Design Specifications for the Maryland Health Information Exchange

March 25, 2009

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Executive Summary

In February 2009, the Maryland Health Care Commission (MHCC) published *The Design Specifications for the Maryland Health Information Exchange (HIE).* This publication includes a detailed health information exchange implementation blueprint that specifies the core design components required for building a consumer centric, private and secure, interoperable HIE. The design features were determined by assessing the Request for Application (RFA) core design features and by reconciling two multi-stakeholder planning team reports.[1,2] The planning team design features were augmented with best practices from emerging or established HIEs. This HIE Implementation blueprint provides the foundation for creating an RFA for *A Citizen-Centric Health Information Exchange for Maryland,* which will be released in the second quarter 2009.

Beginning in July 2008, the Chesapeake Regional Information System for our Patients (CRISP) and Montgomery County HIE Collaborative (MCHIE) were awarded funding to develop proposals for planning a statewide HIE. Each multi-stakeholder group focused on issues related to governance, privacy and security, role-based access, user authentication and trust hierarchies, architecture of the exchange, hardware, and software solutions, costs of implementation, alternative sustainable business models, and strategies to assure appropriate patient engagement, access, and control over information exchange, and generated planning team reports to MHCC.

The core design features were selected by evaluating the design specifications of at least ten emerging or established HIES.[3] In some instances, the CRISP and MCHIE teams identified granular design features and in other instances an alternate HIE was selected based upon their approach to a particular design feature for the design specifications.

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[1] Maryland Health Care Commission. (2/2009). Chesapeake Regional Information System for our Patients (CRISP): A Plan for a Citizen-Centric Statewide Health Information Exchange in Maryland. Available on the Maryland Health Care Commission website: mhcc.maryland.gov.

[2] Maryland Health Care Commission. (2/2009). Montgomery County Health Information Exchange Collaborative (MCHIE): Strategies for a Person-Centric, Inclusive Maryland Health Information Exchange. Available on the Maryland Health Care Commission website: mhcc.maryland.gov.

[3] Maryland Health Care Commission. (2/2009). Building of a Statewide HIE: Implementation Effort Working Papers. Available on the Maryland Health Care Commission website: mhcc.maryland.gov.

The final planning group reports reflect nine months of deliberation. The information contained in the design specifications are categorized by vision and mission, strategy and planning, detail design, implementation, and maintenance. Each of these categories is further defined in the report.

Overview

In December 2008, MHCC issued a bid board notice for the purpose of reviewing and comparing the proposals received from Chesapeake Regional Information System for our Patients (CRISP) and Montgomery County HIE Collaborative (MCHIE), as well as researching ten forming or existing HIE's. The main deliverable of this bid board notice was to propose implementation specifications aimed at building a consumer centric, private and secure, and interoperable HIE and provide the justification for the recommendations. This was accomplished by reviewing the CRISP and MCHIE proposals and comparing the planning team recommendations to other HIE's. The contractor researched twelve Health Information Exchanges (HIE's) and provided detailed rationale for how each implementation specification was selected. The final design specifications will be essential to building the statewide HIE.

Acknowledgements

MHCC would like to recognize Health Care Information Consultants, LLC, a consulting firm who collaborated with MHCC and who conducted HIE research and contributed significantly to the creation of design specifications for building a statewide HIE.

Section I: Introduction

State and National Health Information Exchange (HIE) Initiatives

According to the eHealth Initiative (eHI) 2008 Firth Annual Survey of Health Information Exchange at the State and Local Levels, there are 42 operational health information exchange initiatives in the United States, which is a 31 percent increase over 2007 survey results.[4] Further, it is reported that the most significant challenge continues to be the development of a sustainable business model.

eHI also reports that the results indicate a great improvement in improving patient care and lowering health care costs. Sixty nine percent of all respondents report an impact on decreasing dollars in redundant testing, staff time, and patient admissions. One-half of all respondents also report favorable impact on health care delivery, including improved access to test results and quality of practice life.[5] It is important to also note that in the 2008 survey was the first time HIE's were reporting a positive financial return on investment.

The survey also reports that although HIE's continue to focus their efforts on supporting care delivery, many are starting to work on improving population health. Ten HIE's reported they are offering chronic disease management, six are offering public health reporting and five are offering quality improvement reporting for purchasers or payers. [6]

The national health information exchange efforts continue to be managed by the Department of Health and Human Services (HHS) under the Office of the National Coordinator (ONC). These initiatives include:

National Health Information Network (NHIN) – NHIN was developed in order to provide an interoperable, secure, nationwide health information infrastructure to connect

[4] eHealth Initiative Releases Results From 2008 Survey on Health Information Exchange Summary of Key Findings: Financing Continues to be a Challenge, February 18, 2009, available at: http://www.ehealthinitiative.org/HIESurvey/

[5] eHealth Initiative Releases Results From 2008 Survey on Health Information Exchange Summary of key findings: Impact on Health care: 2008 Results Indication Growing Impact on Lowering Costs and Improving Care, February 18, 2009, available at: http://www.ehealthinitiative.org/HIESurvey.

[6] eHealth Initiative Releases Results From 2008 Survey on Health Information Exchange Summary of key findings: Impact on Health care: 2008 Results Indication Growing Impact on Lowering Costs and Improving Care, February 18, 2009, available at: http://www.ehealthinitiative.org/HIESurvey.

states, providers, and consumers.[7] The approach to this initiative is threefold: Develop prototype architecture, support trial implementation, and production. Contracts were awarded to several states to participate in this project.

Health Information Security and Privacy Collaborative – This was established in June 2006 by RTI International through a contract with the U.S. Department of HHS.[8] The Health Information Security and Privacy Collaboration (HISPC) originally comprised 34 states and territories. Phases 1 and 2 of the HISPC project involved 34 states and territories who were awarded contracts to explore barriers around privacy and security for the exchange of electronic health records. Phase 3 of the HISPC started in April 2008, and includes 42 state and territories who are working as a multi-state collaborative to address specific areas of privacy and security that were identified in Phases 1 and 2.

The State Level Health Information Exchange Consensus Project (SLHIE) – SLHIE focuses on activities states are performing to advance HIE. [9] By focusing on the individual state research, analysis, and consensus building activities, SLHIE continues to identify commonalities among states as well as distinct roles and contributions. The SLHIE steering committee is comprised of representatives from 13 states.

Background HIE planning teams (CRISP and MCHIE)

The Maryland Health Care Commission (MHCC) issued a RFA in February 2008, in order to begin a planning project for researching different Health Information Exchange (HIE) models, either forming or existing, for comparison purposes in forming a statewide citizen-centric health information exchange. Awards were given to two different groups, Chesapeake Regional Information System for our Patients (CRISP) and Montgomery County HIE Collaborative (MCHIE). Each group has proposed a detailed response to the RFA, explaining the methodology and recommendations for a statewide HIE. Please see Appendix A for the composition of the CRISP and MCHIE executive and steering committee teams.

Strategic Plan Objectives

The strategic objectives for the MHCC statewide HIE are to deliver essential information about patients to authorized providers to assure appropriate, safe and cost effective care, while ensuring that all information is secure and all transactions are following best practices regarding privacy and security. Further, the objective is to provide patient access and consent to help engage patients in their own care, as well as allowing the patient to have appropriate control

[7] Nationwide Health Information Network (NHIN): Background, February 18, 2009, available at: http://www.hhs.gov/healthit/healthnetwork/background.

[8] Health Information Security and Privacy Collaboration, Executive Summary, February 18, 2009, available at: http://www.hhs.gov/healthit/privacy/execsum.htm.

[9] The State Level Health Information Exchange Consensus Project, February 18, 2009, available at: http://www.slhie.org/#.

over the flow of private medical information. MHCC also would like to provide a mechanism to gather information for researching the effectiveness and cost of care, measuring quality, and outcomes of care, performing post-marketing surveillance of drugs and devices and conducting surveillance and bio-surveillance.

Section II: Approach

MHCC's approach to building a statewide HIE involved two distinct projects. The first project was the work completed by CRISP and MCHIE which involved detailed proposals for HIE formation in Maryland. The second project involved an analysis of the CRISP and MCHIE proposals, as well as the analysis of ten forming or existing HIE's and two advisory organizations. The results of this analysis will provide an all-encompassing implementation specification with detail and recommendations for each item in the specification, based on the analysis of the HIE's. The process will allow MHCC to move forward in determining the preferred method for each specific area when designing the statewide HIE.

The implementation specification was developed using the information from the RFA that was issued in January 2008. Specifically, the baseline implementation specification used Appendix *A – HIE- The Desired Future State*, Appendix *B – HIE Principles* and Appendix *C – Final Report Outline*, from the RFA to determine which areas of HIE formation would be analyzed. Once the 12 HIE's were selected for analysis, a rationale was provided to justify the selection of the HIE's.

In the selection of HIE's for research purposes, Appendices A, B and C were used again in order to ensure that the HIE's selected would fall into one or more categories from the appendices. By doing a high-level overview of the schedules and comparing them to the HIE's, the rationale for selecting the HIE's tied directly to the RFA. (See Appendix B.) Of the 12 HIE's selected for further research, two represent advisory organizations that provide oversight for HIE formation in their respective states. This information on the advisory organization has been separated from the actual HIE analysis and is represented in the *MHCC Explanation Document NYeC and AzHeC*. In addition, it is important to note that in some cases, the CRISP and/or MCHIE proposal was included in the explanation document as a recommendation.

While researching the 12 HIE's, items were added to the implementation specification that were deemed important and necessary for an implementation specification. This resulted in an outline that covered the following areas:

- Vision and Mission
- Strategy and Planning
    - Financial Model and Sustainability
    - Governance Framework
    - Privacy and Security
    - Stakeholder Outreach and Education
- Detail Design
    - Care delivery
- Implementation
    - Project Management

The project team also completed a Master Schedule C, which notes the area of implementation and a checklist representing if the item was found in the CRISP and MCHIE proposals. Further,

this schedule indicates which HIE or HIE's from the research covered the area of implementation. (See Appendix C.)

Section III: Implementation Specification

The implementation specification reflects information from the CRISP and MCHIE proposals and from the ten HIE's and two advisory organizations that were researched. The specification and recommendations are separated into two distinct areas, one for the HIE titled *HIE Recommendations by Implementation Category* and one for the advisory organization titled *Advisory Organization Recommendations by Implementation Category*.

HIE Recommendations by Implementation Category

Vision

A. Vision and Mission

Recommendation: Vermont – VITL, Tennessee – MSeHA

VITL's vision is that the health information exchange network will be a Statewide HIE which will share real-time clinical information with providers to improve patient outcomes while reducing duplication and decreasing the rate at which health care spending occurs.

MSeHA's approach to HIE is unique in that they focused on privacy and security and employer buy-in. MSeHA decided to promote HIE to the major employers (many are hospitals) as a way to reduce health insurance costs. They are able to provide quantifiable measurements to the employers by showing reduced insurance costs, employee absence decreases etc.

CRISP and MCHIE reference the need for a vision. Both reference a governance board to establish HIE mission and vision. CRISP summarizes a "future state". MCHIE outlines a vision based on the end year 2012.

B. Principles

Recommendation: All

All HIE's researched have established foundational principles with several common principles including sustainability, interoperability, and quality.

Strategy and Planning

Financial Model and Sustainability

A. Revenue Sources

1. Transaction Fees

   Recommendation: Vermont – Vermont - VITL

   VITL is receiving transaction fees which are claims based. For every claim processed by the insurers, VITL received 2/10 or 1 percent of the claim amount.

   CRISP and MCHIE recommend transaction fees as a revenue source and both indicate that transaction fees should not be considered as the sole source.

2. Subscription Fees

   Recommendation: Virginia – MedVirginia, Vermont – VITL

   MedVirginia really does operate on a subscription basis with the large hospitals that pay annually. In addition, they plan to offer certain hosted services such as e-prescribing on a subscription basis. VITL also has a model that collects subscription fees based on data services they provide.

   CRISP and MCHIE both reference subscription fees.

3. Membership Fees

   Recommendation: None of the HIE's is charging membership fees.

4. One Time Set-up Fee

   Recommendation: None of the researched HIE's due to lack of available information.

   MCHIE recommends a one-time set-up fee for initial connections.

5. Hospital Funding

   Recommendation: Virginia - MedVirginia

   MedVirginia receives annual subscription hospital fees.

   MCHIE suggests consideration of "provider collaboration on raising capital" citing the HealthBridge example in their planning report.

6. State Funding

   Recommendation: Tennessee – MSeHA, West Virginia – WVHIN, Virginia – MedVirginia, Vermont – VITL

MSeHA received state funding of 7.2M over five years, VWHIN received 3.5M in start up costs from the state, the state of Virginia provided funding to provide HIE to the free clinics in Virginia, VITL received $3M in startup funding.

Both CRISP and MCHIE advise state funding initially. CRISP and MCHIE recommend $10M of State funding. MCHIE references "reprogramming" a small percentage of Maryland community benefit dollars to support HIE expenditures.

7. Federal Funding

   Recommendation: Tennessee – MSeHA, West Virginia – WVHIN, Virginia – MedVirginia

   All of these HIE's have participated in the NHIN Trial Implementations, which has allowed them to implement a pilot program.

   CRISP and MCHIE recommend federal funding where appropriate.

8. Health Plan Funding

   Recommendation: Vermont – VITL

   Vermont received $1M from the four major payers in the state for the electronic health record pilot program. They also put into legislation the "Health IT Fund" that collects 2/10 of 1 percent on medical claims and it is paid to VITL.

   MCHIE references all payor assessments as one possible approach to cover ongoing operational expenses.

9. Physician Funding

   Recommendation: None of the researched HIE's due to lack of available information.

10. Philanthropic Funding

    Recommendation: Vermont – VITL

    VITL received a community grant of $500K from a local foundation.

    MCHIE supports this particularly for funding governance initiatives.

B. Budget

CRISP and MCHIE provided detailed budget information containing projected capital and operating costs. CRISP proposed costs for individual functions (services or use cases) and core infrastructure costs required to create exchange completely (MPI, audit trails, registry, authentication, and human resources). Two models proposed: (1) Initial $10M investment (assumed adoption rates) spread over first

four years. Services costs assume 3.5 percent inflation rate and include hardware, software, communications technology, initial interface, and maintenance, software configuration (data maps). Core infrastructure assumes 3.5 percent inflation rate. Both services and core infrastructure include ongoing costs such as maintenance, resources, etc. and are specified below as operating costs. (2) Increased Implementation Pace Model assumes additional funding, faster implementation (different adoption rate assumptions).

MCHIE proposed a total of $80-$125M for years one to three. Hospital capital costs $400-500K and $100K operating (over three years) and $30-$35K/site capital and $5-$7K/site operating for physician offices and clinics over three years (assuming 60 percent adoption).

1. Capital

   Recommendation: None of the researched HIE's due to lack of available information.

   CRISP and MCHIE provided detailed budget information. MCHIE summarized capital costs. Overall costs proposed a total of $80-$125M for years one to three. Hospital capital costs are $400-500K (over three years) and $30-$35K/site capital for physician offices and clinics over three years (assuming 60percent adoption). Assumptions are that five HIE's across the state, $4-$6M/HIE for infrastructure and $6-10M/HIE for functionality (eight use cases) over three years.

2. Operating Costs

   Recommendation: Tennessee – MSeHA

   MSeHA has operating costs of approximately $3M per year and technology accounts for 75 percent of that number.

   CRISP and MCHIE provided detailed budget information. MCHIE summarized operating costs. Overall costs proposed a total of $80-$125M for years one through three. Hospital operating costs are $100K (over three years) and $5-$7K/site operating for physician offices and clinics over 3 years (assuming 60% adoption). Assumptions are that five HIE's across the state, $6-$9M/HIE over three years; $12-$15M annually for ongoing maintenance and system expansion. Does not include costs for governance bodies and processes.

   a. Salaries

      Recommendation: None of the researched HIE's due to lack of available information.

      For two models proposed, CRISP salary projections included: (1) eight implementation resources at unit cost of $230,000 (years one and two) and

15 permanent resources at unit cost of $125,000 (year one and two only Executive Director with seven permanent in year three, ten in year five and 15 in year six); (2) 20 imp resources for first two years and permanent staff begins at five and increases to full 15 in year three.

b. Benefits

Recommendation: None of the researched HIE's due to lack of available information.

CRISP did not break out benefit information.

c. Office Expense

Recommendation: None of the researched HIE's due to lack of available information.

For the two models proposed, CRISP office expense projections included (one & two) 10 percent of resources for "overhead" including office expense, rent, utilities, etc.

d. Rent

Recommendation: None of the researched HIE's due to lack of available information.

CRISP did not break out rent information.

e. Utilities

Recommendation: None of the researched HIE's due to lack of available information.

CRISP did not break out utilities information.

f. Software Purchase and Maintenance

Recommendation: Tennessee – MSeHA

MSeHA suggests that 75 percent of the operating budget is for software and hardware.

For both models proposed, CRISP did not summarize total dollars but specified inclusion: Interface maintenance, other services maintenance, core software and hardware including exchange platform and portal license, EMPI, hardware/supporting software. MCHIE incorporates these costs into overall capital and operating costs.

g. Hardware Purchase and Maintenance

Recommendation: Tennessee – MSeHA

MSeHA suggests that 75 percent of the operating budget is for software and hardware.

For both models proposed, CRISP did not summarize total dollars but specified inclusion: Interface maintenance, other services maintenance, core software and hardware including exchange platform and portal license, EMPI, hardware/supporting software. MCHIE incorporates these costs into overall capital and operating costs.

h. Taxes

Recommendation: None of the researched HIE's due to lack of available information.

CRISP did not break out tax information.

i. Cyber Liability Insurance

Recommendation: Colorado – CORhio

CORhio had to buy cyber liability insurance in order to get the data partners to share their data. This cost $80K per year.

CRISP did not break out insurance information.

3. Cash Flow

Recommendation: None of the researched HIE's due to lack of available information.

For the two models proposed, CRISP cash flow and break even analysis is: (1) Marginal income from HIE Services beginning year 1 with positive cash flow year five; (2) Positive cash flow in years six and seven higher due to higher adoption rates and thus higher income from participant fees.

4. Break Even Analysis

Recommendation: Virginia – MedVirginia

MedVirginia will not share the financial information, however they state that they are profitable and they understand the break even.

For the two models proposed, CRISP cash flow and break even analysis is: (1) Marginal income from HIE Services beginning year 1 with positive cash flow year five; (2) Positive cash flow in years six and seven higher due to higher adoption rates and thus higher income from participant fees.

C. Community Benefit

Recommendation: Colorado – CORhio

CORhio recommends that the market forces are researched and understood, such as what are the patterns of case, who to connect with and the political pressure points.

CRISP and MCHIE both imply community benefits will be obtained via the operation of a statewide HIE.

D. Benefit Realization – ROI

1. Financial Measurement

Recommendation: Vermont – VITL, Ohio – HealthBridge

VITL performs measurements on the electronic health record project whereby physician offices are held to five-milestone grant payment to prove they have meaningful use of their systems. Modeled after the stimulus bill and is based on improved receivables. Recent HealthBridge statistics indicate that the average hospital cost was anticipated to be 75 cents. The actual cost for 2007 was 12 cents. The total cost reduction based on volume for 2007 was $16.4M. Based on current volume, ROI/month to the community is $1.5M (does not factor in inflation, physician office efficiencies, or quality of care improvements.

2. Quality Measurement

Recommendation Vermont – VITL, Ohio – HealthBridge, Wisconsin - WHIE

VITL is performing measurements on the electronic health record project around the use of e-prescribing and patient satisfaction.

HealthBridge is planning to conduct quality reporting / performance measurement for diabetes care in the near future.

Wisconsin formed the Wisconsin Health Information Organization (WHIO) in 2005. The WHIO is governed by a multi-stakeholder board that includes providers, payers, and purchasers, including the Secretaries of the ETF and the DHFS. It seeks to create a centralized claims repository for Wisconsin with credible and useful data elements for the purpose of quality improvement, health care provider performance comparisons, and consumer decision making. The WHIO plans to use the data repository to develop and disseminate unified public reports on health care quality, safety, and efficiency

MCHIE referenced quality measurement in terms of a high priority use case identified by their Finance Team.

3. System Use Measurement

   Recommendation: Arizona – AMIE

   AMIE is measuring the number of users and the type of data being accessed. AMIE is also measuring the help desk requests to understand where more training may be required or added functionality.

   MCHIE recommends system use measurement as a condition of funding. HIE's collect and provide data as condition of state funding. MD eHealth Collaborative provides annual report to public.

   a. How many users?

      See above "System Use Measurement".

   b. What do they access?

      See above "System Use Measurement".

Governance Framework

A. Ownership Model: Public-Private Partnership

   Recommendation: Tennessee – MSeHA, Vermont – VITL,

   MSeHA, VITL and NYeC all create frameworks for a public-private partnership. MSeHA acts as government advisory body overseeing and staffing the infrastructure. CRISP and MCHIE recommend a public-private partnership model.

B. Profit Status: Not-for-Profit

   Recommendation: All

   Most HIE's have a not-for-profit status.

   CRISP and MCHIE recommend a not-for-profit status.

C. Articles of Governance

   Recommendation: None of the researched HIE's due to lack of available information.

   CRISP recommends bylaws for the HIE that avoid domination or pressure by powerful stakeholders.

D. Role of Local HIE's:

1. Include but not Require Regional / Local HIE's; All HIE's Conform with Statewide Policies, Standards and Rules

   Recommendation: Based on limited data, Vermont – VITL, Tennessee – MSeHA

   VITL is the statewide HIE but they do not discourage other formation of RHIO's but those would have to connect through VITL. In Tennessee, there are several RHIO's exchanging data. Tennessee's eHealth Council's road map will continue to strengthen the basic infrastructure hosting the Tennessee eHealth Exchange Zone.

   CRISP recommends that resources be spent on a more comprehensive singular approach. If a HIE is already established (e.g. LifeBridge, etc.), integrate, but do not promote.

   While Maryland has a number of fledgling HIE efforts, there exist no operational RHIO's. MCHIE believes that communities and regions in Maryland should organize in the manner that best suits their local needs and circumstances.

2. Regional / Local HIE Participation Required (Regional Governance Entities)

   Recommendation: None of the researched HIE's due to lack of available information.

   MCHIE addresses having the local HIE's represented on the board but they do not come to conclusion about this. CRISP addresses this with the idea that all HIE's must abide by the statewide HIE standards.

E. Technical Operations

1. Separate Governing Structure (Possible Combination in Latter Stages)

   Recommendation: None of the researched HIE's due to lack of available information.

   MCHIE recommends a separate governing structure.

2. Governance and Technical Operations in Single Entity

   Recommendation: Delaware – DHIN

   Delaware has a single entity with both governing and technical operations responsibility.

   CRISP recommends having governance and technical operations in a single entity.

F. Accountability Mechanisms

According to the NCLS, there is not one single trend among HIE's today. However, most oversight is conducting through contracting. New York is looking into certification. EHNAC is most advanced in their certification requirements. JCAHO is also contemplating establishing HIE guidelines. One challenge for accreditation will be funding.

Recommendation: None of the researched HIE's due to lack of available information.

MCHIE addressed accountability mechanisms as follows. Utilizing a mix of contractual authority and the State's existing regulatory authority is likely to enhance the State's ability to oversee and protect the public's interests. As practical experience is gained through implementation, the State could, if necessary, create additional enforcement mechanisms through stronger regulations and/or accreditation.

1. Direct Oversight Through Contracts with Incentives and Penalties

   Recommendation: None of the researched HIE's due to lack of available information.

   MCHIE recommends that Maryland require all participants in statewide HIE abide by the policies, standards, and guidance developed for HIE. Compliance with the agreed-upon statewide policies should be established and enforced through contracts and other incentives for adherence.

2. Direct Oversight via Legislation

   Recommendation: Delaware – DHIN

   DHIN is an agent of the government and therefore their primary source of authority is legislation.

   MCHIE recommends that for oversight activities related to imposing penalties for breach or other actions harmful to consumers, Maryland state government should continue to exercise its regulatory oversight authorities.

3. Indirect Oversight via Voluntary Accreditation

   Recommendation: None of the researched HIE's due to lack of available information.

   MCHIE recommends that as some entities may forgo state funding and incentives and choose to develop HIE capabilities outside the statewide HIE governance framework, MCHIE recommends that the State government monitor HIE's conformance to statewide policies and assess the need for additional enforcement through accreditation and / or regulation.

G. Governance Board

1. Board of Directors' Composition

Recommendation: Colorado – CORhio

CORhio has a very diverse Board, including several non-profits, an attorney, private company representation, and providers.

CRISP references participation on the Board, highlighting several participants include government, hospitals and clinical laboratories. MCHIE mirrors AzHeC with representation including a broad range of stakeholders: Hospitals, providers, a clinic, a long-term facility, payers, a purchaser, the State Department of Health, a representative of county or local public health, a researcher, a health IT community, a consumer organization, state government representation, a quality organization, a pharmacy and one other representation (academician with expertise in public / private governance).

a. Governor's Office

Recommendation: None of the researched HIE's due to lack of available information.

b. State Medicaid Agencies

Recommendation: None of the researched HIE's due to lack of available information.

MCHIE recommends having the State Medicaid agency represented on the Board.

c. State Department of Health

Recommendation: Colorado – CORhio

CORhio has representation from the Department of Health and the Department of Health Care Policy and Public Financing on the Board.

CRISP and MCHIE both recommend having the State Department of Health on the Board.

d. State Healthcare and Hospital Association

Recommendation: Colorado – CORhio

CORhio has representation for the Colorado Hospital Association on the Board.

e. State Medical Association

Recommendation: Colorado – CORhio

CORhio has representation from the State Medical Association on the Board.

f. Other Non-Profits Involved in Medical Community

Recommendation: Colorado - CORhio

CORhio has representation from the Colorado Foundation for Medical Care and AHIMA on the Board.

MCHIE recommends this representation.

g. Government Agencies who may be a Stakeholder

Recommendation: Colorado - CORhio

CORhio has representation from the State of Colorado, Chief Information Officer on the Board.

CRISP and MCHIE recommend this representation.

h. Consumers

Recommendation: None of the researched HIE's due to lack of available information.

MCHIE recommends this representation.

i. Employers / Purchasers

Recommendation: None of the researched HIE's due to lack of available information.

MCHIE recommends this representation.

j. Insurers

Recommendation: Colorado – CORhio

CORhio has representation from three major insurers on the Board.

MCHIE recommends this representation.

k. Individual Health Care Providers (Physicians)

Recommendation: None of the researched HIE's due to lack of available information.

CRISP and MCHIE recommend this representation.

l. Hospitals

Recommendation: Colorado – CORhio

CORhio has the Children's Hospital on the Board.

CRISP and MCHIE recommend this representation.

m. Clinics

Recommendation: Colorado – CORhio

CORhio has representation from a clinic on the Board.

MCHIE recommends this representation.

n. Pharmacies

Recommendation: None of the researched HIE's due to lack of available information.

MCHIE recommends this representation.

o. Clinical Laboratories

Recommendation: None of the researched HIE's due to lack of available information.

CRISP recommends this representation.

p. Higher Education

Recommendation: None of the researched HIE's due to lack of available information.

MCHIE recommends this representation.

q. Quality Organizations

Recommendation: Colorado – CORhio

CORhio has representation from a Clinical Guidelines Quality organization on the Board.

MCHIE recommends this representation.

r. Local HIE's

Recommendation: None of the researched HIE's due to lack of available information.

MCHIE recommends having the local HIE's involved.

2. Responsibilities

   According to the State Level Health Information Exchange (SLHIE), HIE governance functions include convening and coordinating.

   Recommendation: None of the researched HIE's due to lack of specific available information.

   CRISP and MCHIE provided specific governance responsibilities.

   a. Maintain Vision, Strategy and Outcomes Metrics

      Recommendation: None of the researched HIE's due to lack of specific available information.

      CRISP and MCHIE both recommend the Board perform these tasks.

   b. Build Trust, Buy-In and Participation of Major Stakeholders Statewide

      Recommendation: None of the researched HIE's due to lack of specific available information.

      CRISP and MCHIE both recommend the Board perform these tasks.

   c. Assure Equitable and Ethical Approaches

      Recommendation: None of the researched HIE's due to lack of specific available information.

      CRISP references the Board assuring equitable and ethical approaches via strict bylaws.

   d. Develop High-Level Business and Technical Plans

      Recommendation: None of the researched HIE's due to lack of specific available information.

      CRISP and MCHIE address having the Board develop the standards for business and technical operation of the HIE.

   e. Approve Statewide Policies, Standards, Agreements

      Recommendation: None of the researched HIE's due to lack of specific available information.

      CRISP and MCHIE address having the Board approve and set statewide policies, standards and agreements.

f. Balance Interests and Resolve Disputes

Recommendation: None of the researched HIE's due to lack of specific available information.

CRISP addresses this by having the Board ensure that all compensation and bonus structures avoid incentives that encourage short-term action.

g. Raise, Receive, Manage and Distribute State, Federal and /or Private Funds

Recommendation: None of the researched HIE's due to lack of specific available information.

h. Prioritize and Foster Interoperability for Statewide and Sub-State Initiatives

Recommendation: None of the researched HIE's due to lack of specific available information.

i. Implement Statewide Projects and Facilitate Local /Sector Projects

Recommendation: None of the researched HIE's due to lack of specific available information.

CRISP recommends the Board have oversight to the implementation of a statewide HIE. MCHIE recommends individual HIE's be allowed to form under the guidance of the Board.

j. Identify and Overcome Obstacles

Recommendation: None of the researched HIE's due to lack of specific available information.

CRISP recommends that the Board be transparent. MCHIE indicates this is a function of the Board because they would have oversight.

k. Financial and Legal Accountability, Compliance and Risk Management

Recommendation: None of the researched HIE's due to lack of specific available information.

CRISP recommends the Board be responsible for formulating, overseeing and reporting on budgets for the HIE's.

l. Educate and Market

Recommendation: None of the researched HIE's due to lack of specific available information.

CRISP and MCHIE indicate the Board will perform education functions and market the HIE.

m. Facilitate Consumer Input

Recommendation: None of the researched HIE's due to lack of specific available information.

CRISP recommends the Board engage consumers to learn about concerns around health information exchange.

n. Determine Compensation for Staff

Recommendation: None of the researched HIE's due to lack of specific available information.

CRISP recommends the Board should determine staff compensation.

3. Committees

Recommendation: Wisconsin – WHIN

Wisconsin is at an early stage of HIE formation; Arizona is in a later stage. Both organizations have some consistencies, yet slight variations in their committee structures. In addition to the committees (workgroups) listed below, WHIN also has a separate governance workgroup and AzHeC has Membership, Health IT Adoption (e Prescribing) and Consumer Advocacy Committees.

MCHIE has recommended 3 working committees with consideration given to additional teams focused on cross-cutting issues (e.g., planning and assessment, communications, education and outreach, and sustainability).

a. Steering

Recommendation: None of the researched HIE's due to lack of specific available information.

b. Privacy and Security / Legal

Recommendation: Wisconsin – WHIN

Wisconsin was part of the national HISPC project and consequently established Variations and Legal Workgroups. Arizona has a Legal Committee and New York has a Privacy and Security Workgroup.

c. Clinical

Recommendation: Wisconsin – WHIN

Wisconsin has a Patient Care Information Support Workgroup that identifies ways for clinician information sharing, identifies strategies for electronic health information at point of care, designs strategies to promote the

adoption of EHR's and decision support systems, and ensures products and processes are responsive to consumer interests.

d. Technical / Standards

Recommendation: Wisconsin – WHIN

Wisconsin's Information Exchange Workgroup is responsible for developing and implementing a technical infrastructure that meets clinical care requirements, enhancing and facilitating use of patient care data for disease surveillance, etc., linking medical information to public health information and ensuring products and processes are responsive to consumer interests

e. Outreach and Education

Recommendation: Wisconsin – WHIN

Wisconsin has a Consumer Interests Workgroup that ensures initiatives are customer-focused and develops recommendations for serving consumer health information needs ensuring privacy and security.

f. Finance

Recommendation: Wisconsin – WHIN

The WHIN Financing Workgroup develops options for funding EHR's, develops options for aligning financial incentives for adopting and maintaining IT, and HIE.

H. Operational / Management Positions and Responsibilities

Recommendation: Based on limited data, Virginia – MedVirginia, Vermont – VITL

1. Management

Recommendation: Based on limited data, Virginia – MedVirginia, Vermont – VITL

The number and types of positions staffed are dependent upon numerous factors, including, but not limited to, business model, governance framework, architectural design, and implementation stage. In considering operational and management staffing, in addition to the aforementioned factors, any unique requirements of the State must be considered.

MedVirginia, a limited liability company, is actively marketing their services including "RHIO Lab" advisement services. Their management staff consists of a CEO, COO / CIO, Program Manager, Vice President of Marketing and Business, and Directors of IT, Operations and Finance.

VITL provides governance and technical operations for facilitating electronic health records and HIE in Vermont. VITL has an Executive Director.

CRISP specified an Executive Director in their two staffing models.

2. Staff

   Recommendation: Based on limited data, Virginia – MedVirginia, Vermont – VITL

   The number and types of positions staffed are dependent upon numerous factors, including, but not limited to, business model, governance framework, architectural design, and implementation stage. In considering operational and management staffing, in addition to the aforementioned factors, any unique requirements of the State must be considered.

   MedVirginia staff totals approximately 40 people.

   VITL provides governance and technical operations for facilitating electronic health records and HIE in Vermont. VITL's staff includes seven full-time and seven part-time resources to handle operations, marketing, etc. In addition, VITL leverages the resources of their HIT partner, GE, and consultative resources.

   CRISP proposed to potential staffing models: (1) Eight implementation resources (years one and two) and 15 permanent resources (year one and two only Executive Director with 7 permanent in year three, ten in year five and 15 in year six); (2) 20 imp resources for first two years and permanent staff begins at five and increases to full 15 in year three.

3. Responsibilities

   a. Execute Strategic, Business and Technical Plans

      Recommendation: None of the researched HIE's due to lack of specific available information.

      CRISP proposes that the staff be responsible for this function.

   b. Coordinate Day-to-Day Tasks and Deliverables

      Recommendation: None of the researched HIE's due to lack of specific available information.

      CRISP recommends that the staff coordinate these activities.

   c. Establish Contracts and Other Relationships with Local / Sectoral Initiatives

      Recommendation: None of the researched HIE's due to lack of specific available information.

d. Provide Industry Knowledge

Recommendation: None of the researched HIE's due to lack of specific available information.

e. Advise the Board

Recommendation: None of the researched HIE's due to lack of specific available information.

CRISP recommends that the staff would advise the Board.

Privacy and Security

A. Registration / Type of Registration

Recommendation Virginia – MedVirginia, Tennessee – MSeHA, Arizona – AMIE

MedVirginia is a registration authority with the ability to check credentials for a provider. MSeHA and AMIE have developed trusted relationships with the hospitals in the area. The provider registration is delegated to the hospitals under the terms of the participation agreement.

B. Authentication

1. Providers

Recommendation: Tennessee – MSeHA

MSeHA is using a login, password and pin, as well as a RSA token that the physician is responsible for carrying.

MCHIE recommends dual factor authentication. CRISP indicates single factor authentication.

2. Consumers

Recommendation: Kentucky – KHIE

Kentucky is using a unique user ID and password as well as a master patient index.

CRISP recommends further research on consumer authentication. MCHIE implies single factor authentication for consumers.

3. Public Health

Recommendation: Kentucky – KHIE

Kentucky is using a unique user ID and password as well as a master patient index.

MCHIE addresses public health authentication as single factor.

4. Other Institutions (Educational)

   Recommendation: Kentucky – KHIE

   Kentucky is using a unique user ID and password as well as a master patient index.

   MCHIE addresses other institutions as single factor authentication.

5. Non-licensed Providers in State

   Recommendation: None of the researched HIE's due to lack of specific available information.

6. Data Authentication (in and out of HIE)

   Recommendation: None of the researched HIE's due to lack of specific available information.

7. System Authentication (System Accessing HIE)

   Recommendation – Arizona – AMIE

   AMIE is using system authentication of the IP address where the data is coming from and which system is sending the data.

C. Identification

1. Use of Master Person Index to Provide Provider and Consumer Information

   Recommendation: KHIE – Kentucky, MedVirginia – MedVirginia, Vermont – VITL, Colorado – CORhio

   Each of the HIE's above is using a Master Person Index to facilitate the identification process for providers.

   CRISP references a Master Patient Index and MCHIE refers to a Master Person Index.

2. Public Health

   Recommendation: None of the researched HIE's due to lack of specific available information.

3. Other Institutions (educational)

   Recommendation: None of the researched HIE's due to lack of specific available information.

4. Non-licensed Providers in State

   Recommendation: None of the researched HIE's due to lack of specific available information.

5. Data Identification

   Recommendation: None of the researched HIE's due to lack of specific available information.

6. System Identification

   Recommendation: Kentucky – KHIE

   KHIE plans to have organization identification.

7. Credentialing of Health Care Providers

   Recommendation: Virginia – MedVirginia, Kentucky - KHIE

   MedVirginia is a registration authority with the ability to check credentials for a provider. KHIE is planning to have a credentialing service for identification. Kentucky also plans for cross-referencing the identification to the Master Person Index.

D. Audit

1. What is Audited

   Recommendation: Kentucky – KHIE, Arizona – AMIE, Virginia – MedVirginia, Vermont – VITL

   All HIE's listed above require an audit trail of all transactions, including date, and data accessed. KHIE will require that the module accessed be also on the audit log.

   CRISP recommends random auditing and trigger based auditing events for records such as VIP access. MCHIE recommends a robust auditing software program.

2. Who Audits

   Recommendation: Kentucky – KHIE, Arizona – AMIE, Virginia – MedVirginia, Vermont – VITL

   All HIE's review the audit activity, except KHIE who has the vendor ASP performs the audit.

CRISP and MCHIE imply that the HIE would conduct the audits.

3. How Often

   Recommendation: Arizona – AMIE

   AMIE reviews audit logs on a weekly basis.

   CRISP recommends random audits and triggered audits for specific events.

4. External Audit Requirements (Including Consumer Audit Requirements)

   Recommendation: Vermont – VITL

   VITL models their external audits from the OTR guidance. HIPAA security rules are also followed.

   CRISP recommends an external audit.

E. Authorization (To See What Data)

1. Providers

   Recommendation: Tennessee – MSeHA, Arizona – AMIE

   MSeHA authorizes providers at each location they need to login to. AMIE providers are authorized via the trusted relationship with the data partners.

   CRISP addressed authorization allowing providers to view and save data. MCHIE addresses authorization in very general terms.

2. Consumers

   Recommendation: Kentucky – KHIE

   KHIE is planning to have consumers assign authorization to providers that are allowed to see their data.

3. Public Health

   Recommendation: None of the researched HIE's due to lack of specific available information.

4. Other Institutions (Educational)

   Recommendation: None of the researched HIE's due to lack of specific available information.

5. Non-licensed Providers in State

   Recommendation: None of the researched HIE's due to lack of specific available information.

6. Data Authorization

   Recommendation: Arizona – AMIE

   Data is authorized to the RLS when requested by a provider.

7. System Authorization

   Recommendation: Arizona – AMIE

   Systems are authorized by AMIE and the data partners.

F. Access (Role Based Using HL7 Standards)

1. Who Can Access What Data

   Recommendation: Kentucky – KHIE

   KHIE recommends a plan for role-based access using the HL7 RBAC.

   CRISP and MCHIE recommend consumer controlled access to data. CRISP recommends role based access. MCHIE does not address this.

2. Who Can Change and / or Update Data

   Recommendation: None of the researched HIE's due to lack of specific available information.

   CRISP recommends that providers can view, contribute to and save data for treatment purposes.

3. Sensitive Specially Protected Health Info – Substance Abuse, HIV, / SIDS, Genetic, etc.

   Recommendation: Virginia – MedVirginia

   The electronic chart contains a symbol that indicates there is sensitive PHI in the chart and in a "break the glass" scenario, the provider can click on the symbol and get the information.

   CRISP and MCHIE recommend data filtering for specially protected health information.

G. Consent Framework / Type of Consent

   Recommendation: Vermont – VITL

VITL uses an opt-in model for exchange of information. (As a side note, the HIPSC Consumer Collaborative has excellent use case document of the different types of consent that can be used to facilitate decision-making.)

CRISP recommends an Opt-Out consent policy, allowing PHI into the exchange but not viewable if the patient opts out. MCHIE recommends affirmative consent (opt-in) before a patients records can be accessed.

H. Legal Agreements

1. Master Participation Agreements

Recommendation: Arizona – AMIE

AMIE has an extensive Master Participation agreement for organization joining as data partners. This has been negotiated and reworked with several large hospitals in Arizona.

CRISP recommends a base terms and conditions agreement that can be amended depending on the data provider and the system users. MCHIE recommends a common, single agreement for all entities to use.

2. Use Agreements

Recommendation: Virginia – MedVirginia

MedVirginia has a use agreement that the provider agrees to access only the patient data with which they have an established relationship.

CRISP recommends having an appropriate use agreement.

3. Business Associate Agreements

Recommendation: Virginia – MedVirginia

MedVirginia has a business associate agreement in place.

CRISP recommends "transitive trust" be used for providers.

I. Policies and Procedures

1. Authentication

Recommendation: Virginia – MedVirginia, Vermont -VITL, Arizona – AMIE

All three HIE's listed above have policies in place for authentication.

CRISP and MCHIE address the need for policies. CRISP doesn't address how to get the policy completed. MCHIE recommends a security workgroup be established to define policy.

2. Audit

   Recommendation: Virginia – MedVirginia, Vermont -VITL, Arizona – AMIE

   All three HIE's listed above have policies in place for audit.

   CRISP and MCHIE address the need for policies. CRISP doesn't address how to get the policy completed. MCHIE recommends a security workgroup be established to define policy.

3. Authorization

   Recommendation: Virginia – MedVirginia, Vermont -VITL, Arizona – AMIE

   All three HIE's listed above have policies in place for authorization.

   CRISP and MCHIE address the need for policies. CRISP doesn't address how to get the policy completed. MCHIE recommends a security workgroup be established to define policy.

4. Access

   Recommendation: Virginia – MedVirginia, Vermont -VITL, Arizona – AMIE

   All three HIE's listed above have policies in place for access.

   CRISP and MCHIE address the need for policies. CRISP doesn't address how to get the policy completed. MCHIE recommends a security workgroup be established to define policy.

5. Consent

   Recommendation: Virginia – MedVirginia, Vermont –VITL

   MedVirginia only documents consent as required by HIPAA although they are reevaluating this. Vermont has a documented Opt-in consent policy.

   CRISP and MCHIE address the need for policies. CRISP doesn't address how to get the policy completed. MCHIE recommends a security workgroup be established to define policy.

6. Break the Glass

   Virginia – MedVirginia, Vermont –VITL

   Both HIE's listed above have a policy in place for "break the glass".

   CRISP addresses break the glass functionality that would be monitored and the actions would be evaluated.

7. Policies Governing Patient Authorization for Data Sharing as in Health Record Bank

   Recommendation: Kentucky – KHIE

   Kentucky plans documented support for patient authorization for data sharing.

   CRISP address this for consumers to augment and annotate data in the HRB.

J. Legal Issues

1. HIPAA Considerations

   Recommendation: ALL HIE's researched

   All HIE's are following the HIPAA regulations.

   CRISP and MCHIE recommend following the HIPAA guidelines.

2. MDCMRA

   Recommendation: None of the researched HIE's due to lack of specific available information.

   CRISP has considered this in their planning effort. MCHIE addresses it just from a legal perspective.

Stakeholder Outreach and Education

A. Consumers

Recommendation: None of the researched HIE's due to lack of specific available information.

CRISP addresses consumer outreach and education including what should be communicated and how to best communicate it to the "community" via brand and one-to-one marketing. MCHIE also addresses having consumer outreach.

1. Under-served

   Recommendation: None of the researched HIE's due to lack of specific available information.

   Both CRISP and MCHIE addressed the importance of outreach and education to the under-served consumer population through their "C0mmunity Interaction and Privacy and Security Workgroup" and "Community Leadership Team" respectively. Both CRISP and MCHIE worked with The Summit Health Institute for Research and Education, Inc. (SHIRE), a nonprofit organization promoting of

health and wellness for all people by working to eradicate health disparities and aid vulnerable populations in attaining optimal health.

B. Providers

Recommendation: Arizona – AMIE

AMIE did significant provider outreach while designing the HIE in order to educate providers about e-health. They continue to have a physician user monthly meeting to provide input about the system and possible improvements / issues. They found that by meeting in the evening they were able to get good participation.

Both CRISP and MCHIE address outreach and education to the providers.

C. Public Health

Recommendation: None of the researched HIE's due to lack of specific available information.

D. Government Agencies

Recommendation: None of the researched HIE's due to lack of specific available information.

E. Non-profits

Recommendation: None of the researched HIE's due to lack of specific available information.

Detail Design / Care Delivery (Implementation Sequencing and Phasing)

A. Data Partners

Data Partners (data senders and data receivers) will be directly related to the data exchange requirements established in implementation phasing with the data exchange requirements directly related to the value and benefit to stakeholders.

In addition to the information detailed below, CRISP and MCHIE recommend Pharmacy Benefit Managers (PBMs) and Radiology Centers as additional initial participants.

1. Hospitals

Recommendation: Delaware – DHIN, West Virginia – WVHIN, Virginia – MedVirginia, Tennessee – MSeHA, Ohio – HealthBridge, and Colorado - CORhio.

All HIE's identified above have identified hospitals as data partners during the first phase of their implementation (again based on first phase use cases).

CRISP provides summary information regarding initial HIE participants, which include hospitals. MCHIE's participants are implied via other sections of their planning report (e.g. Recommended use case implementation).

2. Laboratories

   Recommendation: Based on limited data, Delaware – DHIN

   The HIE identified above has identified laboratories as data partners during the first phase of their implementation (again based on first phase use cases).

   CRISP provides summary information regarding initial HIE participants, which include laboratories. MCHIE's participants are implied via other sections of their planning report (e.g. Recommended use case implementation).

3. Clinics

   Recommendation: Based on limited data, Tennessee – MSeHA

   The HIE identified above has identified ambulatory clinics (15) as data partners during the first phase of their implementation (again based on first phase use cases).

   CRISP provides summary information regarding initial HIE participants, which include clinics. MCHIE's participants are implied via other sections of their planning report (e.g. Recommended use case implementation).

4. Pharmacies

   Recommendation: None of the researched HIE's due to lack of specific available information.

   CRISP and MCHIE assume pharmacy inclusion in the operational HIE. MCHIE more specifically via their use case analysis (medication management) identifies pharmacies and PBMs as initial participants. CRISP identifies PBMs only for the purpose of medication history delivery.

5. Individual Physician Practices

   Recommendation: Delaware – DHIN, West Virginia-WVHIN, Virginia – MedVirginia, Tennessee – MSeHA, Ohio – HealthBridge, Colorado - CORhio

   All HIE's identified above have identified physicians as data partners during the first phase of their implementation (again based on first phase use cases).

CRISP provides summary information regarding initial HIE participants, which include physicians. MCHIE's participants are implied via other sections of the planning report (e.g. Recommended use case implementation).

6. Nursing Homes

   Recommendation: None of the researched HIE's due to lack of specific available information.

   CRISP provides summary information regarding HIE participants, which include skilled nursing facilities. MCHIE's participants are implied via other sections of their planning report (e.g. Recommended use case implementation).

7. State Health Agencies

   Recommendation: Ohio – HealthBridge

   The HIE identified above has identified state health agencies as data partners during the first phase of their implementation (again based on first phase use cases).

   CRISP provides summary information regarding HIE participants, which include public health agencies. MCHIE's participants are implied via other sections of their planning report (e.g. Recommended use case implementation).

8. Quality Organizations

   Recommendation: None of the researched HIE's due to lack of specific available information.

   CRISP provides summary information regarding quality or safety performance A&R as a subsequent HIE "service". MCHIE's participants are implied via other sections of their planning report (e.g. Recommended use case implementation).

9. Medicare

   Recommendation: None of the researched HIE's due to lack of specific available information.

   CRISP identifies CMS/Medicare as a later HIE participant. MCHIE's participants are implied via other sections of their planning report (e.g. Recommended use case implementation).

10. Medicaid

    Recommendation: None of the researched HIE's due to lack of specific available information.

CRISP identifies State Medicaid as a later HIE participant. MCHIE's participants are implied via other sections of their planning report (e.g. Recommended use case implementation).

11. Insurers

    Recommendation: Delaware – DHIN, Tennessee – MSeHA, Colorado - CORhio

    All HIE's identified above have identified insurers as data partners during the first phase of their implementation (again based on first phase use cases). Note that insurers in MSeHA provide data but cannot view data.

    CRISP identifies health plans as a later HIE participant. MCHIE's participants are implied via other sections of their planning report (e.g. Recommended use case implementation).

B. Data Exchange Requirements (Use Case Analysis to Determine Actors, Information Needed and How to Provide)

CRISP identified data exchange requirements based on individual use cases that are driven by clinical value and that allow for near-term progress while planning for long-term success. CRISP is advocating an incremental strategy.

MCHIE also identified data exchange requirements based on "priority use cases". Both MCHIE's Finance and Technical teams identified use cases with the overall selection based on clinical value, efficiency improvements, the ability to identify discrete transactions for possible future fee assessment and the ease with which the data will integrate with existing workflows.

1. Medication History and Reconciliation

   Recommendation: Colorado – CORhio, Arizona – AMIE, Vermont – VITL, West-Virginia – WVHIN, Kentucky – KHIE, Wisconsin – WHIE

   Medication history and reconciliation is a top priority in terms of data exchange as evidenced by both operational HIE's and those in earlier stages (e.g. implementation planning). More specifically, Colorado, Arizona, and Vermont are exchanging medication history. West Virginia has it slated for their 2nd phase (RFP in development). Kentucky is planning for it (based on their recent RFP). In Wisconsin, their RFP asks the implementer to identify high-priority use cases, however, the Wisconsin eHealth Action Plan has a stated goal for the HIE to focus on real-time information for hospital emergency rooms, results delivery and medication lists.

   CRISP and MCHIE identified medication history and reconciliation as data to be exchanged during the first phase of implementation.

   a. E-Prescribing and Prescription Histories

Recommendation: Colorado – CORhio, Virginia – MedVirginia, West-Virginia – WVHIN, Kentucky – KHIE

E-prescribing and prescriptions histories are priorities in terms of data exchange as evidenced by both operational HIE's and those in earlier stages (e.g. implementation planning). More specifically, Colorado is exchanging this data. Virginia has e-prescribing but waiting on interfaces. West Virginia has it slated for their 2nd phase (RFP in development). Kentucky is planning for it (based on their recent RFP).

CRISP and MCHIE reference the need for e-prescribing.

2. Laboratory Results

Recommendation: Colorado – CORhio, Tennessee – MSeHA, Virginia – MedVirginia, Ohio – HealthBridge, Arizona – AMIE, Vermont – VITL, West Virginia – WVHIN, Kentucky – KHIE, Wisconsin - WHIE

Laboratory resulting is a top priority in terms of data exchange as evidenced by both operational HIE's and those in earlier stages (e.g. implementation planning). More specifically, Colorado, Tennessee, Virginia, Ohio, Arizona, and Vermont are exchanging lab results. West Virginia has it slated for their 1st phase (RFP in development). Kentucky is planning for it (based on their recent RFP). Wisconsin's eHealth Action Plan identified lab results delivery as one of the highest priority information types for inclusion in HIE and has entitled their project "Planning and Feasibility Testing of a Regional Laboratory Results Reporting System to Support Clinical Care and Public Health Processes Using the WHIE (The Lab Results Project)".

CRISP and MCHIE identified laboratory results (diagnostic results reporting) as data to be exchanged during the first phase of implementation. CRISP also specified the exchange of a historical results list.

3. Radiology Results

Recommendation: Colorado – CORhio, Tennessee – MSeHA, Virginia – MedVirginia, Ohio – HealthBridge, West Virginia – WVHIN, Kentucky – KHIE, Wisconsin – WHIE

Radiology resulting is a priority (in some cases more of a secondary priority to laboratory resulting) in terms of data exchange as evidenced by both operational HIE's and those in earlier stages (e.g. implementation planning). More specifically, Colorado, Tennessee, Virginia and Ohio are exchanging radiology results. Note that Tennessee is only exchanging chest x-rays. West Virginia has it slated for their 1st phase (RFP in development). Kentucky is planning for it (based on their recent RFP). In Wisconsin, their RFP asks the implementer to identify high-priority use cases, however, the Wisconsin eHealth Action Plan has

a stated goal for the HIE to focus on real-time information for hospital emergency rooms, results delivery and medication lists.

CRISP and MCHIE identified radiology results (diagnostic results reporting) as data to be exchanged during the first phase of implementation. CRISP also specified the exchange of a historical results list.

4. Radiology Images

   Recommendation: Colorado – CORhio, Tennessee – MSeHA, Virginia – MedVirginia, Ohio – HealthBridge, West Virginia – WVHIN, Kentucky – KHIE

   Exchanging radiology images is a priority (in some cases more of a secondary priority to laboratory resulting) in terms of data exchange as evidenced by both operational HIE's and those in earlier stages (e.g. implementation planning). More specifically, Colorado, Tennessee, Virginia, and Ohio are exchanging radiology results. Note that Tennessee is only exchanging chest x-rays. West Virginia has it slated for their 1st phase (RFP in development). Kentucky is planning for it (based on their recent RFP).

   CRISP supports exchange of radiology images during the initial implementation phase. MCHIE's Finance Team does not support this. MCHIE's Technical team references PACS interfaces without specific reference to radiology image exchange.

5. Inpatient Episodes

   Recommendation: Tennessee – MSeHA

   Tennessee is exchanging inpatient encounter data.

   CRISP references the exchange of "chart summaries" during the initial phase of implementation. MCHIE is implies the exchange of chart summaries (identified under the "transfer of care" use case) during the 2nd phase of implementation.

6. Dictation / Transcription

   Recommendation: Tennessee – MSeHA, Ohio – HealthBridge

   MSeHA and HealthBridge are exchanging dictated / transcribed reports.

7. Pathology

   Recommendation: Tennessee – MSeHA, Ohio – HealthBridge

   MSeHA is exchanging microbiology reports only while HealthBridge is exchanging microbiology and pathology reports.

8. Cardiology

   Recommendation: Ohio – HealthBridge

   HealthBridge is exchanging cardiology reports.

9. GI

   Recommendation: None of the researched HIE's due to lack of specific available information.

10. Pulmonary

    Recommendation: None of the researched HIE's due to lack of specific available information.

11. Claims

    Recommendation: None of the researched HIE's due to lack of specific available information.

12. Enrollment / Eligibility

    Recommendation: Ohio – HealthBridge, Kentucky – KHIE

    HealthBridge verifies insurance eligibility, checks the status of claims, and submits referral requests. Kentucky is planning for it (based on their recent RFP).

13. Hospital Discharge Summary

    Recommendation: Arizona – AMIE, Tennessee – MSeHA, Ohio – HealthBridge

    AMIE, MSeHA and HealthBridge are exchanging hospital discharge summary reports.

    CRISP is recommending the exchange of discharge summaries during the 1st phase of implementation. MCHIE is recommending the exchange of discharge summaries (identified under the "transfer of care" use case) during the 2nd phase of implementation.

14. Emergency Room Reports

    Recommendation: Colorado – CORhio, Wisconsin - WHIE

    Colorado uses a point of care system inquiry system that allows 500 Emergency Department physicians to use the Record Locator Service. The "ED Linking" project in Wisconsin is to design and implement a secure, rapid-response HIE system that provides Milwaukee County emergency room clinicians with on-site, on-demand patient medical history for use in treatment. When fully operational

in early 2009, the HIE system, will mark the launch of the state's first scalable Regional Health Information Network (RHIN).

CRISP identifies discharge summaries, clinical summaries, medication histories, and results. MCHIE references via their use case analyses.

15. Immunization

    Recommendation: Kentucky – KHIE, Wisconsin – KHIE

    Kentucky has just issued their implementation RFP and Wisconsin issued theirs late 2008. Both RFPs have stated plans for exchanging immunization data. Wisconsin already has an immunization registry; the Wisconsin Immunization Registry (WIR) is a computerized Internet database application that was developed to record and track immunization dates of Wisconsin's children and adults.

    CRISP identifies "immunization, medication, or device registry" as a service considered in a subsequent implementation phase. MCHIE's implies the exchange of immunization data via other sections of their planning report (e.g. Recommended use case implementation).

16. Bioterrorism Alerts

    Recommendation: Kentucky – KHIE

    Kentucky is planning for bioterrorism alerts as identified in their recent RFP.

    CRISP implies bioterrorism alerts as a service considered in a subsequent implementation phase. MCHIE implies bioterrorism alerts within the Public Health Use Case identified in Phase 2 of implementation.

17. Ambulatory Health Record

    Recommendation: Tennessee – MSeHA, Ohio – HealthBridge, Vermont – VITL

    The above referenced HIE's solicit functional aspects of an ambulatory heath record. Tennessee is in the process of implementing an ambulatory health record. Within the Ohio HIE, ambulatory order entry allows hospitals to receive lab orders from physician offices. VITL is hosting an electronic health record for physicians, they chose from five systems selected using CCHIT requirements.

    CRISP references a clinical inquiry portal as an entry way to an entry level ambulatory health record. CRISP has identified chart summaries (not specified as strictly ambulatory) as a high priority data exchange requirement. MCHIE implies ambulatory health record exchange within the Transfer of Care Use Case identified for Phase 2 of implementation.

18. Medical Alerts

    Recommendation: Ohio – HealthBridge, Kentucky – KHIE

    Medical Alerts have been identified as a data exchange requirement as evidenced by both operational HIE's and those in earlier stages (e.g. implementation planning). HealthBridge provides electronic disease reporting and public health alerts. Kentucky has identified medical alerts as a data exchange requirement in their RFP.

    CRISP implies medical alerts as a service considered in a subsequent implementation phase. MCHIE implies medical alerts within the Public Health Use Case identified in Phase 2 of implementation.

19. Demographics

    Recommendation: Tennessee – MSeHA, Wisconsin – WHIE, Kentucky – KHIE

    Demographics has been identified as a data exchange requirement as evidenced by both operational HIE's and those in earlier stages (e.g. implementation planning). Tennessee is currently exchanging demographic information. Wisconsin and Kentucky are planning for it (based on their recent RFP's).

    CRISP and MCHIE imply the ability to exchange patient demographic data via architectural models proposed, IHE integration profiles, etc.

20. Patient Reported Data

    Recommendation: None of the researched HIE's due to lack of specific available information.

    CRISP has identified chart summaries (possibly via HRB) as a high priority data exchange requirement and references HRBs throughout their planning report. MCHIE also references HRBs throughout their report and implies patient reported data within the Consumer Empowerment Use Case identified for Phase 3 of implementation.

C. Application Functionality

1. Clinical Messaging

    Recommendation: Virginia – MedVirginia, Vermont – VITL, West Virginia – WVHIN

    MedVirginia offers a "Provider by Solution" where it messages those providers in the network. VITL has results messaging on a secure FTP point-to-point network, which is their private network. The messaging is an interface structured standard document for physicians and custom to the physician code set. WVHIN

has clinical messaging for providers and public health designated for Phase 1 implementation (there is a pilot in two communities which is still being defined).

CRISP recommended 1st phase includes secure messaging services. MCHIE's Technical Team identifies "messaging" as part of Phase 1 implementation along with security and presentation services.

2. Continuity of Care Records (CCD)

   Recommendation: Ohio – HealthBridge, West Virginia – WVHIN

   HealthBridge's plans include CCD exchange along with community wide CDR, advanced administrative functions and advanced population health and research capabilities. West Virginia has identified this as part of their 2nd phase.

   CRISP identified CCD version C32 as a foundational standard for data architecture but with appropriate restraints. MCHIE references it within the Transfer of Care Use Case identified for Phase 2 of implementation.

3. Longitudinal Health Records

   Recommendation: West Virginia – WVHIN

   West Virginia has identified this as part of their 3rd phase.

4. Insurance Eligibility

   Recommendation: Ohio – HealthBridge

   HealthBridge's plans include web-based eligibility.

   CRISP references insurance eligibility checking as another service that may be considered during Phase 1 implementation.

5. Health Services Research / Public Health

   Recommendation: Ohio – HealthBridge, Kentucky – HIE, Wisconsin – WHIE

   HealthBridge's plans include advance population health and research capabilities exchange. Kentucky and Wisconsin are planning for it (based on their recent RFP's).

   CRISP references public health reporting as a service considered in a subsequent implementation phase. MCHIE references research and public health within the Public Health Use Case identified for Phase 2 of implementation.

6. Master Person Index

   Recommendation: Virginia – MedVirginia, Colorado, CORhio, Kentucky – KHIE, Wisconsin – WHIE

Operational HIE's, MedVirginia and CORhio, both have a Master Person Index (CORhio uses NOVO). KHIE uses a credentialing service for this function. Wisconsin is planning for one.

CRISP and MCHIE both address MPI's in their respective architectures. CRISP envisions the MPI hosted by the exchange with basic personal information transmitted, captured, and stored. The MPI and a registry of the location of electronic health records are central functions, but do not constitute a centralized record, but rather key information to allow records to be identified and located throughout the distributed system. MCHIE's Technical Team incorporates the MPI within Phase 1 implementation along with messaging and exchange services (specific costs associated).

7. Record Locator Service

   Recommendation: Arizona – AMIE, Colorado - CORhio

   Arizona and Colorado have record locator services. Arizona uses MASS Share open source.

   CRISP envisions a MPI hosted by the exchange with basic personal information transmitted, captured, and stored. The MPI and a RLS of electronic health records are central functions, but do not constitute a centralized record, but rather key information to allow records to be identified and located throughout the distributed system. MCHIE's Technical Team incorporates the RLS within Phase 1 implementation along with messaging and exchange services (specific costs associated).

8. Health Record Banking

   Recommendation: Virginia – MedVirginia, Ohio – HealthBridge, Kentucky - KHIE

   MedVirginia is looking at PHR. HealthBridge is currently exploring with employers personal health record integration from health record banks. Kentucky is planning for HRB's. Note that Vermont has reviewed PHR's but is waiting for the Markle Foundation document on this.

   CRISP envisions HRB's as networked consumer access points; not tied directly to a particular source, but nodes on the exchange. MCHIE does not specify how HRB's would be incorporated but references a model contemplated in Washington State.

9. Disease Management Tools

   Recommendation: Ohio – HealthBridge, Kentucky - KHIE

HealthBridge's plans include electronic disease reporting and public health alerts; diabetes disease registry planned for beginning with 11 physician practices. Kentucky is planning for this as evidenced in their RFP.

CRISP identifies "disease management registry" as a service considered in a subsequent implementation phase. MCHIE references disease management within the Consumer Empowerment Use Case identified for Phase 3 of implementation.

D. System Architecture

1. Interfaces

Recommendation: Arizona – AMIE, Ohio – HealthBridge, Virginia – MedVirginia, Vermont – VITL

All aforementioned HIE's have put forth concerted effort in planning for interfaces. VITL has drawn a distinction between standards for exchanging data and the internal standards a data partner may have. MedVirginia is planning interfaces to EMR systems.

CRISP and MCHIE both address the interfaces in the financial and technical sections.

2. Central Repository / Federated Model

Recommendation: Vermont – VITL, Virginia – MedVirginia, Kentucky – KHIE, West Virginia – WVHIN

Vermont uses a combination of a central repository and a RLS. Virginia's uses a central repository (viewer only but no patient viewing) with anticipated feed in to PHR later. Kentucky uses a central system where data might be stored and a distributed system, which includes more than one, HIE, insurance companies, e-prescribing repositories, etc. West Virginia is planning a federated model for their 2nd phase (ASP model).

CRISP has identified that a core concept be that all patient information should remain within the organizational and technical boundaries of the entities that created it. MCHIE recommends a central repository and a federated model where appropriate.

3. Record Locator / Edge Servers

Recommendation: Vermont – VITL, Arizona – AMIE, Colorado – CORhio, Kentucky – KHIE

VITL uses a registry, which is similar to a RLS HITSP compliant, and the data is self-contained. AMIE has edge servers installed at the data partner locations but

are maintained by the AMIE staff. CORhio is using a RLS. Kentucky is planning for this.

CRISP architecture is such that each node on the exchange will store data locally in their own edge device. Metadata will be stored in centralized document registry. MCHIE has a record locator service in the use case diagrams and in the cost modeling in technical requirements.

4. Hybrid Model

   Recommendation: Kentucky – KHIE

   KHIE uses a hybrid model; the data remains in the same location as the source system.

   CRISP has recommended a hybrid, distributed approach to the technology infrastructure. MCHIE recommends a hybrid approach which would be a federated model with a central provider registry and a central master person index.

5. Master Person Index

   Recommendation: Virginia – MedVirginia, Colorado, CORhio, Kentucky – KHIE, Wisconsin – WHIE

   Operational HIE's, MedVirginia and CORhio, both have a Master Person Index (CORhio uses NOVO). KHIE uses a credentialing service for this function. Wisconsin is planning for one.

   CRISP and MCHIE both address MPI's in their respective architectures. CRISP envisions the MPI hosted by the exchange with basic personal information transmitted, captured, and stored. The MPI and a registry of the location of electronic health records are central functions, but do not constitute a centralized record, but rather key information to allow records to be identified and located throughout the distributed system.

6. Health Record Bank with Opt-in

   Recommendation: Virginia – MedVirginia, Ohio – HealthBridge, Kentucky - KHIE

   MedVirginia is looking at PHR. HealthBridge is currently exploring with employers personal health record integration from health record banks. Kentucky is planning for HRB's. Note that Vermont has reviewed PHR's but is waiting for the Markle Foundation document on this.

   CRISP envisions HRB's as networked consumer access points; not tied directly to a particular source, but nodes on the exchange. CRISP recommends a HRB with

Opt-Out for the consumer. MCHIE addresses the HRB model as a technical consideration but does not make a recommendation.

7. Service Oriented Architecture

   Recommendation: None of the researched HIE's due to lack of available information.

   CRISP has identified SOA as a coding standard. MCHIE has identified an additional principle regarding Service Oriented Architecture. More specifically, "The statewide HIE should be designed using a Service Oriented Architecture approach".

8. Web-based Application

   Recommendation: Ohio – HealthBridge, Virginia – MedVirginia, Arizona – AMIE

   All three HIE's use web-based applications.

   CRISP has stated that "Any successful exchange solution should include at minimum a provider portal for web-based access into records and would preferably include a pathway for practices to move from an inquiry portal to a minimal-functioning EMR to a fully-functional, integrated EMR". MCHIE refers to a web portal for presentation to the clinician.

9. Auditing

   Recommendation: Based on limited data, Arizona – AMIE

   AMIE has custom auditing applications.

   CRISP refers to "robust auditing" in the privacy and security section. MCHIE has shown an audit layer in the architecture design.

10. Security Applications

    Recommendation: Based on limited data, Arizona – AMIE

    AMIE has custom security applications.

    CRISP implies that they will have security applications. MCHIE has a layer of security applications in the technical architecture.

E. Analytics / Reporting

   Recommendation: Wisconsin – WHIE

The Wisconsin Health Information Organization was founded in 2005. They currently have a data aggregation, analysis and reporting project (improve quality, efficiency, etc.). It is a central repository.

CRISP and MCHIE infer analytics / reporting capabilities inherent in the exchange.

F. Standards

1. Message and Document Formats (HL7)

   Recommendation: Arizona – AMIE, Virginia – MedVirginia

   AMIE and MedVirginia use HL7 standards for message and document formats.

   CRISP and MCHIE reference the necessity of standards. CRISP provides detailed coding standards.

2. Clinical Terminology

   Recommendation: Arizona – AMIE

   AMIE has standards for clinical terminology.

   CRISP and MCHIE address this as it relates to semantic interoperability which is focused on medical terminology.

3. CCHIT and EHNAC for Certification

   Recommendation: Vermont – VITL, Kentucky – KHIE, Wisconsin – WHIE, West Virginia - WVHIN

   VITL provides an ambulatory care system solution. These products must be CCHIT certified. All systems connected to the KHIE must be CCHIT certified. The WHIE RFP specifies conformance to CCHIT certification. Products used in the WVHIN must be CCHIT certified.

   CRISP addresses CCHIT as it relates to the CCD they are recommending. MCHIE references CCHIT in the appendix.

4. HITSP

   Recommendation: Arizona – AMIE, Wisconsin – WHIE

   Arizona conforms to HITSP standards where applicable. The WHIE RFP specifies conformance to HITSP standards.

   CRISP addresses HITSP as a standard to be followed throughout HIE development and implementation. MCHIE addresses HITSP throughout the use case analysis.

5. ASTM

   Recommendation: Vermont – VITL

   Vermont conforms to ASTM standards.

   CRISP addresses the ASTM standards as it relates to interoperability and the CCD.

6. NIST e-Authentication

   Recommendation: West Virginia – WVHIN

   NIST standards apply for WVHIN.

7. IHE

   Recommendation: Wisconsin – WHIE

   Wisconsin specifies in their RFP that technical architectures must align with IHE technical frameworks.

   CRISP discusses IHE as it relates to the implementation approach and guidelines for interoperability. MCHIE refers to IHE in relation to the sizing of the record locator service.

Implementation / Project Management

A. Gap Analysis of Current Technologies

   Recommendation: Wisconsin – WHIE, Kentucky – KHIE

   Wisconsin's RFP statement of work required several tasks related to assessing stakeholders' and statewide public and private technical environments. KHIE's RFP calls for system analysis and the identification of barriers.

B. Team Selection

   Recommendation: Arizona – AMIE, Virginia – MedVirginia, Tennessee – MSeHA, Kentucky – KHIE

   This function is in place in Arizona. MedVirginia performs this function in-house even though hosting at Wellogic. This function is performed by Vanderbilt University for MSeHA. Function planned for in KHIE RFP.

C. Detail Schedule

   Recommendation: Arizona – AMIE, Virginia – MedVirginia, Tennessee – MSeHA, Kentucky – KHIE

This function is in place in Arizona. MedVirginia performs this function in-house even though hosting at Wellogic. This function is performed by Vanderbilt University for MSeHA. Function planned for in KHIE RFP.

D. Task Development

Recommendation: Arizona – AMIE, Virginia – MedVirginia, Tennessee – MSeHA, Kentucky – KHIE

This function is in place in Arizona. MedVirginia performs this function in-house even though hosting at Wellogic. This function is performed by Vanderbilt University for MSeHA. Function planned for in KHIE RFP.

E. Hardware Infrastructure

Recommendation: Arizona – AMIE, Virginia – MedVirginia, Tennessee – MSeHA, Kentucky – KHIE

This function is in place in Arizona. MedVirginia performs this function in-house even though hosting at Wellogic. This function is performed by Vanderbilt University for MSeHA. Function planned for in KHIE RFP.

F. Software Solution Development

Recommendation: Arizona – AMIE, Virginia – MedVirginia, Tennessee – MSeHA, Kentucky – KHIE

This function is in place in Arizona. MedVirginia performs this function in-house even though hosting at Wellogic. This function is performed by Vanderbilt University for MSeHA. Function planned for in KHIE RFP.

G. Interface Analysis

Recommendation: Arizona – AMIE, Virginia – MedVirginia, Tennessee – MSeHA, Kentucky – KHIE

This function is in place in Arizona. MedVirginia performs this function in-house even though hosting at Wellogic. This function is performed by Vanderbilt University for MSeHA. Function planned for in KHIE RFP.

H. Interface Development

Recommendation: Arizona – AMIE, Virginia – MedVirginia, Tennessee – MSeHA, Kentucky – KHIE

This function is in place in Arizona. MedVirginia performs this function in-house even though hosting at Wellogic. This function is performed by Vanderbilt University for MSeHA. Function planned for in KHIE RFP.

I. Agreement Negotiation

Recommendation: Arizona – AMIE, Virginia – MedVirginia, Tennessee – MSeHA, Kentucky – KHIE

This function is in place in Arizona. MedVirginia performs this function in-house even though hosting at Wellogic. This function is performed by Vanderbilt University for MSeHA. Function planned for in KHIE RFP.

J. Solution Testing

Recommendation: Arizona – AMIE, Virginia – MedVirginia, Tennessee – MSeHA, Kentucky – KHIE

This function is in place in Arizona. MedVirginia performs this function in-house even though hosting at Wellogic. This function is performed by Vanderbilt University for MSeHA. Function planned for in KHIE RFP.

Maintenance / Operations Processes (Support Functions)

A. Staffing

Recommendation: Arizona – AMIE, Virginia – MedVirginia, Kentucky – KHIE

This function is in place in Arizona. MedVirginia's support is provided by Wellogic. Their plan is to move the database and support in house and continue to have Wellogic work on the application. Function planned for in KHIE RFP.

B. Support Services

Recommendation: Arizona – AMIE, Virginia – MedVirginia, Kentucky – KHIE

This function is in place in Arizona. MedVirginia's support is provided by Wellogic. Their plan is to move the database and support in house and continue to have Wellogic work on the application. Function planned for in KHIE RFP.

Advisory Organization Recommendations by Implementation Category

Vision

A. Vision and Mission

Recommendation: New York – NyeC

"The New York eHealth Collaborative (NYeC) was founded by health care leaders across the state, with leadership and support from the New York State Department of

Health, based on a shared vision of the urgent need to improve health ca quality, safety, and efficiency in New York. NYeC is a public-private partnership that will serve as a focal point for health care stakeholders to build consensus on state health IT policy priorities, and to collaborate on state and regional health IT implementation efforts, in order to improve the organization, delivery and outcomes of health care for all New Yorkers. NYeC will become a trusted, independent voice that can reflect a diverse array of interests and perspectives on key policies and standards to ensure that health IT implementation efforts are successful, and to realize the state's return on investment under HEAL-NY and other funding mechanisms."

B. Principles

Recommendation: New York – NYeC, Arizona – AzHeC

Guiding principles are outlined in each organization.

Strategy and Planning

Financial Model and Sustainability

Both NYeC and AzHeC are financially sustainable at this point. NYeC recognizes that they may need to look to other source (than the state) as this only lasts for five years. AzHeC is trying to determine what it will take to continue to be sustainable.

NYeC is funding through the state HEAL funding; $5M over a five year timeframe. They will also be looking at funding from the stimulus package. NYeC made a conscious decision not to be a membership organization due to the competitive nature of this model. They decided to let the forming RHIO's solicit funding from private companies.

AzHeC is a membership organization and they were initially funded by the Medicaid Transformation Grant. The Medicaid funding was tied to specific scope of work around policy and education. This was $750K over a two-year period. In addition, AzHeC has a yearly summit, which generates approximately $40K. Their members pay based on company revenue.

A. Revenue Sources

1. Transaction Fees

   Recommendation: These organizations do not charge transaction fees.

2. Subscription Fees

   Recommendation: These organizations do not charge transaction fees.

3. Membership Fees

   Recommendation: Arizona – AzHeC

   AzHeC is a membership organization and charges members based on their company revenue. A schedule of fees can be found at www.azhec.org.

4. One Time Set-up Fee

   Recommendation: These organizations do not charge transaction fees.

5. Hospital Funding

   Recommendation: Arizona – AzHeC

   AzHeC has hospitals on the BOD that pay membership fees.

11. State Funding

    Recommendation: New York - NYeC

    NYeC has received $5M over a period of five years from the state of New York.

12. Federal Funding

    Recommendation: Arizona – AzHeC

    AzHeC intends to apply for federal funding in the future.

13. Health Plan Funding

    Recommendation: Arizona – AzHeC

    AzHeC received initial start up funding from the Arizona Health Care Cost Containment system, which is tied to specific deliverables. This money was funded from the Medicaid Transformation Grant.

14. Physician Funding

    Recommendation: Arizona – AzHeC

    AzHeC would receive physician funding in the form of membership dues.

15. Philanthropic Funding

    Recommendation: Arizona - AzHeC

    AzHeC received funding from a local organization to develop the initial roadmap for electronic health record exchange. In addition, any organizations that are non-profit and join would pay membership fee.

B. Budget

1. Capital

Recommendation: None of the Advisory Organizations researched due to lack of available information.

2. Operating Costs

Recommendation: None of the Advisory Organizations researched due to lack of available information.

a. Salaries

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

b. Benefits

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

c. Office Expense

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

d. Rent

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

e. Utilities

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

f. Software Purchase and Maintenance

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

g. Hardware Purchase and Maintenance

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

h. Taxes

Recommendation: None of the researched Advisory Organizations due to lack of available information.

i. Cyber Liability Insurance

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

3. Cash Flow

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

4. Break Even Analysis

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

E. Community Benefit

Recommendation: New York – NYeC

Five percent of the funding received from the state was awarded to the NITEC Academic Research Group to develop standard research methods to evaluate projects in terms of outcomes and effectiveness.

F. Benefit Realization – ROI

1. Financial Measurement

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

2. Quality Measurement

Recommendation: New York – NYeC

New York – NYeC as oversight body has begun quality measurement initiatives.

In New York, HITEC Academic Research Group received 5% to come up with standardized research methods used to academically evaluate projects in terms of outcomes and effectiveness. To bridge there is a statewide adoption survey - same as HHS commissioned for physicians and hospitals to assess.

3. System Use Measurement

Recommendation: New York – NYeC

NYeC as oversight body has begun system use measurement initiatives.

NYeC initiated via three levels, contract monitoring, formal research evaluation, and regular statewide adoption survey to establish and monitor progress over time.

a. How many users?

   See above “System Use Measurement”.

b. What do they access?

   See above “System Use Measurement”.

Governance Framework

A. Ownership Model: Public-Private Partnership

   Recommendation: New York – NYeC, Arizona – AzHeC

   NYeC and AzHeC are both independent organization state providing input and potentially approving the statewide HIE policies and procedures that are collaboratively developed.

B. Profit Status: Not-for-Profit

   Recommendation: New York – NYeC, Arizona – AzHeC

   NYeC and AzHeC are both 501 c 3.

C. Articles of Governance

   Recommendation: New York – NYeC and Arizona – AzHeC

   NYeC and AzHeC have articles of governance. NYeC includes By-laws, Antitrust, Policy and Operations Council Charter and Education and Communication Charter.

   Role of Local HIE’s:

   1. Include but not Require Regional / Local HIE’s; All HIE’s Conform with Statewide Policies, Standards and Rules

      Recommendation: New York – NYeC

      NYeC and AzHeC are very inclusive in their activities with the local RHIO’s. NYeC requires the RHIO’s to adopt the statewide policy if the RHIO wants to receive state funding. AzHeC recommends RHIO’s adopt the standard policy. The adoption of HIE in the state is considered a network of networks facilitated by adoption of common policy and technical protocol.

   2. Regional / Local HIE Participation Required (Regional Governance Entities)

      Recommendation: New York – NYeC

New York State's efforts are to advance interoperability through the development and implementation of a shared health information infrastructure based on a community-driven. The HIE will evolve in two layers: a *statewide* framework of rules and policies that facilitates exchange between multiple networks at the *local* level. In this two-layer model, NYeC, with state funding, will support the creation and deployment of common policies, technical standards, and protocols, as well as regional bottom-up approaches that allow local communities to structure their own efforts on the basis of clinical and patient priorities.

D. Technical Operations

1. Separate Governing Structure (Possible Combination in Latter Stages)

   Recommendation: New York - NYeC

   New York is and will be a separate governing structure from any technical operations.

2. Governance and Technical Operations in Single Entity

   Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

E. Accountability Mechanisms

1. Direct Oversight Through Contracts with Incentives and Penalties

   Recommendation: New York – NYeC

   NYeC does have direct oversight for policy and technical protocol. If a RHIO does not comply with NYeC standards they are not eligible for state funding.

2. Direct Oversight via Legislation

   Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

3. Indirect Oversight via Voluntary Accreditation

   Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

F. Governance Board

1. Board of Directors' Composition

   Recommendation: Arizona – AzHeC

Arizona's Board of Directors represents a broad range of stakeholders including hospitals, providers, local HIE's, payers, purchasers, researchers, state government representation, a quality organization, a laboratory, and a pharmacy.

a. Governor's Office

   Recommendation: Arizona – AzHeC

   AzHeC has the Governor's health policy advisor on the Board.

b. State Medicaid Agencies

   Recommendation: Arizona – AzHeC

   The State Medicaid Director is on the Board.

c. State Department of Health

   Recommendation: New York – NYeC, Arizona – AzHeC

   NYeC and AzHeC have the Director of the local Department of Health on the Board.

d. State Healthcare and Hospital Association

   Recommendation: Arizona – AzHeC

   AzHeC has the State Healthcare and Hospital Association on Board.

e. State Medical Association

   Recommendation: Arizona – AzHeC

   AzHeC has the State Medical Association on the Board.

f. Other Non-Profits Involved in Medical Community

   Recommendation: New York – NYeC, Arizona – AzHeC

   NYeC has the Center for Medical Consumers represented on the Board. AzHeC has The Arizona Medical Association, Arizona Pharmacy Association, Arizona Osteopathic Association, and Tribal Representation on the board.

g. Government Agencies who may be a Stakeholder

   Recommendation: Arizona – AzHeC

   Arizona has the Arizona Government Information Technology Agency on the Board.

h. Consumers

Recommendation: New York – NYeC, Arizona – AzHeC

NYeC has representation from the Center for Medical Consumers on the Board and AzHeC has a consumer representative from a private company on the Board.

i. Employers / Purchasers

Recommendation: Arizona – AzHeC

AzHeC has an Intel representative on the board.

j. Insurers

Recommendation: Arizona – AzHeC

AzHeC has the CEO of each major health plan in the state on the Board.

k. Individual Health Care Providers (Physicians)

Recommendation: Arizona – AzHeC

AzHeC has one physician on the Board.

l. Hospitals

Recommendation: Arizona – AzHeC

AzHeC has two major hospitals represented on the Board.

m. Clinics

Recommendation: Arizona – AzHeC

AzHeC has representation from a major rural clinic on the Board.

n. Pharmacies

Recommendation: Arizona – AzHeC

AzHeC has a representative from the Arizona Pharmacy Association on the Board.

o. Clinical Laboratories

Recommendation: Arizona – AzHeC

AzHeC has the CEO of Sonora Quest Laboratories on the Board.

p. Higher Education

Recommendation: Arizona – AzHeC

AzHeC has representatives from two major universities on the Board.

q. Quality Organizations

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

r. Local HIE's

Recommendation: Arizona – AzHeC

AzHeC has representation from the forming RHIO on the Board.

2. Responsibilities

According to the State Level Health Information Exchange (SLHIE), HIE governance functions include convening and coordinating.

NYeC and AzHeC all have specific responsibilities for the Board; however, this information is very general and was not shared in detail. The outline below represents information from MHCC Schedule C and other HIE's at a general level.

a. Maintain Vision, Strategy and Outcomes Metrics

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

b. Build Trust, Buy-In and Participation of Major Stakeholders Statewide

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

c. Assure Equitable and Ethical Approaches

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

d. Develop High-Level Business and Technical Plans

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

e. Approve Statewide Policies, Standards, Agreements

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

f. Balance Interests and Resolve Disputes

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

g. Raise, Receive, Manage and Distribute State, Federal and /or Private Funds

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

h. Prioritize and Foster Interoperability for Statewide and Sub-State Initiatives

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

i. Implement Statewide Projects and Facilitate Local /Sector Projects

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

j. Identify and Overcome Obstacles

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

k. Financial and Legal Accountability, Compliance and Risk Management

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

l. Educate and Market

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

m. Facilitate Consumer Input

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

n. Determine Compensation for Staff

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

3. Committees

Recommendation: New York – NYeC, Arizona – AzHeC

Both NYeC and AzHeC have strong committees made up of volunteers in the medical community.

a. Steering

Recommendation: New York – NYeC, Arizona – AzHeC

NYeC has a policy and operations council responsible for facilitating the development of HIE. AzHeC has an executive committee that helps decide what the recommendations would be to the BOD about moving forward with HIE.

b. Privacy and Security / Legal

Recommendation: New York – NYeC, Arizona – AzHeC

NYeC has privacy and security working group and AzHeC has a legal committee and a security-working group. Both were heavily involved in the HISPC work.

c. Clinical

Recommendation: New York - NYeC, Arizona – AzHeC

NYeC has a clinical priorities working group and AzHeC has a clinical committee combined with the technical committee.

d. Technical / Standards

Recommendation: New York – NYeC, Arizona – AzHeC

NYeC has a protocol and services working group that facilitates the technical requirements for forming RHIO's. AzHeC has a clinical / technical committee that performs the same function.

e. Outreach and Education

Recommendation: New York - NYeC, Arizona – AzHeC

NYeC has a statewide collaborative process framework to involve all stakeholders in defining the criteria for RHIO development. AzHeC hosts education events and outreach activity for their members.

f. Finance

Recommendation: Arizona – AzHeC

AzHeC has a finance committee that is chaired by a member of the Board.

G. Operational / Management Positions and Responsibilities

1. Management

Recommendation: New York – NYeC, Arizona – AzHeC

NYeC has an executive director and a program manager. AzHeC has an executive director, an associate executive director, and a marketing / communications manager. Both organizations rely heavily on the volunteer community.

2. Staff

   Recommendation: All NYeC and AzHeC staff is management.

3. Responsibilities

   a. Execute Strategic, Business and Technical Plans

      Recommendation: New York – NYeC, Arizona – AzHeC

      NYeC and AzHeC are responsible for the execution of the strategic and business plans.

   b. Coordinate Day-to-Day Tasks and Deliverables

      Recommendation: New York – NYeC, Arizona – AzHeC

      NYeC and AzHeC are responsible for coordinating tasks and deliverables for the projects they are executing.

   c. Establish Contracts and Other Relationships with Local / Sectoral Initiatives

      Recommendation: New York – NYeC, Arizona – AzHeC

      NYeC and AzHeC are responsible for establishing contracts within their projects.

   d. Provide Industry Knowledge

      Recommendation: New York – NYeC, Arizona – AzHeC

      NYeC and AzHeC are considered educators in their communities and provide industry knowledge.

   e. Advise the Board

      Recommendation: New York – NYeC, Arizona – AzHeC

      NYeC and AzHeC are responsible for reporting on statewide and national e-health initiatives and advising the Board.

Stakeholder Outreach and Education

A. Consumers

Recommendation: New York – NYeC

NYeC's goal is to double efforts for outreach and education in 2009. NYeC has established separate funding for their consumer advisory council. It has been convened by a legal action center and includes a cross section of different consumer groups who serve as a sounding board for policy and are helping to construct some of the educational materials. The council resulted as an outgrowth of the HISPC project where the Health Commissioner initiated an ad campaign including a You Tube video about health IT. Additionally a model consent form has been rolled out amidst the educational efforts.

1. Under-served

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

B. Providers

Recommendation: Arizona – AzHeC

AzHeC has done a tremendous amount of provider outreach and education as they participated in the launch of the AMIE project. Provider focus groups were conducted and there is now a user group made up of providers who meet to discuss the AMIE system.

C. Public Health

Recommendation: None of the researched Advisory Organizations researched due to lack of available information.

D. Government Agencies

Recommendation: Arizona – AzHeC

AzHeC works with the Department of Health and the Privacy and Security Office under the Government Information Technology Agency to keep these offices informed.

E. Non-profits

Recommendation: Arizona – AzHeC

Due to the many non-profits represented on the Board, there is outreach done by those non-profits to the community. Further, AzHeC is reaching out to consumer advocacy groups.

Section IV: Summary

MHCC has put considerable planning into the specifications for implementation of a statewide HIE. The major requirements of the planning teams are to address issues related to governance, privacy and security, HIE architecture, hardware and software solutions, and a sustainable business model. The implementation specification covers each of those areas in detail, focusing on the information received from the HIE's researched.

The planning work completed to date on HIE formation will be critical to the implementation of a statewide HIE. The next step in the planning effort is to compare the proposals submitted by CRISP and MCHIE to the implementation specification developed during this project for determining best practices. This will be a critical prerequisite step for the development of a RFA focused on formation and implementation of a statewide HIE.

Appendix A: CRISP and MCHIE Planning Teams

CRISP Steering Committee Members

Dr. Peter Basch, Medical Director for eHealth, MedStar Health

Patty Brown, President, Johns Hopkins Healthcare, LLC

Jon Burns, CIO and SVP, University of Maryland Medical System

Rick Grindrod, CEO, Erickson Retirement Communities

David Horrocks, SVP, Erickson Retirement Communities

Dr. Mark Kelemen, SVP and CMIO, University of Maryland Medical System

Dr. Matt Narrett, EVP and CMO, Erickson Retirement Communities

Dr. John Parrish, Executive Director, The Erickson Foundation

Stephanie Reel, CIO and Vice Provost for Information Technology, Johns Hopkins Medicine

Catherine Szenczy, CIO and SVP, MedStar Health

MCHIE Executive Committee Members

Dr. Roger Leonard, Vice President of Medical Affairs, Montgomery General Hospital (Co-Chair)

Dr. Thomas Lewis, Vice President of Medical Affairs, Primary Care Coalition of Montgomery County (Co-Chair)

Dr. Blair Eig, Vice President of Medical Affairs, Holy Cross Hospital

Dr. Gaurov Dayal, Vice President of Medical Affairs, Shady Grove Adventist Hospital

Kathleen Dyer, Vice President and Chief Information Officer, Adventist Health Care

Katie Ronca, Executive Assistant, Montgomery General Hospital

MCHIE Operations Committee Members

Dr. Roger Leonard, Vice President of Medical Affairs, Montgomery General Hospital (Co-Chair)

Dr. Thomas Lewis, Vice President of Medical Affairs, Primary Care Coalition of Montgomery County (Co-Chair)

Judy Averbach, Grant Writer, Montgomery General Hospital

Ron Benfield, Vice President and Chief Financial Officer, Shady Grove Adventist Hospital

Curtis Brown, Member, Shire National Advisory Council

Dr. Shirley Brown-Ornish, Senior Planner, Prince George's County Health

Russell J. Davis, President and CEO, Summit Health Institute for Research and Education

Dr. Gaurov Dayal, Vice President of Medical Affairs, Shady Grove Adventist Hospital

Steve Galen, Executive Director, Primary Care Coalition of Montgomery County

Leta Kajut, Project Manager – Metro DC Health Information Exchange, Primary Care Coalition

Chris Magee, TITLE, Washington Adventist Hospital

Manny Ocasio, Vice President of Information Systems, Holy Cross Hospital

Katie Ronca, Executive Assistant, Montgomery General Hospital

Dr. Ulda Tillman, Chief – Public Health, Montgomery County Department Health and Human Services

Appendix B: HIE Rationale for Selection Matrix

	State / HIE	Summary of HIE	Schedule A, B, C Justification for Selection	Rationale
1	Arizona - AMIE	AMIE was established by the Arizona Health Care Cost Containment System for health information exchange has been in pilot mode since September 2008. The utility web services includes clinical system gateway and record locator service gateway. Message structure based on HL 7 standards including discharge summary, lab results, and medication history. Four major hospitals, one major lab and one medication management company provide information to the record locator service. Hospital clinicians are able to query on a patient and view their records.	**Privacy and Security** **Infrastructure** **Stakeholder Outreach** Desired Future State: 1. Clearly defined rules for appropriate data use and applied penalties. 4. HIE clearly demonstrates value to each stakeholder. 6. Distinguished patient records. HIE Principles: 4. HIE secure and protects patient privacy and confidentiality. 7. Industry-defined standards. Other (based on Final Report Outline): • Core Functions – Clinical decision support priorities including medication history. • Vision & Strategy - Expansion Functions • Infrastructure/Data Management – Security and Privacy; Analytics	Kim participated in the negotiation of contracts with data providers and the agreements around privacy and security, provides lessons learned. Also very familiar with the infrastructure – really one way communication to providers via record locator service with Edge servers at the provider. Conducted many focus groups with physicians to get stakeholder outreach and buy in – currently have user groups meeting.

	State / HIE	Summary of HIE	Schedule A, B, C Justification for Selection	Rationale
2	Colorado - CORhio	CoRHIO is a federated model with four partners working to establish HIE through a central site that offers secure hosted services. The HIE has been incorporated as a non-profit organization, with Governor and cabinet closely involvement with the RHIO. Governance structure includes not only steering committee, work, and user groups, but also Community Advisory Council to represent consumer interests. Currently used in emergency rooms for point of care inquiry medication management, laboratory tests, imaging, diagnoses and registration information. Colorado Immunization Information System (CIIS) is the electronic state-wide system for reporting immunization information. It will utilize interface between CORHIO and other data-sharing partners (CDC, CO Dept. of Public Health & Financing, etc.). CORHIO served as secure biosurveillance portal. CORHIO participates in HISPC.	**Governance** **Targeted Use (ER Only)** **Clinical Decision Support** **Privacy and Security** Desired Future State: 1. Clearly defined rules for appropriate data use and applied penalties. 3. HIE "understands" and is able to share data with multiple organizations.....acceptable standards for exchange. 4. HIE clearly demonstrates value to each stakeholder. HIE Principles: 4. HIE secure and protects patient privacy and confidentiality. 5. Governance structure transparent and inclusive. Other (based on Final Report Outline): • Vision and Strategy – Core Functions – Clinical Decision Support Priorities; Expansion Functions – Public Health Priorities • Infrastructure/Data Management – Security and Privacy	Community Advisory Group helps govern this HIE. They are targeting ER which a critical component of patient safety. They provide clinical decision support in the form of medication management, laboratory tests etc., which are considered the most, cost effective and desirable information to have available as it can help reduce medication error and duplicate testing. CoRHIO has been involved in HISPC since inception (2006). .

	State / HIE	Summary of HIE	Schedule A, B, C Justification for Selection	Rationale
3	Ohio - HealthBridge	HealthBridge has been operating in Ohio since 1999. They are using the Axolotl solution to provide connectivity for 29 hospitals, over 4400 physician users, 17 local health departments, physician offices and clinics, as well as nursing homes, independent labs, radiology centers and others in their healthcare community. They are able to provide clinical messaging and represent 95% of the hospital sector in the Cincinnati region. HealthBridge serves as partner to two other HIE's (Collaborating Communities Health Information Exchange-CCHIE). They started testing their expansion capabilities in October 2008. They are a Chartered Value Exchange, as noted by Secretary Leavitt, due to their work in making consumers and providers able to make better decisions about health care. NHIN cooperative participant.	**Clinical Decision Support** **Expansion Functions** **Sustainability** **Consumer Issues and Outreach** Desired Future State: 3. HIE "understands" and is able to share data with multiple organizations...acceptable standards for exchange. 5. There is a sustainable financial model. HIE Principles: 1. HIE must have a business model that is sustainable. Other (based on Final Report Outline): • Vision and Strategy – Core Functions – Clinical Decision Support Priorities; Expansion Functions – Community Health Resource Management • Infrastructure/Data Management – Security and Privacy	Secure messaging provides high efficiency for physicians transmitting clinical data electronically. They are already testing their ability to provide more services. We assume they have a sustainable model due to their formation date. Being a chartered value exchange requires that they have strong consumer outreach.
4	Vermont -	VITL has been operating since	**Governance (statewide HIE)**	One of few statewide

	State / HIE	Summary of HIE	Schedule A, B, C Justification for Selection	Rationale
	VITL	2005. It is intended to be a statewide HIE. VITL has an "opt-in" model and the first pilot is exchanging claims medication history with two emergency departments. This has been in operation for six months. The second the pilot project offers grants of up to $45,000 per physician to participate in an EHR implementation for their practice. Practices will pay up to 25 percent of the cost of an electronic health record system. VITL will also help practices modify their clinical processes and successfully implement. VTIL has established message formats and transport standards to support technical interoperability. Core semantic standards established. Documented Vermont Health Information Technology Plan addressing major areas of HIE "blueprint".	**Consumer Issues (OPT-IN)** **Electronic Medical Record Factor (not really on Appendix C of RFA; however an extremely important issue)** Desired Future State: 3. HIE "understands" and is able to share data with multiple organizations...acceptable standards for exchange. 4. HIE clearly demonstrates its value to each stakeholder. HIE Principles: 2. HIE is consumer-centric. 7. HIE uses industry-defined standards. Other (based on Final Report Outline): • Vision and Strategy - Core Functions - Clinical Decision Support Priorities • Infrastructure/Data Management	HIE efforts. They appear to be very consumer centric due to the opt-in model. High focus on EMR for physicians. They appear to be able to focus on ER, consumers and physicians that is a very broad method of implementing.
5	Delaware - DHIN	The DHIN was formed in 1997 and went live in May 2007, using Medicity and Perot Hosting Systems, to deliver laboratory, pathology results,	**Community Health Expansion Functions** **PHR** **Infrastructure**	It appears that it took 10 years to get up and running which makes them a good candidate to look at lessons

	State / HIE	Summary of HIE	Schedule A, B, C Justification for Selection	Rationale
		radiology and admission sheets from three hospitals and one lab. The system features secure messaging. In 2009, they will implement a patient centric record search, order entry from an EHR and a patient portal. During the NHIN implementations, DHIN implemented the Delaware Electronic Reporting and Surveillance System to report biosurveillance and lab data from hospitals to the Division of Public Health. They provide one record in one format for patient care.	Other (based on Final Report Outline): • Vision and Strategy - Core Functions – Clinical Decision Support Priorities • Expansion Functions – Public Health, PHR Management, and Community Health Resource Management • Infrastructure/Data Management – Data Architecture (able to secure messaging and scale applications)	learned and actual implementation. They are also emphasizing biosurveillance, which is unusual in the early formation stages.
6	Tennessee - MSeHA	MidSouth eHealth Alliance (MSeHA) was established in 2004. They received grant from AHRQ for $12.5 million. Data is shared between hospital emergency departments and ambulatory clinics. They have 9 hospitals, 15 ambulatory clinics, and UTMG. Data exchanged is patient information, demographics, ICD-9 discharge codes, lab results, encounter data, and dictated reports. An opt-out model is used and they ensure patient privacy, following HIPAA laws. MSeHA is working with Vanderbilt	**Privacy and Security** **Governance** Desired Future State: 3. The HIE "understands" and is able to share data with multiple organizations, patients and consumers, and platforms. HIE Principles: 4. HIE is secure and private. Other (based on Final Report Outline): • Vision and Strategy – Sound tactical plan to accelerate benefit realization; • Infrastructure/Data Management – Security and Privacy	An opt-out model is used, which is different from most HIE's we are researching. They have collaborated with Vanderbilt University to build this HIE.

	State / HIE	Summary of HIE	Schedule A, B, C Justification for Selection	Rationale
		University as well as a diverse board of directors. An opt-out model is used and they ensure patient privacy, following HIPAA laws.		
7	Virginia - MedVirginia	MedVirginia is a clinical HIE that delivers clinical data from a central database. Patient centric design using WellLogic solutions. Other features include practice schedule, e-prescribing for refills, diagnostic test results and order entry. Patient focused systems with an option for affordable EHR. All data collected is integrated into one record per patient. Additional services are available on a subscription basis, including electronic health records, electronic prescribing, integration of practice notes, and integration with practice management systems. They have implemented numerous proactive, preventative privacy and security features. NHIN cooperative participant.	**Sustainability** **Privacy and Security** **Infrastructure** Desired Future State: 3. The HIE "understands" and is able to share data with multiple organizations, patients and consumers, and platforms. 4. There is a sustainable financial model. HIE Principles: 1. The HIE must have a business model that is sustainable. 4. HIE is secure and protects patient privacy and confidentiality. Other (based on Final Report Outline): • Infrastructure/Data Management – Security and Privacy	They are using a subscription basis to generate revenue. They have been involved in HISPC and NHIN in the past twelve months and the model allows for secure information that would appear to satisfy the consumer and the provider (based on demo at NHIN). They are using WellLogic, which is also a leader in HIE software solutions – using a central database.
8	West Virginia - WVHIN	WVHIN was established to provide a phased in approach to health information exchange and a statewide HIE. The first	**Health Policy** **Infrastructure** **Expansion Functions**	The consumer / employer committee is an interesting concept that should be explored

	State / HIE	Summary of HIE	Schedule A, B, C Justification for Selection	Rationale
		phase is to provide clinical messaging, second phase is coordinated care with inquiry capabilities, and the third phase is a central database for exchange of health information. They intend to serve as the standards setting body for the state and the coordination point for HIE in the state. A consumer/ employer committee has been established to ensure patient rights regarding privacy and security. Outreach and education programs for consumers are being established. NHIN cooperative participant.	Desired Future State: 2. The HIE has consistent and controlled access to health data so that it is available at the right time, by the right person, for the reason, for the length of time, with appropriate authorization. HIE Principles: 7. The HIE uses industry-defined standards. Other (based on Final Report Outline): • Vision and Strategy – Core Functions – Clinical Decision Support Priorities; Expansion Functions – Community Health Resource Management (outreach and education programs; Health Policy Formation • Infrastructure/Data Management – Standards	further. Their infrastructure which will provide clinical messaging first is solid as this is one area providers would like to see become a reality. The phased in approach is also attractive.
9	New York - NYeC	NYeC was established to facilitate the Statewide Collaboration Process to advance health information technology across the state of New York. Key activities: develop policies and standards; evaluate and establish accountability measures for health IT strategy; convene, educate and engage key	**Governance** **Health Policy** Other (based on Final Report Outline): • Vision and Strategy – Policy Health Formation	NYeC is working with the Office of Health Information Technology under State Government as well as the forming HIE's in the state to set policy and provide education. They are not an HIE.

	State / HIE	Summary of HIE	Schedule A, B, C Justification for Selection	Rationale
		stakeholders. The State of New York has established the Office of Health Information Technology Transformation, which coordinates with NYeC in addition to members of the medical community and health plans involved in the governance of the organization.		
10	Wisconsin - WHIE	Executive Order #129 specified the *Wisconsin eHealth Action Plan*. The Wisconsin eHealth Care Quality and Patient Safety Board's ("eHealth Board") Information Exchange Workgroup recommended establishing between 3-5 RHIO's. WHIE is linking 10 hospital emergency departments. A RFP was recently issued to obtain consulting services and expertise in assessment, planning, and architecture modeling and design activities for a state-level HIE entity and the business and technical services the entity would provide statewide for Wisconsin. (It includes an assessment and gap analysis of existing State technologies.)	**Vision and Strategy** **Governance** **Infrastructure / Data Management** Desired Future State: 3. HIE "understands" and is able to share data with multiple organizations...acceptable standards for exchange. HIE Principles: 5. Governance structure is transparent and inclusive. Other (based on Final Report Outline): • Vision and Strategy - Core Functions - Clinical Decision Support Priorities • Infrastructure / Data Management – Infrastructure Assessment (Gap Analysis)	WHIN has done a lot of prerequisite planning in terms of vision and strategy and governance. They are a HIE in an early stage with just issuing a RFP last year with vendor selection due early 2009.

	State / HIE	Summary of HIE	Schedule A, B, C Justification for Selection	Rationale
11	Arizona - AzHeC	AzHeC is an oversight organization with the following charter: Convene Coordinate Communicate In three words, that's the simplest way to express what AzHeC is here to accomplish. Our charter is to help Arizona consumers, insurers and providers find their way in the space where the importance of medical information and the power of information technology come together.	**Governance** **Health Policy** Other (based on Final Report Outline): Vision and Strategy – Policy Health Formation	Arizona Health-e Connection was established in 2007 as the oversight organization to facilitate health information exchange. They are a membership organization providing education to stakeholders and recommendations to the AzHeC BOD.
12	Kentucky - KHIE	KHIE is a forming HIE that has an RFP out to solicit partners to create a HIE. They are going to form a statewide HIE. Their vision is to create a laboratory to design, develop and research RIO and healthcare outcomes for HIE.	**Vision and Strategy** **Governance** **Infrastructure / Data Management** Desired Future State: 4. HIE "understands" and is able to share data with multiple organizations...acceptable standards for exchange. HIE Principles: 5. Governance structure is transparent and inclusive. Other (based on Final Report Outline): • Vision and Strategy - Core Functions - Clinical Decision Support Priorities • Infrastructure / Data Management – Infrastructure Assessment (Gap	Kentucky has a very detailed RFP that shows the different levels of planning they have completed. The RFP is very detailed and has a phased in approach with specific requirements for privacy and security as well as data exchange.

	State / HIE	Summary of HIE	Schedule A, B, C Justification for Selection	Rationale
			Analysis)	

Appendix C: Implementation Plan Assessment

Maryland Health Information Exchange

Implementation Plan Assessment

Category	Function	Addressed by Planning Teams		Alternate HIE
		CRISP	MCHIE	
Key: Items in magenta represent new outline items				
I. Vision	A. Vision and Mission	x	x	VITL / MSeHA/ NYeC
	B. Principles	x	x	All
II. Strategy and Planning	**Financial Model and Sustainability**			
	A. Revenue Sources			
	1. Transaction Fees	x	x	VITL
	2. Subscription Fees	x	x	MedVirginia / VITL
	3. Membership Fees			AzHeC
	4. One Time Set-up Fee		x	*
	5. Hospital Funding		x	MedVirginia / AzHeC
	6. State Funding	x	x	MSeHA / WVHIN / MedVirginia / VITL / NYeC
	7. Federal Funding	x	x	WVHIN / MSeHA / MedVirginia / AzHeC
	8. Health Plan funding		x	VITL / AzHeC
	9. Physician funding			AzHeC
	10. Philanthropic funding		x	VITL / AzHeC
	B. Budget			
	1. Capital	x	x	*
	2. Operating Costs	x	x	MSeHA
	a. Salaries	x		*
	b. Benefits			*
	c. Office Expense	x		*
	d. Rent	x		*
	e. Utilities	x		*
	f. Software Purchase and Maintenance	x	x	MSeHA
	g. Hardware Purchase and Maintenance	x	x	MSeHA
	h. Taxes			*
	i. Cyber Liability Insurance			CORhio
	3. Cash Flow	x		*
	4. Break Even Analysis	x		MedVirginia
	C. Community Benefit	x	x	CORhio / NYeC
	D. Benefit Realization - ROI			
	1. Financial Measurement			VITL / HealthBridge

Maryland Health Information Exchange

Implementation Plan Assessment

Category	Function	Addressed by Planning Teams		Alternate HIE
		CRISP	MCHIE	
Key: Items in magenta represent new outline items				
	2. Quality Measurement		x	VITL / HealthBridge / NYeC /WHIE
	3. System Use Measurement		x	AMIE / NYeC
	a. How Many Users			AMIE
	b. What Do They Access			AMIE
	Governance Framework			
	A. Ownership Model: Public-Private Partnership	x	x	MSeHA / NYeC / VITL / AzHeC
	B. Profit Status: Not-for-Profit	x	x	All
	C. Articles of Governance	x		AzHeC / NYeC
	D. Role of Local HIE's:			
	1. Include but not Require Regional / Local HIE's; All HIE's Conform with Statewide Policies, Standards and Rules	x	x	VITL / MSeHA / NYeC
	2. Regional/local HIE Participation Required Regional Governance Entities).	x	x	NYeC / AzHeC
	E. Technical Operations			
	1. Separate Governing Structure (Possible Combination in Latter Stages)		x	MedVirginia / NYeC
	2. Governance and Technical Operations in Single Entity	x		DHIN
	F. Accountability Mechanisms			
	1. Direct Oversight Through Contracts with Incentives and Penalties		x	NYeC
	2. Direct Oversight via Legislation		x	DHIN
	3. Indirect Oversight via Voluntary Accreditation		x	*
	G. Governance Board			
	1. Board of Directors' Composition	x	x	AzHeC / CORhio
	a. Governor's Office			AzHeC
	b. State Medicaid Agencies		x	AzHeC
	c. State Department of Health	x	x	AzHeC / NYeC/ CORhio
	d. State Healthcare and Hospital Association			CORhio

* denotes insufficeint data to provide detail

Maryland Health Information Exchange

Implementation Plan Assessment

Category	Function	Addressed by Planning Teams		Alternate HIE
		CRISP	MCHIE	
Key: Items in magenta represent new outline items				
	e. State Medical Association			CORhio
	f. Other Non-Profits Involved in Medical Community		x	AzHeC / NYeC / CORhio
	g. Government Agencies who may be a Stakeholder	x	x	CORhio / AzHeC
	h. Consumers		x	AzHeC / NYeC
	i. Employers / Purchasers		x	MedVirginia / AzHeC
	j. Insurers		x	AzHeC / CORhio
	k. Individual Health Care Providers (Physicians)	x	x	AzHeC
	l. Hospitals	x	x	AzHeC / NYeC/ CORhio
	m. Clinics		x	AzHeC / CORhio
	n. Pharmacies		x	AzHeC
	o. Clinical Laboratories	x		AzHeC
	p. Higher Education		x	AzHeC
	q. Quality Organizations		x	CORhio
	r. Local HIE's		x	AzHeC
	2. Responsibilities			AzHeC / NYeC
	a. Maintain Vision, Strategy and Outcomes Metrics	x	x	AzHeC / NYeC
	b. Build Trust, Buy-In and Participation of Major Stakeholders Statewide	x	x	AzHeC / NYeC
	c. Assure Equitable and Ethical Approaches	x		AzHeC / NYeC
	d. Develop High-level Business and Technical Plans	x	x	AzHeC / NYeC
	e. Approve Statewide Policies, Standards, Agreements	x	x	AzHeC / NYeC
	f. Balance Interests and Resolve Disputes	x		AzHeC / NYeC
	g. Raise, Receive, Manage and Distribute State, Federal and/or Private Funds			AzHeC / NYeC
	h. Prioritize and Foster Interoperability for Statewide and Sub-State Initiatives	x	x	AzHeC / NYeC

Maryland Health Information Exchange

Implementation Plan Assessment

Category	Function	Addressed by Planning Teams		Alternate HIE
		CRISP	MCHIE	
Key: Items in magenta represent new outline items				
	i. Implement Statewide Projects and Facilitate Local / Sector Projects	x	x	AzHeC / NYeC
	j. Identify and Overcome Obstacles	x	x	AzHeC / NYeC
	k. Financial and Legal Accountability, Compliance and Risk Management	x		AzHeC / NYeC
	l. Educate and Market	x	x	AzHeC / NYeC
	m. Facilitate Consumer Input	x		AzHeC / NYeC
	n. Determine Compensation for Staff	x		AzHeC / NYeC
	3. Committees			NYeC / AzHeC
	a. Steering			WVHIN / AzHeC / NYeC
	b. Privacy and Security / Legal		x	WHIE / AzHeC / NYeC
	c. Clinical		x	WHIE / AzHeC / NYeC
	d. Technical / Standards		x	WHIE / AzHeC / NYeC
	e. Outreach and Education			WHIE / AzHeC / NYeC
	f. Finance			WHIE / AzHeC
	H. Operational / Management Positions and Responsibilities			
	1. Management	x		MedVirginia /VITL / AzHeC / NYeC
	2. Staff	x		MedVirginia / VITL
	3. Responsibilities			AzHeC / NYeC
	a. Execute Strategic, Business and Technical Plans	x		AzHeC / NYeC
	b. Coordinate Day-to-Day Tasks and Deliverables	x		AzHeC / NYeC
	c. Establish Contracts and Other Relationships with Local / Sectoral Initiatives			AzHeC / NYeC
	d. Provide Industry Knowledge			AzHeC / NYeC
	e. Advise the Board	x		AzHeC / NYeC
	Privacy and Security			
	A. Registration / Type of Registration Authority			MedVirginia / MSeHA / AMIE

Maryland Health Information Exchange

Implementation Plan Assessment

Category	Function	Addressed by Planning Teams		Alternate HIE
		CRISP	MCHIE	
Key: Items in magenta represent new outline items				
	B. Authentication			
	1. Providers	x	x	MSeHA
	2. Consumers	x	x	KHIE
	3. Public Health		x	KHIE
	4. Other Institutions (Educational)		x	KHIE
	5. Non-licensed Providers in State			*
	6. Data Authentication (in and out of HIE)			*
	7. System Authentication (System Accessing HIE)			AMIE
	C. Identification			
	1. Use of Master Person Index to Provide Provider and Consumer Information	x	x	KHIE / MedVirginia / VITL / CORhio
	2. Public Health			*
	3. Other Institutions (Educational)			*
	4. Non-licensed Providers in State			*
	5. Data Identification			*
	6. System Identification			KHIE
	7. Credentialing of Health Care			MedVirginia / KHIE
	D. Audit			
	1. What is Audited	x	x	KHIE / AMIE / MedVirginia / VITL
	2. Who Audits	x	x	KHIE / AMIE / MedVirginia / VITL
	3. How Often	x		AMIE
	4. External Audit Requirements (Including Consumer Audit Requirements)	x		VITL
	E. Authorization (To See What Data)			
	1. Providers	x	x	MSeHA / AMIE
	2. Consumers			KHIE
	3. Public Health			*
	4. Other Institutions (Educational)			*
	5. Non-licensed Providers in State			*
	6. Data Authorization			AMIE
	7. System Authorization			AMIE

Maryland Health Information Exchange

Implementation Plan Assessment

Category	Function	Addressed by Planning Teams		Alternate HIE
		CRISP	MCHIE	
Key: Items in magenta represent new outline items				
	F. Access (Role Based Using HL7 Standards)			
	1. Who Can Access What Data	x	x	KHIE
	2. Who Can Change and / or Update Data	x		*
	3. Sensitive Specially Protected Health Info - Substance Abuse, HIV/AIDS, Genetic, etc.	x	x	MedVirginia
	G. Consent Framework / Type of Consent	x	x	VITL
	H. Legal Agreements			
	1. Master Participation Agreements	x	x	AMIE
	2. Use Agreements	x		MedVirginia
	3. Business Associate Agreements	x		MedVirginia
	I. Policies and Procedures			
	1. Authentication	x	x	MedVirginia / VITL / AMIE
	2. Audit	x	x	MedVirginia / VITL / AMIE
	3. Authorization	x	x	MedVirginia / VITL / AMIE
	4. Access	x	x	MedVirginia / VITL / AMIE
	5. Consent	x	x	MedVirginia / VITL
	6. Break the Glass	x		MedVirginia / VITL
	7. Policies Governing Patient Authorization for Data Sharing as in Health Record Bank	x		KHIE
	J. Legal Issues			
	1. HIPAA Considerations	x	x	All
	2. MDCMRA	x	x	*
	Stakeholder Outreach and Education			
	A. Consumers	x	x	AzHeC / NYeC
	1. Under-served	x	x	*
	B. Providers	x	x	AzHeC / NYeC/ AMIE
	C. Public Health			*
	D. Government Agencies			AzHeC

Maryland Health Information Exchange

Implementation Plan Assessment

Category	Function	Addressed by Planning Teams		Alternate HIE
		CRISP	MCHIE	
Key: Items in magenta represent new outline items				
	E. Non-profits			AzHeC
III. Detail Design	**Care Delivery (Implementation Sequencing and Phasing)**			
	A. Data Partners			
	1. Hospitals	x	x	DHIN / WVHIN / MedVirginia / MSeHA / HealthBridge / CORhio
	2. Laboratories	x	x	DHIN
	3. Clinics	x	x	MSeHA
	4. Pharmacies	x	x	*
	5. Individual Physician Practices	x	x	DHIN / WVHIN / MedVirginia / MSeHA / HealthBridge / CORhio
	6. Nursing Homes	x	x	*
	7. State Health Agencies	x	x	HealthBridge
	8. Quality Organizations	x	x	*
	9. Medicare	x	x	*
	10.Medicaid	x	x	*
	11.Insurers	x	x	DHIN / MSeHA / CORhio
	B. Data Exchange Requirements (Use Case Analysis to Determine Actors, Information Needed and How to Provide)			
	1. Medication History and Reconciliation	x	x	CORhio / AMIE / VITL / WVHIN / KHIE /WHIE
	a. e-Prescribing and Prescription Histories	x	x	CORhio / MedVirginia / WVHIN / KHIE
	2. Laboratory Results	x	x	WVHIN / CORhio / MSeHA / MedVirginia / HealthBridge / AMIE / VITL / KHIE / WHIE
	3. Radiology Results	x	x	/ MedVirginia / HealthBridge / KHIE / WHIE

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Implementation Plan Assessment

Category	Function	Addressed by Planning Teams		Alternate HIE
		CRISP	MCHIE	
Key: Items in magenta represent new outline items				
	4. Radiology Images	x	x	WVHIN / CORhio / MSeHA / HealthBridge / MedVirginia/ Kentucky
	5. Inpatient Episodes	x	x	MSeHA
	6. Dictation / Transcription			MSeHA / HealthBridge
	7. Pathology			MSeHA / HealthBridge
	8. Cardiology			HealthBridge
	9. GI			*
	10.Pulmonary			*
	11.Claims			*
	12.Enrollment / Eligibility			HealthBridge/ KHIE
	13.Hospital Discharge Summary	x	x	AMIE /MSeHA / HealthBridge
	14.Emergency Room Reports	x	x	CORhio / WHIE
	15.Immunization	x	x	KHIE / WHIE
	16.Bioterrorism Alerts	x	x	KHIE
	17.Ambulatory Health Record	x	x	MSeHA /HealthBridge /VITL
	18.Medical Alerts	x	x	HealthBridge / KHIE
	19.Demographics	x	x	MSeHA / WHIE / KHIE
	20.Patient Reported Data	x	x	*
	C. Application Functionality			
	1. Clinical Messaging	x	x	MedVirginia / WVHIN /VITL
	2. Continuity of Care Records (CCD)	x	x	HealthBridge / WVIN
	3. Longitudinal Health Records			WVIN
	4. Insurance Eligibility	x		HealthBridge
	5. Health Services Research / Public Health	x	x	HealthBridge / KHIE / WHIE
	6. Master Person Index	x	x	MedVirginia / CORhio / KHIE / WHIE
	7. Record Locator Service	x	x	CORhio / AMIE
	8. Health Record Banking	x	x	MedVirginia / HealthBridge / KHIE
	9. Disease Management Tools	x	x	HealthBridge / KHIE

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Key: Items in magenta represent new outline items				
	D. System Architecture			
	1. Interfaces	x	x	AMIE / HealthBridge / MedVirginia /VITL
	2. Central Repository / Federated Model	x	x	VITL / MedVirginia / WVHIN / KHIE
	3. Record Locator / Edge Servers	x	x	VITL / AMIE / CORhio / KHIE
	4. Hybrid Model	x	x	KHIE
	5. Master Person Index	x	x	MedVirginia / CORhio / KHIE / WHIE
	6. Health Record Bank with Opt-in	x	x	MedVirginia / HealthBridge / KHIE
	7. Service Oriented Architecture		x	*
	8. Web-based Application (Portal)	x	x	HealthBridge / MedVirginia / AMIE
	9. Auditing	x	x	AMIE
	10.Security Applications	x	x	AMIE
	E. Analytics / Reporting	x	x	WHIE
	F. Standards			
	1. Message and Document Formats	x	x	AMIE / MedVirginia
	2. Clinical Terminology	x	x	AMIE
	3. CCHIT and EHNAC for Certification	x	x	VITL / KHIE / WHIE
	4. HITSP	x	x	AMIE / WHIE
	5. ASTM	x		VITL
	6. NIST e-Authentication			AMIE / WVHIN
	7. IHE	x	x	WHIE
IV. Implementation	**Project Management**			
	A. Gap Analysis of Current Technologies			WHIE /KHIE
	B. Team Selection			AMIE /MedVirginia / MSeHA / KHIE
	C. Detail Schedule			AMIE /MedVirginia / MSeHA / KHIE
	D. Task Development			AMIE /MedVirginia / MSeHA / KHIE

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		CRISP	MCHIE	
Key: Items in magenta represent new outline items				
	E. Hardware Infrastructure			AMIE /MedVirginia / MSeHA / KHIE
	F. Software Solution Development			AMIE /MedVirginia / MSeHA / KHIE
	G. Interface Analysis			AMIE /MedVirginia / MSeHA / KHIE
	H. Interface Development			AMIE /MedVirginia / MSeHA / KHIE
	I. Agreement Negotiation			AMIE /MedVirginia / MSeHA / KHIE
	J. Solution Testing			AMIE /MedVirginia / MSeHA / KHIE
V. Maintenance	**Operations Processes (Support Functions)**			
	A. Staffing			AMIE /MedVirginia / KHIE
	B. Support Services			AMIE /MedVirginia / KHIE