration and Coordination within Massachusetts

The existing high level of collaboration, coordination and strong data exchange capabilities among entities in Massachusetts will allow the State to build on the depth and breadth of HIE expertise in the Commonwealth. The following table was derived from a survey sent to twenty-four major health networks in Massachusetts and provides an environmental scan of those twenty networks that responded, with a focus on clinical data sharing. Following the deployment of phase 1 of the statewide HIE services, MeHI will conduct an updated readiness assessment.

Existing HIEs at MassHealth Providers and Managed Care Organizations[6]

HIE Entity	Data Sharing Capabilities	Standards Used
Atrius Health	Clinical summaries data sharing view into other systems e.g. BID "Magic Button" CHAPS with SSH (See below), Claims submission, registration eligibility checks, electronic remits, referral auth and claims status	TLS for encryption of document sharing. CHAPS standards are listed below.
Baystate Health System	Lab, micro, path, bbk Results, Rad results, cardiology result, documents/notes, clinical summaries, H&P, allergies	HL7/CCD, X12, XML, web services, J2EE
Boston Medical Center / Boston HealthNet	Share Meds, Probs, Allergies, Labs, Vaccines, Referral Notes, Consult Notes (soon to exchange D/S, ED Notes) using Community Information Exchange (CIE)	CIE utilizes the following protocol and terminology standards: HITSP (TP22, TP23, TP30, C78, C32, CT17,T15,T16, C48) IHE PROFILES (PIX, PDQ, XDS, BPPC, PCC, ATNA, CT, DDR) Terminologies (RxNorm, ICD, LOINC)
Cambridge Health Alliance/Mount Auburn Cambridge Independent Practice Association, Inc. (MACIPA)	Lab, Rad (Text only), Departmental Reports, Discharge Summary, ADT for external PM systems	HL7
Cape Cod Healthcare System	N/A	N/A
CareGroup	All HIPAA/administrative simplification transactions and code sets, clinical summaries, eRx, public health reporting, quality measurement and reporting	ANSI X12, HL7/CCD, NCPDP SCRIPT
Caritas Christi Healthcare System	N/A	N/A
Central Mass IPA	Data warehouse	CDA/CCD, .net, HL-7, SQL server

[6] 2011 State Medicaid Health IT Plan, p33.

HIE Entity	Data Sharing Capabilities	Standards Used
Community Hospitals and Physician Practice Systems (CHAPS)	Regional Patient registration matching, external medical summaries, discharge summaries, notes and dictated reports, Lab, Micro, Pathology results, Image orders and scheduling	HL7, XML, CDA/CCD, PDQ/PIX for patient query, XDS Registry query, Repository Document Retrieval
Hallmark Health System	Unidirectional outbound HL7 for Laboratory, Imaging, Departmental ADT and Scheduled Appointments. Unidirectional inbound HL7 to file charges bi-directional ADT/Order Entry in development HIPAA Transactions for 837/835 Eligibility transactions via Passport	HL7 Scripting ANSI X12 Engine (Microsoft/Sql)
Lahey Clinic	HIPAA transactions, CCD records	HL7 ANSIX12 e-Gate Engine
MA EOHHS Enterprise Service Bus	Synchronous and asynchronous messaging bus with data transformation, data integration, routing, XML Editing, FTS, validation and publishing capabilities using a Web Services and Q based architecture	Web Services standards, J2EE
Massachusetts League of Community Health Centers (MLCHC)	Visit and patient contact documentation including details from EHR products (Dx, medications, vitals, lab results); patient demographics and CPT10 coding from EPM products including insurance	SQL Server/XML
New England Healthcare Exchange Network (NEHEN)	All HIPAA/administrative simplification transactions and code sets, clinical summaries, eRx, public health reporting, quality measurement and reporting	ANSI X12, HL7/CCD, NCPDP SCRIPT
Northeast Health System	All HIPAA/administrative simplification transactions and code sets. Hospital outbound results including discharge summaries, lab, micro, pathology reports, history & physical, public health reporting, quality measurement and reporting	ANSI X12, HL7 , ICD-9-CM, CPT, LOINC, XML,NPI#
Northern Berkshire eHealth Collaborative	Shared (merged) CCD among 14 practices, Lab Results, Radiology Results, soon to be hospital encounters, Hospital data such as discharge summaries, EKG's, PACS Image access, etc. sent to practices also but passes through the HIE, not resident in the HIE for access there	ASTM E2369 -05e1 XML CCD, ICD-9-CM, CPT, Multum

HIE Entity	Data Sharing Capabilities	Standards Used
Partners Healthcare System	ED visit notifications, IP Daily census and daily discharges, discharge orders, discharge summaries, patient appointment information, insurance, information, patient clinical information, lab results, images and imaging reports	Site to site TLS encrypted email, fax. HL7, CCD, XMS
SAFE Health	Textual Notes, including: Medication List Allergies Problem List Immunization History Code Status Advance Directive Status PCP and phone number Vital Signs Recent Lab/Rad Results	LOINC SNOMED-CT NPI# HL7 2.x
Signature Healthcare	Laboratory and Pathology results; Radiology Reports; Departmental Reports; Patient Demographics	HL7
Sisters of Providence Health System	N/A	N/A
SouthCoast Health System	Live: patient registry data, laboratory data, ePrescribing, voice recognized/transcribed reports (live later this month: radiology reports)	HL7
UMass Memorial Healthcare System	N/A	N/A
Vanguard Health Systems (Metrowest-Natick & Framingham and St. Vincent Hospital)	Lab, micro, path, bbk Results, Rad results, PACS images, dictated reports/textual notes, allergies, med list, adv directives	HL7, CCD
Wellport (Newburyport)	Lab, micro, path, bbk results, Rad Results	HL7

1.4. Public Initiatives

The SMHP envisions the following state HIE services, which will be launched as part of or along with the statewide HIE infrastructure.

#	Reconciled HIE Project List	Project Description
1	Direct exchange gateway	Implementation of gateway implementing Direct specification for universal messaging interoperability
2	Provider directory	Directory of providers and facilities to ensure unambiguous and reliable addressing of electronic transactions
3	Public Key Infrastructure (PKI)/certificate management	Infrastructure to ensure security of statewide HIE infrastructure
4	Public health interfaces	HL7 interfaces to variety of public health services, including ELR, MIIS, SSS, CBHI, CLPPP, PMP, OTP
5	Enterprise Master Patient Index (EMPI) / Record Locator Service (RLS)	Statewide patient-matching function to match medical records across organizations
6	Quality data infrastructure	Infrastructure to facilitate aggregation of quality and performance measurement data for reporting to Medicaid and other purposes
7	Clinical data repository	Integration of clinical data with All Payer Claims Database (APCD)
8	Statewide HIE solution integration services	System integration and project management for HIE infrastructure Implementation
9	Open access Health Information Service Provider (HISP)	Service organization to provide network connection to statewide HIE services for providers unable to connect through their own organizations
10	Consent services	Centralized management of patient consent status information
11	Vocabulary services	Translation service to transform non-standard medical vocabulary to national standards-based nomenclatures
12	Routing service for patients	Messaging services to allow providers to send messages and records securely to patient-controlled applications
13	Re-architect/enabling payment methods	Flexible IT claim processing systems to address new forms of payment and organization (accountable care, patient-centered medical home, etc.)
14	VG upgrade	Upgrade of Virtual Gateway for standards-based HL7 transactions
15	Claims relay service	Single gateway for the submission of claims for MassHealth (regardless of medical, pharmacy, Dental or Health Safety Net Claims)
16	HIE end-user integration	Program to remove/lower barriers to HIE adoption

1.5. Adoption and use of E-Prescribing at State Level[7]

The following report summarizes statistics associated with the adoption and use of e-prescribing at the state level for years 2008 – 2010. The statistics contained in this report have been compiled by Surescripts®, a national Prescription Network. Surescripts connects prescribers to payers, chain pharmacies and independent pharmacies.

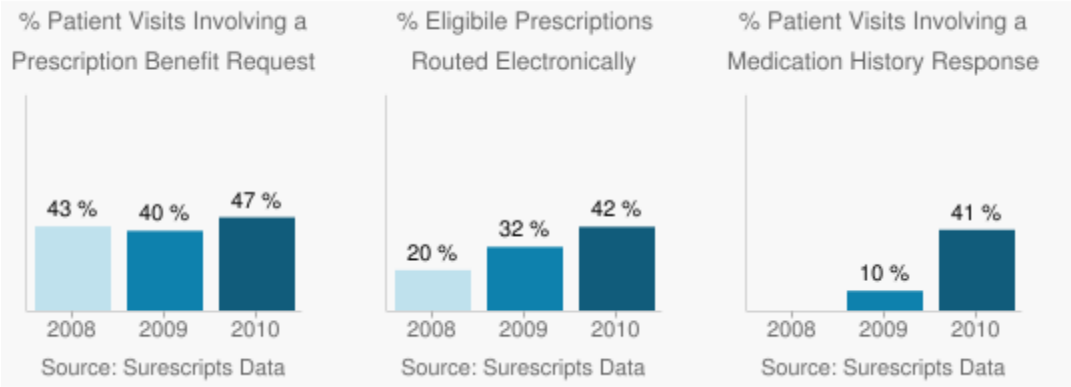
1.5.1. E-Prescribing Utilization

	2008	2009	2010
Prescription Benefit Requests	9,370,238	12,088,906	25,938,673
Rate of Response to Benefit Requests at Year-End	62.32%	80.72%	78.6%
Total Prescriptions Routed Electronically[1]	6,747,060	11,114,608	14,609,605
% of Total Prescriptions Represented by Renewal Response	8.56%	10.22%	11.5%
Total Estimated Responses to Medication History Requests[2]		**2,992,319**	**12,258,771**

1. Eligible prescriptions do not include controlled substances, which were not eligible for e-prescribing under 2009 DEA regulations, or preauthorized refills on existing prescriptions, because they do not require communication between a physician and a pharmacist. Total benefit transactions reflect adjustment of 15% to reflect potential duplicate coverages.

2. Prescription/medication history data for 2009 are based on available data for Q4 2009 only. No seasonality is assumed. Method will adjust in future years as full-year data becomes available.

1.5.2. Massachusetts Utilization Percentages



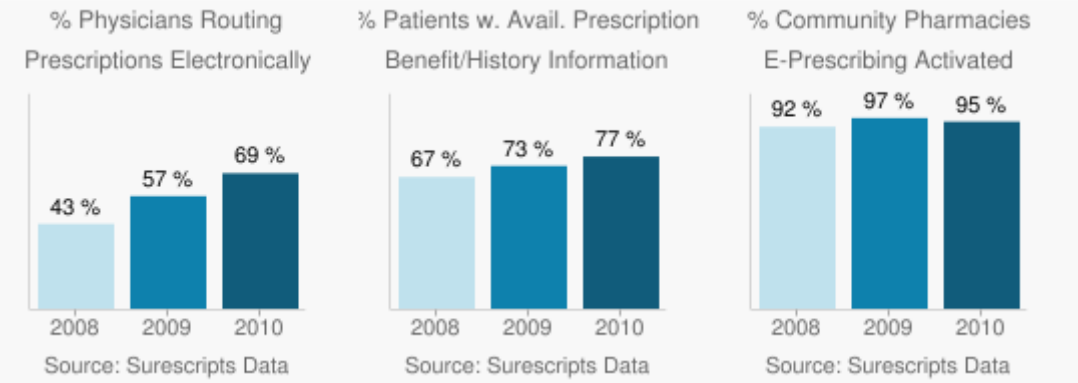
1.5.3. Adoption Metrics

	2008	2009	2010
Physicians Routing Prescriptions at Year End	6,403	8,500	11,005
Community Pharmacies Activated for E-Prescribing at Year-End[3]	1,009	1,063	1,038

4. Pharmacy calculations use NCPDP-supplied data showing total numbers of community pharmacies in each state.

[7] SureScripts, Progress Report http://www.surescripts.com/about-e-prescribing/progress-reports/state.aspx?state=ma&x=42&y=17, 2010.

1.5.4. Massachusetts Adoption Percentages



5. Total number of physicians per state sourced from Physician Characteristics and Distribution in the US. 2010 ed. (Chicago: American Medical Association). In addition to physicians, nurse practitioners and physician assistants may also e-prescribe in your state.

1.6. Current State of ONC Program Information Notice Priority Areas in Massachusetts[8]

The following is the current status as of 2011 for Massachusetts of the percent of electronic data exchange for eligibility and claims, ePrescribing, lab results and clinical summaries.

PIN Focus	Status in Massachusetts
% of health plans supporting electronic eligibility and claims transactions	Virtually 100% adoption of administrative transactions among payers and larger provider organizations
% of pharmacies accepting electronic prescribing and refill requests	Massachusetts has had the highest percentage of e-Rx and connected pharmacies in the country for 3 consecutive years – 88%, 92% and 97%
% of clinical laboratories sending results electronically	Preliminary analysis indicates about half the labs (48%) are able to send results electronically [9]
% of health departments electronically receiving immunization, syndromic surveillance and notifiable lab results	Repositories exist for reportable lab, syndromic surveillance and immunization. Syndromic surveillance systems are not used by local boards of health. MDPH contracts with Boston's Children's Hospital who maintains the syndromic surveillance application and data. MDPH Staff receive/interpret the data and then disseminates to local health departments as needed. Immunizations have been recently released into production and few early adopter health departments are now receiving immunization data. 65 out of 71 clinical labs are sending ELR data to MDPH. 2/3 of local boards of health receive electronic notifications of notifiable disease and lab results.

[8] A PIN is additional guidance supplied by the ONC for programs and/or grants. This PIN specifies the Requirements and Recommendations for the State Health Information Exchange Cooperative Agreement Program (ONC-HIE-PIN-001).
[9] This number is based on a scan of independent labs conducted by TUFTS Health Plan.

PIN Focus	Status in Massachusetts
% of Clinical Summary Exchange	There is a fairly high rate of clinical exchange already (58%) among surveyed providers as summarized below. Adoption is proceeding rapidly. MeHI will conduct further analysis to gain a more granular understanding beyond the current data set. **Survey of major provider organizations** Total Providers in Survey 23 Total Provider Respondents 19 Currently Exchanging CCD 11 (58%) Currently or Soon to Implement CCD 8 (42%) % Intending to Implement CCD 100%

1.7. Economy and Workforce

1.7.1. Effects on the Economy

The health care industry is already the largest employer in Massachusetts, with 458,965 jobs in 2005 (14.5% of total state employment). The industry generates $29 billion in revenue through 19,158 establishments: teaching hospitals, regional hospitals, community clinics, ambulatory services, doctor and dentist offices, home health care, outpatient services and laboratories. It is estimated that through 2016, 64,630 new healthcare jobs will be created in the Commonwealth. Each of these jobs, from office receptionist, to home respiratory therapist, to neurosurgeon, to billing specialist will require some degree of expertise in the use of Health IT.

The Commonwealth of Massachusetts has a large and established biotechnology industry. At 18% of the state's GDP and approximately $65 billion in revenue, technology is the state's second largest industry. Roughly 10,300 firms directly employ 178,323 workers and support another 290,122 jobs in the state. Massachusetts also has the greatest number of institutions of higher learning per capita in the US, including several academic medical centers, creating demand for researchers and research assistants fluent in Health IT.

Investment in curricula and programs to educate and train both existing and new workers in the fields of healthcare, biotechnical development, research and public health will achieve the dual purpose of meeting workforce demand, while providing job opportunities for those who are currently unemployed, under employed, dislocated or displaced. Development of a local workforce to support Health IT related initiatives is a key strategy in meeting the overall goals and objectives of widespread adoption of health information technology.

1.7.2. Current Workforce State

Organizations throughout the healthcare industry are facing obstacles that must be addressed, if they are to meet the challenge of achieving meaningful use of EHRs by 2015. Employers lack change management capabilities. They also face a high turnover rate in key staff areas, with top talent being heavily recruited by other organizations, lowering their return on investment in workforce development. Educational institutions do not have faculty trained in this growing field, and are having problems recruiting students into the health IT field of study. Furthermore, both employers and educational institutions lack the funding to adequately train or hire qualified talent to meet workforce demands and are finding that a common language around EHR and health IT does not exist.

Today, the talent that is most in demand and hard to find in the health IT industry are individuals with healthcare awareness, clinical experience, communication skills and knowledge of information

technologies. Although there is currently a large availability of workforce talent in the marketplace, this talent does not possess the training/knowledge to meet the needs of healthcare employment organizations: workers with a combination of skills in both information technology (IT) and healthcare. Specific areas of need include system implementation and integration support, project management, data specialists, systems training, education and outreach. The areas of greatest immediate need are implementation, project management, practice consultant and data management.

To grow their health IT teams to meet Chapter 305 and HITECH requirements, health IT employers are looking both internally and externally to fill positions. Additionally, if they are to fill these positions, they may need to focus on individuals with proficiency in either IT or healthcare: the IT professional outside the healthcare industry looking for a career change or a healthcare professional outside IT looking for a career change. In both cases, employees will need to supplement their lack of experience with education and training.

2. Massachusetts Health Information Exchange (HIE) Development and Adoption

The Massachusetts Statewide Health Information Exchange (HIE) will offer a mechanism for patients, consumers, providers, public health officials and researchers to access data and actionable information, to allow them to demonstrate measurable improvements in health care quality, safety, efficiency and population health. With reliable data delivered in real-time, caregivers will have an accurate view of the patient. The future of HIE for Massachusetts includes services, such as advanced patient-centric and population health-focused services that meet the broader needs of Massachusetts' citizens. The Commonwealth will be able to better identify reportable information and support quality reporting that identifies emerging health care trends. Based on available resources, previous investments and health care stakeholder interest, Massachusetts is well positioned to make this vision a reality.

The Commonwealth has found that electronic reporting and monitoring of information required for public health or quality reporting can significantly improve the accuracy of that information, while decreasing the resources required to support current manual processes. While the use of electronic reporting is very limited today, it is key in supporting a future health care system capable of simultaneously improving the quality of care provided to all Commonwealth residents and reducing the costs of that care. Various health provider and payer groups in the Commonwealth have already invested a significant amount of time, effort and capital creating several community and provider-based HIEs in Massachusetts. Knowledge gained from those implementations will be used in the development of the Statewide HIE.

Today, the patient's care and referrals are supported by manual processes. Generating a longitudinal view of a patient's care across locations is very time-consuming and costly, and often patients have to coordinate their own care, making sure their health information is routed to the right care giver in a timely manner. Diagnostic tests are often repeated because each provider needs the test results in a timelier manner than currently exists or does not have access to the patient's previous test results. Beyond the individual patient's struggles, providers and the Commonwealth struggle to develop quality reports that identify larger health care trends. With a Statewide HIE that enables and facilitates the exchange of clinical and administrative data, a patient's care will be better coordinated, and providers and insurance company will be able to make better, more informed and faster decisions about care. Furthermore, the Commonwealth will be better equipped to identify emerging health care trends.

2.1. Mission

The Commonwealth of Massachusetts 2010 HIE Strategic and Operational Plan was approved by ONC in the fall of 2010. A collaborative planning process was utilized that involved the complete integration and cooperation of the HIE, the REC, and MassHealth. A similar collaborative process was initiated to prepare this Annual Update to the HIE Strategic and Operational Plan for 2012. As such, the vision, goals and objectives represent substantial agreement among the parties on the re-focus, shift and division of roles and responsibilities as between Mass Technology Collaborative (Last Mile and Challenge Grants) and MassHealth (all HIE implementation deployment, services and procurements)as well as priorities for the next five years. These were developed within the context of the Commonwealth of Massachusetts 2010 Health IT Strategic Plan and the State Medicaid Health Plan (SMHP).

The following section provides a high-level articulation of the vision by year for the HIE and overall Health IT in the Commonwealth as described in the statewide Health IT Strategic Plan.

2.2. Roles and Responsibility

Successful widespread adoption of interoperable HIEs and use of a statewide mechanism for health information exchange requires engagement by and input from a multitude of stakeholders. Massachusetts is fortunate to have many interested parties who contribute to recommendations and decisions about the priorities, timelines, and funding associated with the development of a successful program. . As discussed in various other places within this Strategic and Operational Plan, Mass Technology Collaborative and MassHealth, with input and recommendations from ONC and CMS, have determined that the most effective strategy for achieving the timely and fully operational HIE is to re-focus, shift and clearly divide roles and responsibilities in ways that are materially different from those described in the initial Strategic and Operational Plan, submitted on August 30, 2010. Specifically, Mass Technology Collaborative will no longer have any responsibility for HIE implementation, deployment, services or procurements under the ONC Grant, but will instead utilize ONC funding to develop and implement a Last Mile strategy to increase and improve provider connectivity to the operational HIE. Conversely, MassHealth will assume all other responsibilities for HIE implementation, deployment, services and procurements under the terms of its Grant with CMS. ONC will need to provide an amended Notice of Grant Award (or some other form of contract amendment) to reflect this change in Mass Technology Collaborative's role, as well as the schedule for completion of the tasks.

The following table summarizes the roles and responsibilities of the various governing entities:

Entity	Roles and Responsibilities
Massachusetts Technology Collaborative	With a mission to foster economic development through technology and the named recipient of all Health IT related federal and state funds, the Corporation has fiduciary responsibility for MeHI and the E-Health Institute Fund, the latter of which hold funds allocated through the state and federal Health IT programs. Per Chapter 305, Mass Technology Collaborative: ▪ Appoints the Director of the eHealth Institute as an employee of the Corporation ▪ Approves MeHI budgets and plans following action by the Health IT Council ▪ Is the contracting entity for Health IT related procurements ▪ Provides shared corporate services to MeHI (office space, IT support, legal, finance, human resources, etc.)
Massachusetts eHealth Institute (MeHI)	Established within Mass Technology Collaborative per Chapter 305, the Institute's primary role is to facilitate the development of the Health IT infrastructure. This is to be accomplished by focusing on "core" activities (as clearly defined in legislation or contractual agreements) within the Institute and contracting out other activities. Responsibilities vary, depending on program and funding source: **Chapter 40J, Massachusetts General Laws** ▪ Preparation of Health IT Plan and updates ▪ Preparation of budgets for implementing the Health IT Plan ▪ Issuance of RFPs for Implementation Organizations (IOs) ▪ Development (in consultation with the Council) mechanisms for funding Health IT (widespread EHRs and HIE), including a grant program to assist providers with the cost of Health IT technologies**,** using funds available in the eHealth Fund (this assumed that MeHI would receive $ 25M per year from 2008-2015). ▪ Oversight for reporting from grant (see above) recipients ▪ Maximization of available Federal Financial Participation (FFP) funding in collaboration with MassHealth **Federal and State Funded Grants and Agreements** ▪ **Regional Extension Center:** Provide Core Functions as described in

Entity	Roles and Responsibilities
	agreement with Office of National Coordinator (ONC) and contracted for Direct Services. ▪ **State Health Information Exchange Cooperative Agreement Program:** Provide Core functions per agreement with ONC. Contracted for technologies and other services. As stated above and elsewhere, if this revised Strategic and Operational Plan is approved, Mass Technology Collaborative will no longer have contractual responsibility under the ONC Cooperative Agreement for any HIE implementation, deployment, services or procurements, as all of those activities will be assumed by MassHealth under the CMS SMHP IAPD process. Mass Technology Collaborative's activities under the ONC grant will be to develop and implement a Last Mile strategy to increase and improve connectivity to an operational HIE. Mass Technology Collaborative shall also oversee the implementation of the Challenge grants. ▪ **Medicaid Health IT Plan:** Provide core services per MassHealth and contract for technologies and other services. **Medicaid Incentive Program** ▪ Provide outreach and training to eligible providers. ▪ Determine Eligibility and Verification for Medicaid Incentive Program payments for 10 years. **Other** ▪ Interface with and be accountable to government agencies as necessary ▪ Assure coordination of other ARRA programs in Massachusetts; i.e., broadband access, and workforce development ▪ Facilitate high-level coordination across public and private sector stakeholders
Health IT Council	Created by Chapter 305 to consult, advise and oversee the Institute's activities with respect to dissemination of Health IT across the Commonwealth and state-administered Health IT and HIE activities. Council is Chaired by Secretary, Executive Office of Health and Human Services. ▪ Council responsibilities per Chapter 305 include engagement in development and approval of: ▪ Budgets ▪ Contracts ▪ Grants to providers in the Commonwealth (as per Chapter 305) assuming adequate funding ▪ The annual Health IT plans ▪ Health IT Council members will also be actively engaged in the five workgroups described under HIE-HIT Advisory Group.
HIE-HIT Advisory Committee	The HIE / HIT Advisory Committee is charged with the following: ▪ Considering and making recommendations for HIE / HIT policies ▪ Developing the overall Health IT Roadmap ▪ Setting priorities for Health IT activities ▪ Developing Health IT related metrics and monitoring activities ▪ Making recommendations for procurements and budgets ▪ Identifying requirements for RFPs ▪ Participating on workgroups and proposal review panels
Subject Matter Expert	Partnering organizations contracted by MeHI/Mass Technology Collaborative after an RFP process to provide subject matter expertise and support services to the HIT-HIE Advisory Committee as it develops and makes its recommendations to the Council and the MeHI. Key responsibilities include:

Entity	Roles and Responsibilities
	Support to the HIT-HIE Advisory Committee ▪ Manage logistics of each meeting ▪ Research and provide additional information, as required, regarding activities in other part of the country ▪ Support and provide information for the development of Committee recommendations **Support to the Workgroups** ▪ With Committee and Council members, develop charge statements for each of the five Workgroups outlined above and identify participants. ▪ Logistics for each Workgroup meeting with date-certain deliverables and regular updates to the full Committee ▪ Collate input of each workgroup and work with Committee to develop a recommended roadmap of milestones and deliverables that will be necessary to achieve the overall goal. ▪ Assist in the development and review of HIE technical standards (e.g., Implementation guides) as requested. **Support to MeHI** ▪ Provide technical and industry information as requested ▪ Write specifications for procurements per Health IT infrastructure roadmap and Advisory Committee recommendations after approval by Council ▪ Provide input for any tools and surveys to various stakeholders, as required ▪ Prepare Committee related presentations for the Council and review with the Secretary, EOHHS and the MeHI ▪ Provide support for the update of the Health IT Strategic Plan and HIE Strategic and Operational Plans for the Commonwealth

2.3. Health IT Strategic Plan Vision, Goals and Objectives

The Commonwealth of Massachusetts Health IT Strategic Plan established a vision for the future. The vision is described as follows:

“As a result of healthcare reform and statewide deployment and adoption of Health Information Technology (Health IT), the Commonwealth of Massachusetts will benefit from, and be recognized for, a significantly healthier population, with measurable improvements demonstrated in health care costs, quality, safety and efficiency. Every resident in the state will have access to the highest quality care and to providers, who are supported in their efforts to deliver safe, equitable, affordable, coordinated care. Widespread implementation and adoption of Health IT will give health care providers access to electronic medical records that are interoperable and to health information exchanges that allow them to share key information about their patients in a secure manner. This will also reduce medical errors and provide a platform for enhanced coordination of care.

“Armed with information from multiple sources, patients will be in better control of their own health and health related services, through access to their protected health information through a secure web-based interface. With permission from the patient, providers will be able to access real-time health information from all providers involved in their care. Health IT will support an integrated system and promote improvements in health care quality and safety. To manage and maintain this system, a Health IT workforce that is skilled and knowledgeable in advancing all aspects of Health IT adoption and sophistication will be available to providers and employers.

"Achieving this vision will require a shift in the way all participants in the health care system interact with each other. A Health IT-enabled system will support virtual interaction among care provider and patient, wherever a patient might be, with information coming from disparate sources, such as home monitoring devices, registries, other clinicians and providers, and research trials. Health IT supported administrative transactions will decrease administrative burdens for the providers, patients and payers. Finally, information will be easily, securely and reliably available to better understand public health needs and trends, to support public health interventions and programs, and be available to support research and emergency response efforts.

"It is understood that payment reforms, greater accountability for the costs and quality of healthcare, privacy protection and more efficient technologies will also be necessary to achieve this vision. The intent of this strategic plan is to lay the Health IT foundation for these changes to occur."

The Commonwealth of Massachusetts Health IT Strategic Plan also identified four high-level goals and 18 supporting objectives[10]. During the SMHP visioning work with the MassHealth Executive Team, it was determined that these four statewide goals should be adopted and the 18 supporting objectives be enhanced to provide additional focus on the priorities set forth by EOHHS and MassHealth. The MassHealth Executive Team provided direction to ensure that the goals and objectives for the SMHP be consistent and aligned with those previously developed in the statewide plan. The four goals as set forth in The Commonwealth of Massachusetts Health IT Strategic Plan include the following:

Goal 1: Improve access to comprehensive, coordinated, person-focused health care through widespread provider adoption and meaningful use of certified EHRs.

Goal 2: Demonstrably improve the quality and safety of health care across all providers, through Health IT that enables better coordinated care, provides useful evidence-based decision support applications, and can report data elements to support quality measurement.

Goal 3: Slow the growth of health care spending through efficiencies realized through the use of Health IT.

Goal 4: Improve the health of the Commonwealth's population through public health programs, research and quality improvement efforts, enabled through efficient, accurate, reliable and secure health information exchange processes.

2.4. HIE Strategic and Operational Plan Vision

Providers are able to easily and quickly exchange health information of patients for improved continuity and quality of patient care.

Health care organizations are able to electronically submit all public health and quality measures in an efficient manner and be able to quickly see statewide trends and improvement efforts.

Patients and consumers trust that their health information is secure and private and are confident their authorization will determine who will see their information, for what purposes and when.

[10] IBID, pages 6-8

2.5. Goals and Objectives

Shared between the SMHP and the SOP, MassHealth and Mass Technology Collaborative will work together on an integrated infrastructure and adoption program to effectively and efficiently achieve the following goals and objective.

Goal 1: Improve access to comprehensive, coordinated, person-focused health care through widespread provider adoption and meaningful use of certified EHRs.

Objectives:

1.1 Equitably increase the number of providers who can demonstrate meaningful use of interoperable EHRs across all service areas, including rural, suburban and urban areas where health disparities have been identified.

1.2 Assure private and secure electronic access, use and portability of protected health information by all authorized individuals.

1.3 Increase the number of patients whose care is coordinated across disparate delivery systems within the state and across state boundaries.

Goal 2: Demonstrably improve the quality and safety of health care across all providers, through Health IT that enables better coordinated care, provides useful evidence-based decision support applications, and can report data elements to support quality measurement.

Objectives:

2.1 Equitably increase the number of ambulatory primary care providers that have re-engineered their care processes, to better manage chronic conditions, through adoption of patient centered medical home processes and Health IT that supports evidence-based care.

2.2 Adopt and promulgate a common set of Health IT enabled quality and safety measures across all payers and providers.

2.3 Commit to the principles that hospitals and health care providers would report quality and safety measures one way, one time and to one place, to ensure they are collected consistently and with minimum administrative burden.

2.4 Behavioral Health, Substance Abuse and Long-Term Care Providers participate in the HIE to improve overall quality of care.

2.5 Transitions of care will be improved across the population.

2.6 Adopt meaningful use measures, as defined by the federal government, for reporting purposes across all agencies.

Goal 3: Slow the growth of health care spending through efficiencies realized through the use of Health IT.

Objectives:

3.1 All payers in the Commonwealth will adopt a single set of Federal standards for eligibility and claims payment processes, which will be incorporated into certified EHRs.

3.2 Patients report more timely, effective and appropriate care, delivered both virtually and face to face.

3.3 Engage patients to actively participate in managing their health information, their health and their care, and encourage providers to engage with and respond to their patients, using IT.

Goal 4: Improve the health of the Commonwealth's population through public health programs, research and quality improvement efforts, enabled through efficient, accurate, reliable and secure health information exchange processes.
Objectives: 4.1 Efficiently track and demonstrate improvement in the Commonwealth's key public health measures. 4.2 Develop and improve EOHHS and public infrastructure and capabilities to allow for robust participation in the Statewide HIE. 4.3 Support health reform in the Commonwealth, by providing ready access to data and information that is necessary for identification and implementation of key reform policies and strategies, being meticulous about protecting patient information and carefully following the minimum necessary use of information standards.

2.6. Health Information Exchange Guiding Principles

The Health IT Council has developed the following seven guiding principles to focus the development of an operating plan for the statewide HIE:

- **Patient-centric:** The Statewide HIE will enable better longitudinal, cross-organizational care for every individual in Massachusetts and provide access to and use of health information for those individuals.
- **Adoptability:** The Statewide HIE will conform to all applicable state and federal laws, standards, policies and regulations.
- **Adaptability:** The Statewide HIE will be able to be modified and expanded to integrate new components, services, interfaces and features, as needed to accommodate more users, systems or networks.
- **Maintainability:** The standards and requirements for participating in the Statewide HIE will be as simple as possible to allow greater participation throughout the community.
- **Systems Integration:** Statewide HIE adapters and connection mechanisms will be defined and developed for all HIE participants.
- **Extensibility and Scalability:** Statewide HIE functionality will be added or updated with minimum impact to existing functions and ensure that the infrastructure is scalable.
- **Data Aggregation:** Information will be collected, transmitted and aggregated in standard, secure formats.

2.7. Strategies

1. A unified approach to implementing the statewide HIE

   Massachusetts supports a unified approach to the statewide HIE focusing on creating infrastructure (MassHealth) and removing barriers to adoption (Mass Technology Collaborative, the Last Mile). The Commonwealth will be optimizing the use of multiple funding streams. The ONC funds will support Mass Technology Collaborative's 'Last Mile" activities. The CMS funds will support MassHealth's HIE implementation, deployment, services and procurements activities. In addition, state and private funds may be used with the preceding sources, to forge existing infrastructure into a single integrated approach.

6. Ensure state's Statewide HIE services align with Federal HIE efforts.

   While aligning with Federal HIE efforts (priority services), the Commonwealth (public and private sectors) will initially focus on services, such as administrative simplification, e-prescribing, electronic laboratory ordering, electronic public health reporting, quality reporting, prescription fill status, personal health record development and coordination of care/clinical summary exchange. The Health IT Council will review recommendations from the HIE-HIT Advisory Committee and its Workgroups in considering what additional services, if any, may be provided by the Statewide HIE.

7. Build a statewide hybrid data model.

   EOHHS-MassHealth will build a state-wide system, based on a "federated" model and will only store data in centralized repositories, when absolutely necessary, to support specific uses, such as public health, quality reporting and overall population management. Leveraging and building upon the existing HIEs currently operating in Massachusetts, will allow the system to be structured by MassHealth as a network of networks.

8. Obtain advice and recommendations from public and private stakeholders as the Commonwealth develops the Statewide HIE infrastructure and business model.

   The Health IT Council will seek input on the sustainability of the Statewide HIE through consultation with the HIE HIT Advisory Committee and the Finance and Sustainability workgroup. The Finance and Sustainability workgroup will provide advice and recommendations concerning the development of the Statewide HIE Operational Plan, including a business model for sustaining the Statewide HIE. The Health IT Council will also receive recommendations and advice from each of the other four workgroups.

   There are multiple, sustainable HIEs already functioning in Massachusetts. The expectation going forward is that enough value will be derived by all HIE stakeholders to ensure an on-going sustainable Statewide HIE in the Commonwealth, with an appropriate combination of public and private resources to support it even after ONC (Last Mile) and CMS (implementation) funds have been expended. A key new component of the sustainability model will be the inclusion of MassHealth's re-focus and assumption of all implementation, deployment services and procurements (Medicaid) and their ability to access federal matching funds, where available, to support the technical infrastructure.

   Building a Statewide HIE, which will link the information that is currently captured in paper charts and unconnected EHRs, will help put the patient at the center of the health care delivery system. As the Commonwealth's health care reform initiatives move forward, a flexible HIE architecture will support models that require sharing of data across networks.

2.8. Nationwide Health Information Network - Direct

Built upon a confederation of trusted entities that are bound by mission and governance, the Nationwide Health Information Network (NwHIN) provides a set of internet-based policies, standards, specifications and services that define the technical framework around which the secure and meaningful exchange/transport of health information can occur. It is comprised of a group of networked entities that facilitate information exchange with a broad set of users, systems and communities.

To oversee and support the range of activities surrounding information exchange, governance is structured to enable valid, trusted entities to participate. These entities are required to sign a trust agreement that allocates responsibility and accountability. While the federal government has played an integral role in determining the common elements of this trust agreement, the aim is to minimize the government's role, as these common elements expand over time to accommodate the evolving spectrum of information.

To maintain privacy and security as a first priority, information exchange will need to be broadened over time. The work currently being done for state and enterprise level information exchange should set the foundation for a more robust information exchange in 2013 and 2015. In other words, while existing and new exchanges will be fostered, support for increased interoperability will be expanded.

The future vision for NwHIN-Direct has been officially endorsed by the Health IT Policy Committee, and ONC is catalyzing this vision by focusing the use of Direct as the "On ramp" for providers and consumers to enable information exchanges and meaningful use.

3. Health IT Adoption – the Last Mile

Telecommunication companies, including Internet Service Providers, divide their infrastructure into two major components: the central office, which provides the core functionality and the "Last Mile" house wiring, which connects consumer devices, such as phones, televisions, and computers to the central office. Healthcare Information Services Providers (HISPs) will function much the same way, which may include significant investments in centralized applications and infrastructure, with a process to connect clinician offices, hospitals, payers, registries, community health centers, and public health organizations to the HISP. Patients may also be able to subscribe to HISP services, in later phases.

The connection of stakeholders to the HISP will not require physical wiring, since existing internet connections will be used. However, it will require that electronic health records and other healthcare applications be able to process and integrate into the workflow the clinical information that will be transported via the HISP. For those stakeholders without electronic health records, such as many long term care providers, a web portal will support sending and receiving clinical messages.

While Mass Technology Collaborative anticipates that emerging technical and certification standards will, over the coming years, increase the penetration of EHRs that are able to integrate with the statewide HISP “out-of-the-box”, no EHR systems have such capability in production today, to our knowledge. Therefore, to achieve the rapid adoption necessary to meet ONC’s requirements, as well as the growing market demands of accountable care, a proactive, coordinated approach to end-user integration with the statewide HISP will be absolutely necessary.

As previously indicated, if ONC approves this revised Strategic and Operational Plan, Mass Technology Collaborative will no longer have any responsibilities under the ONC Cooperative Agreement for any HIE implementation, deployment, infrastructure services or procurements, as those responsibilities will all shift to MassHealth under the terms of its CMS Grant. If authorized through an amended NGA, Mass Technology Collaborative will re-focus its efforts on the Last Mile services (and will retain management of the HIE Challenge Grants). The combination of MassHealth’s implementation activities on the one hand and Mass Technology Collaborative’s Last Mile activities on the other, will work to ensure the statewide HIE and Last Mile services provide value to the Commonwealth in the form of lower costs and improved quality of care for its residents.

There are roughly 20,000 licensed practicing physicians in Massachusetts, and of those, approximately 10,000 (50%) are currently or will be active users of electronic health record (EHR) systems and the health information exchange (HIE). Some hospital and ambulatory applications are already connected to local or regional HIEs, such as the New England Healthcare Exchange Network (NEHEN), SafeHealth, the North Berkshire eHealth Collaborative HIE, the Community Hospital and Physicians Practice System’s (CHAPS) HIE and the UMass HIE. However, many small providers have limited HIE connectivity through a web portal, which is not integrated into their EHR workflows or no access at all.

While significant investments will be made in centralized applications and infrastructure, there must be a process to connect clinician offices, hospitals, payers, registries, community health centers and public health entities to a healthcare information services provider (HISP). Electronic health record systems and other healthcare applications will need to integrate into their systems the capability to accept and receive data via the HISP, and for those stakeholders without electronic health records, such as many long term care providers, a web portal is needed to support the sending and receiving of clinical messages. Therefore, a "Last Mile" connection of these systems and applications is required.

Phase 1 of the HIE will be the integration of the DIRECT messaging capability into the automated workflows of EHR products. This will ensure rapid adoption of the HIE services. The initial focus will be on those hospitals and ambulatory EHRs that have been identified in the environmental scan with the greatest market share in the state. Vendors with a smaller market share will be supported if sufficient funding is available. The plan is to ensure that providers have the ability to use the DIRECT messaging infrastructure to support the exchange of the standard CCD among other capabilities. This bi-directional exchange will be enabled by the EHR vendors who will integrate the DIRECT messaging capability into their products and will ensure that the changes in clinical workflows are limited to the extent possible.

PIN Support

As the Commonwealth must also support the PIN priority entities as part of the Last Mile strategy, our plan is to include in the readiness assessment an update to the lab, pharmacy and clinical summary document (CCD) data that was included in the first submission (2010) of the Massachusetts HIE Strategic and Operational Plan.

- eRx – The transaction volume data from Surescripts and NEHEN indicates that 97 to 98 percent of Massachusetts pharmacies are connected. However, Meaningful Use Stage 2 will require an even higher provider eRx adoption rate. The remaining 2 percent of the pharmacies that are not yet connected will be identified and MeHI/Mass Technology Collaborative will work with them in a similar manner as they worked with providers on EHR adoption.
- Labs – The current transaction volume for labs will be provided by Quest, Lab Corps and hospitals. Quest and Lab Corps currently route the lab results electronically; however, community hospitals serving as reference labs will need to purchase products to connect to their HIS/LIS applications to community-based EHRs.

  The Massachusetts Department of Public Health (DPH) is authorized to collect and respond to reports of infectious disease in Massachusetts residents. Accordingly, DPH operates a secure, electronic laboratory reporting infrastructure to support the receipt of results received electronically from hospital laboratories. Electronic Lab Results (ELR) arrive at MDPH via a secure web-based portal, are quality assured, and transmitted to an integrated, web-based disease surveillance and case management system known as the Massachusetts Virtual Epidemiologic Network (MAVEN). Clinical laboratories may transmit data on all notifiable conditions. Participants use a web-based user interface to create a mapping between selected Logical Observation Identifier Names and Codes (LOINC) and the Systematized Nomenclature of Medicine – Clinical terms (SNOMED) codes and their local equivalents. These mappings are used to translate native codes into their LOINC and SNOMED equivalents before data persists into MAVEN. Institutions may transmit messages using the HL7 2.5.1, HL7 2.3.1 or a B.I.D developed message format that is transformed into HL7 2.3.1. In order to meet Meaningful Use requirements, MDPH upgraded this infrastructure to provide the capability of transforming existing HL7 2.3.1 to HL7 2.5.1. This allows hospitals to send data in their existing formats and still meet one of the Meaningful Use requirements for public health reporting.

  There are a total of 72 hospital laboratories in Massachusetts. In July 2008, MDPH passed regulations mandating the use of its ELR infrastructure for reporting notifiable conditions. As of Feb 2012, 65 of the 72 hospital laboratories are fully certified to transmit results using ELR and the remainder is in various stages of the implementation process. Two commercial laboratories are fully certified.

  The ELR infrastructure recently received attestation as Meaningful Use certified which allows these hospitals to immediately meet Stage 1 of the Meaningful Use requirements at no additional cost or effort. The DPH model is one of the first in the country to be both certified and operational for ELR.

- Clinical Summaries – A survey of NEHEN and other sub-networks will provide the current transaction volume data for clinical summaries. As Meaningful Use Stage 2 requires summary exchange, the statewide HIE will offer the backbone and Last Mile service to providers to support this requirement.

Our Last Mile strategy is designed to enable every payer, provider, public health entity, registry and patient, as well as labs and pharmacies to send and receive healthcare data, by ensuring access to the HISP services from their existing applications or web portal. These applications will generate and consume clinical data from such sources as hospital information systems, electronic health records systems, and personal health records (PHRs), public health repositories and quality measurement registries.

To optimize the transport capabilities of the statewide HIE, all hospital information systems and EHRs must be able to connect to a transport backbone. The end result is an integrated network of networks that enables any payer, provider, patient or consumer to exchange data, influencing the improvement of health and health outcomes for all consumers and patients. While the means of achieving this goal differ by geographic distribution, economic considerations and type of provider, the overall goal is to bring all clinical setting to a point of optimal use of the technology. Mass Technology Collaborative refers to this integration of end-user applications with consumers and providers as *Health IT Adoption – the Last Mile*.

3.1. Components

The main components of *Health IT Adoption – the Last Mile* are connection, education and optimization. Connection will address the technical integration of EHRs and sub-state HIEs with the statewide HIE backbone, to facilitate stages 1 through 3 of meaningful use. Education will be directed at providers, patients and consumers to instruct them on the benefits of using health IT for better health outcomes. Optimization will focus on how the providers will best use the technology in an effective manner to maximize efficiency while delivering quality care to the patient. These components are cyclical in nature, in that all three are required at different points in time for health IT adoption and optimization to continue, as it evolves along with the technology. The ultimate goal is to provide a formalized coordination program to work directly with EHR and HIE vendors on statewide-approaches that enables their end-users to connect to the statewide HISP more rapidly and economically than would be the case if each vendor and each end-user was left to achieve such connectivity on their own.

3.1.1. Connection

MassHealth and the Health IT Coordinator will have all responsibilities for overseeing the efforts associated with the technical implementation of HIE deployment across the Commonwealth. Mass Technology Collaborative will no longer have any implementation responsibilities under the ONC Cooperative Agreement. Instead, MeHI will be solely responsible for ensuring that Last Mile activities are implemented as planned. The Health IT Coordinator will provide statewide Health IT guidance and oversight and provide an additional single point of contact to ONC and CMS for statewide Health IT activities and status including the HIE implementation and Last Mile activities. MeHI will work closely with the Health IT Coordinator on all Last Mile planning, procurement and related activities Three phases of the Connection component have been defined: analysis, managed selection of vendors and procurement of service providers, and installation.

Analysis

The first step in creating a coordinated approach is to understand the landscape of end-user systems that will be connecting to the statewide infrastructure. Through the REC and other long-standing initiatives in the state, there is a very good understanding of the vendors that currently account for the vast majority of provider installations in the state. However, non-participating providers must also be inventoried, so a full

market analysis of products being used by providers will provide a more complete inventory of the hospital and ambulatory end-user systems currently in place.

Using this analysis MeHI will develop the scope of the HISP with a priority framework for allocating Last-Mile resources. While our goal is to have every end-user system connected to the network, the approach will be to prioritize our approach, with the first phase being to connect the largest number of providers in the shortest amount of time.

Although Meaningful Use Stage 2 may include a HISP interface as part of the certification criteria, the Stage 2 attestation timeline has been delayed a year. This means that standard products will not be required to contain this interface until late 2013, and upgrading existing systems to this new interface will take even longer. As the current schedule of the Massachusetts plan will place the HISP in production by October 2012, Mass Technology Collaborative intends to accelerate the EHR/HISP interface work ahead of Meaningful Use timelines, since Direct-compatible systems are unlikely to be widely deployed in the market for at least 2 years after launch of the statewide HISP. This means that Mass Technology Collaborative will need to work closely with the various hospital and ambulatory EHR vendors to ensure that their systems are Direct-enabled ahead of the Stage 2 Meaningful Use requirement for HIE services. A specific challenge is the considerable variation in vendor interoperability capabilities and strategies. Part of the assessment process will involve understanding the nature of these variations to create a program tailored to the needs of the market. This assessment and engagement process has been started with an open full-day "Vendor Roundtable" discussion hosted on December 16, 2011, engaging over 20 EHR and HIE vendors currently operating in the Massachusetts market. All interested technology vendors were invited to participate. The following are main findings from these sessions:

There is wide variation in vendor interoperability capabilities

- Few if any vendors have production Direct-enabled systems in place today
- There are no standardized approaches to integration with centralized provider directories or PKI infrastructure
- All participating vendors supported a centrally coordinated approach to interface development and deployment.

Managed Selection of Vendors and Procurement of Service Providers

The major area of focus of the Last Mile adoption program will be the managed selection of EHR vendors and the procurement of systems integration service providers to create and implement standards-based interfaces and system integration services for the use and interoperability of her systems. The selections and procurements for interface development and the other services will be accomplished strategically, as described more fully below, so the maximum number of stakeholders can be connected to the HISP at the lowest cost.

This process will involve a Competitive Grant Solicitation that will result in the selection and contracting with vendors to develop a scalable approach to integration, interfaces, adaptors, and gateways for their current and future installed base in the state. By necessity, the optimal development and deployment strategy may be tailored to each vendor because some vendors may choose to develop an interface/integration and replicate it at each client site; whereas others may choose to build a single statewide gateway to broker all the transactions for underlying clients. It is important to accommodate approaches that are consistent with each vendor's architecture and development roadmap, as this will ensure quicker vendor buy-in, shorter development time, and consistent post-implementation support. In any event, the process will be a competitive one so that the vendors will be incented to provide the highest level of quality in their products and services and the most competitive pricing available.

Specifically, the Competitive Grant Solicitation for EHR vendors (the "Solicitation") will occur upon completion of the environmental market scan, and depending on the results of that scan, the Solicitation may either be (a) closed to the vendors that are identified in the scan, or (b) open to all EHR vendors who respond to the Solicitation. By making the Solicitation competitive, it is intended, among other things, to incent cost savings and provide a grant contracting mechanism to proscribe in great detail the use of proceeds and deliverables of the EHR vendors. Depending on the results of the environmental market scan, the Solicitation may only be open to the EHR vendors with the greatest market share. However, if funding allows, it may also be open to those vendors with a lesser market share. This Competitive Grant Solicitation will encourage EHR vendors to move to the top of their development cycle the integration of DIRECT messaging into their EHRs. Mass Technology Collaborative envisions that a grant contract will be executed with each vendor for a one-time development of this interface or gateway and would include an agreement on basic terms and conditions, such as reasonable end-user pricing, which Mass Technology Collaborative will make all best efforts to achieve, for interface configuration, installation, testing, and support that each vendor would include in their end-user agreements with their customers.

Reasonable and appropriate end-user terms and conditions are a priority focus that will ensure providers, especially those working with the under-served and those who have not been able to benefit from Meaningful Use incentives, will be able to effectively and affordably access statewide HIE services. The contracting strategy, and terms and conditions may be somewhat tailored to each vendor, as contracting approaches may vary widely by vendor, but the intention is to maintain as much uniformity in terms and conditions as possible.

In addition, the process will include creation of a Last Mile Program Management Office (PMO). Mass Technology Collaborative will issue an open and competitive Request for Proposals (RFP) for Systems Integration services to be provided to Mass Technology Collaborative for oversight (along with the PMO) of the EHR vendors. The systems integration contractor(s) will have technical and project management experience working with EHR vendors in large-scale deployments to function as part of the PMO. MeHI will also assess the competencies included in the HIE and REC teams to determine how much additional support will be required to provide ongoing, sustainable support for the maintenance and support of the interfaces and gateways after implementation within their existing support organizations. The Integration Contractor will be a Mass Technology Collaborative contractor and will not have separate authority outside of Mass Technology Collaborative to enter into any contracts. All contracts will be managed through Mass Technology Collaborative.

MeHI and their PMO will work with ONC and EOHHS to ensure the appropriate standards/implementation guides are available to Last Mile developers, establish vendor-specific scope/design/development/implementation projects with each of the target EHR vendors, and provide oversight, vendor management, facilitation and coordination of requisite meetings, progress and risk reports, and other tasks that will be required to keep the interface project(s) on track. Each project will involve technical and project personnel from the EOHHS technical team and the vendor technical team. MeHI's PMO role will be to define each project and actively manage the coordination of the necessary technical and project teams, to ensure delivery according to the agreed upon scope and timelines. MeHI and MassHealth will work in close collaboration to ensure the processes associated with the PMO are consistent with those used by MassHealth. This effort will ensure that the HIE project is efficiently coordinated.

Based on feedback received from a recent vendor roundtable event and on past experience, vendors indicated they will be willing to work closely with Mass Technology Collaborative in this process. For the vendors, a coordinated statewide approach offers greater efficiency through a single program

management office, with a focused development according to well-specified technical requirements. The PMO will also provide efficiency in contracting by incorporating to the greatest extent possible a uniform set of end-user terms and conditions. MeHI's outreach and education efforts for the provider and consumer will also benefit the EHR vendors, by informing their customers about the benefits of connection with the statewide HISP.

Installation

Depending on the terms of Mass Technology Collaborative's grant contract with each vendor and the availability of funds, MeHI may also assist with end-user testing and validation support to ensure that contracted interfaces and gateways are installed in the end-user's EHR, according to agreed upon parameters. This would primarily be accomplished through use of a certified IOO, with oversight from the four to five system integration (SI) consultants. To select the IOOs, Mass Technology Collaborative will issue an open Request for Qualifications (RFQ) for the certification of IOOs to work with providers on HIE Services. The RFQ will be structured on the model used for the REC. By doing so, Mass Technology Collaborative will not make direct support payments to providers, but rather will make payments to the IOOs as an offset of fees charged to providers. Through the contracting mechanism used with the IOOs, Mass Technology Collaborative intends to require that IOOs provide "Most Favored Pricing" or specific discounts on services as a condition of selection and certification under the RFQ.

The IOOs would be overseen by the HIE Project Managers supporting the Last Mile PMO and the Clinical Relationship Managers who have account management responsibilities.

Certain segments of the health care delivery system may not have sufficient expertise and resources to work with their selected vendors on end-user configuration, testing, and go-live. Therefore, supplemental resources will be available to those covered through Medicaid for providers, expanding participation in HIE for the following:

- Pediatricians under the 20% Medicaid threshold
- Behavioral health providers
- Unaffiliated primary care providers (PCPs) in remote areas of state
- Community hospitals and health centers
- Specialists
- Long-term care providers

MeHI will use a multi-pronged approach to assist providers with these vital Last Mile activities: the EHR integration to accept and send DIRECT messages, and support for business services the provider will need to implement the DIRECT messaging into their practice. As previously mentioned, for the DIRECT messaging integration, MeHI will develop a separate Competitive Grant Solicitation to encourage EHR vendors to move to the top of their development cycle the enablement of DIRECT in their systems. MeHI will track the status of both the EHR integrations development schedule and the EHR vendor to provider contracting efforts using a combination of the CRMs who have existing client (provider) relationships and the four to five consultants who will be hired to assist MeHI with the Last Mile PMO.

For the business services support, Mass Technology Collaborative's plan is to provide funding support for the highest priority providers. The prioritization is yet to be finalized. MeHI will build upon the current contractual and operational framework developed for the REC, where a prequalified Implementation and Optimization Organization (IOO), with appropriate technical capabilities, is selected by the provider to assist in the implementation of HIE capabilities into the provider's practice. The IOO would agree to a basic pricing model to supply pre-defined HIE implementation services to the provider.

Specifically, funding will be provided based on the criteria developed in collaboration with the Health IT Council and HIE-HIT Advisory Committee. MeHI envisions that the grant funds will not go directly to providers but will be paid to the IOOs, who will respond to an RFP for a predefined set of services. Once the priorities for funding recipients are established, MeHI will oversee the connectivity funding through the IOOs, leveraging enhanced REC operational capabilities, which include the following:

- Assisting providers with modified practice workflows resulting from the integration of DIRECT messaging with the ambulatory or hospital-based EHRs.
- Assisting providers with ensuring that connectivity to the statewide HIE is enabled.
- Monitoring the status of services delivered to the providers via the IOO.

3.1.2. Education and Outreach

Education, training and outreach are necessary to promote adoption of health IT and to ensure the new capabilities of the HIE are used in a meaningful way. The State will fully engage providers and patients in discovering how the adoption and optimization of health IT will benefit the patient through more effective and efficient healthcare delivery. As part of the Last Mile activities, Mass Technology Collaborative will leverage the same model used for REC outreach and education and will lead the Commonwealth in a statewide campaign of outreach, communication and education, including multi-cultural and multi-lingual efforts for specific populations in the Commonwealth. MeHI will leverage relationships with other organizations either through contractual relationships or partnerships, and address policy issues driving technical/business solution, such as continuity of care and use of personal health records (PHRs), accountable care organizations (ACOs), etc.

3.1.3. Optimization

Once the Last Mile connection is effectively established, ongoing support and maintenance for the HISP interfaces will be necessary. Many support models are possible, including delegation to EHR vendors, third parties, or a dedicated support staff internal to the HISP. As the HISP and its interfaces are created, an analysis of the pros and cons of each alternative will be conducted, and a sustainable support model will be developed.

To optimize health IT adoption, Mass Technology Collaborative plans to evaluate a practice's efficiency and effectiveness in the use of health IT, and, to offer a path for improvement based on this assessment. This process of improvement will be continuous, as technology and its usefulness will be ever evolving. Building upon tools already developed by the Regional Extension Center and State HIE programs, Mass Technology Collaborative is planning to develop an evaluation process to determine how the healthcare practice engages in and uses health IT (EHR and HIE), and to work with these practices to improve efficiency and effectiveness.

To measure the success of health IT adoption in the State as a whole, Mass Technology Collaborative is considering the development of an annual *Report Card for Health IT Adoption in Massachusetts.* Among the initial measurements Mass Technology Collaborative anticipates the following, with more measurements being added as the program progresses:

- Percentage of adoption of EHRs by geography, specialty, such as physician, hospitals, home health agencies and community clinics.
- Number and percentage of providers who have achieved meaningful use
- Number of providers engaged in statewide HIE by geography and specialty
- Number of patients who opt in to HIE
- Number and percentage of patients who are using a Personal Health Record

- Number and type of providers and hospitals participating in the Medicaid Incentive Program and value of incentive payments made to Massachusetts
- HIE Program Notification (PIN) requirements; i.e., eRX, Lab results and Clinical Summary Exchange

The details of this report card will be defined in coordination with EOHHS, and with input from other stakeholders, to align with the Implementation Advanced Planning Document (IAPD) performance benchmarks that will be provided regularly to CMS and ONC. This report card will be developed between April and September 2012. This is an example of the type of cooperation and coordination that is required by the terms of the MOU between Mass Technology Collaborative and EOHHS.

3.2. Execution

Hospital information system and electronic health record vendors report that state HIEs tend to build central infrastructure assuming the endpoints will be able to connect to the HIE on their own. However, most practices lack the technical capability and incentives to do this work, so the value of the HIE is not realized and sustainability is never achieved. Massachusetts intends to avoid this failed scenario by actively ensuring the connection of the Last Mile.

1. Scope Definition

Mass Technology Collaborative, acting through its MeHI division is the State Designated Entity for healthcare innovation. Mass Technology Collaborative and the Regional Extension Center for Massachusetts, will conduct a readiness assessment for hospital information system and EHR adoption in Massachusetts. This will be used to identify those providers and institutions not yet connected to an HIE and those EHR applications not capable of connecting.

2. Readiness Assessment

An analysis will be conducted to determine what additional software or services are required to enable initial HIE connectivity: sending and receiving clinical summaries and HL7 public health messages from hospital information systems and EHRs through the HIE backbone. Additionally, this will position Massachusetts for Stage 2 Meaningful Use, since it is anticipated that providers will be required to use vendors certified to support these functionalities. .

3. System Integration Services

Based on the analysis, the services for system integrations to connect with HIE services will be defined. The delivery model will include the necessary resources to install and configure software, provide training and education, and supply other support activities to practices throughout the Commonwealth. It will also contain a strategy to connect those providers who are currently without an EHR or who have an EHR but lack the capability to send and receive data directly.

4. Last Mile Management Office

Mass Technology Collaborative and its consultants will be responsible for the PMO and may contract with a third party consulting firm who may help provide the necessary support of the end-user adoption/Last Mile components of the HIE program. Additionally, Mass Technology Collaborative will centralize Last Mile integration expertise and achieve economies of scale by creating an efficient approach to Last Mile integration.

5. Education and Training

MeHI will provide educational materials and training to clinicians and consumers to enable them to optimize the benefits of new HIE connectivity, achieve meaningful use stage 2 and maximizing the amount of data flowing to other clinicians, public health and quality registries. The educational effort will be designed so that each stakeholder understands the value of these capabilities in terms they can

understand with the focus on health outcomes. This extensive educational and outreach effort will include both multi-lingual and multi-cultural capabilities so that every provider and every consumer in the Commonwealth is engaged.

6. MeHI Staffing Support for Last Mile Services

As has been noted previously, MeHI is no longer responsible for implementation, deployment, infrastructure services and procurements, and thus, will focus its organizational development on skill sets required for optimizing Last Mile adoption of HIE functions made available by the infrastructure. The MeHI HIE Last Mile team will include the Chief Technology Officer, two HIE Project Managers and 1.55 of an FTE comprised of MeHI staff members working in HIE Last Mile activities, which includes the MeHI Director, the MeHI Chief of Staff, Administrative Assistant, Clinical Relationship Managers, and the Manager of Information Design and Development. The Last Mile staff will oversee the efforts of an expert and experienced systems integration consulting team of 5 FTEs, manage all grants and procurements, and Education and Outreach, as well as all other HIE Last Mile program activities and requirements. MeHI currently has all staff on board with the exception of one Project Manager who is projected to be hired in July and the Chief Technology Officer which is projected to be filled in the next few months. In addition to the Last Mile staff, MeHI also has Project Managers and other MeHI staff for a total of 1.4 FTEs that are responsible for the management and oversight of the HIE Challenge Grants. For those providers who are already REC members, their assigned Clinical Relationship Managers (2.5 FTEs) supported by an Operations Coordinator will help to oversee the efforts of the system integrator to ensure continued high levels of satisfaction, as part of their REC role.

MeHI/MTC has proper time tracking and financial controls in place that requires staff to charge their time on a bi-weekly basis according to level of effort spent on each of the MeHI activities, including the HIE Last Mile, each Challenge Grant, the REC program, and other non-federal MeHI programs. MeHI/MTC will continue to ensure that staff tracks their time using the proper project codes for each MeHI project and grant.

The proposed funding process for provider connectivity to the HIE is expected to be similar to that of the REC. The current process includes having funds flow through the Implementation and Optimization Organizations, who provide the support services at a discounted rate. This approach has proven successful in Massachusetts and has resulted in the MA REC being the first to achieve its enrollment targets with high levels of customer satisfaction. This approach has also created private sector jobs. A second option may include providing grants directly to providers to support HIE connectivity.

The Education and Outreach efforts will be shared across all MeHI programs, since the messaging content will be the same for providers, consumers, etc. The Medicaid team's outreach coordinator and staff will support all Medicaid eligible hospitals and EPs. MeHI's Director of Information Design and Development, Mass Technology Collaborative's Public Information Officer, the REC Director, and the Director of Medicaid Operations and the EOHSS Project Director for the Medicaid Incentive Payment program, will all be actively involved in Education and Outreach efforts supported by Marketing and Communications consultants, in collaboration with the HIE-HIT Advisory Committee. This will ensure message consistency across the Commonwealth.

3.3. Proposed Services

Component	Proposed Services
Connection	**Analysis** • Vendor products used by 2500 REC clinician participants • Vendor products used by non-REC clinician participants, by number of clinicians • Vendor products used by hospitals, by number of hospitals • Self-developed systems and number of providers using these systems. **Selection of Vendors** • Conduct a Competitive Grand Solicitation process to determine and contract with EHR vendors to assure maximum coverage of the provider community at most economical cost. • Portal functionality for providers without EHRs, or for those using EHRs with low penetration in the Commonwealth **Installation** • Test software in the offices of eligible professionals and in data centers of hospitals, PH entities, and payers. • Contract with third party service organizations to perform this function, as needed. • Provide connectivity funding and consulting services to foster the connection to the backbone and the achievement of meaningful use. • Provide technical assistance for community HIEs to connect to the statewide HIE. • Use the work products from the two State HIE Challenge Grants as a potential component for future projects.
Education and Outreach	• Foster a Community of Practice for community hospitals to improve the dissemination of “best practices”. • Identify and build local leadership • Partner with the Mass League for Community Health Centers developing specific offerings for community health centers, similar to community hospitals • Partner with associations for mental health and substance abuse programs, community organizations or directly with agencies as needed to develop mental health/substance abuse offerings, similar to community hospitals • Work with providers to maximize efficiencies in the practice related to HIE that will lead to better quality care for the patient. • Work directly with providers to assure that access to the HIE is included in patient care workflows • Develop educational material which the provider can share with the consumer

Component	Proposed Services
	• Develop a direct message campaign aimed at providers and consumers • Develop web based training modules • MeHI will work directly with the Massachusetts Department of Public Health and EOHHS to develop a single goal that will serve as a "rallying" point for all stakeholders participating in the statewide HIE. • Include the Commonwealth's health care improvement goals with associated metrics developed by the Health Care Quality and Cost Council (scorecard is included in Appendix H): - Reduce the cost of health care - Ensure patient safety and effectiveness of care - Improve screening for and management of chronic illnesses in the community - Develop and provide useful measurements of health care quality in areas of health care for which current data are inadequate. - Eliminate racial and ethnic disparities in health and in access to and utilization of health care; health indicators will be consistent, and consistently improving, across all racial and ethnic groups - Promote quality improvement through transparency • Conduct annual surveys to measure the adoption and use of health IT.
Optimization	• Provide workflow connectivity funding and consulting services to optimize EHR/HIE utilization. • Work with providers to maximize efficiencies in the practice that lead to better quality care for the patient. • Work directly with providers to assure that access to the HIE is incorporated in patient care workflows. • Develop model for sustainable support and maintenance of the HISP interfaces, including a feedback loop to address and study problem patterns.

3.4. Use of HIE Grant Funds

The following is an excerpt from the full budget on page 66 and shows where the majority of the HIE funds will be spent.

The ONC HIE grant funds provided under the ONC Cooperative Agreement will be used to complete the Last Mile of health IT adoption. Mass Technology Collaborative will not be responsible for any HIE implementation, deployment, infrastructure services or procurements, as those responsibilities will shift to MassHealth under the CMS Grant. With this in mind, Mass Technology Collaborative proposes that the majority of the remaining ONC funds may be used for Last Mile grants and contracts in the following manner:

Category of Cost	Description of Cost	Number (people/ contracts)	Rate/ Amount	Annual hours	# of Years	Year 1&2 (2/8/10-2/7/12)	Year 3&4 (2/8/12-2/7/14)	Total Cost	Budget notes
Contractual-Sub recipients	Last Mile Integration Vendor	5	150	2080	1.42		$2,210,520	$2,210,520	5 LM integration FTEs for 1.42 years to scope and execute approximately 25 individual EHR vendor projects. Assume start date of 9/1/2012.
Contractual-Financial Assistance	EHR vendor - Development Contracts	25	75,000	N/A			$1,875,000	$1,875,000	Integration development contracts with approximately 25 vendors. Assume a mix of hospital, ambulatory, LTC, behavioral health vendors, to be determined from the landscape analysis. Actual price will vary depending on vendor mix; average price estimate based on experience with similar efforts in MA and NY.

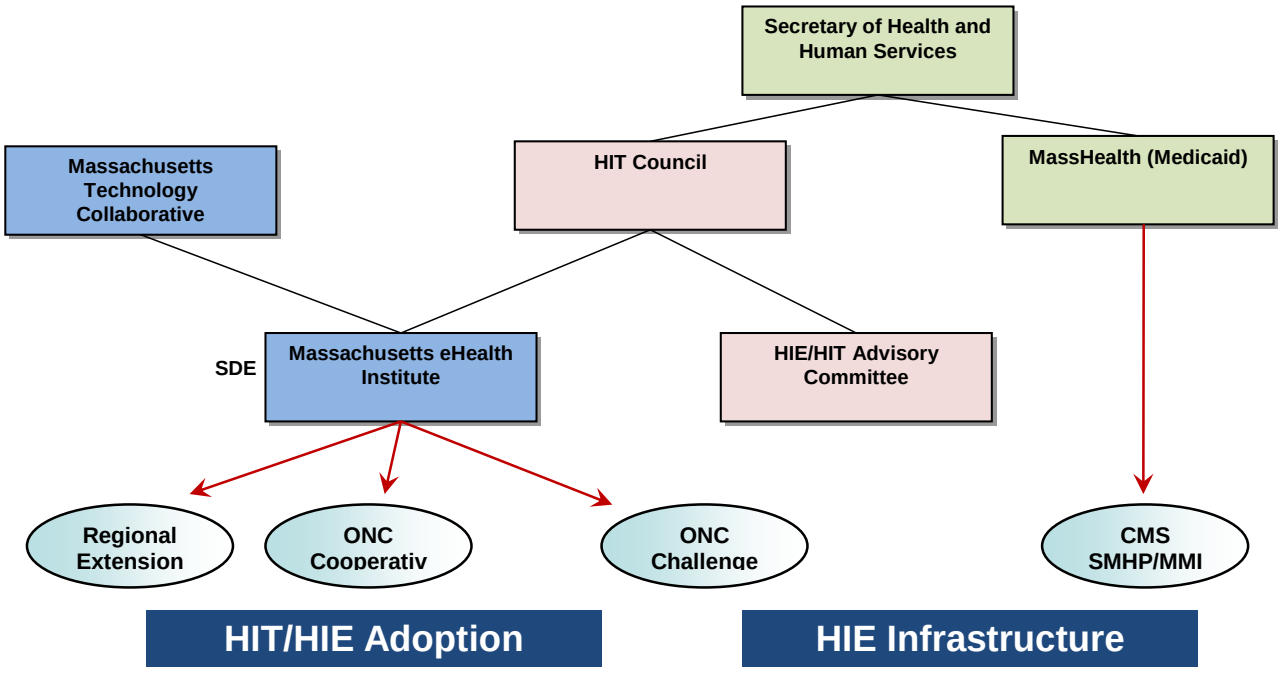
Category of Cost	Description of Cost	Number (people/ contracts)	Rate/ Amount	Annual hours	# of Years	Year 1&2 (2/8/10-2/7/12)	Year 3&4 (2/8/12-2/7/14)	Total Cost	Budget notes
Contractual-Financial Assistance	Small practices End-user grants/support program	1000	2,500	N/A			$2,500,000	$2,500,000	Assume approximately 1000 unaffiliated/under-served small practices that would comprise 2000-3000 clinicians
Contractual-Financial Assistance	Long Term Care End-user grants/support program	100	1,000	N/A			$100,000	$100,000	Training/support for those LTCs that are using web portal or need assistance with EHR interface acceptance testing and training. Assumes targeting roughly 1/4 of the 400 LTC facilities in the state.
Contractual-Financial Assistance	Behavioral health End-user grants/support program	100	1,000	N/A			$100,000	$100,000	Training/support for those BH providers that are using web portal or need assistance with EHR interface acceptance testing and training
Contractual-Financial Assistance	Hospitals End-user grants/support program	20	20,000	N/A			$400,000	$400,000	Technical support for small hospitals and state hospitals that need assistance with EHR interface acceptance testing and training

4. Coordination with Medicaid and MassHealth

The Commonwealth established an organizational structure for statewide health IT planning that enables EOHHS and MassHealth leadership and staff to fully participate in all aspects of statewide health IT planning and development. The Commonwealth passed Chapter 305 in 2008, creating both the Massachusetts Health Information Technology (Health IT) Council and Massachusetts eHealth Institute (MeHI). The law made the Secretary of EOHHS the Chair of the Council and directed that the Director of MassHealth be one of the ten Council members. The Health IT Council and Mass Technology Collaborative Board oversee and direct the activities of MeHI, a division of the Massachusetts Technology Collaborative. MeHI is charged with promoting cost containment, transparency and efficiency in the delivery of quality health care through the deployment of EHR systems in all health care provider settings and networking those systems through statewide interoperable HIE services.

The Secretary of Health and Human Services recast the state's HIE governance structure in June 2011, by creating the HIE-HIT Advisory Committee (The Advisory Committee), charged with serving as the mechanism for channeling advice and recommendations to the Health IT Council from interested constituents from private and public sectors. The Advisory Committee's primary focus is to make recommendations on all aspects of the design and implementation of Health Information Exchange (HIE), and to weigh in on other health information technology policies for the Commonwealth.

The diagram below shows the specific agencies involved in promoting HIT/HIE Adoption and building the HIE Infrastructure.



The creation of the Advisory Committee fosters effective public-private collaboration to shape the successful implementation of the statewide HIE. The Advisory Committee is co-chaired by the Chief Information Officer for Massachusetts' EOHHS and the Chief Information Officer for a large teaching hospital. As a result of this unique organizational structure, MassHealth, EOHHS, and MeHI staff members have established Health IT workgroups to ensure that all efforts related to Health IT planning and implementation both within MassHealth and statewide are fully integrated in their approaches and desired outcomes. The Advisory Committee includes over eighty stakeholders who participate in one or more workgroups:

- Legal and Policy
- Technology and Implementation
- Finance and Sustainability
- Consumer and Public Engagement
- Provider Engagement and Adoption

Chapter 305 also contains a mandate that the Massachusetts Department of Public Health (MDPH) and the Board of Registration in Medicine (BORIM) adopt regulations requiring the demonstration of competent use of EHR systems, as a condition of licensure for hospitals, community health centers and physicians. MeHI is collaborating with the BORIM, MassHealth (Medicaid) and MDPH to ensure a consistent approach for meeting the needs of both Chapter 305 and the Meaningful Use requirements of the HITECH Act. MeHI's Director is appointed by Mass Technology Collaborative's Executive Director and is charged, under the Act, with preparing the Commonwealth's Health Information Technology Plan and Health Information Exchange Strategic and Operational Plan and their corresponding budgets for implementation.

An example of an outcome of the collaboration among MeHI, MassHealth and EOHHS is the agreement among the entities to ensure that various sources of external funds are used in a manner that avoids duplication of incentives among certain provider groups, and prioritizes and targets technical assistance and provider education to those healthcare providers who serve populations with the greatest needs.

The organizations have further agreed that MeHI will complete a "gap analysis" to determine which MassHealth providers may be under-represented in both the Medicare and MassHealth Provider Incentive Payments Programs. For those MassHealth providers that may "fall through the cracks" of both incentive programs, such as Public Hospitals, behavioral health providers, long-term care providers, etc. MeHI and MassHealth will convene a work group to develop specific initiatives to support these MassHealth providers in acquiring or upgrading to certified EHRs, as well as support the providers in their meaningful use of the EHR systems. In addition, based on discussions from the workgroup, MeHI has determined that its business model for the Regional Extension Centers will focus on MassHealth providers identified as individual and MassHealth group practices (10 providers or less); Public Hospitals and Critical Access Hospitals; Community Health Centers and Rural Health Clinics; and other settings that predominantly serve uninsured, underinsured and medically underserved populations.

4.1. MassHealth Service Agreement

Key to the collaboration between MassHealth and MeHI is a set of services agreements between EOHHS and Mass Technology Collaborative. The initial agreement focused primarily on development of a preliminary marketing/communications plan and strategy for statewide HIT/HIE initiatives and Medicaid EHR Incentive Payment Program designed to encourage the adoption and meaningful use of EHR technology by Massachusetts providers. The marketing plan included strategies and a budget for the development of a common look for Health IT/HIE and Medicaid EHR Incentive Payment Program

communication materials (possibly co-branded with EOHHS) so that providers and eventually consumers recognize that these materials are coming from a trusted source of information; incorporated any specific EOHHS or Commonwealth requirements for marketing materials into the strategic plan; outlined strategy for marketing to providers and eventually consumers; developed time line and proposed the budget for rolling out marketing materials to providers and eventually consumers.

Under the second, agreement, MeHI/Mass Technology Collaborative is providing operational support for the Medicaid Incentive Payment Program. The operations team at MeHI is performing Evaluation, Verification, Outreach and Training for all eligible Medicaid providers in the Commonwealth who apply for the Medicaid Incentive Program. The Massachusetts Medicaid EHR Incentive Program went live on October 3, 2011 with full operations currently underway.

4.2. Joint planning activities between MassHealth and MeHI

As previously described, MeHI is playing an important role in the planning, implementation, and operation of the Medicaid EHR Incentive Payment Program through the creation of the MeHI Enrollment, Validation, and Outreach Team (MeHI/EVOT). MassHealth is overseeing the MeHI/EVOT by monitoring and overseeing their efforts, including the development and review of service level agreements (SLAs) with MeHI, on-site monitoring of MeHI/EVOT, review and approval of Medicaid EHR Incentive Program policies and procedures to ensure compliance with federal regulations, review of monthly and ad-hoc operations reports, a random sampling of incentive program documentation to ensure policies and procedures are being followed, and reviewing the output of a contracted annual Independent Review of MEHI program administration. Section E (The State's Health IT Roadmap, Diagram E.1.2) identifies the major business functions that will be required of EOHHS and MeHI/EVOT in order to support the Medicaid EHR Incentive Payment Program.

In addition, MeHI will assist in accelerating adoption of EHRs and the statewide HIE. To optimize the transport capabilities of the statewide HIE, all hospital information systems and EHRs need to be connected to the transport backbone. The end result is an integrated network of networks that enables any payer, provider, patient or consumer to exchange data in such a way that it supports the improvement of health and health outcomes for all consumers and patients. While the means of achieving this goal differ by geographic distribution, economic considerations and type of provider, the overall goal is to bring all clinical settings to a point of optimal use of the technology. This connection and application is referred to as *Health IT Adoption – the Last Mile*

Mass Technology Collaborative's approach to connecting the Last Mile includes:

1. Analyze the adoption of Hospital Information Systems/EHRs in Massachusetts to identify those applications which are not yet connected to an HIE. It is estimated that 80% of the unconnected organizations are using one of the dozen most common vendor applications.
2. Use the analysis to procure the necessary software which enables sending and receiving clinical summaries and HL7 public health messages from Hospital Information Systems/EHRs to the HIE backbone.
3. To accelerate HIE integration, conduct a coordinated procurement system integration service that will provide the resources necessary to install and configure this software at practices throughout the Commonwealth.
4. Manage support of the integration project via a single project management office, by reducing the individual tasks to a set of coordinated projects.

5. Provide training and educational materials for clinicians on how to optimize their new HIE connectivity, achieving Meaningful Use Stage 2, and maximizing the amount of data flowing to other clinicians, public health and quality registries.

By taking this approach, the Commonwealth bridges the gap of building a central infrastructure and enabling endpoints to be able to connect to the HIE. Mass Technology Collaborative working through MeHI and using the ONC HIE funds, will actively connect the Last Mile, such that enough value is created to motivate stakeholders to sustain the operation of the infrastructure.

5. Coordination of Medicare and Federally Funded State Programs

Federal Funding of MeHI will bring resources to community health centers and primary care providers to help them achieve "meaningful use" of Electronic Health Records. State health information technology efforts are focused on preparing for and maximizing the return on Centers for Medicare & Medicaid Services (CMS) incentives for providers and the Commonwealth.

5.1. Federally Funded Grants

(This chart will be updated in the final version.)

MeHI will study other non-ARRA federally funded grants to understand if and how these programs may intersect with the HIE project. The following is a list of these programs as of October 2010 which will be updated in future revisions of the HIE Plan:

Item	Department	Description	GOV	HFA	SFA
4500-1059	Department of Public Health	Federal granted entitled FY09 Earmark Proposal (Health Equity)		$238,000	$238,000
4502-1012	Department of Public Health	Cooperative Health Statistics System	$531,239	$531,239	$531,239
4510-0109	Department of Public Health	State Loan Repayment Project	$250,000	$250,000	$250,000
4510-0111	Department of Public Health	ARRA State Loan Repayment Program	$100,000	$100,000	$100,000
4510-0115	Department of Public Health	Federal granted entitled ARRA-State Primary Care Offices		$42,470	$42,470
4510-0119	Department of Public Health	Rural Hospital Flexibility Program	$303,900	$303,900	$303,900
4510-0219	Department of Public Health	Small Rural Hospital Improvement Grant	$81,000	$81,000	$81,000
4510-0400	Department of Public Health	Medicare and Medicaid Survey and Certification	$9,282,552	$9,282,552	$9,282,552
4510-0500	Department of Public Health	Clinical Laboratory Improvement Amendments	$295,153	$295,153	$295,153
4510-0630	Department of Public Health	Enabling Electronic Prescribing and Enhancement	$230,150	$230,150	$230,150
4512-9065	Department of Public Health	State Outcomes Measurement and Management System	$150,000	$150,000	$150,000
4513-9094	Department of Public Health	Federal granted entitled MassCARE Data Systems Improvement (SPNS)		$15,000	$15,000
4516-1028	Department of Public Health	State Local Pub Health Infrastructure	$1,049,486	$1,049,486	$1,049,486
6440-0088	Department of Public Health	Federal granted entitled Perform Registry Info Management System		$259,478	$259,478
6440-0090	Department of Public Health	Federal granted entitled CDL Information System Enhancement		$1,132,125	$1,132,125

6. Participation with Federal Care Delivery Organizations

The Veteran's Administration, Department of Defense (Hanscom Field) and Indian Health Services (IHS) (Martha's Vineyard) will be integrated with state-level health information exchange services, to ensure continuity of care.

The Veterans Administration (VA) Boston Healthcare System has campuses in the Jamaica Plain and West Roxbury neighborhoods of Boston and outpatient clinics in Boston and neighboring Quincy. While Greater Boston is not a Virtual Lifetime Electronic Record (VLER) site, the Greater Boston Quality Coalition (GBQC) infrastructure uses the same NwHIN-Direct standards the VA intends to use for its interoperability projects, allowing for future linkages when VA NwHIN projects are developed throughout the country.

MeHI will begin the process of reaching out to the DOD, VA and IHS in collaboration with the HIE-HIT Advisory Committee and will integrate these organizations into the planning process going forward.

Massachusetts, as a lead state for a 6-state New England consortium, is the recipient of the innovator grant from CCIIO for developing reusable components for an ACA-compliant Health Insurance Exchange by 2014. EOHHS staff is closely associated in the management of this grant and the Medicaid agency has collaborated with the grant to also leverage CMS 90% FFP to enhance its Eligibility System. The Health IT Coordinator shall provide close coordination and alignment between these critical ACA-driven IT initiatives and the HIE-HIT program in Massachusetts.

7. Coordination with other ARRA Programs

As previously indicated, is the locus of the position and the responsibilities of the HIT Coordinator are being reviewed by the Secretary of EOHHS. Once this direction has been given, the Health IT Coordinator will oversee and coordinate the ARRA programs described below.

7.1. Regional Extension Center

As a result of the centralized structure created by Chapter 305 (MeHI and Health IT Council), MeHI was designated by the Governor as the State agency to receive HITECH funding under the State Health Information Exchange Cooperative Agreement Program and to serve as the single Regional Extension Center (REC) for the entire Commonwealth. Through the REC, the Commonwealth will provide assistance to priority primary care providers to promote implementation of EHRs. Priority primary providers include primary care providers in individual and small practices (ten or fewer professionals with prescriptive privileges) principally focused on primary care; public and critical access hospitals; community health centers and rural health clinics; and other settings that predominantly serve uninsured, underinsured and medically underserved populations.

MeHI was notified on February 12, 2010, that it was awarded $13.4 million in funds for the first two years of an expected four year contract, to support 2,500 priority providers. With the funding to begin phasing out after two years and end after four, it is critical to sustain the REC to support the Commonwealth's Health IT strategy of accelerating Health IT implementation for all providers.

While only 2,500 priority providers are eligible for the federally funded direct assistance services, all services delivered through the REC are available to all providers in the Commonwealth. Additionally, licensure requirements from the Board of Registration in Medicine (BORIM) and Department of Public Health require providers to integrate with the Statewide HIE, and Chapter 305 requires all providers to be proficient in the use of an EHR.

7.1.1. Implementation and Optimization Organizations (IOOs)

MeHI has entered into agreements with Implementation and Optimization Organizations (IOOs) to deliver Health IT services to support adoption and meaningful use of certified EHRs within the physician offices. The IOOs contract with providers to offer a full range of adoption and meaningful use support services, including clinical and technical implementation.

This model provides unique benefits and efficiencies, as it enables the Commonwealth to harness the services of all of the highly experienced IOOs in the state simultaneously, thus accelerating the goal of statewide EHR adoption.

7.1.2. Regional Extension Center Services

MeHI provides value-added services for all participating REC providers. Through the use of clinical relationship managers (CRM), the REC provides education on meaningful use, HIEs and advanced compliance. In addition, the following services are offered:

- Select IOOs and establish required contract provisions between providers and IOOs.
- Evaluate and structure arrangements with EHR and other vendors.
- Promote financing alternatives, such as a Loan Program
- Provide education, including REC program overview and State and Federal Health IT Programs.
- Provide ongoing education and support for Federal and State Health IT compliance including Meaningful Use, HIPAA, HIE, Chapter 305, Quality Improvement Coaching, and Privacy and Security.

- Coordinate Community of Practice (CoP).
- Communicate to providers and consumers for targeting, education and outreach.

7.2. Strategic Healthcare IT Advanced Research Projects on Security (SHARP)

The Strategic Healthcare IT Advanced Research Projects on security (SHARP) will advance the sophistication, development and deployment of security and privacy for health information technology, through long-term research that is strategically managed for fundamental impact and incremental short term benefits. There are three major environments of concentration: electronic health records, health information exchange and telemedicine. Of the twelve universities involved in the SHARP project, two are located in Massachusetts: Harvard University and the University of Massachusetts Amherst.

7.3. Workforce Development

Investment in curricula and programs to educate and train both existing and new workers in the fields of healthcare, biotechnical development, research and public health will achieve the dual purpose of meeting workforce demand, while providing job opportunities for those who are currently unemployed, under employed, dislocated or displaced. Development of a local workforce to support HIE related initiatives, such as readiness, is a key strategy in meeting the overall goals and objectives of widespread adoption of HIE technology.

To better understand the specific needs of health IT organizations, MeHI convened two Workforce Advisory Workgroups who met over a one-week period: one for employer organization and one for educational institutions. The following is a breakdown of the objectives and findings of each focus group.

Objectives

Employer Organizations	Educational Institutions
• Define the current and anticipated talent gaps. • Identify competencies that are difficult to recruit. • Gain an understanding of current internal training efforts and opportunities within the organizations.	• Gain an understanding of existing curricula and program capabilities. • Identify qualities of successful graduates. • Understand current challenges in managing and growing development programs.

Findings

Employer Organizations	Educational Institutions
Employers face three key issues, as they address the changing needs of health IT. **Timing** • The need for skilled workers is immediate – trained and on the job within six months. • Most of the workforce need is viewed as temporary – few are expected to remain after the implementation period. **Skill Gaps** Applicants for the most difficult roles to staff require a mix of the following three skills: • Healthcare knowledge • IT technical skills • Change management experience	A number of certification and degree programs are currently preparing students in Massachusetts for a career in health IT. These Programs focus on meeting the key skill gaps in the industry, including healthcare, IT and change management. Some programs are built to address all three of these skill gaps, while others are focused on one or two skills. **Certifications/Degrees** Certifications available today include Associate's, BS, MS, PhD, and Certificate, among others. **Duration** 1-4 years – variance is due to the certificate versus degree programs. **Structure** Variety exists between blended online and in-person

Employer Organizations	Educational Institutions
Economics Organizations do not have funding to spend on training and have difficulty affording talent that is currently trained.	curriculum. Many have virtual e-learning and webinar opportunities. **Employer Partnerships** Apprenticeships; e.g., Labor, UMASS Lowell, Middlesex, Year Up

Short Term Needs

To fulfill the ambitious goals of HITECH and Chapter 305, a range of health care and technology-related skills will be needed in the near term. In addition to installing the technological infrastructure, a skilled workforce will be needed to integrate these tools into care delivery processes in the doctor's offices, hospitals and other settings. These workers will help health care organizations to incorporate the new technology, modify their current processes, and train providers and hospital staff to use the information that becomes available. This will improve the quality of care and improve efficiency, thereby, decreasing total costs.

Given the aggressive schedule for deployment of EHRs, the immediate need for qualified Health IT talent and the availability of ARRA funds to support Health IT training, MeHI will work in coordination with key stakeholders, focusing on developing competencies to support the mission of the Regional Extension Center program. Specific roles have been defined by an ONC Workforce Technical Expert Workshop: clinician consultant, implementation manager, implementation support specialist, practice workflow and information management redesign specialist, technical/software support and trainer. MeHI will employ the following tactics to meet these short term needs:

- Coordinate with local colleges and employers to promote the Health IT curricula they are offering.
- Set up a job board for job and internships listing across Massachusetts. There will be a nominal fee to post these jobs/internships on the MeHI website.

Medium Term Needs

As noted previously, the current health care workforce extends far beyond the professionals and staff in a physician's office. On the job training, continuing education programs and certification programs in Health IT proficiency will need to be developed and offered by a wide range of universities and community colleges. Current workers will need to be persuaded to acquire this knowledge and advance their careers. To further these approaches, MeHI is working with a regional consortium funded by the Office of the National Coordinator (ONC), to develop curricula and to train current and new workers in the basics of health IT.

To train the workforce that will fill the employment gap, the following health IT-based training programs are being considered:

1. Health IT Community College Consortia – Rapidly create health IT education and training programs at Community Colleges or expand existing programs. Community colleges funded under this initiative will establish intensive, non-degree training programs that can be completed in six months or less.
2. Program Assistance for University-Based Training – Rapidly increase the availability of individuals qualified to serve in specific health information technology professional roles requiring university-level training.
3. Competency Examinations – Provide $6 million in grants to an institution of higher learning to support the development and initial administration of a set of health IT competency examinations.

4. Curriculum Development Centers – Provide $10 million in grants to institutions of higher learning to support health IT curriculum development.
5. Employment/Training Administration Program – Provide grants for training and placement services for workers to pursue careers in health care and other high growth and emerging industries.

Long Term Needs

Ultimately, all professional educational programs leading to degrees, such as Registered Nurse, Bachelor of Science in Nursing, Doctor of Medicine or Osteopathy must include in their curricula, coursework in medical informatics and health information technology. Likewise, all programs leading to certification in some field of medicine, such as lab technician, radiology technician or licensed social worker will need to include education related to health IT. Lastly, courses specific to medical informatics will be needed in both Bachelor's and Master's degree programs that prepare students for careers in public health, research and biotechnical development. Given the large number of academic institutions in the Commonwealth, there is significant opportunity to coordinate these efforts, so the needed educational content is available as soon as possible and made widely available for incorporation into existing programs in the state and across the nation.

The Future

MeHI recommends that the Health IT Coordinator continues to collaborate with employers and education and training organizations to ensure that the Commonwealth is developing the workforce needed to meet future demand for health IT-experienced professionals. The Coordinator should also track the successful the training and development programs are at meeting the demand for qualified workers and assess other emerging skills and workforce needs that develop, as circumstances change. The Coordinator should serve as a forum to facilitate discussion and coordination among the many stakeholders who have need for a workforce proficient in health IT. The full deployment and adoption of health IT will provide critical infrastructure for advancing improvements in the quality, safety and efficiency of health care.

Bristol Community College

Bristol Community College in Massachusetts has received federal funding as part of the Community College Consortium. Their focus is on practice/workflow and practitioner consultants, and on recruiting the under employed in nursing and IT. The program is six months long and accommodates 250 participants over a two-year period. Although the course includes a practicum component, they also offer as many courses online, as is feasible.

7.3.1. Massachusetts Health Professional Grants

Massachusetts received $6.8 million in grants for health care workforce training programs.

Grantee	City	Award
Advanced Education Nursing Grants		
Northeastern University	Boston	$213,288.00
Northeastern University	Boston	$276,023.00
Boston College	Chestnut Hill	$292,634.00
Trustees of Boston College	Chestnut Hill	$261,270.00
University of Massachusetts, Boston	Dorchester	$285,799.00
University of Massachusetts, Lowell	Lowell	$224,406.00
Advanced Education Nursing Traineeship Grants		
Northeastern University	Boston	$71,886.00
Simmons College	Boston	$44,758.00
Massachusetts General Hospital	Charlestown	$98,918.00
Boston College	Chestnut Hill	$69,132.00
University of Massachusetts, Lowell	Lowell	$18,502.00
UMass, Dartmouth	N. Dartmouth	$14,402.00
Salem State College	Salem	$32,446.00
American International College	Springfield	$20,813.00
Baystate Medical Center	Springfield	$19,040.00
Regis College	Weston	$98,981.00
UMass Medical School	Worcester	$45,866.00
University of Massachusetts	Worcester	$60,047.00
Nurse Anesthetist Traineeship Grants		
Northeastern University	Boston	$23,875.00
Nurse Education, Practice, Quality and Retention Grants		
Boston Health Care for the Homeless, Inc.	Boston	$199,435.00
The General Hospital Corporation	Boston	$281,168.00
The General Hospital Corporation	Boston	$292,614.00
University of Massachusetts, Boston	Dorchester	$269,004.00
Springfield Tech. Community College	Springfield	$220,536.00
Nursing Workforce Diversity Grants		
Trustees of Boston College	Chestnut Hill	$315,782.00
University of Massachusetts, Lowell	Lowell	$315,671.00
Geriatric Training Programs for Physicians Grants		
Beth Israel Deaconess Medical Center	Boston	$671,549.00
Boston Medical Center	Boston	$1,091,985.00
Comprehensive Geriatric Education Program Grants		
UMass Medical School	Worcester	$159,800.00
Centers for Excellence Grants		
President and Fellows of Harvard College	Boston	$782,645.00

7.4. Agency for Healthcare Research and Quality (AHRQ)

Massachusetts State Department of Public Health, Boston, MA

This project proposes to engage clinicians, patients, malpractice insurers and the State public health agency to ensure more timely resolution of medical errors that occur in outpatient practices and improve communication in all aspects of care. The project will identify key areas contributing to ambulatory medical errors and malpractice suits in order to redesign systems and care processes to prevent, minimize, and mitigate such errors in a group of Massachusetts primary care practices. The project will also transform communication culture, processes and outcomes in these practices so they are more patient and family-centered, particularly with respect to proactively seeking out, handling and safety learning from patients' safety experiences, concerns and complaints.

The ARRA appropriates $1.1 billion for research that compares the effectiveness of different medical options of which $300 million is for the AHRQ, $400 million has been transferred to the National Institutes of Health (NIH), and $400 million is for allocation at the discretion of the Secretary of the Department of Health and Human Services (HHS). AHRQ has agreed to manage the Office of the secretary's $400 million.[11]

7.5. Other Healthcare Related ARRA Grants

The Department of Public Health and other federal agencies are using ARRA funding for other healthcare-related projects. MeHI will study the funding opportunities within the Department of Public Health to understand if and how these programs may intersect with the HIE project. The following is a list of these programs:

Item	Department	Description	GOV	HFA	SFA
4510-0111	Department of Public Health	ARRA State Loan Repayment Program	$100,000	$100,000	$100,000
4510-0115	Department of Public Health	Federal granted entitled ARRA-State Primary Care Offices		$42,470	$42,470
4512-0178	Department of Public Health	ARRA Immunization	$461,924	$461,924	$461,924
4512-0181	Department of Public Health	ARRA Meningococcal Virus Prevention	$99,500	$99,500	$99,500
4512-0182	Department of Public Health	ARRA Preventing Healthcare Associated Infections	$730,466	$730,446	$730,466
4513-9091	Department of Public Health	ARRA HNI Health Disparities (READY)	$431,245	$431,245	$431,245
4514-1007	Department of Public Health	ARRA WIC Systems	$624,969	$624,969	$624,969

[11] Overview of the American Recovery and Reinvestment Act of 2009 (Recovery Act), http://www.ahrq.gov/fund/cefarraover.htm, Agency for Healthcare Research and Quality, June 30, 2010.

Chapter Two: Domain-Specific Components

1. Governance

Chapter 305 of the Acts of the Legislature in 2008 directed the Massachusetts Technology Corporation (Mass Technology Collaborative), an independent development agency chartered to promote new economic opportunity, to create within its structure an e-Health Institute to "advance the dissemination of Health IT across the Commonwealth, including the deployment of EHR systems in all health care provider settings that are networked through a statewide HIE." Chapter 305 also directed the creation of a nine member Health IT Council chaired by the Secretary of the EOHHS to consult to, advise and oversee the Institute's activities. The Health IT Council and Mass Technology Collaborative Board must approve all budgets, contracts, grants, and plans proposed by MeHI.

As Federal programs and monies became available through the ARRA, MeHI became the designated Regional Extension Center and State Designated Entity for Federal HIE grants, and opportunities to realize the goals of Chapter 305 expanded substantially.

Recognizing and wishing to take advantage of the wealth of Health IT subject matter expertise available in Massachusetts, the Health IT Council voted to create an HIE-HIT Advisory Committee to make recommendations on Health IT/HIE policy, technology, independent sustainability, and the cultural acceptance of Health IT among both providers and the public. Five workgroups were created to develop these recommendations for the Advisory Committee, which forward them to the Health IT Council as appropriate for vote and acceptance. Lastly, the Massachusetts eHealth Collaborative, working with the Massachusetts Health Data Consortium, was procured by MeHI as subject matter expert in facilitation, research, and collation of recommendations to support the Advisory Committee and its Workgroups.

It is the intent of all entities involved to ensure the effective and efficient use of public and private funds to build the infrastructure necessary for widespread use of interoperable health information and to create a sustainable business model.

1.1. Governance Entities defined in State Statute

The Health IT Council

The Health IT Council, as described in Chapter 305, consists of nine members, including four representatives of governmental agencies and five representatives from the private sector. The four agencies are the Executive Office of Health and Human Services, the Executive Office for Administration and Finance, the Executive Office of Housing and Economic Development and the Medicaid Office. The five private sector members are appointed by the Governor. Of the five, one is to be an expert in health information technology, one an expert in law and health policy and one an expert in health information privacy and security. The Health IT Council is chaired by the Secretary of the EOHHS, who also chairs the Health Care Quality and Cost Council and oversees the Medicaid Office. The Health IT Council must approve all budgets, contracts, grants to providers in the Commonwealth, and annual Health IT Plans.

Massachusetts Technology Collaborative (Mass Technology Collaborative)

Mass Technology Collaborative is an independent development agency chartered by the Commonwealth to promote new economic opportunity and foster a more favorable environment for the formation, retention and expansion of technology-related enterprise in Massachusetts. Mass Technology Collaborative serves as a catalyst for growing the knowledge and technology-based industries that comprise the Commonwealth's Innovation Economy. As one of its activities, Mass Technology Collaborative works with major healthcare organizations to implement e-health solutions that are intended to improve the quality and continuity of patient care and reduce costs. Mass Technology Collaborative operates at the intersection of government, industry and academia. It brings together leaders and

stakeholders to advance technology-based solutions that lead to economic growth and improved healthcare. Mass Technology Collaborative energizes emerging markets by filling gaps in the marketplace, connecting key stakeholders, conducting critical economic analyses and providing access to intellectual and financial capital. Mass Technology Collaborative operates three programmatic divisions that support economic growth and innovation and attempt to generate public benefits for Massachusetts citizens.

- **The Massachusetts Broadband Institute:** Exists to extend affordable high-speed Internet access to all homes, businesses, schools, libraries, medical facilities, government offices and other public places across Massachusetts.
- **John Adams Innovation Institute:** A public economic development agency that fosters a more favorable environment for the formation, retention, and expansion of technology-related enterprises in Massachusetts.
- **Massachusetts e-Health Institute:** Responsible for advancing the dissemination of health information technology across the Commonwealth, including the deployment of electronic health records systems in all healthcare provider settings that are networked through a statewide health information exchange.

Mass Technology Collaborative functions as the legal contracting entity for all of its divisions.

The Massachusetts e-Health Institute (MeHI)

Oversight of MeHI lies with the Health IT Council and the Mass Technology Collaborative Board of Directors. The Institute is directed to accomplish its mission through facilitating implementation and use of EHRS throughout the delivery system. MeHI has been designated by Mass Technology Collaborative and EOHHS as the Regional Extension Center (REC) for the Commonwealth.

MeHI's responsibilities are defined by Chapter 40J of Massachusetts General Laws, Federal and State Agreements and Grants, and its contract with the Medicaid Incentive Payment Program. These include:

- Chapter 40J
  - Prepare Health IT Plan and updates
  - Prepare budgets for implementing the Health IT Plan
  - Issue RFPs for Implementation Optimization Organizations (IOOs)
  - Develop (in consultation with the Council) mechanisms for funding Health IT (widespread EHRs and HIE) including a grant program to assist providers with the cost of Health IT technologies, using funds available in the eHealth Fund
  - Oversee reporting from grant (see above) recipients
  - Maximize available FFP funding (through Medicaid matches)
- Federal and State Funded Grants and Agreements
  - Regional Extension Center -- Provide core functions as outlined in the REC agreement and contract for direct services
  - State Health Information Exchange Cooperative Agreement Program – Provide core functions as outlined in the agreement, and contract for services and technologies.
  - Interface with and be accountable to government agencies as necessary
  - Assure coordination of other ARRA programs in the state,(i.e., broadband, and workforce
- Medicaid Incentive Program

  Provide outreach and training to eligible providers through REC activities

1.2. Advisory Bodies

Health Information Technology -Health Information Exchange Advisory Committee

The HIT-HIE Advisory Committee (The Advisory Committee) serves as a multi-stakeholder advisory body to the HIT Council. The Advisory Committee's primary focus is to make recommendations on all aspects of the design and implementation of Health Information Exchange (HIE) and to advise on other health information technology policies for the Commonwealth. The Advisory Committee is co-chaired by representatives of both the public and private sectors: the Chief Information Officer for Massachusetts' EOHHS and the Chief Information Officer for a large teaching hospital.

Responsibilities of the HIT-HIE Advisory Group reflect its robust level of subject matter expertise and include recommendations for the following:

- Health IT/HIE Policy
- Development of the overall Health IT Roadmap
- Establishment of priorities for Health IT activities
- Development of adoption metrics and monitoring activities
- Procurements and budgets
- Requirements for RFPs
- Development of a self-sustaining HIE business model
- Participation by Advisory Group members on Workgroups and panels reviewing proposals

Advisory Council Workgroups

Over eighty stakeholders participate in one or more workgroups making recommendation to the HIT-HIE Advisory Committee. The charges and objectives of each are listed below.

- Legal and Policy
  Workgroup Charge: To plan and develop a governance model and legal & policy framework for statewide HIE activity conducted through publicly-funded or -supported programs.

  Objectives:

  - Review and assess existing legal and policy foundation for statewide HIE from Ad Hoc Committee, HISPC, and other existing work completed to data, and develop gap analysis.
  - Identify governance models for policy oversight and operations of statewide HIE activities funded by federal and state programs
  - Identify statutory and/or regulatory barriers to HIE and recommend changes statutes and/or regulations to the AC or determine if they serve an important protective purpose and need technological support to allow the HIE to proceed.
  - Identify governance models for policy oversight and operations of statewide HIE activities funded by federal and state programs
  - Draft key legal and policy documents for AC review and approval e.g., HIE Policies and Procedures, Participation Agreements
  - Technology and Implementation Workgroup
    Workgroup Charge: To plan and develop technical and operational requirements and approaches for statewide HIE activity conducted through publicly-funded or -supported programs. To develop strategies, standards, and requirements for an enhanced statewide HIE architecture that

leverages existing networks, shared services, and standardized regional services to enable broad adoption and use of statewide HIE services.

Objectives:

- Develop strategies for effective utilization of statewide HIE shared and standardized regional services related to clinical care and Meaningful Use
- Develop strategies and recommendations for standardized EHR-HIE interoperability
- Develop strategies and recommendations for implementing and operating statewide HIE infrastructure and services funded or supported through federal or state programs.
- Develop updated policy and architecture specifications that support statewide interoperable HIE for each HIE Phase

- Finance and Sustainability Workgroup
  Workgroup Charge: To recommend financing and business models for implementing and sustaining statewide HIE infrastructure and services.

  Objectives:

  - Assist Advisory Committee regarding allocation and use of Federal, State, and private funds
  - Inform key Advisory Committee decisions with cost data, budget projections, and representative stakeholder/customer input
  - Define financial feasibility & constraints for procurement decisions
  - Identify potential business models for sustaining health information exchange infrastructure and operations after existing federal and state funds have been depleted
  - Provide recommendations on a business plan for statewide HIE activities funded through federal and state programs

- Provider Engagement and Adoption Workgroup
  Workgroup Charge: To raise awareness of the Health IT-HIE program among providers, to encourage adoption of Health IT-HIE among providers, and to ensure that provider input is considered for all critical recommendations and Advisory Committee decisions.

  Objectives:

  - Communicate with, inform, and educate providers regarding Health IT and HIE in the Commonwealth
  - Encourage adoption of Health IT/HIE among Providers
  - Ensure that Provider input is sought out and considered for all critical recommendations and Advisory Committee decisions
  - Facilitate dialogue and input gathering among Providers for confusing or controversial topics and to raise Provider awareness of Health IT/HIE benefits and risks
  - Advise regarding development of Last Mile strategy

- Consumer and Public Engagement Workgroup
  Workgroup Charge: To raise awareness of the Health IT-HIE program among consumers, to engage consumers in the program, and to ensure that consumer input is considered for all critical recommendations and Advisory Committee decisions.

Objectives:

- Communicate with, inform, and educate consumers regarding Health IT and HIE in the Commonwealth Ensure that consumer input is sought out and considered for all critical recommendations and Advisory Committee decisions
- Facilitate public dialogue and consumer input gathering (e.g., through interviews, workshops, and surveys) for confusing or controversial topics and to raise consumer awareness of Health IT HIE benefits and risks
- Advise regarding development of Last Mile strategy, keeping in mind the consumer connection as an integral part of this work

2. Finance

Sustaining the HIE is critical to the Commonwealth's strategy for accelerating Health IT implementation for all providers.

2.1. Information Exchange Financing and Sustainability

Sustaining statewide Health Information Exchange (HIE) will require support from both the public and private sectors. If this revised Strategic and Operational Plan is approved, Mass Technology Collaborative will no longer be responsible for any HIE implementation, deployment, infrastructure services and procurements, as those responsibilities will all shift to Mass Health under its CMS SMHP IAPD process. As a result, in its new and comprehensive role as coordinator of HIE implementation statewide, MassHealth will also develop the sustainability plan, under the guidance of Health IT Council, and with strong support from the HIT-HIE Advisory Committee.

By leveraging Medicaid funds and existing and planned MassHealth infrastructure, and aligning the statewide HIE directly with current and future MassHealth business needs, we are now highly confident about the ability of the Commonwealth to sustain a universally accessible Statewide HIE service.

2.2. Federal Funding and Support for Workforce Development

The Federal Government has recognized the need for investment in workforce development with respect to health IT and has made available a number of grant opportunities through the ARRA.

- Health Information Technology Research Center made curriculum and training available in August 2010 for 1500 nationwide Regional Extension Center staff.
- The Regional Extension Center is working with community colleges to develop curricula that train staff to meet the needs of an expanding REC program.
- Curriculum Development Centers is funded to meet the needs of the Community College Consortia quickly and efficiently.
- Community College Consortia is funded to provide six-month educational programs.

The availability of these federal funds and programs provides a unique opportunity for the Commonwealth, including the rapid development of a health IT workforce that will meet the immediate need for health IT deployment in the delivery system, while positioning the state to develop the necessary health IT expertise for stable, high-paying employment in the future, commensurate with the needs of our healthcare and biotechnological development communities.

2.3. Proposed Revised State Health Information Exchange Cooperative Agreement Budget Calculations

Category of Cost	Description of Cost	Number (people/ contracts)	Rate/ Amount	Annual hours	# of Years	Year 1&2 (2/8/10-2/7/12)	Year 3&4 (2/8/12-2/7/14)	Total Cost	Budget notes
Personnel	HIE Planning and Implementation Staff Project Year 1&2	Varied during the period	Based upon annual salary of staff plus benefits	2080	2	$1,037,973		1,037,973	Assumes actual salaries and benefits for MeHI HIE staff allocations through June 30, 2011 and budgeted amounts through February 7,2012
Personnel	MeHI personnel-Last Mile Project Management	3.55 to 4.55	Based upon annual salary of staff plus benefits	2080	2		$1,309,669	$1,309,669	Includes salaries and benefits for 1 project manager, HIE Program Director and allocation of 1.55 other MeHI staff focused on HIE Last Mile activities. An additional Project Manager is projected in July 2012 for Last Mile project management. More defined roles will be determined as Last Mile activities are more fully defined.
Contractual-Vendor	Project Year 1&2 Consulting costs - management consultants, legal services, technical services	Varied	Based upon agreed upon rate for specific vendors for agreed upon scope of work	Varied	2	$360,552		$360,552	Actual consulting costs incurred through June 30, 2011 and budgeted consultants for FY12 through Feb 8th. These consulting costs include technical consultants, A133 audit fees, and evaluation services
Contractual-	Subject Matter		Based upon		1	$200,000	$75,000	$275,000	Subject Matter Expert,

Category of Cost	Description of Cost	Number (people/ contracts)	Rate/ Amount	Annual hours	# of Years	Year 1&2 (2/8/10-2/7/12)	Year 3&4 (2/8/12-2/7/14)	Total Cost	Budget notes
Vendor	Expert		contract budget and agreed upon fee cap for 1 year						MAeHC, contract value includes estimate for costs incurred through Feb 8th based upon run rate and remainder of contract to be expended by end of contract in August of 2012
Contractual-Vendor	Project Year 3&4 Other consulting		Estimated	Varied			$257,750	$257,750	Projected costs for consulting requirements for evaluation services, annual A-133 audit, and other consulting needs that may include outreach, marketing, or technical assistance
Contractual-Vendor	Analysis Consultant	1	150	1040	1		$156,000	$156,000	The EHR landscape (hospital and ambulatory) is largely known. More work will be required to understand the LTC and behavioral health landscape, and to get a better understanding of the individual capabilities of each vendor.

Category of Cost	Description of Cost	Number (people/ contracts)	Rate/ Amount	Annual hours	# of Years	Year 1&2 (2/8/10-2/7/12)	Year 3&4 (2/8/12-2/7/14)	Total Cost	Budget notes
Contractual-Vendor	Legal Services-Contract development	35	5,000	Varied		$85,000	$90,000	$175,000	Legal costs for HIE matters and the development and end-user terms and conditions for 25 EHR vendors plus end-user grant/support contracts
Contractual-Vendor	PR firm-Education and Outreach	1	100	520	1		$52,000	$52,000	Development of marketing/educational collateral to support education/outreach.
Contractual-Sub recipients	Last Mile Integration Vendor	5	150	2080	1.42		$2,210,520	$2,210,520	5 LM integration FTEs for 1.42 years to scope and execute approximately 25 individual EHR vendor projects. Assume start date of 9/1/2012.
Contractual-Financial Assistance	EHR vendor - Development Contracts	25	75,000	N/A			$1,875,000	$1,875,000	Integration development contracts with 25 vendors. Assume a mix of hospital, ambulatory, LTC, behavioral health vendors, to be determined from the landscape analysis. Actual price will vary depending on vendor mix; average price estimate based on experience with similar efforts in MA and NY.

Category of Cost	Description of Cost	Number (people/ contracts)	Rate/ Amount	Annual hours	# of Years	Year 1&2 (2/8/10-2/7/12)	Year 3&4 (2/8/12-2/7/14)	Total Cost	Budget notes
Contractual-Financial Assistance	Small practices End-user grants/support program	1000	2,500	N/A			$2,500,000	$2,500,000	Assume approximately 1000 unaffiliated/under-served small practices that would comprise 2000-3000 clinicians
Contractual-Financial Assistance	Long Term Care End-user grants/support program	100	1,000	N/A			$100,000	$100,000	Training/support for those LTCs that are using web portal or need assistance with EHR interface acceptance testing and training. Assumes targeting roughly 1/4 of the 400 LTC facilities in the state.
Contractual-Financial Assistance	Behavioral health End-user grants/support program	100	1,000	N/A			$100,000	$100,000	Training/support for those BH providers that are using web portal or need assistance with EHR interface acceptance testing and training
Contractual-Financial Assistance	Hospitals End-user grants/support program	20	20,000	N/A			$400,000	$400,000	Technical support for small hospitals and state hospitals that need assistance with EHR interface acceptance testing and training

Category of Cost	Description of Cost	Number (people/ contracts)	Rate/ Amount	Annual hours	# of Years	Year 1&2 (2/8/10-2/7/12)	Year 3&4 (2/8/12-2/7/14)	Total Cost	Budget notes
Travel-Year 3&4	Conference and local travel costs including mileage, airfare, hotel and parking			N/A	2		$19,800	$19,800	Travel Costs for 2 annually required ONC HIE conference participation and other local travel to vendor site and statewide HIE stakeholders.
Travel-Year 1&2	Conference & local travel costs including mileage, airfare, hotel & parking			N/A	2	$17,044		$17,044	Travel costs for annual ONC HIE conferences, other DC trips and local travel for HIE stakeholder events
Other-Year 1&2	Direct costs for HIE event, materials, HIE specific IT needs, outside services, facility costs, and other minor costs categories			N/A	2	$116,222		$116,222	Other costs including events, publications, HIE staff facility costs, specialized SW for HIE activities, temporary staff and other costs not included in other categories
Other Year 3&4	Direct costs for HIE event, materials, HIE specific IT needs, outside services, facility costs, and other minor costs categories			N/A	2		$218,203	$218,203	Other costs including events, publications, HIE staff facility costs, specialized SW for HIE activities, temporary staff and other costs not included in other categories

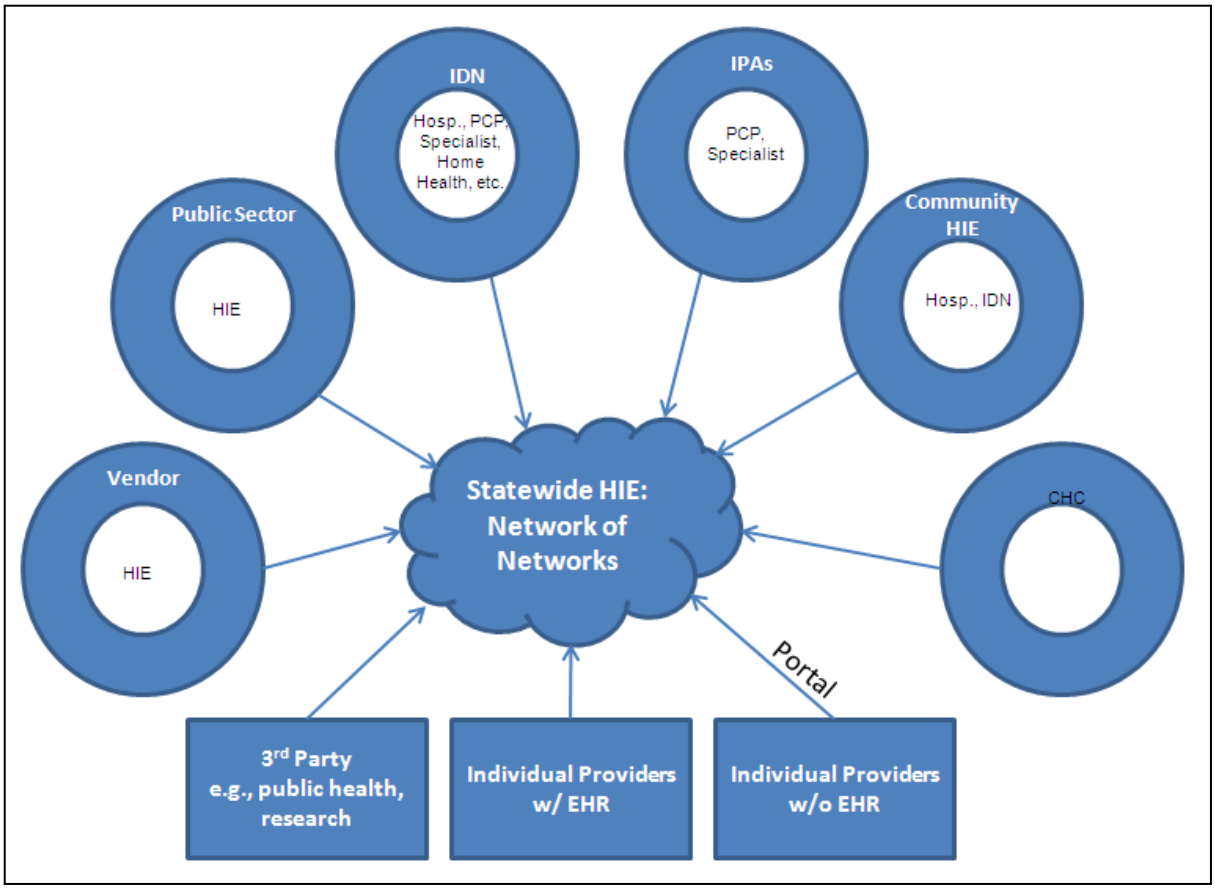
Category of Cost	Description of Cost	Number (people/ contracts)	Rate/ Amount	Annual hours	# of Years	Year 1&2 (2/8/10-2/7/12)	Year 3&4 (2/8/12-2/7/14)	Total Cost	Budget notes
Other-In-Kind Year 1&2	In-kind/Donated services by Ad Hoc Workgroup members and vendors			Varied	2	$315,947		$315,947	Value for donated services to be used toward match requirements. In-kind services includes ad hoc workgroup member time for HIE participation and vendor donated services
Other-In-Kind Year 3&4	In-kind/Donated services by Ad Hoc Workgroup members and vendors			Varied	2		$113,900	$113,900	Value for donated services to be used toward match requirements. In-kind services includes ad hoc workgroup member time for HIE participation and vendor donated services
Indirect Costs Year 1&2	Shared Corporate services costs			Varied	2	$774,759		$774,759	Mass Technology Collaborative Shared Corporate Services costs for all Executive, Finance, Legal, IT, HR, and Communication efforts of staff and other non-personnel costs. This is allocated in accordance with Mass Technology Collaborative's federal approved indirect cost rate.

Category of Cost	Description of Cost	Number (people/ contracts)	Rate/ Amount	Annual hours	# of Years	Year 1&2 (2/8/10-2/7/12)	Year 3&4 (2/8/12-2/7/14)	Total Cost	Budget notes
Indirect Costs Year 3&4	Shared Corporate services costs			Varied	2		$921,785	$921,785	Mass Technology Collaborative Shared Corporate Services costs for all Executive, Finance, Legal, IT, HR, and Communication efforts of staff and other non-personnel costs. This is allocated in accordance with Mass Technology Collaborative's federal approved indirect cost rate.
	Total					$2,907,497	$10,399,627	$13,307,124	

Mass Technology Collaborative shall provide the applicable match required under the ONC HIE Cooperative agreement based upon the match period that the expenditure is incurred. The above proposed budget includes both federal and non-federal project costs.

3. Technical Infrastructure

If this revised Strategic and Operational Plan is approved, Mass Health will be responsible for all aspects of the HIE Technical Infrastructure and its implementation. The current environment of HIEs in Massachusetts consists of a number of operating HIEs, IDNs and independent providers. A hybrid model for the HIE (federated and centralized), using a "Network of Networks" approach in designing the HIE technical infrastructure is preferred. This takes advantage of HIEs that currently exist in various states of readiness and the ability to concentrate more fully on those entities in a lower state of readiness.



To meet federal and state requirements, including Chapter 305 requirements, and support health care reform initiatives, the Health Information Exchange (HIE) technical architecture must support the following concepts:

- Principles of the Federal Privacy Network

  The degree of anticipated patient control must be consistent with state and federal policy and will be key in selecting technical approaches for HIE; e.g., patient consent applied universally vs. patient control by provider/geography/provider group/other.

- Public Health Reporting

  Massachusetts must have the ability to electronically report Immunizations, reportable labs and syndromic surveillance data to the State Department of Public Health (DPH). This data or a subset of this data must also be made available to town and city health departments, as needed, such as the Boston Public Health Commission.

- Reporting for Quality and other Initiatives

  The HIE must facilitate routing of appropriate data to appropriate reporting tools and support the possible linkage to registries.

- Bi-directional Data Exchange

  HIE participants, including patients, must be able to contribute data, allowing others to retrieve data from the HIE, with consent applied. There is the potential to create a portal capability for those providers who are close to retirements, etc. and choose not to invest in full-fledged EHR functionality before 2015.

- Exchange of Standardized Clinical Data Summaries

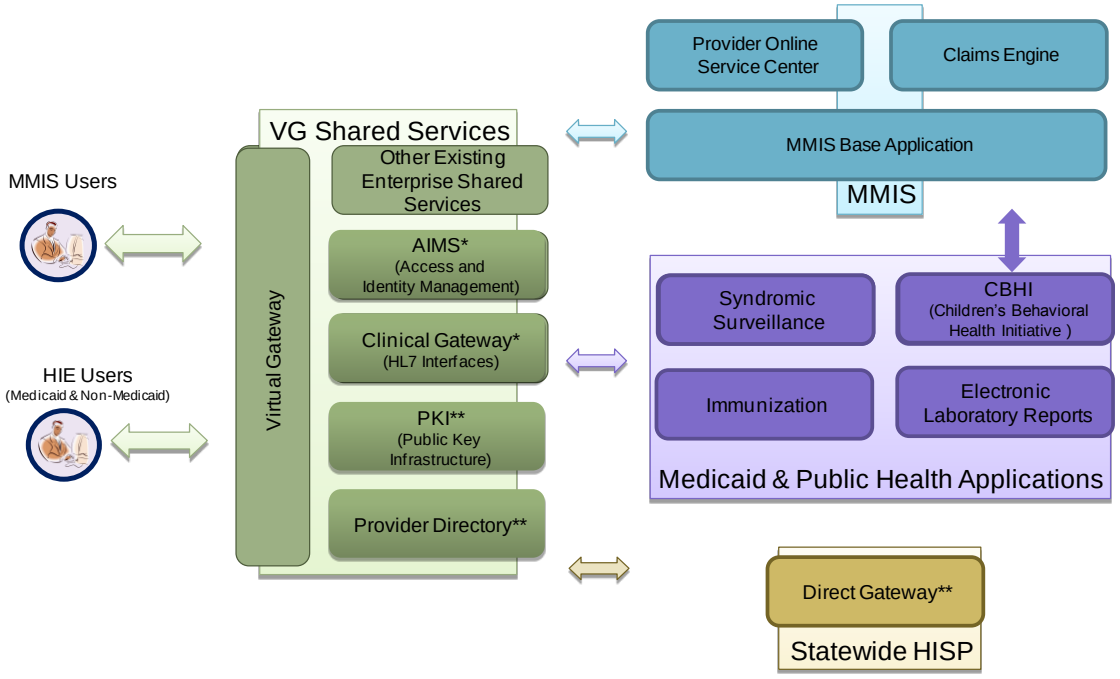
  To provide clinicians with actionable data at the point of care, the Statewide HIE must adopt, use and support the standards needed to exchange summary data, including the Continuity of Care Document (CCD), among various clinical settings.

- Financial Stability

  Current federal funding will not support the entire HIE infrastructure. The HIE must provide value to stakeholders willing to support it financially.

3.1. Health Information Exchange Technical Architecture

If the revised Strategic and Operational Plan is approved, Mass Health shall become responsible for all aspects of the HIE Technical Architecture and its implementation. Under the hybrid model, most of the HIE will be federated, with the majority of data remaining in the health care systems where it was created. The HIE will centralize data only when necessary to support specific uses, such as public health reporting, quality reporting, and tracking and management of overall population health. For example, pharmacy transactions may be facilitated through a federated model, while lab data will be consolidated into a centralized database that will not be managed or controlled by the State. Providers in a hybrid architecture may decide to share patient data through the statewide HIE, through a centralized data repository, or through use of peer-to-peer tools. Depending on the specific configuration, a master patient index may be used to link patient records across the participant databases. In this way, data can be presented to users in an integrated, patient-centric manner, employing a common user interface, regardless of where the data actually reside.



4. Business and Technical Operations

Within their areas of expertise, the HIE-HIT Advisory Committee will make recommendations regarding the HIE business requirements. These requirements will be used in an open and transparent process to solicit support from vendors to aid in MassHealth's implementation of the Statewide HIE.

4.1. Design Principles

The following are the design principles that will be considered by MassHealth in developing the business and technical operations.

Principle	Description
Healthcare-Centric	Business of healthcare drives the MA HIE interoperability activities.
Adoptability	The statewide HIE conforms to the standards, policies and regulations put forth by authorizing entities
Adaptability	MA HIE can be modified and expanded to integrate with newly introduced architecture components, additional services, interfaces and features that will cater to the needs of increased users, systems and networks
Develop Standards	Establishing standards is an evolutionary process coordinated via an open, transparent and inclusive Stakeholder Collaboration Process, as defined by our stakeholders
Scalability	MA HIE supports the requirements for small practices up to large providers and payers
Compliance	The MA HIE conforms to the standards, policies and regulations put forth by authorizing entities
Reporting	Provides the ability to collect, transmit and report required information in standards-based formats relying primarily on pull methods.
Transparency	The standards used throughout the MA HIE are well-known, industry-recognized, clearly communicated and shared with the community.
Systems Integration	Adapters and connection mechanisms are defined and developed for all MA HIE participants to use.
Future-Proof Framework	MA HIE can be modified and expanded to integrate with newly introduced architecture components, additional services, interfaces and features that will cater to the needs of increased users, systems and networks without disrupting the underlying structure.
Consistency	The requirements for reporting, data exchange and oversight do not change frequently or without significant community input and support.
Maintainability	MA HIE standards and requirements for participation are not onerous or overly complex, allowing greater participation by the MA community.
Extensibility	Enables addition of new functionality or updates to existing functionality with minimal impact to existing functions

4.2. Operating Principles

The following are the operating principles that will be considered by MassHealth in developing the business and technical operations.

Principle	Definition
Patient-Centric	Synthesize patient data from multiple sources to provide a unified, consolidated view of data to providers and patients.
Usability	Ensures data is easy to access and use by multiple stakeholders
Adaptability	MA HIE can be modified and expanded to integrate with newly introduced architectural components, additional services, interfaces and functionalities
Sustainability	MA HIE standards and requirements for participation are not onerous or overly complex, allowing for greater participation, secure storage and updates to information
Scalability	Enables addition of new participants and functionalities (expansion of the HIE) with no impact to existing functions
Portability	Attributes of software that bear on the opportunity for its adaptation to different environments, ease of installation and interaction with other software
Patient Controlled	Patient will be able to control who can access their data and under what circumstance
Reliability	Ensures that patient data is authentic and is the same at point of origin as point of exit
Extensibility	Incorporates federal standards for interoperability, so information can be shared beyond a given state
Availability	Solution meets aggressive up-time and fail-over standards
Redundancy	Ensures that service capability is redundant

4.3. Legal/Policy

If the revised Strategic and Operational Plan is approved, Mass Health shall be responsible for all aspects of legal/policy development necessary to implement the HIE. To the extent there are legal/policy issues raised in the context of implementing the Last Mile program, Mass Technology Collaborative shall be responsible for those matters. As part of the Last Mile adoption program, Mass Technology Collaborative will ensure that legal/policy decisions made through the statewide governance process regarding HIE services are communicated to HIE nodes and end-users. Patients' confidence in the way their health-related information is used, accessed and disclosed is at the core of their trust in the health care system. Therefore, privacy and security are essential elements of the Statewide HIE plan. All health information must be stored, transmitted, viewed and disposed, in a manner that balances the need to protect individual privacy with the need to allow health information to be shared with authorized participants, for improved quality of care. The Commonwealth and federal government both understand that development of and adherence to a consistent and coordinated approach to privacy and security is critical in achieving a high level of trust among consumers, health care providers, and other health care organizations participating in an electronic health information exchange.[12]

In 1996, Congress passed the Health Insurance Portability and Accountability Act, commonly known as HIPAA, to establish standards for electronic health transactions and national identifiers for providers, health plans and employers. HIPAA also includes explicit rules regarding the privacy and security of health data. Extending these guidelines, the Office of the National Coordinator (ONC) developed eight principles for a Nationwide Privacy and Security framework. The workgroup will use these ONC principles, in addition to public and private input, to develop the Commonwealth's privacy and security approach.

4.3.1. Privacy and Security

Patients will be able to designate how their health-related information is handled through a Statewide HIE. The HIE will be designed to enhance their experience with the health care system, as well as support public health and quality reporting.

- Process for Authorization of HIE participating entities: When participating in the future Statewide HIE, the Commonwealth will implement a process, by which compliance with common policies and procedures developed through the statewide governance process are validated through an authorization program. As part of the program, MassHealth will implement the privacy and security requirements/thresholds that all entities must meet before connecting to the statewide HIE. The approach for authorizing Statewide HIE participants is still being defined."
- The Health IT Council will leverage stakeholder input through the HIE-HIT Advisory Committee and Legal Policy Workgroup to review federal and state-specific laws and regulations in the development of policies and procedures governing the HIE.

[12] Office of the National Coordinator for Health Information Technology. October 2008. "Nationwide Privacy and Security Framework for Electronic Exchange of Individually Identifiable Health Information."

4.3.2. ONC Principles for a Nationwide Privacy and Security Framework[13]

Principle	Description
Individual Access	Individuals should be provided with a simple and timely means to access and obtain their individually identifiable health information, in a readable form and format.
Correction	Individuals should be provided with a timely means to dispute the accuracy or integrity of their individually identifiable health information, and to have erroneous information corrected or, if their requests are denied, to have a dispute documented.
Openness and Transparency	There should be openness and transparency about policies, procedures and technologies that directly affect individuals and/or their individually identifiable health information
Individual Choice	Individuals should be provided a reasonable opportunity and capability to make informed decisions about the collection, use and disclosure of their individually identifiable health information.
Collection, Use and Disclosure Limitation	Individually identifiable health information should be collected, used and/or disclosed only to the extent necessary to accomplish a specified purpose(s) and never to discriminate.
Data Quality and Integrity	Persons and entities should take reasonable steps to ensure that individually identifiable health information is complete, accurate and up-to-date, to the extent necessary for the person's or entity's intended purposes and has not been altered or destroyed in an unauthorized manner.
Safeguards	Individually identifiable health information should be protected with reasonable administrative, technical, and physical safeguards to ensure its confidentiality, integrity, and availability and to prevent unauthorized or inappropriate access, use, or disclosure.
Accountability	These principles should be implemented, and adherence assured, through appropriate monitoring and other means and methods should be in place to report and mitigate non-adherence and breaches.

4.3.3. The Commonwealth's Privacy and Security Framework

As mentioned in the Introduction, much of the sharing of current information across organizations is primarily supported by a paper process. Currently, the patient is the primary one responsible for ensuring that records from a primary care provider reach the specialist prior to a visit. In the future, the Commonwealth envisions that most residents will have the ability to share their medical records with their caregivers via electronic means. The HIE Privacy and Security framework will ensure that those authorized to provide information to or retrieve information from an HIE in the state will have appropriate processes in place to protect consumers' information from unauthorized access. The Commonwealth's privacy and security framework, as implemented by Mass Health, will focus on the following key areas:

- Compliance with and development and coordination of policies and standards, using frameworks (e.g., ONC, Markle Foundation), that have been developed and vetted by a broad-based group of stakeholders
- Information about how to respond to and mitigate breaches of information, quickly and transparently
- Health Information Exchange infrastructure / services to protect security
- Process / requirements for certification by standards bodies
- Processes and tools to manage consent

[13] Office of the National Coordinator for Health Information Technology U.S. Department of Health and Human Services, *Nationwide Privacy and Security Framework For Electronic Exchange of Individually Identifiable Health Information*, December 15, 2008

Compliance with Policies and Standards

As a prerequisite to developing consistent privacy and security controls within the Statewide HIE, policies and standards around information security, data protection, user access management and related areas must be developed and documented. These policies and standards will support the guiding principles and requirements for privacy and security within the Statewide HIE infrastructure. Mass Health shall be responsible for developing these standards as part of its HIE implementation activities.

Multiple federal and state laws and regulations govern privacy and security requirements for protected health information. The following table identifies a number of the key laws and regulations that must be incorporated into the Commonwealth's privacy and security framework. The initial Ad Hoc Privacy and Security Workgroup provided advice and recommendations to the Health IT Council and Mass Technology Collaborative Board of Directors, as needed, in the review of these federal and state-specific laws and regulations. The role of the Commonwealth will be to ensure that there is a set of privacy and security standards that are in full compliance with all applicable Federal and State laws, so the community can continue to deploy EHRs and HIEs within a common framework. The role of the Commonwealth should be to both require and facilitate compliance with nationally recognized standards. The following is a sample of Federal and State privacy and security regulations and policies:

Federal Regulations and Policies	Massachusetts Regulations and Policies
Health Insurance Portability and Accountability Act (HIPAA)	Chapter 305
Health Information Technology for Economic and Clinical Health (HITECH) Act	MA 201 CMR 17:00
Federal Information Security Management Act (FISMA)	Executive Order 504
Medicaid Information Technology Architecture (MITA)	MGL Chapter 93H, section 3
Health information technology Standards Panel (HITSP)	
National Institute of Standards and Technology (NIST) Special Publications 800 Series	
Privacy Act of 1974 Fair Information Practices	

Secure Health Information Exchange Technology

As the primary technologies that will be used to aid the provider and empower the patient, EHRs and HIE must be based on technical models that ensure protection of patients' health-related information. Considering advice and recommendations from the HIE-HIT Advisory Committee, Mass Health will implement technical requirements for achieving this goal, which will include security provisions that apply to interstate information exchange.

Consent Management

Consent management is about ensuring that consumers have the ability and understanding of how to exercise their right to control their data at specified levels of granularity. If a patient just wants information shared for research and direct care coordination with their physician, but does not want to be in a registry or called by an insurer's disease management program, they should be able to control that access. Once the process is defined, a comprehensive education and marketing campaign is planned for consumers, providers and non-clinical staff, to ensure they all understand their rights and obligations and what it means to consent to being part of a state-wide HIE.

Implementation of the Statewide HIE will require a process to educate, engage and inform patients about HIE. It will allow the patient to exercise control and choose how their health information is accessed, used and disclosed. The consent management approach, developed by Mass Health, will include education about how a patient's information will be specifically used for the purposes of patient care, public health reporting, disease management, registries, quality reporting, and other potential secondary uses. Under Chapter 305 there is an Opt-In provision permitting patients to decide if and how their health information is accessed, used and disclosed. In addition, under the provisions of the HIE Cooperative Agreement; the Commonwealth must address the need for a common consent approach with adjoining states.

4.4. Engaging Patients and Consumers in Secure Health Information Exchange Environment

If the revised Strategic and Operational Plan is approved, Mass Health shall be responsible for all aspects of the Patients and Consumers Secure HIE Environment. Engaging patients and consumers in a secure HIE environment is critical to the success of Health IT and to health care reform. For patients, engagement means understanding and using technology to actively participate in their health care and health care decision making, based on their own individual preferences and values. The potential benefits of Health IT use for patients and consumers include easy access to, and use, control and portability of their health information; increased efficiency; the avoidance of potential medical errors or complications; and increased partnering with their clinician to improve the their overall health and quality of care. Health IT also has many possible uses for health promotion and disease prevention, from coaching and mentoring applications to uploading of data from personal health monitors.

The Consumer and Provider Workgroups will focus on provider and consumer education, outreach and participation. The workgroup's charge is to provide advice and recommendations to ensure that the state's Health IT plan is responsive to the concerns, expectations and needs of the population it will be serving. Toward that end, it will be instrumental in the development of a messaging plan aimed at educating and engaging consumers and patients to help them understand both the benefits and risks of this technology. These messages will need to reach the consumer audience at different levels: global, community, provider, home, in different languages, and be sensitive to cultural and language literacy variations.

Patients and consumers need to be educated about both the benefits and risks of this undertaking, trust that personal health information is private, secure and used only as specified, and feel confident that any problems will be addressed quickly, fairly, and transparently. The Commonwealth's approach to assuring security of HIE statewide begins with an end-to-end security framework linked to the various legal and regulatory requirements. The HIE-HIT Advisory Committee will develop advice and recommendations that focus on privacy and information security policies that will be considered for incorporation into statewide HIE requirements for participating systems, both within Massachusetts and between states. The Advisory Committee will also concentrate on providing advice and recommendations for consent

policies and processes, HIE participation certification, data breach reporting, error correction/record amendment process and policy enforcement.

Engaging patients and consumers in Health IT, while protecting their privacy, requires that patients have the ability to add to and modify their own records, as well as meaningful control over who views or shares their records. Leading researchers in the field of health informatics point to the fact that consumers are already managing their own bank accounts, investments and purchases online. Those same consumers will expect a similar level of control with their personal health records.[14]

While consumers should always look for opportunities to enhance communication with providers through interactions not involving technology, the potential value of consumer-empowering technologies must be recognized. As the Commonwealth works to achieve its vision to be a state "where, as a result of statewide deployment and adoption of Health IT, the Commonwealth of Massachusetts is thriving, as it demonstrates measurable improvements in health care quality, safety, efficiency and population health", patients and consumers also have important roles to play, as active, engaged participants in their own health care and in the healthcare of people in their charge.

[14] Mandl, Kenneth D., Peter Szolovits, and Isaac S Kohane. "Public Standards and Patients' Control: How to Keep Electronic Medicaid Records Accessible but Private." *BMJ,* February 3, 2001.

Section 2: Health Information Exchange Operational Plan

The development of the Statewide HIE Operational plan began with the HIE strategic goals defined in the Massachusetts Health IT Strategic Plan.[15] Part of the Health IT Strategic Plan was to establish six Ad Hoc Workgroups, of which the HIE Ad Hoc Workgroup was one. This workgroup offered advice and recommendations to Mass Technology Collaborative/MeHI and the Health IT Council on the development of the functional and technical requirements to support Statewide HIE. Additionally, the other Ad Hoc Workgroups, within their area of expertise, offered additional advice and recommendations on the Statewide HIE Strategic and Operational Plan submitted and approved in 2010.

In the 2011 HIE Strategic and Operational plan, the establishment of the HIE-HIT advisory committee is discussed. This committee will advise and offer recommendations to Mass Health regarding the steps necessary for Mass Health to create and implement a functioning, self-sustaining HIE infrastructure in the Commonwealth, while MeHI will be re-focusing its efforts to support the Last Mile services, which is critical to the acceleration of Health IT adoption in Massachusetts.

[15] The Commonwealth of Massachusetts 2010 Health Information Technology Strategic Plan http://maehi.org/pdfs/MeHI_2010_HIT_Plan.pdf.

Chapter One: General Components

1. Project Schedule

1.1. Project Schedule for Health IT Adoption under MeHI – the Last Mile

Below is a summary of the project schedule based on the current plans for the Last Mile implementation to be undertaken by Mass Tech Collaborative (the full schedule can be found in Appendix B on page 184). As the details are analyzed and reviewed the direction might be slightly modified and will be reflected in an update to the project schedule. This is the based on the current understanding and plans.

Massachusetts eHealth Institute (MeHI)
Last Mile Initiative - Project Schedule (Summary View)

ID	Task Name	Status	Duration	Start	Finish	%Comp	Resource Names
1	Last Mile Implementation		524 days	Wed 2/1/12	Mon 2/3/14	2%	
2	Initial Planning/Kickoff		74 days	Wed 2/1/12	Mon 5/14/12	35%	
8	HIE Competitive Grant - As Defined By EOHHS		74 days	Wed 2/1/12	Mon 5/14/12	22%	
14	EHR Assessment/Analysis (EHR Vendors)		43 days	Wed 2/15/12	Fri 4/13/12	11%	
17	Inventory installed EHRs		10 days	Mon 3/26/12	Fri 4/6/12	0%	
26	Managed Vendor Selection/Service Provider Procurement (EHR Vendors)		115 days	Thu 4/12/12	Wed 9/19/12	1%	
31	Last Mile Project Management Office (PMO)		495 days	Tue 3/13/12	Mon 2/3/14	3%	
33	Develop RFPs for PMO system integrators		130 days	Tue 3/13/12	Mon 9/10/12	0%	
39	Develop RFQs for PMO Implementation/Optimization Organizations		130 days	Tue 3/13/12	Mon 9/10/12	0%	
46	Grant Management		502 days	Fri 3/2/12	Mon 2/3/14	0%	
52	Provider Support		485 days	Tue 3/27/12	Mon 2/3/14	0%	
56	Integration		454 days	Wed 5/9/12	Mon 2/3/14	0%	
59	Education & Outreach		492 days	Fri 3/16/12	Mon 2/3/14	0%	
65	Go-Live - HIE Backbone		55 days	Tue 10/16/12	Mon 12/31/12	0%	
67	PIN Priorities - 2012		72 days	Tue 3/13/12	Wed 6/20/12	0%	
68	Lab results delivery		72 days	Tue 3/13/12	Wed 6/20/12	0%	
71	e-Prescribing		72 days	Tue 3/13/12	Wed 6/20/12	0%	
74	Clinical summary exchange		72 days	Tue 3/13/12	Wed 6/20/12	0%	
77	Deployment/Roll-Out		0 days	Mon 2/3/14	Mon 2/3/14	0%	

1.2. Project Schedule for planning, development and implementation of the Statewide HIE under EOHHS

The following is the project schedule for the planning, development and implementation of the Statewide HIE under EOHHS and the SMHP.[16] If this revised Strategic and Operational Plan is approved, the following Project Schedule for implementation and deployment will no longer be part of the ONC Cooperative Agreement but shall shift over to Mass Health under the CMS Grant and become the sole responsibility of Mass Health.

When all of the project activities are completed and functionality is in place, Medicaid providers – and other providers – will have the infrastructure to:

- Transmit information from and to multiple senders and receivers (directed exchange)
- Access a directory of providers and facilities
- Utilize a service to accommodate bulk certificate management, as well as ongoing management of enrollment/disenrollment of providers and organizations in the service
- Exchange clinical information between state systems and providers/labs/healthcare organizations, using HL7 standard in a secure environment

[16] 2011 APD, Section 3

Phasing	Reconciled HIE Project List	Next steps	Timing
Phase 1	Statewide HISP w/ Direct Gateway Provider directory VG enhancement: Access & Identity Mgmt VG enhancement: PKI VG enhancement: HL7 gateway HL7 interface: Syndromic Surveillance HL7 interface: CBHI HIE end-user integration program IMPACT (ONC Challenge Grant)	- Develop detailed scope, requirements, budgets, and RFPs	Q3 2012 Q3 2012 Q3 2012 Q3 2012 Q3 2012 Q3 2012 Q3 2012 Q3 2012 Q4 2012
Phase 2	Clinical data repository Quality data infrastructure HL7 public health interfaces EMPI Vocabulary services Claims relay service MDPHnet (ONC Challenge Grant)	- Develop governance, business, and operational model	Q1 2013 Q1 2013 Q1 2013 Q2 2013 Q2 2013 Q3 2013 Q4 2013
Phase 3	RLS Consent services Routing service for patients Re-architect/enabling payment methods	- Develop policy frameworks & governance model - Develop technical standards - Develop business/operations model	Q1 2014 Q1 2014 Q3 2014 Q3 2014

Overall and complete ownership of requirements and deliverables will be held by MassHealth, EOHHS project management staff and specific individuals identified by senior leaders within the Division of State Medicaid Management and informed by the Health IT Council and HIE-HIT Advisory Group. Mass Technology Collaborative will no longer have any responsibility for these implementation activities nor the time frames established for completing them.

[17]By the end of CY 2012, the Commonwealth's envisions having in place key Meaningful Use functionality:

- Statewide HISP "information highway" making available various HIE services
- Direct Gateway enabling participating providers to send and receive clinical documents
- Public Health Gateway enabling DPH to receive clinical transactions from participating providers
- Long-Term Care (LTC) Gateway enabling LTC entities to receive clinical information from participating providers
- Provider Directory facilitating bi-directional exchange of clinical transactions
- Security Management Service ensuring end-to-end security
- Adoption incentives and services removing barriers to HIE adoption

The overall schedule for MassHealth's completion of the various Phase I projects is included below.

[17] 2011 APD, Section 6

HIE Phase 1 Timeline							
Projects	Sub Projects	Analysis	Design	Construction	System Testing	UAT	Implementation
HISP	Direct Gateway	3/1/2012	4/16/2012	5/21/2012	7/23/2012	8/27/2012	10/15/2012
Virtual Gateway Enhancements	AIMS 3.0 - HIX Development	2/1/2012	3/1/2012	4/1/2012	6/1/2012	7/5/2012	
	AIMS 3.0 - HIE changes & Expansion	5/21/2012	6/11/2012	6/25/2012	7/23/2012	8/15/2012	10/15/2012
	Public Key Infrastrcture	3/1/2012	4/9/2012	5/14/2012	6/11/2012	7/16/2012	10/15/2012
	Provider Directory	3/1/2012	4/16/2012	5/21/2012	7/9/2012	8/6/2012	10/15/2012
	Clinical Gateway	5/7/2012	6/4/2012	7/9/2012	8/27/2012	9/24/2012	12/14/2012
HL7 Interface - Syndromic Surveillance		6/4/2012	7/23/2012	8/20/2012	10/15/2012	11/19/2012	12/14/2012
HL7 Interface – Children's Behavioral Health Initiative(CBHI)		6/4/2012	7/23/2012	8/20/2012	10/15/2012	11/19/2012	12/14/2012

1.3. Risks and Issues

Risks and Issues are listed below and organized by domain. This is a high-level assessment that will be more defined to as MassHealth refine its services delivery architecture.

1.3.1. Governance

Risk/Issue	Description	Probability	Impact	Prevention/Mitigation Strategy
Stakeholder Consensus	Stakeholders may disagree on the state-wide HIE strategy. This may spill over to the public forum which could decrease confidence in the HIE solution	Low	Medium	Continue to keep a broad set of stakeholders involved at various levels in our process and decision-making.
Lack of Public Acceptance	The Public could strongly oppose an HIE for economic, political or privacy reasons.	Low	High	Continue and enhance public outreach campaigns. Hold public forums with Advisory members to explain the necessity and value of the HIE.

1.3.2. Finance

Risk/Issue	Description	Probability	Impact	Prevention/Mitigation Strategy
Economic Environment Fails to Improve or Deteriorates	MA state economy is currently under pressure with many budget cuts. Without improvement in the economic climate, it may be difficult to garner additional public or private financial support...	Medium	High	Foster broad stakeholder base and work closely with Administration and Legislature, to secure sustainable financial resources. Develop a self-sustainability plan for the HIE
Fee structure too complex in network of Networks Paradigm	HIE charges may be uneven or favor one type of entity over another and cause lower participation.	Medium	High	Develop fee structure with a broad group of stakeholders. Hold forums for public comment. Enable remediation strategies where imbalances develop.
Network of network entities cannot connect due to financial constraints	Some provider entities are unable to meet the readiness requirements to connect to the Statewide HIE.	Medium	High	Develop financing mechanisms that support direct connectivity, likely in some form of financial assistance.

1.3.3. Technical Infrastructure

Risk/Issue	Description	Probability	Impact	Prevention/Mitigation Strategy
Difficulty Coordinating Use of State and Vendor Infrastructure	MA model may create complexity for integrating State and Vendor infrastructure and operations	Low	Medium	EOHHS to provide key staff to enable vendor continuity. Plans will also be developed to move to an all-state or all-vendor infrastructure if vendor performance fails to meet acceptable standards.
Dependency between state projects	REC, HIE, Medicaid and other projects are supportive of each other. Each of these initiatives depends on deliverables from other initiatives.	Medium	High	MeHI is the REC for MA, the State designates entity (SDE) for HIE and is closely aligned with Medicaid and other state agencies. Working with the MA Secretary of EOHHS, close coordination and alignment exists between relevant state agencies and MeHI to increase the continuity between projects and infrastructure.
MPI Complexity Between Multiple Systems	The statewide Master Patient Index will require the harmonization of several existing institutional Patient indices. There is a risk that it will be difficult to get all provider stakeholders to the table to effectively create a statewide MPI.	Medium	High	Most providers have articulated a strong desire to see a statewide MPI in place. Policy, regulatory and a clear value proposition are available to ensure that broad based stakeholders are motivated.
REC and other EHR Adoption Initiatives Prove Slower Than Planned	The scale and timing EHR adoption in MA is unprecedented. Direct connectivity to the HIE may be slowed by inability to implement systems at provider sites	Medium	Medium	Ensure that portal solution offers a high degree of functionality. Work closely with broadband initiatives to ensure that portal is reasonably accessible. Chapter 305 mandate will provide further incentive for implementation of EHRs in Commonwealth.
EHR Vendor Products Difficult to Integrate with HIE	The vendor solutions may create expensive and time consuming integration overhead. This may result in lower HIE adoption and higher costs.	Low	High	Work on vendor relationships using statewide and regional leverage to ensure that integration points are minimized and cost is contained.

1.3.4. Business and Technical Operations

Risk/Issue	Description	Probability	Impact	Prevention/Mitigation Strategy
NHIN Timing and Capabilities	NHIN timing and capabilities continue to change making it difficult to anticipate how the HIE and other providers in the state will utilize NHIN capabilities.	Medium	Medium	Develop short-term implementation and financing strategies that are independent of NHIN while ensuring that the architecture is ready to leverage future capabilities.
Managing Multiple Vendors	The MA strategy of fostering innovation and put the optimal solution in place may require multiple vendors. Multiple vendors may prove difficult to manage.	Low	High	EOHHS will focus resources on ensuring that the vendor contracts include specific vendor cooperation metrics. EOHHS will also focus on ensuring vendor communication.
Vendor fails to meet key Milestones	A vendor may miss a milestone with implications on other dependent activities.	Low	Medium	Contracts and vendor management will be acutely focused on this possibility and strategies to mitigate risks.
Vendor cannot meet service levels	Vendor is overextended, has overcommitted or is dependent on a failing sub-vendor.	Medium	Medium	EOHHS (and for purposes of the Last Mile activities only, the LMMO) will closely monitor vendor contract performance and will be actively involved in vendor performance remediation to ensure issue resolution.
Vendor bidding process will be challenged	Unselected vendors may claim bidding process is flawed to their detriment	Low	Low	Ensure open, competitive and transparent bidding process is followed; elicit feedback from all vendors during and following the process.
Multiple vendors	Multiple vendors to contract, manage and coordinate requires strong PMO capabilities	Medium	Low	In the case of the Last Mile ensure a strong LMMO is maintained
HIE implementation complexities	More flexibility adds more complexity on the HIE side	Medium	Low	Establish consistent standards and processes across entities
Workforce	Shortage of skilled workforce	Medium	Medium	Use advice and recommendations from Workforce Ad Hoc Workgroup to develop workforce development program.

1.3.5. **Legal and Policy**

Risk/Issue	Description	Probability	Impact	Prevention/Mitigation Strategy
Unable to Implement Unified Consent System	Existing consent policies and difficulty in interpreting the State and Federal law may lead to inconsistent implementation of consent.	Low	Medium	Implement a centralized consent system to ensure uniformity.
Data Breach - PHI	A data breach occurs that can be attributed to a failure in the statewide HIE process, procedure or system.	Medium	High	Policies and procedures to quickly notify appropriate parties including individuals, state Attorney General and appropriate federal agencies; transparency about potential risks and mitigation strategies included in educational materials; set of sanctions and remedies developed.
Single or Class Action Lawsuit	Statewide HIE fails to meet service levels or an individual or group rejects aspect of functionality, e.g., consent management.	Low	Medium	Ensure adequate monitoring and communication to and from stakeholders.
Opt-in consent modes	Chapter 305 requires an Opt-in strategy, which may cause a large number of individuals to stay outside of the statewide HIE system of services either by choice or by default.	High	High	Create broad stakeholder base. Hold numerous public meetings. Public marketing campaigns. Education materials for providers. Learn from existing HIE experience to repeat success and avoid issues.

2. Coordination with ARRA Programs

2.1. Regional Extension Center

MeHI has been established as the Regional Extension Center (REC) for Massachusetts. While only 2,500 priority providers will be eligible for the federally funded direct assistance services, MeHI is delivering services to all providers in the Commonwealth including capabilities to help them integrate with the statewide Health Information Exchange; MeHI will continue to update providers, patients and consumers in the following areas:

- Meaningful use standards
- Chapter 305
- HIPAA
- Privacy and Security
- Medicaid
- Health information exchange
- Other federal and state Health IT compliance requirements

In addition, MeHI's REC program staff and partners will design curricula and educational tools for providers, patients and consumers, as well as developing the necessary contacts and approaches for ongoing information gathering and subject matter expertise. MeHI's value-added service for providers includes the following:

- Leverage Computerized Physician Order Entry (CPOE) expertise.
- Link with Massachusetts Broadband Institute (MBI) for broadband infrastructure for underserved areas.
- Collaborate with Department of Public Health on Quality Improvement Coaching in practices.
- Partner with the Patient Centered Medical Home program and emerging Accountable Care Organizations.

2.2. Agency for Healthcare Research and Quality (AHRQ)

There are no AHRQ-funded projects related to HIE in Massachusetts at this time.

2.3. Workforce Development

Bristol Community College in Massachusetts has received federal funding as part of Community College Consortium. Their focus is on practice/workflow and practitioner consultants and on recruiting the underemployed in nursing and IT. The program is six months long and will accommodate 250 participants over a two-year period. Although the course includes a practicum component, they offer as many online courses, as is feasible.

2.4. Massachusetts Broadband Institute

MeHI will work in collaboration with the Massachusetts Broadband Institute (MBI), a division of the Massachusetts Technology Collaborative, whose broad mission is the extension of affordable high-speed internet access to all homes, businesses, schools, libraries, public safety and medical facilities, government offices, and other public places across the Commonwealth. MeHI has worked closely with MBI including making joint presentations in western Massachusetts and leveraging MBI's mapping capabilities to track provider adoptions of EHRs.

MassBroadband 123[18]

The National Telecommunications and Information Administration (NTIA) has awarded a $45.4 M grant to Mass Technology Collaborative that will supplement the $26.2 M in state matching funds to build the *MassBroadband 123* project – a robust, open access, middle mile fiber network covering over one-third of the state. The network will connect 123 communities in western Massachusetts and the 1,392 community anchor institutions (CAIs) that serve them. *MassBroadband 123* is the transformative missing link to deliver comprehensive economic, educational and public safety benefits to this region hard hit by the national shift from manufacturing to a knowledge-based economy. Supporting the MBI's comprehensive community approach is a broad coalition that includes small towns and large cities; home-based businesses and multi-national companies; schools, from kindergartens to community colleges and research universities; and healthcare facilities, from small clinics to regional hospitals.

[18] MassBroadband 123, The Massachusetts Broadband Institute, March 25, 2010.

3. Coordination with Other States

At the national level MeHI staff has participated in a number of Standards and Interoperability (S&I) Framework Initiatives. Participants in the S&I Framework include representatives of states as well as EHR vendors and are facilitated by ONC. The overarching goal is to collaborate on interoperability challenges critical to meeting Meaningful Use objectives. MeHI staff have participated in the Transitions of Care (ToC) Initiative whose mission is to improve the exchange of core clinical information among providers, patients and other authorized entities electronically in support of meaningful use and IOM-identified needs for improvement in the quality of care; the Lab Results Interface (LRI) Initiative charged with addressing the challenge of lab reporting to ambulatory primary care providers; the Provider Directories (PD) Initiative charged with addressing challenges of certificate information, security information (public keys) and electronic service information including electronic addresses; and the Query Health Initiative charged with establishing requirements for the clinical information model, distributed queries and results expression, with the objective of giving providers, consumers, researchers and others insight into prevention issues, healthcare research and disease outbreaks.

Regionally, MeHI staff participates in the New York eHealth Collaborative (NYeC) EHR/ HIE Interoperability group, a coalition of states and vendors working to address EHR/ HIE Interoperability. Representing states that comprise 41% of US population, participants are engaged at various levels of intensity and commitment. The coalition's goal is to create functional and technical specifications that are common from state to state; states use their own respective processes to promote adoption and implementation of the detailed requirements in each state.

Massachusetts helped form the New England States Consortium of Systems Organizations (NESCSO), which focuses on collaborating on issues pertinent to eHealth activity in this region. NESCSO has expanded from its original scope of providing coordination for Medicaid Information System projects in the New England States. The expanded scope now includes the State-designated entities (SDEs) that are working on statewide Health Information Exchange via the State HIE Cooperative Agreement. NESCSO includes state agencies, quasi-public agencies, non-profits and other organizations in the following states:

- Connecticut
- Maine
- Massachusetts
- New Hampshire
- Rhode Island
- Vermont
- New York

The group meets monthly to share information and best practices and identify priorities among the New England states in Health IT. Topics include the following:

- Best practices
- Management of overlapping patients in medical trading areas
- Processes to support joint work on issues pertinent across our states
- Mechanisms to optimize opportunities relevant to health information technology
- Efforts to create short-term opportunities for HIE Operational Plans

Representatives include Health IT coordinators, Medicaid, HIE organizations and universities. As a result of these meetings, the group has agreed to evaluate and implement projects representing opportunities to promote interstate HIE integrated with Medicaid and the evolving MITA architecture. Mass Health, as the implementor of the HIE, will take over participation in these events and discussions. Initial areas for collaboration have been identified as follows:

- Regional provider directory
- Leverage Direct - Consider use of Direct to support care transition between hospitals and ambulatory providers
- Consider creation of centers of excellence for the various EHR systems that meet certification, with resources available to others in the region
- Privacy policy harmonization: the states have adopted, and are adopting, different privacy policies that will need to be harmonized, or at least dealt with, as patients cross state lines.
- Consent management
- Sharing of best practices and lessons learned in various state-wide deployments of EHR and HIE
- Leverage multi-state influence to influence vendors

4. Strategy to Address ONC Program Information Notification (PIN) Priority Exchanges

4.1. Current State Activity

Comprehensive data on all lab results delivery and ordering is not yet available. Data collected to date indicates reasonable rates of lab delivery in major institutions, and most institutions are technically capable of receiving results and routing to systems under their authority. To broaden the data available, Massachusetts' major health networks were contacted to better understand their lab and ePrescribing capabilities and utilization. Reponses to date are listed separately in Appendix I. We will also work with EHR vendors and the REC to analyze ambulatory lab results delivery and ordering. The following is a summary of the PIN focus areas in Massachusetts, which MeHI will update within the next six months.

Lab Data Exchange

PIN Focus	Status in Massachusetts
% of labs able to produce and deliver structured lab results	95 % of clinical labs send electronic lab results via HL7 messages to MPH Electronic Lab Record Application
% of labs able to receive orders electronically	A scan of independent lab providers performed by a major payer in MA identified that 12% of commercial labs can electronically receive lab orders.
% of providers receiving structured lab results	Our most recent survey information indicates: • 40% EHR usage based on - Simon et al., 2009, Physicians' Usage of Key Functions in Electronic Health Records from 2005-2007. Journal of the American Medical Informatics Association • 48% CPOE based on recent MeHI study – Estimated Costs to Achieve Meaningful Use of Certified EHRs in Massachusetts Hospitals – Results from spring 2009 Survey. •
% of lab results currently being delivered electronically	The status in Massachusetts is unclear. However, based on current analysis total results, delivery is under 50% with wide variation: major institutions are near 100%, but many smaller institutions are at 0%. Ambulatory status is not known but again varies widely with major practice organizations near 100% and many smaller practices at 0%.

E-Prescribing

PIN Focus	Status in Massachusetts
% of pharmacies accepting electronic prescribing and refill requests	97% of pharmacies in Massachusetts have the capability to accept electronic prescriptions and issue refill requests.

Clinical Summary Records

PIN Focus	Status in Massachusetts
Surveyed Major Provider Organizations (HIEs, IDNs, IPAs, State)	• 58% of surveyed respondents currently are exchanging a CCD • 95% of surveyed respondents currently or plan in the near future to exchange a CCD

4.2. Electronic Lab Reporting to Public Health

One hundred percent of Public Health Departments are currently capable of or in testing to receive Immunization, Syndromic Surveillance and Reportable Lab records. Below is a listing of providers and their status.

Hospitals/Labs in Production for Electronic Lab Reporting

Anna Jaques Hospital	Mayo-Blood Lead	Northeast Health Sys (Addison Gilbert and Beverly)
Berkshire	Mayo-Other	Partners: BWH
Brockton	Medtox	Partners: Faulkner
Cambridge Health Alliance	Mercy	Partners: MGH - Lab
Cape Cod	Merrimack Valley Hospital	Partners: Newton Wellesley
Emerson Hospital	Milford Regional Hospital	South Coast HG (Charlton, Saint Lukes, Toby)
Hallmark: Melrose & Lawrence	Milton Hospital	St. Vincent Hospital
Harrington Hospital	Morton Hospital	Sturdy Memorial
Harvard EHR	New England Baptist	Tufts-NE Medical Ctr
Heywood	Noble Hosp	Wing Hospital
Holyoke		

Hospitals/Labs in Electronic Lab Testing

BID Needham	Mount Auburn	North Shore MC
Imugen	Nashoba Valley	UMass
MetroWest MC (Framingham & Leonard Morse)	North Adams	

Hospitals/Labs in Process

ARUP Laboratories	Cooley Dickinson Hospital	Massachusetts Eye and Ear Infirmary
Baystate	Focus Diagnostics	Nantucket Cottage Hospital
Boston Medical Center	Franciscan Children's Hospital	Quest Diagnostics: Cambridge
Caritas: Carney Hospital	Health Alliance Leominster	Quest Diagnostics: Virginia
Caritas: Good Samaritan	Jordan	Quincy Medical Center
Caritas: Holy Family Hospital	LabCorp	Saints Memorial Medical Center
Caritas: Norwood Hospital	Lahey Clinic	

Caritas: Saint Anne's Hospital	Lawrence General Hospital	South Shore
Caritas: Saint Elizabeth's Medical Center	Lowell General Hospital	Specialty Laboratories
Children's Hospital	Martha's Vineyard Hospital	VA Hospital Boston
		Winchester Hospital

Hospitals in AEGIS Production[19]

Addison General Hospital	Heywood Hospital	Somerville Hospital
Berkshire Medical Center	Holyoke Hospital	South Shore Hospital
Beth Israel Deaconess	Marlborough Hospital	Southcoast Hosp - Charlton Memorial
Beverly Hospital	Mass General Hospital	Southcoast Hosp - St. Lukes
Cambridge Hospital	MWMC: Framingham	Southcoast Hosp - Tobey Hosp
Children’s Hospital	MWMC: Leonard Morse Hospital	Sturdy Mem Hospital
Clinton Hospital	Nashoba Valley Med Ctr	UMass Memorial Medical Center
Emerson Hospital	Newton-Wellesley Hospital	Whidden Hospital
Fairview Hospital	Saint Vincent Hospital	
Harrington Hospital	Saints Memorial Med Ctr	

[19] Funding for Automated Epidemiological Geotemporal Integration System (AEGIS) Implementations runs out August 9, 2010.

4.3. Gap Analysis

The following tables represent the gap analysis and the response to the PIN requirements.

Labs

PIN Requirement	Gap Analysis and Response for Massachusetts	
Meaningful use menu set objectives, EPs and hospitals: Incorporate clinical lab test results as structured data	Gap	Strategy
	1: EHR adoption:	• REC via IOOs provide adoption assistance • Meaningful Use incentive payments will help to broadly encourage adoption • MA Chapter 305 legislation mandates EHR in all provider offices by 2015
	2: Lab ability to receive orders and send structured results.	• Look to market solutions for major labs, work with hospitals and other smaller lab providers to integrate with these capabilities. • There have been discussions with Surescripts because Surescripts and Quest are working on a lab hub service that may provide a cost-effective option for labs that aren't currently delivering result electronically. This would provide a market solution that would enable the State to avoid building lab interfaces to all major labs. • Other vendor solutions are likely to emerge, as well.
	3: Statewide capability to securely route and transport. Existing HIEs have capability but would need to expand or have state-level connection point.	This Plan addresses statewide routing and transport through an RFP for statewide services.
Meaningful use menu set objectives, Hospitals: Capability to provide electronic submission of reportable lab results to public health agencies	DPH and Boston DPH are capable of accepting reportable lab results from hospitals. Efforts are underway to bring more providers online with this service with about 17 more institutions coming on line in the next year	

4.3.1. E-Prescribing

PIN Requirement	Gap Analysis and Response for Massachusetts	
	Gap	Strategy
Meaningful use core set objectives, EPs: e-prescribing	Robust market solutions in place.	• Build on existing infrastructure through policy and EHR adoption efforts, such as REC. • Chapter 305 is statewide and requires ePrescribing by 2015 • Market will drive 100% compliance for ePrescribing

4.3.2. Clinical Summary Records

PIN Requirement	Gap Analysis for Massachusetts	
	Gap	Strategy
Meaningful use core set objectives, EPs and hospitals: Provide Patients with an electronic copy of their health information, upon request	1: EHR adoption:	• REC via IOOs provide adoption assistance • Meaningful Use incentive payments will help to broadly encourage adoption • MA Chapter 305 legislation mandates EHR in all provider offices by 2015
	2: EHR ability to emit/consume summary exchange in standard formats.	• Direct-based Statewide HIE Infrastructure will go live in Q4 2012 • Statewide Last Mile Adoption program will procure focused development from vendor to implement Direct-based integration with Statewide HIE backbone.
	3: Statewide capability to securely route and transport. Existing HIEs have capability but would need to expand or have state-level connection point.	This plan addresses statewide routing and transport through an RFP for statewide services.

4.4. Goal

On the connectivity side of the equations, our goal is to develop a network of networks statewide, with exchange and core connectivity capability that connects rich community HIE, Integrated Delivery Networks (IDN) and Independent Physicians Association (IPA) existing networks as well as unaffiliated providers. Massachusetts is poised to accomplish this goal by leveraging our rich existing networks and procuring a set of connectivity services that will join this network together.

To help address the providers' trading partners, MeHI will use State HIE Cooperative Agreement funding to incent and accelerate readiness for labs, pharmacies and provider entities. Although planning is still in early stages, MeHI has demonstrated our commitment to a vision of complete connectivity in our state to facilitate high quality/low cost healthcare delivery. This vision is reinforced by Chapter 305.

4.5. Strategies

In the first phase of statewide HIE infrastructure development; MeHI and its partners are pursuing a connectivity solution that enables all healthcare providers to meet the Meaningful Use and Chapter 305 requirements. The Commonwealth is in the early stages of designing a strategy to rapidly improve the readiness of healthcare trading partners such as labs, pharmacies and long-term care facilities. The following strategies represent, at a high level, our approach to gaps that have been identified, and the means for closing these gaps in functionality and coverage.

- Leverage existing HIE capabilities and add central services and capabilities as needed to provide statewide functionality.
- Support deployment of lowest-common-denominator capabilities (e.g. Clinical Push Portal) in order to meet providers where they are and provide value.
- MassHealth is currently designing and will develop a profiling platform that we will issue to providers and trading partners in order to have a comprehensive database of current and planned capabilities for providers and their trading partner for specific exchange transactions.

Chapter Two: Domain-Specific Components

1. Governance

Chapter 305 of the Acts of the Legislature in 2008 directed the Massachusetts Technology Corporation (Mass Technology Collaborative), an independent development agency chartered to promote new economic opportunity, to create within its structure an e-Health Institute to "advance the dissemination of Health IT across the Commonwealth, including the deployment of EHR systems in all health care provider settings that are networked through a statewide HIE." Chapter 305 also directed the creation of a nine member Health IT Council chaired by the Secretary of the EOHHS to consult to, advise, and oversee the Institute's activities. The HIT Council and Mass Technology Collaborative Board must approve all budgets, contracts, grants, and plans proposed by MeHI.

As Federal programs and monies became available through the ARRA, MeHI became the designated Regional Extension Center and State Designated Entity for Federal HIE grants, and opportunities to realize the goals of Chapter 305 expanded substantially.

Recognizing and wishing to take advantage of the wealth of Health IT subject matter expertise available in Massachusetts, the Health IT Council voted in to create an HIE-HIT Advisory Committee to make recommendations on Health IT/HIE policy, technology, independent sustainability, and the cultural acceptance of Health IT among both providers and the public. Five workgroups were created to develop these recommendations for the Advisory Committee, which forward them to the Health IT Council as appropriate for vote and acceptance. Lastly, the Massachusetts eHealth Collaborative, working with the Massachusetts Health Data Consortium, was procured by MeHI to serve as subject matter expert in facilitation, research, and collation of recommendations to support the Advisory Committee and its Workgroups.

It is the intent of all entities involved to ensure the effective and efficient use of public and private funds to build the infrastructure necessary for widespread use of interoperable health information and to create a sustainable business model. To further that goal, upon approval of this revised Strategic and Operational Plan, Mass Health shall assume and have all responsibilities related to HIE implementation, deployment, infrastructure services and procurements under the CMS Grant. Mass Technology Collaborative will re-focus its activities and limit them to the Last Mile only under the ONC Cooperative Agreement, as more fully described in this document.

1.1. Governance Entities defined in State Statute

The Health IT Council

The Health IT Council, as described in Chapter 305, consists of nine members, including four representatives of governmental agencies and five representatives from the private sector. The four agencies are the Executive Office of Health and Human Services, the Executive Office for Administration and Finance, the Executive Office of Housing and Economic Development and the Medicaid Office. The five private sector members are appointed by the Governor. Of the five, one is to be an expert in health information technology, one an expert in law and health policy and one an expert in health information privacy and security. The Health IT Council is chaired by the Secretary of the EOHHS, who also chairs the Health Care Quality and Cost Council and oversees the Medicaid Office. The Health IT Council must approve all budgets, contracts, grants to providers in the Commonwealth, and annual Health IT Plans.

Massachusetts Technology Collaborative

Mass Technology Collaborative is an independent development agency chartered by the Commonwealth to promote new economic opportunity and to foster a more favorable environment for the formation, retention and expansion of technology-related enterprise in Massachusetts. Mass Technology

Collaborative serves as a catalyst for growing the knowledge and technology-based industries that comprise the Commonwealth's Innovation Economy. As one of its activities, Mass Technology Collaborative works with major healthcare organizations to implement e-health solutions that are intended to improve the quality and continuity of patient care and reduce costs. Mass Technology Collaborative operates at the intersection of government, industry and academia. It brings together leaders and stakeholders to advance technology-based solutions that lead to economic growth and improved healthcare. Mass Technology Collaborative energizes emerging markets by filling gaps in the marketplace, connecting key stakeholders, conducting critical economic analyses and providing access to intellectual and financial capital. Mass Technology Collaborative operates three programmatic divisions that support economic growth and innovation and attempt to generate public benefits for Massachusetts citizens.

- **The Massachusetts Broadband Institute:** Exists to extend affordable high-speed Internet access to all homes, businesses, schools, libraries, medical facilities, government offices and other public places across Massachusetts.
- **John Adams Innovation Institute:** A public economic development agency that fosters a more favorable environment for the formation, retention, and expansion of technology-related enterprises in Massachusetts.
- **Massachusetts e-Health Institute:** Responsible for advancing the dissemination of health information technology across the Commonwealth, including the deployment of electronic health records systems in all healthcare provider settings that are networked through a statewide health information exchange.

Mass Technology Collaborative functions as the legal contracting entity for all of its divisions.

The Massachusetts e-Health Institute (MeHI)

Oversight of MeHI lies with the Health IT Council and the Mass Technology Collaborative Board of Directors. The Institute is directed to accomplish its mission by facilitating implementation and use of EHRS throughout the delivery system. MeHI has been designated by Mass Technology Collaborative and EOHHS as the REC for the Commonwealth.

MeHI's responsibilities are defined by Chapter 40J of Massachusetts General Laws, Federal and State Agreements and Grants, and its contract with the Medicaid Incentive Payment Program. These include:

- Chapter 40J
  - Prepare Health IT Plan and updates
  - Prepare budgets for implementing the Health IT Plan
  - Issue RFPs for Implementation Optimization Organizations (IOOs)
  - Develop (in consultation with the Council) mechanisms for funding Health IT (widespread EHRs and HIE) including a grant program to assist providers with the cost of Health IT technologies, using funds available in the eHealth Fund
  - Oversee reporting from grant (see above) recipients
  - Maximize available FFP funding (through Medicaid matches)
- Federal and State Funded Grants and Agreements
  - Regional Extension Center -- Provide core functions as outlined in the REC agreement and contract for direct services

- State Health Information Exchange Cooperative Agreement Program – Provide core functions as outlined in the agreement, and contract for services and technologies.
- Interface with and be accountable to government agencies as necessary
- Assure coordination of other ARRA programs in MA (i.e., broadband, and workforce)

- Medicaid Incentive Program
  Provide outreach and training to eligible providers through REC activities

1.2. Advisory Bodies

Health Information Technology - Health Information Exchange Advisory Committee

The HIT-HIE Advisory Committee (The Advisory Committee) serves as a voluntary multi-stakeholder advisory body to the HIT Council. The Advisory Committee's primary focus is to make recommendations on all aspects of the design and implementation of Health Information Exchange (HIE) and to advise on other health information technology policies for the Commonwealth. The Advisory Committee is co-chaired by representatives of both the public and private sectors: the Chief Information Officer for Massachusetts' EOHHS and the Chief Information Officer for a large teaching hospital.

Responsibilities of the HIT-HIE Advisory Group reflect its robust level of subject matter expertise and include recommendations for the following:

- Health IT/HIE Policy
- Development of the overall Health IT Roadmap
- Establishment of priorities for Health IT activities
- Development of adoption metrics and monitoring activities
- Procurements and budgets
- Requirements for RFPs
- Development of a self-sustaining HIE business model
- Participation by Advisory Group members on Workgroups and panels reviewing proposals

Advisory Council Workgroups

Over eighty stakeholders participate in one or more workgroups making recommendation to the HIT-HIE Advisory Committee. The charges and objectives of each are listed below.

- Legal and Policy
  Workgroup Charge: To plan and develop a governance model and legal & policy framework for statewide HIE activity conducted through publicly-funded or -supported programs.

  Objectives:

  - Review and assess existing legal and policy foundation for statewide HIE from Ad Hoc Committee, HISPC, and other existing work completed to data, and develop gap analysis.
  - Identify governance models for policy oversight and operations of statewide HIE activities funded by federal and state programs
  - Identify statutory and/or regulatory barriers to HIE and recommend changes statutes and/or regulations to the AC or determine if they serve an important protective purpose and need technological support to allow the HIE to proceed.

- Identify governance models for policy oversight and operations of statewide HIE activities funded by federal and state programs
- Draft key legal and policy documents for AC review and approval e.g., HIE Policies and Procedures, Participation Agreements
- Technology and Implementation Workgroup
  Workgroup Charge: To plan and develop technical and operational requirements and approaches for statewide HIE activity conducted through publicly-funded or -supported programs. To develop strategies, standards, and requirements for an enhanced statewide HIE architecture that leverages existing networks, shared services, and standardized regional services to enable broad adoption and use of statewide HIE services.

  Objectives:

  - Develop strategies for effective utilization of statewide HIE shared and standardized regional services related to clinical care and Meaningful Use
  - Develop strategies and recommendations for standardized EHR-HIE interoperability
  - Develop strategies and recommendations for implementing and operating statewide HIE infrastructure and services funded or supported through federal or state programs.
  - Develop updated policy and architecture specifications that support statewide interoperable HIE for each HIE Phase

- Finance and Sustainability Workgroup
  Workgroup Charge: To recommend financing and business models for implementing and sustaining statewide HIE infrastructure and services.

  Objectives:

  - Assist Advisory Committee regarding allocation and use of Federal, State, and private funds
  - Inform key Advisory Committee decisions with cost data, budget projections, and representative stakeholder/customer input
  - Define financial feasibility & constraints for procurement decisions
  - Identify potential business models for sustaining health information exchange infrastructure and operations after existing federal and state funds have been depleted
  - Provide recommendations on a business plan for statewide HIE activities funded through federal and state programs

- Provider Engagement and Adoption Workgroup
  Workgroup Charge: To raise awareness of the Health IT-HIE program among providers, to encourage adoption of Health IT-HIE among providers, and to ensure that provider input is considered for all critical recommendations and Advisory Committee decisions.

  Objectives:

  - Communicate with, inform, and educate providers regarding Health IT and HIE in the Commonwealth
  - Encourage adoption of Health IT/HIE among Providers

- Ensure that Provider input is sought out and considered for all critical recommendations and Advisory Committee decisions
- Facilitate dialogue and input gathering among Providers for confusing or controversial topics and to raise Provider awareness of Health IT/HIE benefits and risks
- Advise regarding development of Last Mile strategy

- Consumer and Public Engagement Workgroup
  Workgroup Charge: To raise awareness of the Health IT-HIE program among consumers, to engage consumers in the program, and to ensure that consumer input is considered for all critical recommendations and Advisory Committee decisions.

  Objectives:

  - Communicate with, inform, and educate consumers regarding Health IT and HIE in the Commonwealth Ensure that consumer input is sought out and considered for all critical recommendations and Advisory Committee decisions
  - Facilitate public dialogue and consumer input gathering (e.g., through interviews, workshops, and surveys) for confusing or controversial topics and to raise consumer awareness of Health IT HIE benefits and risks
  - Advise regarding development of Last Mile strategy, keeping in mind the consumer connection as an integral part of this work

2. Finance

As described throughout this document, all implementation, deployment, infrastructure services and procurements required for the Statewide HIE will be implemented by EOHHS, using matching funds from CMS. End user integration and adoption of the Statewide HIE (the Last Mile) will be funded through the ONC HIE Cooperative Grant.

2.1. Budgeted Match Calculation Methodology

The budget is built on a quarterly basis and the match costs are calculated in the budget accordingly. The budget for the matching costs has been calculated in accordance with the level of match required for each federal fiscal period and is calculated at the appropriate ratio of all project costs across all costs categories. The actual match is calculated in accordance with the project year start and end date, the applicable ratio in effect at that time, and the actual cost incurred during the period. The applicable match ratio for nonfederal funds is calculated by taking the total project costs times the appropriate match ratio for the applicable period. The most current budget has been sent to ONC.

Year 1

- Project start to 10/1/10: No match requirement
- For the period from 10/1/10 through the end of the project year 1: the ratio of $1 match for every $10 federal or 9.09% of total project costs.

Year 2

- Start of project year 2 through 10/1/11: the ratio of $1 match for every $10 federal or 9.09% of total project costs
- For the period from 10/1/11 through 2/7/12: the ratio of $1 match for every $7 federa1 or 12.5% of the project costs.

Year 3

- From the start of project year 3 through 10/1/12: the ratio of $1 match for every $7 federa1 or 12.5% of the total project costs
- For the period from 10/1/12 through 2/7/13 the ratio of $1 match for every $3 federa1 or 25% of the project costs.

Year 4

For project year 4: the ratio of $1 match for every $3 federal or 25% of the project costs.

2.2. Proposed Revised ONC HIE Cooperative Agreement Budget

Category of Cost	Description of Cost	Number (people/ contracts)	Rate/ Amount	Annual hours	# of Years	Year 1&2 (2/8/10-2/7/12)	Year 3&4 (2/8/12-2/7/14)	Total Cost	Budget notes
Personnel	HIE Planning and Implementation Staff Project Year 1&2	Varied during the period	Based upon annual salary of staff plus benefits	2080	2	$1,037,973		1,037,973	Assumes actual salaries and benefits for MeHI HIE staff allocations through June 30, 2011 and budgeted amounts through February 7,2012
Personnel	MeHI personnel-Last Mile Project Management	3.55 to 4.55	Based upon annual salary of staff plus benefits	2080	2		$1,309,669	$1,309,669	Includes salaries and benefits for 1 project manager, HIE Program Director and allocation of 1.55 other MeHI staff focused on HIE Last Mile activities. An additional Project Manager is projected in July 2012 for Last Mile project management. More defined roles will be determined as Last Mile activities are more fully defined.
Contractual-Vendor	Project Year 1&2 Consulting costs - management consultants, legal services, technical services	Varied	Based upon agreed upon rate for specific vendors for agreed upon scope of work	Varied	2	$360,552		$360,552	Actual consulting costs incurred through June 30, 2011 and budgeted consultants for FY12 through Feb 8th. These consulting costs include technical consultants, A133 audit fees, and evaluation services

Category of Cost	Description of Cost	Number (people/ contracts)	Rate/ Amount	Annual hours	# of Years	Year 1&2 (2/8/10-2/7/12)	Year 3&4 (2/8/12-2/7/14)	Total Cost	Budget notes
Contractual-Vendor	Subject Matter Expert		Based upon contract budget and agreed upon fee cap for 1 year		1	$200,000	$75,000	$275,000	Subject Matter Expert, MAeHC, contract value includes estimate for costs incurred through Feb 8th based upon run rate and remainder of contract to be expended by end of contract in August of 2012
Contractual-Vendor	Project Year 3&4 Other consulting		Estimated	Varied			$257,750	$257,750	Projected costs for consulting requirements for evaluation services, annual A-133 audit, and other consulting needs that may include outreach, marketing, or technical assistance
Contractual-Vendor	Analysis Consultant	1	150	1040	1		$156,000	$156,000	The EHR landscape (hospital and ambulatory) is largely known. More work will be required to understand the LTC and behavioral health landscape, and to get a better understanding of the individual capabilities of each vendor.
Contractual-Vendor	Legal Services-Contract development	35	5,000	Varied		$85,000	$90,000	$175,000	Legal costs for HIE matters and the development and end-user terms and conditions for 25 EHR

Category of Cost	Description of Cost	Number (people/ contracts)	Rate/ Amount	Annual hours	# of Years	Year 1&2 (2/8/10-2/7/12)	Year 3&4 (2/8/12-2/7/14)	Total Cost	Budget notes
									vendors plus end-user grant/support contracts
Contractual-Vendor	PR firm-Education and Outreach	1	100	520	1		$52,000	$52,000	Development of marketing/educational collateral to support education/outreach.
Contractual-Sub recipients	Last Mile Integration Vendor	5	150	2080	1.42		$2,210,520	$2,210,520	5 LM integration FTEs for 1.42 years to scope and execute approximately 25 individual EHR vendor projects. Assume start date of 9/1/2012.
Contractual-Financial Assistance	EHR vendor - Development Contracts	25	75,000	N/A			$1,875,000	$1,875,000	Integration development contracts with 25 vendors. Assume a mix of hospital, ambulatory, LTC, behavioral health vendors, to be determined from the landscape analysis. Actual price will vary depending on vendor mix; average price estimate based on experience with similar efforts in MA and NY.
Contractual-Financial Assistance	Small practices End-user grants/support program	1000	2,500	N/A			$2,500,000	$2,500,000	Assume approximately 1000 unaffiliated/under-served small practices that would comprise 2000-3000 clinicians

Category of Cost	Description of Cost	Number (people/ contracts)	Rate/ Amount	Annual hours	# of Years	Year 1&2 (2/8/10-2/7/12)	Year 3&4 (2/8/12-2/7/14)	Total Cost	Budget notes
Contractual-Financial Assistance	Long Term Care End-user grants/support program	100	1,000	N/A			$100,000	$100,000	Training/support for those LTCs that are using web portal or need assistance with EHR interface acceptance testing and training. Assumes targeting roughly 1/4 of the 400 LTC facilities in the state.
Contractual-Financial Assistance	Behavioral health End-user grants/support program	100	1,000	N/A			$100,000	$100,000	Training/support for those BH providers that are using web portal or need assistance with EHR interface acceptance testing and training
Contractual-Financial Assistance	Hospitals End-user grants/support program	20	20,000	N/A			$400,000	$400,000	Technical support for small hospitals and state hospitals that need assistance with EHR interface acceptance testing and training
Travel-Year 3&4	Conference and local travel costs including mileage, airfare, hotel and parking			N/A	2		$19,800	$19,800	Travel Costs for 2 annually required ONC HIE conference participation and other local travel to vendor site and statewide HIE stakeholders.
Travel-Year 1&2	Conference & local travel costs including mileage, airfare, hotel & parking			N/A	2	$17,044		$17,044	Travel costs for annual ONC HIE conferences, other DC trips and local travel for HIE stakeholder events

Category of Cost	Description of Cost	Number (people/ contracts)	Rate/ Amount	Annual hours	# of Years	Year 1&2 (2/8/10-2/7/12)	Year 3&4 (2/8/12-2/7/14)	Total Cost	Budget notes
Other-Year 1&2	Direct costs for HIE event, materials, HIE specific IT needs, outside services, facility costs, and other minor costs categories			N/A	2	$116,222		$116,222	Other costs including events, publications, HIE staff facility costs, specialized SW for HIE activities, temporary staff and other costs not included in other categories
Other Year 3&4	Direct costs for HIE event, materials, HIE specific IT needs, outside services, facility costs, and other minor costs categories			N/A	2		$218,203	$218,203	Other costs including events, publications, HIE staff facility costs, specialized SW for HIE activities, temporary staff and other costs not included in other categories
Other-In-Kind Year 1&2	In-kind/Donated services by Ad Hoc Workgroup members and vendors			Varied	2	$315,947		$315,947	Value for donated services to be used toward match requirements. In-kind services includes ad hoc workgroup member time for HIE participation and vendor donated services
Other-In-Kind Year 3&4	In-kind/Donated services by Ad Hoc Workgroup members and vendors			Varied	2		$113,900	$113,900	Value for donated services to be used toward match requirements. In-kind services includes ad hoc workgroup member time for HIE participation and vendor donated services

Category of Cost	Description of Cost	Number (people/ contracts)	Rate/ Amount	Annual hours	# of Years	Year 1&2 (2/8/10-2/7/12)	Year 3&4 (2/8/12-2/7/14)	Total Cost	Budget notes
Indirect Costs Year 1&2	Shared Corporate services costs			Varied	2	$774,759		$774,759	Mass Technology Collaborative Shared Corporate Services costs for all Executive, Finance, Legal, IT, HR, and Communication efforts of staff and other non-personnel costs. This is allocated in accordance with Mass Technology Collaborative's federal approved indirect cost rate.
Indirect Costs Year 3&4	Shared Corporate services costs			Varied	2		$921,785	$921,785	Mass Technology Collaborative Shared Corporate Services costs for all Executive, Finance, Legal, IT, HR, and Communication efforts of staff and other non-personnel costs. This is allocated in accordance with Mass Technology Collaborative's federal approved indirect cost rate.
	Total					$2,907,497	$10,399,627	$13,307,124	

Mass Technology Collaborative shall provide the applicable match required under the ONC HIE Cooperative agreement based upon the match period that the expenditure is incurred. The above proposed budget includes both federal and non-federal project costs.

2.3. Public and Private Financing Strategies

ONC Grants

In February 2010, Mass Technology Collaborative/MeHI received a four year grant award of $ 10.6 million from the Office of the National Coordinator to complete the development of the HIE planning process and to begin the deployment of the statewide HIE. The planning funding was up to $1,000,000 to develop the HIE Strategic and Operational Plan. The grant amount covered staff salaries, fringe benefits, consulting and other direct and indirect costs. Once the HIE Strategic and Operational Plans were approved by ONC in the fall of 2012, Mass Technology Collaborative/MeHI was able to access the remaining grant funding, to begin the development of the statewide HIE. MeHI has also received two challenge grants, IMPACT and MDPHnet. Mass Technology Collaborative will continue to manage IMPACT and MDPHNET Challenge Grants along with the Last Mile activities. Upon approval of the revised Strategic and Operation Plans, Mass Technology Collaborative shall use funds for the Last Mile activities outlined in this SOP and proposed budget.

In January 2011, Massachusetts was awarded supplemental funding for State Grants to Promote Health Information Technology under the Health Information Exchange Challenge Program. The grants were awarded to drive breakthrough progress for statewide health information exchange in the following key challenge areas:

- Theme 2: Improving long-term and post-acute care transitions (IMPACT)
- Theme 5: Fostering distributed population-level analytics (MDPHnet)

There were a total of 10 grants available across the US and territories with funding of $1M to $2M per grant; MeHI was selected to receive approximately $3.4M ($1.7M each) of additional funding for both submissions.

The Theme 2 project, entitled *Improving Massachusetts Post-Acute Care Transfers* (IMPACT), has the goal of connecting post-acute providers to hospitals and physician offices. Synergies between the IMPACT grant and the Statewide HIE Infrastructure will be captured to the greatest extent possible. For example, both projects envision a Direct Gateway as well as web-based access to Direct-based services and the Statewide HIE infrastructure will thus create components that can be used both for IMPACT as well as for other HIE uses. The Theme 5 project will build upon work currently underway by the Massachusetts Department of Public Health and Harvard Medical School's Department of Population Medicine (DPM), and will create a population-based surveillance network, *Massachusetts Department of Public Health Net* (MDPHnet), targeting a broad array of health indicators across multiple providers and delivery systems. More detail on the IMPACT and MDPHnet projects is provided below.

IMPACT

Improving Long-Term and Post-Acute Care Transitions (IMPACT) is an Office of the National Coordinator grant- designed to improve care transitions using an enhanced electronic Universal Transfer Form (UTF) and electronic health information exchange. IMPACT will focus its efforts in Worcester County, a region where 85% of the healthcare for its 800,000 person population stays within the county. It will analyze almost 100,000 patient transfers per year, as well as 20,000 Medicare Advantage patients whose claims data will be used for total cost of care analyses. A pre- and post-test model using claims and other metrics will be used to evaluate the success of the project objectives, using claims data and other metrics.

MDPHnet

The MDPHnet Project is the marriage of two software systems created by Harvard Medical School's Department of Population Medicine (DPM). The first system, Electronic Support for Public Health System (ESP), is a disease surveillance software application that can extract and analyze data from electronic health record system for events of public health importance. The second, PopMedNet, is a software application than enables controlled, secure, distributed analyses of health data owned by different organizations and stored in different locations. Marrying these two technologies will make it possible for hospitals and clinics to give the health department controlled access to their electronic health record data to study specific health indicators in their patient population. It will also make it possible for health departments to easily query the electronic health record systems of multiple providers at once to get a population level view of health indicators.

The federal funds allocated for the State HIE Cooperative agreement--including the Challenge grants--is $13,992,348, which supports staff salaries, benefits, consulting costs, sub recipient costs, and other direct and indirect costs. The costs categories anticipated under this revised plan are expected to remain relatively consistent with the approved federal budget. The primary change to the budget initially proposed and approved is in the contractual category of the current budget, which previously projected an expense of approximately $5 million of the federal award for HIE Implementation Services, which will now be repurposed for Last Mile activities; MeHI requests a revision to the budget to allow these funds to be used for the Last Mile services and grant activities. It is also likely that the projected match requirements will change based upon the timing of expenditure of the Last Mile activities through which MeHI shall meet the required match of the federal expenditures. Upon approval of this revised plan, MeHI will work with the ONC Office of Grants Management (OGM) to provide additional budget details as necessary.

Business Plan

The statewide HIE will finalize its business plan following receipt of information from multiple stakeholders. MeHI is considering a variety of possible HIE business models, such as the following:

- Not-for-Profit – The not-for-profit HIEs are driven by their charter to help the patients and the community in which they provide services. Their tax-exempt status can help to reduce funding challenges and provide special tax credits/incentives.
- Public Utility – These HIEs are created and maintained with the assistance of federal/state funds and are provided direction by the federal/state government. The organization's funding source is the primary differentiator for this category. The State Medicaid agency often assumes responsibility for the HIE in this model.
- Physician and Payer Collaborative – This type of HIE collaborative is created for and by certain physicians and payers within a geographical region. These collaboratives can be either for-profit or not-for-profit organizations; however, the key to this category is the collaboration between and mutual benefits for participating payers and physicians.
- For-Profit – For-profit HIEs are created with private funding and have firm return on investment targets. These organizations look to reap financial benefits from their transactions and often have solid start-up funding.
- Selection of the appropriate model for Massachusetts will also involve assuring consistency with the governance responsibilities under Chapter 305 of Mass Technology Collaborative, MeHI and the Health IT Council.

State-level HIE revenue strategies are often built around arrangements used by local HIEs, with consideration on who will provide value and how the HIE will be involved (see Appendix C for example). The four primary revenue strategies are as follows:

- Subscription Fees – Data providers or data users pay fees to the HIE on a subscription basis. Subscriptions can be in the form of annual membership, monthly subscription or specific set fees for services consumed.
- Transaction Fees – Data providers or data users pay fees to the HIO based on transactional volume. This may include a tiered scale with volume discounts – lower fee per message delivered for higher volumes.
- Service/Cost Sharing Fee – Fees are charged or paid based on the completion of certain milestones or cost savings for case management or coordination of care.
- Pay for Performance – HIE-enabled pay for performance models can be deployed in two ways: (1) through fees paid by insurers on per member basis, or (2) by insurers paying financial incentives to physicians and health systems for achieving certain healthcare-related quality measures.

2.4. Financial Reporting

Mass Technology Collaborative has appropriate systems and processes to track and report on costs in a segregated manner. Its systems and reporting are sufficient to meet all required reporting to ONC and other federal agencies in an accurate and timely manner. Financial statements are audited annually by independent auditors. If this revised Strategic and Operational Plan is approved, Mass Health will assume all reporting requirements for all implementation activities pursuant to the terms of the CMS Grant and Mass Technology Collaborative shall retain all reporting requirements related to Last Mile and Challenge Grants activities under the ONC Cooperative Agreement. An amended NGA (or some other form of contract amendment) between ONC and Mass Technology Collaborative will be required to further specify reporting and all compliance requirements.

2.5. Audits and Controls

As of 2010, Mass Technology Collaborative has successfully managed close to $500 million in public funding by providing grants, loans and other financial assistance to thousands of projects across the state during the past 27 years. Mass Technology Collaborative employs 55 professional staff to manage all legal, finance, audit, IT and communications/marketing services for its major divisions. Annual budgets and operating plans are presented and approved by the Executive Committee of the Mass Technology Collaborative Board of Directors and the Health IT Council. The agency has a $13 million annual operating budget and maintains strict financial controls, procedures and billing records that contribute to clean audits from the State Auditor's Office. The audited financial statements of Mass Technology Collaborative are prepared in accordance with the accounting principles generally accepted (GAAP) as applied to government entities and the Governmental Accounting Standards Board (GASB) is the accepted standard-setting body for the accounting and financial reporting principles. The agency's books and records are audited annually by independent external auditors and are also subject to annual audit by the State Auditor's Office. Mass Technology Collaborative shall comply with all Single Audit requirements under OMB Circular A-133.

3. Technical Infrastructure

If this revised Strategic and Operational Plan is approved, Mass Health shall be responsible for all aspects of HIE Technical Infrastructure and Architecture. The original HIE Strategic and Operational plan detailed a "service stack" of HIE components that was subsequently adopted by the Medicaid program and amended with changes specific to the EOHHS infrastructure as needed to support the service stack. These plans were subsequently merged; reanalyzed and released under a revised Advanced Planning Document (APD) for the Medicaid program. That revised APD describes the first phase of the Massachusetts HIE.

3.1. Technical Architecture

The Massachusetts HIE will employ a hybrid model to support HIE, using federated data and reusing existing components when those components meet the requirement or can be adopted to do so. A three phased implementation is planned. The technical architecture, which is proposed to be realized through the APD, is described below.

[20]The various projects and activities included in this HIT-APDU support the Medicaid program while advancing the development of a statewide HIE. To date, the Strategic and Operational Plan and State Medicaid Health IT Plan have been developed in parallel but with close cooperation. However, two recent events led to the unification of these plans:

- State Medicaid Director letter of May 2011 refining use of Medicaid funds for HIE activities
- Massachusetts Secretary of Health and Human Services recasting the state's HIE governance structure

The timing and impact of these two events led the state to develop a unified approach that:

- Maintains the priorities and phasing of the original SOP and SMHP
- Rationalizes and aligns differences to create a single plan incorporating SDE, Medicaid, and DPH priorities and preferences
- Optimizes use of multiple funding streams (ONC, CMS, State, and Private) and existing infrastructure into a single, integrated approach
- Focuses both on creating infrastructure AND removing barriers to adoption

The projects in this phase were considered "ready to go" and were selected based on several criteria including:

- Absence of significant business, technical, governance, or legal complexities that needed to be resolved
- Market demand for capability to perform the various transactions as a statewide HIE service
- Market gaps whereby no other solution could immediately fill the need

The selected projects represent the first phase/highest priority projects, which are focused on developing and enhancing the information superhighway to create an infrastructure to enable secure transmission – otherwise known as "directed exchange"--of health information. This functionality will support exchange among clinicians, public health and stand-alone registries, with a focus on breadth rather than depth. MassHealth's development of this infrastructure is the first step to support health care data normalization and aggregation, which are key components of a future, fully functioning exchange. The focus on infrastructure and the use of both Medicaid and HITECH funds to support these efforts will result in the

[20] 2011 APD, Section 3

repurposing of existing components to lower incremental cost of new functions and to add new functions to platforms that already have high use.

When all of the project activities are completed and functionality is in place, Medicaid providers, along with other providers, will have the infrastructure to:

- Transmit information from and to multiple senders and receivers (directed exchange)
- Access a directory of providers and facilities
- Utilize a service to accommodate bulk certificate management, as well as ongoing management of enrollment/disenrollment of providers and organizations in the service
- Exchange clinical information between state systems and providers/labs/healthcare organizations, using HL7 standard in a secure environment

Phasing	Reconciled HIE Project List	Next steps	Timing
Phase 1	Statewide HISP w/ Direct Gateway Provider directory VG enhancement: Access & Identity Mgmt VG enhancement: PKI VG enhancement: HL7 gateway HL7 interface: Syndromic Surveillance HL7 interface: CBHI HIE end-user integration program IMPACT (ONC Challenge Grant)	- Develop detailed scope, requirements, budgets, and RFPs	Q3 2012 Q3 2012 Q3 2012 Q3 2012 Q3 2012 Q3 2012 Q3 2012 Q3 2012 Q4 2012
Phase 2	Clinical data repository Quality data infrastructure HL7 public health interfaces EMPI Vocabulary services Claims relay service MDPHnet (ONC Challenge Grant)	- Develop governance, business, and operational model	Q1 2013 Q1 2013 Q1 2013 Q2 2013 Q2 2013 Q3 2013 Q4 2013
Phase 3	RLS Consent services Routing service for patients Re-architect/enabling payment methods	- Develop policy frameworks & governance model - Develop technical standards - Develop business/operations model	Q1 2014 Q1 2014 Q3 2014 Q3 2014

Phase 1

If the revised Strategic and Operational Plan is approved, Mass Health shall be responsible for implementing the 3 Phases set forth above and described below. The first phase of the HIE is to establish an infrastructure that knits together the substantial existing HIE networks, forming the basic "network of networks", enabling direct point-to-point messaging, often referred to as "push" messaging. This effort will immediately connect a significant number of providers and the Public Health departments of the state and the city of Boston, enabling the network to support connected providers in achieving Stage 1 meaningful use.

The services required to implement Phase 1 are listed below and described in detail in Section 4.1: Service Delivery.

#	Reconciled HIE Project List	Project Description
1	Direct gateway	Implementation of gateway implementing Direct specification for universal messaging interoperability
2	Provider directory	Directory of providers and facilities to ensure unambiguous and reliable addressing of electronic transactions
3	PKI/certificate management	Infrastructure to ensure security of statewide HIE infrastructure
4	Public health interfaces	HL7 interfaces to variety of public health services, including ELR, MIIS, SSS, CBHI, CLPPP, PMP, OTP
5	EMPI/RLS	Statewide patient-matching function to match medical records across organizations
6	Quality data infrastructure	Infrastructure to facilitate aggregation of quality and performance measurement data for reporting to Medicaid and other purposes
7	Clinical data repository	Integration of clinical data with APCD
8	Statewide HIE solution integration services	System integration and project management for HIE infrastructure Implementation
9	Open access HISP	Service organization to provide network connection to statewide HIE services for providers unable to connect through their own organizations
10	Consent services	Centralized management of patient consent status information
11	Vocabulary services	Translation service to transform non-standard medical vocabulary to national standards-based nomenclatures
12	Routing service for patients	Messaging services to allow providers to send messages and records securely to patient-controlled applications
13	Re-architect/enabling payment methods	Flexible IT claim processing systems to address new forms of payment and organization (accountable care, PCMH, etc.)
14	VG upgrade	Upgrade of Virtual Gateway for standards-based HL7 transactions
15	Claims relay service	Single gateway for the submission of claims for MassHealth (regardless of medical, pharmacy, Dental or Health Safety Net Claims)
16	HIE end-user integration	Program to remove/lower barriers to HIE adoption

4. Business and Technical Operations

4.1. Health Information Technology Adoption

4.1.1. Health IT Adoption – the Last Mile

Telecommunication companies, including Internet Service Providers, divide their infrastructure into two major components: the central office, which provides the core functionality and the "Last Mile" house wiring, which connects consumer devices, such as phones, televisions, and computers to the central office. Healthcare Information Services Providers (HISPs) will function much the same way, which may include significant investments in centralized applications and infrastructure, with a process to connect clinician offices, hospitals, payers, registries, community health centers, and public health organizations to the HISP. Patients may also be able to subscribe to HISP services, in later phases.

The connection of stakeholders to the HISP will not require physical wiring, since existing internet connections will be used. However, it will require that electronic health records and other healthcare applications be able to process and integrate into the workflow the clinical information that will be transported via the HISP. For those stakeholders without electronic health records, such as many long term care providers, a web portal will support sending and receiving clinical messages.

While Mass Technology Collaborative anticipates that emerging technical and certification standards will, over the coming years, increase the penetration of EHRs that are able to integrate with the statewide HISP “out-of-the-box”, no EHR systems have such capability in production today, to our knowledge. Therefore, to achieve the rapid adoption necessary to meet ONC’s requirements, as well as the growing market demands of accountable care, a proactive, coordinated approach to end-user integration with the statewide HISP will be absolutely necessary.

As previously indicated, if ONC approves this revised Strategic and Operational Plan, Mass Technology Collaborative will no longer have any responsibilities under the ONC Cooperative Agreement for any HIE implementation, deployment, infrastructure services or procurements, as those responsibilities will all shift to MassHealth under the terms of its CMS Grant. If authorized through an amended NGA, Mass Technology Collaborative will re-focus its efforts on the Last Mile services (and will retain management of the HIE Challenge Grants). The combination of MassHealth’s implementation activities on the one hand and Mass Technology Collaborative’s Last Mile activities on the other, will work to ensure the statewide HIE and Last Mile services provide value to the Commonwealth in the form of lower costs and improved quality of care for its residents.

There are roughly 20,000 licensed practicing physicians in Massachusetts, and of those, approximately 10,000 (50%) are currently or will be active users of electronic health record (EHR) systems and the health information exchange (HIE). Some hospital and ambulatory applications are already connected to local or regional HIEs, such as the New England Healthcare Exchange Network (NEHEN), SafeHealth, the North Berkshire eHealth Collaborative HIE, the Community Hospital and Physicians Practice System’s (CHAPS) HIE and the UMass HIE. However, many small providers have limited HIE connectivity through a web portal, which is not integrated into their EHR workflows or no access at all.

While significant investments will be made in centralized applications and infrastructure, there must be a process to connect clinician offices, hospitals, payers, registries, community health centers and public health entities to a healthcare information services provider (HISP). Electronic health record systems and other healthcare applications will need to integrate into their systems the capability to accept and receive data via the HISP, and for those stakeholders without electronic health records, such as many long term

care providers, a web portal is needed to support the sending and receiving of clinical messages. Therefore, a "Last Mile" connection of these systems and applications is required.

Phase 1 of the HIE will be the integration of the DIRECT messaging capability into the automated workflows of EHR products. This will ensure rapid adoption of the HIE services. The initial focus will be on those hospitals and ambulatory EHRs that have been identified in the environmental scan with the greatest market share in the state. Vendors with a smaller market share will be supported if sufficient funding is available. The plan is to ensure that providers have the ability to use the DIRECT messaging infrastructure to support the exchange of the standard CCD among other capabilities. This bi-directional exchange will be enabled by the EHR vendors who will integrate the DIRECT messaging capability into their products and will ensure that the changes in clinical workflows are limited to the extent possible.

PIN Support

As the Commonwealth must also support the PIN priority entities as part of the Last Mile strategy, our plan is to include in the readiness assessment an update to the lab, pharmacy and clinical summary document (CCD) data that was included in the first submission (2010) of the Massachusetts HIE Strategic and Operational Plan.

- eRx – The transaction volume data from Surescripts and NEHEN indicates that 97 to 98 percent of Massachusetts pharmacies are connected. However, Meaningful Use Stage 2 will require an even higher provider eRx adoption rate. The remaining 2 percent of the pharmacies that are not yet connected will be identified and MeHI/Mass Technology Collaborative will work with them in a similar manner as they worked with providers on EHR adoption.
- Labs – The current transaction volume for labs will be provided by Quest, Lab Corps and hospitals. Quest and Lab Corps currently route the lab results electronically; however, community hospitals serving as reference labs will need to purchase products to connect to their HIS/LIS applications to community-based EHRs.

  The Massachusetts Department of Public Health (DPH) is authorized to collect and respond to reports of infectious disease in Massachusetts residents. Accordingly, DPH operates a secure, electronic laboratory reporting infrastructure to support the receipt of results received electronically from hospital laboratories. Electronic Lab Results (ELR) arrive at MDPH via a secure web-based portal, are quality assured, and transmitted to an integrated, web-based disease surveillance and case management system known as the Massachusetts Virtual Epidemiologic Network (MAVEN). Clinical laboratories may transmit data on all notifiable conditions. Participants use a web-based user interface to create a mapping between selected Logical Observation Identifier Names and Codes (LOINC) and the Systematized Nomenclature of Medicine – Clinical terms (SNOMED) codes and their local equivalents. These mappings are used to translate native codes into their LOINC and SNOMED equivalents before data persists into MAVEN. Institutions may transmit messages using the HL7 2.5.1, HL7 2.3.1 or a B.I.D developed message format that is transformed into HL7 2.3.1. In order to meet Meaningful Use requirements, MDPH upgraded this infrastructure to provide the capability of transforming existing HL7 2.3.1 to HL7 2.5.1. This allows hospitals to send data in their existing formats and still meet one of the Meaningful Use requirements for public health reporting.

  There are a total of 72 hospital laboratories in Massachusetts. In July 2008, MDPH passed regulations mandating the use of its ELR infrastructure for reporting notifiable conditions. As of Feb 2012, 65 of the 72 hospital laboratories are fully certified to transmit results using ELR and the remainder is in various stages of the implementation process. Two commercial laboratories are fully certified.

The ELR infrastructure recently received attestation as Meaningful Use certified which allows these hospitals to immediately meet Stage 1 of the Meaningful Use requirements at no additional cost or effort. The DPH model is one of the first in the country to be both certified and operational for ELR.

- Clinical Summaries – A survey of NEHEN and other sub-networks will provide the current transaction volume data for clinical summaries. As Meaningful Use Stage 2 requires summary exchange, the statewide HIE will offer the backbone and Last Mile service to providers to support this requirement.

Our Last Mile strategy is designed to enable every payer, provider, public health entity, registry and patient, as well as labs and pharmacies to send and receive healthcare data, by ensuring access to the HISP services from their existing applications or web portal. These applications will generate and consume clinical data from such sources as hospital information systems, electronic health records systems, and personal health records (PHRs), public health repositories and quality measurement registries.

To optimize the transport capabilities of the statewide HIE, all hospital information systems and EHRs must be able to connect to a transport backbone. The end result is an integrated network of networks that enables any payer, provider, patient or consumer to exchange data, influencing the improvement of health and health outcomes for all consumers and patients. While the means of achieving this goal differ by geographic distribution, economic considerations and type of provider, the overall goal is to bring all clinical setting to a point of optimal use of the technology. Mass Technology Collaborative refers to this integration of end-user applications with consumers and providers as *Health IT Adoption – the Last Mile*.

Components

The main components of *Health IT Adoption – the Last Mile* are connection, education and optimization. Connection will address the technical integration of EHRs and sub-state HIEs with the statewide HIE backbone, to facilitate stages 1 through 3 of meaningful use. Education will be directed at providers, patients and consumers to instruct them on the benefits of using health IT for better health outcomes. Optimization will focus on how the providers will best use the technology in an effective manner to maximize efficiency while delivering quality care to the patient. These components are cyclical in nature, in that all three are required at different points in time for health IT adoption and optimization to continue, as it evolves along with the technology. The ultimate goal is to provide a formalized coordination program to work directly with EHR and HIE vendors on statewide-approaches that enables their end-users to connect to the statewide HISP more rapidly and economically than would be the case if each vendor and each end-user was left to achieve such connectivity on their own.

Connection

MassHealth and the Health IT Coordinator will have all responsibilities for overseeing the efforts associated with the technical implementation of HIE deployment across the Commonwealth. Mass Technology Collaborative will no longer have any implementation responsibilities under the ONC Cooperative Agreement. Instead, MeHI will be solely responsible for ensuring that Last Mile activities are implemented as planned. The Health IT Coordinator will provide statewide Health IT guidance and oversight and provide an additional single point of contact to ONC and CMS for statewide Health IT activities and status including the HIE implementation and Last Mile activities. MeHI will work closely with the Health IT Coordinator on all Last Mile planning, procurement and related activities Three phases of the Connection component have been defined: analysis, managed selection of vendors and procurement of service providers, and installation.

Analysis

The first step in creating a coordinated approach is to understand the landscape of end-user systems that will be connecting to the statewide infrastructure. Through the REC and other long-standing initiatives in the state, there is a very good understanding of the vendors that currently account for the vast majority of provider installations in the state. However, non-participating providers must also be inventoried, so a full market analysis of products being used by providers will provide a more complete inventory of the hospital and ambulatory end-user systems currently in place.

Using this analysis MeHI will develop the scope of the HISP with a priority framework for allocating Last-Mile resources. While our goal is to have every end-user system connected to the network, the approach will be to prioritize our approach, with the first phase being to connect the largest number of providers in the shortest amount of time.

Although Meaningful Use Stage 2 may include a HISP interface as part of the certification criteria, the Stage 2 attestation timeline has been delayed a year. This means that standard products will not be required to contain this interface until late 2013, and upgrading existing systems to this new interface will take even longer. As the current schedule of the Massachusetts plan will place the HISP in production by October 2012, Mass Technology Collaborative intends to accelerate the EHR/HISP interface work ahead of Meaningful Use timelines, since Direct-compatible systems are unlikely to be widely deployed in the market for at least 2 years after launch of the statewide HISP. This means that Mass Technology Collaborative will need to work closely with the various hospital and ambulatory EHR vendors to ensure that their systems are Direct-enabled ahead of the Stage 2 Meaningful Use requirement for HIE services. A specific challenge is the considerable variation in vendor interoperability capabilities and strategies. Part of the assessment process will involve understanding the nature of these variations to create a program tailored to the needs of the market. This assessment and engagement process has been started with an open full-day “Vendor Roundtable” discussion hosted on December 16, 2011, engaging over 20 EHR and HIE vendors currently operating in the Massachusetts market. All interested technology vendors were invited to participate. The following are main findings from these sessions:

There is wide variation in vendor interoperability capabilities

- Few if any vendors have production Direct-enabled systems in place today
- There are no standardized approaches to integration with centralized provider directories or PKI infrastructure
- All participating vendors supported a centrally coordinated approach to interface development and deployment.

Managed Selection of Vendors and Procurement of Service Providers

The major area of focus of the Last Mile adoption program will be the managed selection of EHR vendors and the procurement of systems integration service providers to create and implement standards-based interfaces and system integration services for the use and interoperability of her systems. The selections and procurements for interface development and the other services will be accomplished strategically, as described more fully below, so the maximum number of stakeholders can be connected to the HISP at the lowest cost.

This process will involve a Competitive Grant Solicitation that will result in the selection and contracting with vendors to develop a scalable approach to integration, interfaces, adaptors, and gateways for their current and future installed base in the state. By necessity, the optimal development and deployment strategy may be tailored to each vendor because some vendors may choose to develop an

interface/integration and replicate it at each client site; whereas others may choose to build a single statewide gateway to broker all the transactions for underlying clients. It is important to accommodate approaches that are consistent with each vendor's architecture and development roadmap, as this will ensure quicker vendor buy-in, shorter development time, and consistent post-implementation support. In any event, the process will be a competitive one so that the vendors will be incented to provide the highest level of quality in their products and services and the most competitive pricing available.

Specifically, the Competitive Grant Solicitation for EHR vendors (the "Solicitation") will occur upon completion of the environmental market scan, and depending on the results of that scan, the Solicitation may either be (a) closed to the vendors that are identified in the scan, or (b) open to all EHR vendors who respond to the Solicitation. By making the Solicitation competitive, it is intended, among other things, to incent cost savings and provide a grant contracting mechanism to proscribe in great detail the use of proceeds and deliverables of the EHR vendors. Depending on the results of the environmental market scan, the Solicitation may only be open to the EHR vendors with the greatest market share. However, if funding allows, it may also be open to those vendors with a lesser market share. This Competitive Grant Solicitation will encourage EHR vendors to move to the top of their development cycle the integration of DIRECT messaging into their EHRs. Mass Technology Collaborative envisions that a grant contract will be executed with each vendor for a one-time development of this interface or gateway and would include an agreement on basic terms and conditions, such as reasonable end-user pricing, which Mass Technology Collaborative will make all best efforts to achieve, for interface configuration, installation, testing, and support that each vendor would include in their end-user agreements with their customers.

Reasonable and appropriate end-user terms and conditions are a priority focus that will ensure providers, especially those working with the under-served and those who have not been able to benefit from Meaningful Use incentives, will be able to effectively and affordably access statewide HIE services. The contracting strategy, and terms and conditions may be somewhat tailored to each vendor, as contracting approaches may vary widely by vendor, but the intention is to maintain as much uniformity in terms and conditions as possible.

In addition, the process will include creation of a Last Mile Program Management Office (PMO). Mass Technology Collaborative will issue an open and competitive Request for Proposals (RFP) for Systems Integration services to be provided to Mass Technology Collaborative for oversight (along with the PMO) of the EHR vendors. The systems integration contractor(s) will have technical and project management experience working with EHR vendors in large-scale deployments to function as part of the PMO. MeHI will also assess the competencies included in the HIE and REC teams to determine how much additional support will be required to provide ongoing, sustainable support for the maintenance and support of the interfaces and gateways after implementation within their existing support organizations. The Integration Contractor will be a Mass Technology Collaborative contractor and will not have separate authority outside of Mass Technology Collaborative to enter into any contracts. All contracts will be managed through Mass Technology Collaborative.

MeHI and their PMO will work with ONC and EOHHS to ensure the appropriate standards/implementation guides are available to Last Mile developers, establish vendor-specific scope/design/development/implementation projects with each of the target EHR vendors, and provide oversight, vendor management, facilitation and coordination of requisite meetings, progress and risk reports, and other tasks that will be required to keep the interface project(s) on track. Each project will involve technical and project personnel from the EOHHS technical team and the vendor technical team. MeHI's PMO role will be to define each project and actively manage the coordination of the necessary technical and project teams, to ensure delivery according to the agreed upon scope and timelines. MeHI

and MassHealth will work in close collaboration to ensure the processes associated with the PMO are consistent with those used by MassHealth. This effort will ensure that the HIE project is efficiently coordinated.

Based on feedback received from a recent vendor roundtable event and on past experience, vendors indicated they will be willing to work closely with Mass Technology Collaborative in this process. For the vendors, a coordinated statewide approach offers greater efficiency through a single program management office, with a focused development according to well-specified technical requirements. The PMO will also provide efficiency in contracting by incorporating to the greatest extent possible a uniform set of end-user terms and conditions. MeHI's outreach and education efforts for the provider and consumer will also benefit the EHR vendors, by informing their customers about the benefits of connection with the statewide HISP.

Installation

Depending on the terms of Mass Technology Collaborative's grant contract with each vendor and the availability of funds, MeHI may also assist with end-user testing and validation support to ensure that contracted interfaces and gateways are installed in the end-user's EHR, according to agreed upon parameters. This would primarily be accomplished through use of a certified IOO, with oversight from the four to five system integration (SI) consultants. To select the IOOs, Mass Technology Collaborative will issue an open Request for Qualifications (RFQ) for the certification of IOOs to work with providers on HIE Services. The RFQ will be structured on the model used for the REC. By doing so, Mass Technology Collaborative will not make direct support payments to providers, but rather will make payments to the IOOs as an offset of fees charged to providers. Through the contracting mechanism used with the IOOs, Mass Technology Collaborative intends to require that IOOs provide "Most Favored Pricing" or specific discounts on services as a condition of selection and certification under the RFQ.

The IOOs would be overseen by the HIE Project Managers supporting the Last Mile PMO and the Clinical Relationship Managers who have account management responsibilities.

Certain segments of the health care delivery system may not have sufficient expertise and resources to work with their selected vendors on end-user configuration, testing, and go-live. Therefore, supplemental resources will be available to those covered through Medicaid for providers, expanding participation in HIE for the following:

- Pediatricians under the 20% Medicaid threshold
- Behavioral health providers
- Unaffiliated primary care providers (PCPs) in remote areas of state
- Community hospitals and health centers
- Specialists
- Long-term care providers

MeHI will use a multi-pronged approach to assist providers with these vital Last Mile activities: the EHR integration to accept and send DIRECT messages, and support for business services the provider will need to implement the DIRECT messaging into their practice. As previously mentioned, for the DIRECT messaging integration, MeHI will develop a separate Competitive Grant Solicitation to encourage EHR vendors to move to the top of their development cycle the enablement of DIRECT in their systems. MeHI will track the status of both the EHR integrations development schedule and the EHR vendor to provider contracting efforts using a combination of the CRMs who have existing client (provider) relationships and the four to five consultants who will be hired to assist MeHI with the Last Mile PMO.

For the business services support, Mass Technology Collaborative's plan is to provide funding support for the highest priority providers. The prioritization is yet to be finalized. MeHI will build upon the current contractual and operational framework developed for the REC, where a prequalified Implementation and Optimization Organization (IOO), with appropriate technical capabilities, is selected by the provider to assist in the implementation of HIE capabilities into the provider's practice. The IOO would agree to a basic pricing model to supply pre-defined HIE implementation services to the provider.

Specifically, funding will be provided based on the criteria developed in collaboration with the Health IT Council and HIE-HIT Advisory Committee. MeHI envisions that the grant funds will not go directly to providers but will be paid to the IOOs, who will respond to an RFP for a predefined set of services. Once the priorities for funding recipients are established, MeHI will oversee the connectivity funding through the IOOs, leveraging enhanced REC operational capabilities, which include the following:

- Assisting providers with modified practice workflows resulting from the integration of DIRECT messaging with the ambulatory or hospital-based EHRs.
- Assisting providers with ensuring that connectivity to the statewide HIE is enabled.
- Monitoring the status of services delivered to the providers via the IOO.

Education and Outreach

Education, training and outreach are necessary to promote adoption of health IT and to ensure the new capabilities of the HIE are used in a meaningful way. The State will fully engage providers and patients in discovering how the adoption and optimization of health IT will benefit the patient through more effective and efficient healthcare delivery. As part of the Last Mile activities, Mass Technology Collaborative will leverage the same model used for REC outreach and education and will lead the Commonwealth in a statewide campaign of outreach, communication and education, including multi-cultural and multi-lingual efforts for specific populations in the Commonwealth. MeHI will leverage relationships with other organizations either through contractual relationships or partnerships, and address policy issues driving technical/business solution, such as continuity of care and use of personal health records (PHRs), accountable care organizations (ACOs), etc.

Optimization

Once the Last Mile connection is effectively established, ongoing support and maintenance for the HISP interfaces will be necessary. Many support models are possible, including delegation to EHR vendors, third parties, or a dedicated support staff internal to the HISP. As the HISP and its interfaces are created, an analysis of the pros and cons of each alternative will be conducted, and a sustainable support model will be developed.

To optimize health IT adoption, Mass Technology Collaborative plans to evaluate a practice's efficiency and effectiveness in the use of health IT, and, to offer a path for improvement based on this assessment. This process of improvement will be continuous, as technology and its usefulness will be ever evolving. Building upon tools already developed by the Regional Extension Center and State HIE programs, Mass Technology Collaborative is planning to develop an evaluation process to determine how the healthcare practice engages in and uses health IT (EHR and HIE), and to work with these practices to improve efficiency and effectiveness.

To measure the success of health IT adoption in the State as a whole, Mass Technology Collaborative is considering the development of an annual *Report Card for Health IT Adoption in Massachusetts.* Among the initial measurements Mass Technology Collaborative anticipates the following, with more measurements being added as the program progresses:

- Percentage of adoption of EHRs by geography, specialty, such as physician, hospitals, home health agencies and community clinics.
- Number and percentage of providers who have achieved meaningful use
- Number of providers engaged in statewide HIE by geography and specialty
- Number of patients who opt in to HIE
- Number and percentage of patients who are using a Personal Health Record
- Number and type of providers and hospitals participating in the Medicaid Incentive Program and value of incentive payments made to Massachusetts
- HIE Program Notification (PIN) requirements; i.e., eRX, Lab results and Clinical Summary Exchange

The details of this report card will be defined in coordination with EOHHS, and with input from other stakeholders, to align with the Implementation Advanced Planning Document (IAPD) performance benchmarks that will be provided regularly to CMS and ONC. This report card will be developed between April and September 2012. This is an example of the type of cooperation and coordination that is required by the terms of the MOU between Mass Technology Collaborative and EOHHS.

Execution

Hospital information system and electronic health record vendors report that state HIEs tend to build central infrastructure assuming the endpoints will be able to connect to the HIE on their own. However, most practices lack the technical capability and incentives to do this work, so the value of the HIE is not realized and sustainability is never achieved. Massachusetts intends to avoid this failed scenario by actively ensuring the connection of the Last Mile.

1. Scope Definition

Mass Technology Collaborative, acting through its MeHI division is the State Designated Entity for healthcare innovation. Mass Technology Collaborative and the Regional Extension Center for Massachusetts, will conduct a readiness assessment for hospital information system and EHR adoption in Massachusetts. This will be used to identify those providers and institutions not yet connected to an HIE and those EHR applications not capable of connecting.

2. Readiness Assessment

An analysis will be conducted to determine what additional software or services are required to enable initial HIE connectivity: sending and receiving clinical summaries and HL7 public health messages from hospital information systems and EHRs through the HIE backbone. Additionally, this will position Massachusetts for Stage 2 Meaningful Use, since it is anticipated that providers will be required to use vendors certified to support these functionalities. .

3. System Integration Services

Based on the analysis, the services for system integrations to connect with HIE services will be defined. The delivery model will include the necessary resources to install and configure software, provide training and education, and supply other support activities to practices throughout the Commonwealth. It will also contain a strategy to connect those providers who are currently without an EHR or who have an EHR but lack the capability to send and receive data directly.

4. Last Mile Management Office

Mass Technology Collaborative and its consultants will be responsible for the PMO and may contract with a third party consulting firm who may help provide the necessary support of the end-user adoption/Last Mile components of the HIE program. Additionally, Mass Technology Collaborative will

centralize Last Mile integration expertise and achieve economies of scale by creating an efficient approach to Last Mile integration.

5. Education and Training

MeHI will provide educational materials and training to clinicians and consumers to enable them to optimize the benefits of new HIE connectivity, achieve meaningful use stage 2 and maximizing the amount of data flowing to other clinicians, public health and quality registries. The educational effort will be designed so that each stakeholder understands the value of these capabilities in terms they can understand with the focus on health outcomes. This extensive educational and outreach effort will include both multi-lingual and multi-cultural capabilities so that every provider and every consumer in the Commonwealth is engaged.

6. MeHI Staffing Support for Last Mile Services

As has been noted previously, MeHI is no longer responsible for implementation, deployment, infrastructure services and procurements, and thus, will focus its organizational development on skill sets required for optimizing Last Mile adoption of HIE functions made available by the infrastructure. The MeHI HIE Last Mile team will include the Chief Technology Officer, two HIE Project Managers and 1.55 of an FTE comprised of MeHI staff members working in HIE Last Mile activities, which includes the MeHI Director, the MeHI Chief of Staff, Administrative Assistant, Clinical Relationship Managers, and the Manager of Information Design and Development. The Last Mile staff will oversee the efforts of an expert and experienced systems integration consulting team of 5 FTEs, manage all grants and procurements, and Education and Outreach, as well as all other HIE Last Mile program activities and requirements. MeHI currently has all staff on board with the exception of one Project Manager who is projected to be hired in July and the Chief Technology Officer which is projected to be filled in the next few months. In addition to the Last Mile staff, MeHI also has Project Managers and other MeHI staff for a total of 1.4 FTEs that are responsible for the management and oversight of the HIE Challenge Grants. For those providers who are already REC members, their assigned Clinical Relationship Managers (2.5 FTEs) supported by an Operations Coordinator will help to oversee the efforts of the system integrator to ensure continued high levels of satisfaction, as part of their REC role.

MeHI/MTC has proper time tracking and financial controls in place that requires staff to charge their time on a bi-weekly basis according to level of effort spent on each of the MeHI activities, including the HIE Last Mile, each Challenge Grant, the REC program, and other non-federal MeHI programs. MeHI/MTC will continue to ensure that staff tracks their time using the proper project codes for each MeHI project and grant.

The proposed funding process for provider connectivity to the HIE is expected to be similar to that of the REC. The current process includes having funds flow through the Implementation and Optimization Organizations, who provide the support services at a discounted rate. This approach has proven successful in Massachusetts and has resulted in the MA REC being the first to achieve its enrollment targets with high levels of customer satisfaction. This approach has also created private sector jobs. A second option may include providing grants directly to providers to support HIE connectivity.

The Education and Outreach efforts will be shared across all MeHI programs, since the messaging content will be the same for providers, consumers, etc. The Medicaid team's outreach coordinator and staff will support all Medicaid eligible hospitals and EPs. MeHI's Director of Information Design and Development, Mass Technology Collaborative's Public Information Officer, the REC Director, and the Director of Medicaid Operations and the EOHSS Project Director for the Medicaid Incentive Payment program, will all be actively involved in Education and Outreach efforts supported by Marketing and

Communications consultants, in collaboration with the HIE-HIT Advisory Committee. This will ensure message consistency across the Commonwealth.

4.2. Proposed Services

Component	Proposed Services
Connection	**Analysis** • Vendor products used by 2500 REC clinician participants • Vendor products used by non-REC clinician participants, by number of clinicians • Vendor products used by hospitals, by number of hospitals • Self-developed systems and number of providers using these systems. **Selection of Vendors** • Conduct a Competitive Grand Solicitation process to determine and contract with EHR vendors to assure maximum coverage of the provider community at most economical cost. • Portal functionality for providers without EHRs, or for those using EHRs with low penetration in the Commonwealth **Installation** • Test software in the offices of eligible professionals and in data centers of hospitals, PH entities, and payers. • Contract with third party service organizations to perform this function, as needed. • Provide connectivity funding and consulting services to foster the connection to the backbone and the achievement of meaningful use. • Provide technical assistance for community HIEs to connect to the statewide HIE. • Use the work products from the two State HIE Challenge Grants as a potential component for future projects.
Education and Outreach	• Foster a Community of Practice for community hospitals to improve the dissemination of “best practices”. • Identify and build local leadership • Partner with the Mass League for Community Health Centers developing specific offerings for community health centers, similar to community hospitals • Partner with associations for mental health and substance abuse programs, community organizations or directly with agencies as needed to develop mental health/substance abuse offerings, similar to community hospitals • Work with providers to maximize efficiencies in the practice related to HIE that will lead to better quality care for the patient. • Work directly with providers to assure that access to the HIE is included in patient care workflows

Component	Proposed Services
	• Develop educational material which the provider can share with the consumer • Develop a direct message campaign aimed at providers and consumers • Develop web based training modules • MeHI will work directly with the Massachusetts Department of Public Health and EOHHS to develop a single goal that will serve as a "rallying" point for all stakeholders participating in the statewide HIE. • Include the Commonwealth's health care improvement goals with associated metrics developed by the Health Care Quality and Cost Council (scorecard is included in Appendix H): - Reduce the cost of health care - Ensure patient safety and effectiveness of care - Improve screening for and management of chronic illnesses in the community - Develop and provide useful measurements of health care quality in areas of health care for which current data are inadequate. - Eliminate racial and ethnic disparities in health and in access to and utilization of health care; health indicators will be consistent, and consistently improving, across all racial and ethnic groups - Promote quality improvement through transparency • Conduct annual surveys to measure the adoption and use of health IT.
Optimization	• Provide workflow connectivity funding and consulting services to optimize EHR/HIE utilization. • Work with providers to maximize efficiencies in the practice that lead to better quality care for the patient. • Work directly with providers to assure that access to the HIE is incorporated in patient care workflows. • Develop model for sustainable support and maintenance of the HISP interfaces, including a feedback loop to address and study problem patterns.

Use of HIE Grant Funds

The following is an excerpt from the full budget on page 66 and shows where the majority of the HIE funds will be spent.

The ONC HIE grant funds provided under the ONC Cooperative Agreement will be used to complete the Last Mile of health IT adoption. Mass Technology Collaborative will not be responsible for any HIE implementation, deployment, infrastructure services or procurements, as those responsibilities will shift to MassHealth under the CMS Grant. With this in mind, Mass Technology Collaborative proposes that the majority of the remaining ONC funds may be used for Last Mile grants and contracts in the following manner:

Category of Cost	Description of Cost	Number (people/ contracts)	Rate/ Amount	Annual hours	# of Years	Year 1&2 (2/8/10-2/7/12)	Year 3&4 (2/8/12-2/7/14)	Total Cost	Budget notes
Contractual-Sub recipients	Last Mile Integration Vendor	5	150	2080	1.42		$2,210,520	$2,210,520	5 LM integration FTEs for 1.42 years to scope and execute approximately 25 individual EHR vendor projects. Assume start date of 9/1/2012.
Contractual-Financial Assistance	EHR vendor - Development Contracts	25	75,000	N/A			$1,875,000	$1,875,000	Integration development contracts with approximately 25 vendors. Assume a mix of hospital, ambulatory, LTC, behavioral health vendors, to be determined from the landscape analysis. Actual price will vary depending on vendor mix; average price estimate based on experience with similar efforts in MA and NY.

Category of Cost	Description of Cost	Number (people/ contracts)	Rate/ Amount	Annual hours	# of Years	Year 1&2 (2/8/10-2/7/12)	Year 3&4 (2/8/12-2/7/14)	Total Cost	Budget notes
Contractual-Financial Assistance	Small practices End-user grants/support program	1000	2,500	N/A			$2,500,000	$2,500,000	Assume approximately 1000 unaffiliated/under-served small practices that would comprise 2000-3000 clinicians
Contractual-Financial Assistance	Long Term Care End-user grants/support program	100	1,000	N/A			$100,000	$100,000	Training/support for those LTCs that are using web portal or need assistance with EHR interface acceptance testing and training. Assumes targeting roughly 1/4 of the 400 LTC facilities in the state.
Contractual-Financial Assistance	Behavioral health End-user grants/support program	100	1,000	N/A			$100,000	$100,000	Training/support for those BH providers that are using web portal or need assistance with EHR interface acceptance testing and training
Contractual-Financial Assistance	Hospitals End-user grants/support program	20	20,000	N/A			$400,000	$400,000	Technical support for small hospitals and state hospitals that need assistance with EHR interface acceptance testing and training

4.3. Consumer focused Marketing & Education and Provider Workflow Education

MeHI's primary focus for education of the consumer will occur through the provider. The MeHI objective is to develop material to aid providers and their offices with a clear explanation of EHRs, the statewide HIE and consent as it applies to the HIE, describing how those can help to improve health outcomes for the individual consumer and for the community,. Our reasoning for providing this educational material is that an EHR connected to an HIE is not a sufficient guarantee of positive outcomes. This education will ensure that we maximize participation through quality education from one of the consumer's most trusted resources: the provider. Additionally, to aid successful EHR adoption, MeHI will develop and distribute best practices in the utilization of EHR to provider business offices. These best practices will encourage the use and success of EHRs in smaller provider offices or those unable to purchase or commit time to workflow analysis. Consumers will be able to access materials directly through internet distribution. Other channels and means of distributing information and education will be reviewed so that the most effective methods are used.

Our plan includes:

- Review current literature and interview other states on HIE adoption in "opt-in" states in order to help understand on the ground experience of HIEs and providers.
- Research consumer information on the understanding of HIE and EHR, committing to detail surveys and focus groups if necessary, to develop a Massachusetts specific knowledge base.
- Develop educational material, adapted as needed for differing cultural communities, for provider offices as well as speaking points and guidelines for use by providers in communicating with consumers and patients.
- Develop educational materials marketed at specific demographic groups such as baby boomers faced with eldercare; the parents of children who are hospitalized or with chronic disease; and those with chronic disease who could benefit from HIE-enabled chronic disease self-management.

4.4. Service Delivery Groups – HIE Infrastructure support of phase 1

The following describes the services that will be available to support Stages 1 through 3 of meaningful use. Detail from this section reflects APD section 3.1. EOHHS is responsible for all of the services listed in this Section 4.3 in their entirety under the terms and conditions of its CMS Grant.

4.4.1. Health Information Service Provider (HISP) – Direct Gateway[21]

Various providers are adopting differing EHR systems with different capabilities at different times. Similarly Health Information Exchanges (HIE) with varying capability are expected to be deployed at different times in different locations. The Direct project is intended to enable users who have not yet implemented EHR/HIE systems or who have implemented such systems with limited data exchange capabilities to exchange data with other users whose systems provide any of several different interfaces. This will be of particular benefit to small providers, especially small Medicaid providers.

The efficient and ready exchange of patient specific health care data can lead to higher quality health care and potentially lower costs of providing health care. The specific benefit of this project is to enable adoption by a wider population of providers sooner than would be otherwise possible. In addition this project protects the investments already made by providers in EHR or HIE systems which may have only limited interface capability at the current time.

Participants can include users with a webmail client only (no EHR or an EHR with no interface capability, EHR/HIE systems with SMIME interface, EHR/HIE systems with XDR/SOAP interface. Patients can receive their own health data from their provider via an interface to Microsoft's Health vault.

The key goals of this program are as follows

- Lower the cost of entry into electronic health data exchange by enabling a provider with the minimum requirements (a computer and a web browser for internet access) to begin to exchange health data with other providers.
- Provide a bridge for providers with no EHR and users of EHR and HIE systems with disparate capabilities to exchange health data with other trading partners electronically.
- By removing the concerns listed above, speed the adoption of electronic health capability by all providers, especially solo and small group practices that frequently serve Medicaid recipients.

4.4.2. Project Description - Health Information Service Provider (HISP) – Direct Gateway

The Direct Project specifies a simple, secure, scalable, standards-based way for participants to send authenticated, encrypted health information directly to known, trusted recipients over the Internet. This project supports communication from provider to provider, provider to state agency, and provider to patient. It utilizes the SMIME, HTTPS, and XDR protocols.

This project is based on the Direct Project standards and software as published by ONC. See http://directproject.org

The Massachusetts implementation of a Direct capability will include the core Direct functionality, along with a series of interfaces, and related services provided by the Virtual Gateway environment already in place in MA. The core Direct functionality and the interfaces will be based on the open source reference implementations provided by ONC. The related services include access and identity management (AIMS), public key infrastructure (PKI), and a provider directory. These services are discussed in the Virtual Gateway enhancement IAPD.

[21] 2011 APD

This project includes core functionality and a series of interfaces as described below.

Core functionality

The system will include components related to

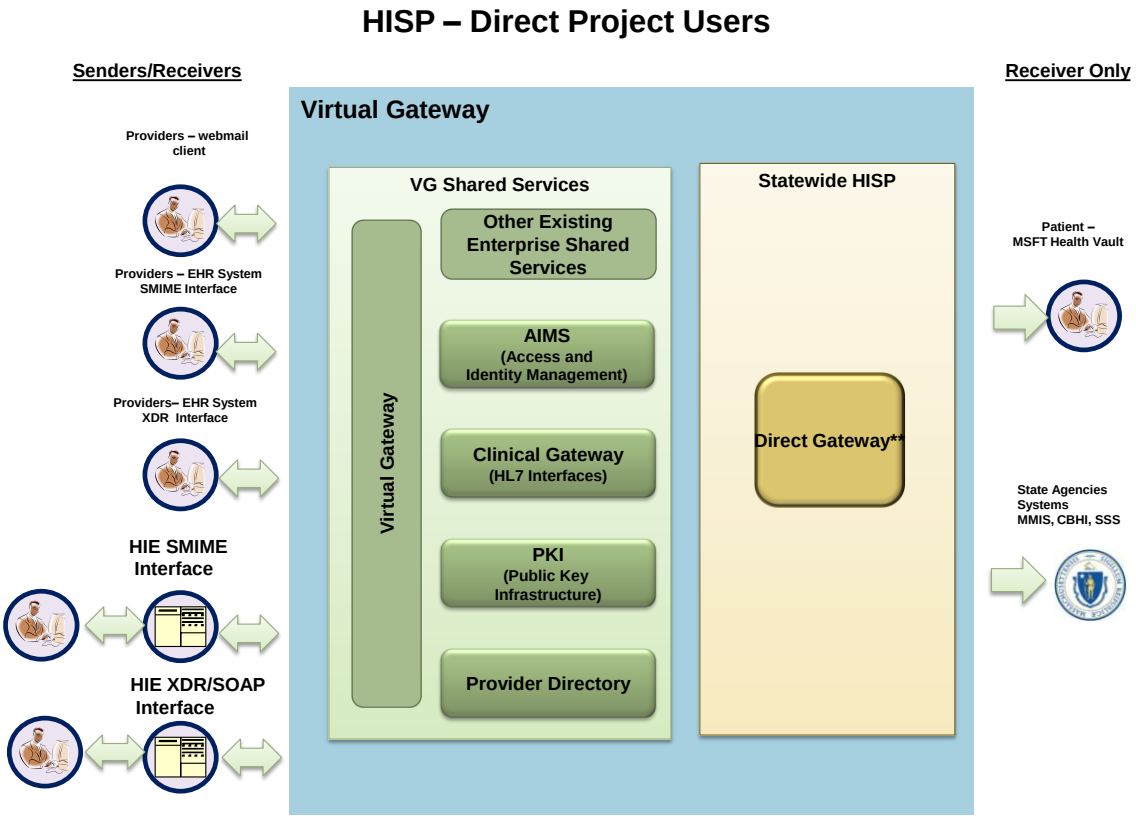
- Direct Project components (security trust agent, XD agent, Configuration web service, XD* SOAP end point, etc.)
- Encryption using public key technology for messages originating from providers using the webmail client. EHR and HIE systems are expected to perform encryption prior to sending messages to the core Direct system.
- Provider Directory to enable providers and EHR systems to look up provider information
- AIMS (access and identity management system) to provide single sign on and appropriate security and authentication
- Health data content processing such as providing a method to edit CCD documents
- Provider enrollment module. This will be a website which enables providers to enroll in Direct, manage certificates, and pay any necessary certificate fees. MA will implement technology and business processes to ensure that potential enrollees are properly licensed providers eligible to participate in this system
- Other modules /components and administrative tools required to provide a complete system

For a more complete technical description of the Direct Project components, see http://wiki.directproject.org/Reference+Implementation+Components

Interfaces

- Web-based email client with MIME attachment capabilities
- A SMIME interface suitable for use by EHR and HIE systems (and testing of this interface with at least one EHR and one HIE).
- A XDR/Soap interface to EHR and HIE systems.
- Interface to Microsoft Health Vault to enable providers to send data to patients
- Interface to State and Federal data collection systems such as CBHI and Syndromic surveillance.
- Interface to I-LAND as defined in Impact Architecture presentation

The following diagram depicts the vision of the system architecture. Note that a sender using any technology noted can communicate with any receiver using any technology.



4.4.3. Project Approach - Health Information Service Provider (HISP) – Direct Gateway

It is the EOHHS' intent to prepare an RFR identifying the particular requirements for vendors to bid upon by July 2012. The ONC Direct project has open source Java based reference software for some of these functions which we intend to adapt for use in MA. After vendor selection and completion of contract details, development will begin using the Systems Development Life Cycle (SDLC) process adopted by EOHHS. This variation of the Rational Unified Process includes Inception, Elaboration, Construction, Test and Implementation phases for each project. These broad categories include requirements gathering and analysis, development or construction, testing, user acceptance testing, and implementation. We intend to involve potential users in all phases to ensure that the design addresses user needs and concerns as well as all the relevant use cases.

4.4.4. Relationship to Other Entities - Health Information Service Provider (HISP) – Direct Gateway

The IMPACT project, which will continue to be managed by MeHI under the ONC Cooperative Agreement, focused on exchanging electronic patient information related to long term care transitions in Worcester MA, and is funded through a Challenge Grant from ONC for $1.7M. This project is developing the ability for EHR systems and HIE systems to communicate to the statewide HISP using the XDR/SOAP interface. The IMPACT development team will work closely with this development team so that the result is a single system working on a common statewide HISP infrastructure.

This DIRECT project assumes that the Virtual Gateway enhancements described in a related IAPD are in place. Specifically this project needs the enhancements to the AIMS identity management system, the establishment of a public key infrastructure (PKI), and a provider directory (PD) to enable the rapid lookup of recipients of messages.

MeHI and ONC will facilitate outreach efforts and statewide technical/implementation approaches to generate rapid adoption.

4.4.5. Virtual Gateway Enhancement

The next set of projects (3.2.a through 3.2.d) is interrelated and all contribute to upgrading and enhancing the Virtual Gateway to better support provider participation in Health Information Exchange

4.4.6. Overview – Access and Identify Management Services (AIMS)

Health Information Technology initiatives require strong Identity & Access Management System for creating and maintaining users and their privileges that meets all Federal and State guidelines. Establishing a new identity and access management system from ground up is expensive and time consuming. Currently EOHHS is providing Access & Identity Management as a shared resource which HIE projects can leverage.

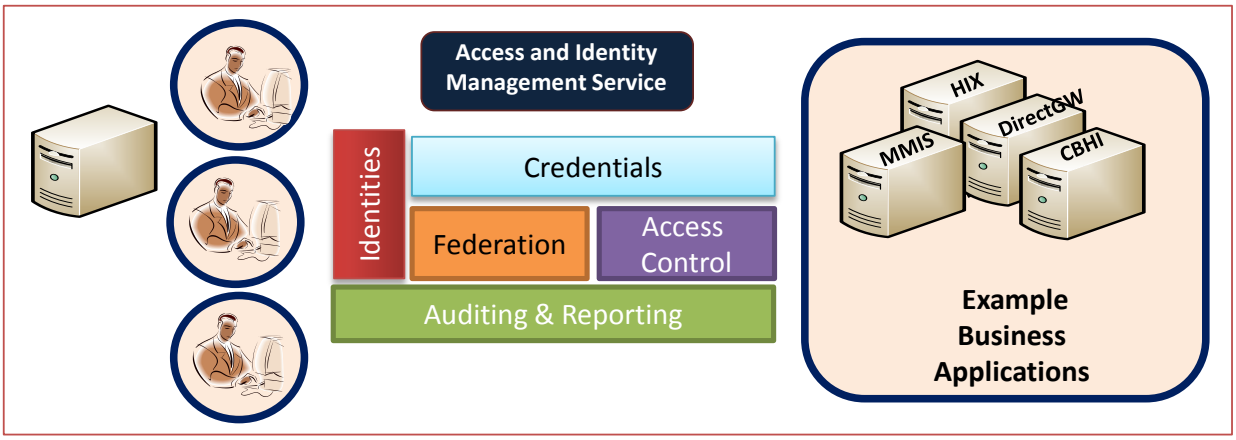
The EOHHS Access and Identity Management Service (AIMS) will provide an end-to-end access and identity management solution that will facilitate users' access to agency applications and confidential data, while ensuring that user access is consistent with policy and regulatory requirements. AIMS 3.0 will be built by taking Federal and State Identity, Credential and Access Management (ICAM) requirements into consideration which can be used as a base to extend the functionality needed for HIE. Currently there are 88K MMIS provider users that are using AIMS as their Identity & Access Management Service. Also AIMS provides single sign on to all current virtual gateway applications.

The core features that are provided by AIMS which will be used in the Health IT projects are explained below.

Identity Management – Identity Management Service is the system responsible for establishing digital identities and setting of credentials for users across EOHHS. AIMS Identity Management system currently manages three groups of users: Commonwealth workforce members, provider organizational staff and members of the public. Identity Management manages users' access to various resources and the entire life cycle of the user from connecting the user until disabling the user's access when the relationship ends.

Access Management – Access Management Services provide the service endpoints to allow for other services to ask for permission (access) to the resources (business services and confidential data such as entitlements) through the use of authorization and access control mechanisms. Access Management also provides session management and single sign on services. Federation services provide integration with external parties by establishing trust relationships.

Auditing & Reporting - Auditing & Reporting Services provide for monitoring and reporting on user rights and activities. All centrally provisioned aspects of the user's identity, as well as their activities within AIMS itself are covered by auditing services. Reporting will be generated to meet all the compliance needs.



Current version of AIMS 2.x will be upgraded to AIMS 3.0 as part of the Health Insurance Exchange program. AIMS 3.0 will be built as per the Oracle Identity & Access Management Plus stack and HIE projects will be first of those to get integrated with the new infrastructure. Since AIMS 3.0 only supports existing applications and their requirements it will not possess the few features that are deemed necessary for the purpose of the HIE. Enhancements are required to AIMS 3. 0 and a new version of AIMS 3.1 has to be released by developing the required feature set for HIE. By leveraging the shared infrastructure one can quickly enable new functionality to the already existing 88K users

4.4.7. Project Description - AIMS

Following enhancements need to be performed for AIMS 3.1 to meet the needs of HIE projects:

Support for PKI infrastructure - Enhancements need to be performed to the Access Management Service in order to support authentication & authorization using certificates

Integration of AIMS with provider directory – AIMS will be integrated with the provider directory, enabling automated provisioning and de-provisioning purposes.

Federation Services – Federation capabilities need to be extended to integrate with external state and federal agencies.

Web services enhancements – Existing AIMS web services will be extended or new web services will be developed to provide the needed support for current gateway services and new clinical gateway.

Single sign on – AIMS will provide single sign on by integrating with all the HIE systems. Single sign on features need to be enhanced for PKI support.

Migration to new infrastructure – Exiting applications such as Children's Behavioral Health Initiative (CBHI), MMIS and Clinical Gateway Web services need to be migrated to new the AIMS infrastructure.

Capacity enhancements – Integration with HIE systems creates additional user load on the system. AIMS capacity must be expanded to accommodate the new user load.

4.4.8. Project Approach - AIMS

As part of the Health Insurance Exchange (HIX) project current AIMS 2. 0 system will be upgraded to AIMS 3.0 however it doesn't meet all the requirements or needs of the HIE systems once base AIMS 3.0 is built new functionality needed for HIE will be added and rolled out subsequently. Development will be done using the system development life cycle (SDLC) process adopted by EOHHS. This variation of the Rational Unified Process includes Inception, Elaboration, Construction, Test and Implementation phases for each project. These broad categories include requirements gathering and analysis, development or construction, testing, user acceptance testing, and implementation. We intend to involve potential users

in all phases to ensure that the design addresses user needs and concerns as well as all the relevant use cases.

4.4.9. Relationship to Other Entities - AIMS

AIMS infrastructure will be upgraded from version 2 to version 3 for Health Insurance Exchange (HIX) and Integrated Eligibility System which includes migrating from the Sun product suite to the Oracle product suite. The new version of AIMS will be deployed on the Oracle-supported platform, as the current products from Sun are no longer supported by Oracle. The base version 3 of AIMS has rich functionality for public users but not for providers. AIMS 3.1 will be built and released to meet all HIE functionality requirements.

4.4.10. Overview – Public Key Infrastructure (PKI)

The State Medicaid Health IT Plan (SMHP) requires a foundational set of identity management services. A specific component of the SMHP relies on implementation of a digital identity management infrastructure based upon the assignment and use of "digital certificates". A statewide HIE capable of eventual integration with a nationwide health information exchange (NwHIN) depends upon the Commonwealth's ability to establish a highly secure and dependable trust community which utilizes standards published and adopted by Federal Agencies based upon the work of the Health IT Policy and Standards committees under the auspices of the Office of the National Coordinator for Health IT. Current consensus within HHS, with the direction and guidance of NIST, is consistent with the Commonwealth's plan to adopt Public Key Infrastructure (PKI) technology as the foundation for establishing an HIE trust fabric. This approach will sufficiently address the policy and technology concerns related to privacy and security, as well as support a rapid and scalable adoption of electronic healthcare information exchange across the Commonwealth.

Given that the overall trust fabric is to be based upon PKI with an associated method and infrastructure for delivery, inquiry, retrieval and maintenance of digital certificates, the Commonwealth's plan will also address certain practical concerns related to efficiency and value creation. To this end, the trust fabric plan will incorporate the following design principles:

- The design will be to utilize, wherever practical and feasible an "open standards" approach
- The fabric will be constructed to be optimally scalable across three dimensions: adoption speed, technical efficiency and economic sustainability
- The instantiation of the trust fabric will be foreseeably "future-proof" as the design and components will be evaluated against evolving and alternative models for PKI implementations and the use of digital certificates, and compartmentalized to create functional modularity in support of package based refactoring of the infrastructure as HIE architecture models change
- The implementation of the SMHP will incorporate and leverage the various "private" but mature implementations of HIE within the Commonwealth so as to avoid the allocation of resources in support of redundant capability. Stakeholders in the existing landscape of Massachusetts HIE's will be engaged in the development of interface standards which allow mature infrastructure to be integrated rather than replaced.

The Goal for the Commonwealth PKI Service is to provide a statewide utility which services a broad spectrum of primary constituents in the EOHHS but also supporting an at-large healthcare process community across the Commonwealth. This utility will act as a companion to both the Provider Directory and the Account Identity Management (AIM) capabilities within the Virtual Gateway. The PKI Service will be the technical engine which enables the creation of an integrated, statewide "trust community" in the service of health information exchange.

The primary contributions to the SMHP/HIE of the "PKI Service" are as follows:

- Provides a technically rationalized approach to support root and subordinate certificate management across a geographically and technically heterogeneous community engaged in large scale secure data exchange.
- Provides a forum for multi-stakeholder acceptance of a shared approach for secured sharing of PHI
- Generates significant economies of scale related to the purchase, distribution, maintenance and utility of digital certificates
- Enables an efficient, highly capable, single sourced repository for inquiry and retrieval of encryption keys capable of supporting a broad array of payload exchange gateways utilizing multiple transport protocols, including but not limited to-
  - Direct
  - Connect
  - CORE
  - IHE

4.4.11. Project Description – Public Key Infrastructure (PKI)

This project will create a centralized encryption key and certificate management infrastructure which will be integrated into a statewide trust fabric for HIE. The PKI Service will ensure the security and non-reputability of HIE payloads, both clinical and administrative, across the Commonwealth.

The essence of the PKI Service will be the instantiation of hardware and software specifically designed to act as a statewide "key store" and key management utility. The service will be deployed with interface adapters sufficient to integrate with both new and existing state infrastructure, specifically state Medicaid systems, as well as existing public and private HIE capability in the Commonwealth.

Further, the infrastructure will be designed to support interface adapters to address the requirements of:

- Federal PKI Infrastructure
- Federal Bridge project
- Current and future HIPAA Operating Rules
- Future developments associated with a national provider directory
- National Payer ID/ Payer routing repository

The PKI Service will accommodate bulk certificate management, as well as ongoing management of enrollment/disenrollment of providers and organizations in the service. Certificate management maintenance will accommodate a multi-channel interaction infrastructure that includes both portal and web service integration.

In addition to the technical and functional requirements above, detailed use cases will be developed in support the general goals and objectives of the SMHP, as well as the HIX in particular.

4.4.12. Project Approach – Public Key Infrastructure (PKI)

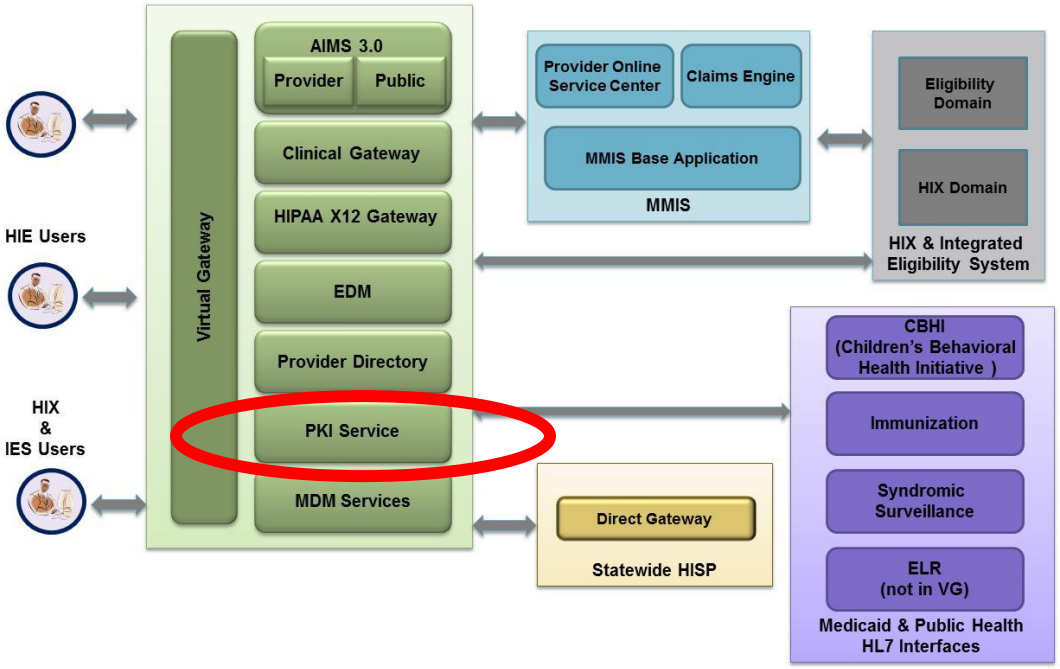
This project will conform to the standard System Development Life Cycle (SDLC) and project management practices adopted by the Commonwealth and EOHHS in particular. EOHHS project ownership responsibilities will be aligned and reconciled with the project management methods and practices adopted by the selected integration vendor(s) responsible for delivering certain technology components of the SMHP.

The final design and technical requirements of the PKI will be the byproduct of coordinated efforts between State Medicaid, MeHI and other constituents with a key stake in the Commonwealth's overall HIT, HIE and HIX investments.

Specifically with regard to the PKI Service, an important prescriptive aspect of this component of the Virtual Gateway is that the Commonwealth intends to use a "managed PKI" design and procurement approach, i.e., core components of the overall PKI Service infrastructure will be purchased as a service from a "best in class" vendor. Underlying the prescriptive nature of this decision is an overwhelming body of evidence demonstrating significant economies of scale related to the total cost of ownership represented by a PKI investment. Perhaps more importantly, the management of liability associated with a PKI Service is an important consideration when the advantages of a SAS model in this specific instance. The supporting infrastructure costs related to liability and risk management are far better allocated across a large base of customers than they would be if the PKI Service were a standalone asset of the Commonwealth.

4.4.13. Relationship to Other Entities – Public Key Infrastructure (PKI)

The PKI Service will function both independently and in conjunction with other components of the overall SMHP. Specifically, it is a critical component of the Virtual Gateway that acts on its own as a public service utility to multiple external constituents, and as well, as an integrated unit of function within the end-to-end technical architecture supporting all Medicaid programs and operations.



The PKI Service is foundational with respect to the interdependencies between it and other projects supporting a statewide HIE. Foremost is the critical dependency of the Phase I functionality of the Direct Gateway which cannot go live without a functioning PKI Service, Phase 1 will be implemented Q32012. Also of immediate importance are the AIMS 3.X components of the Virtual Gateway which are tightly integrated with the PKI Service. Consequently, the initial release of the provider directory must include most, if not all of the structural components required to support release 1 and subsequent planned releases of the Virtual Gateway and the SMHP in general. However, from the perspectives of both

configured and available services, and comprehensive data population, the level of utility associated with the PKI Service will increase in phases consistent with the overall roll out of the SMHP.

4.4.14. Overview – Clinical Gateway

The primary objective of a clinical gateway is to provide a single gateway for clinical data in and out of the Commonwealth's data environment resulting in all partners submitting data to the Commonwealth using the same interface. Similarly the clinical gateway will support partners requesting data using the same interface. This project will also provide infrastructure that will enable the development of a clinical data repository in phase 2 and to support MU stage 2 and 3 use cases such as query/respond and publish/subscribe data access patterns.

This initiative will develop the sole clinical gateway for all EOHHS applications including MMIS, MIIS (immunization reporting), PMP/PMIX (prescription monitoring and exchange of prescription data with other states) and ELR (electronic lab reporting).

Having a single gateway of this nature will facilitate the reuse of the extensive infrastructure already in place. This gateway will enable clinical data which is currently submitted via a variety of systems to ultimately all be entered once in a provider's EHR system and be routed to the appropriate database for the appropriate state agency.

One of the Meaningful Use objectives is to enable providers to submit clinical information to departments of public health. In this initial phase, the clinical gateway will be interfaced to two specific applications: a Children's Behavioral Health application (CBHI) and syndromic surveillance.

- Syndromic surveillance refers to monitoring of patterns of symptoms presented at Emergency Departments to detect potential outbreaks of communicable diseases or bioterrorism at the earliest stage. The Clinical gateway is the "plumbing" that will enable this capability to be implemented. Several specific gateway features are required to enable this application. The syndromic surveillance project will describe the Commonwealth's specific plans for implementing this capability, reusing existing software and infrastructure to the maximum extent possible and support providers in meeting Meaningful Use.
- CBHI is a currently deployed application which enables pediatric mental health providers to record clinical information which is used by MMIS for a variety of purposes, including claims adjudication. Without this interface it would be necessary for these clinicians to record this information in two places – the EHR system and the CBHI system. The CBHI initiative will enhance the application to support this interface, thus eliminating certain redundant data entry. While CHBI is not included in Meaningful Use, the clinical gateway is an enabling technology to move this interface forward.

This project will also provide infrastructure that will enable the development of a clinical data repository in phase 2. The ability to integrate EHR systems with the MA Virtual Gateway will also provide clinical data to state Medicaid systems for future uses, including the following:

- Medicaid claims adjudication
- Treatment policy determination
- Fraud detection and investigation of suspected improper payments
- Other analysis as might be required in the future
- Prior Authorization (ACS12n 275 transaction with embedded HL7) processing and will enable MMIS to automatically determine approval

Technical objectives include providing a business-to-business (B2B) level interface, transformation services, and scalability in terms of users and partners.

4.4.15. **Project Description – Clinical Gateway**

The Clinical Gateway will provide a secure, standards-based, scalable infrastructure for exchanging clinical information between state systems and providers/labs/healthcare organizations, using HL7 standard.

There is an XML gateway in place today, however this system lacks the ability to integrate with a transformation service and does not provide partner profile management capabilities. The enhanced gateway will provide these capabilities. In addition the enhanced XML gateway will ease maintenance tasks including changing business and security policies.

The XML gateway currently in place will be upgraded to a version that will support both B2B integration and transformation services. In a Service-Oriented Architecture (SOA) Infrastructure, a B2B Gateway acts as the gateway to exchange documents and large files (electronic data interchange, flat files) with external systems/partners.

The clinical gateway will support three modes of operation. "Push" is where the providers initiate the transaction to submit data to EOHHS, for example a physician submitting immunization data. "Pull" is where providers initiate a transaction to retrieve information from the Commonwealth, for example a physician in emergency room querying state systems for information related to the condition of a patient seeking emergency treatment. The third mode is called "publish/subscribe" where the Commonwealth provides information to providers in the form of an alert, for example alert regarding a potential outbreak of a communicable disease which is issued to all physicians.

The approach to bio-surveillance is for the providers to enter data into their EHR systems, or into a webmail interface to the DIRECT project (see Direct Project IAPD). From there the data is aggregated and routed via this Clinical Gateway to the CDC (center for disease control) BioSense 2.0 application. State officials as well as CDC officials will then use this data to accomplish their missions. In addition to a web service transport layer, this application requires the use of secure file transfer protocol (sFTP) as an efficient means to transport a file of many cases of submitted data to the CDC.

The enhanced gateway will also include an extensive monitoring capability that will aid in incident detection, triage and root cause analysis. It will help in identifying and removing the bottlenecks. Thus it will help optimize resource usage, maintain performance goals and lower maintenance costs.

4.4.16. **Project Approach – Clinical Gateway**

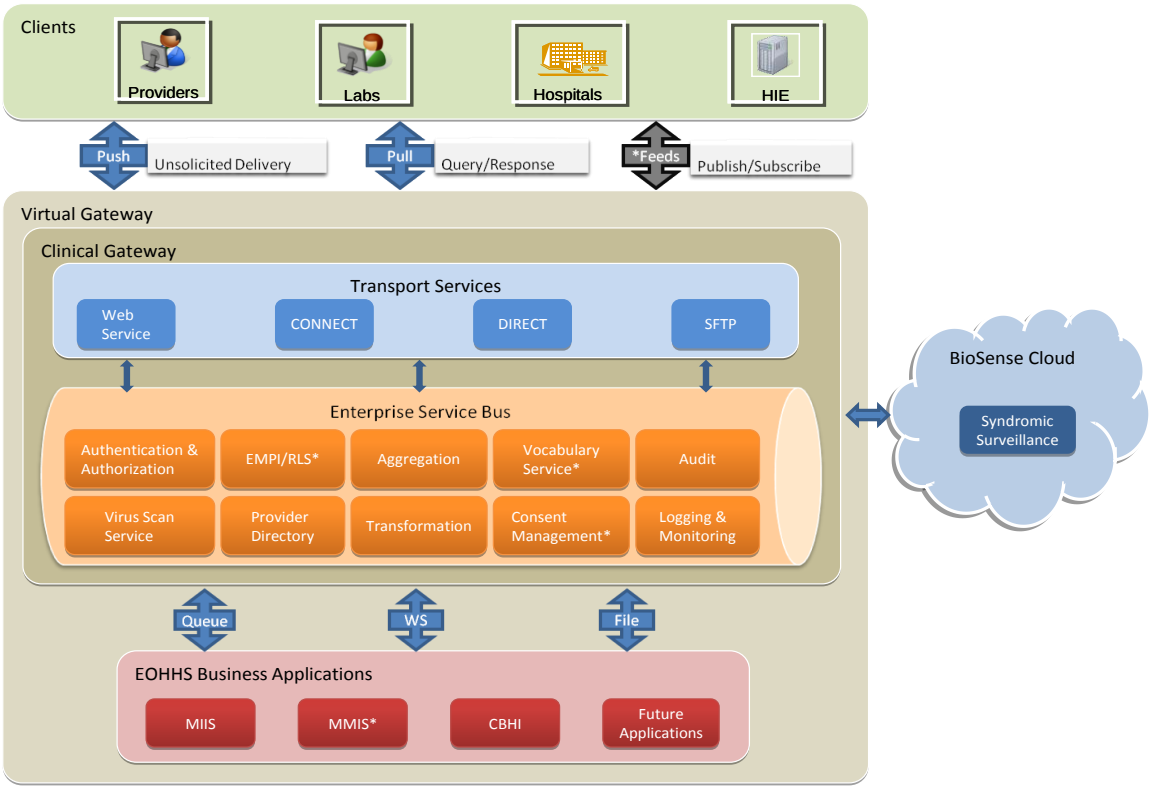
A key element of this project is an IBM Datapower appliance as the firewall. This project will also involve developing and deploying related software to implement the capabilities noted above, specifically including,

- HL7 Service
- Enterprise Service Bus (ESB)
- Aggregation and routing of appropriate data to CDC BioSense 2.0 program
- Data Transformation
- Audit – stores all transaction data exchanged via the gateway
- Logging

The intent is for EOHHS to prepare an RFR identifying the particular requirements for vendors to bid upon. After vendor selection and completion of contract details, development will begin using the SDLC process adopted by EOHHS. This variation of the Rational Unified Process includes Inception, Elaboration, Construction, Test and Implementation phases for each project. These broad categories

include requirements gathering and analysis, development or construction, testing, user acceptance testing, and implementation.

The following illustrates the conceptual architecture of the system



*Future Capability

4.4.17. Relationship to Other Entities – Clinical Gateway

With the development of the clinical gateway, EOHHS will provide a mechanism to gather data for its immunization registry and other disease surveillance programs. Instead of entering such data into dedicated systems (MIIS for immunization or EDSS for disease surveillance) the data already entered into EHR can be used for these purposes. It can also use the gateway as a mechanism to send alerts to health care providers.

This Clinical gateway project is dependent upon several other Virtual Gateway enhancement projects, including the identity management capability (AIMS), the Public Key infrastructure, and the Provider Directory.

4.4.18. **Overview – Provider Directory**

The SMHP plan requires a foundational set of identity management services. These services in turn depend upon the establishment of a transport level security and identity assurance. The Provider Directory is a logical array of software and hardware components which combine to deliver a set of services which is include, but are not limited to, the following:

- "White Pages" of HIE network users and participating organizations
- Digital identity "look-up" including public key storage and retrieval
- Authentication and permissions management functions
- Self-service enrollment including channels for both portal and web service interactions (as described in Section 3.1.1)
- Application support for business processes related to identity validation supporting certificate assignment
- Application support for business processes related to bulk data loading, quality and process controls, and ongoing data management and user help functions

The Goal for the Provider Directory (PD) is to provide a statewide utility which services a broad spectrum of primary constituents in the EOHHS but which also supports an at-large healthcare process community across the Commonwealth. This utility will represent a master entity reference database of all community participants engaging in activities directly and indirectly related to the exchange of healthcare information, both administrative and clinical. The statewide Provider Directory will serve as a single point of reference for patients, providers and other key stakeholders who need to identify the name, location and payload routing information associated with specific persons and organizations involved in the management and delivery of healthcare in the state of Massachusetts.

Three specific goals for the Provider Directory relate to required support for Health IT initiatives sponsored under HITECH and ARRA

- The Directory must fully enable the Direct Gateway for its intended use by State Medicaid and the Commonwealths HIE. Baseline functionality for the Direct Gateway supporting meaningful use will be available in Release 1. Subsequent, phased releases of functionality will be aligned with the requirements set forth under Meaningful Use stages 2 and 3.
- The Provider Directory will also be designed and implemented in Release 1 to support the broader requirements of Meaningful Use related to HIE in general, whereby payload transport is accomplished through means other than the state-sponsored Direct Portal. This would include, but not be limited to, the following use cases:
  - Clinician Orders Test from Lab & Lab Sends Results
  - Patient Summary from PCP to Specialist
  - Hospital Discharge Summary (or ED Visit Summary or Surgical Report Summary)
  - Hospital X Request for Information from Hospital Y
  - Patient Request for Site of Referral
  - Public Health request for data from provider
  - HIO to HIO routing
- The Provider Directory will interface with other components of the state infrastructure (e.g., AIM and OMS) in order to provide support for a secure and auditable adoption of multiple messaging patterns

capable of scaling across the Commonwealth's HIE foundation architecture. Supported patterns will include:

- Push
- Pull
- "Publish-Subscribe"

The primary contributions to the SMHP of the "Provider Directory" are as follows:

- It provides a critical electronic entity reference and routing repository without which a functionally integrated network for statewide exchange of healthcare information cannot be achieved
- It is a foundational component for a web services infrastructure required to streamline and optimize the provider selection functions associated with the Commonwealth Health Insurance Exchange, as well as other state sponsored programs
- It supports multiple statewide healthcare initiatives, both public and private, which utilize provider data to generate reports and actively manage the overall quality and process performance of programs and systems.

4.4.19. Project Description – Provider Directory

This project will create a directory of providers and facilities to ensure unambiguous and reliable addressing of electronic transactions. It will also leverage the information required to support this addressing function to enable additional, more general inquiries on names, locations and roles of the individual and organizational entities maintained in the database.

The essence of the PD will be the assembly of a comprehensive roster of specific entities that will be represented as nodes on a statewide healthcare information communications network. The roster will be a compilation of:

- Existing data assets
- Data submitted by public and private organizations acting as data aggregators, provider representatives and provider employers
- Positive enrollment by participating HIE/HIX participants

A "business change" component of the SMHP will be to establish a specific program with dedicated resources whose sole responsibility is to engage with all stakeholders and the provider community at large in order to collect all information necessary to insure the utility of the Provider Database.

The accumulated data will be loaded into a data base whose data model will be specifically designed to support the exposure of this data in a private and secure fashion to support the overall goals of the SMHP. The data will be optimized with regard to accuracy, timeliness and usability. The Commonwealth will use existing master data management capabilities (e.g., IBM's Initiate software tools) to cleanse, validate and insure the accuracy, integrity and utility of data stored in the Provider Directory.

The data will be accessible via a defined set of interface protocols consistent with state and federal standards. Additionally, it will be accessible via both portal and B2b channels.

The PD will incorporate specific attributes associated with the included entities which will specifically support the implementation of PKI as a security and authentication backbone. Additional attributes will address rules and roles based data access permissions, as well as support various secure interfaces for public key inquiry and retrieval and future requirements for dual factor authentication.

A second set of PD application level functionality will include the provision of data update and management interfaces which will support external applications responsible for:

- Self-service portal functions
- Identity validation
- Certificate assignment and maintenance (renewal/revocation)
- Bulk data cleansing and loading
- Overall data integrity management
- User support functions

4.4.20. Project Approach – Provider Directory

This project will conform to the standard processes for system development life cycle and project management adopted by the Commonwealth and EOHHS in particular. EOHHS project ownership responsibilities will be aligned and reconciled with the project management methods and practices adopted by the selected integration vendor(s) responsible for delivering certain technology components of the SMHP.

Overall ownership of requirements and deliverables will be held by EOHHS project management staff and specific individuals identified by senior leaders within the Division of State Medicaid Management.

The final design and technical requirements of the PD will be the byproduct of coordinated efforts between State Medicaid, MeHI and other constituents with a key stake in the Commonwealth's overall HIT, HIE and HIX investments.

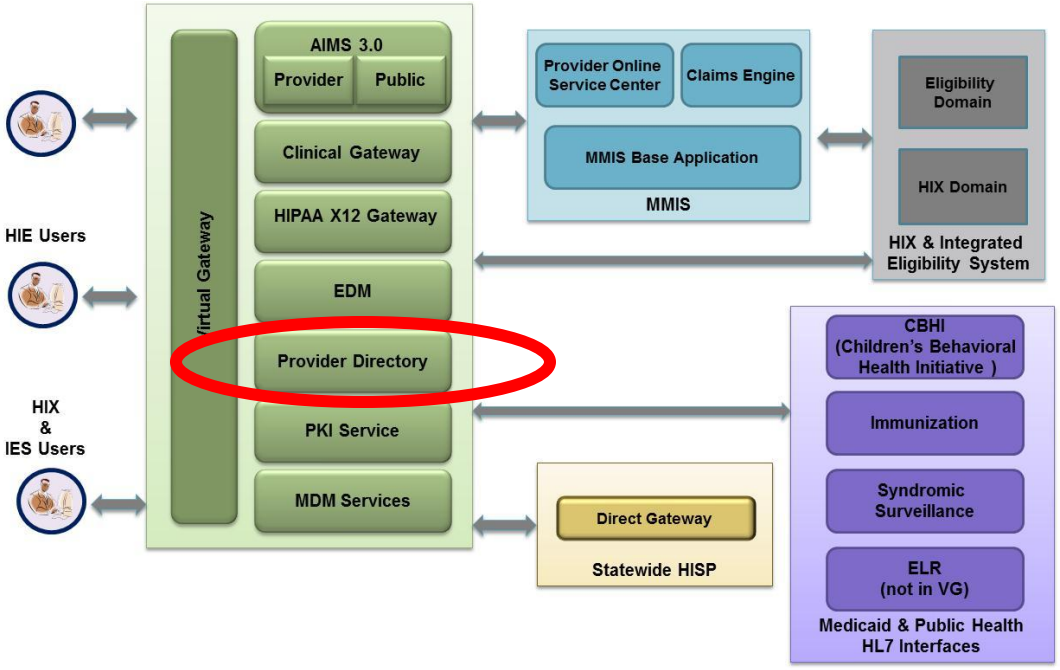
4.4.21. Relationship to Other Entities – Provider Directory

The Provider Directory will function both independently and in conjunction with other components of the overall SMHP. Specifically, it is a critical component of the Virtual Gateway that acts on its own as a public service utility to multiple external constituents, and as an integrated unit of function within the end to end technical architecture supporting all Medicaid programs and operations.

The Provider Directory will be leveraged to create a gestalt effect within the Virtual Gateway. The Directory will be logically extended via integration with the Medicaid Enterprise Service Bus. The resulting "meta-directory" will augment the AIM and OMS systems to bridge entity relationship data, rules and roles data and digital identity data; conceptually, a synergy between CRM, LDAP and DNS.

This integration provides enablement to other state initiatives:

- Single-source Service Directory for Medicaid
- Option to upgrade the capability of, and reduce operating costs related to, Provider Selection within HIX
- Delivered capability to enhance the messaging utility of the Direct Gateway, as well as extend both the Direct and Clinical gateways to be capable of a robust set of B2B/machine-to-machine transactions
- Enabled opportunity to upgrade or replace the existing OMS infrastructure in order to optimize facilitated communication among and between the Commonwealth's HIE stakeholders



The Provider Directory is foundational with respect to the interdependencies between it and other projects within the SMHP. Consequently, the initial release of the PD must include most, if not all of the structural components required to support release 1 and subsequent planned releases of the Virtual Gateway and the SMHP in general. However, from the perspectives of both configured and available services, and comprehensive data population, the level of utility associated with the PD will increase in phases consistent with the overall roll out of the SMHP.

4.4.22. Syndromic Surveillance

The Syndromic Surveillance BioSense 2.0 interface is to use the Clinical Gateway as a mechanism for hospitals to use one Gateway for their EMR Syndromic Surveillance transmissions to the Commonwealth

Syndromic Surveillance will be using the CDC's BioSense 2.0 project for storing and retrieving data. The following are the specific goals and objectives of this project:

- To provide one gateway for MA data destined to BioSense 2.0
- To offer technical assistance to hospitals and EMR vendors
- To offer support for technical validation of Meaningful Use

The Syndromic Surveillance BioSense 2.0 interface is to use the Clinical Gateway as a mechanism for hospitals to use one Gateway for their EMR Syndromic Surveillance transmissions to the Commonwealth. By accepting, staging and delivering Syndromic Surveillance data to BioSense 2.0 duplication of effort is eliminated at the hospital EMR system.

Reduce costs and increase public health effectiveness. Reduce the time and cost involved in capturing Syndromic Surveillance data, decreases the efforts of reporting institutions, increase efficiencies of data transfer, and improves the Department's ability to respond quickly and appropriately to a public health emergency.

Support proactive public health initiatives. Syndromic Surveillance has the potential ability to detect early deviations in disease trends. Sudden changes in disease trends may be more quickly identified than could otherwise occur through more traditional surveillance methods.

The Syndromic Surveillance BioSense 2.0 interface is critical to pro-active public health response and directly supports health care providers in meeting the "meaningful use" criteria defined by the HITECH act of 2009.

Historical data from each hospital are used to predict syndromes for each chief complaint and diagnostic code entered in the facility's emergency department. These data are categorized into syndromes and statistical algorithms are used to detect clusters of illness that might signal an unusual event is occurring.

4.4.23. Project Description – Syndromic Surveillance

BioSense 2.0 is a program of the Centers for Disease Control and Prevention (CDC) that tracks health problems as they evolve and provides public health officials with the data, information and tools they need to better prepare for and coordinate responses to safeguard and improve the health of the American people.

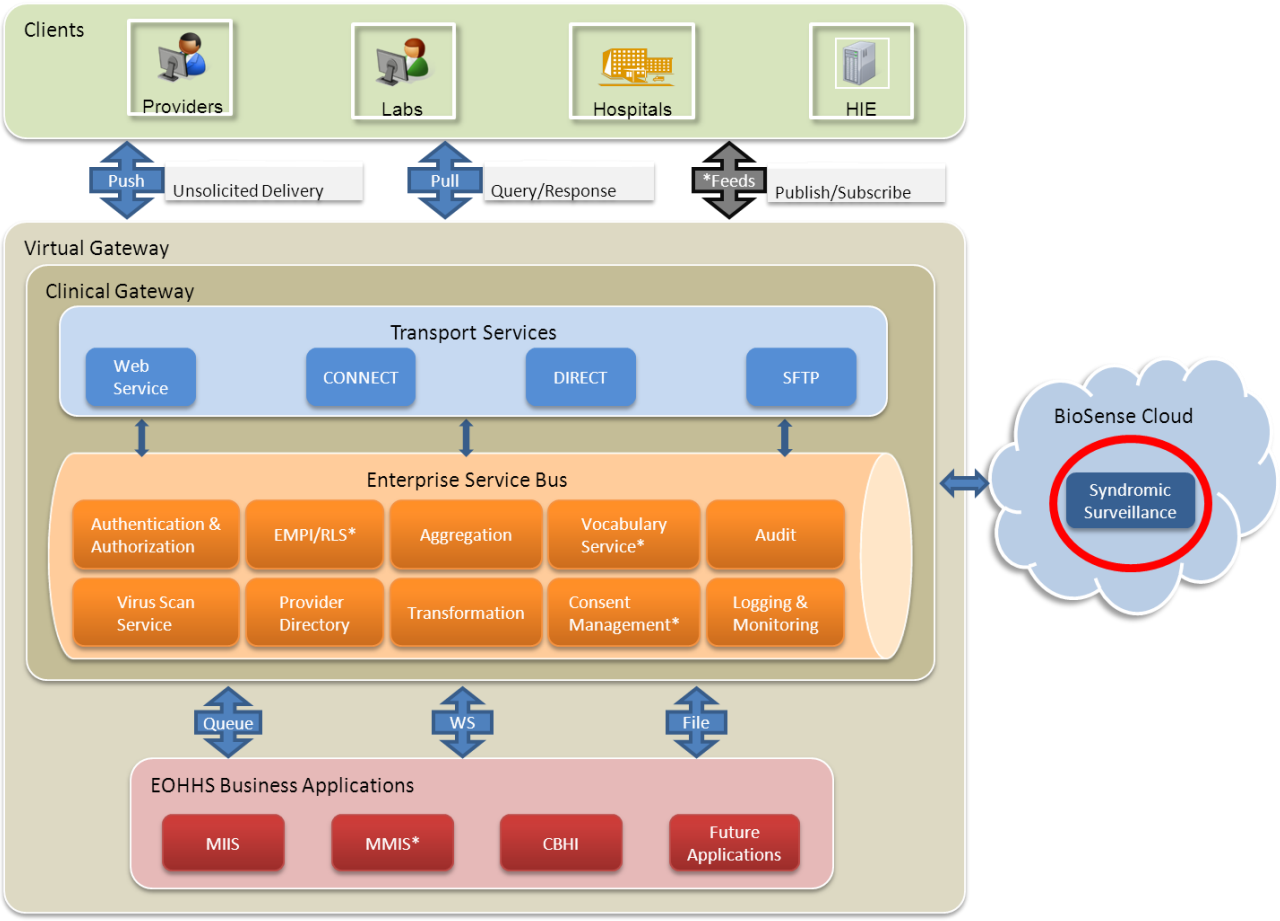
The Syndromic Surveillance BioSense 2.0 interface will allow hospitals to use CommonWealth Clinical Gateway interface to report their Syndromic Surveillance data directly into BioSense 2.0, eliminating the need for redundant EMR interfaces.

There will be a technical resource available to work with hospitals to help with technical validation of Meaningful Use.

4.4.24. Project Approach – Syndromic Surveillance

Syndromic Surveillance BioSense 2.0 interface will leverage the Clinical Gateway and AIMS components that fall within the Virtual Gateway enhancement project.

The following illustrates the conceptual architecture of where the Syndromic Surveillance BioSense 2.0 interface sits with this project.



*Future Capability

4.4.25. Relationship to Other Entities – Syndromic Surveillance

The Syndromic Surveillance BioSense 2.0 interface has no relationship to other State Entities. It is dependent on AIMS and the new Clinical Gateway

4.4.26. Children's Behavioral Health Initiative (CBHI)

The Children's Behavioral Health Initiative (CBHI) is an interagency initiative of the Commonwealth's Executive Office of Health and Human Services whose mission is to strengthen, expand and integrate Massachusetts state services into a comprehensive, community-based system of care, to ensure that families and their children with significant behavioral, emotional and mental health needs can obtain the services necessary for success in home, school and community.

Through CBHI, MassHealth requires primary care providers to offer standardized behavioral health screenings at well child visits, but also enables mental health clinicians to use a standardized behavioral health assessment tool, and provides new or enhanced home and community-based behavioral health services. CBHI also includes a larger interagency effort to develop an integrated system of state-funded behavioral health services for children, youth and their families.

CBHI places the family and child at the center of the service delivery system, and will build an integrated system of behavioral health services that meets the individual needs of the child and family. Policies, financing, management and delivery of publicly-funded behavioral health services will be integrated to

make it easier for families to find and access appropriate services, and to ensure that families feel welcome and respected, and receive services that meet their needs, as defined by the family.

The following are the specific goals and objectives of providing an HL7 interface to CBHI system.

- To enable Medicaid providers to electronically transmit data from their local systems using a common language
- To allow CBHI to deliver required data to MCE (Managed Care Entities) for claims processing.
- To Provide functional and semantic interoperability
- Streamline data entry
- Reduce duplication of effort
- Reduce data entry error

The CBHI system's main function is to track CANS (Child and Adolescent Needs and Strengths). The CANS is a component of a client's overall medical record. Currently this information is being entered at the point of evaluation (the provider) and reentered in the CBHI system. HL7 integration would enable providers to electronically submit CANS directly from their customized local applications to the CBHI system. Currently provider compliance with data entry of records within 90 days of evaluation is low. HL7 integration is expected to raise the rate of compliancy based on ease of use and automation.

Managed Care Entities (MCEs) utilizing HL7 integration will have the ability to analyze client and provider data in real time, based on successful transmission of CANS data. Currently the data MCEs are receiving may have been entered during the compliance window or may be entered after the date of compliance has passed, thereby skewing the results of their demographic and financial analysis.

Promote efficiencies in delivery of Medicaid services: allow providers with EMRs to transmit all required data via HL7 and to bill Medicaid directly. This will eliminate redundant direct data entry and manual posting of payments. Providers will receive timely electronic confirmation of transactions.

Support employees and Medicaid providers in their day to day work: enable providers to efficiently submit client assessments Providers and MassHealth CBHI users will have up to date data persisted in one repository giving access to data for business decision support and outcome analysis

Focus on measurable outcomes/measures: enable collection of timely and accurate data for assessment of client outcomes and supports the promotion of best practices.

This project supports the emerging Health Information Exchange (HIE) effort **mandated** by the Health Information Technology for Economic and Clinical Health Act (HITECH Act)

4.4.27. Project Description – Children's Behavioral Health Initiative (CBHI)

The CBHI (Children's Behavioral Health Initiative) system was designed to develop and implement a web-based application to facilitate assessment for MassHealth (Medicaid) children entering behavioral health services and for treatment planning and monitoring of behavioral health service delivery for children receiving intensive care coordination services.

Assessments of these children are entered by certified clinicians working at Medicaid provider locations throughout the Commonwealth of Massachusetts. The assessment information includes details about a child, their living situation, and their family based on interview sessions performed periodically. This information may be used to evaluate the progress of the child during treatment, often known as an outcome measure.

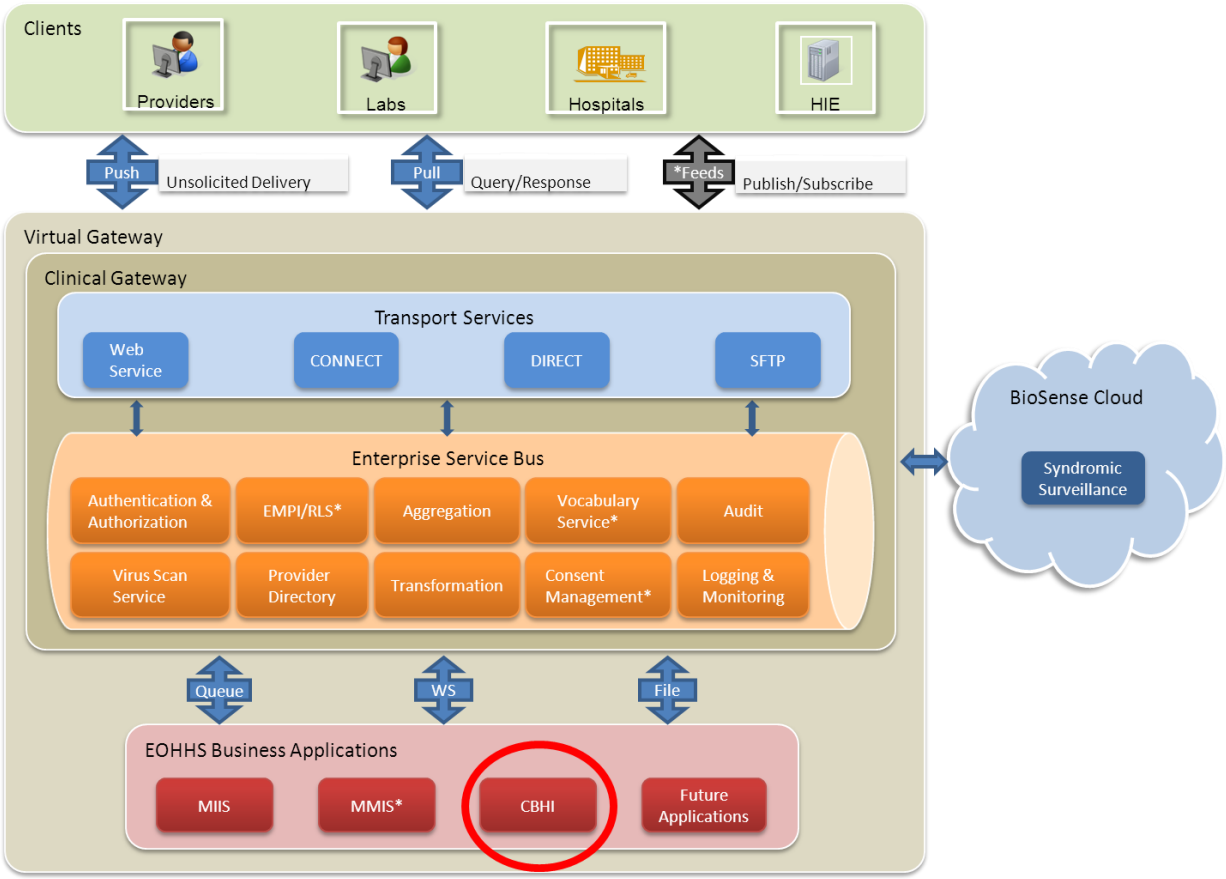
Reporting enables providers and EHS administrators of the CBHI program to see the results and history of a child.

Some Medicaid providers are currently entering assessment information in their EMR system and entering that same information (or a subset of it) into the CBHI system. To alleviate this duplicate manual data entry CBHI is seeking to integrate an HL7 solution for transferring data from Medicaid provider system to the CBHI system.

4.4.28. Project Approach – Children's Behavioral Health Initiative (CBHI)

CBHI will use the clinical gateway and AIMS components that fall within the MIIS Virtual Gateway enhancement project

The following illustrates the conceptual architecture of where CBHI sits within this project.



*Future Capability

4.4.29. Relationship to Other Entities – Children's Behavioral Health Initiative (CBHI)

CBHI is a MassHealth project and as such is funded through MMIS. The HL7 interface of CBHI will leverage the Clinical Gateway and AIMS infrastructure.

4.5. Statement of Alternative Considerations

Massachusetts has elected to undertake the effort to complete this set of projects to take advantage of existing functionality, to develop the critical infrastructure to support HIE and to streamline the process by which providers send and receive health data information. Within the Commonwealth, the state Medicaid

agency (MassHealth) and the State Designated Entity (MeHI) have come together to develop an integrated plan to leverage strengths within each organization to bring the HIE to providers versus developing their own solutions in isolation. In doing so, they have, with the support and input from ONC and CMS, chosen to re-focus and divide their respective roles and responsibilities such that, upon approval of the revised Strategic and Operational Plan, EOHHS will be responsible for all implementation, deployment, infrastructure services and procurements under the terms of the CMS Grant, and Mass Technology Collaborative will be responsible for the Last Mile and HIE Challenge Grants under the ONC Cooperative Agreement.

The state did not find any existing Commercial Off-the-Shelf products which could meet the needs of these projects and we believe strongly that existing, knowledgeable, staff is the right team of individuals to oversee and guide these efforts.

Finally, the overall framework of the Commonwealth's plan draws from, and aligns with, the guidance published by the various national standards bodies. The reasonability of this approach is based upon the conclusions that it:

- leverages valuable, publicly available intellectual property
- accelerates the design process
- significantly reduces the risk of failure
- ensures that the Commonwealth infrastructure will be fully compatible with a current and proposed standards going forward.

HISP

As an alternative to the web based portal, the team considered implementing a security "add-on" to standard email clients such as Outlook. This approach was not pursued because the advisory committee observed that the providers, especially the small providers are not using such clients, and an approach like this would entail higher support costs.

Another alternative is to not implement DIRECT components, but rather to wait for widespread adoption of EHR and HIE by the provider community. This was rejected as delaying widespread deployment of these capabilities to improve healthcare.

4.5.1. AIMS

In order to eliminate external dependencies capacity check has been done to see if HIE system can be integrated with existing infrastructure but it was found that existing infrastructure can't support the needs of HIE without making the needed changes.

By the time AIMS 3.0 will be ready, EOHHS will have all the appropriate resources needed to enhance it to AIMS 3.1. This will meet all the HIE requirements, in a cost-effective manner. Also, the resources will have background knowledge of the existing setups, which makes it easy for them to enhance the system to meet HIE requirements.

HIE staff do not have either the band-width to undertake this level of effort or the background to perform these enhancements timely;

- Any third-party Contractor would first require procurement and then a long learning curve to understand the EOHHS enhancements to the original Oracle products thereby increasing the time to enhancement.

4.5.2. PKI

There are a number of alternatives for encryption key management and certificate assignment which are currently being discussed in the security community at large. The Commonwealth considered evaluating, on its own, the merits and faults of the various approaches. Ultimately, the time, effort and cost of determining a state-specific solution did not seem reasonable given the amount of effort and expertise being devoted to this topic by HHS, NIST, ONC and IHE.

Consequently, the overall framework of the Commonwealths plan draws from, and aligns with, the guidance published by the various national standards bodies. The reasonability of this approach is based upon the conclusions that it:

- leverages valuable, publicly available intellectual property
- accelerates the design process
- significantly reduces the risk of failure
- insures that the Commonwealth infrastructure will be fully compatible with the NwHIN

4.5.3. Clinical Gateway

Consideration was given to not implementing this gateway, however to do so would require that all legacy systems stay in place and clinical data be submitted to the various state agencies multiple times. This alternative was rejected.

4.5.4. Provider Directory

Alternatives to a Commonwealth sponsored statewide provider directory were investigated and considered. Existing provider entity sources include payer directories, local HIE networks (see scan of existing landscape supplied in SMHP), public and private directories such as CAQH and HMS, Federal directories (NPPES), as well as the Mass Medicaid's various operating data repositories.

None of these sources are capable of meeting minimum criteria for either data sufficiency or functional capability.

Another approach, sourcing a reliable, accurate statewide provider directory and routing repository by combining existing sources, using either a federated or centralized approach, was found to be technically unrealistic, economically unsustainable and practically non-feasible.

Consideration was also given to a fully outsourced build of the Provider Directory. Though certainly feasible, this approach would forego the cost advantages of a public-private partnership while incurring the risk of not being economically and/or politically sustainable.

4.5.5. Syndromic Surveillance

The alternative is for each Emergency Room EHR to submit directly to BioSense 2.0. We did not adopt this approach since we believe that would imply that many EHR vendors would have to develop dedicated BioSense 2.0 interfaces

4.5.6. CBHI

There is no alternative that was considered.

4.6. Services to support Phase 2

Where Phase 1 services focus on the building of a health information highway Phase 2 tasks focus on analytics and population health. The first, analytics, will be addressed by improvements to the clinical data repository, the quality data infrastructure and the claims relay service. Population health will be addressed through an expanded set of public health interfaces and the ONC challenge grant MDPHnet.

MeHI's role is to continue to manage the MDPHnet project and work closely with MassHealth to ensure effective coordination. Underlying all these, vocabulary services will provide translation or context relative transformation to allow data sharing across disparate platforms.

4.7. Services to Support Phase 3

Phase 3 services will be expanded to fully support cross institutional and cross infrastructure services enabling a fully connecting the federated data network. A fully implemented EMPI and RLS, consent services, and routing for (to) patients will be implemented in this phase.

4.8. Service Delivery Model

[22]The state's Five-Year strategic plan describes the approach and projects, or tactical steps, to achieve the states long-term Medicaid vision for Health IT/HIE and meeting the four goals and fifteen objectives developed by the MassHealth Executive Team during the visioning process. It also includes the benchmarks to measure progress toward the stated goals. Mass Health is responsible for completing all of the tasks necessary to achieve the goals and objectives of the Service Delivery Model.

MassHealth's approach to the Five-Year strategic plan is based on the following key principles:

- Leverage existing Health IT and HIE strategic planning efforts in the Commonwealth.
- Leverage state-wide, inter-agency and public-private partnerships and collaboration.
- Leverage existing and planned resources, projects, technology and infrastructure.
- Execute key strategic EOHHS technology projects to facilitate state-wide HIE and provider adoption of EHR and achievement of meaningful use, which are the core components of the state's future vision and four goals and fifteen objectives.
- Support the implementation of MassHealth's strategic non-Health IT projects and coordinating with other strategic healthcare delivery projects in the state.
- The goals and objectives stated in the SMHP originated from the State-wide Health IT Plan. The Roadmap describes how those goals and objectives become Medicaid-specific through the projects and benchmarks described in the following sections.

4.9. Current Health Information Exchange Capacities

4.9.1. ePrescribe

Commercial Solutions

Numerous electronic health records and e-prescribe standalone vendors operate in Massachusetts and are connected to the Surescripts network. These vendors include Allscripts, athenahealth, eClinicalWorks, GE/Kryptiq, Epic, Nextgen, and DrFirst. Surescripts complies with National Council for Prescription Drug Programs (NCPDP) and X12 standards for electronic prescribing and ensures their certified vendors also comply. The standards include the following:

- Prescription Benefit
  - The X12 270/271 is used for eligibility messaging.
  - The NCPDP Formulary and Benefits Standard 1.0 is used for formulary information.
- Prescription History
  - NCPDP SCRIPT 8.1 is used for medication history request and response messages in the ambulatory setting.

[22] 2011 APD, Section E.2

  - HL7's ADT and ORU/RDS messages are used for medication reconciliation messaging.
- Prescription Routing – NCPDP's SCRIPT 8.1 standard is used.

Self-built Solutions

NEHENRxGateway (formerly MA-SHARE) is connected to Surescripts and is in compliance with the standards stated above.

Emerging Products

There is currently no data on emerging products.

4.9.2. Patient Engagement

The Consumer Engagement Ad Hoc Workgroup conducted an analysis concerning the alignment of the available technical solutions with the challenging task of making recommendations on how these technical solutions will work for the consumer. They provided advice and recommendations on the development of a consumer attitudes survey to identify concerns and expectation (see Appendix B); a messaging strategy aimed at affecting consumer behavior and attitudes; and messaging needs to develop a continuum of support messages. Once the review of the consumer landscape is complete, the Ad Hoc Workgroup will encourage member participation on expert panels, and plan and conduct focus group.

Commercial Solutions

- WebMD (several employers are using this system) supports most standards and is more claims-based.
- Dossia supports most standards and is more claims-based.
- Microsoft HealthVault supports most standards.
- Google Health is limited to CCR-G standards.
- RelayHealth supports most standards.
- Several EHR-based PHRs solutions, such as Cerner, eCW, GE Centricity, etc. use some standards but have many aspects which are proprietary to the system.

Self-built Solutions

- Several hospitals/IDNs have created their own patient engagement tools, such as the Partners-based, Patient Gateway, BIDMC's PatientSite and Children's Hospital's Indivo Health. These systems all support clinical standards, with Children's and BIDMC supporting portability to other services, such as Google Health and HealthVault.
- Caritas has signed an agreement with Microsoft and will likely follow the HealthVault route, similar to New York Presbyterian.

Emerging Products

Patient engagement products are wide ranging and come from an equally wide range of vendors. These products address a multitude of consumer needs, from weight loss and smoking cessation to diabetes management and cancer treatment. Therefore it is difficult to state any one product that should be considered. However, the following are worth noting:

- SaaS models support ecosystems of consumer health applications, which include Dossia, Google Health and Microsoft's HealthVault.
- Mobile heath applications are just starting to come into play and will likely be a popular platform used by consumers, in support of what the Robert Wood Johnson Foundation refer to as "Observations of Daily Living (ODLs)."

4.9.3. Eligibility Verification and Claims Submission

Commercial Solutions

There are several solutions in use today to enable verification of eligibility and submission of claims to payers. Many organizations use commercially available solutions, such as HealthTrio, Navinet, Emdeon, AthenaHealth, EDIfecs, and other vendor solutions. These solutions are currently HIPAA 4010 and CAQH Core Phase I compliant, and each solution provider is currently pursuing HIPAA 5010 compliance, which encompasses CAQH CORE II compliance.

Self-built Solutions

Some participants in electronic exchange of eligibility and claim submission information use self-built solutions for direct-connectivity between parties. An example of a robust self-built solution in MA is NEHENclassic[23] and NEHENnet.

Emerging Products

Each of the solution providers currently in use today is positioning itself for 5010 and CAQH CORE Phase II compliance. There are several new or emerging hardware appliances/devices that provide inline processing and handling of security, messaging and data translation. Massachusetts should consider standard appliances for use in its data exchange.

- Internet-based EDI protocols, such as AS2 EDIINT will enable secure EDI transactional capabilities over the internet and will widen the adoption of participants in a data exchange.
- Specific to claim submissions, HL7 version 3 specifications should be used for those attachments/documentation requirements that need to be exchanged between parties.

4.9.4. Data Submission to Immunization Registries, Electronic Lab Reporting and Syndromic Surveillance

Commercial Solutions

- MAVEN from Consilience Software
  - Boston Public Health Commission (BPHC) uses a modified version to suit the needs of the local health department to track and report on infectious disease.
  - Electronic Laboratory Reporting (ELR) data exchange uses the MAVEN database to create, store and analyze infectious disease cases for the Bureau of Infectious Diseases at the Massachusetts Department of Public Health.
  - The Massachusetts Immunization Information System (MIIS) data exchange uses MAVEN to track vaccine inventory and population vaccination for the Bureau of Infectious Diseases at the Massachusetts Department of Public Health.
  - This product meets Massachusetts' required standards.

[23] NEHEN (New England Healthcare Exchange Network) is a state-wide consortium of healthcare service providers, payers, academic institutions, public sector and other advocates in the healthcare industry.

- DiagnosisOne web portal
  - ELR takes in HL7 formatted files, performs a format and data validity check and then pushes the validated information through to a database (MAVEN – see above).
  - The Automated Epidemiological Geotemporal Integration System (AEGIS) data exchange also takes in HL7 formatted files and pushes the information through to a database (see next bullet).
  - This product meets Massachusetts' required standards.
- EMTrack from EMSystems – BPHC uses this for patient tracking during an emergency and to track immunizations.

Self-built Solutions

- Syndromic Surveillance System – created by BPHC, this system collects chief complaint data from all urgent care hospitals in Boston and one local community health center. This system does not use any federal standards, but BPHC is working with Beth Israel Deaconess Medical Center (BIDMC) to create a transmission that meets the HL7 2.5 standards.
- Health Inequities Surveillance System (HISS) – Also created by BPHC, this system collects demographic data from hospitals in Boston to track care based on race/ethnicity, to ensure that all patients get the best care possible. There are currently no federal standards for health disparities; however, BPHC is working with BIDMC and NEHEN to create a transmission using continuity of care documents.
- SAFEHealth – Standards based health information exchange serving central Massachusetts.
- Electronic Support for Public Health Program (ESP) – Northern Berkshire eHealth Collaborative implemented a public health reporting tool, based on HL7 2.x standards, as part of a Massachusetts Department of Health, Harvard Medical School and Harvard Pilgrim Health Care program. To meet current HL7 2.51 standards, the specifications, protocols and programming language would have to be updated.
- MAeHC Quality data center – Commercial-ready platform, based on HITSP and national standards for data exchange. This platform can easily be scaled to support a robust, efficient and standardized clinical quality and public health reporting.
- AEGIS – Developed by the Children's Hospital Informatics Program to perform Syndromic Surveillance on Massachusetts emergency department visits. AEGIS performs automated, real-time surveillance for bioterrorism and naturally occurring outbreaks and disease clusters. This product meets Massachusetts' required standards.

Emerging Products

Data Exchange Pilot – BPHC is currently involved in a data exchange pilot with BIDMC. This project will replicate Syndromic Surveillance and Health Inequities, using Federal standards and the NEHEN gateway. It will also add feeds, such as a limited set of lab data, immunizations, and a chronic disease data set that encompasses all visits for persons with diabetes and asthma.

4.9.5. Quality Measurement and Reporting

The Quality and Public Health Ad Hoc group is creating an inventory that crosswalks the NPRM quality measures, the organizations in Massachusetts that aggregate data, and the reporting requirements (see Appendix C). There is also a task force that is developing a quality data use case that will provide us with a sense for the many touch points before useful aggregate data can be generated. A third task force is

developing an EHR workflow to articulate EHR and HIE capabilities that will be required to streamline physician workflow and utilization of aggregate data.

Hospital Self-built Solutions

Hospital quality reporting is mature with various reporting regimes as depicted in the below crosswalk, e.g. RHQDAPU and Joint Commission. MeHI and the CQPH Ad Hoc workgroup are in the process of reviewing the final rule quality measures to ensure that these measures are contained in at least one of the following reporting regimes.

- PQRI
- BORIM
- HQA RHQDAPU & TJC (CMS)
- MassHealth
- Joint Commission
- Leapfrog
- Patient Care Link
- ANA NDNQI Registry
- American College of Cardiology ACC-NCDRs
- Society of Thoracic Surgeons
- American College of Surgeons (ACS)
- MIDA
- Institute for Healthcare Improvement (IHI)
- HOP QDRP
- HCQCC Quality Measure

Ambulatory Providers Self-built Solutions:

- MAeHC Quality Data Center: As noted above in the Public Health section, MAeHC has a commercial-ready platform, based on HITSP and national standards for data exchange. This platform can easily be scaled to support a robust, efficient and standardized clinical quality and public health reporting.
- CHIA: The CHIA (Community Health Information Association) has developed a SQL Server/ XML-based data acquisition and reporting solution that is deployed by the Massachusetts League of Community Health Centers (MA PCA) in several Community Health Centers in Massachusetts. This system captures visit and patient contact documentation including details from EHR products (Dx, medications, vitals, lab results) as well as patient demographics and CPT10 coding from EPM products including insurance information.

The HIE Ad Hoc workgroup anticipates that these and other market organizations and solutions provide the necessary coverage and capability for Massachusetts Hospitals and EPs to effectively meet their Meaningful Use quality reporting requirements. It is consistent with our Statewide HIE Strategy to encourage the use of market solutions, while carefully monitoring and getting feedback from providers to ensure that they have access to at least one option to meet their meaningful use requirements.

4.10. Barriers to Health Information Exchange Implementation

4.10.1. ePrescribe

Although Massachusetts was ranked number one for e-prescribing adoption, with 43% of providers in the state e-prescribing in 2008, there is still a large gap to achieving 100% adoption.

- One reason for this gap may be due to the prohibition, per DEA rules, of prescribing controlled substances electronically. The DEA recently published an Interim Final Rule to remove this restriction: effective June 1, 2010, the DEA will allow electronic prescribing for controlled substances, but adoption of this function should be monitored as the requirements may still be considered a burden by providers.
- Information for all Massachusetts' patients is not available through all e-prescribing applications. For providers, pharmacies, and public and private payers to achieve the full value of e-prescribing, all public and private payers need to be connected to Surescripts and/or the HIE. This will enable the checking of prescription benefits, formulary and medication history.

4.10.2. Patient Engagement

- The primary barrier to consumer engagement in healthcare is educational and cultural.
  - Consumers need education on the value that can be derived from self-management of health and use of health data/records. There is a high level of concern among the majority of consumers with regards to digital personal health information PHI that can be mitigated through education.
  - Clinicians need education as well. First, they must recognize that they are required to allow consumers access to their full records upon request (the cultural issue), and they need to support portability of such records. Clinicians also need to be educated on how to provide guidance to consumers, as most consumers do not know how to use their PHI in support of their health goals.
  - There is a high level of trust between the clinician and consumer that can be effectively leveraged. As part of MeHI's education and outreach efforts, MeHI will educate the provider and patient about the value of EHRs and HIE
- The secondary barrier is lack of tools.

  Once data/PHI begins to flow securely to consumers for their use, a more robust consumer market will naturally develop to provide them effective tools/applications to leverage their PHI in a meaningful and health supporting fashion.

4.10.3. Eligibility Verification and Claims Submission

Mass Health shall be responsible for the development and implementation of all eligibility verification and claims submission processes and required infrastructure.

- Establish a consent framework to define global access to all healthcare providers, payers and participants. Such a framework will need to consider consent options for opting in and consent withdrawal, and provide a common mechanism for the definition and maintenance of consent attributes for all constituents.
- Consider a common person identifier (master patient index) and a common data store of consent information, demographics, and other data used to identify an individual. Without defining a common person identifier and a common reference repository of the identifier, the proposed data exchange will be plagued with the current issue of not finding/identifying an individual across multiple exchange participants. The consent framework must also consider whether or not to permit the inclusion or exclusion of specially protected health information.

- Build into the core transactional processing of the data exchange security credentials and consent verification. Security functions, such as access control, authorization, authentication and auditing must all be included as part of the core data exchange functionality.
- Lack of detailed data definitions within the existing HIPAA eligibility and claim submissions lead to an inconsistent implementation of transactional content among current healthcare participants. While CAQH CORE (Phase I and II) have further identified minimum content for eligibility, it is not generally understood if existing data exchanges are providing the right level of information and value.
- There are very few standards used for the definition of covered benefits and group coverage structures. This can lead to confusion in the interpretation of what payer benefits will or will not cover. Further standards around the definition of benefit coverage, medical policies, and the codification of this information will provide a better foundation for the exchange of this type of data.

4.10.4. Clinical Information Exchange

- State laws that require unique consent be obtained for **every** release for certain types of a patient's data
- Conflicting institutional privacy policies within and between other state consent policies/laws
- Questions surrounding state direction on Health IT policy tied it to state HHS strategy, HIE direction, etc.
- Provider Barriers
  - Relatively high percentage of providers without any or adequate EHRs and barriers to getting EHRs that will be needed to connect to HIEs (e.g., cost, logistics, etc.)
  - Organization(s) priorities and resources and need to replace existing systems; e.g., EHRs and interface engines
  - Connectivity to MDs not affiliated with local HIEs or IDNs will be harder/more expensive
  - Hesitancy to make HIE decisions because current HIE vendors may not be around in a few years
  - Uncertainty surrounding core EHR/vendor HIE interfaces and solutions, or lack of same
- Vendor Barriers

  Misalignment of incentives for vendors, to provide interoperability with other vendors and for provider organizations that compete with each other to interconnect
- Inertia awaiting state's formal designation of the HIE provider
- Uncertainty regarding payer role and use of clinical data
- Lack of adequate funding support from participants
- Unknown where clinical data exists for patients, so unknown from where to query it

4.10.5. Data Submission to Immunization Registries, Electronic Lab Reporting and Syndromic Surveillance

- Funding and resources, at the local level.
- Data Standards
  - To maximize the quantity of data available, standards need to allow for some flexibility with data uploads.

  - Most hospitals do not currently capture the appropriate LOINC and SNOMED codes for laboratory tests and results, which require the hospitals to map local codes to standardized vocabularies.
  - Most hospitals use customized versions of HL7 messaging to deliver lab results, raising the cost and complexity of lab interfacing.
  - There are no state or federal standards for outpatient lab result messaging or vocabularies, and no monitoring or oversight mechanism to enforce such standards, even if they were established.
- Lack of understanding of unique information needs of the local health department to address local issues.
- Need to review existing consent policies and regulations to facilitate intra and interstate exchange of clinical data, while maintaining patient confidentiality and privacy.

4.10.6. Quality Measurement and Reporting

The Clinical Quality and Public Health Ad Hoc workgroup will inform these barriers to adoption section as part of their work.

4.11. Accelerators for Health Implementation Exchange Implementation

4.11.1. ePrescribe

- Connecting the HIE to Surescripts would speed implementation because Surescripts already has the infrastructure and standards in place to support Meaningful Use objectives and measures.
- The Regional Extension Centers and the HIE may also play a role in reducing the gap in adoption and utilization by offering directly to providers education, training, workflow analysis and best practices for implementing and using an e-prescribe or electronic health record system.
- Through the Last Mile services, MeHI will ensure that providers implement EHRs with ePrescribing capabilities.

4.11.2. Patient Engagement

- The Commonwealth can take a more active role in consumer education via public address announcements on major radio and TV networks throughout the State. Examples are the advertising spots the Agency for Healthcare Research and Quality (AHRQ) has developed.
- Incentives can be offered to clinicians (CME discounts) who take special courses on consumer engagement methodologies.
- Incentives can be offered to patients/consumers, such as copay reduction who engage in certain health IT activities.
- The State can follow the context of Meaningful Use guidelines and, upon the consumer's request, publicize regulations that support the full portability of PHI, in an easy to understand format/language.
- Within the context of a statewide HIE, the State can ensure the consumer has full portability of their PHI and can "securely download" it to a location of their choosing. In addition to the initial download, provide consumers with the option to subscribe to a push of updates to a PHR of their choosing.

4.11.3. Eligibility Verification and Claims Submission

There are several vendor or consortium products that could be used to develop a state-wide data exchange. MassHealth's implementation of the exchange should happen in phases, with core clinical and administrative support being developed first. In subsequent phases patient master index, security credentialing, transactional routing, etc. could be implemented, as standards are defined and exchange functionality becomes available.

4.11.4. Clinical Information Exchange

- Record Locator Service or equivalent
- Statewide master patient, provider and organization indices
- Government standards and regulations
  - Statewide privacy and security standards – standards for au**t**hentication, such as password length, complexity and frequency of change; standard consent form for entire state; standard definition of the granularity of consent (types of data, for what purposes, and provider-level vs. organization level); Opt-In vs. Opt-out
  - Federal guidance to standardize privacy and security regulat**i**ons across all states
  - Statewide data-use agreement
  - ONC finalization of standards and rules
  - Clear privacy/consent law or policy guidance from federal government
  - Statewide governance that ensures trust in the HIE
- Funding
  - Clarity regarding funding for HIE; i.e., when, how much, requirements, etc.
  - Additional payer incentives and fun**d**ing for HIE
  - Define return on investment (ROI) for statewide HIE and to whom the benefits would accrue
- Infrastructure and data transmission
  - Baseline structure for document transportation; e.g., CDA
  - Encourage transmission of discrete data elements, whenever possible.
  - No rip-and-replace of existing HIEs and IDN infrastructures
  - Require vendors in Massachusetts to integrate with statewide HIE
  - State selection of a reliable, successful EHR-vendor-agnostic HIE vendor and architecture
  - Clear plans from ONC regarding NHIN Direct: release plans, expectations for use, etc.
  - Encourage small practices to use ASP-model EHRs, so instead of negotiating HIE connectivity with 1000 physicians, you only need to do it with 10 vendors.
  - Success of the state REC and IOOs in implementing EHRs with standard vocabularies/master files
- Industry standards
  - Vocabulary-mapping web services
  - Standard lab and radiology test compendiums
  - Define Meaningful Use for 2013 and 2015 so HIE accommodates the long-term vision

4.11.5. Data Submission to Immunization Registries, Electronic Lab Reporting and Syndromic Surveillance

- BPHC's clinical services would contribute to a robust exchange of HIE.
- Acquire better understanding of the unique information needs of local health departments.
- Develop federal standard for health disparities.

- Develop state-wide master provider and facility index to enhance use of secure transport services
- Mandate use of messaging (HL7 2.5.1) and vocabulary (LOINC, SNOMED) standards by all hospital and locally-based lab source systems in the state. The state could provide annual certification of adherence to such standards and connect it to DPH licensure, or align it with state CLIA oversight.
- Develop a state-wide master patient index.
- Migrate the DiagnosisOne web server, used for AEGIS and ELR data exchange, to the state virtual gateway, since so many other MDPH tools are being deployed on that platform and to incorporate it into the EOHHS HL7 gateway.
- State registry is due January 2011

4.11.6. Quality Measurement and Reporting

The Clinical Quality and Public Health Ad Hoc workgroup is currently in the process of defining the recommendations and advice for clinical quality measures and reporting. The following describes what they are currently evaluating and how they will develop recommendations for the HIE.

- Criteria for prioritization of reporting

  Using the same criteria to choose and envision rationalized data flows for both public health (PH) and clinical quality (CQ) reporting, particularly for 2010+; develop straw man criteria for the Ad Hoc Workgroup discussion.

- Public health reporting

  For 2011, analyze the current state of immunization reporting, including data elements, workflows, technical requirements and available services; and analyze available services and envision rationalized workflows and services. Provide recommendation of options for HIE services needed to meet 2011 Meaningful Use requirements, specifically for immunization reporting.

  For 2013, analyze syndromic surveillance and e-lab reporting, including data elements, workflows, technical requirements and available services; and envision rationalized workflows and services likely to be needed for 2013 reporting. Provide recommendation of options for HIE services needed to support the planned 2013 public health reporting.

  For 2013+, analyze anticipated Meaningful Use requirements, priority measures/reporting, including synergies with clinical quality reporting, and administrative simplification to define options for rationalized workflows and needed HIE support services. Provide recommendation of options for HIE services needed for 2013+ public health reporting, based on a vision of Meaningful Use requirements. Prioritize measures and workflows, and rationalize future workflows and services.

- Data flows for public health and clinical quality reporting

  Develop data flows for Meaningful Use measures, starting with 2011's measures.

4.12. Workforce Development

4.12.1. Funding Strategy for Health IT Workforce Development Initiatives in Massachusetts

Develop an approach to achieve funding requirements to support health IT Workforce Development needs. The level of effort required by provider organizations, EHR vendors, Implementation and Optimization Organizations and others to support the statewide deployment of EHRs and to establish and maintain a statewide HIE will require a highly trained workforce. To meet this demand, a significant level of effort will be required, with the following specific elements:

- Compile strong value proposition and case for funding need; including definition of programs, students/jobs and current employment gaps
- Critical to prioritize identified programs and clear range of funding requirements. Will need to know what the cost range relates to in terms of students, programs, scope, etc.
- Identify funding opportunities: public (state, federal) and private (foundations, employers, etc.)
- Outreach effort
- Launch funding effort

Key Activities

- Inventory of current funding opportunities
- Prioritization of programs
- Discussions with potential funders

4.12.2. Massachusetts Statewide Health Informatics Internship Matching System

Develop a centralized health informatics internship matching program to connect students with internship and project opportunities.

Key Activities

- Form a matching system
- Recruit schools and education groups that provide students
- Recruit and educate employers about the availability of new talent

4.12.3. Curriculum and Program Development and Strengthening

1. Pursue two interrelated tracks of training:
   - IT training for healthcare providers/professionals
     - Health IT element of current curriculum
     - Up-training curriculum
   - Education for software vendors and implementation organizations
3. As the primary unmet needs are the “feet on the ground” implementers, will need to make sure that training is available and that the state is leveraging existing programs
   - Leverage federal development work at Bristol Community College
   - Leverage strong programs in place that focus on higher level positions; e.g., Regis, NEU, UMass, etc.
3. Leverage existing models: http://www.ahhrari.org/documents/MaureenSroczynski.ppt.
   - Building partnerships in education and practice – the journey to the future of nursing
   - Health IT HealthCare Report – use registered apprenticeship to build and fill career paths in health information technology.
4. Coordinate providers and educators, as well as ensuring MeHI coordination around meaningful use and other health IT requirements.
   - Align curriculum with practice needs
   - Coordinate curriculum across programs
   - Coordinate internships--Northeastern model
5. Clearly define career ladder and career pathway.

- Accelerate pathways/career ladders so individuals can recruit and move up in organizations
- Tie in with communications/marketing effort

Key Activities

- GIS/mapping of current needs, such as eligible providers and populations served, vendors, etc. This will help identify "unmet needs" and gaps.
- Conduct discussions and coordinate with Bristol Community College regarding their program.
- Develop coordination plan with regards to programs, internships and needs.
- Leverage Department of Labor's proposed $5M work plan, submitted in October 2009.
- Determine which community colleges/institutions would participate.
- Coordinate with internship and marketing effort.

4.12.4. Health IT Peer/Communities of Practice Development

Provide an online Communities of Practice site for health delivery organizations deploying EHR systems.

Key Activities

- Identify requirements and interest among Massachusetts health delivery organizations using or planning to use EHRs
- Based on this input, develop requirements/specifications for an online, peer-to-peer community
- Review possible existing communities that meet the requirements. Partner or build a community depending on need.
- CoPs will be rolled out in the 2nd quarter of 2012 for REC enrollees and all HIE participants/stakeholders.

4.12.5. Implement Health IT Program and Job Opportunity Communications and Marketing Strategy

Create jobs and provide workforce needed for health IT deployment. Use Marketing programs to raise visibility and awareness of health IT job opportunities, education and intern programs in Massachusetts, resulting in increased enrollment and employment.

Key Activities

- Define targets.
- Identify messages.
- Coordinate outreach through participating educational institutions, healthcare delivery organizations, vendors, and state sponsored programs.
- Develop a comprehensive communications plan that includes a web directory, web site, social networking and media advertising, PR, speaking, job fairs, conferences, etc.
- Implement the plan.

5. Legal/Policy

The Privacy and Security Ad Hoc Workgroup was informally convened last year by the Secretary of the Executive Office of Health and Human Services. As indicated in the Governance Section in 2011 the Secretary of the EOHHS convened the HIE-HIT Advisory Committee as the body that would provide advice and recommendations on matters pertaining to the HIE. This Advisory Committee, in concert with the Health IT Council and MeHI created workgroups; one of the workgroups created was the Legal Policy Workgroup. This Workgroup will leverage all the work done by the Privacy and Security Ad Hoc Workgroup and will provide advice and recommendations to the Health IT Council on privacy and security policies for the Statewide HIE and participating systems, both within Massachusetts and between states and to adhere to the principles outlined in the HHS Health IT Privacy and Security Framework, including: disclosure limitation, individual access, correction, openness and transparency, individual choice, collection and use, data quality and integrity, safeguards and accountability. Mass Health shall be responsible for implementing all legal and policy considerations concerning the HIE, except those that may be related to the Last Mile, for which Mass Technology Collaborative will be responsible.

In 2010, the Privacy and Security Ad Hoc Workgroup created four Task Forces, which provided advice and recommendations on each of the following topics:

- Consent Policy
- Certification
- Legal/Policy
- Research

5.1. Background and Context of Recommendations

The Task Forces spent many hours discussing the topics outlined below. Issues such as consent, for example, are very complex and will require more consideration by the newly created Legal Policy Workgroup and the HIE Health IT Advisory Committee and will further require outreach to the consumer Workgroup and the HIV community. All the recommendations set forth within this legal/policy section are recommendations to be presented to the HIE Health IT Advisory Committee. Once the HIE-HIT Advisory Committee has recommendations, they will be presented to the Health IT Council and the Mass Technology Collaborative Board of Directors who are the decision making authorities. Much progress had been made but there is more work to be done. The path going forward is to continue to vet these issues and leverage all the work of the Ad Hoc Workgroups.

5.2. Legal Policy Task Force Recommendations

The vision of a full electronic exchange of health care-related information is both laudable and exciting. Bringing patients safer, more effective, and better-informed care is a main driver. However, due to the complexities involved, making this vision a reality will take some time. To reduce risk, the program should be divided into readily achievable steps. Since a measure of HIE program success is the degree of adoption among Massachusetts patients and providers, demonstrating the utility to these constituents is critical. Therefore, the Legal Policy Task Force limited its initial discussions to the exchange of information between clinical providers in the context of delivering patient care. For simplicity at this stage, MeHI envisions that the exchange of information between providers, insurers and regulators, whether for quality oversight or pay for performance, will take place by other currently existing mechanisms, thus minimizing the complexity of privacy and security issues to be addressed at inception. As the exchange matures and grows, other entities and capabilities can be added, such as who else can exchange information over the HIE with the related complexities addressed at that time. Once the Health IT Council adopts the

recommendations from the workgroup, MeHI through its marketing and communication plan will educate patients and providers.

The proposed HIE[24] is intended to assume responsibilities for the transmission of certain health information among health care providers in the Commonwealth. Although the governing structure, programmatic architecture and specific functions of the HIE remain to be defined, it is presumed that the HIE will at least undertake the following activities:

1. Establish policies and procedures for the operation of the HIE
2. Establish terms and conditions of employment for all HIE employees, officers and board members
3. Enter into an agreement or agreements with one or more public or private information technology organizations to construct and operate the data transmission and other functions of the HIE
4. Enter into agreements with health care providers, facilities and networks who wish to participate in the HIE by sending and receiving patient health information through the HIE.

5.3. Privacy and Security Policies Applicable to a Decentralized and Federated Model

The following does not address the subject of HIE enforcement of its privacy policies or agreements with non-provider participants, such as patients, insurers, and government agencies. These subjects will be considered in the future.

5.3.1. Privacy and Security Policies for the Operation of the HIE

A core element of the HIE's mission is to protect the privacy and security of the information with which it is entrusted, and to operate in a manner that is fully transparent and accountable to the public.

General Responsibilities under HIPAA Privacy and Security Rules

The obligation of the HIE to comply with the requirements imposed on business associates, and in general under HIPAA and under Massachusetts law, will depend on the model used. Mass Health, as the implementer of the HIE shall be responsible for ensuring HIPPA compliance issues are addressed in the design and implementation of the HIE. A fully Decentralized Model does not appear to qualify as a business associate[25] under the HIPAA Privacy and Security Rules, because it would not "require access on a routine basis to protected health information. "[26] A Federated Model would appear to qualify as a business associate within the meaning of the HIPAA Privacy and Security Rules if it requires routine access to demographic or other protected health information.[27]

[24] The term "HIE" in the section refers to the entity or combination of entities that wall have governance responsibility over the health information exchange.

[25] Under current regulations, DHHS does not consider "organizations, such as the US Postal Service, certain private couriers and their electronic equivalents that act merely as conduits for protected health information" to qualify as business associates. US DHHS, Health Information Privacy FAQs, http://www.hhs.gov/ocr/privacy/hipaa/faq/smaller_providers_and_businesses/234.html. Proposed regulations to implement §13408 of the HITECH Act continue this approach and define a business associate to include: (i) A Health Information Organization, E-prescribing Gateway, or other person that provides data transmission services with respect to protected health information to a covered entity and that requires access on a routine basis to such protected health information. (ii) A person that offers a personal health record to one or more individuals on behalf of a covered entity. (iii) A subcontractor that creates, receives, maintains, or transmits protected health information on behalf of the business associate. DHHS, Office for Civil Rights, *Modifications to the HIPAA Privacy, Security, and Enforcement Rules Under the Health Information Technology for Economic and Clinical Health Act*, 75 F.R. 40868, 40873, 40912 (July 14, 2010) (amending 45 C.F.R. §160.103) [hereafter, July 14, 2010 Proposed Rules].

[26] Protected health information is defined as "individually identifiable health information," including demographic information. 45 C.F.R. §160.103. The July 14, 2010 Proposed Rule would exclude from the definition certain educational and employment records and records of a person who has been dead more than 50 years. July 14, 2010 Proposed Rule, *supra* note 3 (75 F.R. at 40913, amending 45 C.F.R. §160.103).

[27] July 14, 2010 Proposed Rule, *supra* note 3.

Regardless of whether the model used is Decentralized or Federated, it is recommended that under either model the HIE fully comply, to the maximum extent possible, with all requirements of the HIPAA Privacy and Security Rule, as well as the provisions regarding confidentiality and security found in M.G.L. chapter 40J, section 6G ("Section 6G") to demonstrate its commitment to privacy, security and transparency.[28]

5.4. Error Correction and Breach Notification

5.4.1. Specific Responsibilities for Error Correction

The following are the HIE's responsibilities for error correction:

1. The HIE should be responsible for correcting errors and omissions of any kind resulting from the acts or omissions of HIE board members, HIE officers, HIE employees, and any third party acting on behalf of the HIE, including information technology organizations under contract to the HIE and vendors of technology of any kind used in the development, maintenance, or operation of the HIE's health information exchange system. The HIE's responsibility is in addition to, and independent of, the responsibilities of participating providers and covered entities under the HIPAA Privacy and Security Rule or otherwise subject to responsibility for preventing or correcting errors.
2. The HIE is responsible for ensuring the secure, prompt and accurate transmission of data to the intended recipient. HIE transmission errors include delivery to the wrong party and loss of all or part of the data to be transmitted before or during transmission, including data that is incompatible, indecipherable or otherwise corrupted. HIE transmissions should only be made using standard protocols (such as HL7, DICOM etc.), in order to minimize the potential for losing or corrupting data.
3. The HIE will not make any correction or change in any underlying patient data.
4. The HIE may use current definitions of the American Health Information Management Association or other generally accepted organizations to classify types of errors, amendments, addenda, and other corrections, in order to ensure reasonable consistency of terminology across providers and information technology entities.

5.4.2. Breach Notification

The HIE itself will have some responsibilities for breach notification that are independent of the breach notification duties of participating providers, who are also covered entities within the meaning of the HIPAA Privacy Rule. The following are the HIE's responsibilities for breach notification according to the location of the breach:

1. **Breaches of the HIE System.** The HIE will be responsible for all breaches to its health information system, including inadvertent breaches as well as deliberate invasions of the system.[29]
   Notification to Individuals: The HIE will develop a policy for promptly notifying all individuals whose information has been accessed. In a fully Decentralized Model, there may be no health information that can be accessed through the system, while in a Federated Model, a breach may access demographic information that qualifies as personal health information. Under the federal rules

[28] *See* July 14, 2010 Proposed Rule, *supra* note 3, (amending 45 C.F.R. §160.130, expanding the obligations of business associates pursuant to the HITECH Act. For specific obligations, see §164.306 (security standards), §164.308 (administrative safeguards, §164.310 (physical safeguards), 164.312 (technical safeguards).

[29] The HIPAA Security and Privacy Rules define "breach" in a more limited manner as "the acquisition, access, use, or disclosure of protected health information, which compromises the security or privacy of the protected health information. The "compromise" language is further defined to mean that the breach "poses a significant risk of financial, reputational, or other harm to the individual," and expressly excludes any use or disclosure "that does not include the identifiers listed at § 164.514(e)(2), date of birth, and zip code." 42 C.F.R. § 164.402.

currently in effect,[30] the definition of "breach" would not include much of the data the HIE is likely to possess. However, if the HIE keeps a Master Patient List that includes the names, social security numbers, dates of birth, home address, account number, diagnosis or disability code, it would be responsible for notifying individuals. If the HIE cannot access the personal health information contained in the data packets transmitted, it would not be able to determine the types of health information that might be involved, if the party who accessed the HIE system managed to follow the transmission to where the data is kept, presumably with a provider. Regardless of whether the HIE is obligated to notify individuals, the HIE will do so to the extent that it has the relevant contact information. Individuals should be entitled to know how their information is being used and whether those entrusted with keeping it private are meeting their obligations. In addition, the HIE will issue a public notice, of which the type and manner are yet to be determined, of any breach.

The Massachusetts Data Breach law will also apply to a Federated Model that maintains a Master Patient Index with patient names and either (a) their Social Security numbers or (b) their health insurance account numbers.[31] Where it does apply, an HIE that complies with federal laws and regulations, including the HIPAA Security and Privacy Rules, "is deemed to be in compliance with the Massachusetts Data Breach law, if the person notifies Massachusetts residents in accordance with those procedures, and also notifies the Massachusetts Attorney General and the Director of the Office of Consumer Affairs and Business Regulation "as soon as practicable"[32]

Content of Notification to Individuals: The Massachusetts Data Breach Law and HIPAA conflict in a significant respect as to the content of the notification to individuals. The Massachusetts Data Breach Law does not permit the notice to individuals to include the nature of the breach or unauthorized access while HIPAA requires the notice to include a "brief description of what happened." Since these conflicting rules govern all providers in Massachusetts, further definitive guidance will be required in order to harmonize these provisions for Massachusetts providers and their business associates. Apart from the nature of the breach, HIPAA requires that the notice contain a description of the types of information accessed; steps the individuals should take to protect themselves from potential harm; description of what the HIE is doing to investigate the breach, mitigate harm to individuals, and prevent future breaches; contact information for individuals to learn more, including toll-free phone number, email address, Web site, or postal address.[33] In addition to the HIPAA requirements, the Massachusetts Data Breach Law requires the notice to include the consumer's right to obtain a police report and other information relating to a security freeze.

Notification to Providers: Both the HIPAA Security and Privacy Rules and the HITECH Act require a business associate to notify covered entities of a breach of "unsecured protected health information."[34] Even if the HIE is not a business associate, it will notify each provider, including participating providers, whose HIE transmissions have been breached.

[30] *Id*. The rules currently in effect were promulgated by DHHS, *Breach Notification for Unsecured Protected Health Information; Interim Final Rule*, 74 F.R. 42740 (Aug. 24, 2009). DHHS reportedly submitted a subsequent version, to become the Final Rule, to the OMB, but withdrew it in July 2010; any future Final Rule may differ from the Interim Final Rule, which is currently in effect.
[31] Mass. Gen. Laws, ch. 93H, Security Breaches. Personal information is defined as a person's name plus at least one of the following: social security number, driver's license or state-issued identification number, or financial account or credit or debit card number. c. 93H, §1(a). The Office of the Attorney General appears to have interpreted "financial account number" to include health insurance account numbers, at least in some circumstances.
[32] *Id*. at §5.
[33] These elements are based on the HITECH Act, § 13402(f), 42 U.S.C. § 17932; and 45 C.F.R. §164.404.
[34] 45 C.F.R. §164.410; HITECH Act, § 13402(b), 42 U.S.C. § 17932. The obligation of a business associate applies to breaches of "unsecured protected health information," which is defined in § 13402(h) of the HITECH Act as "protected health information that is not secured through the use of a technology or methodology specified by the Secretary. . . ."

HIE system breaches are likely to come to the attention of its information technology entity ("ITE") subcontractor, which will actually administers the system's operation. Therefore, the HIE must ensure that the ITE notifies the HIE immediately of any breaches the ITE discovers.

Notification to Others: Providers; Patients; Secretary of HHS; media

2. **Breaches of Provider Sources.** Providers have independent duties to notify patients whose information, either held by the provider or on the provider's behalf, has been accessed without permission. [35] The HIE will not, and may not be able to, assume the provider's own responsibilities. Still, if the HIE discovers that there has been a breach of identifiable health information held by a participating provider, it will notify that provider and assist in investigating the breach.[36]

3. **Time of Notification.** The HITECH Act requires that notification be conducted "without unreasonable delay and no later than 60 calendar days after discovery of a breach by the covered entity" or, if applicable, the business associate.[37] The Massachusetts Breach law (chapter 93H) requires notification "as soon as practicable and without unreasonable delay," but also permits entities that comply with the HIPAA Rules to be governed by those rules. Section 6G requires "notice, as defined in section 1 of chapter 93H, as soon as practicable, but not later than 10 business days after such unauthorized access or disclosure." Thus, Section 6G imposes on the HIE a much shorter time period than either chapter 93H or HIPAA Rules, and that period begins with the date of breach rather than discovery. This shorter period for the HIE should not impose a significant burden on the HIE, because its sole business is data transmission. In contrast, the other laws apply to many different providers and entities who use electronic transmission as a way to facilitate their core businesses of selling other products or providing services; longer periods for discovery and notice seem reasonable in those cases. The HIE must, at a minimum, comply with Section 6G. It is recommended that HIE send notices "as soon as practicable and no later than 10 business days after any unauthorized access or disclosure" to encourage prompt action and establish a maximum time period for response. In an effort to harmonize the applicable laws, it is recommended that the HIE notify providers within the 10-day period and accept confirmation from providers that they have notified individuals within the appropriate time period applicable to providers under HIPAA Rules and the Massachusetts Data Breach Law.[38]

4. **Manner of Notification.** The specifics regarding the manner of notification must be consistent with the HIE's obligations under HIPAA, the Massachusetts Data Breach Law and Chapter 305. Where there has been an unauthorized access or disclosure of an individual's patient health information, written notice should be given to the affected individual. The Massachusetts Data Breach Law permits a substitute notice if sufficient contact information is not available or if the cost of such notice exceeds a certain threshold or a certain number of individuals. Such substitute notice requires electronic notice, website posting and publication through media outlets. The manner of notification should further the goal of ensuring that any breaches of patient data are promptly and fully communicated to consumers.

[35] 45 C.F.R. §§164.404 - 164.408; Mass. Gen. Laws ch. 93H.
[36] 45 C.F.R. §164.410.
[37] *Id*.
[38] It is not clear whether the HIE should assume responsibility for making sure that providers notify their affected patients at all and, if so, within the 10-day time period. On one hand, chapter 305 applies to the HIE and mentions individual notification; where the HIE does not have individual information, it must rely on providers to notify individuals. On the other hand, the 10-day time period may be difficult for providers to meet, especially allowing for some delay in receiving notice from the HIE; applying the 10-day period to notice by providers could chill provider participation.

5.4.3. Other Functions

The Legal Policy Workgroup will need to review functions, such as maintaining an audit trail, monitoring the operations of the system for accuracy and breaches, adopting and enforcing security technology standards, record retention, etc. and will set forth recommendations. It will also address questions such as whether the HIE should be responsible for an accounting of uses for treatment, payment and health care operations. Covered entities are themselves responsible for this accounting, and asking the HIE to do so seems unnecessary and unduly burdensome. HHS has not yet proposed a rule on this. If the HIE does not keep a database, HIPAA rules on collection and retention should not apply. However, the HIE should retain a log or records on its transmissions.

What should or is the HIE legally obligated to do if patient asks HIE for the patient's information? The Proposed HIPAA Rule requires covered entities to allow patients to get their information and to request that it be sent to a third party without a §164.508 authorization. However, the HIE may not have any information. It should certainly be able to tell the patient what it does have and should provide same if relevant.

5.4.4. Privacy and Security Policies in the Terms and Conditions of HIE Employment

1. The HIE will prepare a Statement of HIE Privacy and Security Policies that must be adhered to by all board members officers and employees of the HIE as a condition of employment. The Statement may be included in a more general brochure or handbook of employment policies, provided that each employee is made aware of his or her obligations and enforcement policies and procedures
2. The HIE will also develop detailed programs to train officers and employees on how to implement the HIE Privacy and Security Policies in the course of their work for the HIE.
3. The employment handbook will include policies and procedures to implement the requirements, and will also include a statement of how such policies will be enforced, including responses to errors and penalties for noncompliance.

5.4.5. Privacy and Security Policies in Agreements with Information Technology Contractors

The HIE is expected to delegate to one or more third parties the activities of designing, maintaining, operating, administering, and monitoring the information technology system to carry out the HIE's functions. Third party accountability must be detailed to ensure compliance and proper data treatment, and to specify responsible individuals for information security plans that govern information technology resources.

1. The HIE must have a written agreement with its information technology entity (ITE) that requires the ITE(s), in all its activities for the HIE, to comply with all applicable laws, regulations, policies and procedures concerning heath information privacy and security. [39]
2. The agreement will require the ITE to immediately notify the HIE of any breach or error the ITE discovers and to check the system, at least daily, for errors and breaches.
3. The agreement will also include policies and procedures for enforcing the agreement and the sanctions for violation of the agreement by the ITE.

HHS Proposed Rules include, in the definition of business associate, entities that are subcontractors of a business associate.[40] If a Federated Model HIE is itself a business associate, then its subcontractor ITE would also be a business associate subject to HIPAA Security and Privacy Rules. Other vendors to the HIE may also qualify as business associates. However, an ITE that is a subcontractor for a fully Decentralized Model HIE would not qualify as a business associate, because the HIE itself would not be a

[39] The Proposed Rule makes a business associate liable for a civil money penalty for its subcontractor-agent's violation of the HIPAA Rules. July 14, 2010 Proposed Rule, *supra* note 3 (amending 45 C.F.R. §160.401, 75 F.R. at 40915).
[40] July 14, 2010 Proposed Rule, *supra* note 3 (§ 160.103: "A subcontractor that creates, receives, maintains, or transmits protected health information on behalf of the business associate.").

business associate. In this case, the agreement between the HIE and the ITE should still require the ITE to comply with HIE policies that incorporate relevant provisions of the HIPAA Rule, to protect the privacy and security of the information it transmits, which should be attached to and be part of the agreement, such as the policies on error correction and breach notification.

The agreement between the HIE and the ITE should expressly prohibit the sale or disclosure of protected health information for marketing purposes, as this supports the HIE's dedication to health care purposes. Although the HIPAA Privacy Rule permits some marketing uses, there is no reason for the HIE or its subcontractors to participate in marketing.

5.4.6. Privacy and Security Policies in Agreements with Participating Providers

The HIE will enter into agreements with providers who wish to participate in the HIE system. The agreements will incorporate HIE privacy and security policies and procedures and specify enforcement policies and procedures.

If the HIE is a business associate, the agreement between the HIE and participating providers must include the HIE's agreement to comply with the obligations of a business associate under the HIPAA Privacy and Security Rule.[41]

5.5. Enforcement of Privacy and Security Requirements

The HIE should develop an enforcement infrastructure (safeguards) to ensure that all participants in the HIE adhere to the HIE privacy and security requirements established for participants. This infrastructure should include mechanisms for monitoring performance and investigating complaints and/or violations of HIE requirements and policies. The HIE should establish a system of graded sanctions, which may include a reprimand, corrective action plan, monitoring and, in extreme cases, termination of participation in the HIE. The HIE should consider whether the imposition of monetary penalties for repeated violations or recoupment of HIE costs of investigation and monitoring are appropriate enforcement tools. The HIE should determine when it may be appropriate or required to report a violation of HIE requirements or policies to a state or federal agency. The enforcement infrastructure should extend beyond the HIE participants to HIE board members, employees, officers, and agents, as well as to ITEs. Finally, it is important that any enforcement structure does not become overly burdensome to the HIE. Therefore, the Legal Policy Task Force suggests that enforcement decisions should be final, without an appeal process built in, except perhaps a mechanism for internal reconsideration for good cause shown.

5.6. Data Rights and Responsibilities

Data rights and responsibilities must be reviewed by the Legal Policy Workgroup and completed before recommendations are set forth.

5.7. Data Sharing Agreements

Data sharing agreements must be reviewed by the Legal Policy Workgroup before recommendations are set forth. The Ad Hoc Workgroup reviewed the DURSA outline below.

5.7.1. Data Use and Reciprocal Support Agreement (DURSA)

The Data Use and Reciprocal Support Agreement (DURSA) is a comprehensive, multi-party trust agreement that will be signed by all NHIN Health Information Exchanges (NHIEs), both public and private, wishing to participate in the Nationwide Health Information Network. The DURSA provides the legal framework governing participation in the NHIN-Direct by requiring the signatories to abide by a common set of terms and conditions. These common terms and conditions support the secure, interoperable exchange of health data between and among numerous NHIEs across the country.

[41] HITECH Act, § 13401(a), 42 U.S.C. § 17931.

The DURSA is being developed as a vehicle for creating trust relationships among the NHIEs participating in the NHIN-Direct. It memorializes the expectations for NHIEs in a "network of networks" with respect to the behavior and activities of other NHIEs. Since it is a multi-party agreement, it avoids the need for each NHIE to enter into "point-to-point" agreements with each other NHIE, which becomes exceedingly difficult, costly and inefficient as the number of NHIEs increases.

Once finalized, the DURSA should be executed by each NHIE participating in the NHIN-Direct. This includes federal and state government agencies, state and regional health information exchanges, personally controlled health records, integrated delivery systems and all other exchange organizations that are admitted into the NHIN-Direct.

The DURSA expressly assumes that each NHIE already has in place trust agreements with its end users. In fact, the DURSA requires that the NHIE have user agreements in place that address, at a minimum, compliance with applicable law, cooperation with other NHIEs, requirements to use the NHIN-Direct only for "permitted purposes," limitations on the future use of data received through the NHIN-Direct and security measures regarding password protection. The DURSA does not replace an NHIE's other agreements with its users.

The NHIN-Direct will include NHIEs that are federal and state government agencies, and other government instrumentalities. In almost all cases, these government agencies or instrumentalities are prohibited by law from indemnifying third parties. The DURSA Workgroup agreed that it was inherently unfair to ask non-governmental NHIEs to agree to indemnification provisions when governmental NHIEs could not.[42]

5.8. Consent Task Force Recommendations

By statute, Massachusetts has an "Opt In" consent policy in regard to patient health information. Thus the Task Force's recommendations addressed an "Opt In" consent model for general patient consent with a separate "Opt In" mechanism for HIV patients and genetic testing which receives special consideration under Massachusetts General Laws.

The goals of the Consent Policy Workgroup were to enhance patient care in the areas of quality, safety and efficiency, while respecting patient privacy. The Task Force took into consideration M.G.L. Chapter 111, Section 70 F (1986) HIV and Chapter 111, 70 G (Genetics Testing), which afford patients further protection and determined that patients should be given the choice to "Opt In" to the Commonwealth's HIE and decide if they want to include the HIV test or HIV related information and Genetics Testing information.

The Consent Management process for HIV and genetic testing recommended by the Consent Task Force of the Privacy and Security Ad Hoc Workgroup was as follows:

- An alternative to filtering HIV test and related medical information and genetics testing would be to require each entity to obtain a second level patient consent (flag) for genetic testing and a third level patient consent (flag) for HIV test and related medical information
- Each entity would have an "Opt In" flag in their EHR for participation in the HIE (1st flag) and the ability to include a flag for genetic testing (2nd flag) in their EHR and/or the ability to include a flag for HIV test and related HIV information (3rd flag)
- This gives the patient the opportunity to consent with each provider genetics testing and HIV test/related information exchange
- If a requesting provider does not have matching flags in their EHR no information is exchanged

[42] DRAFT Data Use and Reciprocal Support Agreement (DURSA), NHIN Cooperative DURSA Workgroup, January 23, 2009.

- Information exchange requests in the HIE for emergency situations should be addressed separately in phase 2
- The flags referred to (flag 1, flag 2 and flag 3) would be set on the patient level within the provider's EHR. The Commonwealth HIE would have a list of medications and problems diagnoses consistent with HIV/test and the genetic tests
- Patient information (brochures) describing the "Opt-In" process would include other sensitive information, e.g. abortion history, STD's and the explanation that a second and third consent is needed once a patient "Opts In" if he or she wants genetics testing and HIV test/related medical information to be exchanged
- Once the consent for genetics is obtained by the provider flag 2 is set in the EHR.
- Once the consent for HIV test/related medical information is obtained by the provider flag 3 is set in their EHR.
- The patient controls information exchange in the HIE by organization
- Information exchange for insurance purposes would not be included in the HIE

The next steps for the Legal Policy Workgroup are to further refine the proposal and get input from the HIV community through focus groups; to formulate a list of questions/bullet points to address with the HIV focus groups; to further refine the proposal for matching flags to exchange information in the Commonwealth HIE; to re-visit substance abuse and mental health information – data elements vs. notes for the HIE; and to work closely with the Consumer Workgroup before any final recommendations are made.

5.9. Certification HIE Task Force Recommendations

5.9.1. HIE Certification Standards

The Certification HIE Task Force of the Privacy and Security Ad Hoc Workgroup convened to recommend practical security guidance for HIE Certification. With the current and ever increasing state and federal laws and regulations related to privacy and security and the overarching principle to protect healthcare data, the HIE Certification Task Force is recommending a hybrid approach.

The Task Force reviewed the following frameworks, standards and regulations to develop its recommendations:

- ISO 17799 and current ISO 27001, 27002
- The Control Objectives for Information and related Technology (COBIT)
- HIPAA
- HITECH
- National Institute of Standards and Technology NIST 800 Controls
- Federal Information Security and Management Act (FISMA) FIPS 200
- Payment Card Industry (PCI)

After much research and consideration, the Task Force's recommendation is to create a hybrid from the frameworks, standards and regulations that meets state laws and federal regulations, using the following security control standards:

- **Access control:** limit HIE access to authorized unique users, processes acting on behalf of authorized users or devices, including other HIEs, and to types of transactions and functions that authorized users are permitted to exercise.

- **Audit and accountability:** create, protect, and retain HIE audit records that are needed for monitoring, analyzing, investigating and reporting unlawful, unauthorized or inappropriate HIE activity, and ensuring that the actions of individual users can be traced so the individual users can be held accountable for their actions.
- **Automatic log-off or screensaver:** document and implement automatic log-off after a period of inactivity
- **Awareness and training:** ensure that managers and users of HIEs are made aware of the security risks associated with their activities and of applicable laws, policies, and procedures related to security. Ensure that personnel are trained to carry out their assigned information security-related duties.
- **Certification, accreditation and security assessments:** assess security controls for effectiveness; implement plans to correct deficiencies and to reduce vulnerabilities; authorize the operation of HIEs and system connections; and monitor system security controls.
- **Configuration management:** establish baseline configurations and inventories of systems, enforcing security configuration settings for products, monitoring and controlling changes to baseline configurations and to components of systems throughout their system development life cycles.
- **Contingency planning:** establish and implement plans for emergency response, backup operations, and post-disaster recovery of HIEs.
- **Identification and authentication:** identify and authenticate the identities of users, processes or devices that require access to HIEs.
- **Incident response:** establish operational incident handling capabilities for HIEs, and track, document and report incidents to appropriate officials.
- **Maintenance:** perform periodic and timely maintenance of systems, and provide effective controls on the tools, techniques, mechanisms and personnel that perform system maintenance.
- **Media protection:** protect information in printed form or on digital media; limit access to information to authorized users; and sanitize or destroy digital media before disposal or reuse.
- **Password Management:** document and implement password policy controls
- **Personnel security:** ensure that individuals in positions of authority are trustworthy and meet security criteria, ensuring that information and HIEs are protected during personnel actions; employ formal sanctions on personnel, assigned security responsibility, who fail to comply with security policies and procedures.
- **Physical and environmental protection:** limit physical access to systems and to equipment to authorized individuals; protect the physical plant and support infrastructure for systems, by providing support utilities for systems, protecting systems against environmental hazards, and providing environmental controls in facilities that contain systems.
- **Planning:** develop, document, update and implement security plans for systems.
- **Risk assessment:** assess the risk to organizational operations, assets and individuals resulting from the operation of HIEs, and the processing, storage or transmission of information.
- **Systems and services acquisition:** allocate resources to protect systems; employ system development life cycles processes; employ software usage and installation restrictions; and ensure that third-party providers employ adequate security measures to protect outsourced information, applications or services.

- **System and communications protection:** monitor, control and protect communications at external and internal boundaries of HIEs; and employ architectural designs, software development techniques and systems engineering principles, to promote effective security.
- **System and information integrity:** identify, report, and correct information and system flaws in a timely manner; provide protection from malicious code; and monitor system security alerts and advisories**.**
- **Written Information Security Program:** document the security policies, process and procedures. Candidates for certification would be expected to demonstrate and meaningfully maintain competence and organization commitment to the above listed security control categories so as to not compromise the data quality, integrity or safeguards required when connecting to and using the HIE.

5.9.2. Penalties for Violating Conditions of Certifications

The Certification Task Force of the Privacy and Security Ad Hoc Workgroup acknowledges that further consideration is needed to recommend specific penalties/sanctions once certification is obtained and the conditions for certification are deemed to have been violated after formal complaint and objective peer review. Various operational models exist for conducting such reviews which when studied in sufficient detail by the Task Force, will yield a recommendation for how best to proceed in Massachusetts.

5.9.3. Interstate Certification

This area is yet to be determined by the Legal Policy Workgroup.

Section 3: Appendix

Appendix A: Terms and Definitions

American Recovery and Reinvestment Act of 2009 (ARRA): a $787.2 billion stimulus measure, signed by President Obama on February 17, 2009, that provides aid to states and cities, funding for transportation and infrastructure projects, expansion of the Medicaid program to cover more unemployed workers, health IT funding, and personal and business tax breaks, among other provisions designed to "stimulate" the economy.

Centers for Medicare & Medicaid Services (CMS): a federal agency within the United States Department of Health and Human Services that administers the Medicare program and works in partnership with state governments to administer Medicaid, the State Children's Health Insurance Program (SCHIP), and health insurance portability standards.

Certification Commission for Health IT (CCHIT): a recognized certification body (RCB) for electronic health records and their networks. It is an independent, voluntary, private-sector initiative, established by the American Health Information Management Association (AHIMA), the Health care Information and Management Systems Society (HIMSS), and The National Alliance for Health Information Technology.

Clinical Relationship Manager (CRM): responsible for assisting Massachusetts eHealth Institute (MeHI) with developing relationships with providers and their practices in order to successfully implement Health Information Technology (Health IT) and meet the requirements of the Regional Extension Center (REC).

Community Health Centers (CHC): health centers spread across the United States that provides comprehensive primary care to 20 million Americans with limited financial resources. CHCs focus on meeting the basic health care needs of their respective communities, providing treatment regardless of an individual's income or insurance coverage.

Computerized Physician Order Entry (CPOE): a process of electronic entry of medical practitioner instructions for the treatment of patients under his or her care. These orders are communicated over a computer network to the medical staff or to the departments responsible for fulfilling the order.

Control Objectives for Information and related Technology (COBIT): a set of best practices for information technology management created by the Information Systems Audit and Control Association (ISACA), and the IT Governance Institute (ITGI) in 1996. COBIT provides a set of generally accepted measures, indicators, processes and best practices to assist in maximizing the benefits derived through the use of information technology and developing appropriate IT governance and control in a company.

Electronic Data Interchange: structured transmission of data between organizations by electronic means

Electronic Health Record (EHR): As defined in the ARRA, an Electronic Health Record (EHR) means an electronic record of health-related information on an individual that includes patient demographic and clinical health information, such as medical histories and problem lists; and has the capacity to provide clinical decision support; to support physician order entry; to capture and query information relevant to health care quality; and to exchange electronic health information with, and integrate such information from other sources.

Electronic Medical Record (EMR): An electronic record of health-related information on an individual that conforms to nationally recognized interoperability standards ant that can be created, managed, and consulted by authorized clinicians and staff across more than one health care organization.

Executive Office of Health and Human Services (EOHHS): is the Massachusetts state agency that offers assistance to the state's most needy and vulnerable citizens.

Federal Information Security Management Act of 2002 (FISMA): is a United States federal law enacted in 2002 as Title III of the E-Government Act of 2002. The act requires each federal agency to develop, document, and implement and agency-wide program to provide information security for the information and information systems that support the operations and assets of the agency, including those provide for or managed by another agency, contractor, or other source.

Federally Qualified Health Center (FQHC): safety**-**net providers such as community health centers, public housing centers, outpatient health programs funded by the Indian Health Service, and programs serving migrants and the homeless. FQHCs provide their services to all people regardless of ability to pay, and charge for services on a community board approved sliding-fee scale that is based on patients' family income and size. FQHCs are funded by the federal government under Section 330 of the Public Health Service Act.

Health Care Effectiveness Data and Information Set (HEDIS): is a widely used set of performance measures in the managed care industry, developed and maintained by the National Committee for Quality Assurance (NCQA). HEDIS was designed to allow consumers to compare health plan performance to other plans and to national or regional benchmarks.

Health Care Quality and Cost Council (HCQCC): is a public entity responsible for setting quality and cost targets for the Commonwealth of Massachusetts. Their mission is to develop and coordinate the implementation of health care quality improvement goals that are intended to lower or contain the growth in health care costs while improving the quality of care, including reductions in racial and ethnic health disparities.

Health Information Exchange (HIE): As defined by the Office of the National Coordinator and the National Alliance for Health Information Technology (NAHIT), Health Information Exchange refers to the electronic movement of health-related information among organizations according to nationally recognized standards.

Health Care Information and Management Systems Society (HIMSS): is a health care industry membership organization focused on the optimal use of health information technology and management systems.

Health Insurance Portability and Accountability Act (HIPAA): enacted by Congress in 1996. Title I of HIPAA protects health insurance coverage for workers and their families when they change or lose their jobs. Title II of HIPAA, known as the administrative simplification (AS) provisions, requires the establishment of national standards for electronic health care transactions and national identifiers for providers, health insurance plans, and employers. The AS provisions also address the security and privacy of health data. The standards are meant to improve the efficiency and effectiveness of the nation's health care system by encouraging the widespread use of electronic data interchange.

Health Information Security and Privacy Collaboration (HISPC): was partnership consisting of a multi-disciplinary team of experts and the National Governor's Association (NGA). The HISPC worked with approximately 40 states or territorial governments to assess and develop plans to address variations in organization-level business policies and state laws that affect privacy and security practices which may pose challenges to interoperable health information exchange. RTI International, a private, nonprofit corporation, oversaw HISPC and was selected as the HHS contract recipient.

Health Information Technology (Health IT): As defined in the ARRA, Health Information Technology means hardware, software, integrated technologies or related licenses, intellectual property, upgrades, or packaged solutions sold as services that are designed for or support the use by health care entities or patients for the electronic creation, maintenance, access, or exchange of health information.

Health Information Technology for Economic and Clinical Health (HITECH) Act: collectively refers to the health information technology provisions included at Title XIII of Division A and Title IV of Division B of the ARRA.

Health Information Technology Standards Panel (HITSP): A multi-stakeholder coordinating body designed to provide the process within which stakeholders identify, select, and harmonize standards for communicating and encouraging broad deployment and exchange of health care information throughout the health care spectrum. The Panel's processes are business process and use-case driven, with decision making based on the needs of all NHIN-Direct stakeholders. The Panel's activities are led by the American National Standards Institute (ANSI), a not-for-profit organization that has been coordinating the U.S. voluntary standardization system since 1918.

Health Information Trust Alliance (HITRUST): established the Common Security Framework (CSF), a certifiable framework that can be used by any and all organizations that create, access, store or exchange personal health and financial information.

Identity Access Management (IAM): involves people, processes, and products to identify and manage the data used in an information system to authenticate users and grant or deny access rights to data and system resources. The goal of IAM is to provide appropriate access to enterprise resources.

Institute of Medicine (IOM): an independent, nonprofit organization that works outside of government to provide unbiased and authoritative advice to decision makers and the public.

Implementation Optimization Organizations (IOOs): is a group of organizations such as vendors, consultants, or other private organizations that are responsible for deploying EHRs and the statewide HIE.

Individually Identifiable Health information: information that is a subset of health information, including demographic information collected from an individual

Interagency Service Agreement (ISA): an agreement involving or representing two or more agencies, especially government agencies.

International Organization for Standardization (ISO): is an international-standard-setting body composed of representatives from various national standards organizations. The organization disseminates worldwide proprietary industrial and commercial standards.

Massachusetts eHealth Collaborative (MAeH): formed in 2004 as an initiative of the physician community to bring together the state's major health care stakeholders for the purpose of establishing an EHR system that would enhance the quality, efficiency and safety of care in Massachusetts.

Massachusetts Health Data Consortium (MHDC): non-profit coalition of a wide range of public and private stakeholders that seek to address health information needs and improve health care in the Commonwealth. MHDC was tasked to collect, analyze and disseminate health care information.

Massachusetts Health Quality Partners (MHQP): provides reliable information to help physicians improve the quality of care they provide their patients and helps consumers take an active role in making informed decisions about their health care.

Massachusetts eHealth Institute (MeHI): is a division of the Massachusetts Technology Collaborative, a quasi-public organization that has been designated as the single statewide entity responsible for the coordination and the dissemination on a statewide basis of electronic health records (EHR) in all provider settings networked through an interoperable health information exchange (HIE).

Massachusetts Technology Collaborative (Mass Technology Collaborative): is a public economic development agency established by the Massachusetts Legislature in 1982 to foster a more favorable environment for growth in the state's innovation-based economy. The agency is currently advancing economic development in health care technology, information technology, life sciences, marine sciences, nanotechnology, broadband deployment, and clean energy.

Medicaid Information Technology Architecture (MITA): is an IT initiative intended to stimulate an integrated business and IT transformation affecting the Medicaid enterprise in all States. The MITA initiative's intention is to improve Medicaid program administration by establishing national guidelines for technologies and processes.

National Institute of Standards and Technology (NIST): the non-regulatory federal agency within the United States Department of Commerce whose mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology. NIST oversees the NIST Laboratories, the Baldrige National Quality Program, the Hollings Manufacturing Extension Partnership, and the Technology Innovation Program.

New England Healthcare Exchange Network (NEHEN): a state-wide consortium of healthcare service providers, payers, academic institutions, public sector and other advocates in the healthcare industry. that created, manages and operates a regional healthcare information exchange for administrative and clinical data.

Office of the National Coordinator (ONC): serves as principal advisor to the Secretary of HHS on the development, application, and use of health information technology; coordinates HHS's health information technology policies and programs internally and with other relevant executive branch agencies; develops, maintains, and directs the implementation of HHS' strategic plan to guide the nationwide implementation of interoperable health information technology in both the public and private health care sectors, to the extent permitted by law; and provides comments and advice at the request of OMB regarding specific Federal health information technology programs. ONC was established within the Office of the Secretary of HHS in 2004 by Executive Order 13335.

Patient Centered Medical Home: Patient care is delivered by teams of primary care providers, including physicians, nurses and other ancillary providers.

Patient Portal: healthcare-related online applications that allow patients to interact and communicate with their healthcare providers

Patient Health Record (PHR): systematic documentation of a patient's medical history and care, particularly for patient use.

Payment Card Industry Data Security Standard (PCI DSS): was created by American Express, Discover Financial Services, JCB, MasterCard Worldwide, and Visa International. It represents a set of fundamental security requirements, industry tools, and measurements that address the handling of sensitive cardholder information.

Protected Health Information (PHI): any information relating to an individual's medical records, health plan beneficiary information, physical or mental health information, or provided health services or any information collected during health service.

Personally Identifying Information (PII): is information that can be used to uniquely identify, contact, or locate a single person or can be used with other sources to uniquely identify a single individual.

Regional Extension Center (REC): as set out in the ARRA, Regional Extension Centers will be created by ONC to provide technical assistance and disseminate best practices and other information learned from the Health Information Technology Research Center to aid health care providers with the adoption of health information technology.

Primary Care Provider (PCP): a physician, such as a general practioner or internist, chosen by an individual to serve as his or her health-care professional and capable of handling a variety of health-related problems, of keeping a medical history and medical records on the individual, and of referring the person to specialists as needed.

Appendix B: Project Schedule

Full Schedule

Massachusetts eHealth Institute (MeHI)
Last Mile Initiative - Project Schedule (Detail View)

ID	Task Name	Status	Duration	Start	Finish	%Comp	Resource Names
1	**Last Mile Implementation**		**524 days**	**Wed 2/1/12**	**Mon 2/3/14**	**2%**	
2	**Initial Planning/Kickoff**		**74 days**	**Wed 2/1/12**	**Mon 5/14/12**	**35%**	
3	Project start - initiate tasks to prepare for federal approval		0 days	Wed 2/1/12	Wed 2/1/12	100%	MeHI
4	Iterative finalization of SOP and associated plans		24 days	Wed 2/1/12	Mon 3/5/12	82%	MeHI
5	Submit SOP		0 days	Tue 3/6/12	Tue 3/6/12	0%	MeHI
6	Federal review of SOP		5 days	Tue 3/6/12	Mon 3/12/12	0%	MeHI
7	Receive federal approval of revised SOP		0 days	Mon 3/12/12	Mon 3/12/12	0%	MeHI
8	**HIE Competitive Grant - As Defined By EOHHS**		**74 days**	**Wed 2/1/12**	**Mon 5/14/12**	**22%**	
9	Develop RFR		16 days	Wed 2/1/12	Wed 2/22/12	100%	EOHHS
10	Issue RFR for procurement of HIE infrastructure		0 days	Thu 2/23/12	Thu 2/23/12	100%	EOHHS
11	Receive RFR responses		15 days	Thu 2/23/12	Wed 3/14/12	0%	EOHHS
12	RFR vendor selection		27 days	Thu 3/15/12	Fri 4/20/12	0%	EOHHS
13	Start Phase 1 work		16 days	Mon 4/23/12	Mon 5/14/12	0%	EOHHS
14	**EHR Assessment/Analysis (EHR Vendors)**		**43 days**	**Wed 2/15/12**	**Fri 4/13/12**	**11%**	
15	Define scope/function of EHR Landscape Consultant role		17 days	Wed 2/15/12	Thu 3/8/12	35%	MeHI
16	Extend existing contract with MAeHC		10 days	Mon 3/12/12	Fri 3/23/12	20%	MeHI
17	**Inventory installed EHRs**		**10 days**	**Mon 3/26/12**	**Fri 4/6/12**	**0%**	
18	Ambulatory providers		10 days	Mon 3/26/12	Fri 4/6/12	0%	MeHI
19	Hospitals		10 days	Mon 3/26/12	Fri 4/6/12	0%	MeHI
20	Perform interface gap analysis		10 days	Mon 3/26/12	Fri 4/6/12	0%	MeHI
21	Assess vendor interoperability capabilities/strategies		10 days	Mon 3/26/12	Fri 4/6/12	0%	MeHI
22	Initial input received from Consultant		0 days	Mon 4/9/12	Mon 4/9/12	0%	MeHI
23	Finalize assessment		3 days	Mon 4/9/12	Wed 4/11/12	0%	MeHI
24	Complete assessment		0 days	Thu 4/12/12	Thu 4/12/12	0%	MeHI
25	Present assessment findings		1 day	Fri 4/13/12	Fri 4/13/12	0%	MeHI
26	**Managed Vendor Selection/Service Provider Procurement (EHR Vendors)**		**115 days**	**Thu 4/12/12**	**Wed 9/19/12**	**1%**	
27	Finalize requirements for procurement		13 days	Thu 4/12/12	Mon 4/30/12	8%	MeHI
28	Prep/dist competitive grant solicitation for EHR vendors based on findings		23 days	Mon 4/23/12	Wed 5/23/12	0%	MeHI
29	EHR vendors competitive procure process finished/qualified vendors selected		45 days	Thu 5/24/12	Wed 7/25/12	0%	MeHI
30	Contracts completed with qualified vendors		40 days	Thu 7/26/12	Wed 9/19/12	0%	MeHI
31	**Last Mile Project Management Office (PMO)**		**495 days**	**Tue 3/13/12**	**Mon 2/3/14**	**3%**	
32	Identify and engage internal PMO staff		21 days	Tue 3/13/12	Tue 4/10/12	100%	MeHI
33	**Develop RFPs for PMO system integrators**		**130 days**	**Tue 3/13/12**	**Mon 9/10/12**	**0%**	

Developed by MeHI Page 1 Tue 3/6/12

Massachusetts eHealth Institute (MeHI)
Last Mile Initiative - Project Schedule (Detail View)

ID	Task Name	Status	Duration	Start	Finish	%Comp	Resource Names
34	Create preliminary definition of support requirements		10 days	Tue 3/13/12	Mon 3/26/12	0%	MeHI
35	Prepare RFP - System Integration consultants		50 days	Tue 3/27/12	Mon 6/4/12	0%	MeHI
36	Release RFP		0 days	Mon 6/4/12	Mon 6/4/12	0%	MeHI
37	Receive responses from SIs		40 days	Tue 6/5/12	Mon 7/30/12	0%	
38	Enter into agreements with SIs		30 days	Tue 7/31/12	Mon 9/10/12	0%	
39	**Develop RFQs for PMO Implementation/Optimization Organizations**		**130 days**	**Tue 3/13/12**	**Mon 9/10/12**	**0%**	
40	Create preliminary definition of support requirements		10 days	Tue 3/13/12	Mon 3/26/12	0%	MeHI
41	Prepare RFQ - IOO Certification		50 days	Tue 3/27/12	Mon 6/4/12	0%	MeHI
42	Release RFQ		0 days	Mon 6/4/12	Mon 6/4/12	0%	
43	Receive responses from IOOs		40 days	Tue 6/5/12	Mon 7/30/12	0%	
44	Enter into agreements with IOOs		30 days	Tue 7/31/12	Mon 9/10/12	0%	
45	Provide EHR vendor development & IOO oversight		365 days	Tue 9/11/12	Mon 2/3/14	0%	MeHI
46	**Grant Management**		502 days	Fri 3/2/12	Mon 2/3/14	0%	
47	Develop provider grant management program		40 days	Fri 3/2/12	Thu 4/26/12	0%	MeHI
48	Define grant management processes		40 days	Fri 3/2/12	Thu 4/26/12	0%	MeHI
49	Determine grant recipients		30 days	Thu 4/12/12	Wed 5/23/12	0%	MeHI
50	Issue grants to providers or IOOs		45 days	Thu 5/24/12	Wed 7/25/12	0%	MeHI
51	Grant coordination and payment services		398 days	Thu 7/26/12	Mon 2/3/14	0%	MeHI
52	**Provider Support**		**485 days**	**Tue 3/27/12**	**Mon 2/3/14**	**0%**	
53	Define support model		30 days	Tue 3/27/12	Mon 5/7/12	0%	MeHI
54	Define end-user support requirements		40 days	Tue 5/8/12	Mon 7/2/12	0%	MeHI
55	Execute end-user training and support		320 days	Tue 11/13/12	Mon 2/3/14	0%	MeHI
56	**Integration**		**454 days**	**Wed 5/9/12**	**Mon 2/3/14**	**0%**	
57	Confirm system integration capabilities for HIE rollout		60 days	Wed 5/9/12	Tue 7/31/12	0%	MeHI
58	Perform integration		394 days	Wed 8/1/12	Mon 2/3/14	0%	MeHI
59	**Education & Outreach**		**492 days**	**Fri 3/16/12**	**Mon 2/3/14**	**0%**	
60	Define value proposition for the provider		16 days	Fri 3/16/12	Fri 4/6/12	0%	MeHI
61	Define and develop content		56 days	Fri 3/16/12	Fri 6/1/12	0%	MeHI
62	Develop outreach & education venues/channels		40 days	Mon 4/9/12	Fri 6/1/12	0%	MeHI
63	Develop schedule		12 days	Mon 4/16/12	Tue 5/1/12	0%	MeHI
64	Execute outreach campaign		436 days	Mon 6/4/12	Mon 2/3/14	0%	MeHI
65	**Go-Live - HIE Backbone**		**55 days**	**Tue 10/16/12**	**Mon 12/31/12**	**0%**	
66	HIE Backbone Go-Live		55 days	Tue 10/16/12	Mon 12/31/12	0%	EOHHS

Developed by MeHI Page 2 Tue 3/6/12

Massachusetts eHealth Institute (MeHI)
Last Mile Initiative - Project Schedule (Detail View)

ID	Task Name	Status	Duration	Start	Finish	%Comp	Resource Names
67	**PIN Priorities - 2012**		**72 days**	**Tue 3/13/12**	**Wed 6/20/12**	**0%**	
68	**Lab results delivery**		**72 days**	**Tue 3/13/12**	**Wed 6/20/12**	**0%**	
69	Update readiness assessment		29 days	Tue 3/13/12	Fri 4/20/12	0%	MeHI
70	Develop action plan to ensure 100% adoption		43 days	Mon 4/23/12	Wed 6/20/12	0%	MeHI
71	**e-Prescribing**		**72 days**	**Tue 3/13/12**	**Wed 6/20/12**	**0%**	
72	Update readiness assessment		29 days	Tue 3/13/12	Fri 4/20/12	0%	MeHI
73	Develop action plan to ensure 100% adoption		43 days	Mon 4/23/12	Wed 6/20/12	0%	MeHI
74	**Clinical summary exchange**		**72 days**	**Tue 3/13/12**	**Wed 6/20/12**	**0%**	
75	Update readiness assessment		29 days	Tue 3/13/12	Fri 4/20/12	0%	MeHI
76	Develop action plan to ensure 100% adoption		43 days	Mon 4/23/12	Wed 6/20/12	0%	MeHI
77	**Deployment/Roll-Out**		**0 days**	**Mon 2/3/14**	**Mon 2/3/14**	**0%**	
78	Program complete		0 days	Mon 2/3/14	Mon 2/3/14	0%	

Developed by MeHI Page 3 Tue 3/6/12

Critical Path

Massachusetts eHealth Institute (MeHI)
Last Mile Initiative - Project Schedule (Critical Path View)

ID	Task Name	Status	Duration	Start	Finish	%Comp	Resource Names
1	**Last Mile Implementation**		**524 days**	**Wed 2/1/12**	**Mon 2/3/14**	**2%**	
2	**Initial Planning/Kickoff**		**74 days**	**Wed 2/1/12**	**Mon 5/14/12**	**35%**	
4	Iterative finalization of SOP and associated plans		24 days	Wed 2/1/12	Mon 3/5/12	82%	MeHI
5	Submit SOP		0 days	Tue 3/6/12	Tue 3/6/12	0%	MeHI
6	Federal review of SOP		5 days	Tue 3/6/12	Mon 3/12/12	0%	MeHI
7	Receive federal approval of revised SOP		0 days	Mon 3/12/12	Mon 3/12/12	0%	MeHI
14	**EHR Assessment/Analysis (EHR Vendors)**		**43 days**	**Wed 2/15/12**	**Fri 4/13/12**	**11%**	
16	Extend existing contract with MAeHC		10 days	Mon 3/12/12	Fri 3/23/12	20%	MeHI
17	**Inventory installed EHRs**		**10 days**	**Mon 3/26/12**	**Fri 4/6/12**	**0%**	
18	Ambulatory providers		10 days	Mon 3/26/12	Fri 4/6/12	0%	MeHI
19	Hospitals		10 days	Mon 3/26/12	Fri 4/6/12	0%	MeHI
20	Perform interface gap analysis		10 days	Mon 3/26/12	Fri 4/6/12	0%	MeHI
21	Assess vendor interoperability capabilities/strategies		10 days	Mon 3/26/12	Fri 4/6/12	0%	MeHI
22	Initial input received from Consultant		0 days	Mon 4/9/12	Mon 4/9/12	0%	MeHI
23	Finalize assessment		3 days	Mon 4/9/12	Wed 4/11/12	0%	MeHI
24	Complete assessment		0 days	Thu 4/12/12	Thu 4/12/12	0%	MeHI
31	**Last Mile Project Management Office (PMO)**		**495 days**	**Tue 3/13/12**	**Mon 2/3/14**	**3%**	
33	**Develop RFPs for PMO system integrators**		**130 days**	**Tue 3/13/12**	**Mon 9/10/12**	**0%**	
34	Create preliminary definition of support requirements		10 days	Tue 3/13/12	Mon 3/26/12	0%	MeHI
35	Prepare RFP - System Integration consultants		50 days	Tue 3/27/12	Mon 6/4/12	0%	MeHI
36	Release RFP		0 days	Mon 6/4/12	Mon 6/4/12	0%	MeHI
37	Receive responses from SIs		40 days	Tue 6/5/12	Mon 7/30/12	0%	
38	Enter into agreements with SIs		30 days	Tue 7/31/12	Mon 9/10/12	0%	
39	**Develop RFQs for PMO Implementation/Optimization Organizations**		**130 days**	**Tue 3/13/12**	**Mon 9/10/12**	**0%**	
40	Create preliminary definition of support requirements		10 days	Tue 3/13/12	Mon 3/26/12	0%	MeHI
41	Prepare RFQ - IOO Certification		50 days	Tue 3/27/12	Mon 6/4/12	0%	MeHI
42	Release RFQ		0 days	Mon 6/4/12	Mon 6/4/12	0%	
43	Receive responses from IOOs		40 days	Tue 6/5/12	Mon 7/30/12	0%	
44	Enter into agreements with IOOs		30 days	Tue 7/31/12	Mon 9/10/12	0%	
45	Provide EHR vendor development & IOO oversight		365 days	Tue 9/11/12	Mon 2/3/14	0%	MeHI
46	**Grant Management**		502 days	Fri 3/2/12	Mon 2/3/14	0%	
49	Determine grant recipients		30 days	Thu 4/12/12	Wed 5/23/12	0%	MeHI
50	Issue grants to providers or IOOs		45 days	Thu 5/24/12	Wed 7/25/12	0%	MeHI

Developed by MeHI Page 1 Tue 3/6/12

Massachusetts eHealth Institute (MeHI)
Last Mile Initiative - Project Schedule (Critical Path View)

ID	Task Name	Status	Duration	Start	Finish	%Comp	Resource Names
51	Grant coordination and payment services		398 days	Thu 7/26/12	Mon 2/3/14	0%	MeHI
52	**Provider Support**		**485 days**	**Tue 3/27/12**	**Mon 2/3/14**	**0%**	
55	Execute end-user training and support		320 days	Tue 11/13/12	Mon 2/3/14	0%	MeHI
56	**Integration**		**454 days**	**Wed 5/9/12**	**Mon 2/3/14**	**0%**	
57	Confirm system integration capabilities for HIE rollout		60 days	Wed 5/9/12	Tue 7/31/12	0%	MeHI
58	Perform integration		394 days	Wed 8/1/12	Mon 2/3/14	0%	MeHI
59	**Education & Outreach**		**492 days**	**Fri 3/16/12**	**Mon 2/3/14**	**0%**	
60	Define value proposition for the provider		16 days	Fri 3/16/12	Fri 4/6/12	0%	MeHI
61	Define and develop content		56 days	Fri 3/16/12	Fri 6/1/12	0%	MeHI
62	Develop outreach & education venues/channels		40 days	Mon 4/9/12	Fri 6/1/12	0%	MeHI
64	Execute outreach campaign		436 days	Mon 6/4/12	Mon 2/3/14	0%	MeHI
77	**Deployment/Roll-Out**		**0 days**	**Mon 2/3/14**	**Mon 2/3/14**	**0%**	
78	Program complete		0 days	Mon 2/3/14	Mon 2/3/14	0%	

Developed by MeHI Page 2 Tue 3/6/12

Appendix C: HIE Entity Survey

	Information Series 1											
HIT Entity	Contact Information	Entity Type	Total # Users	Participant/ User Entities	Software Vendor(s) for Clinical Information Exchange	Data Sharing Capabilities (including types of data exchanged)	Standards Used	If not transporting CCDs, what effort would be necessary to do that?	Consent Architecture	Transport Architecture	Implementation Guides	Future Data Sharing Nee
Atrius Health	Michael Lee, MD	IPA	7825	Access to Atrius EpicCare is from Beth Israel, Lowell General, Marlboro Hospital, Metrowest, MAH, NEBH, BWH, Faulkner, NSMC, QMC	EpicCare, NEHEN	Clinical summaries Data sharing view into other systems e.g. BID "Magic Button" CHAPS with SSH (See below), Claims submisssion, registration eligibility checks, electronic remits, referral auth and claims status	TLS for encryption of document sharing. CHAPS standards are listed below.	We will follow the state HIE strategy for tranport of CCD's.	Upon registration.	Magic Button - SOAP Document Sharing - TLS - encryption CHAPS - HL7 and VPN		
Baystate Health System	Mark Gorrell, Baystate Health	IDN	5000	Baystate Medical Center Baystate Franklin Medical Center Baystate Mary Lane Hospital Baystate Medical Practices.	Cerner	Lab, micro, path, bbk Results, Rad results, cardiology result, documents/notes, clinical summaries, H&P, allergies	HL7/CCD, X12, XML, web services, J2EE			Initiate Health Exchange, VPN,Cerner Healthehub, JCAPS/eGate	HL7 2.X, HL7 v3 (XML), HITSP standards, X12	Images, Patient Portal
Boston Medical Center HealthNet	Meg Aranow, Boston Medical Center Joel Vengco, IT Director of Ambulatory Systems, Boston HealthNet	Shared Infrastructure										
Cambridge Health Alliance/Mount Auburn Cambridge Independent Practice Association, Inc. (MACIPA)	Paul Sawyer, MACIPA	IDN										
Cape Cod Healthcare System	Sheryl Crowley, VP/CIO, Cape Cod Healthcare, Inc.	IDN/IPA										

	Information Series 2								
HIT Entity	Barriers to accomplishing HIE or future needs	Accelerators that would facilitate HIE or future needs	Funding Model	Transactions/ year	Meaningful Use Transactions	**Patient Engagement** (Describe Patient Authentication, Info collected, Info shared, self-management, and Systems/standard involved.)	**Quality and/or Utilization Reporting** (either through the HIE or submission to another entity)	**Public Health Reporting** (including Reportable Diseases, Immunizations and Syndromic Surveillance)	**Research** (either through the HIE or submission to another entity)
Atrius Health	We will be developing to the state HIE strategy which is currently unknown.	Known state HIE strategy Clear privacy/consent rulings			1. Computer Physician Order Entry 2. Drug - drug, drug allergy formulary checks. 3. Up to date problem list and active DX based on IMO. 4. ePrescribing 5. Maintain active med list. 6. Maintain active medication allergy list. 7. Electronically recording vital signs include BMI 8. Structured lab data and test results stored in the EHR 9. Patient lists generated for quality improvement. 10. Checking insurance eligibility and submitting claims. 11. Provide pateints with timely electronic access to their health information. 12. Provide clinical summaries for patients for each office visit. 13. Capability to exchange key clinical information among care providers and patient authorized entities 14. Capability to submit data to immunization registries, provide syndromic surveillance and lab data to public health agencies	Use of Epic's MyChart product.	Public quality reporting through MHQP.	In the past we have sent vaccine/immunzcation registries for HVMA. Syndromic data was sent and funded through HPHC's grant.	
Baystate Health System	Pending final HITSP specifications to support Meaningful use, HIE provider identified	Final ONC Specifications/standards HIE Funding Privacy/Consent rules defined		60+ Million		Oracle (Sun's) MDM			
Boston Medical Center HealthNet									
Cambridge Health Alliance/Mount Auburn Cambridge Independent Practice Association, Inc. (MACIPA)									
Cape Cod Healthcare System									

	Information Series 1											
HIT Entity	Contact Information	Entity Type	Total # Users	Participant/ User Entities	Software Vendor(s) for Clinical Information Exchange	Data Sharing Capabilities (including types of data exchanged)	Standards Used	If not transporting CCDs, what effort would be necessary to do that?	Consent Architecture	Transport Architecture	Implementation Guides	Future Data Sharing Nee
CareGroup	John Halamka, MD, CareGroup and Harvard Medical School	IDN			NEHEN (software developed by CSC), eClinicalWorks EHX, and Internally developed software	All HIPAA / administrative simplification transactions and code sets, clinical summaries, eRx, public health reporting, quality measurement and reporting	ANSI X12, HL7 / CCD, NCPDP SCRIPT	N/A	Federated, with policy established at source; predominently opt-out	SOAP 1.2, VPN, IVANS\ and private leased lines	ANSI X12 4010, C32 v.2.5, HL7 2.5.1, NCPDP 8.1 for various standards and transaction types; ANSI X12 5010 in process	
Caritas Christi Healthcare System	Todd Rothenhaus, MD, Caritas	IDN										
Central Mass IPA	Dale Magee, MD	IPA	~800	Physicians, Office Staff, CMIPA admin	Polaris Danforth	Data warehouse	CDA/CCD, .net, HL-7, SQL server	n/a	Need further clarification	SSL encription	Need further clarification	inter-organizational as well as accomodating diverse EHRs within organization
Community Hospitals and Physician Practice Systems (CHAPS)	Del Dixon, South Shore Hospital	HIE	1,800	South Shore Hospital, Atrius Health, Harbor Medical Associates, Partners, Brigham&Women's Hospital, Dana Farber Cancer Institute, Crown OB/GYN	(RMPI) Initiate, (Interface Engines) Forward Advantage, eGate, (EMR) Meditech, Epic, Allscripts, LMR	Regional Patient registration matching, external medical summaries, discharge summaries, notes and dictated reports, Lab, Micro,Pathology results, Image orders and scheduling	HL7, XML, CDA/CCD, PDQ/PIX for patient query, XDS Registry query, Repository Document Retrieval	Currently exchanging CCD's	Opt in consent at admission	Secure VPN	Yes - Interface specification documents	Images, patient and physician portals, scheduling, data warehouse / data mart

	Information Series 2									
HIT Entity	Barriers to accomplishing HIE or future needs	Accelerators that would facilitate HIE or future needs	Funding Model	Transactions/ year	Meaningful Use Transactions	**Patient Engagement** (Describe Patient Authentication, Info collected, Info shared, Self-management, and Systems/standard involved.)	**Quality and/or Utilization Reporting** (either through the HIE or submission to another entity)	**Public Health Reporting** (including Reportable Diseases, Immunizations and Syndromic Surveillance)	**Research** (either through the HIE or submission to another entity)
CareGroup	Barriers to accomplishing HIE or future needs - Pending / non-final nature of federal standards and rules for meaningful use and certification - Inertia awaiting state's formal designation of the HIE provider - Questions surrounding state direction on HIT policy and tie to state HHS strategy, HIE direction, etc. - Uncertainty surrounding core EMR vendor HIE interfaces and solutions, or lack of same - Uncertainty re: payer role and use of clinical data - Lack of adequate funding support from participants (based on clear ROI analysis or benchmark of what others are spending)	Accelerators that would facilitate HIE or future needs - ONC finalizing standards and rules - Clarity from state re: state plans and funds for HIE (when, how much, requirements, etc.) - Clear privacy / consent law or policy guidance (from state or federal) - Clear plans from ONC re: NHIN Direct (release plans, expectations for use, etc.)		1) Electronic prescriptions sent between Jan 1 and Apr 30 = 143,629. Monthly average 35,907. Annualized 430,887. 2) Electronic clinical summaries sent between Jan 1 and Apr 30 = 1,669. Monthly average 417. Annualized 5,004.	1. ePrescribing (includes eligibility, formulary, history, routing, refill). 2. Patient engagement - sending reminders to patients, providing patients with an electronic copy and access to their records 3. Checking insurance eligibility and submitting claims 4. Capability to exchange key clinical information among care providers and patient authorized entities 5. Capability to submit data to immunization registries, provide syndromic surveillance and lab data to public health agencies 6. Quality measurement and reporting	Patients can use Patientsite, our tethered personal health record, or for eCW, they can use the eCW Patient Portal. At present, BIDMC has the ability to send patient reminders via our tethered PHR, Patientsite. Patients can get a CCD/CCR containing problem list, medication list, allergies, and diagnostic test results via Google Health and Microsoft Healthvault.	The MAeHC Quality Data Center project includes the ability to gather all detailed metrics from home built and eCW systems for reporting to our clinicians, the state, and CMS using the adopted standards. It will go live for all Beth Israel Deaconess Physician Organization clinicians in 2010.	We already submit 4000 data elements every day to the CDC and send ED utilization data to Boston Public Health Commission using proprietary approaches. Converting these to the GIPSE standard and routing them through the NEHEN gateway is a local approach. Since the Boston Public Health Commission is joining NEHEN so that it can receive disparity and surveillance data via one secure gateway, it is a logical choice as our immunization and Reportable Disease pilot. Also, using HITSP standards for data content (CCD) and transmission (SOAP), BIDMC has built a web service to provide real time exchange of data with the Social Security Administration.	At Harvard, the Clinical and Translation Science Awards (CTSA) funded a federated data atomic query mechanism called SHRINE (I2B2). Here's how it works: Using a web-based graphical user interface, a clinical researcher can design an arbitrary query such as "How many patients taking Vioxx have a diagnosis of myocardial infarction". SHRINE first queries the metadata mapping at the border of each organization i.e. is medication name and diagnosis data available? Once the metadata indicates a search is possible, a distributed query is launched to each site. De-identified counts of patients matching the search criteria are returned to the user.
Caritas Christi Healthcare System									
Central Mass IPA	financial, credible vendors, lack of intraoperability	eliminate barriers!	self funded through infrastructure and PFP $	not yet up & running	quality measurement reporting, exchange of key clinical data				
Community Hospitals and Physician Practice Systems (CHAPS)	Organization(s) priorities and resources	Standards definition.	Shared expense with clinical exchange organizations for interface development	343,200	Exchanging clinical summaries among care providers Other transactions outside of CHAPS scope		Clinical outcomes reporting via website. Care Measures reporting.		

	Information Series 1											
HIT Entity	Contact Information	Entity Type	Total # Users	Participant/ User Entities	Software Vendor(s) for Clinical Information Exchange	Data Sharing Capabilities (including types of data exchanged)	Standards Used	If not transporting CCDs, what effort would be necessary to do that?	Consent Architecture	Transport Architecture	Implementation Guides	Future Data Sharing Nee
Hallmark Health System	Carol A. Dresser Vice President - Information Services Hallmark Health System	IDN	4000		Meditech, GE Centricity EMR SaberTech Interface Engine Multi vendor. Multi type HL7	Unidirectional outbound HL7 for Laboratory, Imaging, Departmental ADT and Scheduled appts Unidirectional inbound HL7 to file charges Birectional ADT/Order Entry in development HIPAA Transactions for 837/835 Eligibility txns via Passport	HL7 Scripting ANSI X12 Engine (Microsoft/Sql)	Not transporting CCDs. In process of evaluating interface engine tool. Interface dollars for CCD = approx 20k If another interface engine is determined as necessary cost and resources to implement could be significant	Basically opt-out; pts sign basic TPO consent forms, consent process being eval. Now in office setting.	Point to point and VPN	HL7 ANSI X12 Vendor documentation for interface engine	CCD/CCR, ePrescribe, Patient Portal, Enterprise Master Patient Index, ? Record Locator, Data Respository
Lahey Clinic	Nelson R. Gagnon, Senior Vice President and CIO, Lahey Clinic	IDN										
MA HHS Enterprise Service Bus	Philip Poley	Shared Infrastructure	Approx 10 enterprise applications	Eligibility system, claims processing systems, invoice management system, public health systems, intake systems		Synchronous and asynchronous messaging bus with data transformation, data integration, routing, XML Editing, FTS, validation and publishing capabilities using a Web Services and Q based architecture	Web Services standards, J2EE		Fully integrated with Health and Human Services Shared Security system which is build upon Sun Identity Management and Access Management portfolio	Depends on type of data source. Uses Queues and Web Services end points over an IBM X150 XML Gateway solution.	Deployment guides available	Exploring Open Source FUSE ESB; HL7 Transaction support;
Massachusetts League of Community Health Centers (MLCHC)	Ellen Hafer, Executive VP and COO	CHIA-DRVS is a project of the League, a 501c3 membership association	~ 1400 - potentially	CMOs, clinicians, QI Managers, Analysts, others at MA CHCs, MLCHC Clinical and Data Management staff	Arcadia Solutions	Visit and patient contact documentation including details from EMR products (Dx, medications, vitals, lab results); patient demographics and CPT10 coding from EPM products including insurance	SQL Server / XML	N/A	BAAs between League and CHCs and Arcadia Solutions	Secure FTP	Yes	public health surveillance reporting, immunization registry data, public health required reporting, referrals and patient information access to continuum of care providers; need to establish patient portals and access to information

	Information Series 2								
HIT Entity	Barriers to accomplishing HIE or future needs	Accelerators that would facilitate HIE or future needs	Funding Model	Transactions/ year	Meaningful Use Transactions	**Patient Engagement** (Describe Patient Authentication, Info collected, Info shared, Self-management, and Systems/standard involved.)	**Quality and/or Utilization Reporting** (either through the HIE or submission to another entity)	**Public Health Reporting** (including Reportable Diseases, Immunizations and Syndromic Surveillance)	**Research** (either through the HIE or submission to another entity)
Hallmark Health System	Current Interface Engine problematic Awaiting final regulations	Resources to guide the development of a statewide MPI Standardized technology		ADT - 375,000 SCH - 192,000 LAB - 310,000 RAD - 45,000 DPT - 35,000 OE - 9,500 ---------- 966,500 **#s based on communication to EMR system only Approximate #s	1. Insurance Eligibility Txn 2. Claim/Remit Txn 3. Patient Reminder Letters 4. Disch Summary (Dpt Rpt) 5. Some quality measurement reporting 6. Lab data to public health agencies				
Lahey Clinic									
MA HHS Enterprise Service Bus			Operations and Federal support via APDs	Approx 27 Million Transactions per year	HIPAA transactions, Eligibility transaction, Billing transaction, Birth Record transaction				
Massachusetts League of Community Health Centers (MLCHC)	costs of interface; readiness of other provider; community helath centers without an EMR	adequate funding, HIE design for supporting ezchange	Public and private grant support, transitioning to subscription	Proxy: 560K medical encounters of 10 current community helath center organizations with users of DRVS	problem list, med list, allergies, test results, demographics, vitals, quality reports	TBD - as used by individual provider orgn's, does provide reports for providers on patient self-management, reports on patient data and follow up needed but for center staff use not patient use at this time	("DRVS" IS a reporting tool / platform currently w/ 20+ op & clinical quality reports and 40 plus related KPIs for benchmarking / perfomance improvement with in centers and across centers at enterprise level) includes sorts by race and ethnicity, geography, payer, size of center, emr implementation	immunizations, DPH reportable conditions, syndrome identification	Anticipated with funding and further dev't and adoption by more entities

	Information Series 1											
HIT Entity	Contact Information	Entity Type	Total # Users	Participant/ User Entities	Software Vendor(s) for Clinical Information Exchange	Data Sharing Capabilities (including types of data exchanged)	Standards Used	If not transporting CCDs, what effort would be necessary to do that?	Consent Architecture	Transport Architecture	Implementation Guides	Future Data Sharing Nee
New England Healthcare EDI Network (NEHEN)	Greg DeBor, CSC	HIE	~2,000+	181 unique accounts for billing (many accounts span multiple entities - ~10,000 unique NPIs)	Internally developed software by CSC.	All HIPAA / administrative simplification transactions and code sets, clinical summaries, eRx, public health reporting, quality measurement and reporting	ANSI X12, HL7 / CCD, NCPDP SCRIPT	N/A	Federated, with policy established at source; predominently opt-out	SOAP 1.2, VPN, IVANS\ and private leased lines	ANSI X12 4010, C32 v.2.5, HL7 2.5.1, NCPDP 8.1 for various standards and transaction types; ANSI X12 5010 in process	All other administrative simplification and meaningful use transaction types and capabilities, with priorities set in annual planning process and by targeted participant funding for individual priorities+J1
Northeast Health System	Paul Peck, Interim CIO	IDN			MEDITECH, GE Centricity PM and EMR, NEHEN, Iatric, Kryptiq	All HIPAA / administrative simplification transactions and code sets. Hospital outbound results including discharge summaries, lab, micro, pathology reports, history & physical, public health reporting, quality measurement and reporting	ANSI X12, HL7 , ICD-9-CM, CPT, LOINC, XML,NPI#	Develop interfaces in core system(s) to produce and receive the CCD standard and automate by incorporating the appropriate triggers .	Establish policy at source for sharing appropriate and pertenent content and opt out.	Secure VPN, IVANS, SFTP, leased lines	ANSI X12 4010, C32 v.2.5, HL7 2.5.1, NCPDP 8.1 for various standards and transaction types; ANSI X12 5010 in process. Other available guides available based on our participation in the NEHEN Clinical Data Exchange project.	All other administrative simplification and meaningful use transaction types and capabilities, with priorities set in annual planning process and funding approval.
Northern Berkshire eHealth Collaborative	Dave Delano, MD, Northern Berkshire Health System	HIE	388	16	eClinicalWorks (eHX)	Shared (merged) CCR among 14 practices, Lab Results, Radiology Results, soon to be hospital encounters, Hospital data such as discharge summaries, EKG's, PACS Image access, etc. sent to practices also but passes through the HIE, not resident in the HIE for access there.	ASTM E2369 - 05e1 XML CCR, ICD-9-CM, CPT, Multum	We are transporting CCD's	Opt-in, community-wide by signed & scanned patient consent	Point to point and VPN, no public Internet access	Yes - based on the ASTM CCR Standard with Record Locator services	CCD / CCR exchange with the Hospital and Regional Record Locator Service / exchange

	Information Series 2								
HIT Entity	Barriers to accomplishing HIE or future needs	Accelerators that would facilitate HIE or future needs	Funding Model	Transactions/ year	Meaningful Use Transactions	**Patient Engagement** (Describe Patient Authentication, Info collected, Info shared, Self-management, and Systems/standard involved.)	**Quality and/or Utilization Reporting** (either through the HIE or submission to another entity)	**Public Health Reporting** (including Reportable Diseases, Immunizations and Syndromic Surveillance)	**Research** (either through the HIE or submission to another entity)
New England Healthcare EDI Network (NEHEN)	Barriers to accomplishing HIE or future needs - Pending / non-final nature of federal standards and rules for meaningful use and certification - Inertia awaiting state's formal designation of the HIE provider - Questions surrounding state direction on HIT policy and tie to state HHS strategy, HIE direction, etc. - Uncertainty surrounding core EMR vendor HIE interfaces and solutions, or lack of same - Uncertainty re: payer role and use of clinical data - Lack of adequate funding support from participants (based on clear ROI analysis or benchmark of what others are spending)	Accelerators that would facilitate HIE or future needs - ONC finalizing standards and rules - Clarity from state re: state plans and funds for HIE (when, how much, requirements, etc.) - Clear privacy / consent law or policy guidance (from state or federal) - Clear plans from ONC re: NHIN Direct (release plans, expectations for use, etc.)	Subscription (payer, provider and contract affiliates)	100M+	1. ePrescribing (includes eligibility, formulary, history, routing, refill). 2. Patient engagement - sending reminders to patients, providing patients with an electronic copy and access to their records 3. Checking insurance eligibility and submitting claims 4. Capability to exchange key clinical information among care providers and patient authorized entities 5. Capability to submit data to immunization registries, provide syndromic surveillance and lab data to public health agencies 6. Quality measurement and reporting	N/A. No patient enrollment or authentication in current system.	CCD-based quality data submitted to Massachusetts eHealth Collaboration.	Boston Public Health Commission - CCD-based disparity reporting (race, ethnicity, language, etc.), immunizations, reportable labs and syndromic surveillance. Massachusetts Department of Public Health - CCD-based Immunizations; potential to reuse other reporting capabilities developed for Boston Public Health Commission.	N/A. No secondary use of aggregated data for research.
Northeast Health System					1. ePrescribing (includes eligibility, formulary, history, routing, refill). 2. Patient engagement - sending reminders to patients, providing patients with an electronic copy and access to their records 3. Checking insurance eligibility and submitting claims 4. Capability to exchange key clinical information among care providers and patient authorized entities 5. Capability to submit data to immunization registries, provide syndromic surveillance and lab data to public health agencies 6. Quality measurement and reporting				
Northern Berkshire eHealth Collaborative	Need Statewide Record Locator Service.	Would like State standardized, individually tagged data elements by consent level (Private, Shared, Per-event) to expedite filtering of HIE elements for sensitive information.	Practice support costs & hosted by Hospital	1,919 Average accesses per year over a 28 month period	Yes, CCR document merging / exchange (need hospital CCD exchange), Provide Summary of Care Record at transitions of care and providing electronic surveilance & syndromic data to the State	No patient access at this time. Planned patient portal with authorization provided at Dr. office then web link with encrypted credentials provided to patient. Will be abel to view a lifetime, merged CCR.	Interface to MHQP Quality Data Warehouse provides community level quality reporting with drill down by practice / provider. Has compartive results with other practices and the State norms.	Interface is active with ESP / DPH to report 'reportable conditions' such as Influenza, STD's, etc.	No clinical research interface built at this time.

	Information Series 1											
HIT Entity	Contact Information	Entity Type	Total # Users	Participant/ User Entities	Software Vendor(s) for Clinical Information Exchange	Data Sharing Capabilities (including types of data exchanged)	Standards Used	If not transporting CCDs, what effort would be necessary to do that?	Consent Architecture	Transport Architecture	Implementation Guides	Future Data Sharing Nee
Partners Healthcare System	John Glaser, PhD, CIO Partners Health Care System, Inc.	IDN	>25,000 internal and external users	Atrius Health, DFCI, BWH, SSH, Harbor Medical Associates, MA Share	LMR, Epic, Meditech, Amicas, Centricity, GE IDX, Patient Keeper, Aria, Sched Repository. Mysis, Labdaq	ED visit notifications, IP Daily census and daily discharges, discharge orders, discharge summaries, patient appointment information, insurance, information, patient clinical information, lab results, images and imaging reports, .	Site to site TLS encrypted email, fax. HL7, CCD, XMS	Currently transporting CCD's between some sites. Likely will move to a centralized model for CCD distribution.	Affiliation agreement, patient consent form at time of service	TLS encrypted email, fax, VPN, secure web services.	No	Standards-based clinical interchange through a single set of protocols.
SAFE Health	Larry Garber, MD	HIE	2,500	2	Internally developed software.	Textual Notes, including: Medication List Allergies Problem List Immunization History Code Status Advance Directive Status PCP and phone number Vital Signs Recent Lab/Rad Results	LOINC SNOMED-CT NPI# HL7 2.x	Basic CCD transport could be added for $20K. Comprehensive CCD support would cost ~$200K	"Opt-in" at level of connected organization. Patients only need to sign universal consent form once due to use of an EMPI.	XDS.b-like architecture with federated edge proxy servers and an EMPI. Emulates XDR-like transactions.	Edge Proxy Server Interface Engine Specification and User's Guide. Consent Portal User's Guide.	Will be adding CCD capabilities
Signature Healthcare	Craig Fletcher, CIO	IDN	1500	Signature Healthcare - Brockton Hospital; Signature Medical Group; Tufts Medical Center; NEHEN	Meditech; Iatric; Allscripts;	Laboratory and Pathology results; Radiology Reports; Departmental Reports; Patient Demographics;	HL7	Allscripts has CCD functionality; Iatric is writing CCD interface for use with Meditech;	Affiliation agreement for exchange between SHBH and SMG; Consent form to send to TMC;	NEHEN	NEHEN	CCD; Immunizations to state registies; Quality data to CMS;
Sisters of Providence Health System	Joan Methe, CIO, Sisters of Providence Health System	IDN										

	Information Series 1											
HIT Entity	Contact Information	Entity Type	Total # Users	Participant/ User Entities	Software Vendor(s) for Clinical Information Exchange	Data Sharing Capabilities (including types of data exchanged)	Standards Used	If not transporting CCDs, what effort would be necessary to do that?	Consent Architecture	Transport Architecture	Implementation Guides	Future Data Sharing Nee
SouthCoast Health System	Christopher Baldwin, VP of Information Services	IDN	50	Southcoast physicians network, Southcoast Hospitals Group, Southcoast physician Associates, New Bedford Medical Associates	NextGen Healthcare, Rosetta, MEDITECH, lysys Lab, eScription	Live: patient registry data, laboratory data, eprescribing, voice recognized/transcribed reports (live later this month - radiology reports)	HL7	NextGen CHS data exchange system is the tool we have and will support CCD	Each application will collect patient consent data that determines what can be transferred (pushed)	Sonet WAN, MPLS and VPN for small sitesfor data transport; Citrix Access Gateway for remote access to apps that store the data	Integrated into EMR training	Started with data types to support highly functional EMR; building infrastructure and more advanced requirements this year
UMass Memorial Healthcare System	George Brenckle, CIO	IDN			dbMotion							
Vanguard Health Systems (Metrowest-Natick & Framingham and St. Vincent Hospital)	Tara Jones, VP & CIO VHS New England	IDN	5000	11 plus physician community (1400)	MEDITECH, MEDHOST EDs, GE CPN, Athena EMR,	Lab, micro, path, bbk Results, Rad results, PACS images, dictated reports/textual notes, allergies, med list, adv directives,	HL7, CCD		Universal consent at time of visit	Medicity NOVO product for ambulatory EMR integration, CCD		ICA implementation FY11
Wellport (Newburyport)	Robert Buchanan, CIO of the Anna Jaques Hospital	HIE		Anna Jaques Hospital, Whittier IPA (connecting 32 practices)	Meditech, Iatrics POI, eClinicalWorks (eHX)	Lab, micro, path, bbk results, Rad Results	HL7		Opt-in by location at 32 practices and hospital	Secure VPN		CCD/CCR exchange

	Information Series 2								
HIT Entity	Barriers to accomplishing HIE or future needs	Accelerators that would facilitate HIE or future needs	Funding Model	Transactions/ year	Meaningful Use Transactions	**Patient Engagement** (Describe Patient Authentication, Info collected, Info shared, Self-management, and Systems/standard involved.)	**Quality and/or Utilization Reporting** (either through the HIE or submission to another entity)	**Public Health Reporting** (including Reportable Diseases, Immunizations and Syndromic Surveillance)	**Research** (either through the HIE or submission to another entity)
SouthCoast Health System	physician adoption of EHR is key, since most data access thru this workflow	Additional payer incentives	Hospitals, physician groups, payers	50,000	under evaulation	Patient registry - last name, DOB, first name, SSN or telephone number - exact match or drop to error log. For results sharing use unique order number for the patient returned with results.	under evaulation	under evaluation	under evaulation
UMass Memorial Healthcare System									
Vanguard Health Systems (Metrowest-Natick & Framingham and St. Vincent Hospital)			Self funded		Health information exchange of Patient Record Summary between providers of care and patient authorized entities, as well as for transitions of care and referrals.				
Wellport (Newburyport)	Lack of adequate funding; lack of data sharing standards	Data Sharing Standards; funding	Shared expense between hospital and Wellport/Whittier IPA		HIE sharing of CCDs	Patient Consent Model - well received with 80-90% consent to participate in exchange for sharing of CCD. Planned Patient portal.	Reporting through aEMRs only at this time.	None at this time - practice level only.	None

Appendix D: SMHP/APD Cross Reference

Section	Sub-section	Source
Operational Plan	2.3.1 Existing HIEs at MassHealth Providers and Managed Care Organizations	SMPH pg 31
	2.4 Public Initiatives	SMHP pg 81
	3.4 Goals and objectives	SMHP
Strategic Plan	Section 1, project Plan	APD section 3 and VI
	Technical Architecture	APD Section 3
	Section 4.3 – Service groups	APD Section 3.1
	Section 4.4 – Service Delivery Model	APD-Section E.2

Appendix E: HCQCC Statewide Scorecard to Track Progress on Goals

Goal	Subgoal/Strategy	Measure	2008	2009	2010	National Benchmark		
						Average	Top State	90th %ile
1. Reduce the cost of health care.	A. Reduce the annual rise in health care costs to no more than the unadjusted growth in Gross Domestic Product (GDP) by 2012.	Rate of growth in per capita health care spending (GDP 2.1%)	5.7%	3.9%		3.9%	2.0% (AZ)	2.9%
	B. Promote cost-efficiency through development of a website providing comparative cost information. Develop a website that will enable consumers to compare the cost of health care procedures at different hospitals and outpatient facilities.	HCQCC has developed MyHealthCareOptions website	Hospital Cost Measures (as of December 2011): **INPATIENT:** Angioplasty, Back Procedure (2), Bypass Surgery, Cesarean Section, COPD, Gall Bladder, Heart Attack, Heart Failure, Heart Valve Surgery, Hip Replacement, Intestinal Surgery, Knee Replacement, Normal Newborn, Pneumonia, Stroke, Vaginal Delivery, Weight-loss Surgery **OUTPATIENT:** Cardiac Screening Tests (3), CT Scan (5), Mammogram, MRI (3), Radiation Treatment (3), Ultrasound (2), X-Ray						
	C. Reduce health care spending by preventing the need for avoidable hospital stays.	Medicare 30-day readmissions as a percentage of all admissions	19.3%	19.4%		17.5%	12.9% (OR)	14.4%

Goal	Subgoal/Strategy	Measure	2008	2009	2010	National Benchmark		
						Average	Top State	90th %ile
2. Ensure patient safety and effectiveness of care.	A. Reduce hospital-associated infections (HAI) during FY 2008. Eliminate hospital- associated infections by 2012.	CLABSI rate	DPH is working on a plan to aggregate current data.					
		SSI						
		Number of hospitals reviewed by DPH infection surveyors with significant findings						
	B. Eliminate "Never Events" as defined by the National Quality Forum. Eliminate events that should never happen in hospitals, such as wrong surgery, wrong site, or wrong patient.	Number of hospitals with SRE's	65	64	68	N/A		
		Number of SRE's reported by hospitals	338	383	369			
		Selected - falls	224	199	192			
		Selected - surgical events	62	76	61			
		Selected - care management events	26	78	91			
		Percent of surgical patients receiving appropriate care to prevent complications	76.9%	90.3%		85.3%	92.7% (ME)	90.3%
3. Improve screening for and management of chronic illnesses in the community.	A. Improve chronic and preventive care. Improve care of chronic diseases such as congestive heart failure, diabetes, and asthma.	Diabetes patients with HbA1c - Poor Blood Sugar Control	17.5%	17.00%	15.4.%	28.4%	N/A	18.7%
		Pediatric Asthma hospitalization rate (per 100,000 population)	125.5	154.6	166.8	134.8	45.5 (VT)	N/A
		Adult Asthma hospitalization rate (per 100,000 population)	133.6	138.7	134.8	117.9	40.8 (UT)	N/A
		Cholesterol management for patients with cardiovascular conditions (Cholesterol (LDL-C) - Good Control)	67.9%	67.50%	70.90%	59.7%	N/A	70.6%
		Persistence of beta blocker treatment 6 months after a heart attack	84.2%	83.40%	83.40%	75.0%		85.1%

Goal	Subgoal/Strategy	Measure	2008	2009	2010	National Benchmark		
						Average	Top State	90th %ile
	B. Reduce disease complication rates, readmission rates, and avoidable hospitalizations.	Diabetes - Avoidable hospitalization rate for patients with long-term diabetes complications (number of admissions per 100,000 population)	114	108	109	123.8	58.8 (VT)	N/A
		White	73	70	69	N/A		
		Black	250	249	246			
		Hispanic	116	97	94			
		Asthma - Avoidable hospitalization rate - adult (number of admissions per 100,000 population)	156			120.0	59.3 (UT)	N/A
		White	120			N/A		
		Black	336					
		Hispanic	189					
		Congestive Heart Failure - Avoidable hospitalization rate - adult (number of admissions per 100,000 population)	405	402	384	415.5	188.1 (UT)	N/A
		White	91	92	86	N/A		
		Black	199	201	201			
		Hispanic	94	86	77			

Goal	Subgoal/Strategy	Measure	2008	2009	2010	National Benchmark		
						Average	Top State	90th %ile
4. Develop and provide useful measurements of health care quality in areas of health care for which current data are inadequate.	Develop processes and measures to improve adherence to patients' wishes in providing care at the end of life. Ensure that health care providers ask about and follow patients' wishes with respect to invasive treatments, do not resuscitate orders, hospice and palliative care, and other treatments at the end of life.	State status in gaining endorsement from the National POLST Paradigm Task Force	Developing program-Quality and Safety Committee			7 states have an endorsed program		
		Percent of health care settings with a palliative care program						
		Hospitals	50%	67%		N/A	100% (VT)	N/A
		Nursing Homes/SNF	N/A			78.1%	N/A	
		Home Health Care	N/A					
5. Eliminate racial and ethnic disparities in health and in access to and utilization of health care; health indicators will be consistent, and consistently improving, across all racial and ethnic groups.	A. Reduce disparities in healthcare associated infections.		Where available, breakdowns of the recommended measures have been provided in their respective goal areas. No statistically significant disparities were noted in serious reportable event data.					
	B. Eliminate disparities in Never Events.							
	C. Reduce, and ultimately eliminate, disparities in disease complication rates, readmission rates, and avoidable hospitalizations.							
	D. Reduce disparities in screening and management of chronic illnesses.							
6. Promote quality improvement through transparency.	Promote quality improvement through development of a website and other materials providing comparative quality information.	Average total monthly hits on MHCO	551	2541	2760	N/A		