

Minnesota Public Health Information Network (MN-PHIN)

Roadmap and Recommendations for Strategic Action

Report to the Minnesota Legislature 2005

Minnesota Department of Health

January 2005



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Protecting, maintaining and improving the health of all Minnesotans

January 2005

Dear Colleagues:

Attached is the *Minnesota Public Health Information Network (MN-PHIN): Roadmap and Recommendations for Strategic Action* report delivered in accordance with the Laws of Minnesota 2004, chapter 279, article 11, section 8. This report fulfills the directive by the 2004 Minnesota Legislature to the Minnesota Department of Health to prepare a plan for the development and implementation of a statewide public health data management system in cooperation and consultation with representatives of local public health departments.

The vision for the Minnesota Public Health Information Network is to provide the timely and accurate information that enables public health professionals, policymakers, and community partners to efficiently and effectively respond to community health threats, protect the public from serious but preventable diseases or injury, and carry out their responsibilities to make Minnesota communities healthier places to live. It also enables consumers to access the public health and prevention information they need to make wise health decisions.

The Minnesota Public Health Information Network is a component of the larger Minnesota e-Health Initiative, a statewide public-private collaboration whose aim is to accelerate the use of health information technology in Minnesota

In addition, this report complements the Minnesota Governor's *Drive to Excellence* plan, which describes providing fast, reliable services to the citizens of Minnesota as its number one priority.

We hope that this report will help guide the Minnesota Department of Health and its local partners in developing a blueprint to establish a comprehensive Minnesota Public Health Information Network. For specific questions about this report, please direct your questions to Martin LaVenture at (612) 676-5017.

Sincerely,

A handwritten signature in black ink that reads "Dianne M. Mandernach". The signature is written in a cursive style with a large, flowing "D" and "M".

Dianne M. Mandernach
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Minnesota Public Health Information Network (MN-PHIN): Roadmap and Recommendations for Strategic Action

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**“Public Health is what we, as a society, do collectively to assure
the conditions in which people can be healthy.”**

Institute of Medicine (IOM), 1988

**“One of our greatest opportunities for success lies in the alignment of
the state’s technology strategies with the Administration’s business
objectives. Aggressive use of information technology will help allow us
to achieve our business objectives and offer better services for**

Minnesota citizens.”

**Governor Tim Pawlenty
*Minnesota Drive to Excellence, 2004***

Executive Summary

The vision for a Minnesota Public Health Information Network (MN-PHIN) is to provide the timely and accurate statewide information network that enables public health professionals, policymakers, and community partners to:

- respond efficiently and effectively to community health threats
- protect the public from serious but preventable diseases or injury
- carry out their responsibilities to make Minnesota communities healthier places to live

In addition, MN-PHIN will enable consumers to access the public health and prevention information they need to make informed health decisions.

Current local and state public health information systems have many challenges: they allow gaps in services to clients; they require maintenance of duplicate records, which is costly; and they do not meet national standards for interconnectivity.

Minnesota city and county health departments use excessive resources to process hundreds of thousands of transactions using out-of-date or limited capacity software applications or other technology.

Minnesota lags behind multiple states that have invested significant resources in updating their local and state public health systems.

Some funding opportunities are emerging nationally as this problem is recognized. Implementing the early phases of MN-PHIN will prepare Minnesota to better compete for some of those resources.

In order to protect, maintain, and improve the health of all Minnesotans, a seamless system for the communication of information and access to knowledge is essential. Clear and compelling evidence shows the value of effective implementation of information technology in and across public health organizations.¹ In an increasingly automated world, rapid detection of problems, rapid communication, and rapid response to any event with public health consequences is now an essential activity.

The MN-PHIN is a component of the larger Minnesota e-Health Initiative, a statewide public-private collaboration whose aim is to accelerate the use of health information technology in Minnesota to improve health and safety. Its goal is to make the information needed for good health decisions available whenever and wherever health decisions are made. This report includes three strategies and seven recommendations for strategic action to improve the public health, safety, and

¹ Government Accounting Office, 2003, National Institute of Medicine (IOM) Reports, 2000, 2002, 2004.

quality of services provided through local public health departments and the Minnesota Department of Health (MDH). The plan includes preliminary cost estimates for the planning and development of a statewide system.

Specific strategies are:

1. Integrate information systems to support public health practice and prevention.
2. Interconnect local, state, federal, and key partners.
3. Make personalized prevention and public health information and knowledge available to consumers.

Recommendations for strategic action are:

- a. Establish a joint state-local governance structure.
- b. Identify policy reform needed to implement and integrate information systems, stimulate capital investment, and ensure sustainability.
- c. Adopt national data and technical standards.
- d. Establish uniform policies and practices to ensure protection of confidentiality and security of health information.
- e. Improve and integrate software applications that support the local public health essential activities and statewide public health programs.
- f. Provide training for public health leaders and staff in the core competencies of public health informatics.
- g. Implement MN-PHIN as an integral part of the Minnesota e-Health Initiative.

The preliminary two-year cost estimates for Phase 1, with a state and local component, is \$1.38 million.

This Minnesota Public Health Information Network (MN-PHIN): Roadmap and Recommendations for Strategic Action report has been prepared in accordance with the Laws of Minnesota 2004, chapter 279, article 11, section 8. This report fulfills the directive by the 2004 Minnesota Legislature to MDH to prepare a plan for the development and implementation of a statewide public health data management system in cooperation and consultation with representatives of local public health departments.

The State Community Health Services Advisory Committee (SCHSAC) oversaw the production of this report throughout 2004. In particular, work was carried out by the SCHSAC Strategic Plan Subcommittee, which consisted of representatives from local public health departments, the MDH, and others with knowledge of health information technology. The Chair of the Strategic Plan Subcommittee was Karen Zeleznak, Director of the Bloomington Division of Public Health.

Further work will be performed in the spring of 2005 to carry out the strategic actions outlined within this report.

Introduction

In Minnesota, a partnership of state and local public health departments have the unique responsibility of protecting and improving the health of the community. This is quite different from the medical approach, which treats people one at a time. But to do their jobs effectively and efficiently, public health professionals, state, and local health officials, policymakers, and other public health partners need timely, accurate, and reliable information about the people they serve.

This report highlights the health information challenges facing public health today, the opportunities the current environment presents for addressing these challenges, a vision for a Minnesota Public Health Information Network, and a Roadmap and Recommendations for Strategic Action. It includes cost estimates for the next nine years and a call to action.

The report recommendations are consistent with the Minnesota “Drive to Excellence” initiative

aimed at providing modern, comprehensive and user-friendly access to state services; ensuring a more secure operating environment to safeguard information and citizen privacy; and decreasing the administrative cost of government while increasing the quality and efficiency of public services.

The report was created by staff representing local public health departments, the Minnesota Department of Health (MDH), the Public Health Informatics Institute (a nonprofit organization), and other public health information technology experts, based on information collected through meetings, interviews, and surveys.

Health Information Challenges for Public Health

Public health today faces challenges that, in turn, present opportunities for transformation.

- Recent events have underscored the urgent need for public health, healthcare, and the public to have access to and be able to share comprehensive, timely, accurate information. Terrorist acts against our country, anthrax incidents, and SARS and West Nile outbreaks have turned the spotlight on the huge deficit in information system capacity and the limited ability to communicate across systems that currently exists in most public health departments.

- Public health officials’ need for rapid access to critical information – lab results, disease reports, birth certificates, disease (surveillance) data, preparedness data and knowledge sources – has never been greater. Officials rely on speedy technology to gather information, send it where it is needed, and store it securely. Rapid response using data is essential to controlling epidemics and dispelling worries.

- Technology continues to advance at great speed, and the opportunity for positive impact on the effectiveness, efficiency, and quality of health within our communities is

tremendous. Yet keeping up with technology has become a necessary challenge and a responsibility for state and local health departments. Each purchase decision requires research and review, installation, training, and oversight. However, the challenge of upgrading current software applications to contemporary integrated and interconnected systems has been overwhelming for many and cost prohibitive for most local health departments.

Local and state public health professionals in Minnesota have a long history of using health information and health information technology as tools to address every day and emerging public health challenges. (See Appendix A, *Stories from Across Minnesota*.) Over the past several years, however, this committee and others have documented the limitations and gaps of Minnesota’s public health information systems in addressing the state’s public health concerns and challenges.

Information for Health

Population health improvement requires the collection of timely, accurate, and detailed information that enables assessment of community health, risk factors, research, and the reporting of critical findings back to public and private officials and the public in ways that are useful to decision-making.

State of Public Health Information Technology in Minnesota

The Minnesota public health system relies on effective coordination and collaboration between state and local public health and partners. The need for rapid access to critical information – lab results, disease reports, surveillance data, birth certificates preparedness data and knowledge sources – has never been greater. The need for the speed provided by electronic exchange is growing. As public health officials seek to control epidemics and dispel worries, they rely on technology to gather information, send it where it is needed, and store it securely – in a matter of hours, not days. In an increasingly automated world, rapid detection of problems, rapid communication, and rapid response to any event with public health consequences is now an essential activity.

The health information flow among partners in Minnesota, however, is complex. Fifty-two Community Health Boards (comprising 87 counties and four city public health departments) interact with program staff in seven divisions at MDH. MDH currently relies on a complex array of over 65 information systems to support information management at the state level. Each local public health (LPH) department utilizes 12-33 different, unconnected applications. Although a number of systems and applications are continuously being developed at both (see Appendix B, *Examples of New or Evolving Public Health Information Systems in Minnesota*), relatively few meet the interconnectivity and uniform functional requirements of today's public health professionals, public health officials, their partners, or the public.

Most notably, an estimated 2 percent of state and local applications and systems comply with national standards for linking systems electronically. This deficit has multiple consequences. Silo applications used by MDH and LPH departments

require duplicate entry and complex manual transfer of information, and individual custom programs to transfer the data electronically often are needed. This results in inaccurate and untimely data for public health decision-making, as well as poorly utilized staff. Additionally, it limits information sharing between MDH and LPH departments and with community partners, healthcare organizations, or other authorized partners. Similarly, lack of statewide standards for strong security, login processes, and encryption require multiple security processes that are expensive to operate and administer.

Appendix C, *Minnesota Public Health Information: Challenges, Solutions, and Gaps*, summarizes many of the challenges, solutions, and gaps in the state's health information technology. Some are technological in nature,

while others are organizational. A common theme is the limited capability for electronic access and exchange within the public health system.

Some challenges are organizational in nature. Less than 5 percent of LPH departments and 10 percent of MDH staff have had training on national informatics

practices. The organizational processes and metrics to assess the status of LPH and MDH health information technology do not exist. Activities are focused on single applications, rather than cross-department applications, resulting in duplicative expenditures on information technology.

Another major challenge is the lack of applications supporting community-focused public health and prevention profiles. Accessing existing statewide data often requires separate special requests from programs, and even MDH access is limited. Data from other community agencies is rarely included. Before such profiles can be developed, however, LPH departments must reach agreement upon requirements for a community profile.

Preliminary Results of Minnesota LPH Department Survey

- 900 data sets – (>1 million transactions/clients per year)
- ~ 500 applications (12 - 33 range)
- ~ 200 locally created applications
- ~ 90% use CHAMP, CareFacts, or PH-DOC
- ~ 8 "silo" State and Federal applications
- ~ 2% of applications comply with standards for connecting

N = 45 / 91 LPH cities / counties to date

Public Health Information Technology: How Minnesota Compares

Minnesota is not alone in facing these challenges. Numerous states are already investing in comprehensive, integrated statewide health information systems that better meet state and local public health needs for timely, accurate, and secure information, as well as the needs of healthcare and other community partners. These programs are also investing in the organizational changes needed to ensure success and financial sustainability.

In **Pennsylvania**, Pennsylvania's National Electronic Disease Surveillance System (PA-NEDSS), a statewide electronic disease reporting application, establishes a near real-time, secure communication link between laboratories, hospitals, medical practices, local public health departments, and the state department of health. PA-NEDSS seeks to improve the timeliness and accuracy of disease reporting and expand public health infrastructure to improve response to possible bioterrorism attacks. Over 2,000 individuals currently access PA-NEDSS.

Other states, such as Utah, Florida, California, North Dakota, and South Dakota have implemented similar systems. In contrast, **Minnesota's** disease surveillance systems are not currently interconnected. Local health departments are unable to access case management information, which leads to inefficiencies and can ultimately delay response time to preventable disease outbreaks.

In **Missouri**, community profile data in such areas as chronic disease, unintentional injuries, and cause of death are available online for public health officials, the healthcare community, and the public through the Missouri Information for Community Assessment (MICA) system. Each community data profile table provides data on 15-30 indicators for each county or city selected. Information provided includes the number of events, county/city rate, statistical significance, quintile ranking, and the state rate. The user can access resource pages that provide definitions of risk factors, condition

description, intervention strategies, state and community resources and programs, published reports, and related web sites. The community-specific information is used for improving policy and decision-making.

In contrast, **Minnesota** has developed the Minnesota Vital Statistics Interactive Queries (I.Q.), a web-based query system that will query births, deaths, and population. An expansion to support queries for data on other areas such as morbidity, healthcare utilization, chemical health indicators, environmental health, and maternal and child health is needed and readily available if funded. Modern geographical information systems (GIS) like those used by South Carolina, New York, and Virginia need to be accessible to Minnesota decision makers as well. The consequence of not funding these systems is that state and local public health and policy makers must rely on out-of-date information or expend scarce resources to make decisions based on community-specific information.

In **Rhode Island**, KIDSNET provides automated public health management and follow-up for children's preventive health services, links primary care health providers to the health department, and improves contacts with families and children. The system integrates information from nine state health department programs – immunizations, newborn developmental risk, newborn hearing, metabolic screening, childhood lead poisoning, vital records, early intervention, home visiting, and WIC. Information is used by healthcare providers, schools, HeadStart programs, home visiting agencies, public health officials, as well as public health program staff.

In contrast, **Minnesota** collects this same information about its child health programs using independent software programs, and little, if any, information is interconnected. Consequently, public health professionals and officials do not always have access to critical child development information when working with families in our communities or have access to timely community profiles when needed for policy decision making.

Health Information Opportunities

A National Movement

The limitations of Minnesota's state and local public health information systems are typical. They illustrate why there is growing momentum at the federal, state, and local levels to adopt crosscutting and unifying initiatives to improve health information system interconnections and technical and organizational infrastructure. Some initiatives are targeted to improving healthcare quality, and others to improving public health. Still others recognize that collaboration between the two sectors is fundamental to meeting the nation's health needs.

Sponsors of health information systems infrastructure projects include federal and state agencies. The National Health Information Infrastructure (NHII) initiative of the Department of Health and Human Services is the most encompassing of the federal initiatives. It proposes a network of interoperable systems covering clinical, personal, research, and public health information with the goal of improving the effectiveness, efficiency, safety, and overall quality of health and healthcare in the United States. An initial focus of the NHII is the development of collaborations known as Regional Health Information Organizations (RHIOs). A number of RHIOs comprising healthcare organizations and partners, including public health, are forming around the country.

Funding Opportunities for Public Health Information Technology

Federal and state government agencies, as well as private foundations, are funding health information system initiatives that can help patients receive necessary and timely medical treatment, reduce medical errors, and enable public health officials to more quickly identify and respond to threats from naturally occurring diseases and potential bioterrorism attacks. As a result, states and private healthcare partners are scrambling to compete for the limited funding for health information technology (HIT) funding.

- While the majority of this funding is targeted to advancing HIT adoption among healthcare providers (individuals and organizations), public health will also benefit – if it is at the table as a partner in these initiatives. Making health information readily accessible to consumers is also a primary objective of these initiatives.
- The Robert Wood Johnson Foundation is supporting collaborations among states to develop public health information infrastructure. Minnesota is one of 26 states participating in a collaboration to develop infrastructure for public health laboratory information management systems (LIMS).
- The limited funding provided by CDC has remained largely categorical, that is, supporting specific program objectives and a national view of PHIN. It is up to individual states to redistribute that funding to address cross-agency integration needs for local and state health departments.

Minnesota e-Health Initiative and Minnesota Public Health Information Network

In Minnesota, the e-Health Initiative, a partnership of the Minnesota Department of Health, local public health departments, and healthcare organizations, is poised to ride this wave of support. The initiative has four strategic goals: inform clinical practice, interconnect clinicians, personalize care, and improve population health. The Minnesota Public Health Information Network (MN-PHIN) represents the fourth goal.



Figure 1. Four Dimensions of Minnesota's e-Health Initiative

Minnesota e-Health is a statewide public-private collaboration to accelerate the use of health information technology in Minnesota. Its goal is to make the information needed for good health decisions available whenever and wherever health decisions are made. It encompasses four dimensions representing users of health information: Public Health (state and local), Clinical (healthcare providers and health plans), Consumers (all of us), and Policy and Research (health education and research institutions). The maximum value is realized for "all of us" when we share information across all four dimensions.

Vision for Minnesota Public Health Information Network (MN-PHIN)

The Minnesota Public Health Information Network (MN-PHIN), a component of the Minnesota e-Health Initiative, provides the timely and accurate information that enables public health professionals, policymakers, and community partners to efficiently and effectively respond to community health threats, protect the public from serious but preventable diseases or injury, and carry out their responsibilities to make Minnesota communities healthier places to live. It also enables consumers to access the public health and prevention information they need to make wise health decisions.

MN-PHIN:

- Is a statewide network of interconnected, electronic health information systems.
- Is focused on the health of communities.
- Is collaboratively developed by the Minnesota Department of Health (MDH) and local public health departments.
- Provides the tools and strategies that enable MDH and local public health departments to use IT resources more effectively and cost efficiently.
- Is driven by community and state needs.
- Employs an incremental approach in achieving its vision.
- Leverages existing information systems.
- Facilitates strategic development of new information systems.
- Supports electronic exchange of data.
- Safeguards confidentiality and security of information.

Roadmap for Strategic Action: Minnesota Public Health Information Network (MN-PHIN)

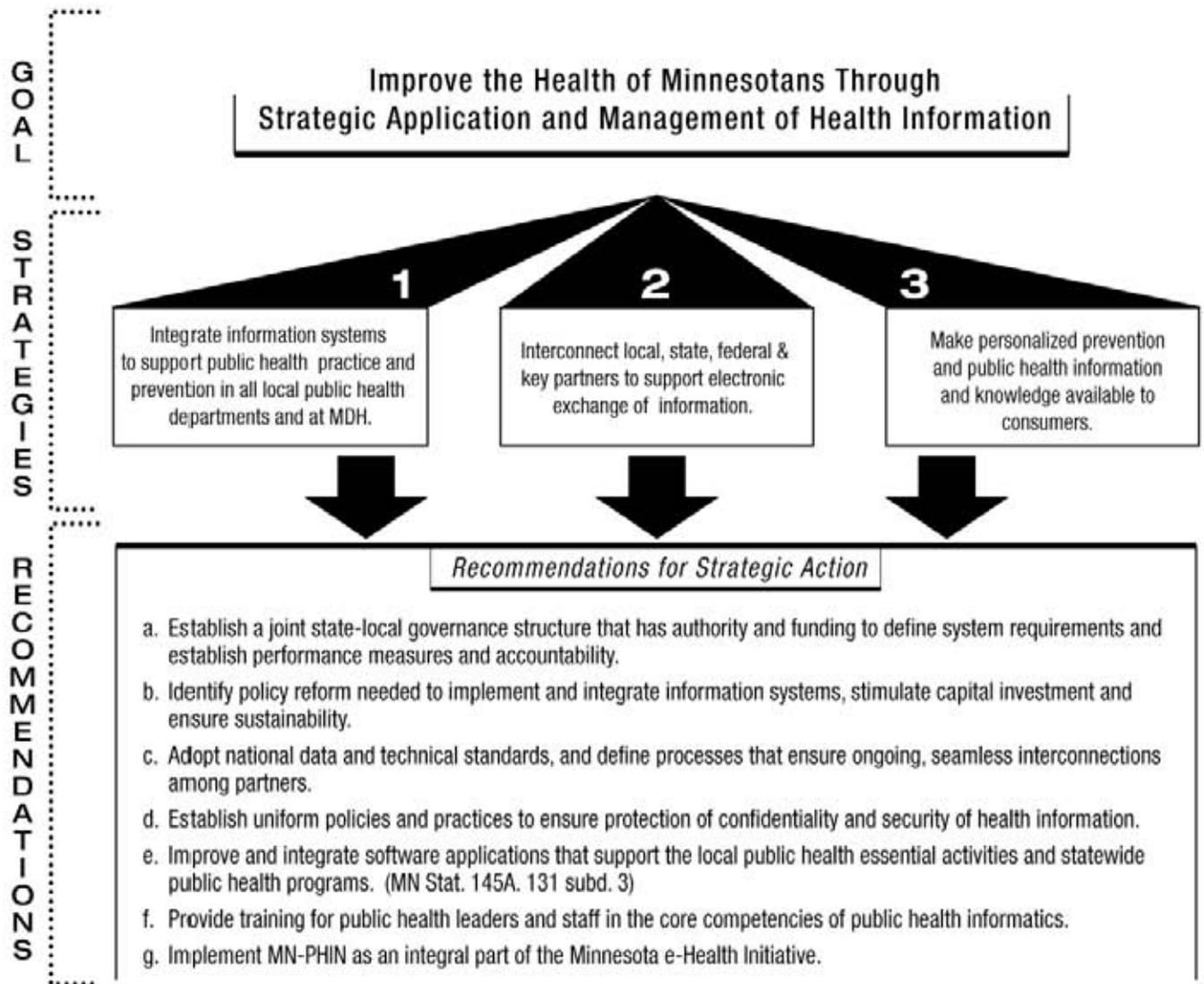


Figure 2

Roadmap for Strategic Action: Minnesota Public Health Information Network (MN-PHIN)

The *Roadmap for Strategic Action* outlines the goal, three strategies, and seven key recommendations for developing MN-PHIN, a comprehensive Minnesota public health information network. All were informed by input from staff of local public health departments and MDH, a survey of local public health information systems, and experts in public health information technology. By design, the *goal* is ambitious and the three *strategies* are broad. They are consistent with federal health information infrastructure initiatives and the Minnesota e-Health Initiative. The *recommendations* are first steps in carrying out these strategies.

Goal

The goal of Minnesota's *Roadmap for Strategic Action* is to improve the health of Minnesotans through strategic application and management of health information.

Strategies

1. Integrate information systems to support public health practice and prevention in all local public health departments and at MDH.

Public health professionals need access to information and knowledge to support public health and prevention decision-making. Implementing efficient, effective, integrated information systems in each LPH department and at MDH will improve the quality and efficiency of public health work. In particular, it will provide a mechanism to LPH departments and MDH for reporting service delivery results and health outcomes.

2. Interconnect local, state, federal, and key partners to support electronic exchange of information.

It is essential to ensure electronic exchange of vital information by interconnecting federal, state, and local public health departments and connecting with key partners. This will allow information to follow clients from one point to another, as necessary, for public health and prevention efforts. This requires implementing compatible applications and an infrastructure based on common vocabulary and data standards to help exchange critical health information when vital individual or public health or prevention decisions are needed.

3. Make personalized prevention and public health information and knowledge available to consumers.

Consumer-centric prevention information and knowledge is essential to good decision-making and informed consumer choices. This strategy encourages the use of personal health records and prevention information that support healthy behaviors.

Recommendations

Seven recommendations (a-g) were developed; all apply across the three strategies. They address governance, policy, standards, confidentiality and security, the development of integrated applications, training, and finally, MN-PHIN as an integral part of the Minnesota e-Health Initiative.

a. Establish a joint state-local governance structure that has authority and funding to define system requirements and establish performance measures and accountability.

An effective governance structure is crucial for guiding the development and operation of information systems. A joint MDH-LPH collaborative governance structure/steering committee should be established to set direction and priorities for MN-PHIN; to take into account stakeholder perspectives; to ensure performance; and to exercise stewardship over public resources. Good governance can also shape policies that facilitate information technology innovation and resourcefulness. Governance in this context includes the following activities: (1) defining functional outcomes for MN-PHIN, (2) creating accountability, (3) setting priorities, (4) making major policy decisions, and (5) overseeing allocation of resources.

b. Identify policy reform needed to implement and integrate information systems; stimulate capital investment and ensure sustainability.

Numerous barriers to implementation of integrated systems have been identified. They include technology, financial, organizational, privacy, and limited use of standards. Policy changes are needed to overcome these barriers. Policies should be adopted that encourage capital investment in information systems and establish a sustainable funding and organizational commitment.

c. Adopt national data and technical standards, and define processes that ensure ongoing, seamless interconnections among partners.

A joint MDH-LPH effort should be established to review, select, adopt, and implement national standards. This includes a process for monitoring national standards and providing feedback into the national standards development process.

d. Establish uniform policies and practices to ensure protection of confidentiality and security of health information.

A variety of practices currently exist at MDH and at LPH departments for the collection, access, and distribution of information. A process for harmonizing policy and processes that support

state and federal requirements across the public health system should be established and linked to compliance with Minnesota's data practices act and federal HIPAA requirements.

e. Improve and integrate software applications that support the local public health essential activities and statewide public health programs. (*MN Stat. 145A. 131 subd. 3*)

LPH departments use considerable resources to manage dozens of software applications that have only limited or no limited interconnectivity. The power and value of integrated information systems should be employed, beginning with a project to define the functional specifications for LPH department applications. A parallel project to identify opportunities for integration of MDH applications internally and with LPH department systems should also be initiated. The initial efforts should focus on information systems involving child health issues.

f. Provide training for public health leaders and staff in the core competencies of public health informatics.

Reports from the Institute of Medicine, the Public Health Informatics Institute, CDC and others highlight the informatics skills public health professionals need in this information age. As an emerging discipline, training in this area is just beginning and should be actively expanded. Education and training for informatics competencies should proceed in a systematic and structured fashion for MDH and LPH department staff.

g. Implement MN-PHIN as an integral part of the Minnesota e-Health Initiative.

It is essential that MN-PHIN be part of the broader Minnesota e-Health efforts in order to leverage resources and extend organizational partnerships with the healthcare system. Minnesota e-Health is a statewide public-private collaboration to accelerate the use of health information technology in Minnesota. Its goal is to make the information needed for good health decisions available whenever and wherever health decisions are made. It encompasses four dimensions representing users of health information: Public Health (state and local), Clinical (healthcare providers and health plans), Consumers (all of us), and Policy and Research (health education and research institutions). The maximum value is realized for all when we share information across all four dimensions.

Cost Estimates for MN-PHIN

Approach

The Minnesota Public Health Information Network comprises a complex set of multi-year projects in three phases over a span of nine years. Each successive phase builds on the foundation of the previous work.

Because these projects utilize common definitions and standards, significant progress can be made through incremental development and implementation. MN-PHIN is not an “all or none” single application. The approach will leverage existing applications, and ensure state and local public health activities will continue while new systems are developed.

Costs estimates are provided for the Phase I only (see Table 1, page 14). Estimates for successive phases will be developed in Year 2 of Phases 1 and 2, based on work accomplished in those phases.

Phase 1 (July 2005 – June 2007)

Phase 1 presents the recommendations in two groups for the purpose of estimating costs.

1. Recommendations *a, b, c, d, f* and *g* should be implemented as part of joint MDH – LPH projects. The cost estimate assumes 1.0 FTE project manager and 0.5 FTE project staff are needed to accomplish this work in the timeframe specified. Also included are contracts for specific technical and informatics support.
2. Recommendation *e* calls for integrated software applications. The cost estimates assume two parallel efforts, one for LPH departments (2a) and the second for MDH applications (2b). The cost estimates propose projects to create functional requirements and logical design documents in each instance.
 - 2a. The LPH department functional requirements project will prepare detailed functional requirement and data and technical specifications needed to meet public health responsibilities, ensure interoperability among LPH department and with state and federal agencies, and better inform consumers. Significant savings will be achieved by using a statewide collaborative approach to development. Two FTEs and a contract for project management and technical and informatics assistance are proposed.
 - 2b. The MDH application integration project will prepare detailed functional requirements and data and technical specifications to ensure MDH connectivity with LPH software applications. The initial project focus is on LPH interconnection to MDH programs with child health information, including WIC, Immunization, Lead Screening, Newborn Metabolic and Hearing Screening, as well as MN-NEDSS (disease surveillance systems), Environmental Health, Vital

Six Areas of Public Health Responsibility

- Assure an adequate local public health infrastructure
- Promote healthy behaviors and healthy communities
- Prevent the spread of infectious disease
- Protect against environmental health hazards
- Prepare for and respond to disasters, and assist communities in recovery
- Assure the quality and accessibility of health services

Records systems, the MDH Laboratory Information Management System, and the Department of Human Services systems. Two FTEs and a contract for project management and technical and informatics support are proposed.

Projects 1, 2a, and 2b will utilize subject matter experts, consultants, and staff to create, review, and publish requirements, definitions and logical design documents that provide a basis for evaluating existing information systems and serve as the framework for system development prioritization.

Phase 2 (July 2007 – June 2009)

Phase 2 will pilot implementation of enhancements to the systems determined to be priorities in Phase 1. Costs and resources needed for specific enhancements to MDH and LPH department systems will be prepared in Phase 1, Year 2. A business case and cost analysis will be conducted for expanding to all LPH departments and additional MDH systems.

Phase 3 (July 2009 – June 2014)

Phase 3 will expand implementation of MDH and LPH systems based on knowledge gained from the pilot efforts in Phase 2. Cost and resources needed for software application enhancements will be made in Phase 2, Year 2.

Table I. MN-PHIN Costs: Phases 1-3 (2005-2014)

Phase / Timing	Focus	Preliminary Cost Estimates
<p>Phase 1 Years 1-2 (2005–2007)*</p>	<p>1. Combined MDH – LPH department efforts (recommendations <i>a, b, c, d, f, and g</i>)</p> <p>Establish Joint MDH – LPH Governance Structure</p> <ul style="list-style-type: none"> • Identify policy reforms needed to support implementation • Establish process for monitoring and using standards • Harmonize privacy / security practices • Establish informatics training opportunities • Integrate with Minnesota e-Health Initiative <p>2a. County/City LPH System Application (recommendation <i>e</i>) Prepare detailed functional requirements and data and technical specifications for LPH department to meet essential services</p> <p>2b. MDH Information Systems Applications (recommendation <i>e</i>) Prepare detailed functional requirements, data and technical specifications to ensure LPH connectivity with key MDH and other state information systems such as:</p> <ul style="list-style-type: none"> • Child health information systems (including WIC, Immunization, Lead Screening, Newborn Metabolic and Hearing Screening) • MN-NEDSS (Disease surveillance systems) • Environmental Health • Vital Records systems • Community Health Department reporting • MDH Laboratory Information Management System • Department of Human Services Systems • Other state agencies (e.g., MN Department of Education, MN Department of Corrections) 	<p>\$150,000 - \$240,000 (1.5 FTE and contracts)</p> <p>\$490,700 – \$550,800 (2 FTE staff and contracts)</p> <p>\$470,400 – \$590,300 (2 FTE staff and contracts)</p>
<p>Phase 2 Years 3-4 (2007–2009)</p>	<p>Pilot to Upgrade County/City LPH Systems</p> <ul style="list-style-type: none"> • Enhance city/county applications as a pilot test in several settings • Upgrade priority MDH systems • Conduct Phase 2 evaluation and develop business and cost analysis for expanding to all LPH departments and additional MDH systems 	<p>To be estimated in Phase 1</p>
<p>Phase 3 Years 5-9 (2009–2014)</p>	<p>County/City LPH Systems Expand system implementations statewide to all city and county LPH departments</p> <p>State Systems Implement upgrades for interconnection to all city and county LPH departments</p>	<p>To be estimated in Phase 2</p>

* Estimates based on FY 2006 costs.

Conclusion

The strategic application and management of modern health information technology has the potential to improve the health of all Minnesotans. *The time is right for the Minnesota Public Health Information Network.*

- All levels of government – federal, state, and local – recognize that speedy electronic exchange of health information is critical to the mission of public health agencies to protect the public and respond to public health threats.
- Health information technology initiatives are underway across the nation. Healthcare providers (individuals and organizations) are increasingly forming partnerships with public health agencies to address comprehensively community and regional health information needs.
- Sophisticated software application technologies are now available to meet the needs of public health, but leadership, organizational commitment, and multi-agency collaboration are needed to move forward.
- Initial funding investments now will position state and LPH departments to take advantage of future multiple funding sources.

The vision for MN-PHIN will be realized incrementally over the next decade through a well-conceived strategic process developed collaboratively by MDH and LPH departments. However, it is important to begin to put the fundamental building blocks in place now. The will, funding, and technology to provide timely, accurate, reliable information that enables public health staff to do their jobs effectively and efficiently are aligned. By acting now, the Minnesota Public Health Information Network can leverage activities of national initiatives, the Minnesota e-Health Initiative, other state agencies' efforts, as well as funding opportunities. We must be prepared to take advantage of these opportunities and to work collaboratively with these partners.

Appendices

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Appendix A. Stories From Across Minnesota

Every day of every year, staff of local health agencies and the Minnesota Department of Health (MDH) work to help keep all citizens healthy and help assure the public is protected from serious disease or injury. Information technology provides the information they need to do their jobs.

ACROSS MINNESOTA – Information systems to measure progress toward health goals require investment and a strategic planning and development process. From 2000-2002, two MDH initiatives supported by tobacco settlement funding, the Minnesota Youth Tobacco Prevention Initiative (MYTPI) and the Youth Risk Behavior (YRB) program, planned and developed the E-Chronicle, a comprehensive, web-based reporting system. The information system enabled grantees, including local public health agencies and community-based organizations across the state, to efficiently and effectively input data and measure progress against their stated goals. Through a collaboration of MDH program staff, MDH IT staff, and consultants, the MDH E-Chronicle was developed to serve multiple MDH programs' monitoring needs by creating a flexible system that also could adapt to their needs. The Teen Pregnancy Prevention (MN ENABL) programs as well as other MDH programs continue to use the outcomes-driven system to monitor their programs' progress, generate summary reports at local, regional and statewide levels, compare efforts statewide, and provide the information that assist program staff in program quality improvements. Jennifer Ellsworth, acting program manager for the MDH Tobacco Free Communities program, oversaw the intensive planning, development, and implementation of E-Chronicle. She says, "Had we not taken the time, it would not have been as useful."

In contrast, MDH received substantial funding in 2000 and again in 2001 to support home visiting programs in the state's 87 counties and 11 tribal governments. Although the funding was substantial, even with significant decreases in funding, home visiting programs continue today. In the first year of the program an assessment of the various types of information systems that were in use throughout the local public health system was completed. In an effort to utilize existing data systems at the local level and as a result of limited funding for strategic planning and/or database development, it was decided to have local public health agencies collect required data elements in their own data systems and report the data to MDH in a stand alone database. Local public health and tribal governments received technical assistance via interactive videoconferences and individual site visits from home visiting staff. In addition, administrative guidelines that included standard definitions for the program were created. Unlike E-Chronicle, funding did not allow for dedicated resources for staff for ongoing training, technical assistance, or database management. Another challenge created was that, as the program matured, and as feedback from local public health and the tribes was collected, changes in the data collection system were necessary thereby complicating the ability to compare some of the data from year to year.

Jill Briggs, Maternal Child Health Section Manager, MDH, the first coordinator for TANF Home Visiting, noted, "I'm certain that if we had had more funding and more time for planning and development, we would have developed an information system that clearly illustrated the positive outcomes of home visiting. It has been said that 'What gets measured, gets done.' If funders want to measure what gets done, then they need to support the development of

information systems by designating funds not only for the program implementation, but also for information system planning, training, and technical assistance.”

DAKOTA COUNTY – Integrating data saves time and helps seniors. Local public health department nurses and social service staff screen approximately 500 individuals annually who are age 65 and older, under 65 and disabled, and are at risk for nursing home or hospital placement. Case management services are provided by the local public health department for eligible participants in need of home services such as respite care, personal care, and delivered meals. The data about the services they receive, however, reside in separate public health and social services databases, impeding sharing of information about the clients that both departments serve. Lila Taft, Health Planning Coordinator for Dakota County Public Health Department, says that’s about to change – for the better. In January 2005, public health and social service staff will begin to enter data into the same information system, enabling staff from both agencies to access important information about the individuals they serve. Information about needs resides in still another state database; county staff is beginning to retrieve that county data in order to better understand the needs of elderly across the county.

ACROSS MINNESOTA – Access across agencies improves service and is efficient. The state’s Women, Infants and Children (WIC) information system currently contains information on pregnant women, new mothers, and their children who are provided WIC services at clinics across Minnesota. Just a few years ago, a client who received WIC nutrition vouchers, counseling, or referral to health services in Minneapolis, for example, would have to be re-certified for the WIC program if she moved to another county or tribal jurisdiction. Not only would all the information about her need to be re-entered into the system, she also would have to wait until the paper work from her previous WIC clinic arrived at the new one before food vouchers could be issued. Today, all WIC clinic staff can locate her record in a matter of minutes, verify her eligibility, and issue vouchers or provide services that ensure continued good nutrition for her and her child.

ST. LOUIS COUNTY – Rapid access to data and information is essential for outbreak detection, control and prevention. In early June 2004, local clinical laboratories submitted samples of *E. coli* 0157:H7, a potentially deadly bacteria, to the MDH Public Health Laboratory. The samples were from two individuals who had become seriously ill; the cause was not yet known. Within four days, the MDH laboratorians had conducted DNA “fingerprinting” of the specimens and interviewed the victims. Epidemiologists were able to link the cases to the same food source: frozen steaks sold door-to-door.

The MDH laboratory, which serves as the Midwest regional laboratory for six states, then searched PulseNet, a national information network that links the regional labs. Through finding similar patterns on PulseNet, scientists can determine whether an outbreak is occurring, even if the affected persons are geographically far apart. The database had two matching cases reported from Michigan and Kansas. Within two weeks, four culture-confirmed and two probable cases of *E. coli* 0157:H7 were identified in Minnesota; three of the cases were hospitalized. Other outbreak-associated cases were confirmed in Kansas, Iowa, Michigan, and North Dakota. Just before the July 4 weekend, when thousands of families traditionally fire up their barbecues, a nationwide recall was issued for approximately 739,000 pounds of steaks that had been injected with meat tenderizer.

“The four cases served as an indicator of a larger problem,” says Dr. Kirk Smith, MDH epidemiologist. He notes that although it is difficult to say how much disease may have been prevented by the quick action of the public health scientists involved, “it was a textbook example” of how technology and information systems can help public health control outbreaks.

OTTER TAIL COUNTY – Technology is an essential tool for program assessment and targeting limiting resources. Each year, 400-500 babies are born in Otter Tail County. Fortunately, public health staff can identify the children who are likely to have developmental delays that can result in difficulties with communication, or fine or gross motor skills. Each birth certificate is reviewed for information about risk factors for developmental delays: low birth weight, premature birth, maternal smoking, drugs or alcohol use, and maternal age. Public health staff send questionnaires to high-risk families, asking about their child’s development. Children identified with delays are screened with the result that approximately 6 percent of all children born in Otter Tail County are referred to needed services, such as speech, physical, and occupational therapy, while they are still infants, instead of waiting for these problems to be identified in kindergarten.

The health department has been following children in this way for over 20 years, but with computerization of the information in the last three to four years, public health staff can now analyze data. Says Diane Thorson, Community Health Services Administrator for Otter Tail County, “We’re now looking at who has *not* returned the questionnaire,” which helps the public health staff identify children who may be at risk and falling through the cracks.

“It’s a valuable tool for assessing our early identification efforts,” says Ms. Thorson. “The percentage of children we identify and refer to services is comparable to the national average.”

DAKOTA COUNTY – Community specific information helps direct services to those in most need. When St. Paul experienced an outbreak of measles in 1999, neighboring Dakota County public health staff was ready to ensure the outbreak didn’t spread among their residents. Data about children who had contracted the disease indicated that the outbreak was principally among the Hispanic population, so the Dakota County Public Health Department used data showing the neighborhoods with the greatest number of Hispanic births to guide where they should locate immunization clinics. Although the outbreak subsided, health officials are ready to dust off the plan again.

SOUTHWEST MINNESOTA – Information technology unequivocally helps protect children and communities by keeping them healthy. In the late 1990s, the Southwest Regional immunization registry automatically generated and sent reminders to families to let them know their children were due for shots, sent recall notices to families when the shots were overdue to let them know their children were due for shots, and then sent recall notices when the shots were overdue. But when the registry moved to using the new web-based statewide Minnesota Immunization Information Connection (MIIC), reminders and recalls were deferred during the transition, and immunization rates quickly dropped. The rate for fourth dose of DTaP (diphtheria, tetanus and pertussis), for example, dropped from 74 percent in 1999 to 58 percent in 2001. Recalls have since resumed using MIIC; rates have risen to 65 percent and continue to climb. Although they have detected no increased incidence in the childhood diseases that immunizations protect against, physicians and public health officials know that children who are not getting reminders and shots are also missing their well child visits. Says Sandy Macziewski

of the Southwest registry, “We know the use of an information system to improve one area of preventive healthcare can have positive spillover effects to other areas of prevention and early detection.”

ACROSS MINNESOTA – Interoperability and statewide access improves service.

Throughout the past decade, local public health agencies, schools, and healthcare clinics have been working together to build regional immunization information systems (IIS), also called immunization registries. An IIS is a computerized, confidential information system that consolidates immunization histories from multiple sources in order to accurately determine what shots are still due. Each region had either developed or purchased their own IIS software application, with little compatibility among them and no ability to exchange and consolidate data among them. Health systems with clinics in different regions found they could not relate to a single IIS system. In 2000, the regions and MDH worked together to select a single, statewide, secure web-based IIS application that could meet everyone’s needs. This saved on redundant regional development costs, provided a single, web-based IIS application for clinics and schools to use, provided secure statewide access to immunization data, and ensured compatibility with national and state standards.

Appendix B. Examples of New or Evolving Public Health Information Systems in Minnesota

State systems used by the Minnesota Department of Health

- Statewide Electronic Birth Records (connects hospitals and counties)
- Statewide Electronic Death Records (connects mortuaries and medical examiners)
- Center for Health Statistics Data Access project (interactive queries project)
- State Health Alert Networks (rapid messaging using e-mail)
- Minnesota Electronic Disease and Laboratory reporting
- Minnesota Immunization Information Connection (MIIC) – statewide immunization registry
- Statewide Women Infants and Children (WIC) system
- Minnesota Statewide Laboratory Network, including the Statewide Laboratory Reporting Network (LRN)

Local systems and applications used specifically by local public health agencies

- Local Health Alert Networks (for timely and critical communications via e-mail)
- CHAMPS system (client management)
- PH-DOC software application
- CareFacts software application

Systems shared with other agencies

- Health Alert Network and Internet
- Immunization Registry (MIIC)
- Department of Human Services Systems (CATCH III, Medical Assistance eligibility)
- Infant Follow-along
- Women, Infant and Children (WIC) system

Appendix C. Minnesota Public Health Information Technology: Challenges, Solutions, and Gaps

Challenges	Solutions	Gap
<ul style="list-style-type: none"> ▪ Silo applications (MDH and counties) require duplicate entry, complex manual transfer of information. ▪ Local public health (LPH) departments use 12–33 different silo applications 	Upgrade applications; link applications using national standards	Estimated only 2% of applications support/use national standards for linking
Older, limited function applications and dozens of separate independent data sets results in inefficient use of state and local health department staff	Increase productivity with updated, integrated applications	<ul style="list-style-type: none"> ▪ MDH~160 data sets; LPH ~ 10-50 data sets/department ▪ Few state or local public health department applications funded for upgrade
Limited staff trained in informatics skills to support integration of health information technology into the organization	Implement training and education efforts focus on CDC informatics competencies	Estimated 5% of local staff and 10% of MDH staff has training on informatics competencies
Lack of system compliance with national vocabulary/technical standards	Upgrade systems to meet national standards	Estimated 2% of state and local systems compliant
Providers/partners required to adapt to multiple different, interfaces / authentication and log-on processes	<ul style="list-style-type: none"> ▪ Harmonize current access points and adopt and implement uniform access interface and log on ▪ Work with partners for design/training 	No process is in place to harmonize access points and processes for access
Electronic file exchange process varies across MDH, LPH departments, and partners. Still highly manual	<ul style="list-style-type: none"> ▪ Adopt and implement uniform exchange standards ▪ Work with partners to update systems 	<ul style="list-style-type: none"> ▪ 2 of 50 state systems use national standards ▪ 1 of 87 counties uses national standards
Lack of common consumer portal for secure access to information	Establish infrastructure and policies for access to information	No consumer portal exists for access
<ul style="list-style-type: none"> ▪ Lack of applications supporting community-focused public health and prevention profiles ▪ Accessing existing statewide data often requires separate special requests from programs ▪ Rarely includes cross-agency data 	Implement applications at LPH departments and MDH that integrate summary data into a community profile on demand for local decision-making; expand the current MDH system	<ul style="list-style-type: none"> ▪ MDH access is limited and does not include city information ▪ Lack of LPH specifications and requirements for information in a community profile
Limited use of automated mapping - geographic information systems (GIS)	Integrate GIS into applications	Automated GIS is integrated into less than 3% of the applications
High fiscal and organizational risk of failure with the deployment of complex LPH information systems	Spread the risk out and use best practices that support cross-LPH department collaborative approach to design, develop, implement	<ul style="list-style-type: none"> ▪ No state/local forum or process exists to support cross department activity ▪ Activities limited to single applications
Lack of systematic readiness assessment and health information technology status for LPH departments and MDH	Conduct a comprehensive readiness assessment for status of information systems	No process or standard metrics exist to assess readiness

Source: Workgroup communications and Survey of Local Public Health Data Set and Software Applications, 2004.

Appendix D. Minnesota Public Health Information Network (MN-PHIN) Membership List: Initiative Steering Committee and Strategic Plan Subcommittee

Initiative Executive Sponsors

Brenda Menier, Chair, Minnesota Local Public Health Association (LPHA)
Aggie Leitheiser, Assistant Commissioner, MDH
Heather Robins, Chair, Statewide Community Health System Advisory Committee (SCHSAC)
Mary Sheehan, Community and Family Health, MDH
Carol Woolverton, Assistant Commissioner, MDH

Initiative Steering Committee

Karen Zeleznak, Chair, Bloomington CHB
Pat Adams, Dakota County CHB
Liz Auch, Countryside CHB
Jill Briggs, Community and Family Health, MDH
John Clare/Elaine Collison, Infectious Disease Epidemiology, Prevention and Control, MDH
Mitchell Davis, MCH Advisory Task Force
Kristin Eggerling, Quin County CHB
Sue Hedlund, Washington County CHB
Vonna Henry, Sherburne County CHB
Martin LaVenture, Executive Office, MDH
Gloria Lewis, Office of Minority and Multicultural Health, MDH
Mary Manning, Health Promotion and Chronic Disease Prevention, MDH
Rina McManus, Anoka County CHB
Susan Mitchell, St. Paul-Ramsey County CHB
Karen Nelson, Cass-Todd-Wadena-Morrison CHB
Wendy Nelson, Information Systems and Technology Management, MDH
John Oswald, Center for Health Statistics, MDH
Colleen Paulus/Dan Wilson, Environmental Health, MDH
Jan Ringer, Carlton-Cook-Lake-St. Louis CHB
Cathy Sandmann, Blue Earth County CHB
Ted Seifert, Goodhue County CHB
Lila Taft, Dakota County CHB
Mary Wellik, Olmsted County CHB

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Strategic Plan Subcommittee

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Pat Adams, Dakota County CHB
Mary Jo Chippendale, Chisago County CHB
Betsy Clarke, Community and Family Health, MDH
Elaine Collison, Infectious Disease Epidemiology, Prevention and Control, MDH
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Ted Seifert, Goodhue County CHB
Mary Wellik, Olmsted County CHB
Dan Wilson, Environmental Health, MDH

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Appendix E. Acronyms and Glossary

Association of State and Territorial Health Officials (ASTHO)

Centers for Disease Control and Prevention (CDC)

Department of Health and Human Services (DHHS)

Geographic Information Systems (GIS)

Information systems that provide data displayed in by geographic formats such as many types of maps. Highly effective when rapid analysis of outbreaks and health threats and crisis exists, as well as in day-to-day program operations.

Health Information Technology (HIT)

The application of information processing involving both computer hardware and software that deals with the storage, retrieval, sharing, and use of healthcare information, data, and knowledge for communication and decision-making. Examples include using sophisticated software applications to help document and maintain client health records, electronic exchange of information, to provide prevention or clinical alerts and reminders, for provider order entry, nursing documentation, decision support systems, and disease surveillance and monitoring systems.

Interoperability

The ability of two or more information systems or components to exchange information and to use the information that has been exchanged.

Institute of Medicine (IOM)

Laboratory Reporting Network (LRN)

Minnesota Public Health Information Network (MN-PHIN)

National Health Information Infrastructure (NHII)

Public Health Informatics Institute (PHII)

Public Health Information Network (PHIN)

Consolidated Health Informatics (CHI) Initiative

One of the 24 Presidential eGovernment initiatives with the goal of adopting vocabulary and messaging standards to facilitate communication of clinical information across the federal health enterprise. CHI now falls under Federal Health Architecture (FHA).

Decision-Support System (DSS)

Computer tools or applications to assist physicians in clinical decisions by providing evidence-based knowledge in the context of patient-specific data. Examples include drug interaction alerts at the time medication is prescribed and reminders for specific guideline-based interventions during the care of patients with chronic disease. Information should be presented in a patient-

centric view of individual care and also in a population or aggregate view to support population management and quality improvement.

Electronic Health Record (EHR)

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

Federal Health Architecture (FHA)

A collaborative body composed of several federal departments and agencies, including the Department of Health and Human Services (HHS), the Department of Homeland Security (DHS), the Department of Veterans Affairs (VA), the Environmental Protection Agency (EPA), the United States Department of Agriculture (USDA), the Department of Defense (DoD), and the Department of Energy (DOE). FHA provides a framework for linking health business processes to technology solutions and standards, and for demonstrating how these solutions achieve improved health performance outcomes.

Personal Health Record (PHR)

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

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